RADIO TEST REPORT

Test Report No. : 14011702S-A-R1

Applicant	:	**Sony Corporation Japan & Sony Group Companies**
Type of EUT	:	**AV Receiver**
Model Number of EUT	:	**XAV-AX4000**
FCC ID	:	**AK8XAVAX4000**
Test regulation	:	**FCC Part 15 Subpart C: 2021**
Test Result	:	**Complied (Refer to SECTION 3)**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by the A2LA accreditation body.
6. This test report covers Radio technical requirements.
   It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. The all test items in this test report are conducted by UL Japan, Inc. 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.
10. This report is a revised version of 14011702S-A. 14011702S-A is replaced with this report.

Date of test: November 4 to 8, 2021

Representative test engineer: H. Sato
Hiromasa Sato
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".

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

REVISION HISTORY

Original Test Report No.: 14011702S-A

<table>
<tr><th>Revision</th><th>Test report No.</th><th>Date</th><th>Page revised</th><th>Contents</th></tr>
<tr><td>-
(Original)</td><td>14011702S-A</td><td>November 24, 2021</td><td>-</td><td>-</td></tr>
<tr><td rowspan="3">1</td><td rowspan="3">14011702S-A-R1</td><td rowspan="3">January 11, 2022</td><td>P.24</td><td>Correction of “Length of transmission”.
From:
<table>
<tr><th>Mode</th><th>Number of transmission in a 31.6(79 Hopping x 0.4) / 12.8 (32 Hopping x 0.4) second period</th><th>Length of transmission [msec]</th><th>Result [msec]</th></tr>
<tr><td>DH1</td><td>50.6 times / 5 sec. x 31.6 sec. = 320 times</td><td>0.402</td><td>129</td></tr>
<tr><td>DH3</td><td>27.6 times / 5 sec. x 31.6 sec. = 175 times</td><td>1.658</td><td>290</td></tr>
<tr><td>DH5</td><td>19.2 times / 5 sec. x 31.6 sec. = 122 times</td><td>2.919</td><td>356</td></tr>
<tr><td>3DH1</td><td>50.6 times / 5 sec. x 31.6 sec. = 320 times</td><td>1.163</td><td>372</td></tr>
<tr><td>3DH3</td><td>27.8 times / 5 sec. x 31.6 sec. = 176 times</td><td>0.407</td><td>72</td></tr>
<tr><td>3DH5</td><td>18.0 times / 5 sec. x 31.6 sec. = 114 times</td><td>2.916</td><td>332</td></tr>
</table>
To:
<table>
<tr><th>Mode</th><th>Number of transmission in a 31.6(79 Hopping x 0.4)</th><th>Length of transmission [msec]</th><th>Result [msec]</th></tr>
<tr><td>DH1</td><td>50.6 times / 5 sec. x 31.6 sec. = 320 times</td><td>0.402</td><td>129</td></tr>
<tr><td>DH3</td><td>27.6 times / 5 sec. x 31.6 sec. = 175 times</td><td>1.663</td><td>291</td></tr>
<tr><td>DH5</td><td>19.2 times / 5 sec. x 31.6 sec. = 122 times</td><td>2.919</td><td>356</td></tr>
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 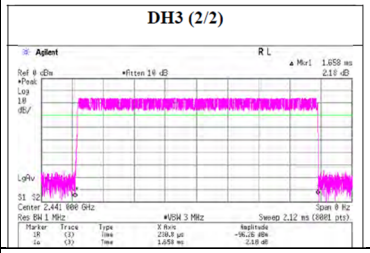

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 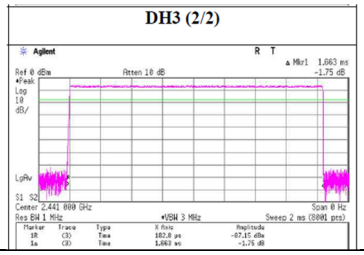
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 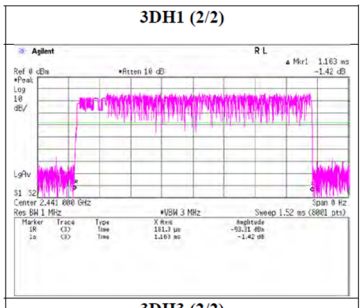

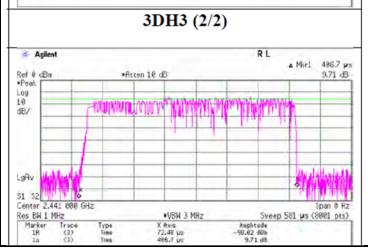

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 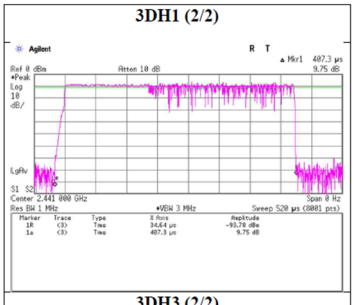

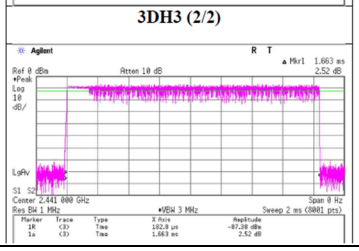
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UL Japan, Inc.
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

Reference: Abbreviations (Including words undescribed in this report)

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

CONTENTS **PAGE**

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-AX4000
Serial Number	:	Refer to SECTION 4.2
Receipt Date	:	October 8, 2021
Condition	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	:	No Modification by the test lab.

2.2 Product Description

Model: XAV-AX4000 (referred to as the EUT in this report) is an 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/BTModule), 1600 MHz (SoC CPU), 1500 Mz (DDR4), 200 MHz (MIPI), 240 MHz (USB), 200 MHz (SDIO, eMMC)

Radio Specification

Bluetooth (BDR / 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	**FCC:** Section 15.207	N/A	N/A	*1)
	ISED: RSS-Gen 8.8	**ISED:** RSS-Gen 8.8			
Carrier Frequency Separation	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05r02	**FCC:** Section15.247(a)(1)	See data.	Complied a)	Conducted
	ISED: -	**ISED:** RSS-247 5.1 (b)			
20dB Bandwidth	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05r02	**FCC:** Section15.247(a)(1)		Complied a)	Conducted
	ISED: -	**ISED:** RSS-247 5.1 (a)			
Number of Hopping Frequency	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05r02	**FCC:** Section15.247(a)(1)(iii)		Complied b)	Conducted
	ISED: -	**ISED:** RSS-247 5.1 (d)			
Dwell time	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05r02	**FCC:** Section15.247(a)(1)(iii)		Complied c)	Conducted
	ISED: -	**ISED:** RSS-247 5.1 (d)			
Maximum Peak Output Power	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05r02	**FCC:** Section15.247(a)(b)(1)		Complied d)	Conducted
	ISED: RSS-Gen 6.12	**ISED:** RSS-247 5.4 (b)			
Spurious Emission & Band Edge Compliance	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05r02	**FCC:** Section15.247(d)	6.0 dB 285.657 MHz, QP, Hori. Mode: Tx, DH5 2480 MHz	Complied# e) / f)	Conducted/ Radiated (above 30 MHz) *2)
	ISED: RSS-Gen 6.13	**ISED:** RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10			

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.
*1) 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 20dB 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.

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	- a)	Conducted
a) Refer to APPENDIX 1 (data of 20dB 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 $k = 2$.

Shonan EMC Lab.

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

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

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) 1 GHz-3 GHz	0.92 dB
Spurious emission (Conducted) 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 %

3.5 Test Location

UL Japan, Inc. Shonan EMC Lab.
1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
Telephone: +81 463 50 6400, Facsimile: +81 463 50 6401
A2LA Certificate Number: 1266.03
(FCC test firm registration number: 626366, ISED lab company number: 2973D / CAB identifier: JP0001)

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

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

SECTION 4: Operation of EUT during testing

4.1 Operating Mode(s)

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

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Spurious Emission (Conducted)	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Spurious Emission (Radiated) (Below 1 GHz)	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Spurious Emission (Radiated) (Above 1 GHz)	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Carrier Frequency Separation	Tx (Hopping On) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
20dB Bandwidth	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Number of Hopping Frequency	Tx (Hopping On) DH5, 3DH5	-
Dwell time	Tx (Hopping On), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5	-
Maximum Peak Output Power	Tx (Hopping Off) DH5, 2DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping On -Hopping Off	2402 MHz 2480 MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -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)
*2DH mode (2 Mb/s EDR: pi/4DQPSK) was excluded for other tests than power measurement by using 3DH mode (3 Mb/s EDR: 8DPSK) 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.

