
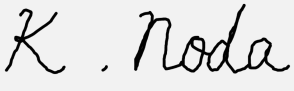






RADIO TEST REPORT

Test Report No. 14344153S-A-R2

Customer	JVCKENWOOD Corporation
Description of EUT	Monitor with Receiver
Model Number of EUT	DMX809S
FCC ID	IOMJ5284
Test Regulation	FCC Part 15 Subpart C
Test Result	Complied (Refer to SECTION 3)
Issue Date	September 21, 2022
Remarks	Wireless LAN (2.4 GHz band) part

Representative Test Engineer	Approved By
	
Shiro Kobayashi Engineer	Kazuya Noda Leader
 	
CERTIFICATE 1266.03	
<input type="checkbox"/> The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan, Inc.	
<input checked="" type="checkbox"/> There is no testing item of "Non-accreditation".	

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- This sample tested is in compliance with the limits of the above regulation.
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- This test report covers Radio technical requirements.
It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
- The all test items in this test report are conducted by UL Japan, Inc Shonan EMC Lab.
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- The information provided from the customer 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.: 14344153S-A

This report is a revised version of 14344153S-A-R1. 14344153S-A-R1 is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	14344153S-A	August 24, 2022	-
1	14344153S-A-R1	September 13, 2022	P.6 Correction of antenna gain of Bluetooth (BR / EDR) From: -6.0 dBi To: -12.3dBi
2	14344153S-A-R2	September 21, 2022	P.7 Correction of worst margin of Spurious Emission From: 7.6 dB To: 8.2 dB

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	JVCKENWOOD Corporation
Address	2967-3, Ishikawa-machi, Hachioji, Tokyo 192-8525 Japan
Telephone Number	+81-42-646-5525
Contact Person	Seigo Tsutsumi

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	Monitor with Receiver
Model Number	DMX809S
Serial Number	Refer to SECTION 4.2
Condition	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	No Modification by the test lab
Receipt Date	July 19, 2022
Test Date	July 19 to 26, 2022

2.2 Product Description

The EUT has following similar model:

Model No.	Difference from the base model
DMX809S	- (Tested model)
DMX8709S	Non HD Radio
KW-M785BW	Brand(JVC), Non HD Radio

General Specification

Rating	DC 12 V
Operating temperature	-10 deg. C to +60 deg. C

Radio Specification

Bluetooth (BR / EDR)

Equipment Type	Transceiver	
Frequency of Operation	2402 MHz to 2480 MHz	
Type of Modulation	FHSS (GFSK, $\pi/4$ DQPSK, 8 DPSK)	
Antenna Gain	-12.3 dBi	

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

Equipment Type	Transceiver	
Frequency of Operation	2412 MHz to 2462 MHz	
Type of Modulation	DSSS, OFDM	
Antenna Gain	-9.4 dBi	

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

Equipment Type	Transceiver	
Frequency of Operation	20 MHz Band:	5745 MHz to 5805 MHz
	40 MHz Band:	5755 MHz to 5795 MHz
	80 MHz Band:	5775 MHz
Type of Modulation	OFDM	
Antenna Gain	ANT0: 1.1 dBi, ANT1: 0.1 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 customer has declared that the EUT has complies with FCC Part 15 Subpart B as SDoC.

3.2 Procedures and Results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.10-2013 6. Standard test methods ISED: RSS-Gen 8.8	FCC: Section 15.207 ----- ISED: RSS-Gen 8.8	-	N/A *1)	-
6 dB Bandwidth	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ----- ISED: -	FCC: Section 15.247(a)(2) ----- ISED: RSS-247 5.2(a)	See data.	Complied a)	Conducted
Maximum Peak Output Power	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ----- ISED: RSS-Gen 6.12	FCC: Section 15.247(b)(3) ----- ISED: RSS-247 5.4(d)		Complied b)	Conducted
Power Density	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ----- ISED: -	FCC: Section 15.247(e) ----- ISED: RSS-247 5.2(b)		Complied c)	Conducted
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	8.2 dB 223.766 MHz, QP, Hori. Mode: Tx 11n-20 2437 MHz	Complied d), e)	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *2)
<p>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.</p> <p>*1) The test is not applicable since the EUT does not have AC Mains. *2) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02 8.5 and 8.6.</p> <p>a) Refer to APPENDIX 1 (data of 6 dB Bandwidth and 99 % Occupied Bandwidth) b) Refer to APPENDIX 1 (data of Maximum Peak Output Power) c) Refer to APPENDIX 1 (data of Power Density) d) Refer to APPENDIX 1 (data of Conducted Spurious Emission) e) Refer to APPENDIX 1 (data of Radiated Spurious Emission)</p>					
<p>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.</p>					

FCC Part 15.31 (e)

The EUT provides stable voltage constantly to the wireless transmitter regardless of input voltage. Instead of a new battery, DC power supply was used for the test. That does not affect the test result, therefore the EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

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

3.3 Addition to Standard

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
99 % Occupied Bandwidth	ISED: RSS-Gen 6.7	ISED: -	N/A	- a)	Conducted
a) Refer to APPENDIX 1 (data of 6 dB Bandwidth and 99 % Occupied Bandwidth)					

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

3.4 Uncertainty

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

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

Item	Frequency range	Uncertainty (+/-)			
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR	No. 4,5,6,8 SR
Conducted emission (AC Mains) LISN	150 kHz to 30 MHz	2.9 dB	2.9 dB	3.0 dB	2.9 dB
Radiated emission (Measurement distance: 3 m)	9 kHz to 30 MHz	3.2 dB	3.1 dB	3.1 dB	-
	30 MHz to 200 MHz	4.6 dB	4.6 dB	4.6 dB	-
	200 MHz to 1 GHz	6.0 dB	6.1 dB	6.1 dB	-
	1 GHz to 6 GHz	4.7 dB	4.7 dB	4.7 dB	-
	6 GHz to 18 GHz	5.2 dB	5.3 dB	5.3 dB	-
Radiated emission (Measurement distance: 1 m)	18 GHz to 40 GHz	5.4 dB	5.5 dB	5.5 dB	-
	1 GHz to 18 GHz	5.6 dB	5.6 dB	5.6 dB	-
	18 GHz to 40 GHz	5.8 dB	5.8 dB	5.8 dB	-

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector) SPM-06	1.2 dB
Power Measurement above 1 GHz (Peak Detector) SPM-06	2.0 dB
Power Measurement above 1 GHz (Average Detector) SPM-07	1.2 dB
Power Measurement above 1 GHz (Peak Detector) SPM-07	1.3 dB
Power Measurement above 1 GHz (Average Detector) SPM-13	1.3 dB
Power Measurement above 1 GHz (Peak Detector) SPM-13	1.3 dB
Spurious emission (Conducted) below 1 GHz	0.93 dB
Conducted emissions Power Density Measurement 1 GHz to 3 GHz	0.92 dB
Conducted emissions Power Density Measurement 3 GHz to 18 GHz	2.3 dB
Spurious emission (Conducted) 18 GHz to 26.5 GHz	2.3 dB
Spurious emission (Conducted) 26.5 GHz to 40 GHz	2.3 dB
Bandwidth Measurement	0.012 %
Duty cycle and Time Measurement	0.27 %
Temperature_SCH-01	0.93 deg. C.
Humidity_SCH-01	4.1 %
Temperature_SCH-02	2.0 deg. C.
Humidity_SCH-02	6.6 %
Voltage	0.97 %

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
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.

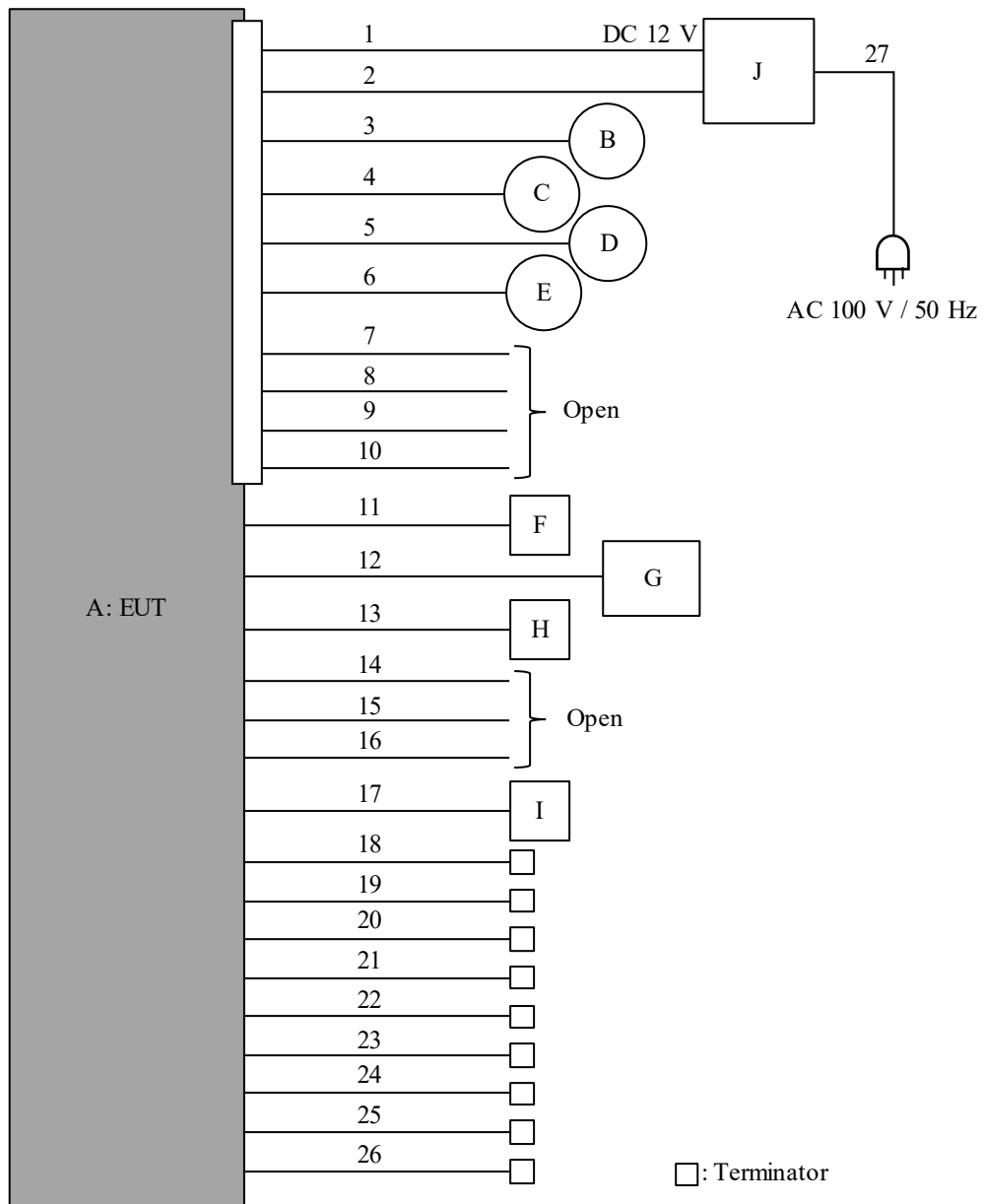
Mode	Remarks*
IEEE 802.11b (11b)	11 Mbps, PN9
IEEE 802.11g (11g)	54 Mbps, PN9
IEEE 802.11n 20 MHz BW (11n-20)	MCS 6, PN9
*The worst condition was determined based on the test result of Maximum Peak Output Power (Low Channel)	
*Power of the EUT was set by the software as follows; Power Setting: TPC: 4, Gain: 10 (Setting value) Software: Application Version: V104.RF10 System Version: V101 (Date: 2022.07 19, Storage location: EUT memory)	
*This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.	

*The Details Of Operating Mode(s)

Test Item	Operating Mode	Tested Frequency
Radiated Spurious Emission (Below 1 GHz), Spurious Emission (Conducted)	Tx 11n-20 *1)	2437 MHz
Radiated Spurious Emission (Above 1 GHz), 6 dB Bandwidth, Maximum Peak Output Power, Power Density, 99 % Occupied Bandwidth	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

