



Test report No.
Page
Issued date
FCC ID

: 14033439S-A
: 1 of 52
: March 22, 2022
: AK8XAVAX6000

RADIO TEST REPORT

Test Report No. : 14033439S-A

Applicant : Sony Corporation Japan & Sony Group Companies
Type of EUT : AV Receiver
Model Number of EUT : XAV-AX6000
FCC ID : AK8XAVAX6000
Test regulation : FCC Part 15 Subpart C: 2021
Test result : Complied (Refer to SECTION 3)

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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6. This test report covers Radio technical requirements.
It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. The all test items in this test report are conducted by UL Japan, Inc. Shonan EMC Lab.
8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
9. The information provided from the customer for this report is identified in SECTION 1.

Date of test: January 20 to February 4, 2022

Representative test engineer:

T. Kawakami

Takahiro Kawakami
Engineer

Approved by:

K. Noda

Kazuya Noda
Leader



CERTIFICATE 1266.03

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

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REVISION HISTORY

Original Test Report No.: 14033439S-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	14033439S-A	March 22, 2022	-	-

Reference: Abbreviations (Including words undescribed in this report)

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

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SECTION 1: Customer information

Company Name	:	Sony Corporation Japan & Sony Group Companies
Address	:	700/402 Moo. 7, Amata City Chonburi Industrial Estate, Don Hua Roh, Muang Chonburi, Chonburi 20000, Thailand
Telephone Number	:	+66 38 214900 17 Ext : 1932
Contact Person	:	Jumroen Phaoenchoke

The information provided from the customer is as follows;

- Applicant, Type of EUT, Model Number of EUT, FCC ID on the cover and other relevant pages
 - Operating/Test Mode(s) (Mode(s)) on all the relevant pages
 - SECTION 1: Customer information
 - SECTION 2: Equipment under test (EUT) other than the Receipt Date
 - SECTION 4: Operation of EUT during testing
- * The laboratory is exempted from liability of any test results affected from the above information in SECTION 2 and 4.

SECTION 2: Equipment under test (EUT)

2.1 Identification of EUT

Type	:	AV Receiver
Model Number	:	XAV-AX6000
Serial Number	:	Refer to SECTION 4.2
Receipt Date	:	January 17, 2022
Condition	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	:	No Modification by the test lab.

2.2 Product Description

Model: XAV-AX6000 (referred to as the EUT in this report) is a AV Receiver.

General Specification

Rating	:	DC 12 V
Clock frequency (ies) in the system	:	32.768 kHz (GPS), 32.768 kHz (MCU), 32.768 kHz (PMIC), 28.6363630 MHz (Video Decoder), 24 MHz (SoC), 9.25 MHz (MCU), 12 MHz (FM/AM Tuner), 26 MHz (GPS) 6.144 MHz (Audio I2S), 12.288 MHz (DSP), 12.288 MHz (DAC_PCM), 48 MHz (WiFi/BT Module), 1600 MHz (SoC CPU), 1500 MHz (DDR4), 200 MHz (MIPI), 240 MHz (USB), 200 MHz (SDIO, eMMC)

Radio Specification

Bluetooth (BR / EDR function)

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	FHSS, GFSK
Antenna type	:	Monopole antenna
Antenna Gain	:	2.0 dBi (Peak), -3.7 dBi (Average)
Operating Temperature	:	0 deg. C to +40 deg. C
Clock frequency	:	48 MHz

Wireless LAN

Radio Type	:	Transceiver
Frequency of Operation	:	5745 MHz - 5825 MHz
Modulation	:	OFDM
Antenna type	:	Monopole antenna
Antenna Gain	:	3.2 dBi (Peak), -7.2 dBi (Average)
Operating Temperature	:	0 deg. C to +40 deg. C
Clock frequency	:	48 MHz

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC Part 15 final revised on May 3, 2021 and effective July 2, 2021

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

* Also the EUT complies with FCC Part 15 Subpart B.

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	N/A	-
Carrier Frequency Separation	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section15.247(a)(1) ISED: RSS-247 5.1 (b)	See data.	Complied a)	Conducted
20 dB Bandwidth	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section15.247(a)(1) ISED: RSS-247 5.1 (a)		Complied a)	Conducted
Number of Hopping Frequency	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section15.247(a)(1)(iii) ISED: RSS-247 5.1 (d)		Complied b)	Conducted
Dwell time	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section15.247(a)(1)(iii) ISED: RSS-247 5.1 (d)		Complied c)	Conducted
Maximum Peak Output Power	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.12	FCC: Section15.247(a)(b)(1) ISED: RSS-247 5.4 (b)		Complied d)	Conducted
Spurious Emission & Band Edge Compliance	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	5.8 dB 341.979 MHz, QP, Horizontal, Mode: Tx, 2DH5 2441 MHz	Complied# e) / f)	Conducted/ Radiated (above 30 MHz) *1)

Note: UL Japan, Inc.'s EMI Work Procedures:Work Instructions-ULID-003591 and Work Instructions-ULID-003593.

*1) The test is not applicable since the EUT does not have AC power ports.

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

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

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

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

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

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

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

Symbols:

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

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

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

FCC Part 15.31 (e)

The 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.

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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.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99 % Occupied Bandwidth	ISED: RSS-Gen 6.7	ISED: -	N/A	Complied a)	Conducted
a) Refer to APPENDIX 1 (data of 20 dB Bandwidth, 99 %Occupied Bandwidth and Carrier Frequency Separation)					

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

3.4 Uncertainty

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

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k = 2$.
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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-30 MHz	2.6 dB	2.6 dB	2.7 dB	2.7 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	2.9 dB	2.9 dB	2.9 dB	-
	30 MHz-200 MHz	4.6 dB	4.6 dB	4.6 dB	-
	200 MHz-1 GHz	6.0 dB	6.0 dB	6.0 dB	-
	1 GHz-6 GHz	4.8 dB	4.8 dB	4.8 dB	-
	6 GHz-18 GHz	5.4 dB	5.4 dB	5.4 dB	-
	18 GHz-40 GHz	5.6 dB	5.6 dB	5.7 dB	-
Radiated emission (Measurement distance: 1 m)	1 GHz-18 GHz	5.7 dB	5.7 dB	5.7 dB	-
	18 GHz-40 GHz	5.9 dB	5.9 dB	5.9 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 1GHz	0.93 dB
Spurious emission (Conducted), Power Density measurement 1 GHz-3 GHz	0.92 dB
Spurious emission (Conducted), Power Density measurement 3 GHz-18 GHz	2.3 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.3 dB
Spurious emission (Conducted) 26.5 GHz-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 %

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3.5 Test Location

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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)

Bluetooth (BT): Transmitting (Tx), Payload: PRBS9

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Spurious Emission (Conducted) Spurious Emission (Radiated) 20 dB Bandwidth	Tx (Hopping Off) DH5, 2DH5	2402 MHz 2441 MHz 2480 MHz
Carrier Frequency Separation	Tx (Hopping On) DH5, 2DH5	2402 MHz 2441 MHz 2480 MHz
Number of Hopping Frequency	Tx (Hopping On) DH5, 2DH5	-
Dwell time	Tx (Hopping On), -DH1, DH3, DH5 -2DH1, 2DH3, 2DH5	-
Maximum Peak Output Power	Tx (Hopping Off) DH5, 2DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Band Edge Compliance (Conducted)	Tx DH5, 2DH5 -Hopping On -Hopping Off	2402 MHz 2480 MHz
99 % Occupied Bandwidth	Tx DH5, 2DH5 -Hopping On -Hopping Off	2402 MHz 2441 MHz 2480 MHz
*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length (except Dwell time test) *3DH mode (3 Mb/s EDR: 8DPSK) was excluded for other tests than power measurement by using 2DH mode (2 Mb/s EDR: pi/4DQPSK) as a representative. * It is considered that the non-tested packet type (e.g. inquiry) can be omitted as it is complied with above all the test items based on Bluetooth Core specification. *EUT has the power settings by the software as follows; Power settings: 9 Software: Tera Team Version 4.105 Qualcomm Radio Control Tool Version 4.0.00158.0 (Date: 2022.1.20, 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.		

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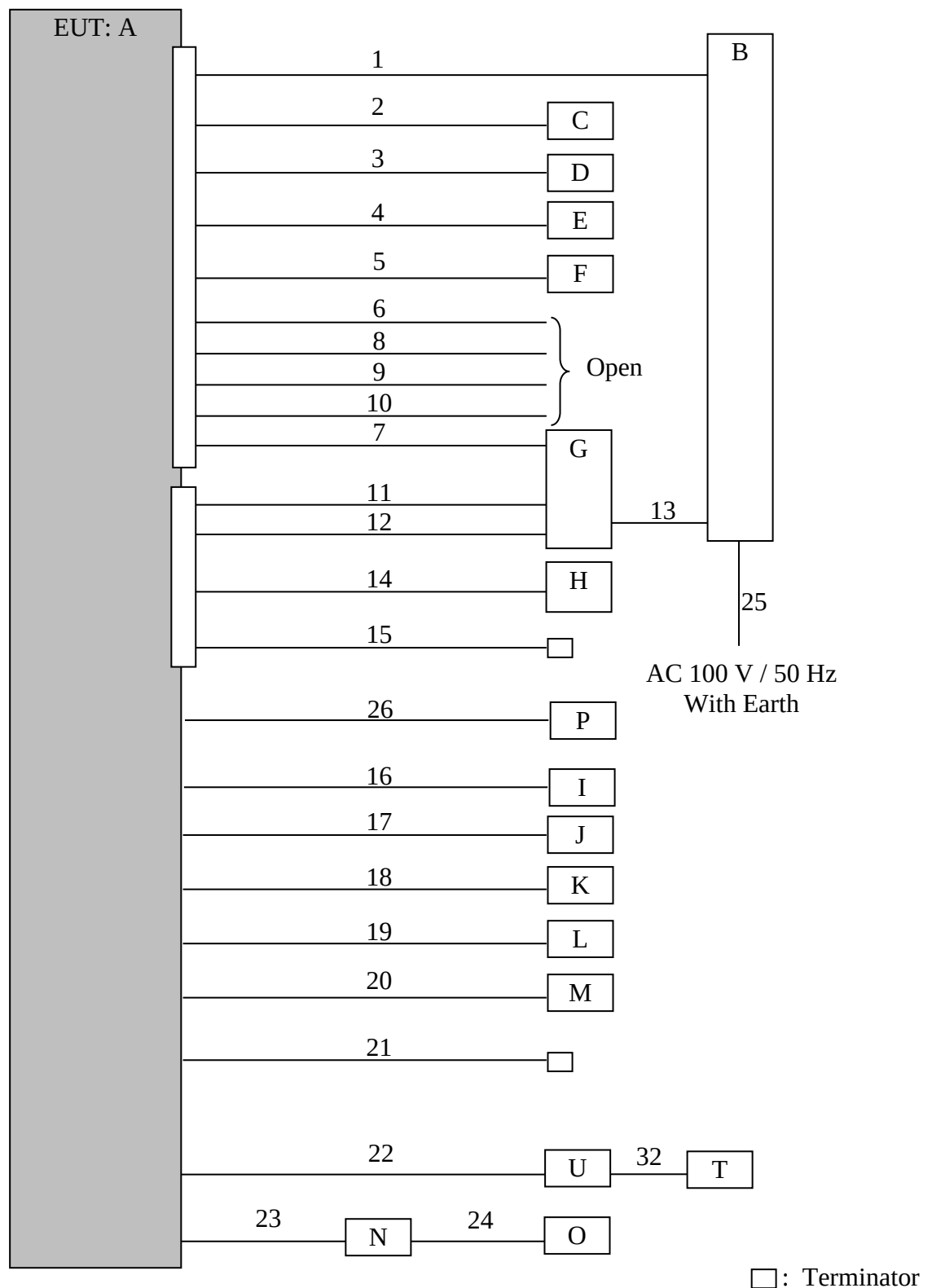
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4.2 Configuration and peripherals

<For Radiated Emission>

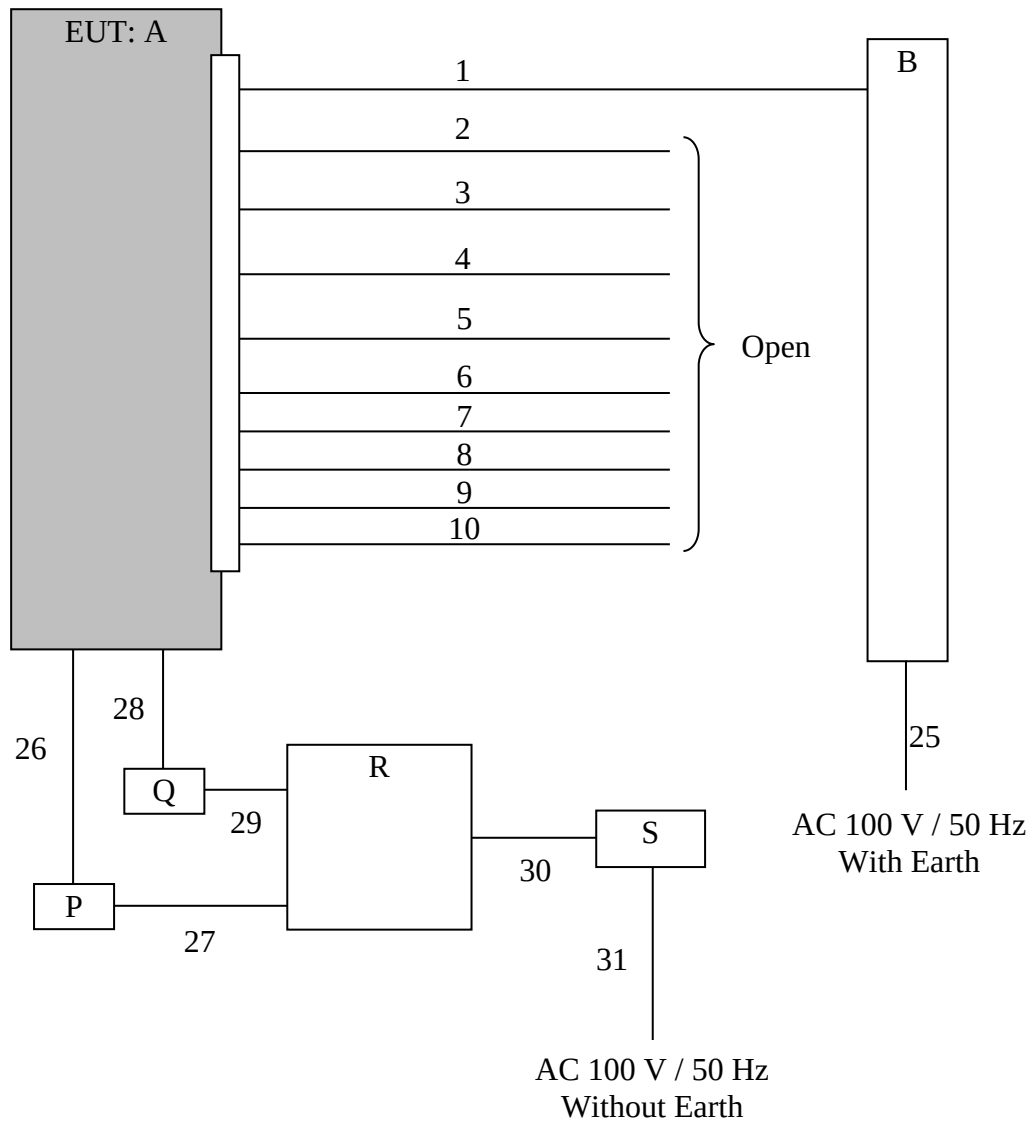


* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

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<For Antenna Terminated conducted test>



Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	AV Receiver	XAV-AX6000	120*1) 119*2)	SONY	EUT
B	DC Power Supply	PAN35-10A	NL002383	Kikusui	-
C	Speaker	TS-F1030	V44QAH2	Pioneer	-
D	Speaker	TS-F1030	V44QAH2	Pioneer	-
E	Speaker	TS-F1030	V44QBA1	Pioneer	-
F	Speaker	TS-F1030	V44QBA1	Pioneer	-
G	Amplifier	XM-GS4	0000052	SONY	-
H	Video Camera	HC-W585M	DM7LA002009	Panasonic	-
I	USB Memory	RUF3-AC32G-YE	P00316	BUFFALO	-
J	Microphone	-	-	SONY	-
K	Wired Remote Controller	RM-X4S	-	SONY	-
L	GPS Antenna	-	-	SONY	-
M	Universal Radio Replacement And Steering Wheel Interface	ADS-MRR	-	Maestro	-
N	Sirius XM Tuner	SXV300	1VH90D08	SiriusXM Radio	-
O	Antenna	NGVA3	1624A	SiriusXM Radio	-
P	Jig Board	-	-	-	*3)
Q	USB-LAN Converter	EDC-GUA3-W	08L168706500A	ELECOM	-
R	Laptop PC	ThinkPad L580	PF-1PMM0X	Lenovo	-
S	AC Adapter	ADLX45YLC2A	8SSA10E75842L1 CZ9480J61	Lenovo	-
T	iPhone	MQ792JA	C8PY95XLLC6H	Apple	-
U	Lightning Digital AV Adapter	A1438	-	Apple	-

*1) Used for Antenna Terminal conducted test

*2) Used for Radiated Emission test

*3) This support equipment is for testing and is not included with products.