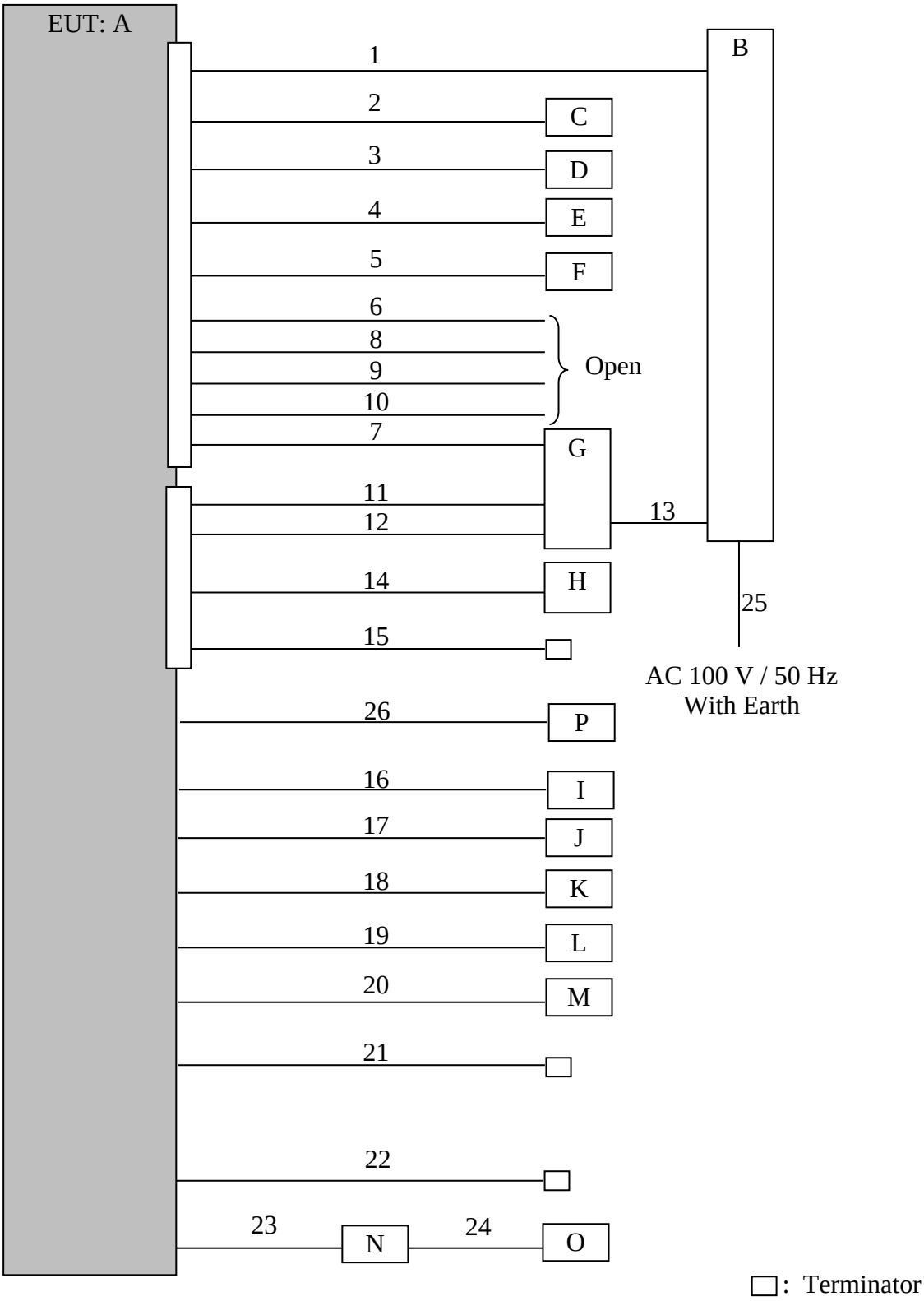
*EUT has the power settings by the software as follows;
Power settings: 9

Software: Tera Team Version 4.105
Qualcomm Radio Control Tool Version 4.0.00158.0
(Date: 2021.11.4, 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.

*1) The mode was tested as a representative, because it had the highest power at antenna terminal test.

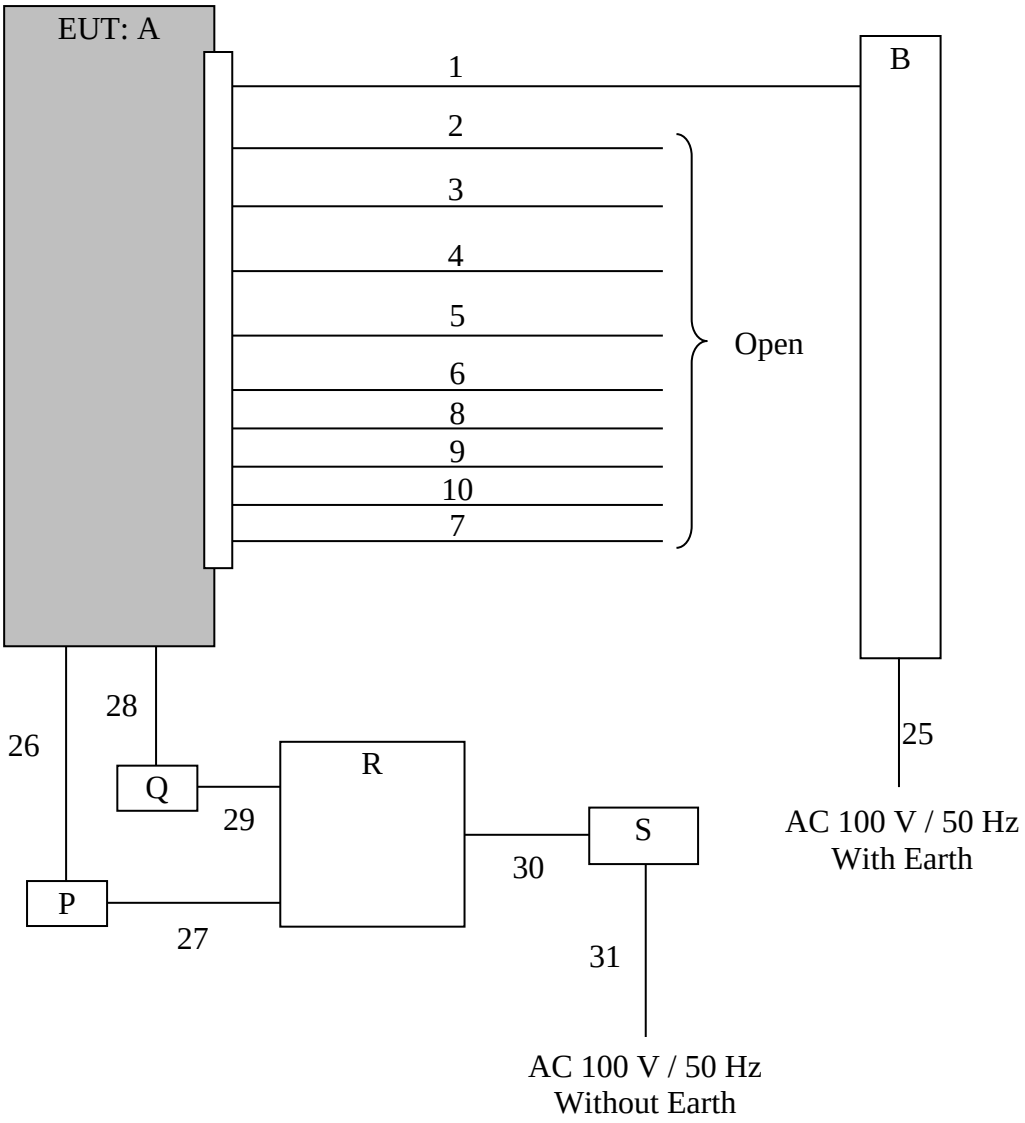
4.2 Configuration and peripherals

<For Radiated Emission>



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

<For Antenna Terminated conducted emission>



* 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	AV Receiver	XAV-AX4000	280*1) 281*2)	SONY	EUT
B	DC Power Supply	PAN60-10A	NL002383	Kikusui	-
C	Speaker	TS-F1030	V44QAH2	Pioneer	-
D	Speaker	TS-F1030	-	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	08L168701192A	ELECOM	-
R	Laptop PC	ThinkPad L580	PF-1PMM0X	Lenovo	-
S	AC Adapter	ADLX45YLC2A	8SSA10E75842L1 CZ9480J61	Lenovo	-

*1) Used for Antenna Terminal conducted test
*2) Used for Conducted Emission test and Radiated Emission test
*3) This support equipment is for testing and is not included with products.