<For Radiated Emission test>



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

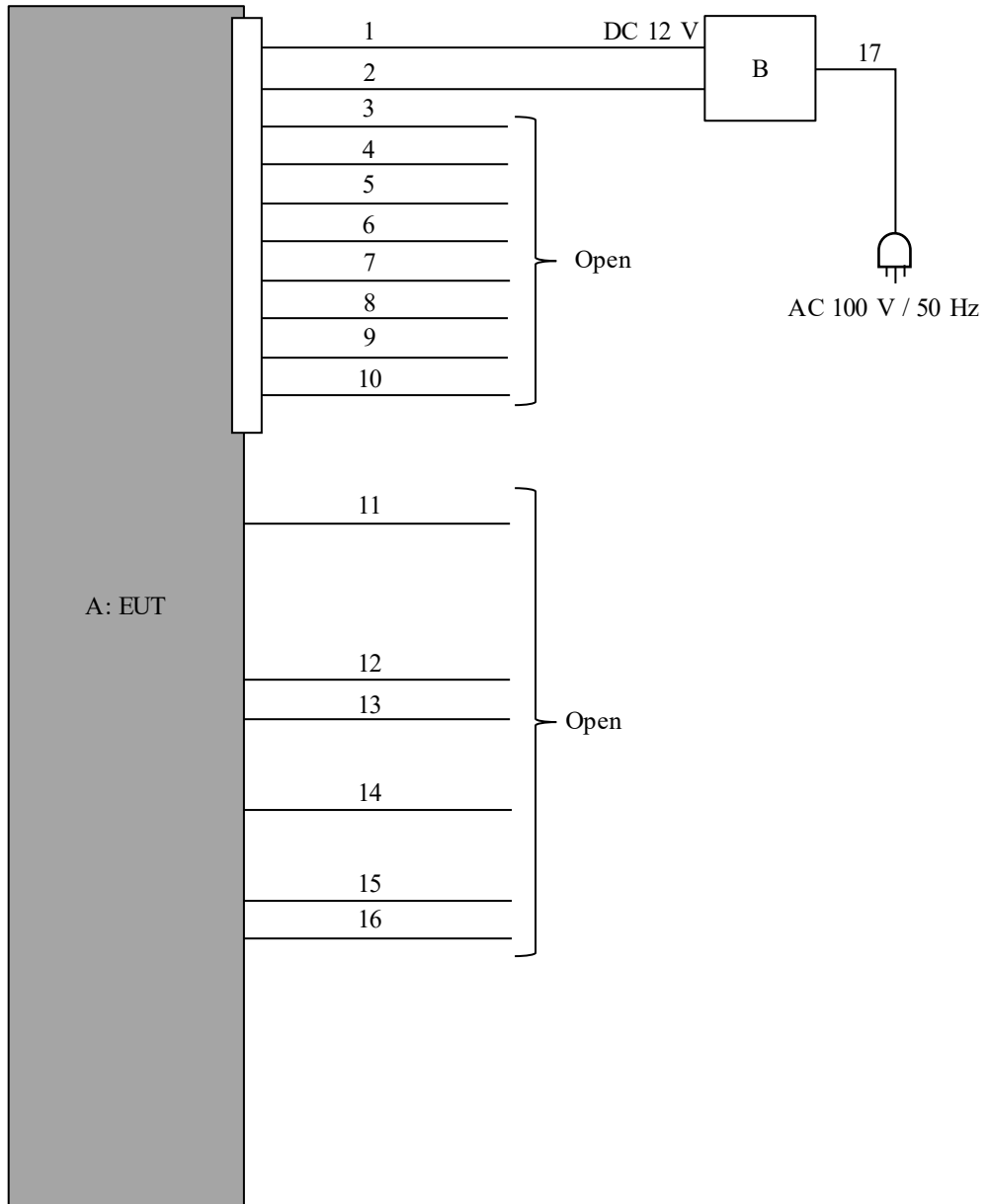
Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Monitor with Receiver	DMX809S	107X0062	JVCKENWOOD	EUT
B	Speaker	KFC-RS160	-	JVCKENWOOD	-
C	Speaker	KFC-RS160	-	JVCKENWOOD	-
D	Speaker	KFC-RS160	-	JVCKENWOOD	-
E	Speaker	KFC-RS160	-	JVCKENWOOD	-
F	USB Memory	SDDDC2-064G-G46	-	SanDisk	-
G	Handy Cam	HC-W585M	DM7LA002009	Panasonic	-
H	GPS ANTENNA	GPA-GS204	-	JVCKENWOOD	-
I	Microphone	GD-VHM4214A2	-	JVCKENWOOD	-
J	Power Supply (DC)	PAN35-10A	DE001677	KIKUSUI	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC (ACC, B+)	0.15 + 1.8	Unshielded	Unshielded	-
2	DC (GND)	0.15 + 1.8	Unshielded	Unshielded	-
3	Speaker (Front-L) +/-	0.15 + 2.0 + 1.9	Unshielded	Unshielded	-
4	Speaker (Front-R) +/-	0.15 + 2.0 + 1.9	Unshielded	Unshielded	-
5	Speaker (Rear-L) +/-	0.15 + 2.0 + 1.9	Unshielded	Unshielded	-
6	Speaker (Rear-R) +/-	0.15 + 2.0 + 1.9	Unshielded	Unshielded	-
7	ILLUMI	0.15 + 0.9	Unshielded	Unshielded	-
8	ANT Cont	0.15 + 0.9	Unshielded	Unshielded	-
9	Mute	0.15 + 0.9	Unshielded	Unshielded	-
10	REMOTE Cont	0.15 + 0.9	Unshielded	Unshielded	-
11	USB	1.0	Shielded	Shielded	-
12	HDMI	0.1 + 1.7	Shielded	Shielded	-
13	GPS	3.5	Shielded	Shielded	-
14	PRK SW	0.1 + 2.0	Unshielded	Unshielded	-
15	REVERSE	0.1 + 1.0	Unshielded	Unshielded	-
16	EXT IF	1.0	Shielded	Shielded	-
17	Mic	0.15 + 3.0	Shielded	Shielded	-
18	IF	1.0	Shielded	Shielded	-
19	FM/AM	0.15 + 1.8	Shielded	Shielded	-
20	Front View Camera	0.2 + 1.5	Shielded	Shielded	-
21	Rear Preout	1.2	Shielded	Shielded	-
22	Front Preout	1.2	Shielded	Shielded	-
23	Subwoofer Preout	1.0	Shielded	Shielded	-
24	VIDEO OUT	3.6	Shielded	Shielded	-
25	R-CAM	2.1	Shielded	Shielded	-
26	AV-IN	1.4	Shielded	Shielded	-
27	AC	2.0	Unshielded	Unshielded	-

<For Antenna Terminal Conducted test>



Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Monitor with Receiver	DMX809S	107X0065	JVCKENWOOD	EUT
B	Power Supply(DC)	PAN35-10A	BP002287	KIKUSUI	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC (ACC, B+)	1.5	Unshielded	Unshielded	-
2	DC (GND)	1.5	Unshielded	Unshielded	-
3	Speaker (Front-L) +/-	0.15	Unshielded	Unshielded	-
4	Speaker (Front-R) +/-	0.15	Unshielded	Unshielded	-
5	Speaker (Rear-L) +/-	0.15	Unshielded	Unshielded	-
6	Speaker (Rear-R) +/-	0.15	Unshielded	Unshielded	-
7	ILLUMI	0.15	Unshielded	Unshielded	-
8	ANT Cont	0.15	Unshielded	Unshielded	-
9	Mute	0.15	Unshielded	Unshielded	-
10	REMOTE Cont	0.15	Unshielded	Unshielded	-
11	USB	1.0	Shielded	Shielded	-
12	PRK SW	0.1	Unshielded	Unshielded	-
13	REVERSE	0.1	Unshielded	Unshielded	-
14	Mic	0.15	Shielded	Shielded	-
15	FM/AM	0.15	Shielded	Shielded	-
16	Front View Camera	0.2	Shielded	Shielded	-
17	AC	2.0	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, 1.0 m by 2.0 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane.

The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

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

Test antenna was aimed at the EUT for receiving the maximum signal and always kept within the illumination area of the 3 dB beamwidth of the antenna.

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

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

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

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

Test Antennas are used as below;

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

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

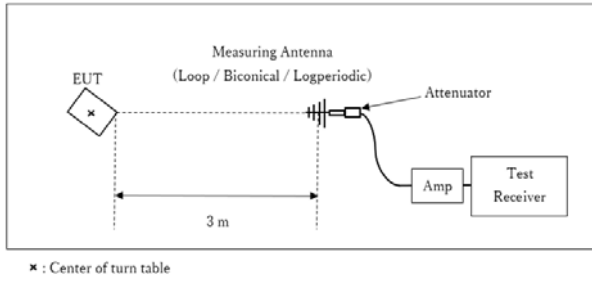
20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9(ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument Used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *1)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	11.12.2.5.3 RBW: 1 MHz VBW: 1/T (T: Burst length, refer to Appendix) Detector: Peak Trace mode: Max hold	RBW: 100 kHz VBW: 300 kHz

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

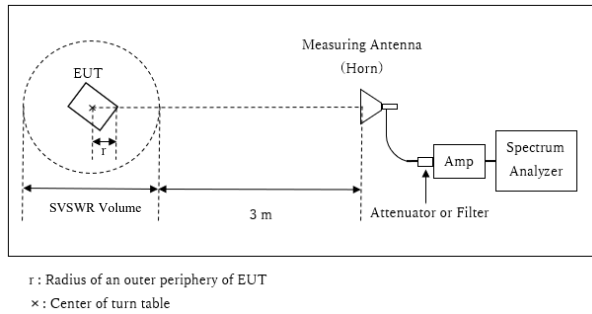
Figure 2: Test Setup

Below 1 GHz



Test Distance: 3 m

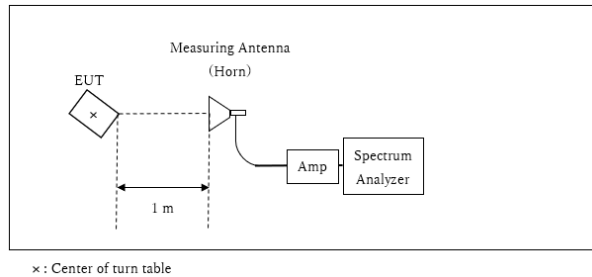
1 GHz to 10 GHz



Distance Factor: $20 \times \log (3.89 \text{ m} / 3.0 \text{ m}) = 2.26 \text{ dB}$
* Test Distance: $(3 + \text{SVSWR Volume} / 2) - r = 3.89 \text{ m}$

SVSWR Volume : 2.0 m
(SVSWR Volume has been calibrated based on CISPR 16-1-4.)
 $r = 0.11 \text{ m}$

10 GHz to 26.5 GHz



Distance Factor: $20 \times \log (1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$
*Test Distance: 1 m

The carrier level and noise levels were confirmed at each position of 0 deg and 30 deg 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	0 deg.	0 deg.	0 deg.	0 deg.	0 deg.	0 deg.
Vertical	0 deg.	0 deg.	0 deg.	0 deg.	0 deg.	0 deg.

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

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

SECTION 6: Antenna Terminal Conducted Tests

Test Procedure

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

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument Used
6 dB Bandwidth	50 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99 % Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak/Average *2)	-	Power Meter (Sensor: 160 MHz BW)
Peak Power Density	1.5 times the 6 dB Bandwidth	3 kHz	9.1 kHz	Auto	Peak	Max Hold	Spectrum Analyzer *3)
Conducted Spurious Emission *4) *5)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	9.1 kHz	27 kHz				

*1) Peak hold was applied as Worst-case measurement.
 *2) Reference data
 *3) Section 11.10.2 Method PKPSD (peak PSD) of "ANSI C63.10-2013".
 *4) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.
 Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.
 (9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 9.1 kHz) *
 *5) The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ohms. For example, the measurement at frequency 9 kHz resulted in a level of 45.5 dBuV/m, which is equivalent to $45.5 - 51.5 = -6.0$ dBuA/m, which has the same margin, 3 dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

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

Test Data : APPENDIX
Test Result : Pass

APPENDIX 1: Test Data

99 % Occupied Bandwidth and 6 dB Bandwidth

Test place Shonan EMC Lab. No.5 Shielded Room
Date July 27, 2022
Temperature / Humidity 25 deg. C / 49 % RH
Engineer Hiromasa Sato
Mode Tx

11b

Frequency [MHz]	99 % Occupied Bandwidth [kHz]	6 dB Bandwidth [MHz]	Limit for 6 dB Bandwidth [MHz]
2412	13122.7	8.350	> 0.5000
2437	12873.1	7.510	> 0.5000
2462	13026.9	8.332	> 0.5000

11g

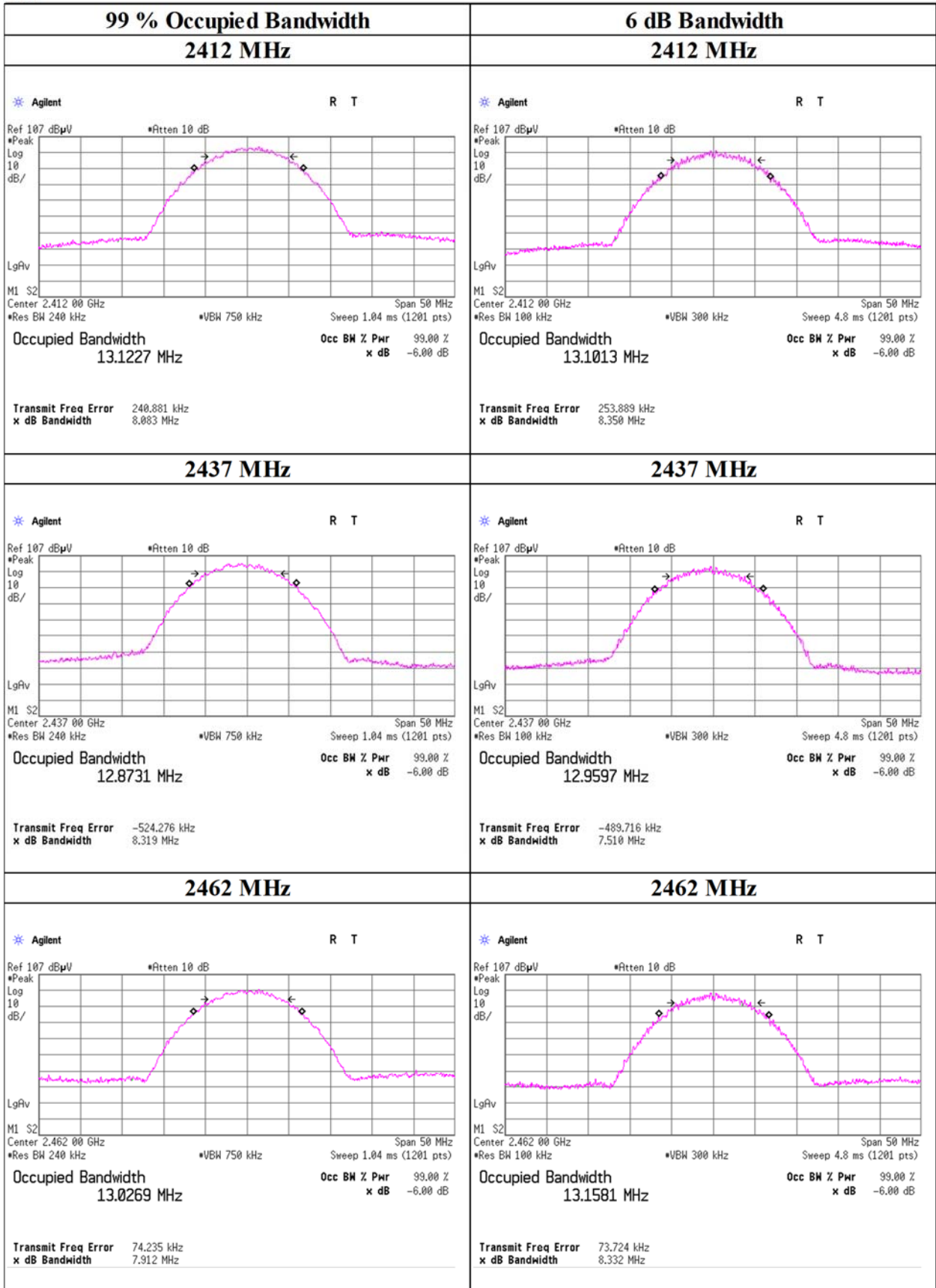
Frequency [MHz]	99 % Occupied Bandwidth [kHz]	6 dB Bandwidth [MHz]	Limit for 6 dB Bandwidth [MHz]
2412	17335.5	16.384	> 0.5000
2437	17167.8	15.802	> 0.5000
2462	17302.1	16.528	> 0.5000