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List of cables used

No.	Cable	Length (m)	Shield-Cable	Shield-Connector	Remarks
1	DC	0.15+2.8*4) 0.15+1.0+0.1 *5)	Unshielded	Unshielded	ACC, B+, GND
2	Speaker	0.15 *4) 0.15+2.0+0.15 *5)	Unshielded	Unshielded	Front-L (+/-)
3	Speaker	0.15 *4) 0.15+2.0+0.15 *5)	Unshielded	Unshielded	Front-R (+/-)
4	Speaker	0.15 *4) 0.15+2.0+0.15 *5)	Unshielded	Unshielded	Rear-L (+/-)
5	Speaker	0.15 *4) 0.15+2.0+0.15 *5)	Unshielded	Unshielded	Rear-R (+/-)
6	ILL	0.15 *4) 0.15+1.0 *5)	Unshielded	Unshielded	-
7	REM OUT	0.15 *4) 0.15+1.5+0.3 *5)	Unshielded	Unshielded	-
8	SPEED IN	0.15 *4) 0.15+1.0 *5)	Unshielded	Unshielded	-
9	REVERSE IN	0.15 *4) 0.15+1.0 *5)	Unshielded	Unshielded	-
10	Parking Brake	2.0	Unshielded	Unshielded	-
11	AUDIO OUT 1	0.15+3.6	Shielded	Shielded	L/R
12	AUDIO OUT 2	0.15+3.6	Shielded	Shielded	L/R
13	DC	1.4	Unshielded	Unshielded	-
14	REAR CAMERA IN	0.15+3.5	Shielded	Shielded	-
15	SUB OUT	0.15+1.5	Shielded	Shielded	-
16	USB	1.5	Shielded	Shielded	-
17	Microphone	3.5	Shielded	Shielded	-
18	Wired Remote Controller	1.9	Shielded	Shielded	-
19	GPS Antenna	3.0	Shielded	Shielded	-
20	Data Link	3.0	Unshielded	Unshielded	-
21	AM/FM Antenna	2.0	Shielded	Shielded	-
22	HDMI	2.0	Shielded	Shielded	-
23	Sirius XM	0.65	Shielded	Shielded	-
24	Antenna	7.0	Shielded	Shielded	-
25	AC	1.8	Unshielded	Unshielded	-
26	Signal	0.12	Unshielded	Unshielded	*6)
27	USB	1.2	Shielded	Shielded	-
28	USB	0.1	Shielded	Shielded	-
29	LAN	1.0	Unshielded	Unshielded	-
30	DC	1.8	Unshielded	Unshielded	-
31	AC	0.9	Unshielded	Unshielded	-
32	Lightning	0.05	Shielded	Shielded	-

*4) For Antenna Terminal conducted test.

*5) For Radiated Emission test.

*6) This cable is for testing and is not included with products.

SECTION 5: Radiated Spurious Emission

Test Procedure

[For below 1 GHz]

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

[For above 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 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

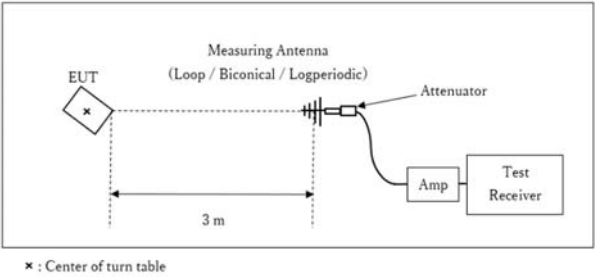
20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9 (ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).

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	RBW: 1 MHz VBW: 1/T (T: burst length, refer to Burst rate confirmation sheet) Detector: Peak	RBW: 100 kHz VBW: 300 kHz

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

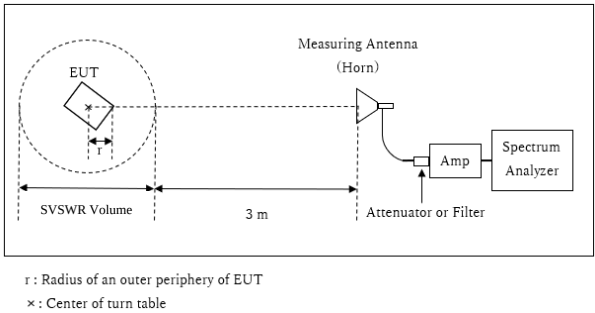
Figure 2: Test Setup

Below 1 GHz



Test Distance: 3 m

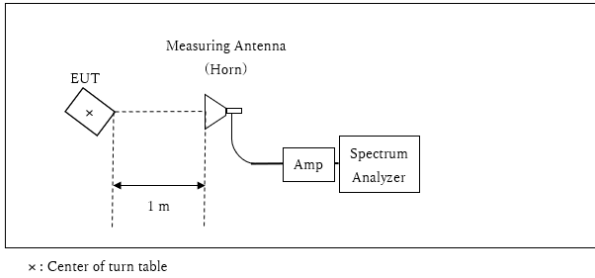
1 GHz - 10 GHz



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

SVSWR Volume : 2.0 m
(SVSWR Volume has been calibrated based on CISPR 16-1-4.)
 $r = 0.1 \text{ m}$

10 GHz - 40 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 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

Test data

Test result

: 30 MHz - 26.5 GHz

: APPENDIX

: 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
20 dB Bandwidth	3 MHz	30 kHz	100 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99 % Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak Average *2)	-	Power Meter (Sensor: 160 MHz BW)
Carrier Frequency Separation	3 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Dwell Time	Zero Span	100 kHz, 1 MHz	300 kHz, 3 MHz	As necessary capture the entire dwell time per hopping channel	Peak	Clear Write	Spectrum Analyzer
Conducted Spurious Emission *3) *4)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	10 kHz	30 kHz				
	30 MHz to 25 GHz	100 kHz	300 kHz				
Conducted Spurious Emission Band Edge compliance	10 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer

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

*2) Reference data

*3) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.

Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.

*4) The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ohms. For example, the measurement at frequency 9 kHz resulted in a level of 45.5 dBuV/m, which is equivalent to $45.5 - 51.5 = -6.0$ dBuA/m, which has the same margin, 3 dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

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

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

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

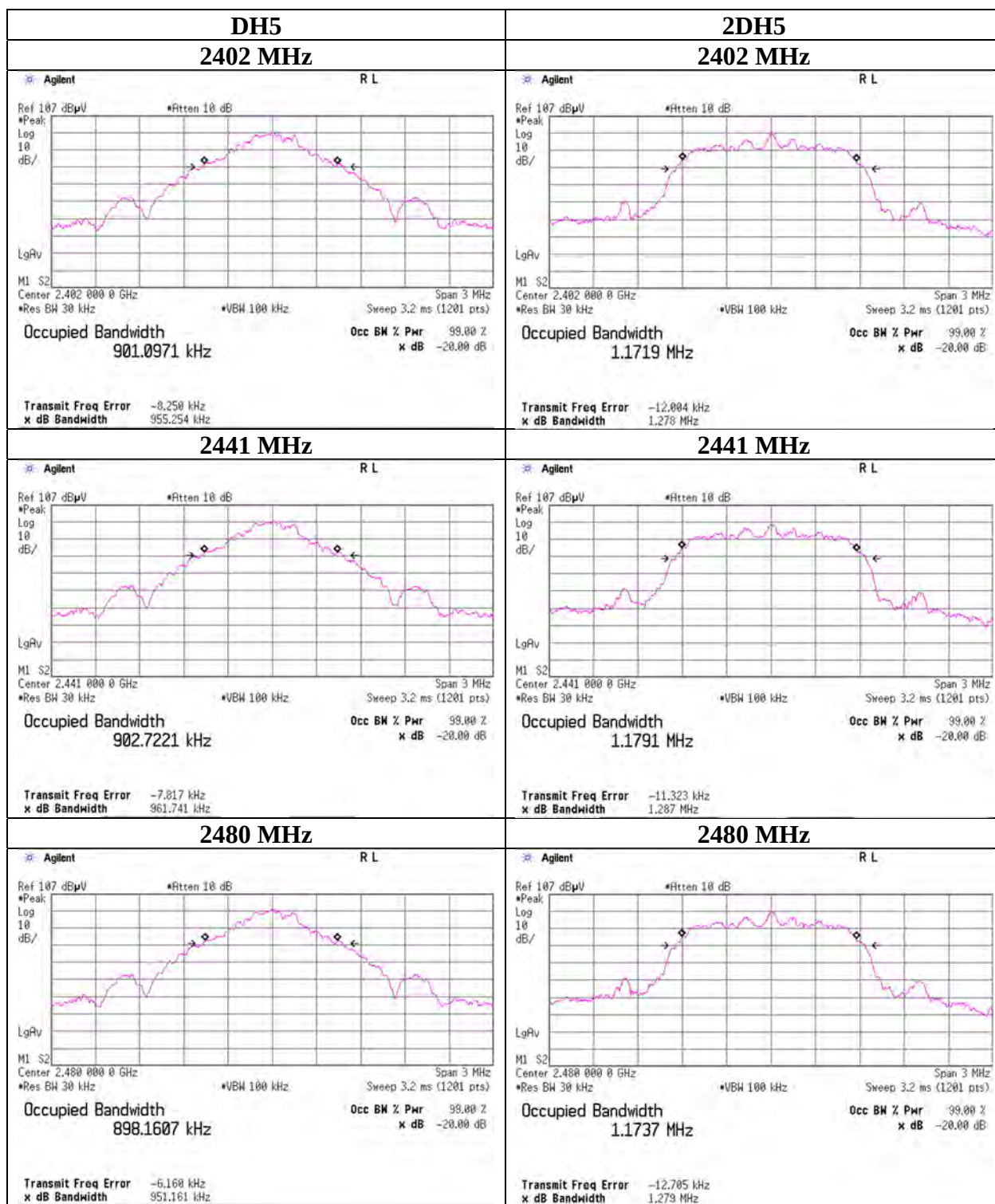
Report No.	14033439S-A
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	January 20, 2022
Temperature / Humidity	23 deg. C / 23 % RH
Engineer	Takahiro Kawakami
Mode	Tx, Hopping Off, Tx, Hopping On

Mode	Freq. [MHz]	20 dB Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.955	901.1	1.000	>= 0.637
DH5	2441.0	0.962	902.7	1.000	>= 0.641
DH5	2480.0	0.951	898.2	1.000	>= 0.634
DH5	Hopping On	-	78594.1	-	-
2DH5	2402.0	1.278	1171.9	1.000	>= 0.852
2DH5	2441.0	1.287	1179.1	1.000	>= 0.858
2DH5	2480.0	1.279	1173.7	1.000	>= 0.852
2DH5	Hopping On	-	78698.5	-	-

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

No limit applies to 20 dB Bandwidth.

20dB Bandwidth and 99% Occupied Bandwidth



UL Japan, Inc.

Shonan EMC Lab.

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

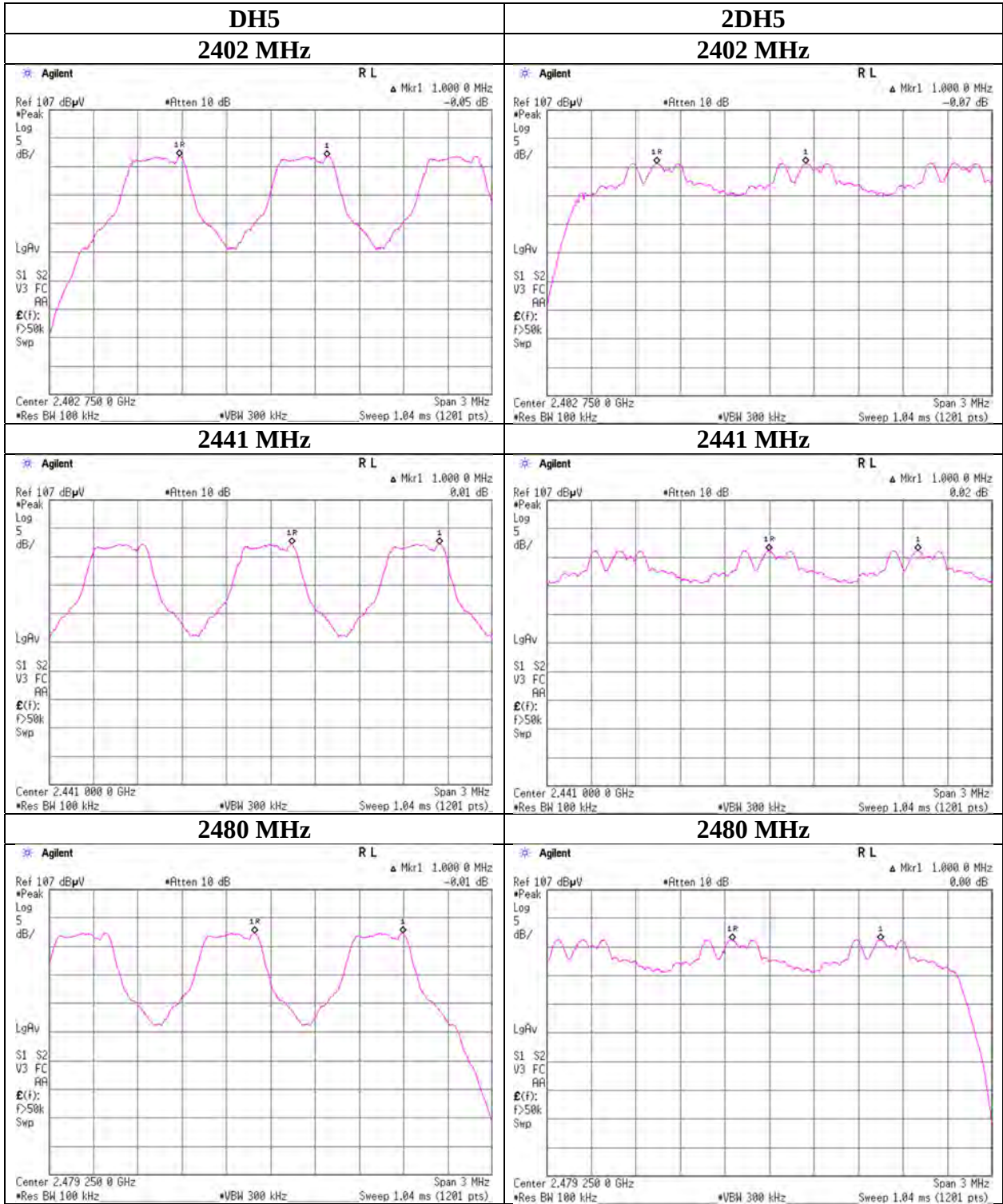
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