List of cables used

No.	Cable	Length (m)	Shield-Cable	Shield-Connector	Remarks
1	DC	0.15+2.8	Unshielded	Unshielded	ACC, B+, GND
2	Speaker	0.15+2.0+0.15	Unshielded	Unshielded	Front-L (+/-)
3	Speaker	0.15+2.0+0.15	Unshielded	Unshielded	Front-R (+/-)
4	Speaker	0.15+2.0+0.15	Unshielded	Unshielded	Rear-L (+/-)
5	Speaker	0.15+2.0+0.15	Unshielded	Unshielded	Rear-R (+/-)
6	ILL	0.15+1.0	Unshielded	Unshielded	-
7	REM OUT	0.15+1.5+0.3	Unshielded	Unshielded	-
8	SPEED IN	0.15+1.0	Unshielded	Unshielded	-
9	REVERSE IN	0.15+1.0	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+2.0	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	0.45	Unshielded	Unshielded	-
21	AM/FM Antenna	2.0	Shielded	Shielded	-
22	Audio	3.0	Shielded	Shielded	-
23	Sirius XM	0.65	Shielded	Shielded	-
24	Antenna	7.0	Shielded	Shielded	-
25	AC	2.9	Unshielded	Unshielded	-
26	Signal	0.12	Unshielded	Unshielded	*4)
27	USB	0.5	Shielded	Shielded	-
28	USB	0.1	Shielded	Shielded	-
29	LAN	3.0	Unshielded	Unshielded	-
30	DC	1.8	Unshielded	Unshielded	-
31	AC	0.9	Unshielded	Unshielded	-

*4) 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, 2.0 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

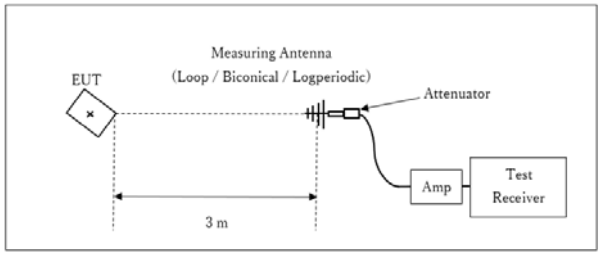
20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9 (ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).

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

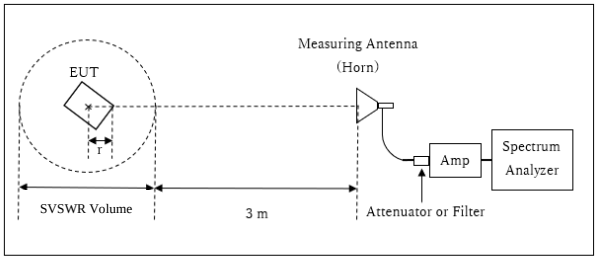
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz - 10 GHz

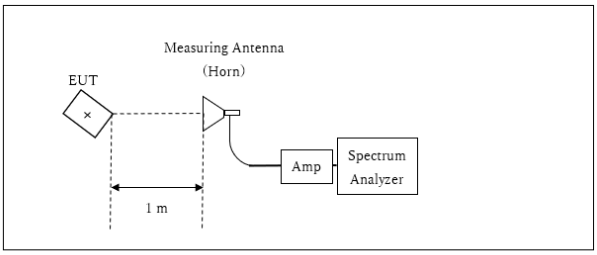


r : Radius of an outer periphery of EUT
× : Center of turn table

Distance Factor: 20 x log (3.9 m / 3.0 m) = 2.28 dB
* Test Distance: (3 + SVSWR Volume /2) - r = 3.9 m

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

10 GHz - 40 GHz



× : Center of turn table

Distance Factor: 20 x log (1.0 m / 3.0 m) = -9.54 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.	30 deg.	0 deg.
Vertical	0 deg.	0 deg.	0 deg.	0 deg.	30 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 - 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
20dB 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 Ohmes. 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

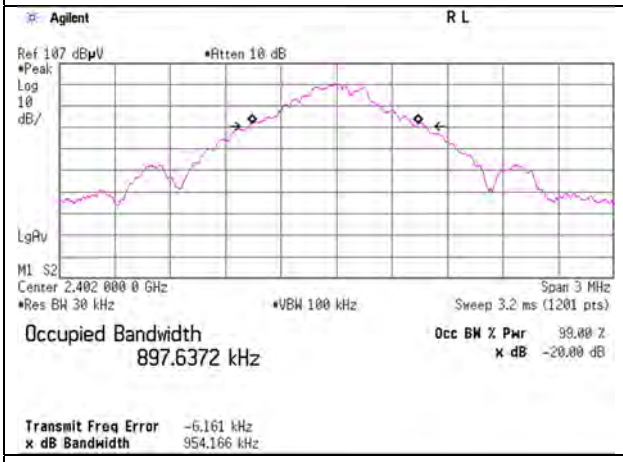
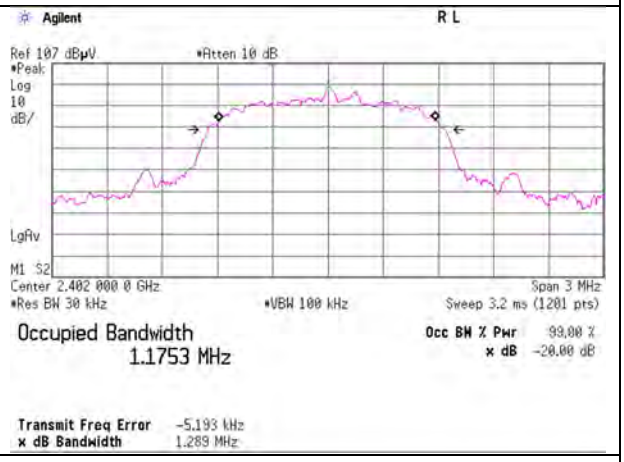
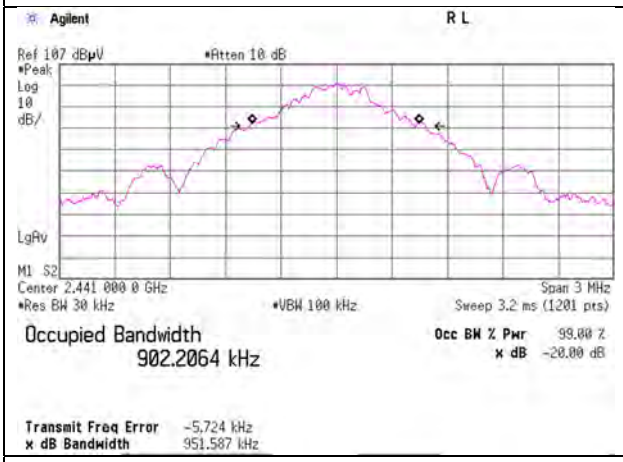
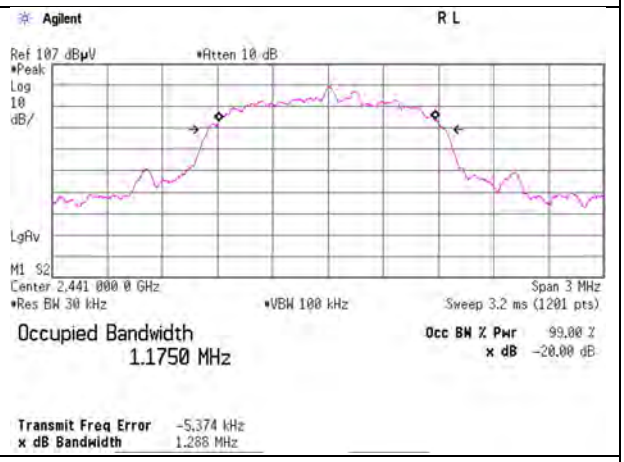
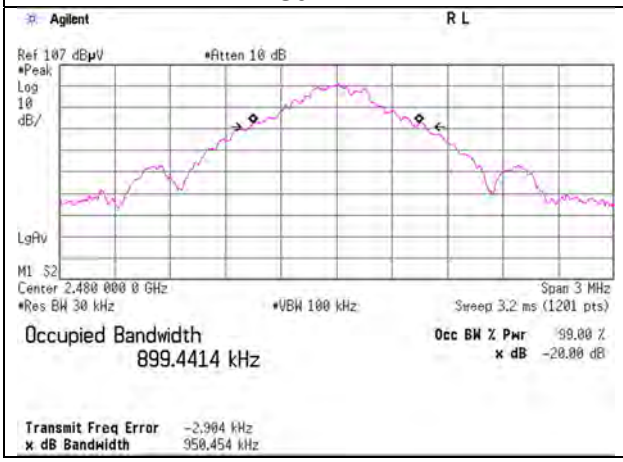
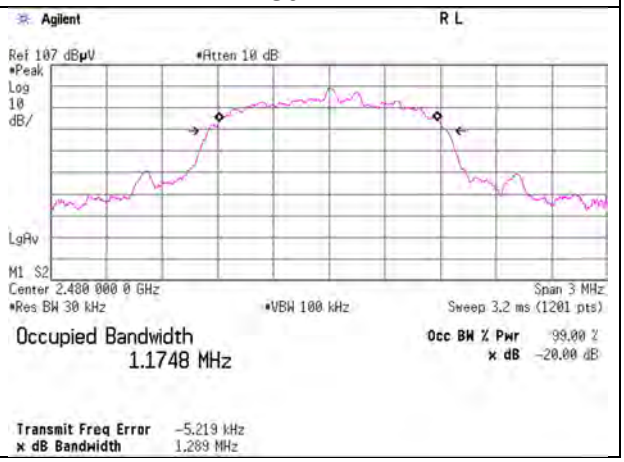
20dB Bandwidth, 99%Occupied Bandwidth and Carrier Frequency Separation