11n-20

Frequency [MHz]	99 % Occupied Bandwidth [kHz]	6 dB Bandwidth [MHz]	Limit for 6 dB Bandwidth [MHz]
2412	18403.6	17.663	> 0.5000
2437	18122.8	16.411	> 0.5000
2462	18330.8	17.737	> 0.5000

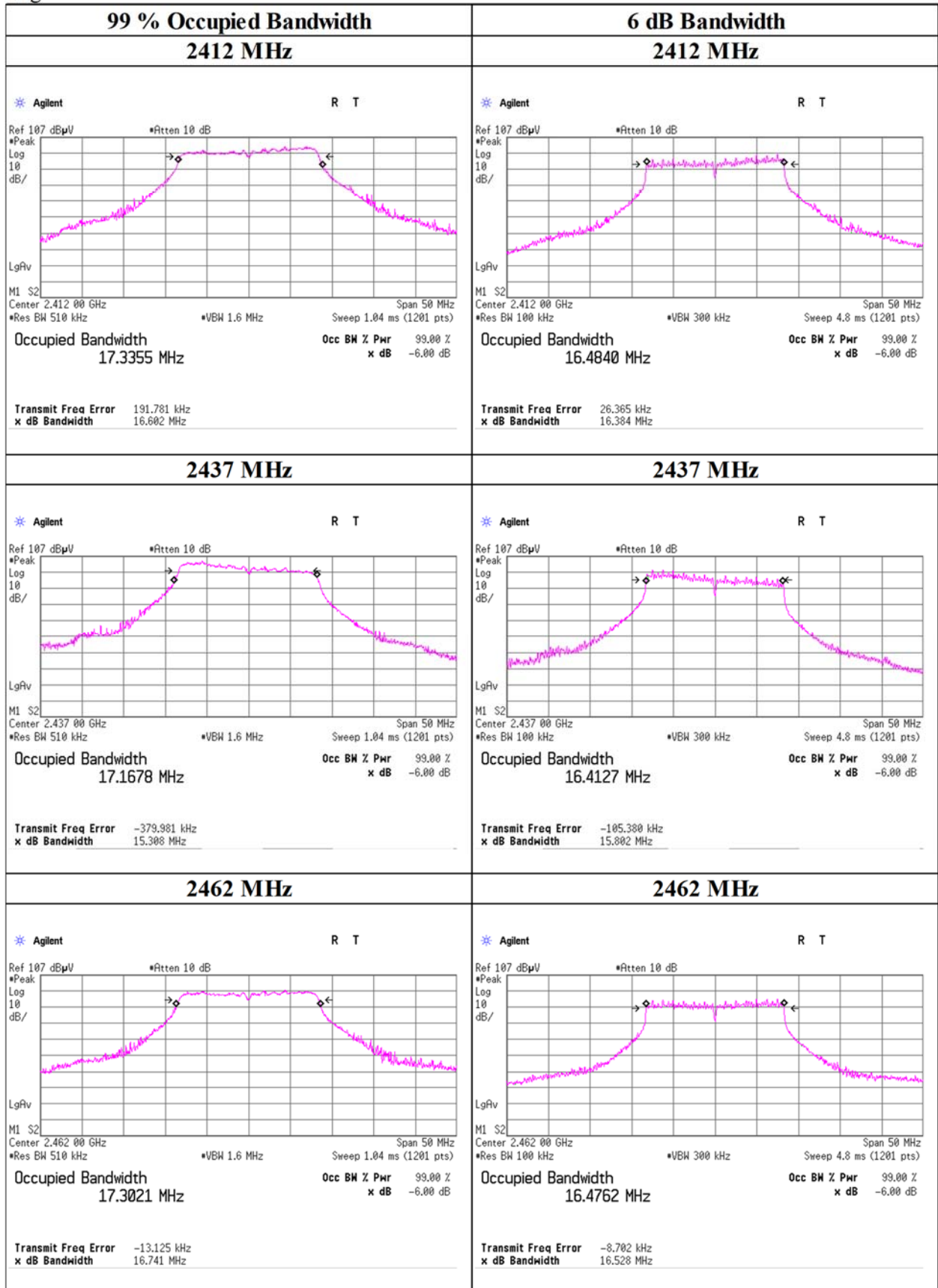
99 % Occupied Bandwidth and 6 dB Bandwidth

11b



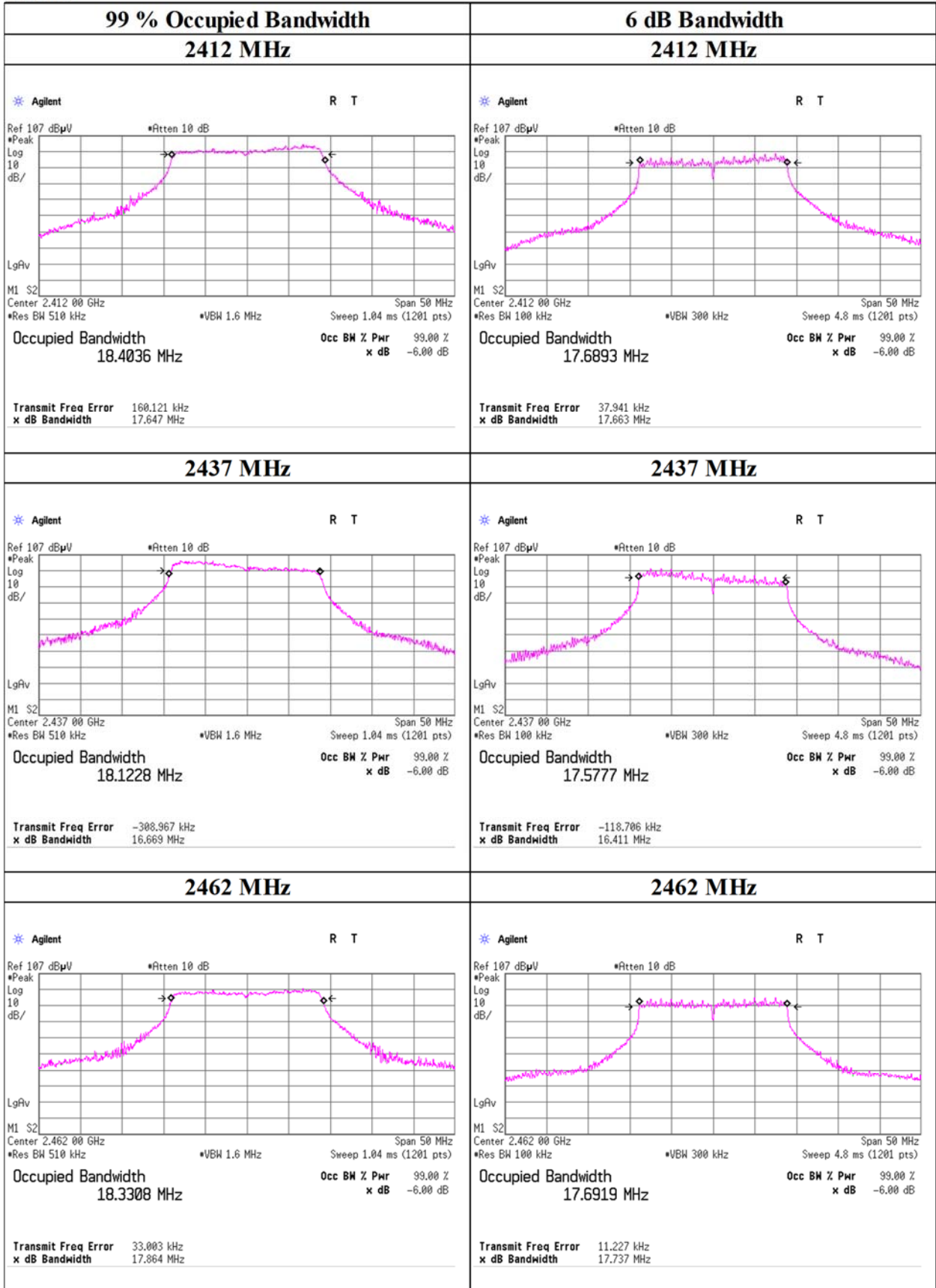
99 % Occupied Bandwidth and 6 dB Bandwidth

11g



99 % Occupied Bandwidth and 6 dB Bandwidth

11n-20



Maximum Peak Output Power

Test place	Shonan EMC Lab. No.5 Shielded Room
Date	July 19, 2022
Temperature / Humidity	25 deg. C / 32 % RH
Engineer	Yosuke Murakami
Mode	Tx

11b

Maximum peak output power 11 Mbps (worst)

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Conducted Power					e.i.r.p. for RSS-247					
				Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
2412	0.96	2.40	10.17	13.53	22.54	30.00	1000	16.47	-9.40	4.13	2.59	36.02	4000	31.89
2437	2.34	2.41	10.18	14.93	31.12	30.00	1000	15.07	-9.40	5.53	3.57	36.02	4000	30.49
2462	-2.29	2.42	10.18	10.31	10.74	30.00	1000	19.69	-9.40	0.91	1.23	36.02	4000	35.11

11g

Maximum peak output power 54 Mbps (worst)

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Conducted Power					e.i.r.p. for RSS-247					
				Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
2412	8.57	2.40	10.17	21.14	130.02	30.00	1000	8.86	-9.40	11.74	14.93	36.02	4000	24.28
2437	9.20	2.41	10.18	21.79	151.01	30.00	1000	8.21	-9.40	12.39	17.34	36.02	4000	23.63
2462	4.96	2.42	10.18	17.56	57.02	30.00	1000	12.44	-9.40	8.16	6.55	36.02	4000	27.86

11n-20

Maximum peak output power MCS 6 (worst)

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Conducted Power					e.i.r.p. for RSS-247					
				Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
2412	8.40	2.40	10.17	20.97	125.03	30.00	1000	9.03	-9.40	11.57	14.35	36.02	4000	24.45
2437	9.87	2.41	10.18	22.46	176.20	30.00	1000	7.54	-9.40	13.06	20.23	36.02	4000	22.96
2462	5.94	2.42	10.18	18.54	71.45	30.00	1000	11.46	-9.40	9.14	8.20	36.02	4000	26.88

Sample Calculation:

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

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

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

Maximum Peak Output Power

Test place	Shonan EMC Lab. No.5 Shielded Room
Date	July 19, 2022
Temperature / Humidity	25 deg. C / 32 % RH
Engineer	Yosuke Murakami
Mode	Tx

(Peak)

11b 2412 MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
1	0.92	
2	0.90	
5.5	0.91	
11	0.96	*

*: Worst Rate

11g 2412 MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
6	5.07	
9	6.65	
12	6.86	
18	6.83	
24	8.50	
36	8.55	
48	8.49	
54	8.57	*

*: Worst Rate

11n-20 2412 MHz

MCS	Reading	Remark
	[dBm]	
0	6.22	
1	6.44	
2	6.35	
3	7.96	
4	8.05	
5	7.98	
6	8.40	*
7	8.11	

*: Worst Rate

Sample Calculation:

All comparisons were carried out on same frequency and measurement factors.

Average Output Power
(Reference data for RF Exposure)

Test place	Shonan EMC Lab. No.5 Shielded Room
Date	July 19, 2022
Temperature / Humidity	25 deg. C / 32 % RH
Engineer	Yosuke Murakami
Mode	Tx

11b

Average power 1 Mbps

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-1.52	2.40	10.17	11.05	12.74	0.00	11.05	12.74
2437	0.12	2.41	10.18	12.71	18.66	0.00	12.71	18.66
2462	-4.89	2.42	10.18	7.71	5.90	0.00	7.71	5.90

* It was measured with using the gate function of power meter.

11g

Average power 6 Mbps

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-1.56	2.40	10.17	11.01	12.62	0.00	11.01	12.62
2437	-0.14	2.41	10.18	12.45	17.58	0.00	12.45	17.58
2462	-4.94	2.42	10.18	7.66	5.83	0.00	7.66	5.83

* It was measured with using the gate function of power meter.

11n-20

Average power MCS 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-1.67	2.40	10.17	10.90	12.30	0.00	10.90	12.30
2437	-0.29	2.41	10.18	12.30	16.98	0.00	12.30	16.98
2462	-5.06	2.42	10.18	7.54	5.68	0.00	7.54	5.68

* It was measured with using the gate function of power meter.