20dB Bandwidth and 99% Occupied Bandwidth



Carrier Frequency Separation



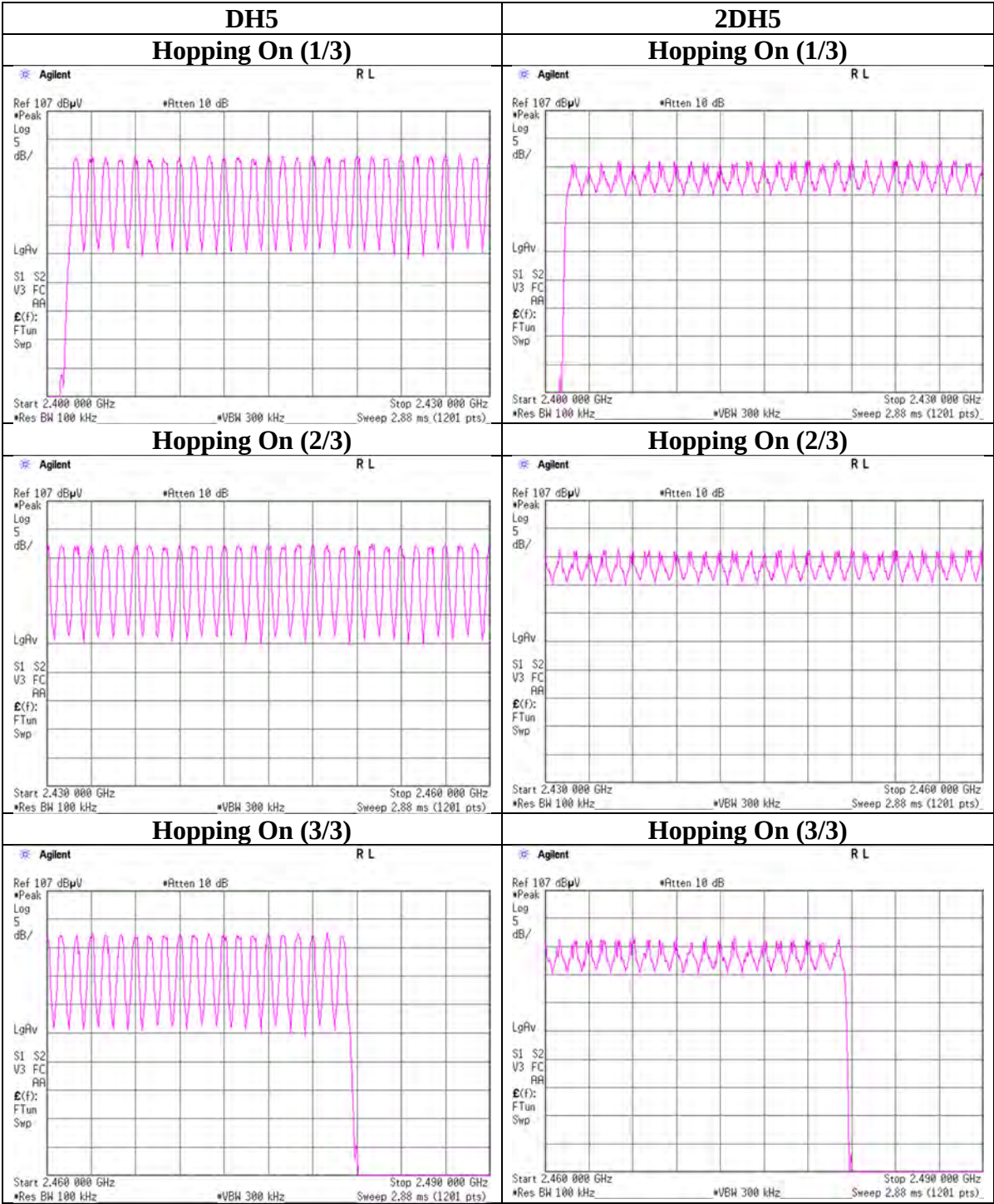
Number of Hopping Frequency

Report No.	14033439S-A
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	January 20, 2022
Temperature / Humidity	23 deg. C / 23 % RH
Engineer	Takahiro Kawakami
Mode	Tx, Hopping On

Mode	Number of channel [channels]	Limit [channels]
DH5	79	>= 15
2DH5	79	>= 15

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

Number of Hopping Frequency



Dwell time

Report No.	14033439S-A
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	January 20, 2022
Temperature / Humidity	23 deg. C / 23 % RH
Engineer	Takahiro Kawakami
Mode	Tx, Hopping On

Mode	Number of transmission in a 31.6(79 Hopping x 0.4)	Length of transmission [msec]	Result [msec]	Limit [msec]
DH1	49.8 times / 5 sec. x 31.6 sec. = 315 times	0.402	127	400
DH3	26.2 times / 5 sec. x 31.6 sec. = 166 times	1.658	275	400
DH5	16.6 times / 5 sec. x 31.6 sec. = 105 times	2.908	305	400
2DH1	49.6 times / 5 sec. x 31.6 sec. = 314 times	0.408	128	400
2DH3	25.6 times / 5 sec. x 31.6 sec. = 162 times	1.658	269	400
2DH5	16.6 times / 5 sec. x 31.6 sec. = 105 times	2.912	306	400

Sample Calculation

Result = Number of transmission x Length of transmission

*Average data of 5 tests.(except Inquiry)

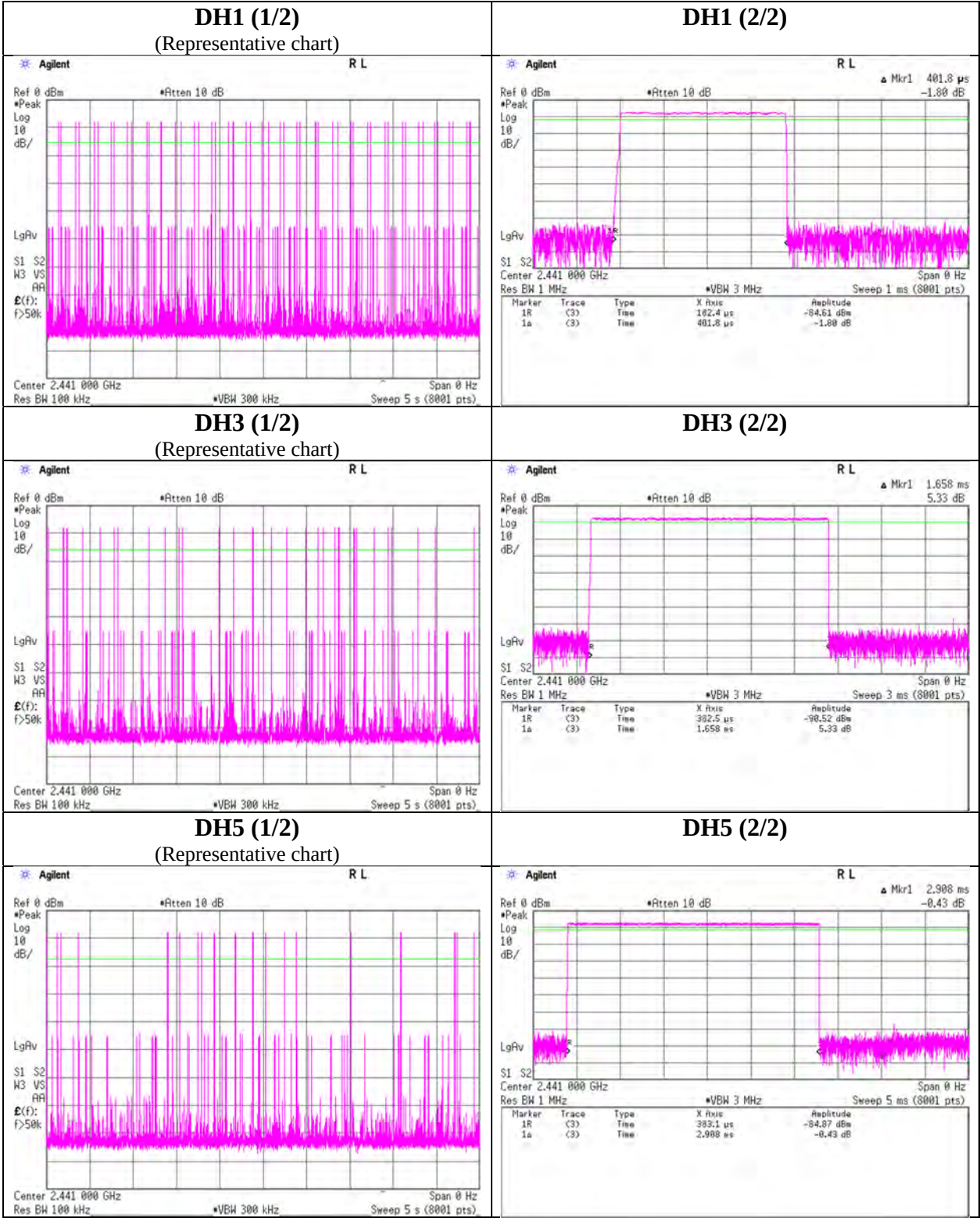
Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	49	49	50	52	49	49.8
DH3	29	28	22	24	28	26.2
DH5	19	15	18	16	15	16.6
2DH1	51	49	49	49	50	49.6
2DH3	29	23	22	27	27	25.6
2DH5	16	20	16	16	15	16.6

Sample Calculation

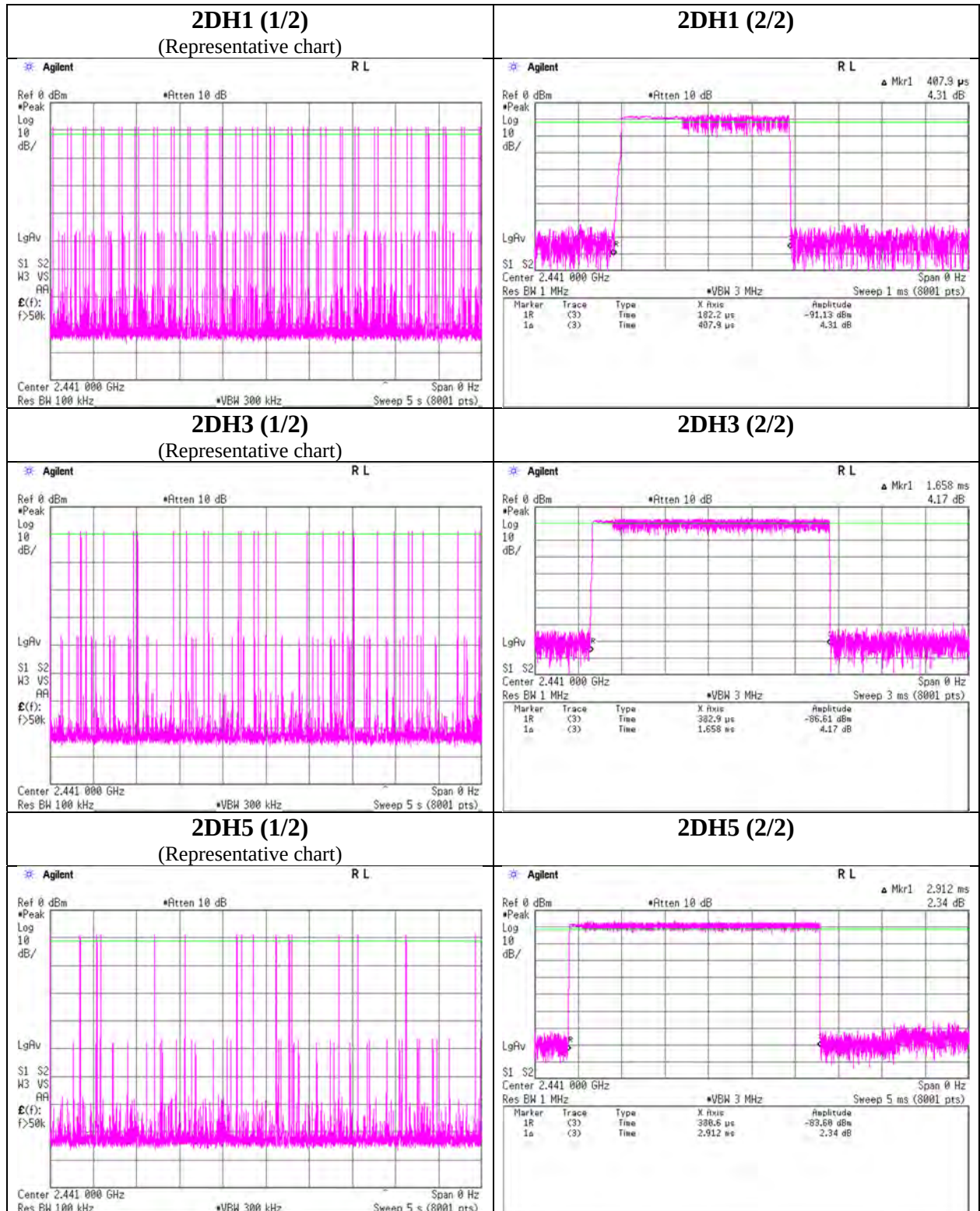
Average = Summation (Sampling 1 to 5) / 5

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

Dwell time



Dwell time



Maximum Peak Output Power

Report No.	14033439S-A
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	January 20, 2022
Temperature / Humidity	23 deg. C / 23 % RH
Engineer	Takahiro Kawakami
Mode	Tx, Hopping Off

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Conducted Power					e.i.r.p. for RSS-247					
					Result		Limit		Margin	Antenna Gain [dBi]	Result		Limit		Margin
					[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-7.53	1.78	10.17	4.42	2.77	20.96	125	16.54	2.00	6.42	4.39	36.02	4000	29.60
DH5	2441.0	-7.11	1.80	10.18	4.87	3.07	20.96	125	16.09	2.00	6.87	4.86	36.02	4000	29.15
DH5	2480.0	-7.00	1.81	10.18	4.99	3.16	20.96	125	15.97	2.00	6.99	5.00	36.02	4000	29.03
2DH5	2402.0	-6.47	1.78	10.17	5.48	3.53	20.96	125	15.48	2.00	7.48	5.60	36.02	4000	28.54
2DH5	2441.0	-6.02	1.80	10.18	5.96	3.94	20.96	125	15.00	2.00	7.96	6.25	36.02	4000	28.06
2DH5	2480.0	-5.95	1.81	10.18	6.04	4.02	20.96	125	14.92	2.00	8.04	6.37	36.02	4000	27.98
3DH5	2402.0	-6.76	1.78	10.17	5.19	3.30	20.96	125	15.77	2.00	7.19	5.24	36.02	4000	28.83
3DH5	2441.0	-6.40	1.80	10.18	5.58	3.61	20.96	125	15.38	2.00	7.58	5.73	36.02	4000	28.44
3DH5	2480.0	-6.28	1.81	10.18	5.71	3.72	20.96	125	15.25	2.00	7.71	5.90	36.02	4000	28.31

Sample Calculation:

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

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

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

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

Average Output Power
(Reference data for RF Exposure)

Report No. 14033439S-A
Test place Shonan EMC Lab. No.1 Measurement Room
Date January 20, 2022
Temperature / Humidity 23 deg. C / 23 % RH
Engineer Takahiro Kawakami
Mode Tx, Hopping Off

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
					[dBm]	[mW]		[dBm]	[mW]
DH5	2402.0	-9.46	1.78	10.17	2.49	1.77	1.11	3.60	2.29
DH5	2441.0	-9.00	1.80	10.18	2.98	1.99	1.11	4.09	2.56
DH5	2480.0	-8.90	1.81	10.18	3.09	2.04	1.11	4.20	2.63
2DH5	2402.0	-10.92	1.78	10.17	1.03	1.27	1.10	2.13	1.63
2DH5	2441.0	-10.41	1.80	10.18	1.57	1.44	1.10	2.67	1.85
2DH5	2480.0	-10.33	1.81	10.18	1.66	1.47	1.10	2.76	1.89
3DH5	2402.0	-11.82	1.78	10.17	0.13	1.03	1.10	1.23	1.33
3DH5	2441.0	-11.38	1.80	10.18	0.60	1.15	1.10	1.70	1.48
3DH5	2480.0	-11.28	1.81	10.18	0.71	1.18	1.10	1.81	1.52

Sample Calculation:

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

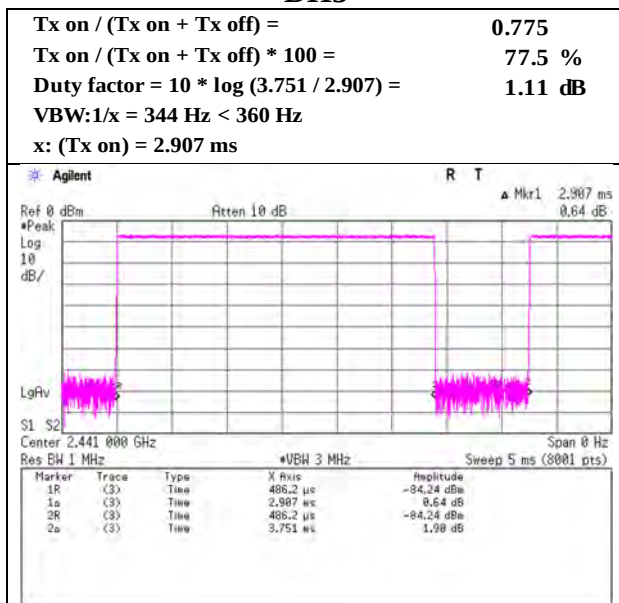
Result (Burst power average) = Time average + Duty factor