Report No.	14011702S-A-R1	
Test place	Shonan EMC Lab. No.5 Shielded Room	
Date	November 5, 2021	November 8, 2021
Temperature / Humidity	25 deg. C / 37 % RH	23 deg. C / 40 % RH
Engineer	Miku Ikudome	Miku Ikudome
Mode	Tx, Hopping Off, Tx, Hopping On	

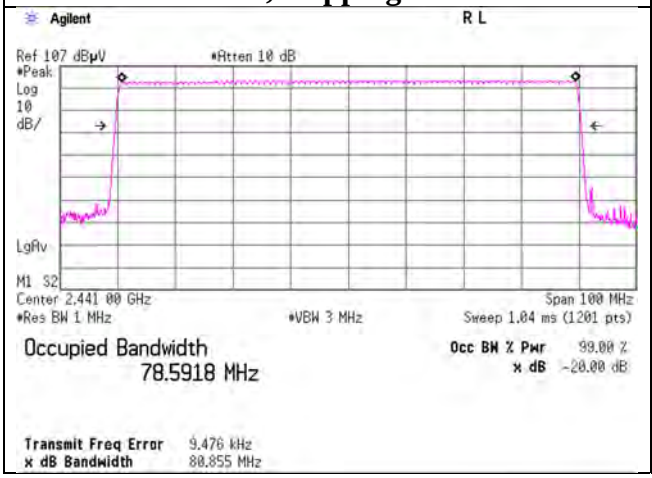
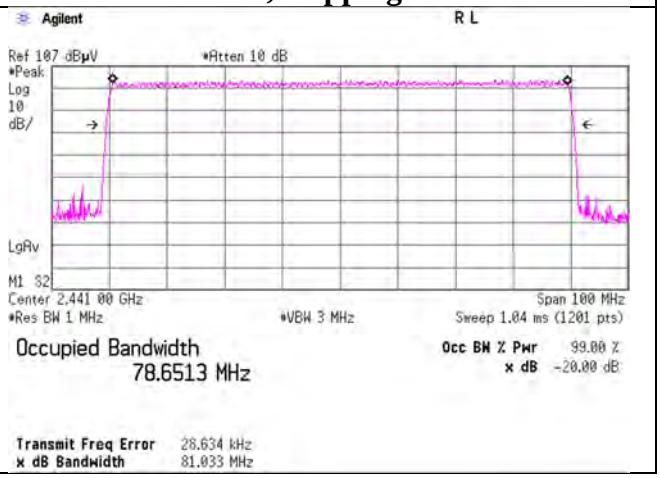
Mode	Freq. [MHz]	20 dB Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.954	897.6	1.000	>= 0.636
DH5	2441.0	0.952	902.2	1.000	>= 0.634
DH5	2480.0	0.950	899.4	1.000	>= 0.634
DH5	Hopping On	-	78591.8	-	-
3DH5	2402.0	1.289	1175.3	1.000	>= 0.859
3DH5	2441.0	1.288	1175.0	1.000	>= 0.858
3DH5	2480.0	1.289	1174.8	1.000	>= 0.859
3DH5	Hopping On	-	78651.3	-	-

Limit: Two-thirds of 20 dB Bandwidth or 25 kHz (whichever is greater).
No limit applies to 20 dB Bandwidth.

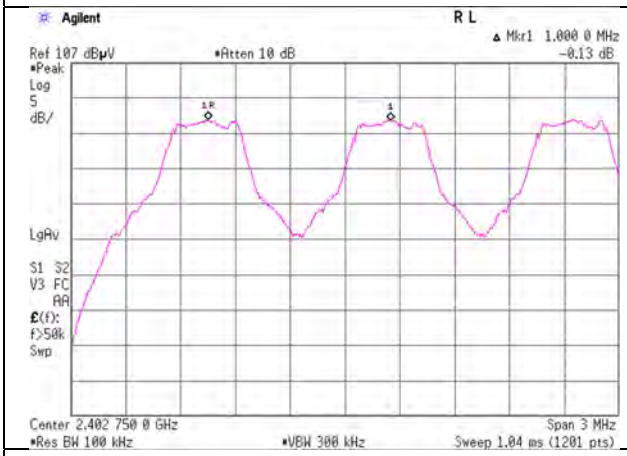
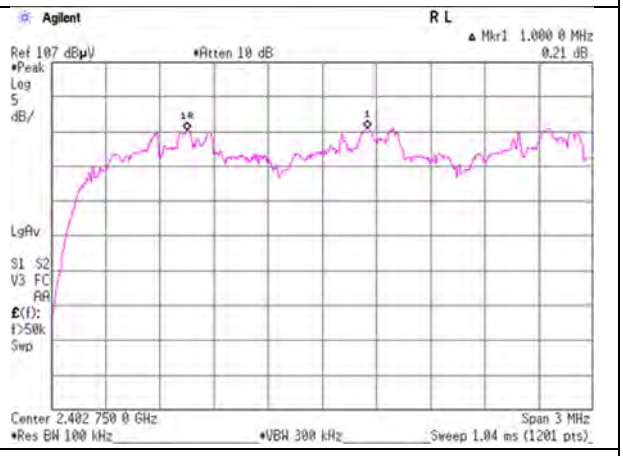
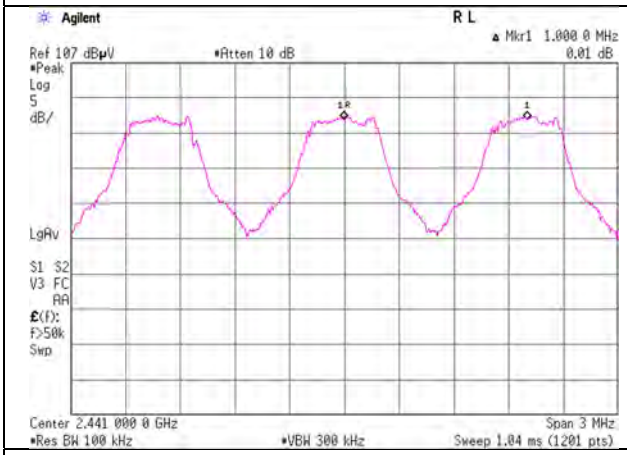
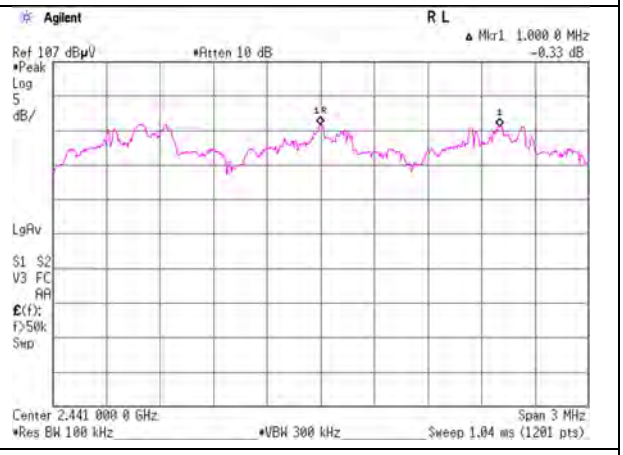
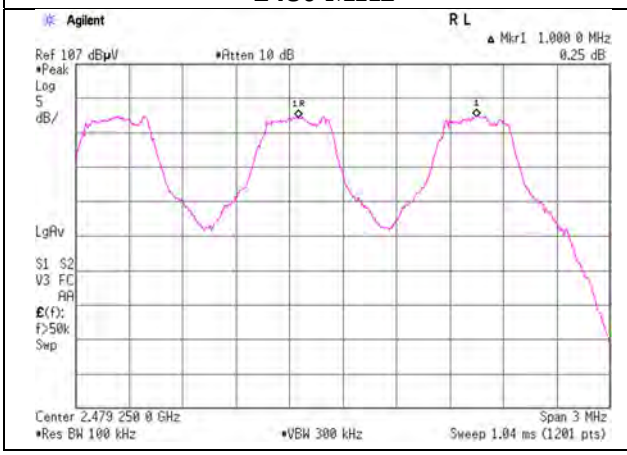
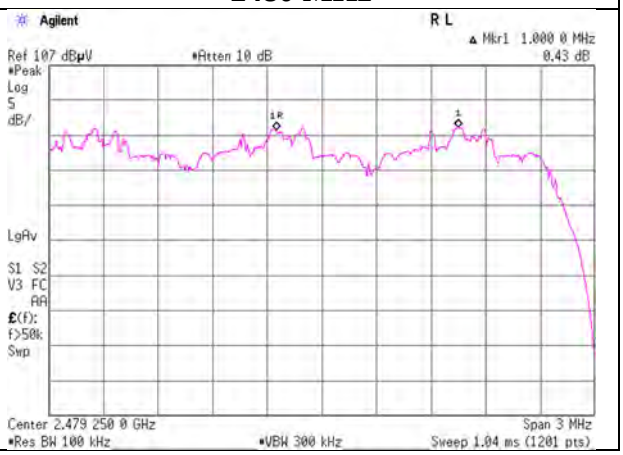
20dB Bandwidth and 99% Occupied Bandwidth