Sample Calculation:

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

Result (Burst power average) = Result (Time average) + Duty factor

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

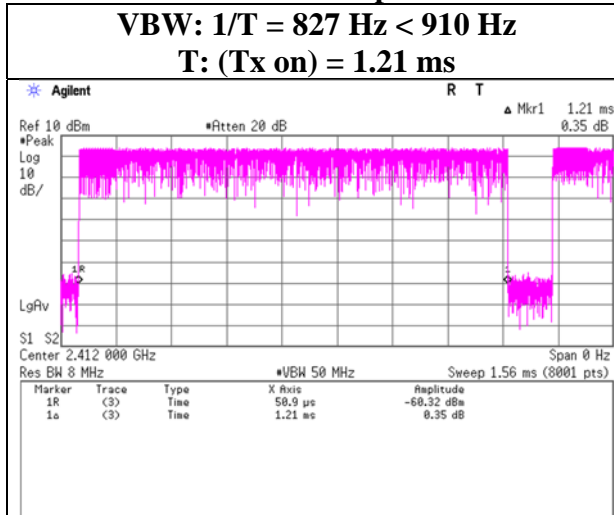
The average output power was measured with the lowest order modulation and lowest data rate configuration in each IEEE 802.11 mode based on KDB 248227 D01.

Burst rate confirmation

Test place Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date July 20, 2022
Temperature / Humidity 21 deg. C / 52 % RH
Engineer Hiromasa Sato
Mode Tx

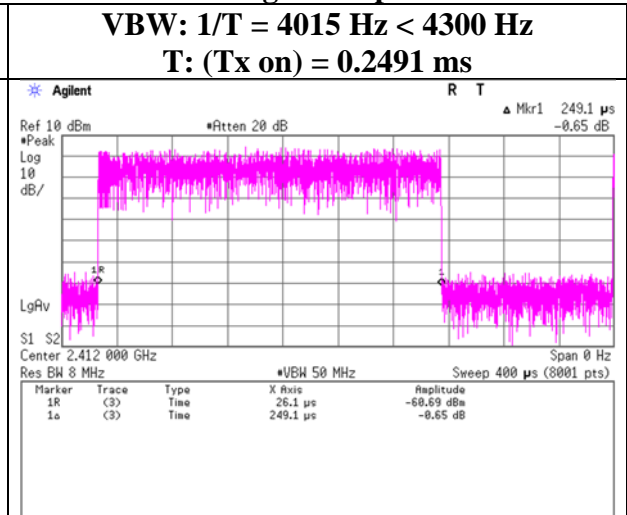
11b 11 Mbps

VBW: 1/T = 827 Hz < 910 Hz
T: (Tx on) = 1.21 ms



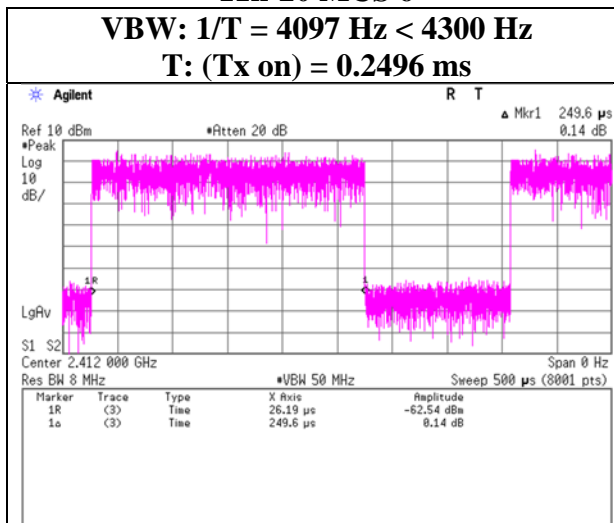
11g 54 Mbps

VBW: 1/T = 4015 Hz < 4300 Hz
T: (Tx on) = 0.2491 ms



11n-20 MCS 6

VBW: 1/T = 4097 Hz < 4300 Hz
T: (Tx on) = 0.2496 ms



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

Radiated Spurious Emission

Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	3	3
Date	July 20, 2022	July 22, 2022
Temperature / Humidity	21 deg.C, 52 %RH	23 deg.C, 57 %RH
Engineer	Hiromasa Sato	Hiromasa Sato
	(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.	2390.000	PK	47.74	28.18	14.56	41.63	2.26	51.11	73.9	22.7	314	273	-
Hori.	4824.000	PK	50.54	31.57	7.27	42.86	2.26	48.78	73.9	25.1	144	3	-
Hori.	7236.000	PK	47.61	37.39	8.90	43.42	2.26	52.74	73.9	21.1	150	0	-
Hori.	9648.000	PK	47.94	38.98	10.19	43.16	2.26	56.21	73.9	17.6	150	0	-
Hori.	2390.000	AV	36.37	28.18	14.56	41.63	2.26	39.74	53.9	14.1	314	273	VBW:910 Hz
Hori.	4824.000	AV	43.71	31.57	7.27	42.86	2.26	41.95	53.9	11.9	144	3	VBW:910 Hz
Hori.	7236.000	AV	36.15	37.39	8.90	43.42	2.26	41.28	53.9	12.6	150	0	VBW:910 Hz,Floor noise
Hori.	9648.000	AV	36.87	38.98	10.19	43.16	2.26	45.14	53.9	8.7	150	0	VBW:910 Hz,Floor noise
Vert.	2390.000	PK	48.31	28.18	14.56	41.63	2.26	51.68	73.9	22.2	165	143	-
Vert.	4824.000	PK	51.46	31.57	7.27	42.86	2.26	49.70	73.9	24.2	149	97	-
Vert.	7236.000	PK	47.40	37.39	8.90	43.42	2.26	52.53	73.9	21.3	150	0	-
Vert.	9648.000	PK	48.39	38.98	10.19	43.16	2.26	56.66	73.9	17.2	150	0	-
Vert.	2390.000	AV	35.94	28.18	14.56	41.63	2.26	39.31	53.9	14.5	165	143	VBW:910 Hz
Vert.	4824.000	AV	42.39	31.57	7.27	42.86	2.26	40.63	53.9	13.2	149	97	VBW:910 Hz
Vert.	7236.000	AV	36.84	37.39	8.90	43.42	2.26	41.97	53.9	11.9	150	0	VBW:910 Hz,Floor noise
Vert.	9648.000	AV	37.04	38.98	10.19	43.16	2.26	45.31	53.9	8.5	150	0	VBW:910 Hz,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 (3.89 m / 3.0 m) = 2.26 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	90.97	28.15	14.59	41.64	2.26	94.33	-	-	Carrier
Hori.	2400.000	PK	40.05	28.17	14.58	41.64	2.26	43.42	74.3	30.8	-
Vert.	2412.000	PK	86.48	28.15	14.59	41.64	2.26	89.84	-	-	Carrier
Vert.	2400.000	PK	38.98	28.17	14.58	41.64	2.26	42.35	69.8	27.4	-

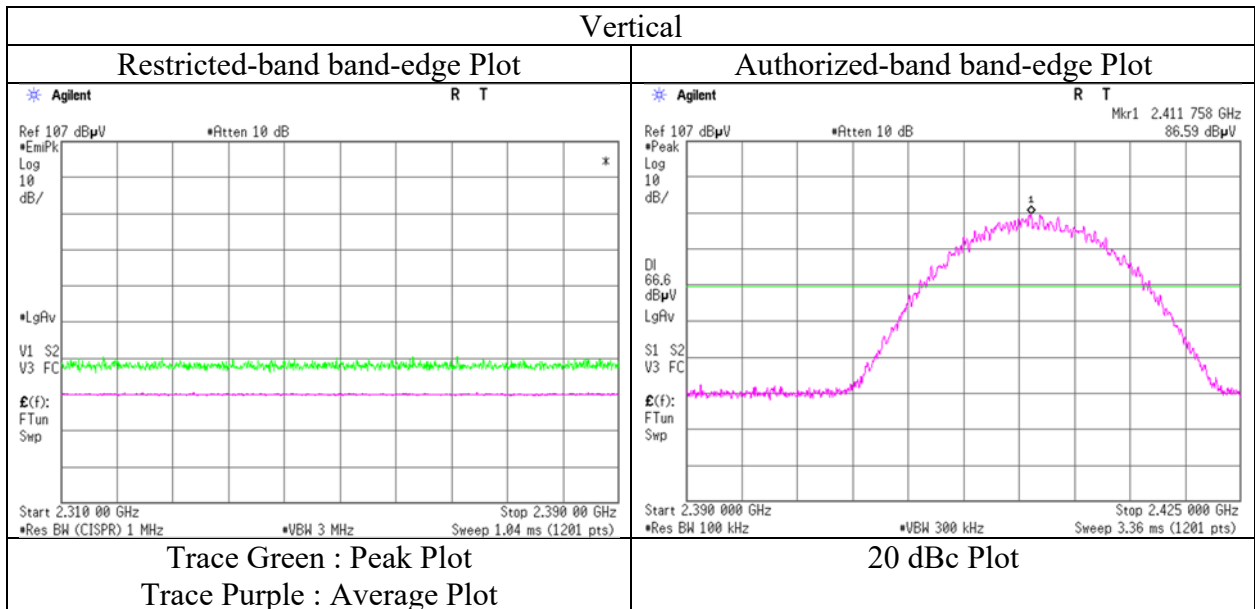
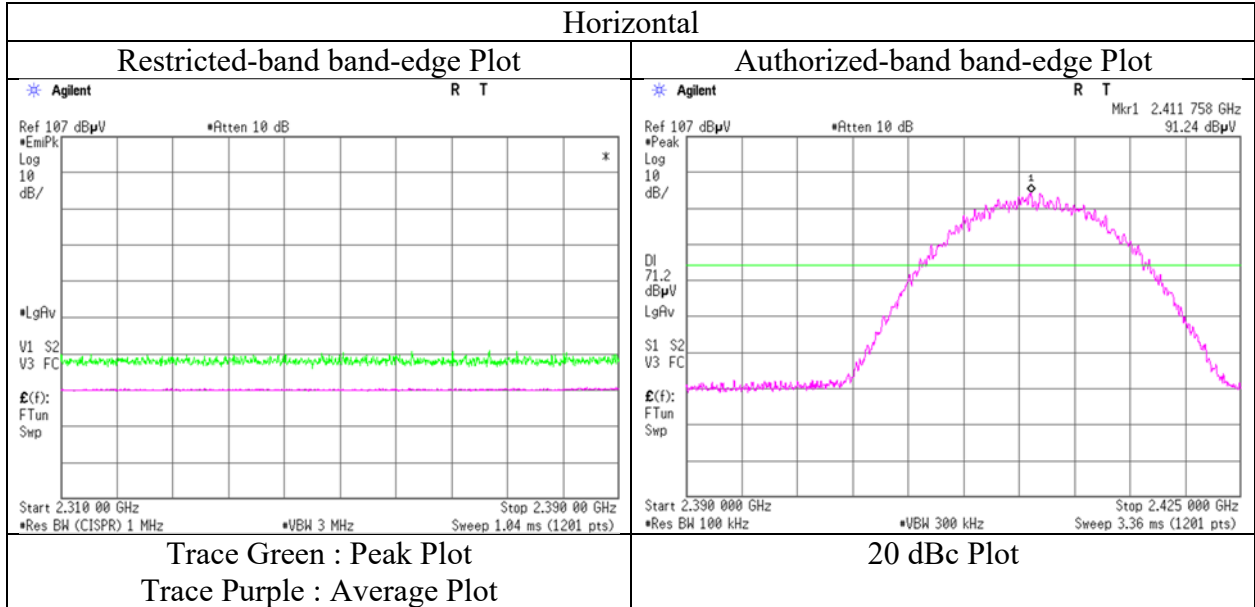
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log (3.89 m / 3.0 m) = 2.26 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 3
Date July 20, 2022
Temperature / Humidity 21 deg.C, 52 %RH
Engineer Hiromasa Sato
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	3	3
Date	July 20, 2022	July 22, 2022
Temperature / Humidity	21 deg.C, 52 %RH	23 deg.C, 57 %RH
Engineer	Hiromasa Sato	Hiromasa Sato
	(1 GHz -10 GHz)	(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	50.54	31.63	7.30	42.84	2.26	48.89	73.9	25.0	153	22	-
Hori.	7311.000	PK	47.36	37.45	8.96	43.51	2.26	52.52	73.9	21.3	150	0	-
Hori.	9748.000	PK	47.25	39.17	10.22	43.04	2.26	55.86	73.9	18.0	150	0	-
Hori.	4874.000	AV	43.71	31.63	7.30	42.84	2.26	42.06	53.9	11.8	153	22	VBW:910 Hz
Hori.	7311.000	AV	37.00	37.45	8.96	43.51	2.26	42.16	53.9	11.7	150	0	VBW:910 Hz,Floor noise
Hori.	9748.000	AV	37.02	39.17	10.22	43.04	2.26	45.63	53.9	8.2	150	0	VBW:910 Hz,Floor noise
Vert.	4874.000	PK	50.79	31.63	7.30	42.84	2.26	49.14	73.9	24.7	144	121	-
Vert.	7311.000	PK	47.20	37.45	8.96	43.51	2.26	52.36	73.9	21.5	150	0	-
Vert.	9748.000	PK	47.44	39.17	10.22	43.04	2.26	56.05	73.9	17.8	150	0	-
Vert.	4874.000	AV	42.25	31.63	7.30	42.84	2.26	40.60	53.9	13.3	144	121	VBW:910 Hz
Vert.	7311.000	AV	36.77	37.45	8.96	43.51	2.26	41.93	53.9	11.9	150	0	VBW:910 Hz,Floor noise
Vert.	9748.000	AV	37.12	39.17	10.22	43.04	2.26	45.73	53.9	8.1	150	0	VBW:910 Hz,Floor noise

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.89\text{ m} / 3.0\text{ m}) = 2.26\text{ dB}$