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

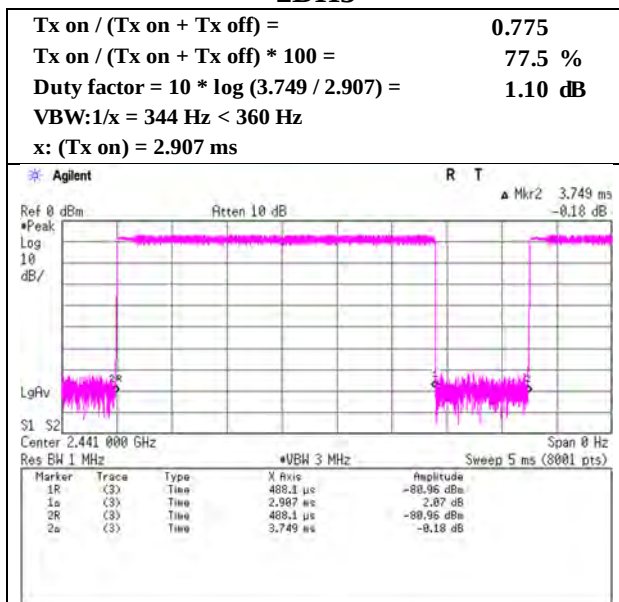
Burst Rate Confirmation

Report No.	14033439S-A
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	January 20, 2022
Temperature / Humidity	23 deg. C / 23 % RH
Engineer	Takahiro Kawakami
Mode	Tx, Hopping Off

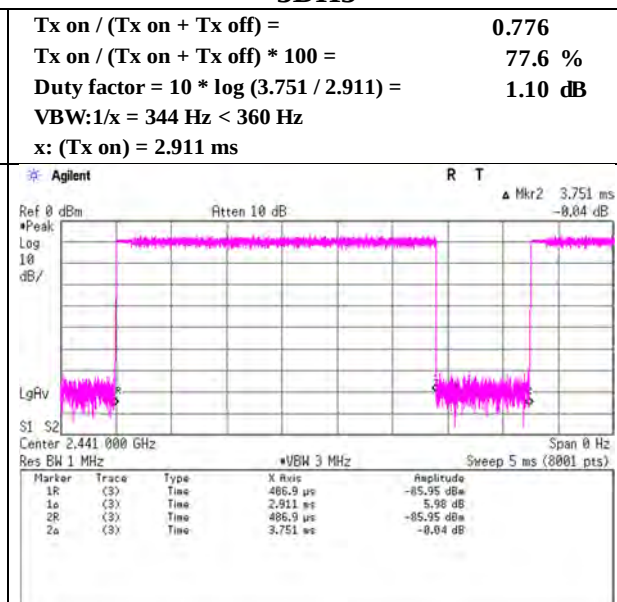
DH5



2DH5



3DH5



Radiated Spurious Emission

Report No.	14033439S-A			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3	No.2	No.1	No.3
Date	January 26, 2022	January 29, 2022	February 2, 2022	February 4, 2022
Temperature / Humidity	24 deg.C, 31 %RH	22 deg.C, 34 %RH	23 deg.C, 33 %RH	22 deg.C, 31 %RH
Engineer	Yosuke Murakami	Shiro Kobayashi	Hiromasa Sato	Hiromasa Sato
	(30 MHz -1 GHz)	(1 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz			

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

Polarity	Frequency [MHz]	Detector	Reading [dBu/m]	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.	65.289	QP	43.50	7.21	6.49	32.16	0.00	25.04	40.0	14.9	349	341	-
Hori.	139.155	QP	42.60	14.37	7.59	32.10	0.00	32.46	43.5	11.0	224	279	-
Hori.	304.891	QP	48.90	13.78	8.60	31.97	0.00	39.31	46.0	6.6	115	244	-
Hori.	329.660	QP	47.60	14.65	8.73	31.94	0.00	39.04	46.0	6.9	105	249	-
Hori.	343.240	QP	46.80	15.09	8.80	31.93	0.00	38.76	46.0	7.2	100	257	-
Hori.	999.995	QP	35.40	22.50	11.29	30.20	0.00	38.99	53.9	14.9	109	340	-
Hori.	1000.000	PK	49.11	24.47	12.61	39.00	2.28	49.47	73.9	24.4	138	158	-
Hori.	2390.000	PK	47.06	28.58	14.08	38.72	2.28	53.28	73.9	20.6	273	269	-
Hori.	4804.000	PK	45.49	31.75	6.49	38.55	2.28	47.46	73.9	26.4	327	90	-
Hori.	7206.000	PK	46.86	37.60	7.92	39.16	2.28	55.50	73.9	18.4	150	0	-
Hori.	9608.000	PK	47.91	39.01	9.21	39.70	2.28	58.71	73.9	15.1	150	0	-
Hori.	1000.000	AV	38.88	24.47	12.61	39.00	2.28	39.24	53.9	14.6	138	158	VBW:10 Hz
Hori.	2390.000	AV	34.14	28.58	14.08	38.72	2.28	40.36	53.9	13.5	273	269	VBW:360 Hz
Hori.	4804.000	AV	34.84	31.75	6.49	38.55	2.28	36.81	53.9	17.0	327	90	VBW:360 Hz
Hori.	7206.000	AV	35.51	37.60	7.92	39.16	2.28	44.15	53.9	9.7	150	0	VBW:360 Hz, floomoise
Hori.	9608.000	AV	36.19	39.01	9.21	39.70	2.28	46.99	53.9	6.9	150	0	VBW:360 Hz, floomoise
Vert.	36.865	QP	36.40	16.18	6.58	32.18	0.00	26.98	40.0	13.0	100	220	-
Vert.	42.450	QP	36.10	14.01	6.69	32.17	0.00	24.63	40.0	15.3	100	214	-
Vert.	49.154	QP	40.20	11.54	6.78	32.17	0.00	26.35	40.0	13.6	100	260	-
Vert.	309.945	QP	42.40	13.90	8.63	31.97	0.00	32.96	46.0	13.0	144	122	-
Vert.	331.775	QP	43.70	14.73	8.74	31.94	0.00	35.23	46.0	10.7	100	55	-
Vert.	999.995	QP	37.00	22.50	11.29	30.20	0.00	40.59	53.9	13.3	155	355	-
Vert.	1000.000	PK	50.66	24.47	12.61	39.00	2.28	51.02	73.9	22.8	138	347	-
Vert.	2390.000	PK	46.75	28.58	14.08	38.72	2.28	52.97	73.9	20.9	367	179	-
Vert.	4804.000	PK	46.59	31.75	6.49	38.55	2.28	48.56	73.9	25.3	202	8	-
Vert.	7206.000	PK	47.13	37.60	7.92	39.16	2.28	55.77	73.9	18.1	150	0	-
Vert.	9608.000	PK	47.83	39.01	9.21	39.70	2.28	58.63	73.9	15.2	150	0	-
Vert.	1000.000	AV	44.22	24.47	12.61	39.00	2.28	44.58	53.9	9.3	138	347	VBW:10 Hz
Vert.	2390.000	AV	34.44	28.58	14.08	38.72	2.28	40.66	53.9	13.2	367	179	VBW:360 Hz
Vert.	4804.000	AV	35.84	31.75	6.49	38.55	2.28	37.81	53.9	16.0	202	8	VBW:360 Hz
Vert.	7206.000	AV	36.28	37.60	7.92	39.16	2.28	44.92	53.9	8.9	150	0	VBW:360 Hz, floomoise
Vert.	9608.000	AV	36.25	39.01	9.21	39.70	2.28	47.05	53.9	6.8	150	0	VBW:360 Hz, floomoise

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

Distance factor : 1 GHz - 10 GHz : 20log(3.90 m / 3.0 m) = 2.28 dB

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

*These results have sufficient margin without taking account Duty cycle correction factor.

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.	2402.000	PK	88.67	28.56	14.10	38.72	2.28	94.89	-	-	Carrier
Hori.	2400.000	PK	37.06	28.56	14.09	38.72	2.28	43.27	74.8	31.5	-
Vert.	2402.000	PK	91.46	28.56	14.10	38.72	2.28	97.68	-	-	Carrier
Vert.	2400.000	PK	37.58	28.56	14.09	38.72	2.28	43.79	77.6	33.8	-

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

Distance factor : 1 GHz - 10 GHz : 20log(3.90 m / 3.0 m) = 2.28 dB

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

UL Japan, Inc.

Shonan EMC Lab.

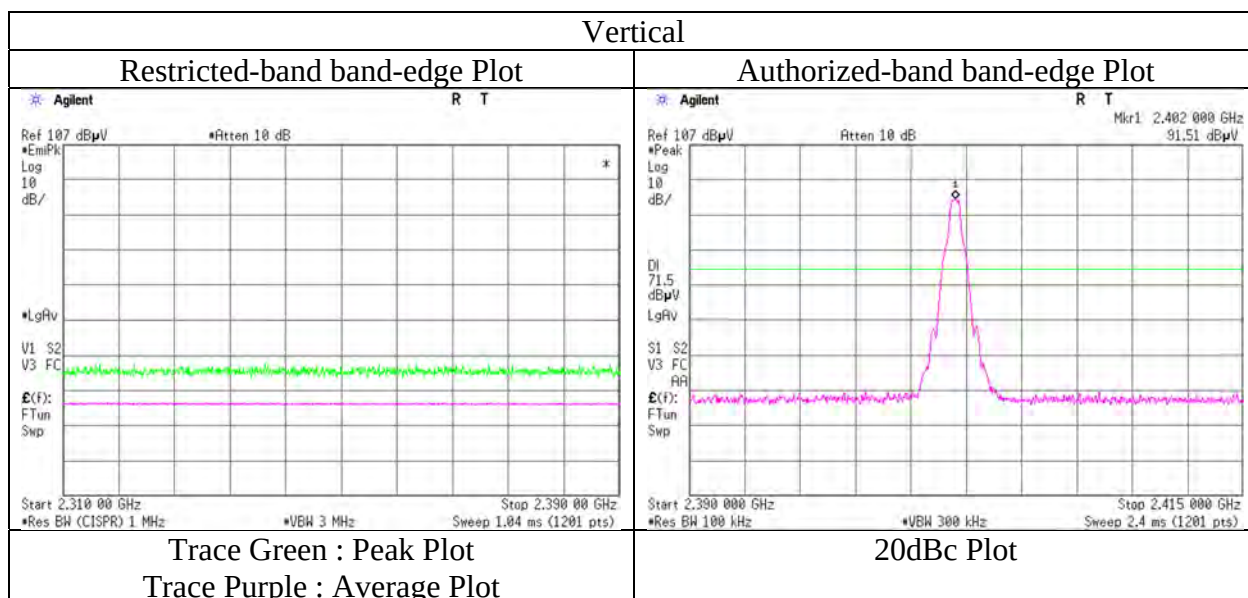
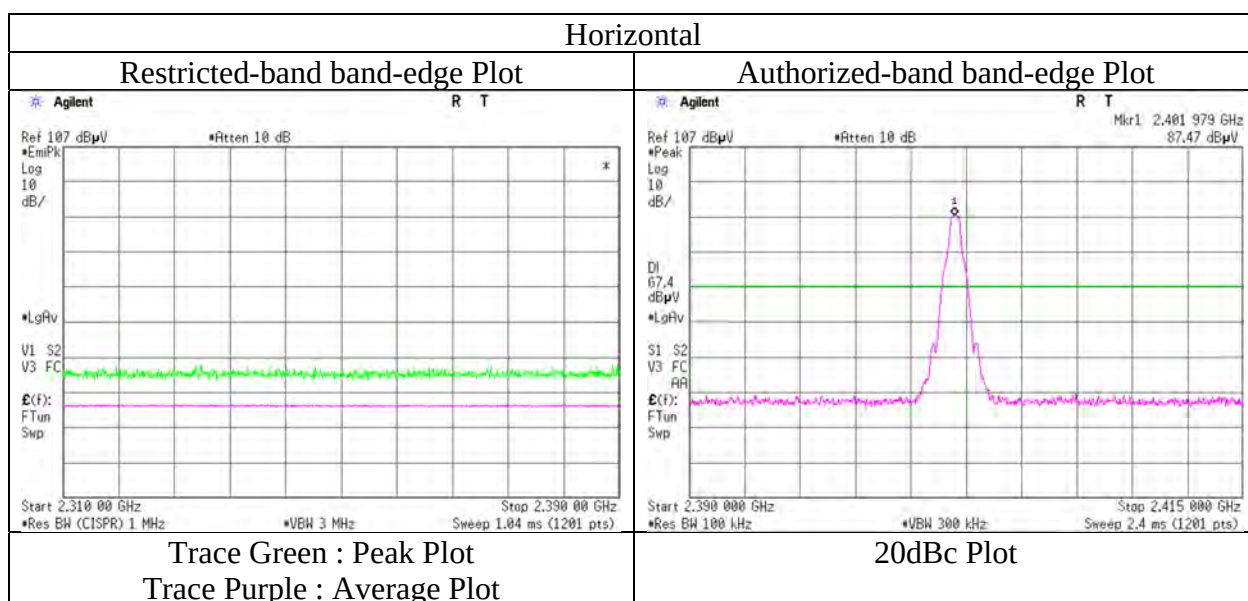
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

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Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 14033439S-A
Test place Shonan EMC Lab.
Semi Anechoic Chamber No.2
Date January 29, 2022
Temperature / Humidity 22 deg.C, 34 %RH
Engineer Shiro Kobayashi
(1 GHz -10 GHz)
Mode Tx, Hopping Off, DH5 2402 MHz



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

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

Radiated Spurious Emission

Report No.	14033439S-A			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3	No.2	No.1	No.3
Date	January 26, 2022	January 29, 2022	February 2, 2022	February 4, 2022
Temperature / Humidity	24 deg.C, 31 %RH	22 deg.C, 34 %RH	23 deg.C, 33 %RH	22 deg.C, 31 %RH
Engineer	Yosuke Murakami	Shiro Kobayashi	Hiromasa Sato	Hiromasa Sato
	(30 MHz -1 GHz)	(1 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx, Hopping Off, DH5 2441 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.	65.294	QP	43.60	7.21	6.49	32.16	0.00	25.14	40.0	14.8	349	343	-
Hori.	139.193	QP	42.70	14.37	7.59	32.10	0.00	32.56	43.5	10.9	222	276	-
Hori.	282.621	QP	45.30	13.48	8.48	31.98	0.00	35.28	46.0	10.7	142	352	-
Hori.	301.338	QP	47.20	13.71	8.59	31.98	0.00	37.52	46.0	8.4	121	243	-
Hori.	329.714	QP	46.60	14.65	8.73	31.94	0.00	38.04	46.0	7.9	104	249	-
Hori.	343.250	QP	45.30	15.10	8.80	31.93	0.00	37.27	46.0	8.7	100	255	-
Hori.	999.995	QP	35.80	22.50	11.29	30.20	0.00	39.39	53.9	14.5	108	341	-
Hori.	1000.000	PK	48.82	24.47	12.61	39.00	2.28	49.18	73.9	24.7	143	147	-
Hori.	4882.000	PK	43.15	31.78	6.53	38.59	2.28	45.15	73.9	28.7	150	0	-
Hori.	7323.000	PK	45.09	37.76	7.99	39.22	2.28	53.90	73.9	20.0	150	0	-
Hori.	9764.000	PK	45.26	39.44	9.27	39.73	2.28	56.52	73.9	17.3	150	0	-
Hori.	1000.000	AV	39.86	24.47	12.61	39.00	2.28	40.22	53.9	13.6	143	147	VBW:10 Hz
Hori.	4882.000	AV	31.32	31.78	6.53	38.59	2.28	33.32	53.9	20.5	150	0	VBW:360 Hz, floomoise
Hori.	7323.000	AV	33.19	37.76	7.99	39.22	2.28	42.00	53.9	11.9	150	0	VBW:360 Hz, floomoise
Hori.	9764.000	AV	33.79	39.44	9.27	39.73	2.28	45.05	53.9	8.8	150	0	VBW:360 Hz, floomoise
Vert.	36.863	QP	36.50	16.18	6.58	32.18	0.00	27.08	40.0	12.9	100	225	-
Vert.	42.408	QP	35.90	14.03	6.69	32.17	0.00	24.45	40.0	15.5	100	217	-
Vert.	49.154	QP	40.60	11.54	6.78	32.17	0.00	26.75	40.0	13.2	100	274	-
Vert.	134.028	QP	43.80	14.12	7.47	32.10	0.00	33.29	43.5	10.2	100	120	-
Vert.	309.916	QP	41.50	13.90	8.63	31.97	0.00	32.06	46.0	13.9	145	124	-
Vert.	331.774	QP	43.40	14.73	8.74	31.94	0.00	34.93	46.0	11.0	100	57	-
Vert.	999.995	QP	37.40	22.50	11.29	30.20	0.00	40.99	53.9	12.9	156	357	-
Vert.	1000.000	PK	49.16	24.47	12.61	39.00	2.28	49.52	73.9	24.3	282	354	-
Vert.	4882.000	PK	43.55	31.78	6.53	38.59	2.28	45.55	73.9	28.3	150	0	-
Vert.	7323.000	PK	45.61	37.76	7.99	39.22	2.28	54.42	73.9	19.4	150	0	-
Vert.	9764.000	PK	46.72	39.44	9.27	39.73	2.28	57.98	73.9	15.9	150	0	-
Vert.	1000.000	AV	43.00	24.47	12.61	39.00	2.28	43.36	53.9	10.5	282	354	VBW:10 Hz
Vert.	4882.000	AV	32.28	31.78	6.53	38.59	2.28	34.28	53.9	19.6	150	0	VBW:360 Hz, floomoise
Vert.	7323.000	AV	35.20	37.76	7.99	39.22	2.28	44.01	53.9	9.8	150	0	VBW:360 Hz, floomoise
Vert.	9764.000	AV	34.71	39.44	9.27	39.73	2.28	45.97	53.9	7.9	150	0	VBW:360 Hz, floomoise

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.90\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

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

*These results have sufficient margin without taking account Duty cycle correction factor.