DH5	3DH5
2402 MHz	**2402 MHz**
	
2441 MHz	**2441 MHz**
	
2480 MHz	**2480 MHz**
	

20dB Bandwidth and 99% Occupied Bandwidth

DH5, Hopping On	3DH5, Hopping On
	

Carrier Frequency Separation

DH5	3DH5
2402 MHz	**2402 MHz**
	
2441 MHz	**2441 MHz**
	
2480 MHz	**2480 MHz**
	

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

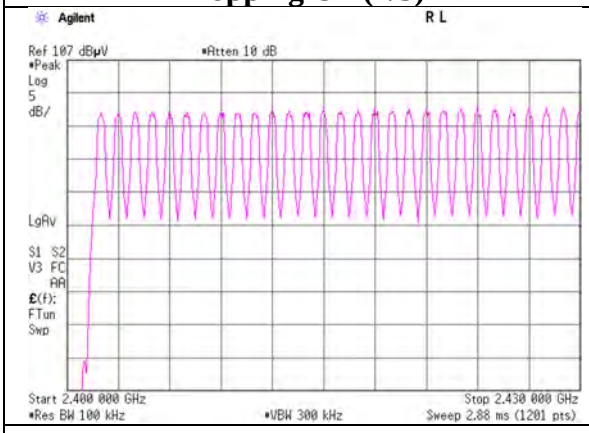
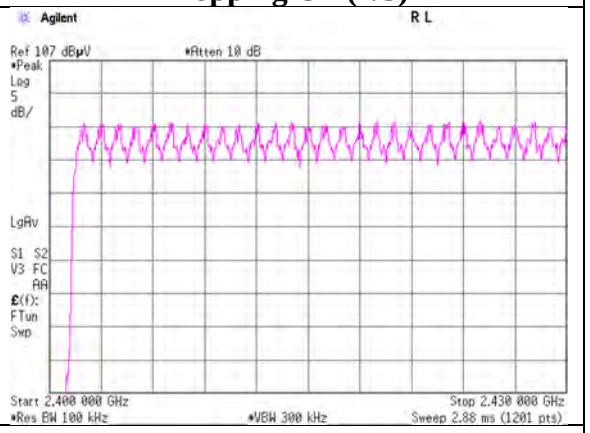
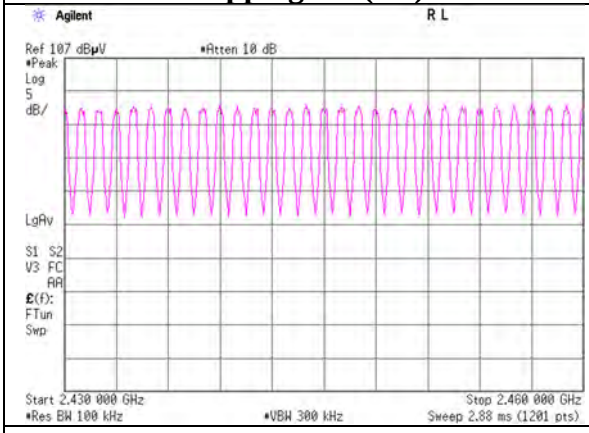
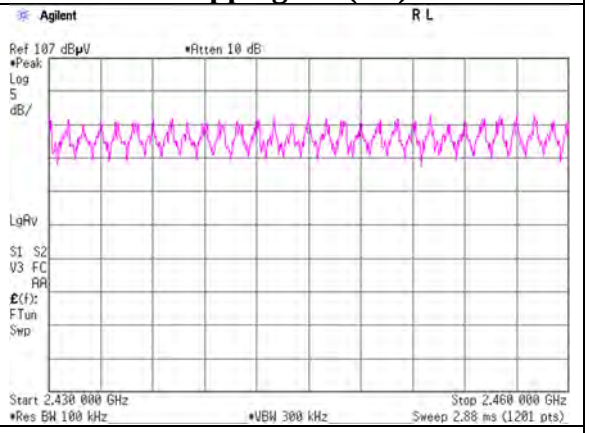
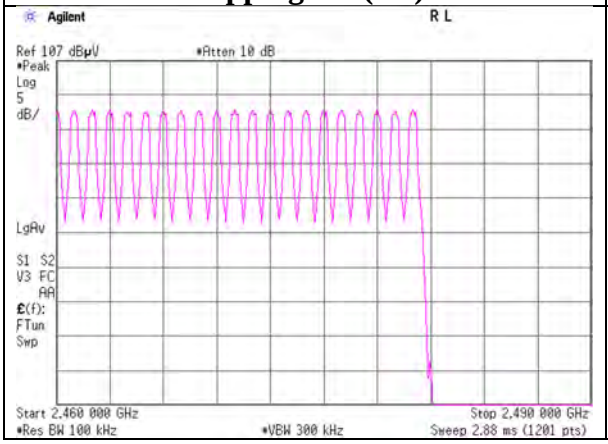
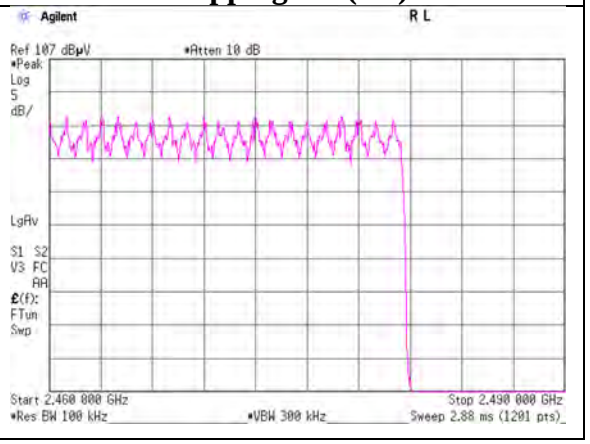
Number of Hopping Frequency

Report No.	14011702S-A-R1	
Test place	Shonan EMC Lab. No.5 Shielded Room	
Date	November 5, 2021	November 8, 2021
Temperature / Humidity	25 deg. C / 37 % RH	23 deg. C / 40 % RH
Engineer	Miku Ikudome	Miku Ikudome
Mode	Tx, Hopping On	

Mode	Number of channel [channels]	Limit [channels]
DH5	79	>= 15
3DH5	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