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

Radiated Spurious Emission

Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	3	3
Date	July 20, 2022	July 22, 2022
Temperature / Humidity	21 deg.C, 52 %RH	23 deg.C, 57 %RH
Engineer	Hiomasa Sato	Hiomasa Sato
	(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	49.66	28.08	14.68	41.68	2.26	53.00	73.9	20.9	232	265	-
Hori.	4924.000	PK	50.15	31.71	7.32	42.81	2.26	48.63	73.9	25.2	164	22	-
Hori.	7386.000	PK	47.16	37.56	9.01	43.59	2.26	52.40	73.9	21.5	150	0	-
Hori.	9848.000	PK	47.35	39.15	10.27	42.91	2.26	56.12	73.9	17.7	150	0	-
Hori.	2483.500	AV	36.59	28.08	14.68	41.68	2.26	39.93	53.9	13.9	232	265	VBW:910 Hz
Hori.	4924.000	AV	41.71	31.71	7.32	42.81	2.26	40.19	53.9	13.7	164	22	VBW:910 Hz
Hori.	7386.000	AV	35.54	37.56	9.01	43.59	2.26	40.78	53.9	13.1	150	0	VBW:910 Hz,Floor noise
Hori.	9848.000	AV	35.64	39.15	10.27	42.91	2.26	44.41	53.9	9.4	150	0	VBW:910 Hz,Floor noise
Vert.	2483.500	PK	48.40	28.08	14.68	41.68	2.26	51.74	73.9	22.1	212	126	-
Vert.	4924.000	PK	50.66	31.71	7.32	42.81	2.26	49.14	73.9	24.7	177	168	-
Vert.	7386.000	PK	47.21	37.56	9.01	43.59	2.26	52.45	73.9	21.4	150	0	-
Vert.	9848.000	PK	48.01	39.15	10.27	42.91	2.26	56.78	73.9	17.1	150	0	-
Vert.	2483.500	AV	35.70	28.08	14.68	41.68	2.26	39.04	53.9	14.8	212	126	VBW:910 Hz
Vert.	4924.000	AV	45.29	31.71	7.32	42.81	2.26	43.77	53.9	10.1	177	168	VBW:910 Hz
Vert.	7386.000	AV	35.90	37.56	9.01	43.59	2.26	41.14	53.9	12.7	150	0	VBW:910 Hz,Floor noise
Vert.	9848.000	AV	35.69	39.15	10.27	42.91	2.26	44.46	53.9	9.4	150	0	VBW:910 Hz,Floor noise

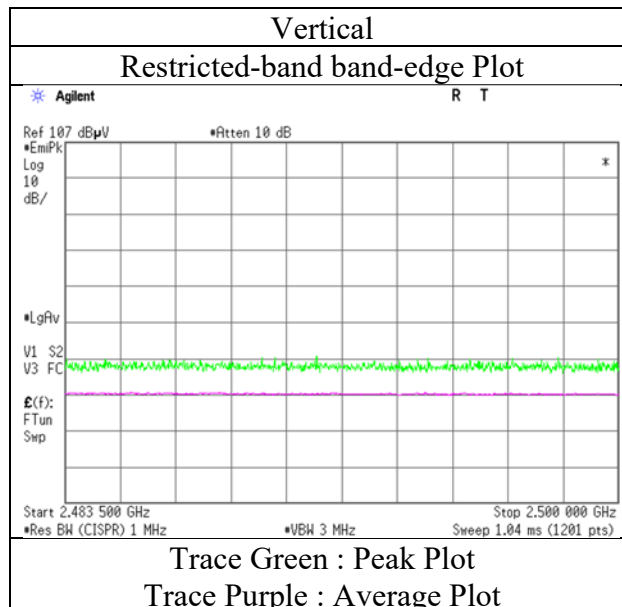
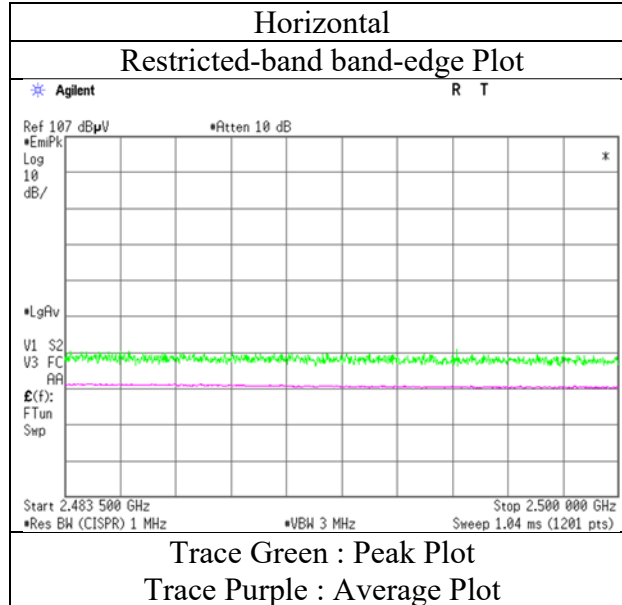
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.89\text{ m} / 3.0\text{ m}) = 2.26\text{ dB}$

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	3
Date	July 20, 2022
Temperature / Humidity	21 deg.C, 52 %RH
Engineer	Hiromasa Sato
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	3	3
Date	July 20, 2022	July 22, 2022
Temperature / Humidity	21 deg.C, 52 %RH	23 deg.C, 57 %RH
Engineer	Hiromasa Sato	Hiromasa Sato
	(1 GHz -10 GHz)	(10 GHz -26.5 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.	2390.000	PK	48.59	28.18	14.56	41.63	2.26	51.96	73.9	21.9	356	268	-
Hori.	4824.000	PK	50.07	31.57	7.27	42.86	2.26	48.31	73.9	25.5	152	86	-
Hori.	7236.000	PK	48.18	37.39	8.90	43.42	2.26	53.31	73.9	20.5	150	0	-
Hori.	9648.000	PK	48.21	38.98	10.19	43.16	2.26	56.48	73.9	17.4	150	0	-
Hori.	2390.000	AV	37.91	28.18	14.56	41.63	2.26	41.28	53.9	12.6	356	268	VBW:4.3 kHz
Hori.	4824.000	AV	41.95	31.57	7.27	42.86	2.26	40.19	53.9	13.7	152	86	VBW:4.3 kHz
Hori.	7236.000	AV	37.29	37.39	8.90	43.42	2.26	42.42	53.9	11.4	150	0	VBW:4.3 kHz,Floor noise
Hori.	9648.000	AV	36.78	38.98	10.19	43.16	2.26	45.05	53.9	8.8	150	0	VBW:4.3 kHz,Floor noise
Vert.	2390.000	PK	47.30	28.18	14.56	41.63	2.26	50.67	73.9	23.2	164	144	-
Vert.	4824.000	PK	50.27	31.57	7.27	42.86	2.26	48.51	73.9	25.3	152	103	-
Vert.	7236.000	PK	47.28	37.39	8.90	43.42	2.26	52.41	73.9	21.4	150	0	-
Vert.	9648.000	PK	48.10	38.98	10.19	43.16	2.26	56.37	73.9	17.5	150	0	-
Vert.	2390.000	AV	37.04	28.18	14.56	41.63	2.26	40.41	53.9	13.4	164	144	VBW:4.3 kHz
Vert.	4824.000	AV	42.13	31.57	7.27	42.86	2.26	40.37	53.9	13.5	152	103	VBW:4.3 kHz
Vert.	7236.000	AV	36.84	37.39	8.90	43.42	2.26	41.97	53.9	11.9	150	0	VBW:4.3 kHz,Floor noise
Vert.	9648.000	AV	37.09	38.98	10.19	43.16	2.26	45.36	53.9	8.5	150	0	VBW:4.3 kHz,Floor noise

Result = Reading + Ant. Fac. + Loss (Cable+Attenuator or Filter(below 18 GHz)) - Gain(Amplifier) + Distance factor
 Distance factor : 1 GHz - 10 GHz : $20\log(3.89\text{ m} / 3.0\text{ m}) = 2.26\text{ dB}$
 10 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

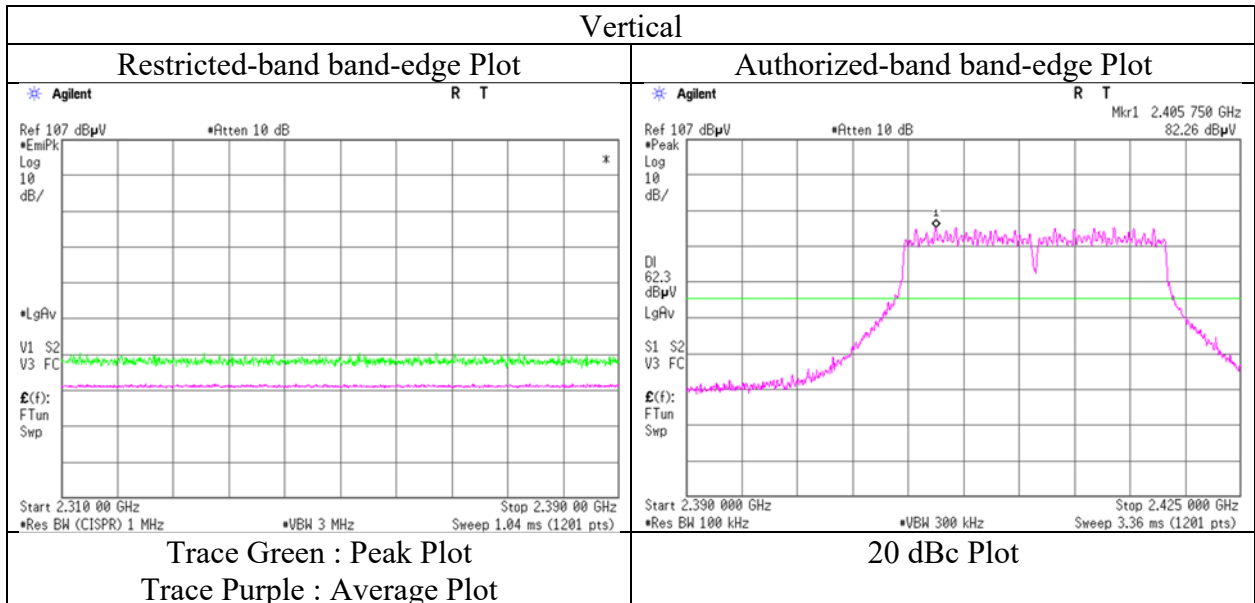
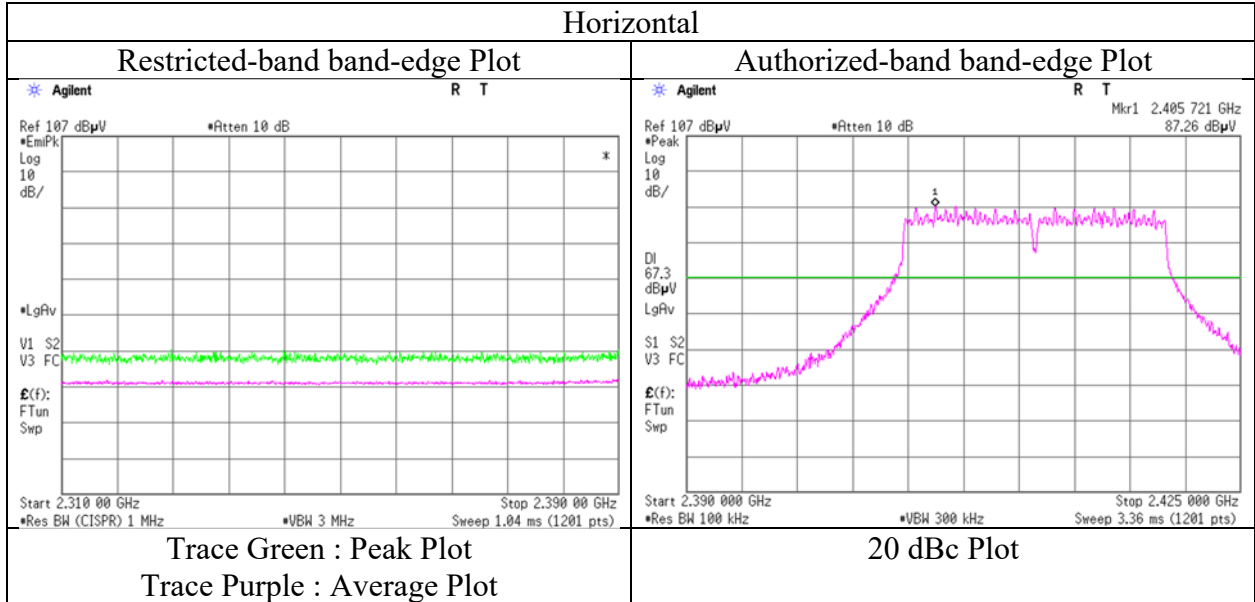
20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

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	86.99	28.15	14.59	41.64	2.26	90.35	-	-	Carrier
Hori.	2400.000	PK	52.24	28.17	14.58	41.64	2.26	55.61	70.3	14.6	-
Vert.	2412.000	PK	81.98	28.15	14.59	41.64	2.26	85.34	-	-	Carrier
Vert.	2400.000	PK	46.50	28.17	14.58	41.64	2.26	49.87	65.3	15.4	-

Result = Reading + Ant. Fac. + Loss (Cable+Attenuator or Filter(below 18 GHz)) - Gain(Amplifier) + Distance factor
 Distance factor : 1 GHz - 10 GHz : $20\log(3.89\text{ m} / 3.0\text{ m}) = 2.26\text{ dB}$
 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 3
Date July 20, 2022
Temperature / Humidity 21 deg.C, 52 %RH
Engineer Hiromasa Sato
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	3	3
Date	July 20, 2022	July 22, 2022
Temperature / Humidity	21 deg.C, 52 %RH	23 deg.C, 57 %RH
Engineer	Hiromasa Sato	Hiromasa Sato
	(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	49.86	31.63	7.30	42.84	2.26	48.21	73.9	25.6	161	4	-
Hori.	7311.000	PK	47.24	37.45	8.96	43.51	2.26	52.40	73.9	21.5	150	0	-
Hori.	9748.000	PK	47.30	39.17	10.22	43.04	2.26	55.91	73.9	17.9	150	0	-
Hori.	4874.000	AV	41.27	31.63	7.30	42.84	2.26	39.62	53.9	14.2	161	4	VBW:4.3 kHz
Hori.	7311.000	AV	37.29	37.45	8.96	43.51	2.26	42.45	53.9	11.4	150	0	VBW:4.3 kHz,Floor noise
Hori.	9748.000	AV	37.15	39.17	10.22	43.04	2.26	45.76	53.9	8.1	150	0	VBW:4.3 kHz,Floor noise
Vert.	4874.000	PK	50.22	31.63	7.30	42.84	2.26	48.57	73.9	25.3	149	135	-
Vert.	7311.000	PK	47.13	37.45	8.96	43.51	2.26	52.29	73.9	21.6	150	0	-
Vert.	9748.000	PK	47.39	39.17	10.22	43.04	2.26	56.00	73.9	17.9	150	0	-
Vert.	4874.000	AV	41.31	31.63	7.30	42.84	2.26	39.66	53.9	14.2	149	135	VBW:4.3 kHz
Vert.	7311.000	AV	36.99	37.45	8.96	43.51	2.26	42.15	53.9	11.7	150	0	VBW:4.3 kHz,Floor noise
Vert.	9748.000	AV	37.08	39.17	10.22	43.04	2.26	45.69	53.9	8.2	150	0	VBW:4.3 kHz,Floor noise