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Radiated Spurious Emission

Report No.	14033439S-A			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3	No.2	No.1	No.3
Date	January 26, 2022	January 29, 2022	February 2, 2022	February 4, 2022
Temperature / Humidity	24 deg.C, 31 %RH	22 deg.C, 34 %RH	23 deg.C, 33 %RH	22 deg.C, 31 %RH
Engineer	Yosuke Murakami	Shiro Kobayashi	Hiromasa Sato	Hiromasa Sato
	(30 MHz -1 GHz)	(1 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx, Hopping Off, DH5 2480 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.	65.299	QP	43.40	7.21	6.49	32.16	0.00	24.94	40.0	15.0	348	345	-
Hori.	139.192	QP	42.60	14.37	7.59	32.10	0.00	32.46	43.5	11.0	223	275	-
Hori.	282.625	QP	45.00	13.48	8.48	31.98	0.00	34.98	46.0	11.0	144	350	-
Hori.	301.307	QP	47.10	13.71	8.59	31.98	0.00	37.42	46.0	8.5	123	244	-
Hori.	329.695	QP	46.40	14.65	8.73	31.94	0.00	37.84	46.0	8.1	103	249	-
Hori.	343.319	QP	45.90	15.10	8.80	31.93	0.00	37.87	46.0	8.1	100	252	-
Hori.	999.995	QP	35.50	22.50	11.29	30.20	0.00	39.09	53.9	14.8	109	340	-
Hori.	1000.000	PK	47.49	24.47	12.61	39.00	2.28	47.85	73.9	26.0	139	153	-
Hori.	2483.500	PK	45.11	28.47	14.18	38.67	2.28	51.37	73.9	22.5	104	304	-
Hori.	4960.000	PK	41.29	32.03	6.59	38.62	2.28	43.57	73.9	30.3	300	67	-
Hori.	7440.000	PK	45.34	37.82	8.05	39.28	2.28	54.21	73.9	19.6	150	0	-
Hori.	9920.000	PK	45.35	39.55	9.34	39.76	2.28	56.76	73.9	17.1	150	0	-
Hori.	1000.000	AV	37.82	24.47	12.61	39.00	2.28	38.18	53.9	15.7	139	153	VBW:10 Hz
Hori.	2483.500	AV	32.89	28.47	14.18	38.67	2.28	39.15	53.9	14.7	104	304	VBW:360 Hz
Hori.	4960.000	AV	30.63	32.03	6.59	38.62	2.28	32.91	53.9	20.9	300	67	VBW:360 Hz, floomoise
Hori.	7440.000	AV	32.80	37.82	8.05	39.28	2.28	41.67	53.9	12.2	150	0	VBW:360 Hz, floomoise
Hori.	9920.000	AV	33.18	39.55	9.34	39.76	2.28	44.59	53.9	9.3	150	0	VBW:360 Hz, floomoise
Vert.	36.863	QP	36.30	16.18	6.58	32.18	0.00	26.88	40.0	13.1	100	225	-
Vert.	42.209	QP	35.90	14.11	6.69	32.17	0.00	24.53	40.0	15.4	100	215	-
Vert.	49.151	QP	40.70	11.54	6.78	32.17	0.00	26.85	40.0	13.1	100	273	-
Vert.	134.029	QP	43.60	14.12	7.47	32.10	0.00	33.09	43.5	10.4	100	117	-
Vert.	331.775	QP	43.50	14.73	8.74	31.94	0.00	35.03	46.0	10.9	100	56	-
Vert.	999.995	QP	37.00	22.50	11.29	30.20	0.00	40.59	53.9	13.3	158	0	-
Vert.	1000.000	PK	48.50	24.47	12.61	39.00	2.28	48.86	73.9	25.0	235	357	-
Vert.	2483.500	PK	45.13	28.47	14.18	38.67	2.28	51.39	73.9	22.5	348	178	-
Vert.	4960.000	PK	43.06	32.03	6.59	38.62	2.28	45.34	73.9	28.5	192	10	-
Vert.	7440.000	PK	45.55	37.82	8.05	39.28	2.28	54.42	73.9	19.4	150	0	-
Vert.	9880.000	PK	47.04	39.56	9.32	39.76	2.28	58.44	73.9	15.4	150	0	-
Vert.	1000.000	AV	42.38	24.47	12.61	39.00	2.28	42.74	53.9	11.1	235	357	VBW:10 Hz
Vert.	2483.500	AV	32.89	28.47	14.18	38.67	2.28	39.15	53.9	14.7	348	178	VBW:360 Hz
Vert.	4960.000	AV	32.51	32.03	6.59	38.62	2.28	34.79	53.9	19.1	192	10	VBW:360 Hz, floomoise
Vert.	7440.000	AV	34.30	37.82	8.05	39.28	2.28	43.17	53.9	10.7	150	0	VBW:360 Hz, floomoise
Vert.	9880.000	AV	34.32	39.56	9.32	39.76	2.28	45.72	53.9	8.1	150	0	VBW:360 Hz, floomoise

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

Distance factor : 1 GHz - 10 GHz : 20log(3.90 m / 3.0 m) = 2.28 dB

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

*These results have sufficient margin without taking account Duty cycle correction factor.

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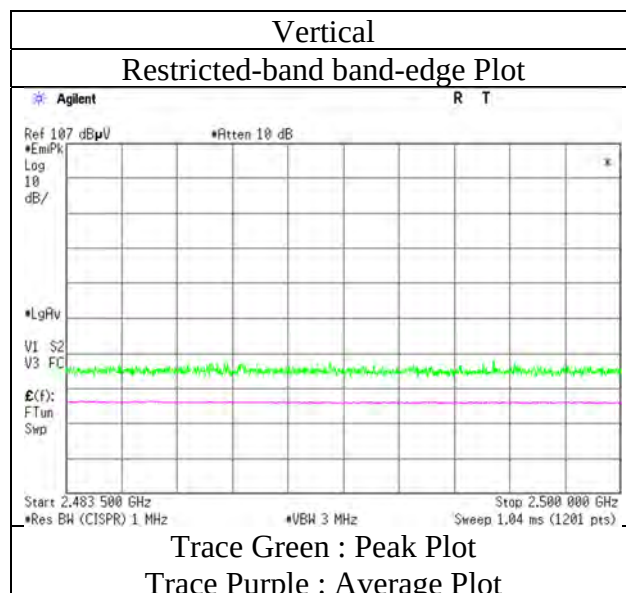
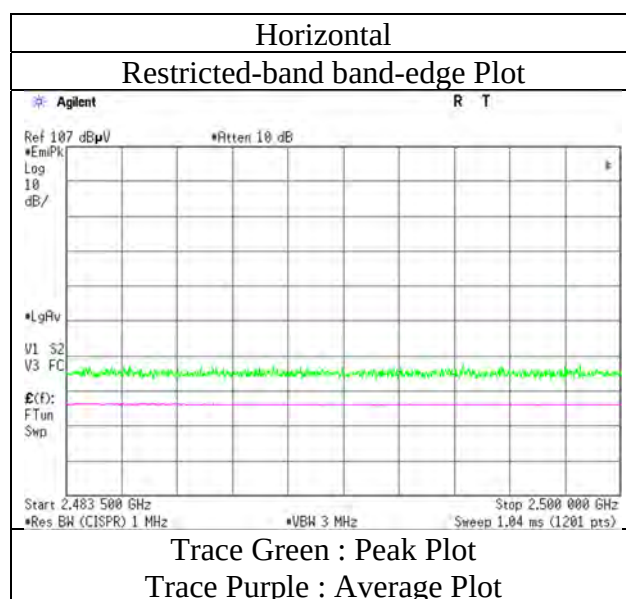
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Radiated Spurious Emission **(Reference Plot for band-edge)**

Report No. 14033439S-A
Test place Shonan EMC Lab.
Semi Anechoic Chamber No.2
Date January 29, 2022
Temperature / Humidity 22 deg.C, 34 %RH
Engineer Shiro Kobayashi
(1 GHz -10 GHz)
Mode Tx, Hopping Off, DH5 2480 MHz



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

Radiated Spurious Emission

Report No.	14033439S-A			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3	No.2	No.1	No.3
Date	January 26, 2022	January 29, 2022	February 2, 2022	February 4, 2022
Temperature / Humidity	24 deg.C, 31 %RH	22 deg.C, 34 %RH	23 deg.C, 33 %RH	22 deg.C, 31 %RH
Engineer	Yosuke Murakami	Shiro Kobayashi	Hiromasa Sato	Hiromasa Sato
	(30 MHz -1 GHz)	(1 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx, Hopping Off, 2DH5 2402 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.	65.299	QP	43.40	7.21	6.49	32.16	0.00	24.94	40.0	15.0	348	345	-
Hori.	139.192	QP	42.60	14.37	7.59	32.10	0.00	32.46	43.5	11.0	223	275	-
Hori.	245.759	QP	44.90	12.09	8.28	31.99	0.00	33.28	46.0	12.7	152	55	-
Hori.	282.622	QP	44.80	13.48	8.48	31.98	0.00	34.78	46.0	11.2	146	59	-
Hori.	301.233	QP	47.50	13.71	8.59	31.98	0.00	37.82	46.0	8.1	121	246	-
Hori.	324.726	QP	47.40	14.46	8.70	31.95	0.00	38.61	46.0	7.3	100	260	-
Hori.	343.186	QP	47.50	15.09	8.80	31.93	0.00	39.46	46.0	6.5	100	250	-
Hori.	999.996	QP	35.30	22.50	11.29	30.20	0.00	38.89	53.9	15.0	108	339	-
Hori.	1000.000	PK	49.99	24.47	12.61	39.00	2.28	50.35	73.9	23.5	147	134	-
Hori.	2390.000	PK	45.58	28.58	14.08	38.72	2.28	51.80	73.9	22.1	239	264	-
Hori.	4804.000	PK	44.36	31.75	6.49	38.55	2.28	46.33	73.9	27.5	150	0	-
Hori.	7206.000	PK	45.41	37.60	7.92	39.16	2.28	54.05	73.9	19.8	150	0	-
Hori.	9608.000	PK	47.70	39.01	9.21	39.70	2.28	58.50	73.9	15.4	150	0	-
Hori.	1000.000	AV	38.67	24.47	12.61	39.00	2.28	39.03	53.9	14.8	147	134	VBW:10 Hz
Hori.	2390.000	AV	35.10	28.58	14.08	38.72	2.28	41.32	53.9	12.5	239	264	VBW:360 Hz
Hori.	4804.000	AV	32.66	31.75	6.49	38.55	2.28	34.63	53.9	19.2	150	0	VBW:360 Hz, floomoise
Hori.	7206.000	AV	33.70	37.60	7.92	39.16	2.28	42.34	53.9	11.5	150	0	VBW:360 Hz, floomoise
Hori.	9608.000	AV	34.61	39.01	9.21	39.70	2.28	45.41	53.9	8.4	150	0	VBW:360 Hz, floomoise
Vert.	36.863	QP	36.30	16.18	6.58	32.18	0.00	26.88	40.0	13.1	100	225	-
Vert.	42.209	QP	35.90	14.11	6.69	32.17	0.00	24.53	40.0	15.4	100	215	-
Vert.	49.151	QP	40.70	11.54	6.78	32.17	0.00	26.85	40.0	13.1	100	273	-
Vert.	134.029	QP	43.60	14.12	7.47	32.10	0.00	33.09	43.5	10.4	100	117	-
Vert.	309.837	QP	43.60	13.89	8.63	31.97	0.00	34.15	46.0	11.8	146	125	-
Vert.	331.771	QP	43.60	14.73	8.74	31.94	0.00	35.13	46.0	10.8	100	58	-
Vert.	999.995	QP	37.60	22.50	11.29	30.20	0.00	41.19	53.9	12.7	155	359	-
Vert.	1000.000	PK	50.56	24.47	12.61	39.00	2.28	50.92	73.9	22.9	290	4	-
Vert.	2390.000	PK	43.62	28.58	14.08	38.72	2.28	49.84	73.9	24.0	305	180	-
Vert.	4804.000	PK	44.64	31.75	6.49	38.55	2.28	46.61	73.9	27.2	150	0	-
Vert.	7206.000	PK	46.33	37.60	7.92	39.16	2.28	54.97	73.9	18.9	150	0	-
Vert.	9608.000	PK	46.91	39.01	9.21	39.70	2.28	57.71	73.9	16.1	150	0	-
Vert.	1000.000	AV	44.02	24.47	12.61	39.00	2.28	44.38	53.9	9.5	290	4	VBW:10 Hz
Vert.	2390.000	AV	32.79	28.58	14.08	38.72	2.28	39.01	53.9	14.8	305	180	VBW:360 Hz
Vert.	4804.000	AV	32.62	31.75	6.49	38.55	2.28	34.59	53.9	19.3	150	0	VBW:360 Hz, floomoise
Vert.	7206.000	AV	33.71	37.60	7.92	39.16	2.28	42.35	53.9	11.5	150	0	VBW:360 Hz, floomoise
Vert.	9608.000	AV	34.43	39.01	9.21	39.70	2.28	45.23	53.9	8.6	150	0	VBW:360 Hz, floomoise

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.90\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

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

*These results have sufficient margin without taking account Duty cycle correction factor.

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.	2402.000	PK	85.62	28.56	14.10	38.72	2.28	91.84	-	-	Carrier
Hori.	2400.000	PK	35.98	28.56	14.09	38.72	2.28	42.19	71.8	29.6	-
Vert.	2402.000	PK	89.92	28.56	14.10	38.72	2.28	96.14	-	-	Carrier
Vert.	2400.000	PK	36.20	28.56	14.09	38.72	2.28	42.41	76.1	33.6	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.90\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

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

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Shonan EMC Lab.