DH5	3DH5
Hopping On (1/3)	**Hopping On (1/3)**
	
Hopping On (2/3)	**Hopping On (2/3)**
	
Hopping On (3/3)	**Hopping On (3/3)**
	

Dwell time

Report No.	14011702S-A-R1	
Test place	Shonan EMC Lab. No.5 Shielded Room	
Date	November 5, 2021	November 8, 2021
Temperature / Humidity	25 deg. C / 37 % RH	23 deg. C / 40 % RH
Engineer	Miku Ikudome	Miku Ikudome
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	50.6 times / 5 sec. x 31.6 sec. = 320 times	0.402	129	400
DH3	27.6 times / 5 sec. x 31.6 sec. = 175 times	1.663	291	400
DH5	19.2 times / 5 sec. x 31.6 sec. = 122 times	2.919	356	400
3DH1	50.6 times / 5 sec. x 31.6 sec. = 320 times	0.407	130	400
3DH3	27.8 times / 5 sec. x 31.6 sec. = 176 times	1.663	293	400
3DH5	18.0 times / 5 sec. x 31.6 sec. = 114 times	2.916	332	400

Sample Calculation
Result = Number of transmission x Length of transmission

*Average data of 5 tests.(except Inquiry)

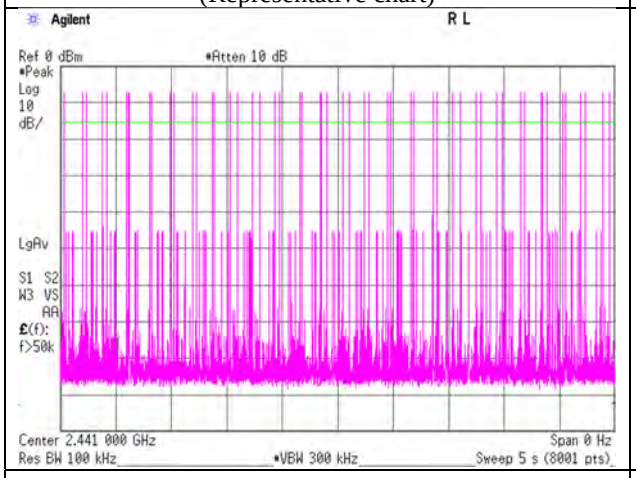
Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	51	50	51	51	50	50.6
DH3	29	25	28	27	29	27.6
DH5	18	19	21	18	20	19.2
3DH1	50	51	52	50	50	50.6
3DH3	26	27	31	26	29	27.8
3DH5	18	16	18	21	17	18

Sample Calculation
Average = Summation (Sampling 1 to 5) / 5

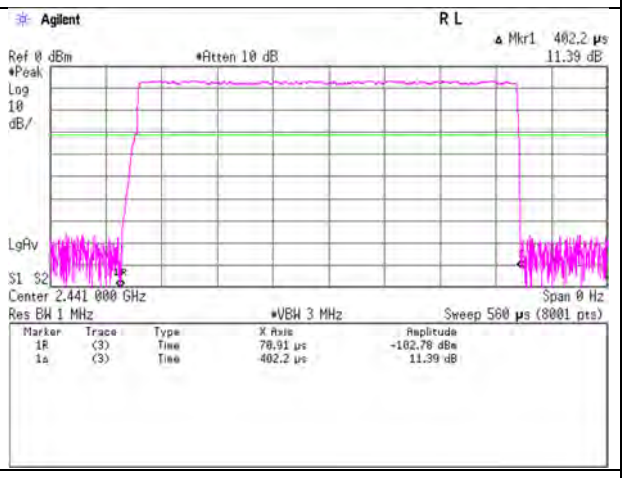
This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in N x 0.4s, where N is the number of channels being used in the hopping sequence ($20 \leq N \leq 79$), is always less than 0.4s regardless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

Dwell time

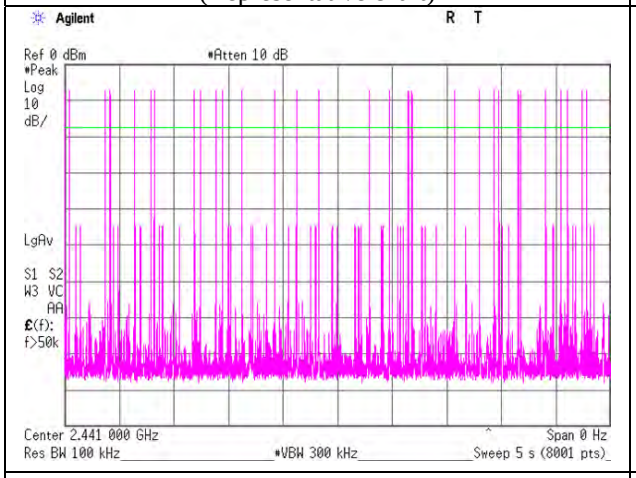
DH1 (1/2)
(Representative chart)



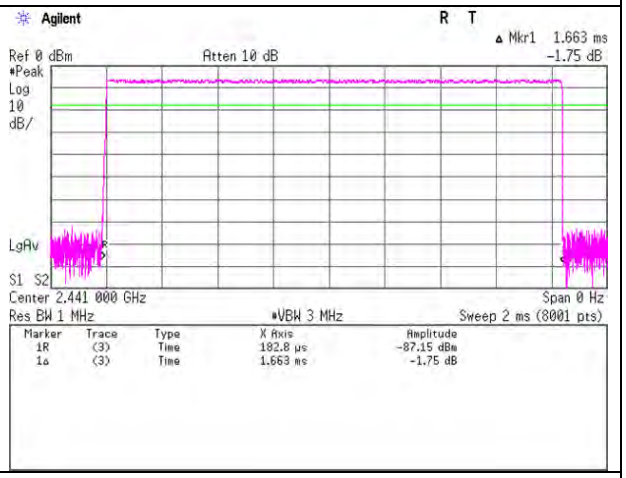
DH1 (2/2)



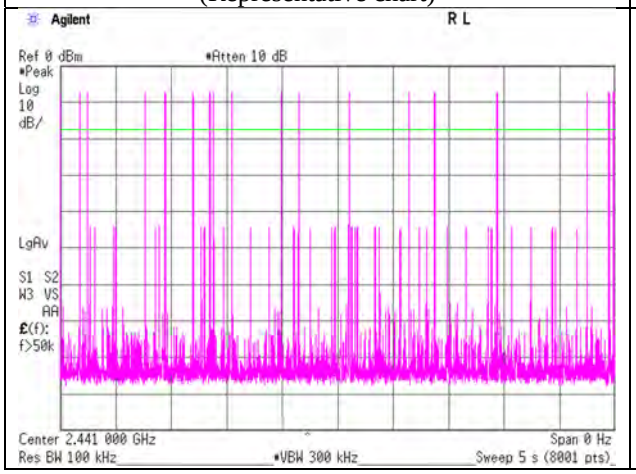
DH3 (1/2)
(Representative chart)



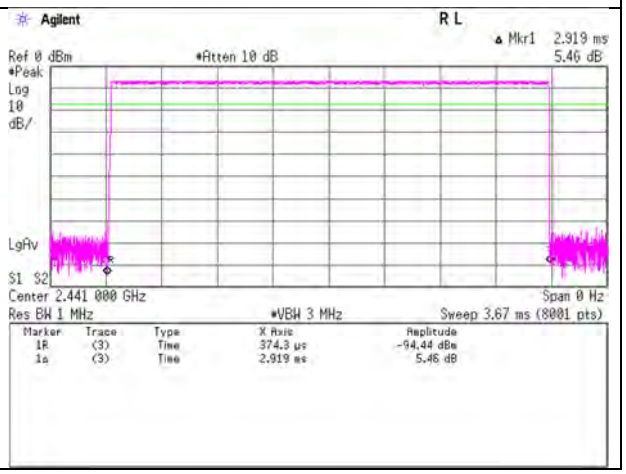
DH3 (2/2)



DH5 (1/2)
(Representative chart)

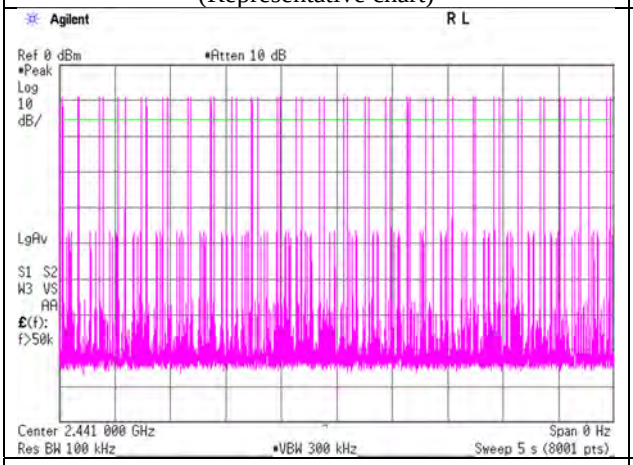


DH5 (2/2)