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.89\text{ m} / 3.0\text{ m}) = 2.26\text{ dB}$

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

Radiated Spurious Emission

Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	3	3
Date	July 20, 2022	July 22, 2022
Temperature / Humidity	21 deg.C, 52 %RH	23 deg.C, 57 %RH
Engineer	Hiromasa Sato	Hiromasa Sato
	(1 GHz -10 GHz)	(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	48.39	28.09	14.64	41.67	2.26	51.71	73.9	22.1	264	253	-
Hori.	4924.000	PK	50.14	31.71	7.32	42.81	2.26	48.62	73.9	25.2	150	15	-
Hori.	7386.000	PK	47.33	37.56	9.01	43.59	2.26	52.57	73.9	21.3	150	0	-
Hori.	9848.000	PK	46.92	39.15	10.27	42.91	2.26	55.69	73.9	18.2	150	0	-
Hori.	2483.500	AV	37.85	28.09	14.64	41.67	2.26	41.17	53.9	12.7	264	253	VBW:4.3 kHz
Hori.	4924.000	AV	41.77	31.71	7.32	42.81	2.26	40.25	53.9	13.6	150	15	VBW:4.3 kHz
Hori.	7386.000	AV	37.55	37.56	9.01	43.59	2.26	42.79	53.9	11.1	150	0	VBW:4.3 kHz,Floor noise
Hori.	9848.000	AV	37.53	39.15	10.27	42.91	2.26	46.30	53.9	7.6	150	0	VBW:4.3 kHz,Floor noise
Vert.	2483.500	PK	47.50	28.08	14.68	41.68	2.26	50.84	73.9	23.0	252	33	-
Vert.	4924.000	PK	50.27	31.71	7.32	42.81	2.26	48.75	73.9	25.1	158	127	-
Vert.	7386.000	PK	47.42	37.56	9.01	43.59	2.26	52.66	73.9	21.2	150	0	-
Vert.	9848.000	PK	47.46	39.15	10.27	42.91	2.26	56.23	73.9	17.6	150	0	-
Vert.	2483.500	AV	37.37	28.08	14.68	41.68	2.26	40.71	53.9	13.1	252	33	VBW:4.3 kHz
Vert.	4924.000	AV	40.86	31.71	7.32	42.81	2.26	39.34	53.9	14.5	158	127	VBW:4.3 kHz
Vert.	7386.000	AV	37.02	37.56	9.01	43.59	2.26	42.26	53.9	11.6	150	0	VBW:4.3 kHz,Floor noise
Vert.	9848.000	AV	37.14	39.15	10.27	42.91	2.26	45.91	53.9	7.9	150	0	VBW:4.3 kHz,Floor noise

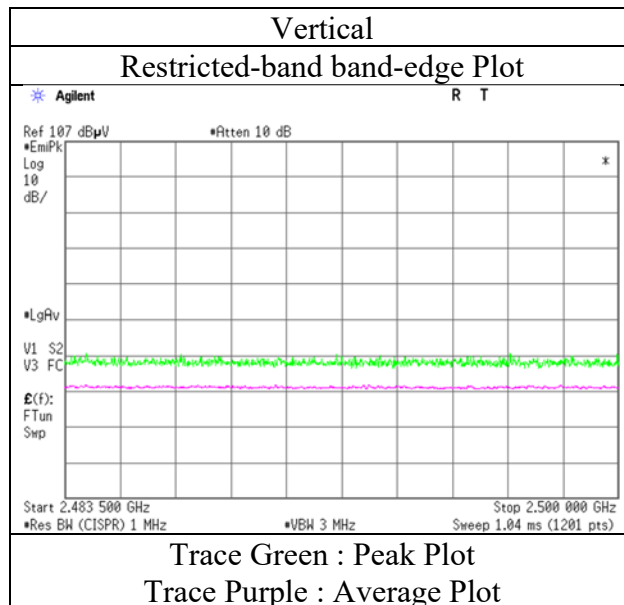
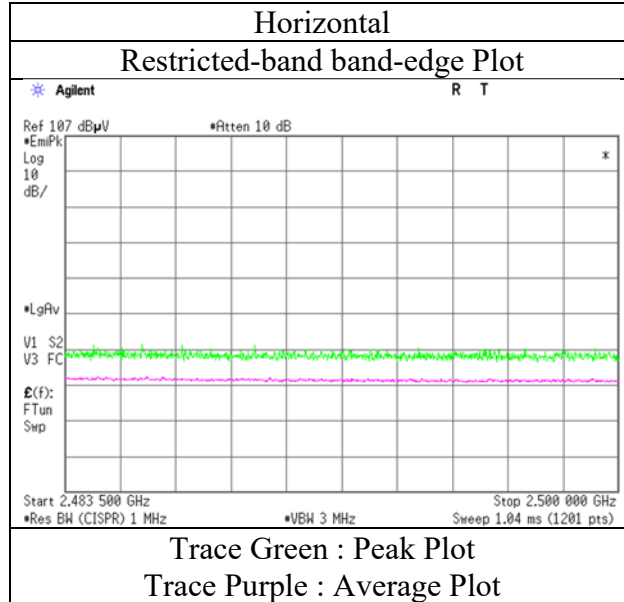
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.89\text{ m} / 3.0\text{ m}) = 2.26\text{ dB}$

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 3
Date July 20, 2022
Temperature / Humidity 21 deg.C, 52 %RH
Engineer Hiromasa Sato
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	3	3
Date	July 20, 2022	July 22, 2022
Temperature / Humidity	21 deg.C, 52 %RH	23 deg.C, 57 %RH
Engineer	Hiromasa Sato	Hiromasa Sato
	(1 GHz -10 GHz)	(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	48.82	28.18	14.56	41.63	2.26	52.19	73.9	21.7	319	278	-
Hori.	4824.000	PK	50.23	31.57	7.27	42.86	2.26	48.47	73.9	25.4	142	31	-
Hori.	7236.000	PK	47.33	37.39	8.90	43.42	2.26	52.46	73.9	21.4	150	0	-
Hori.	9648.000	PK	47.27	38.98	10.19	43.16	2.26	55.54	73.9	18.3	150	0	-
Hori.	2390.000	AV	38.35	28.18	14.56	41.63	2.26	41.72	53.9	12.1	319	278	VBW:4.3 kHz
Hori.	4824.000	AV	41.84	31.57	7.27	42.86	2.26	40.08	53.9	13.8	142	31	VBW:4.3 kHz
Hori.	7236.000	AV	37.19	37.39	8.90	43.42	2.26	42.32	53.9	11.5	150	0	VBW:4.3 kHz,Floor noise
Hori.	9648.000	AV	37.15	38.98	10.19	43.16	2.26	45.42	53.9	8.4	150	0	VBW:4.3 kHz,Floor noise
Vert.	2390.000	PK	47.40	28.18	14.56	41.63	2.26	50.77	73.9	23.1	281	128	-
Vert.	4824.000	PK	50.77	31.57	7.27	42.86	2.26	49.01	73.9	24.8	159	136	-
Vert.	7236.000	PK	47.49	37.39	8.90	43.42	2.26	52.62	73.9	21.2	150	0	-
Vert.	9648.000	PK	47.59	38.98	10.19	43.16	2.26	55.86	73.9	18.0	150	0	-
Vert.	2390.000	AV	37.20	28.18	14.56	41.63	2.26	40.57	53.9	13.3	281	128	VBW:4.3 kHz
Vert.	4824.000	AV	41.38	31.57	7.27	42.86	2.26	39.62	53.9	14.2	159	136	VBW:4.3 kHz
Vert.	7236.000	AV	37.22	37.39	8.90	43.42	2.26	42.35	53.9	11.5	150	0	VBW:4.3 kHz,Floor noise
Vert.	9648.000	AV	36.49	38.98	10.19	43.16	2.26	44.76	53.9	9.1	150	0	VBW:4.3 kHz,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(3.89 m / 3.0 m) = 2.26 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	86.54	28.15	14.59	41.64	2.26	89.90	-	-	Carrier
Hori.	2400.000	PK	48.24	28.17	14.58	41.64	2.26	51.61	69.9	18.2	-
Vert.	2412.000	PK	83.85	28.15	14.59	41.64	2.26	87.21	-	-	Carrier
Vert.	2400.000	PK	47.80	28.17	14.58	41.64	2.26	51.17	67.2	16.0	-