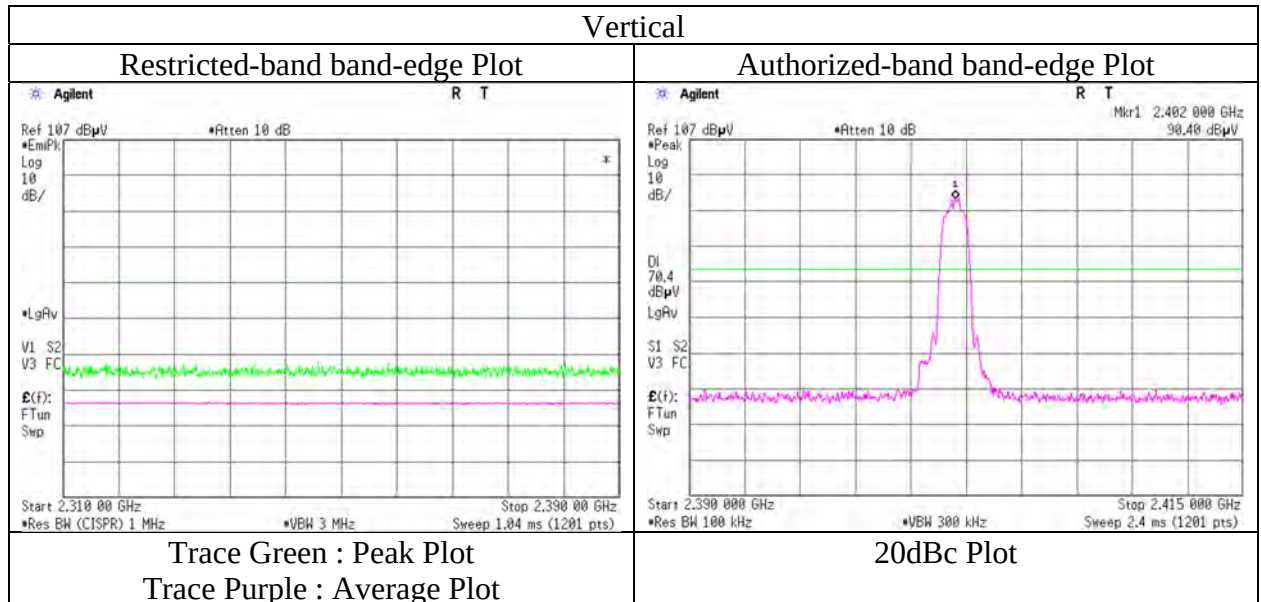
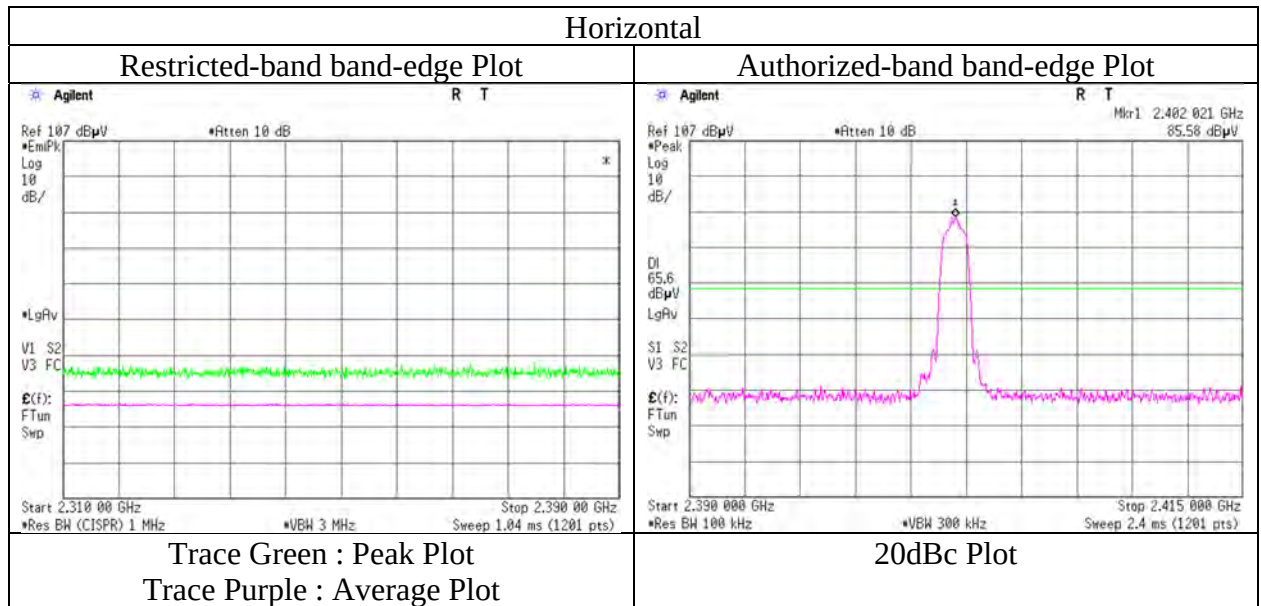
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	14033439S-A
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.2
Date	January 29, 2022
Temperature / Humidity	22 deg.C, 34 %RH
Engineer	Shiro Kobayashi
	(1 GHz -10 GHz)
Mode	Tx, Hopping Off, 2DH5 2402 MHz



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

Radiated Spurious Emission

Report No.	14033439S-A			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3	No.2	No.1	No.3
Date	January 26, 2022	January 29, 2022	February 2, 2022	February 4, 2022
Temperature / Humidity	24 deg.C, 31 %RH	22 deg.C, 34 %RH	23 deg.C, 33 %RH	22 deg.C, 31 %RH
Engineer	Yosuke Murakami	Shiro Kobayashi	Hiromasa Sato	Hiromasa Sato
	(30 MHz -1 GHz)	(1 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx, Hopping Off, 2DH5 2441 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.	65.296	QP	44.00	7.21	6.49	32.16	0.00	25.54	40.0	14.4	348	345	-
Hori.	302.483	QP	48.20	13.72	8.59	31.98	0.00	38.53	46.0	7.4	120	245	-
Hori.	324.709	QP	47.30	14.46	8.70	31.95	0.00	38.51	46.0	7.4	100	257	-
Hori.	341.979	QP	48.20	15.07	8.79	31.93	0.00	40.13	46.0	5.8	100	256	-
Hori.	786.429	QP	36.20	20.54	10.57	31.60	0.00	35.71	46.0	10.2	151	6	-
Hori.	999.996	QP	35.60	22.50	11.29	30.20	0.00	39.19	53.9	14.7	108	339	-
Hori.	1000.000	PK	49.39	24.47	12.61	39.00	2.28	49.75	73.9	24.1	154	142	-
Hori.	4882.000	PK	44.10	31.78	6.53	38.59	2.28	46.10	73.9	27.8	150	0	-
Hori.	7323.000	PK	45.33	37.76	7.99	39.22	2.28	54.14	73.9	19.7	150	0	-
Hori.	9764.000	PK	46.15	39.44	9.27	39.73	2.28	57.41	73.9	16.4	150	0	-
Hori.	1000.000	AV	39.25	24.47	12.61	39.00	2.28	39.61	53.9	14.2	154	142	VBW:10 Hz
Hori.	4882.000	AV	32.33	31.78	6.53	38.59	2.28	34.33	53.9	19.5	150	0	VBW:360 Hz, floomoise
Hori.	7323.000	AV	33.08	37.76	7.99	39.22	2.28	41.89	53.9	12.0	150	0	VBW:360 Hz, floomoise
Hori.	9764.000	AV	33.81	39.44	9.27	39.73	2.28	45.07	53.9	8.8	150	0	VBW:360 Hz, floomoise
Vert.	36.863	QP	36.30	16.18	6.58	32.18	0.00	26.88	40.0	13.1	100	224	-
Vert.	49.150	QP	41.20	11.54	6.78	32.17	0.00	27.35	40.0	12.6	100	271	-
Vert.	309.901	QP	43.30	13.90	8.63	31.97	0.00	33.86	46.0	12.1	145	123	-
Vert.	331.776	QP	43.50	14.73	8.74	31.94	0.00	35.03	46.0	10.9	100	56	-
Vert.	999.996	QP	37.50	22.50	11.29	30.20	0.00	41.09	53.9	12.8	156	358	-
Vert.	1000.000	PK	49.66	24.47	12.61	39.00	2.28	50.02	73.9	23.8	192	2	-
Vert.	4882.000	PK	44.45	31.78	6.53	38.59	2.28	46.45	73.9	27.4	150	0	-
Vert.	7323.000	PK	46.00	37.76	7.99	39.22	2.28	54.81	73.9	19.0	150	0	-
Vert.	9764.000	PK	46.06	39.44	9.27	39.73	2.28	57.32	73.9	16.5	150	0	-
Vert.	1000.000	AV	44.63	24.47	12.61	39.00	2.28	44.99	53.9	8.9	192	2	VBW:10 Hz
Vert.	4882.000	AV	32.32	31.78	6.53	38.59	2.28	34.32	53.9	19.5	150	0	VBW:360 Hz, floomoise
Vert.	7323.000	AV	32.93	37.76	7.99	39.22	2.28	41.74	53.9	12.1	150	0	VBW:360 Hz, floomoise
Vert.	9764.000	AV	33.69	39.44	9.27	39.73	2.28	44.95	53.9	8.9	150	0	VBW:360 Hz, floomoise

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.90\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

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

*These results have sufficient margin without taking account Duty cycle correction factor.

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Radiated Spurious Emission

Report No.	14033439S-A			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3	No.2	No.1	No.3
Date	January 26, 2022	January 29, 2022	February 2, 2022	February 4, 2022
Temperature / Humidity	24 deg.C, 31 %RH	22 deg.C, 34 %RH	23 deg.C, 33 %RH	22 deg.C, 31 %RH
Engineer	Yosuke Murakami	Shiro Kobayashi	Hiromasa Sato	Hiromasa Sato
	(30 MHz -1 GHz)	(1 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx, Hopping Off, 2DH5 2480 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.	65.297	QP	44.20	7.21	6.49	32.16	0.00	25.74	40.0	14.2	349	344	-
Hori.	282.621	QP	45.90	13.48	8.48	31.98	0.00	35.88	46.0	10.1	143	56	-
Hori.	302.459	QP	48.00	13.72	8.59	31.98	0.00	38.33	46.0	7.6	121	242	-
Hori.	324.656	QP	48.00	14.46	8.70	31.95	0.00	39.21	46.0	6.7	100	261	-
Hori.	341.974	QP	48.10	15.07	8.79	31.93	0.00	40.03	46.0	5.9	100	258	-
Hori.	999.996	QP	35.90	22.50	11.29	30.20	0.00	39.49	53.9	14.4	109	341	-
Hori.	1000.000	PK	49.51	24.47	12.61	39.00	2.28	49.87	73.9	24.0	145	120	-
Hori.	2483.500	PK	44.50	28.47	14.18	38.67	2.28	50.76	73.9	23.1	141	143	-
Hori.	4960.000	PK	46.38	32.03	6.59	38.62	2.28	48.66	73.9	25.2	150	0	-
Hori.	7440.000	PK	46.25	37.82	8.05	39.28	2.28	55.12	73.9	18.7	150	0	-
Hori.	9920.000	PK	48.08	39.55	9.34	39.76	2.28	59.49	73.9	14.4	150	0	-
Hori.	1000.000	AV	38.19	24.47	12.61	39.00	2.28	38.55	53.9	15.3	145	120	VBW:10 Hz
Hori.	2483.500	AV	32.94	28.47	14.18	38.67	2.28	39.20	53.9	14.7	141	143	VBW:360 Hz
Hori.	4960.000	AV	32.03	32.03	6.59	38.62	2.28	34.31	53.9	19.5	150	0	VBW:360 Hz, floormoise
Hori.	7440.000	AV	32.46	37.82	8.05	39.28	2.28	41.33	53.9	12.5	150	0	VBW:360 Hz, floormoise
Hori.	9920.000	AV	32.95	39.55	9.34	39.76	2.28	44.36	53.9	9.5	150	0	VBW:360 Hz, floormoise
Vert.	36.864	QP	36.10	16.18	6.58	32.18	0.00	26.68	40.0	13.3	100	225	-
Vert.	49.152	QP	41.20	11.54	6.78	32.17	0.00	27.35	40.0	12.6	100	272	-
Vert.	135.167	QP	42.40	14.18	7.49	32.10	0.00	31.97	43.5	11.5	100	132	-
Vert.	311.026	QP	45.50	13.94	8.64	31.97	0.00	36.11	46.0	9.8	145	121	-
Vert.	331.774	QP	44.20	14.73	8.74	31.94	0.00	35.73	46.0	10.2	100	55	-
Vert.	999.996	QP	37.70	22.50	11.29	30.20	0.00	41.29	53.9	12.6	155	357	-
Vert.	1000.000	PK	50.39	24.47	12.61	39.00	2.28	50.75	73.9	23.1	192	183	-
Vert.	2483.500	PK	44.26	28.47	14.18	38.67	2.28	50.52	73.9	23.3	321	175	-
Vert.	4960.000	PK	46.07	32.03	6.59	38.62	2.28	48.35	73.9	25.5	150	0	-
Vert.	7440.000	PK	45.56	37.82	8.05	39.28	2.28	54.43	73.9	19.4	150	0	-
Vert.	9920.000	PK	47.09	39.55	9.34	39.76	2.28	58.50	73.9	15.4	150	0	-
Vert.	1000.000	AV	44.05	24.47	12.61	39.00	2.28	44.41	53.9	9.4	192	183	VBW:10 Hz
Vert.	2483.500	AV	33.11	28.47	14.18	38.67	2.28	39.37	53.9	14.5	321	175	VBW:360 Hz
Vert.	4960.000	AV	32.11	32.03	6.59	38.62	2.28	34.39	53.9	19.5	150	0	VBW:360 Hz, floormoise
Vert.	7440.000	AV	32.47	37.82	8.05	39.28	2.28	41.34	53.9	12.5	150	0	VBW:360 Hz, floormoise
Vert.	9920.000	AV	32.87	39.55	9.34	39.76	2.28	44.28	53.9	9.6	150	0	VBW:360 Hz, floormoise

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.90\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

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

*These results have sufficient margin without taking account Duty cycle correction factor.

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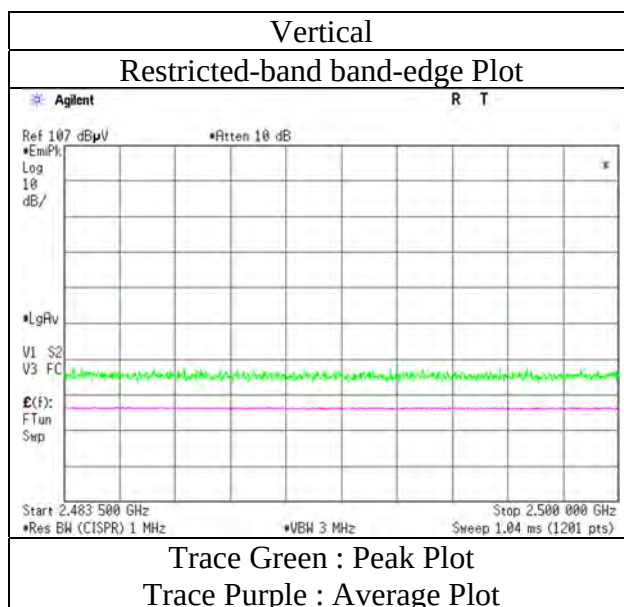
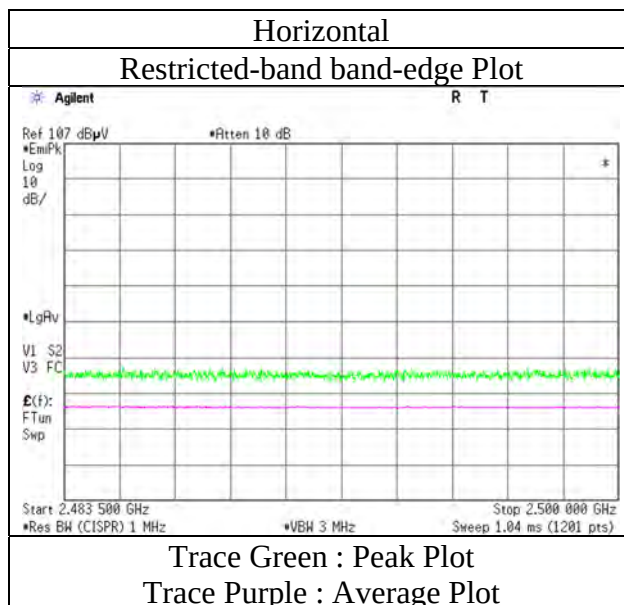
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Radiated Spurious Emission (Reference Plot for band-edge)