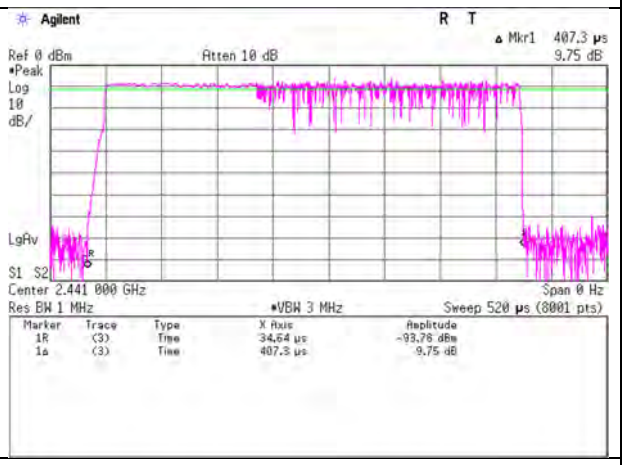


Dwell time

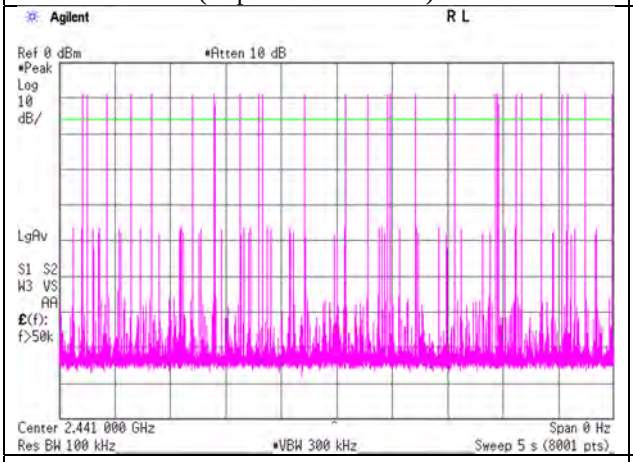
3DH1 (1/2)
(Representative chart)



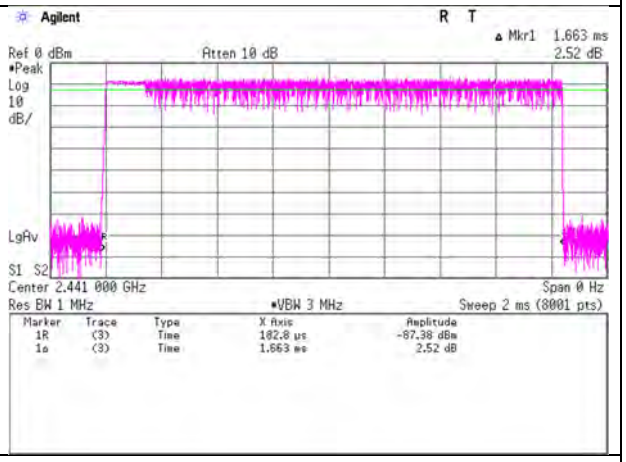
3DH1 (2/2)



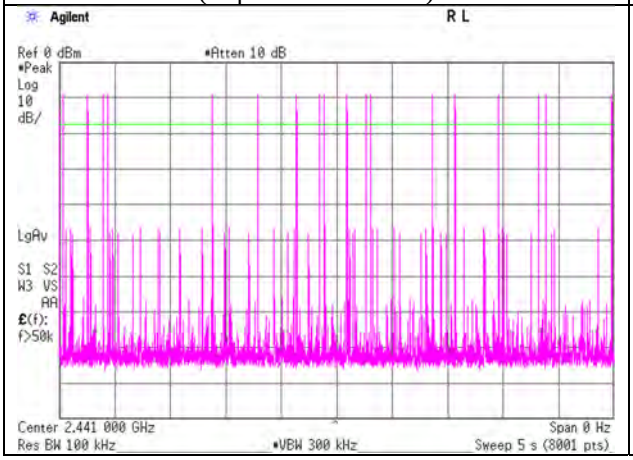
3DH3 (1/2)
(Representative chart)



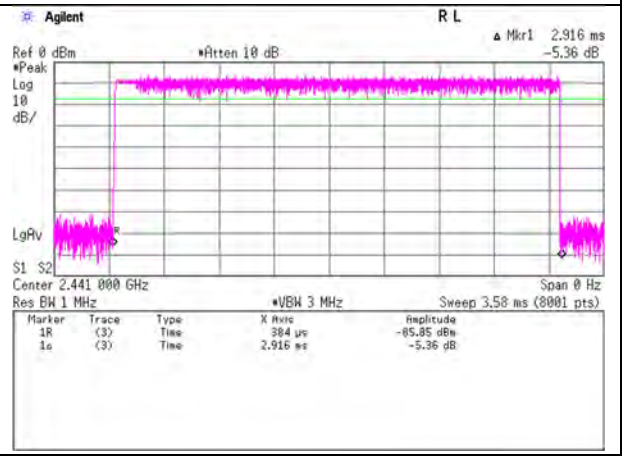
3DH3 (2/2)



3DH5 (1/2)
(Representative chart)



3DH5 (2/2)



Maximum Peak Output Power

Report No.	14011702S-A-R1
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	November 4, 2021
Temperature / Humidity	24 deg. C / 35 % RH
Engineer	Miku Ikudome
Mode	Tx, Hopping Off

					Conducted Power					e.i.r.p. for RSS-247					
Mode	Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	[dB]
DH5	2402.0	-7.01	1.08	10.18	4.25	2.66	20.96	125	16.71	2.00	6.25	4.22	36.02	4000	29.77
DH5	2441.0	-6.43	1.09	10.18	4.84	3.05	20.96	125	16.12	2.00	6.84	4.83	36.02	4000	29.18
DH5	2480.0	-6.32	1.09	10.18	4.95	3.13	20.96	125	16.01	2.00	6.95	4.95	36.02	4000	29.07
2DH5	2402.0	-6.28	1.08	10.18	4.98	3.15	20.96	125	15.98	2.00	6.98	4.99	36.02	4000	29.04
2DH5	2441.0	-5.90	1.09	10.18	5.37	3.44	20.96	125	15.59	2.00	7.37	5.46	36.02	4000	28.65
2DH5	2480.0	-5.86	1.09	10.18	5.41	3.48	20.96	125	15.55	2.00	7.41	5.51	36.02	4000	28.61
3DH5	2402.0	-6.25	1.08	10.18	5.01	3.17	20.96	125	15.95	2.00	7.01	5.02	36.02	4000	29.01
3DH5	2441.0	-5.89	1.09	10.18	5.38	3.45	20.96	125	15.58	2.00	7.38	5.47	36.02	4000	28.64
3DH5	2480.0	-5.84	1.09	10.18	5.43	3.49	20.96	125	15.53	2.00	7.43	5.53	36.02	4000	28.59

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.	14011702S-A-R1
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	November 4, 2021
Temperature / Humidity	24 deg. C / 35 % RH
Engineer	Miku Ikudome
Mode	Tx, Hopping Off

Mode	Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
DH5	2402.0	-8.98	1.08	10.18	2.28	1.69	1.11	3.39	2.18
DH5	2441.0	-8.40	1.09	10.18	2.87	1.94	1.11	3.98	2.50
DH5	2480.0	-8.28	1.09	10.18	2.99	1.99	1.11	4.10	2.57
2DH5	2402.0	-11.36	1.08	10.18	-0.10	0.98	1.11	1.01	1.26
2DH5	2441.0	-10.86	1.09	10.18	0.41	1.10	1.11	1.52	1.42
2DH5	2480.0	-9.95	1.09	10.18	1.32	1.36	1.11	2.43	1.75
3DH5	2402.0	-11.27	1.08	10.18	-0.01	1.00	1.10	1.09	1.29
3DH5	2441.0	-10.82	1.09	10.18	0.45	1.11	1.10	1.55	1.43
3DH5	2480.0	-10.70	1.09	10.18	0.57	1.14	1.10	1.67	1.47

Sample Calculation:
Result (Time average) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss
Result (Burst power average) = Time average + Duty factor

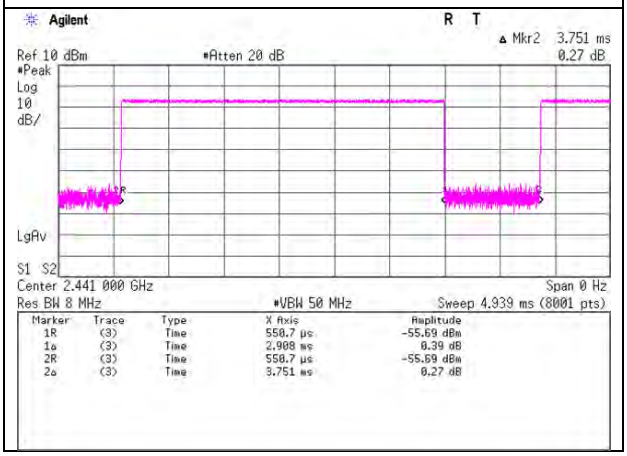
*The equipment and cables were not used for factor 0 dB of the data sheets.