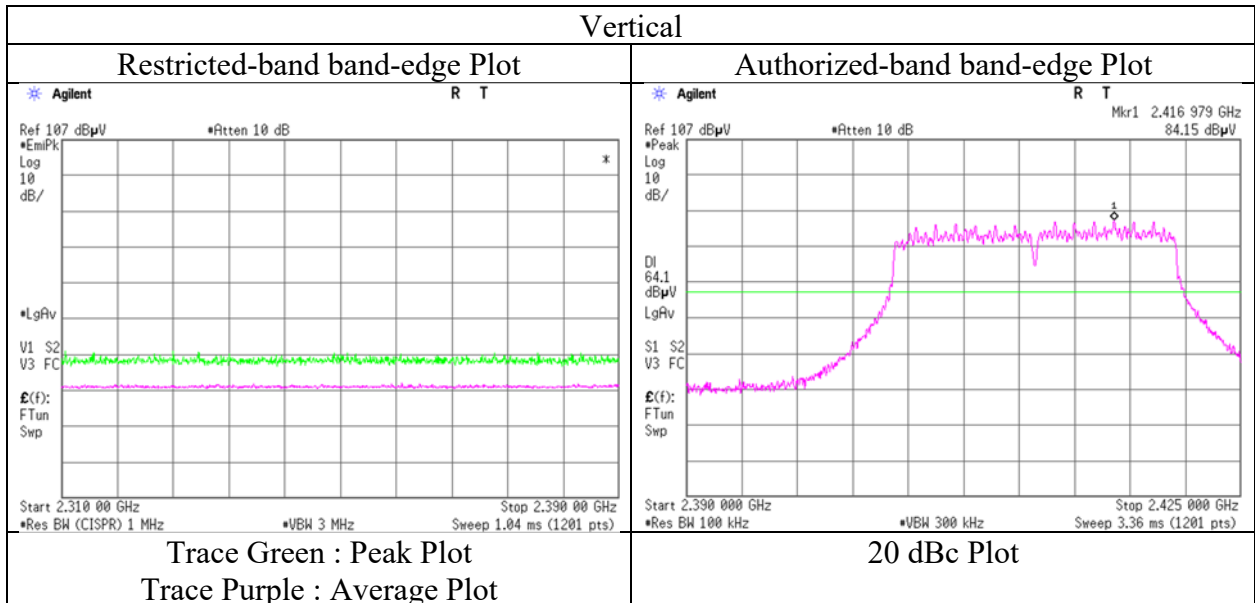
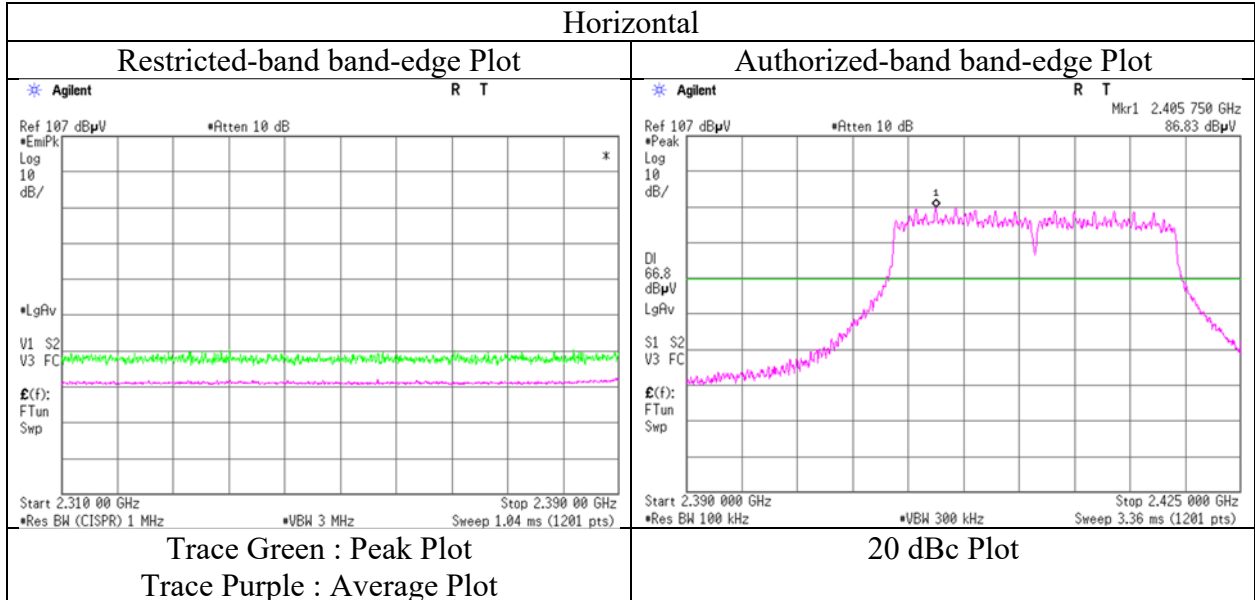
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log(3.89 m / 3.0 m) = 2.26 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 3
Date July 20, 2022
Temperature / Humidity 21 deg.C, 52 %RH
Engineer Hiromasa Sato
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	3	3
Date	July 26, 2022	July 20, 2022	July 22, 2022
Temperature / Humidity	23 deg.C, 69 %RH	21 deg.C, 52 %RH	23 deg.C, 57 %RH
Engineer	Shiro Kobayashi (30 MHz -1 GHz)	Hiromasa Sato (1 GHz -10 GHz)	Hiromasa Sato (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. [dBm]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	86.069	QP	46.52	7.50	8.23	31.90	0.00	30.35	40.0	9.6	348	67	-
Hori.	131.050	QP	36.43	13.95	8.23	31.86	0.00	26.75	43.5	16.7	252	48	-
Hori.	143.996	QP	40.25	14.62	8.54	31.85	0.00	31.56	43.5	11.9	224	27	-
Hori.	200.147	QP	40.56	11.63	5.72	31.79	0.00	26.12	43.5	17.3	162	316	-
Hori.	213.248	QP	40.39	11.29	5.83	31.78	0.00	25.73	43.5	17.7	156	103	-
Hori.	223.766	QP	52.27	11.33	5.91	31.77	0.00	37.74	46.0	8.2	146	101	-
Hori.	4874.000	PK	49.89	31.63	7.30	42.84	2.26	48.24	73.9	25.6	157	39	-
Hori.	7311.000	PK	47.17	37.45	8.96	43.51	2.26	52.33	73.9	21.5	150	0	-
Hori.	9748.000	PK	47.22	39.17	10.22	43.04	2.26	55.83	73.9	18.0	150	0	-
Hori.	4874.000	AV	40.87	31.63	7.30	42.84	2.26	39.22	53.9	14.6	157	39	VBW:4.3 kHz
Hori.	7311.000	AV	37.21	37.45	8.96	43.51	2.26	42.37	53.9	11.5	150	0	VBW:4.3 kHz,Floor noise
Hori.	9748.000	AV	37.04	39.17	10.22	43.04	2.26	45.65	53.9	8.2	150	0	VBW:4.3 kHz,Floor noise
Vert.	49.133	QP	41.39	11.56	7.26	31.92	0.00	28.29	40.0	11.7	100	121	-
Vert.	98.297	QP	44.15	9.93	8.09	31.89	0.00	30.28	43.5	13.2	100	208	-
Vert.	114.562	QP	35.46	12.53	7.98	31.88	0.00	24.09	43.5	19.4	100	229	-
Vert.	144.004	QP	39.01	14.62	8.54	31.85	0.00	30.32	43.5	13.1	100	273	-
Vert.	877.869	QP	25.01	22.05	9.62	30.99	0.00	25.69	46.0	20.3	100	37	-
Vert.	929.484	QP	29.01	22.20	9.86	30.71	0.00	30.36	46.0	15.6	100	53	-
Vert.	4874.000	PK	49.99	31.63	7.30	42.84	2.26	48.34	73.9	25.5	162	148	-
Vert.	7311.000	PK	47.34	37.45	8.96	43.51	2.26	52.50	73.9	21.4	150	0	-
Vert.	9748.000	PK	47.15	39.17	10.22	43.04	2.26	55.76	73.9	18.1	150	0	-
Vert.	4874.000	AV	40.28	31.63	7.30	42.84	2.26	38.63	53.9	15.2	162	148	VBW:4.3 kHz
Vert.	7311.000	AV	37.12	37.45	8.96	43.51	2.26	42.28	53.9	11.6	150	0	VBW:4.3 kHz,Floor noise
Vert.	9748.000	AV	37.31	39.17	10.22	43.04	2.26	45.92	53.9	7.9	150	0	VBW:4.3 kHz,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(3.89 m / 3.0 m) = 2.26 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	3	3
Date	July 20, 2022	July 22, 2022
Temperature / Humidity	21 deg.C, 52 %RH	23 deg.C, 57 %RH
Engineer	Hiromasa Sato	Hiromasa Sato
	(1 GHz -10 GHz)	(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	49.60	28.08	14.68	41.68	2.26	52.94	73.9	20.9	241	264	-
Hori.	4924.000	PK	49.39	31.71	7.32	42.81	2.26	47.87	73.9	26.0	152	27	-
Hori.	7386.000	PK	47.29	37.56	9.01	43.59	2.26	52.53	73.9	21.3	150	0	-
Hori.	9848.000	PK	47.26	39.15	10.27	42.91	2.26	56.03	73.9	17.8	150	0	-
Hori.	2483.500	AV	38.23	28.08	14.68	41.68	2.26	41.57	53.9	12.3	241	264	VBW:4.3 kHz
Hori.	4924.000	AV	40.02	31.71	7.32	42.81	2.26	38.50	53.9	15.4	152	27	VBW:4.3 kHz
Hori.	7386.000	AV	37.03	37.56	9.01	43.59	2.26	42.27	53.9	11.6	150	0	VBW:4.3 kHz,Floor noise
Hori.	9848.000	AV	37.21	39.15	10.27	42.91	2.26	45.98	53.9	7.9	150	0	VBW:4.3 kHz,Floor noise
Vert.	2483.500	PK	48.17	28.08	14.68	41.68	2.26	51.51	73.9	22.3	219	316	-
Vert.	4924.000	PK	50.27	31.71	7.32	42.81	2.26	48.75	73.9	25.1	155	136	-
Vert.	7386.000	PK	47.32	37.56	9.01	43.59	2.26	52.56	73.9	21.3	150	0	-
Vert.	9848.000	PK	47.13	39.15	10.27	42.91	2.26	55.90	73.9	18.0	150	0	-
Vert.	2483.500	AV	37.84	28.08	14.68	41.68	2.26	41.18	53.9	12.7	219	316	VBW:4.3 kHz
Vert.	4924.000	AV	40.21	31.71	7.32	42.81	2.26	38.69	53.9	15.2	155	136	VBW:4.3 kHz
Vert.	7386.000	AV	37.00	37.56	9.01	43.59	2.26	42.24	53.9	11.6	150	0	VBW:4.3 kHz,Floor noise
Vert.	9848.000	AV	36.94	39.15	10.27	42.91	2.26	45.71	53.9	8.1	150	0	VBW:4.3 kHz,Floor noise

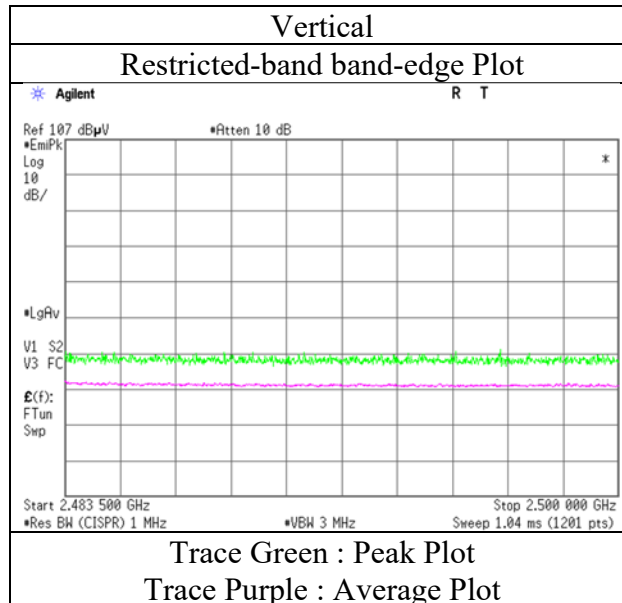
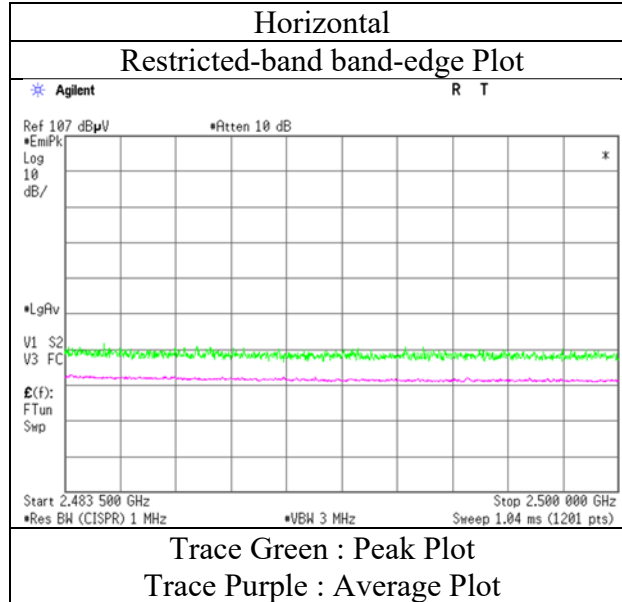
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.89\text{ m} / 3.0\text{ m}) = 2.26\text{ dB}$

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)

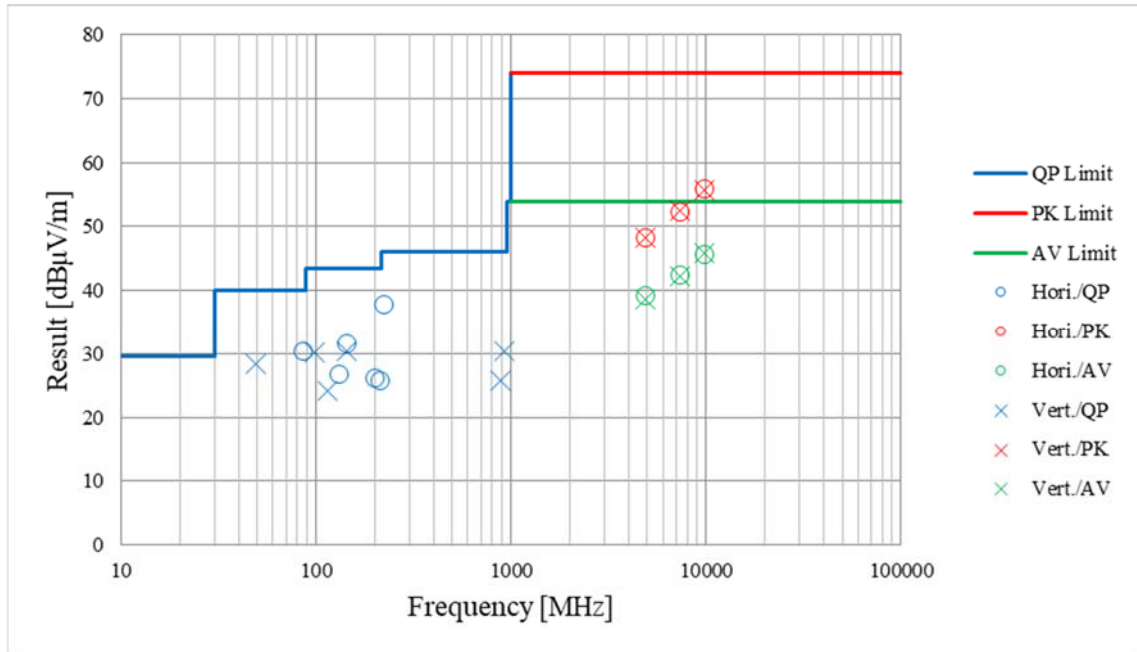
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	July 20, 2022
Temperature / Humidity	21 deg.C, 52 %RH
Engineer	Hiromasa Sato
Mode	Tx 11n-20 2462 MHz



* 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)

Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	2	3	3
Date	July 26, 2022	July 20, 2022	July 22, 2022
Temperature / Humidity	23 deg.C, 69 %RH	21 deg.C, 52 %RH	23 deg.C, 57 %RH
Engineer	Shiro Kobayashi (30 MHz -1 GHz)	Hiomasa Sato (1 GHz -10 GHz)	Hiomasa Sato (10 GHz -26.5 GHz)
Mode	Tx 11n-20 2437 MHz		

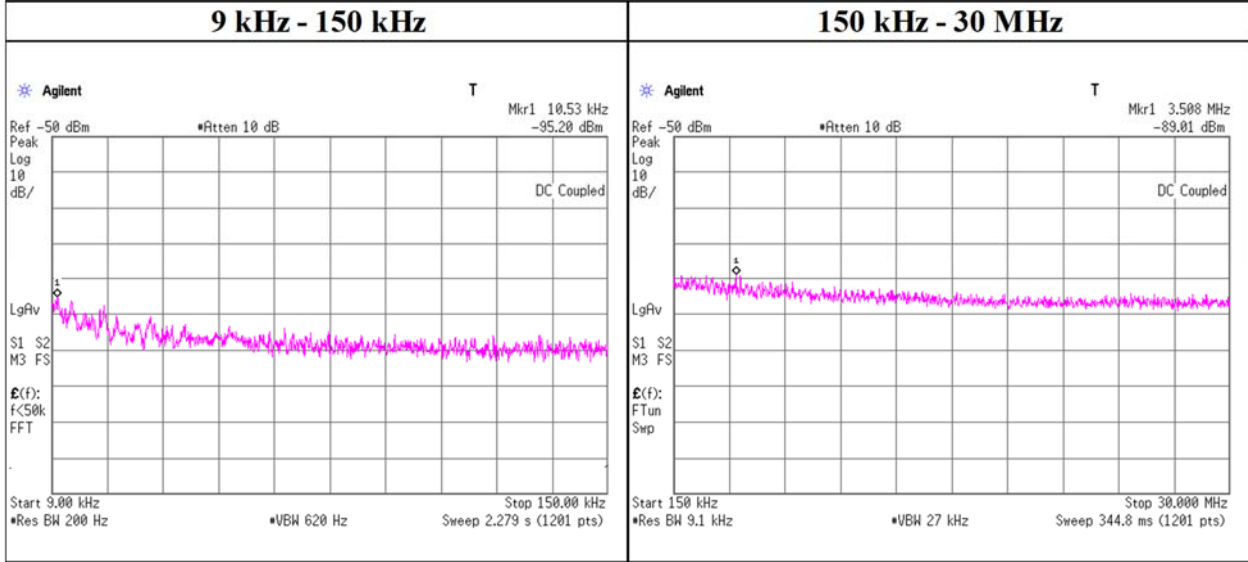


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Date	July 21, 2022
Temperature / Humidity	26 deg. C / 45 % RH
Engineer	Miku Ikudome
Mode	Tx 11n-20 2437 MHz

Tx, 2437 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain * [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
10.53	-95.2	1.0	10.1	2.0	1.0	-82.1	300	6.0	-20.8	47.1	67.9	-
3508.00	-89.0	1.0	10.1	2.0	1.0	-75.9	30	6.0	5.4	29.5	24.2	-

$E \text{ [dBuV/m]} = \text{EIRP [dBm]} - 20 \log(\text{Distance [m]}) + \text{Ground bounce [dB]} + 104.8 \text{ [dBuV/m]}$

$\text{EIRP [dBm]} = \text{Reading [dBm]} + \text{Cable loss [dB]} + \text{Attenuator Loss [dB]} + \text{Antenna gain [dBi]} + 10 * \log(N)$

N: Number of output

*2.0 dBi was applied to the test result based on ANSI C63.10 since antenna gain was less than 2.0 dBi.