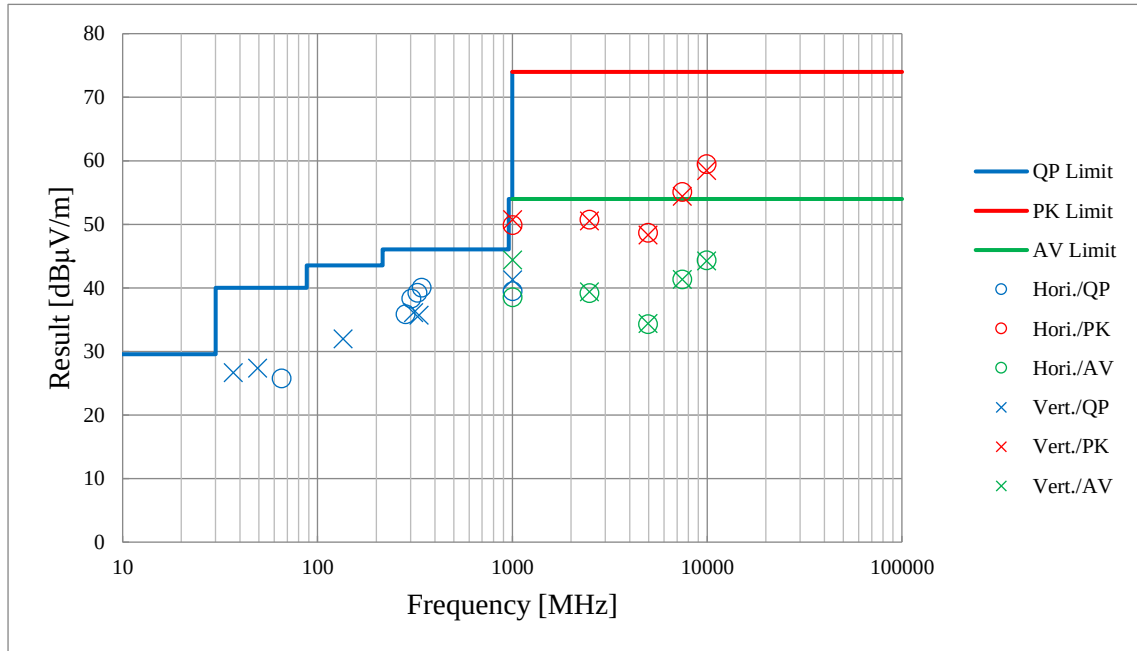
Report No. 14033439S-A
Test place Shonan EMC Lab.
Semi Anechoic Chamber No.2
Date January 29, 2022
Temperature / Humidity 22 deg.C, 34 %RH
Engineer Shiro Kobayashi
(1 GHz -10 GHz)
Mode Tx, Hopping Off, 2DH5 2480 MHz



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

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

Report No.	14033439S-A			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3	No.2	No.1	No.3
Date	January 26, 2022	January 29, 2022	February 2, 2022	February 4, 2022
Temperature / Humidity	24 deg.C, 31 %RH	22 deg.C, 34 %RH	23 deg.C, 33 %RH	22 deg.C, 31 %RH
Engineer	Yosuke Murakami	Shiro Kobayashi	Hiromasa Sato	Hiromasa Sato
	(30 MHz -1 GHz)	(1 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx, Hopping Off, 2DH5 2480 MHz			

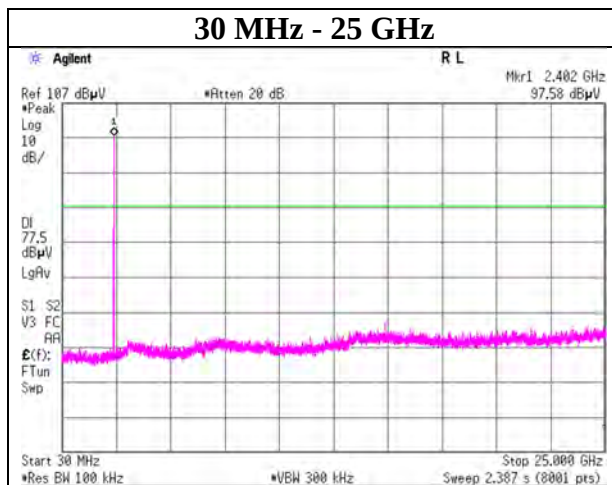
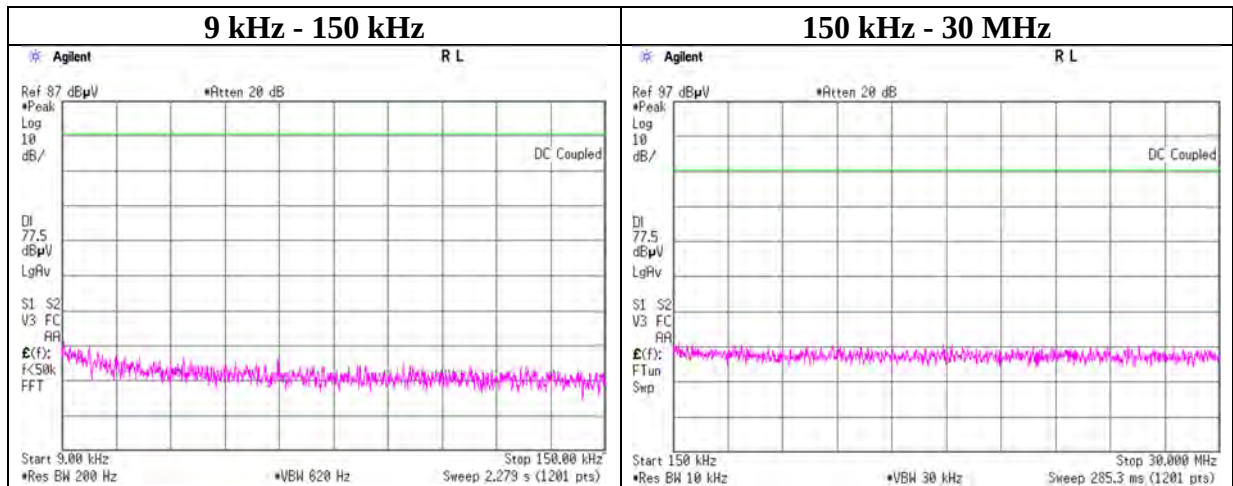


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

Report No. 14033439S-A
Test place Shonan EMC Lab. No.1 Measurement Room
Date January 20, 2022
Temperature / Humidity 23 deg. C / 23 % RH
Engineer Takahiro Kawakami
Mode Tx, Hopping Off, DH5

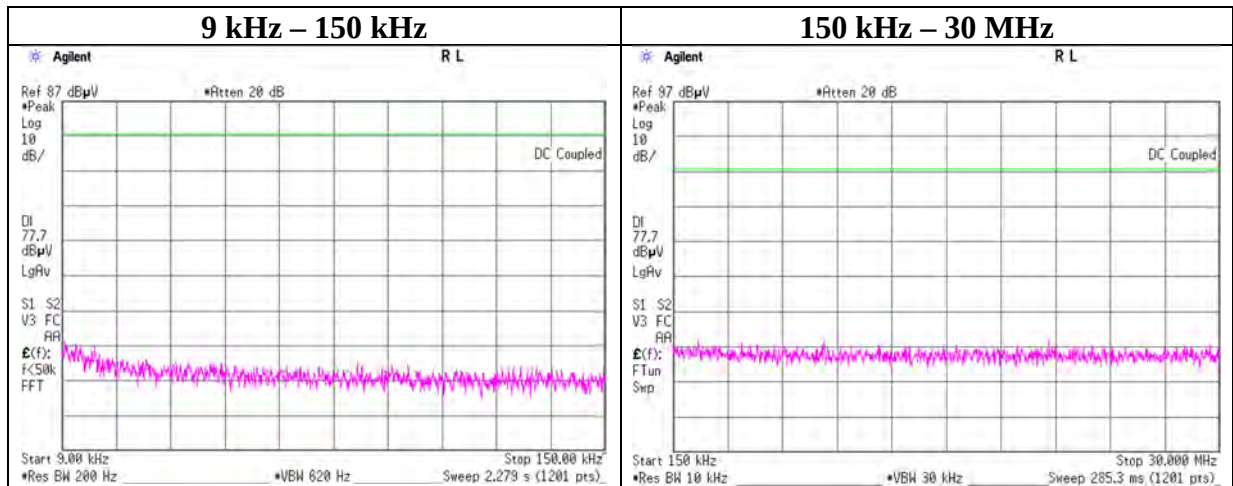
2402 MHz



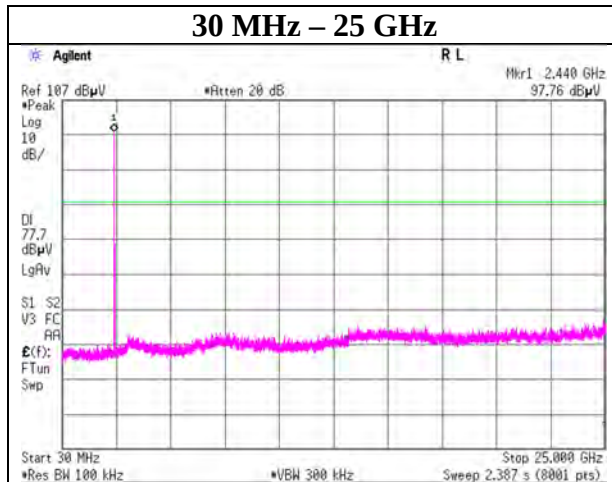
Conducted Spurious Emission

Report No. 14033439S-A
Test place Shonan EMC Lab. No.1 Measurement Room
Date January 20, 2022
Temperature / Humidity 23 deg. C / 23 % RH
Engineer Takahiro Kawakami
Mode Tx, Hopping Off, DH5

2441 MHz



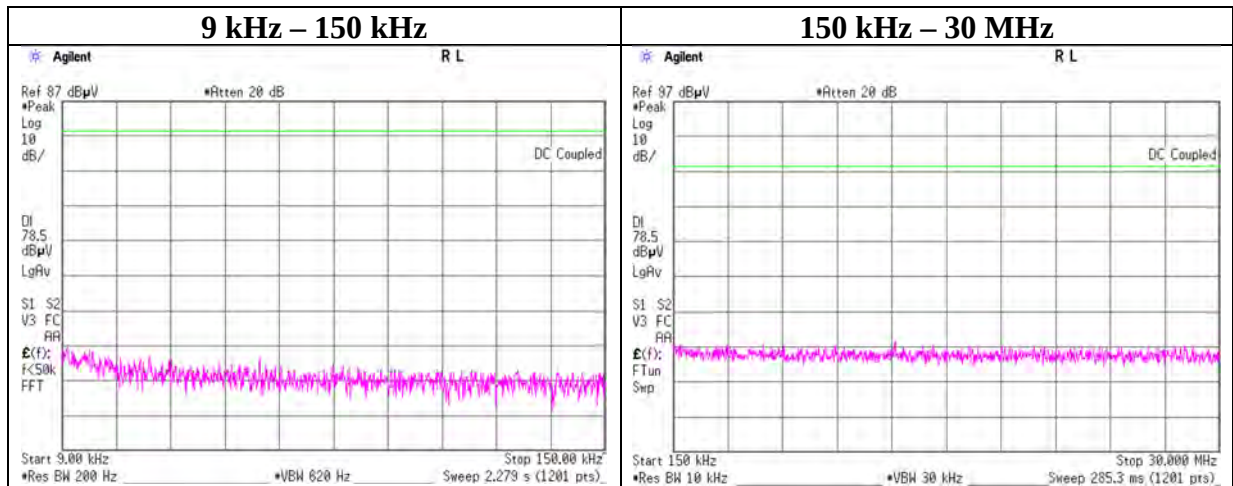
30 MHz – 25 GHz



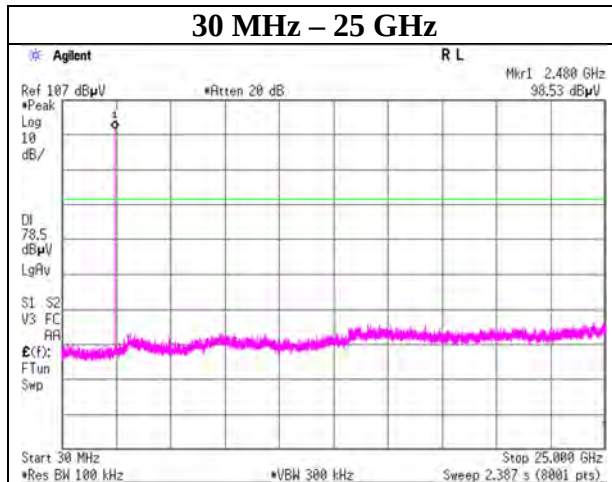
Conducted Spurious Emission

Report No. 14033439S-A
Test place Shonan EMC Lab. No.1 Measurement Room
Date January 20, 2022
Temperature / Humidity 23 deg. C / 23 % RH
Engineer Takahiro Kawakami
Mode Tx, Hopping Off, DH5

2480 MHz



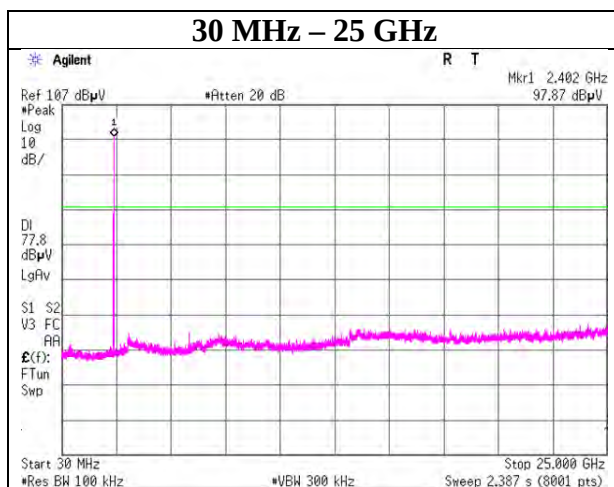
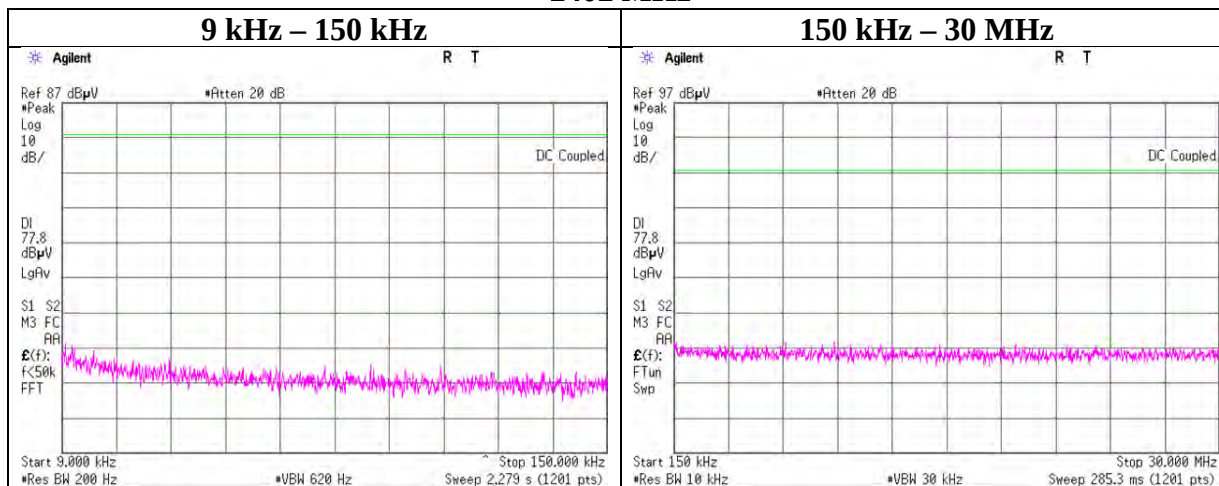
30 MHz – 25 GHz



Conducted Spurious Emission

Report No.	14033439S-A
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	January 20, 2022
Temperature / Humidity	23 deg. C / 23 % RH
Engineer	Takahiro Kawakami
Mode	Tx, Hopping Off, 2DH5