Power Density

Test place	Shonan EMC Lab. No.5 Shielded Room
Date	July 27, 2022
Temperature / Humidity	25 deg. C / 49 % RH
Engineer	Hiromasa Sato
Mode	Tx

11b

Frequency [MHz]	Measured Frequency [MHz]	Reading [dBm/3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm/3 kHz]	Limit [dBm/3 kHz]	Margin [dB]
2412	2408.892	-12.61	2.40	10.17	-0.04	8.00	8.04
2437	2437.326	-7.41	2.41	10.18	5.18	8.00	2.82
2462	2462.326	-11.65	2.42	10.18	0.95	8.00	7.05

11g

Frequency [MHz]	Measured Frequency [MHz]	Reading [dBm/3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm/3 kHz]	Limit [dBm/3 kHz]	Margin [dB]
2412	2419.481	-27.18	2.40	10.17	-14.61	8.00	22.61
2437	2430.779	-23.46	2.41	10.18	-10.87	8.00	18.87
2462	2469.171	-31.24	2.42	10.18	-18.64	8.00	26.64

11n-20

Frequency [MHz]	Measured Frequency [MHz]	Reading [dBm/3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm/3 kHz]	Limit [dBm/3 kHz]	Margin [dB]
2412	2417.642	-24.95	2.40	10.17	-12.38	8.00	20.38
2437	2432.887	-23.92	2.41	10.18	-11.33	8.00	19.33
2462	2466.650	-30.11	2.42	10.18	-17.51	8.00	25.51

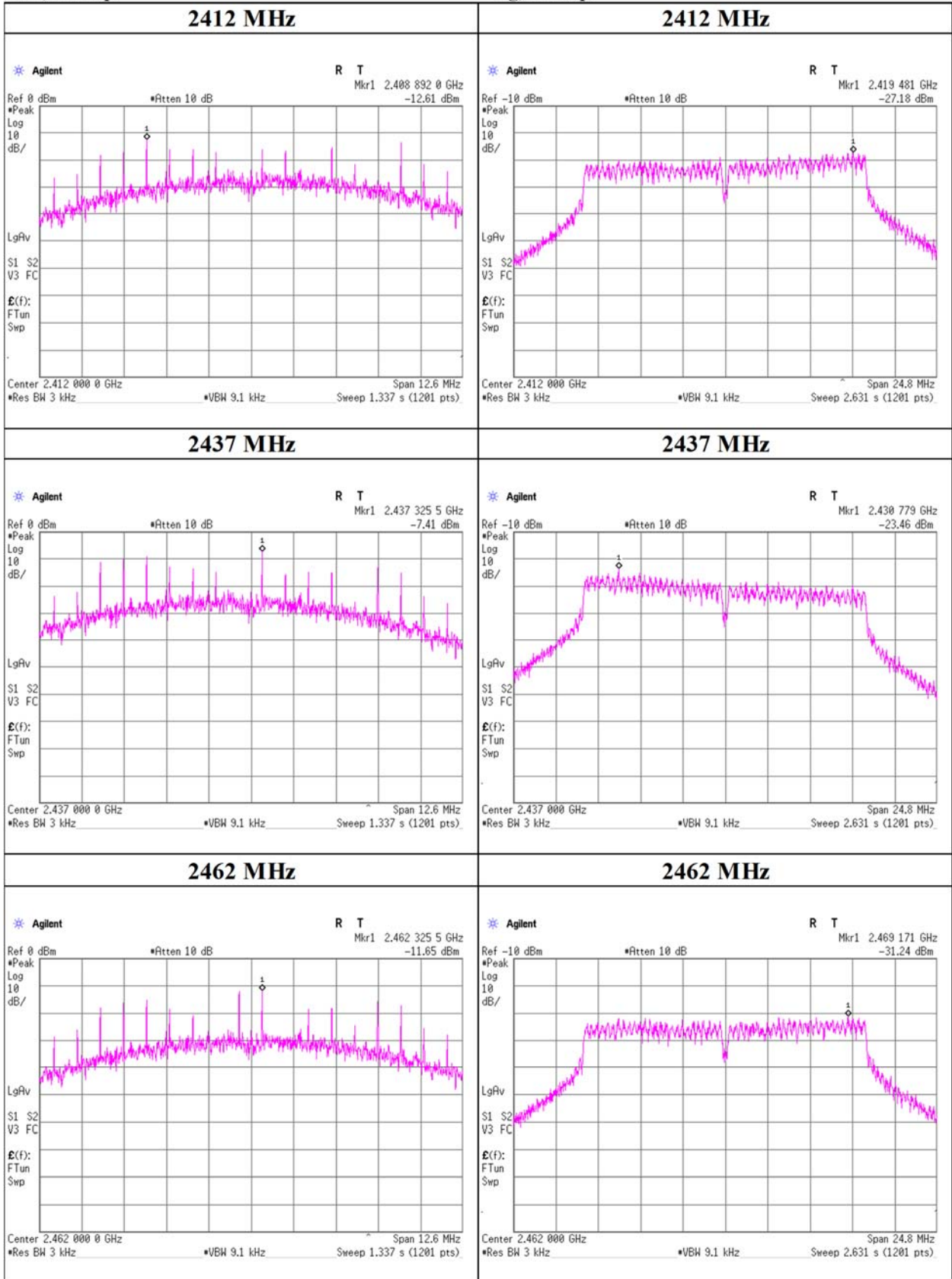
Sample Calculation:

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

Power Density

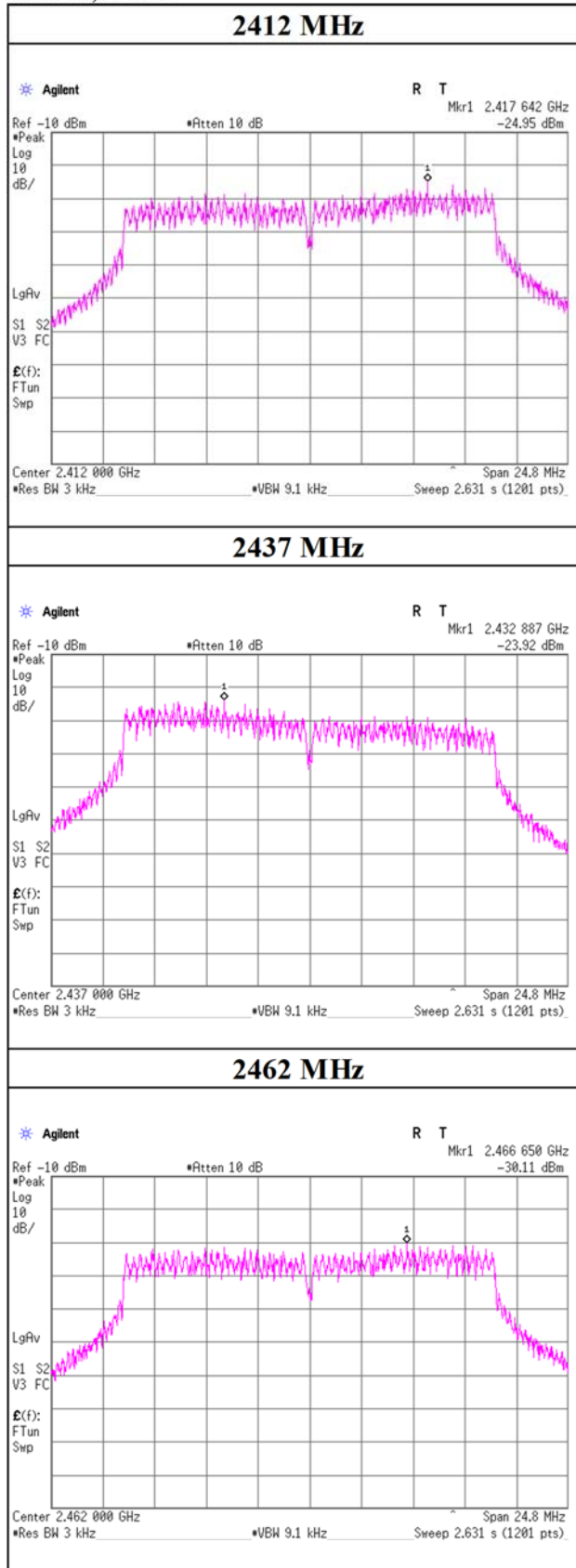
11b, 11 Mbps

11g, 54 Mbps



Power Density

11n-20, MCS 6



APPENDIX 2: Test Instruments

Test Equipment [1/2]

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	SAT10-15	160493	Attenuator	Weinschel Corp.	54A-10	83406	2021/12/07	12
AT	SCC-G14	145175	Coaxial Cable	Suhner	SUCOFLEX 102	31600/2	2021/12/06	12
AT	SOS-27	191845	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2021/08/02	12
AT	SPM-13	169910	Power Meter	Keysight Technologies Inc	8990B	MY51000448	2022/01/25	12
AT	SPSS-06	169911	Power sensor	Keysight Technologies Inc	N1923A	MY57270004	2022/01/25	12
AT	SRENT-15	160899	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46185516	2022/02/02	12
AT	STM-G7	171614	Terminator	Weinschel - API Technologies Corp	M1459A	88995	2022/05/12	12
AT	STS-05	146212	Digital Hitester	HIOKI E.E. CORPORATION	3805-50	80997828	2021/09/14	12
RE	COTS-SEMI-5	170932	EMI Software	TSJ (Techno Science Japan)	TEPTO-DV3(RE,CE,ME,P E)	-	-	-
RE	KJM-02	146432	Measure	TAJIMA	GL19-55	-	-	-
RE	KSA-08	145089	Spectrum Analyzer	Keysight Technologies Inc	E4446A	MY46180525	2021/10/13	12
RE	SAEC-02(NSA)	145563	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	2022/03/20	12
RE	SAEC-03(SVSWR)	145566	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	2022/05/18	12
RE	SAF-02	145004	Pre Amplifier	SONOMA	310N	290212	2022/02/24	12
RE	SAF-06	145005	Pre Amplifier	Toyo Corporation	TPA0118-36	1440491	2022/02/04	12
RE	SAF-08	145007	Pre Amplifier	Toyo Corporation	HAP18-26W	19	2022/03/03	12
RE	SAT10-06	145137	Attenuator	Keysight Technologies Inc	8493C-010	74865	2021/10/05	12
RE	SAT3-11	150921	Attenuator	JFW	50HF-003N	-	2022/02/21	12
RE	SAT6-14	167095	Attenuator	JFW	50HF-006N	-	2022/02/21	12
RE	SBA-02	145022	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	BBA9106	91032665	2022/04/16	12
RE	SCC-B1/B3/B5/B7/B8/B13/SRSE-02	144975	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	2022/04/20	12
RE	SCC-B2/B4/B6/B7/B8/B13/SRSE-02	144976	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	2022/04/20	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-G43	156380	Coaxial Cable	Huber+Suhner	SUCOFLEX_104_E	SN MY 13406/4E	2022/05/20	12
RE	SCC-G57	179540	Coaxial Cable	Huber+Suhner	SUCOFLEX 102	802815/2	2022/05/12	12
RE	SCC-G58	183047	Coaxial Cable	Huber+Suhner	SUCOFLEX 104	800287/4A	2022/05/20	12
RE	SCC-G70	200010	Coaxial Cable	Huber+Suhner	SUCOFLEX 104	575618/4	2022/07/22	12

Test Equipment [2/2]

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	SFL-02	145301	Highpass Filter	MICRO-TRONICS	HPM50111	51	2021/10/07	12
RE	SHA-03	145501	Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	9120D-739	2022/03/16	12
RE	SHA-04	145512	Horn Antenna	ETS-Lindgren	3160-09	00094868	2022/06/06	12
RE	SHA-10	194685	Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA 9120 C	711	2022/03/16	12
RE	SJM-20	207277	Measuring	ASKUL	-	-	-	-
RE	SLA-06	145528	Logperiodic Antenna	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	195	2022/04/16	12
RE	SOS-21	191838	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2021/08/02	12
RE	SOS-23	191840	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2021/08/02	12
RE	STR-01	145790	Test Receiver	Rohde & Schwarz	ESU40	100093	2022/04/28	12
RE	STS-02	145793	Digital Hitester	HIOKI E.E. CORPORATION	3805-50	80997819	2022/04/07	12
RE	STS-03	146210	Digital Hitester	HIOKI E.E. CORPORATION	3805-50	80997823	2021/09/14	12

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

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

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

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

**Test item: RE: Radiated Emission
AT: Antenna Terminal Conducted**