2402 MHz



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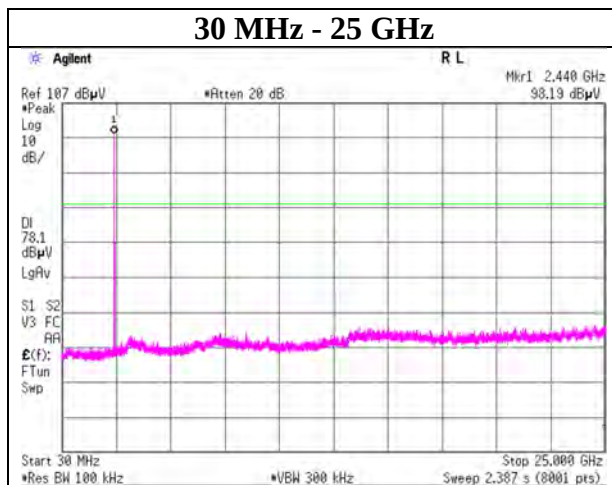
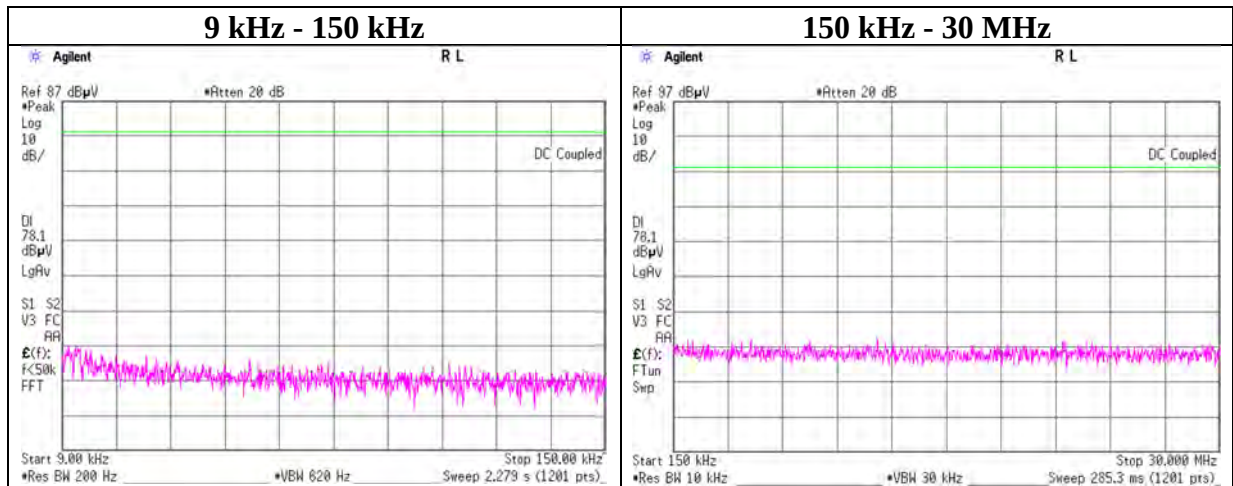
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Conducted Spurious Emission

Report No. 14033439S-A
Test place Shonan EMC Lab. No.1 Measurement Room
Date January 20, 2022
Temperature / Humidity 23 deg. C / 23 % RH
Engineer Takahiro Kawakami
Mode Tx, Hopping Off, 2DH5

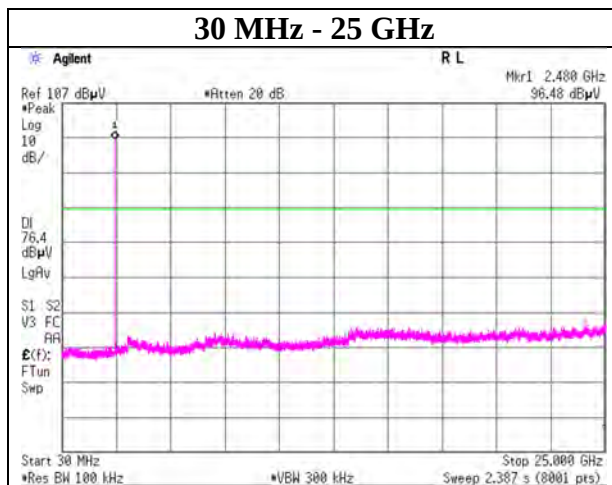
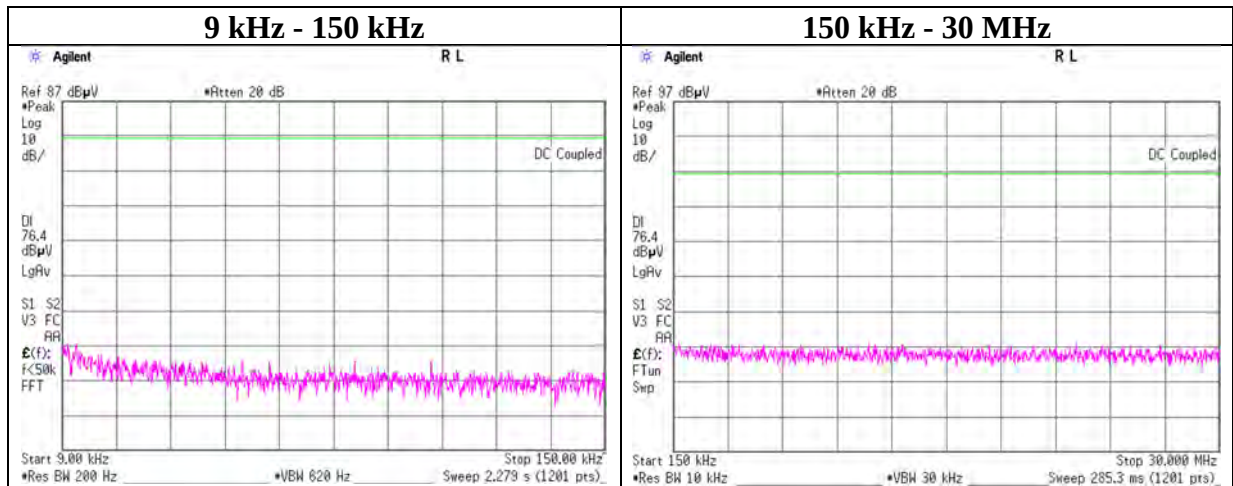
2441 MHz



Conducted Spurious Emission

Report No. 14033439S-A
Test place Shonan EMC Lab. No.1 Measurement Room
Date January 20, 2022
Temperature / Humidity 23 deg. C / 23 % RH
Engineer Takahiro Kawakami
Mode Tx, Hopping Off, 2DH5

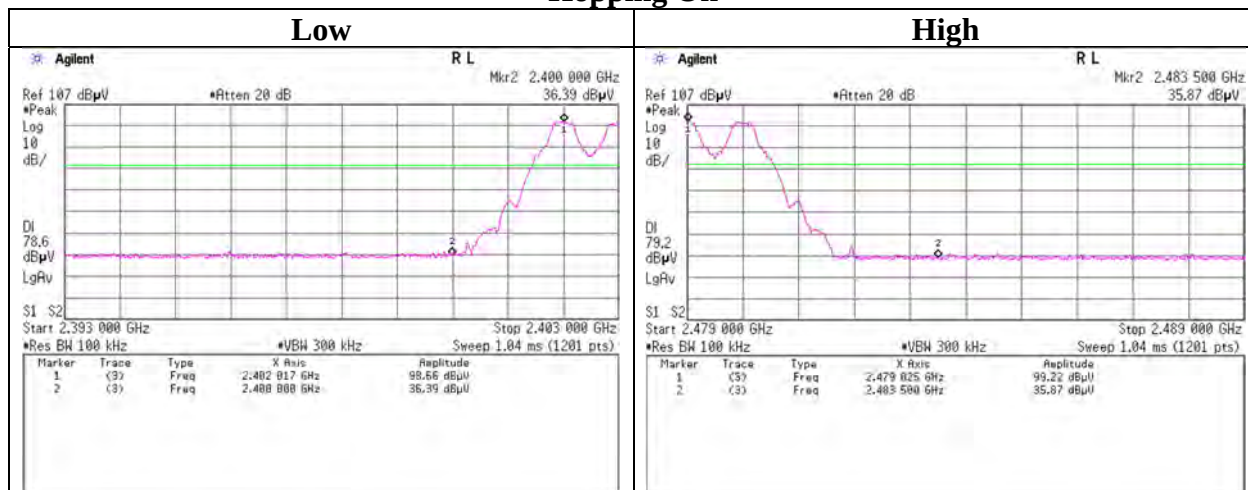
2480 MHz



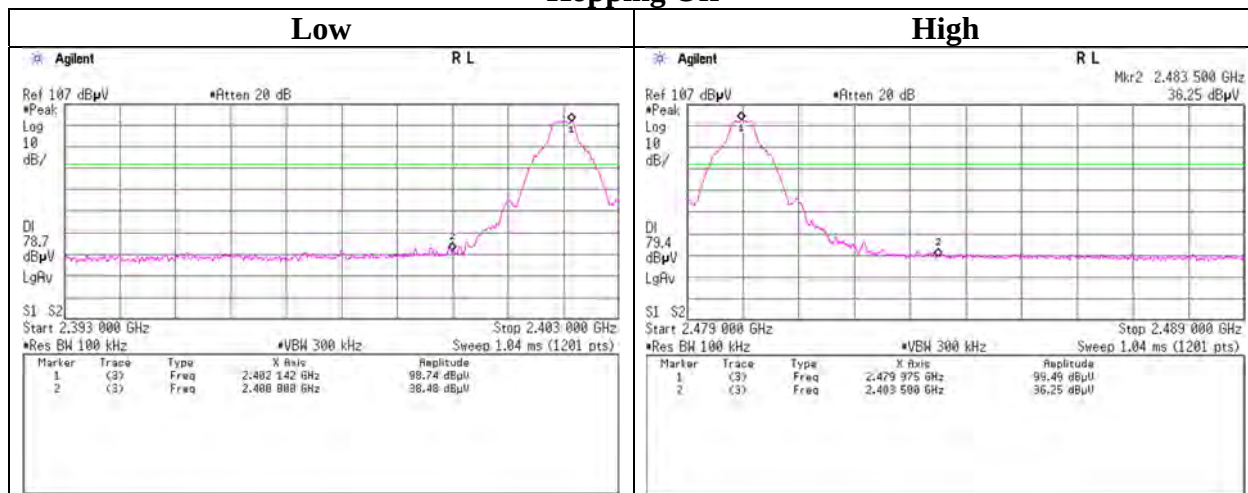
Conducted Emission Band Edge compliance

Report No.	14033439S-A
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	January 20, 2022
Temperature / Humidity	23 deg. C / 23 % RH
Engineer	Takahiro Kawakami
Mode	Tx DH5

Hopping On



Hopping Off



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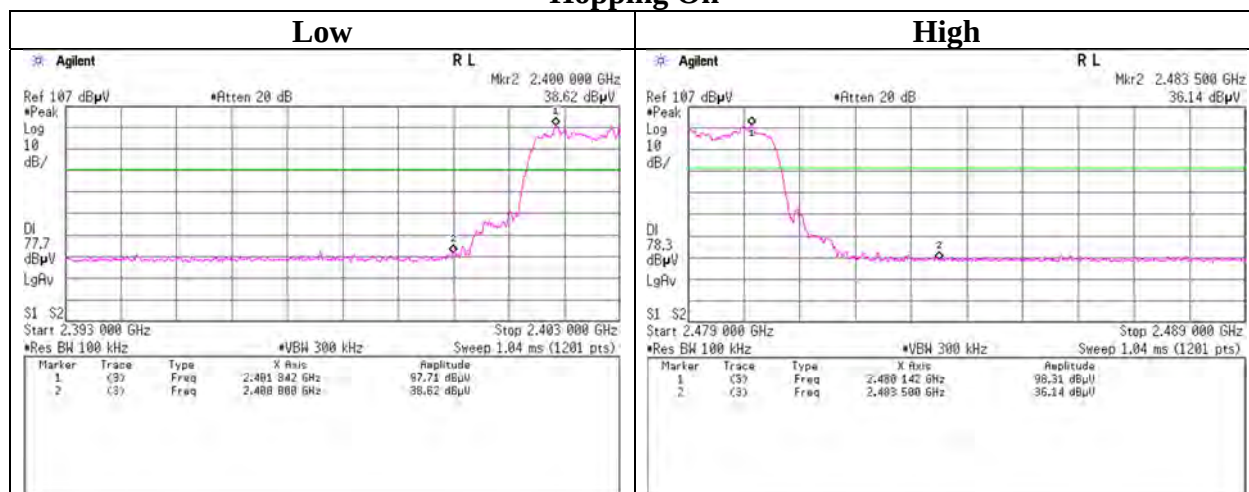
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

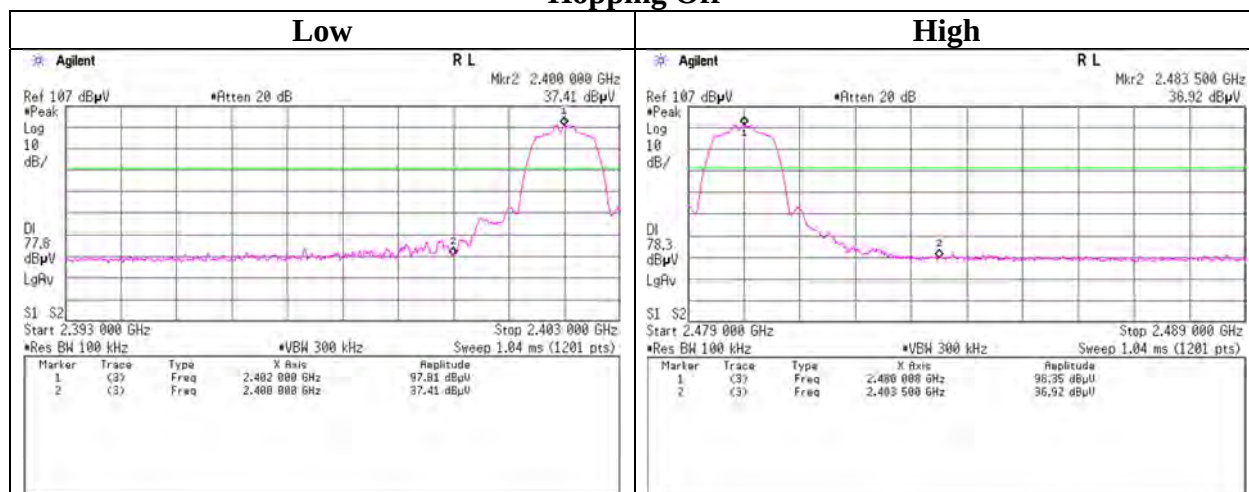
Conducted Emission Band Edge compliance

Report No.	14033439S-A
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	January 20, 2022
Temperature / Humidity	23 deg. C / 23 % RH
Engineer	Takahiro Kawakami
Mode	Tx 2DH5

Hopping On



Hopping Off



APPENDIX 2: Test instruments

Test equipment(1/2)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	KTS-08	145095	Digital Tester	SANWA	PC500	7019224	2021/04/26	12
AT	SAT10-15	160493	Attenuator	Weinschel Corp.	54A-10	83406	2021/12/07	12
AT	SCC-G13	145166	Coaxial Cable	Suhner	SUCOFLEX 102	31599/2	2021/12/06	12
AT	SOS-28	191846	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-09	150461	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46186392	2021/02/22	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-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	SAEC-03(SVSWR)	145566	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	2021/05/21	12
RE	SAEC-03(NSA)	145565	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	2021/04/27	12
RE	SAF-03	145126	Pre Amplifier	SONOMA	310N	290213	2021/02/10	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	2021/03/01	12
RE	SAT10-05	145136	Attenuator	Keysight Technologies Inc	8493C-010	74864	2021/10/07	12
RE	SAT6-13	167094	Attenuator	JFW	50HF-006N	-	2021/02/10	12
RE	SBA-03	145023	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	BBA9106	91032666	2021/05/15	12
RE	SCC-C1/C2/C3/C4/C5/C10/SRSE-03	145171	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(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	2021/03/01	12
RE	SCC-G40	166491	Coaxial Cable	Junkosha	MWX221-01000NFSNMS/B	1612S005	2022/01/06	12
RE	SCC-G50	178573	Coaxial Cable	Huber+Suhner	SUCOFLEX_104_E	MY13407/4E	2021/03/01	12
RE	SCC-G51	178572	Coaxial Cable	Huber+Suhner	SUCOFLEX 104	800288 /4A	2021/03/01	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	2021/03/01	12
RE	SCC-G68	200008	Coaxial Cable	Huber+Suhner	SUCOFLEX 104	575616/4	2021/07/06	12

Test equipment(2/2)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	SFL-18	145305	Highpass Filter	MICRO-TRONICS	HPM50111	119	2021/04/08	12
RE	SHA-02	145384	Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	9120D-726	2021/06/14	12
RE	SHA-04	145512	Horn Antenna	ETS-Lindgren	3160-09	00094868	2021/06/14	12
RE	SHA-08	194683	Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA 9120 C	694	2021/03/03	12
RE	SJM-20	207277	Measuring	ASKUL	-	-	-	-
RE	SJM-21	207278	Measuring Tool, Tape Measure	ASKUL	-	-	-	-
RE	SLA-07	145529	Logperiodic Antenna	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	196	2021/05/15	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	SOS-23	191840	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2021/08/02	12
RE	SSA-02	145800	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY48250106	2021/04/13	12
RE	STR-02	145791	Test Receiver	Rohde & Schwarz	ESCI	100575	2021/06/02	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
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 test