Burst Rate Confirmation

Report No.	14011702S-A-R1
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	November 4, 2021
Temperature / Humidity	24 deg. C / 35 % RH
Engineer	Miku Ikudome
Mode	Tx, Hopping Off

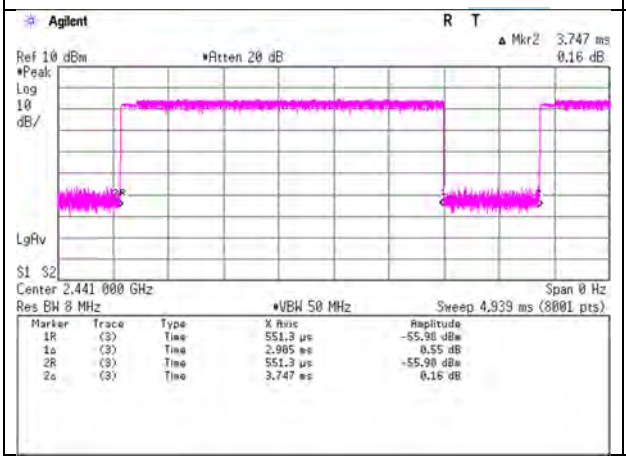
DH5

Tx on / (Tx on + Tx off) =	**0.775**
Tx on / (Tx on + Tx off) * 100 =	**77.5 %**
Duty factor = 10 * log (3.751 / 2.908) =	**1.11 dB**
VBW:1/x = 344 Hz < 360 Hz	
x: (Tx on) = 2.908 ms	



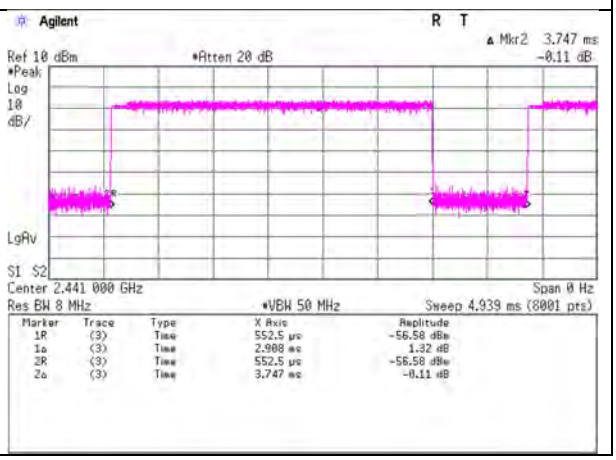
2DH5

Tx on / (Tx on + Tx off) =	**0.775**
Tx on / (Tx on + Tx off) * 100 =	**77.5 %**
Duty factor = 10 * log (3.747 / 2.905) =	**1.11 dB**
VBW:1/x = 344 Hz < 360 Hz	
x: (Tx on) = 2.905 ms	



3DH5

Tx on / (Tx on + Tx off) =	**0.776**
Tx on / (Tx on + Tx off) * 100 =	**77.6 %**
Duty factor = 10 * log (3.747 / 2.908) =	**1.10 dB**
VBW:1/x = 344 Hz < 360 Hz	
x: (Tx on) = 2.908 ms	



Radiated Spurious Emission

Report No.	14011702S-A-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.1	No.1	No.1
Date	November 4, 2021	November 4, 2021	November 5, 2021
Temperature / Humidity	24 deg.C, 41 %RH	25 deg.C, 44 %RH	20 deg.C, 42 %RH
Engineer	Yosuke Murakami	Hiromasa Sato	Yasumasa Owaki
	(30 MHz -1 GHz)	(1 GHz -10 GHz)	(10 GHz -26.5 GHz)
Mode	Tx, Hopping Off, DH5 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.	68.883	QP	38.80	6.66	7.47	31.81	0.00	21.12	40.0	18.8	294	195	-
Hori.	265.103	QP	52.10	12.55	6.29	31.75	0.00	39.19	46.0	6.8	122	199	-
Hori.	278.359	QP	51.60	13.30	6.39	31.76	0.00	39.53	46.0	**6.4**	117	195	-
Hori.	307.211	QP	48.20	13.77	6.61	31.78	0.00	36.80	46.0	9.2	146	291	-
Hori.	442.390	QP	45.20	16.34	7.51	31.88	0.00	37.17	46.0	8.8	100	294	-
Hori.	552.959	QP	41.30	17.94	8.13	32.03	0.00	35.34	46.0	10.6	100	145	-
Hori.	860.188	QP	35.50	21.82	9.70	31.67	0.00	35.35	46.0	10.6	100	18	-
Hori.	1000.002	PK	47.50	23.84	13.14	39.31	2.28	47.45	73.9	26.4	143	11	-
Hori.	2390.000	PK	45.04	27.73	14.82	39.61	2.28	50.26	73.9	23.6	370	101	-
Hori.	4804.000	PK	45.81	31.22	7.44	39.69	2.28	47.06	73.9	26.8	184	150	-
Hori.	7206.000	PK	44.99	36.56	9.10	39.49	2.28	53.44	73.9	20.4	150	0	-
Hori.	9608.000	PK	44.90	38.15	10.71	39.68	2.28	56.36	73.9	17.5	150	0	-
Hori.	1000.002	AV	38.89	23.84	13.14	39.31	2.28	38.84	53.9	15.0	143	11	VBW:10 Hz
Hori.	2390.000	AV	33.52	27.73	14.82	39.61	2.28	38.74	53.9	15.1	370	101	VBW:360 Hz
Hori.	4804.000	AV	35.91	31.22	7.44	39.69	2.28	37.16	53.9	16.7	184	150	VBW:360 Hz
Hori.	7206.000	AV	34.28	36.56	9.10	39.49	2.28	42.73	53.9	11.1	150	0	VBW:360 Hz, Floor noise
Hori.	9608.000	AV	34.94	38.15	10.71	39.68	2.28	46.40	53.9	7.5	150	0	VBW:360 Hz, Floor noise
Vert.	33.006	QP	33.20	17.51	7.10	31.83	0.00	25.98	40.0	14.0	100	197	-
Vert.	46.267	QP	36.30	12.54	7.42	31.81	0.00	24.45	40.0	15.5	100	353	-
Vert.	261.400	QP	47.80	12.29	6.26	31.75	0.00	34.60	46.0	11.4	100	337	-
Vert.	268.812	QP	47.10	12.79	6.32	31.76	0.00	34.45	46.0	11.5	100	337	-
Vert.	1000.055	PK	50.94	23.84	13.14	39.31	2.28	50.89	73.9	23.0	140	0	-
Vert.	2390.000	PK	44.96	27.73	14.82	39.61	2.28	50.18	73.9	23.7	306	2	-
Vert.	4804.000	PK	45.96	31.22	7.44	39.69	2.28	47.21	73.9	26.6	110	33	-
Vert.	7206.000	PK	45.23	36.56	9.10	39.49	2.28	53.68	73.9	20.2	150	0	-
Vert.	9608.000	PK	45.14	38.15	10.71	39.68	2.28	56.60	73.9	17.3	150	0	-
Vert.	1000.055	AV	47.43	23.84	13.14	39.31	2.28	47.38	53.9	6.5	140	0	VBW:10 Hz
Vert.	2390.000	AV	33.42	27.73	14.82	39.61	2.28	38.64	53.9	15.2	306	2	VBW:360 Hz
Vert.	4804.000	AV	35.48	31.22	7.44	39.69	2.28	36.73	53.9	17.1	110	33	VBW:360 Hz
Vert.	7206.000	AV	34.26	36.56	9.10	39.49	2.28	42.71	53.9	11.1	150	0	VBW:360 Hz, Floor noise
Vert.	9608.000	AV	35.00	38.15	10.71	39.68	2.28	46.46	53.9	7.4	150	0	VBW:360 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 (3.90 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.

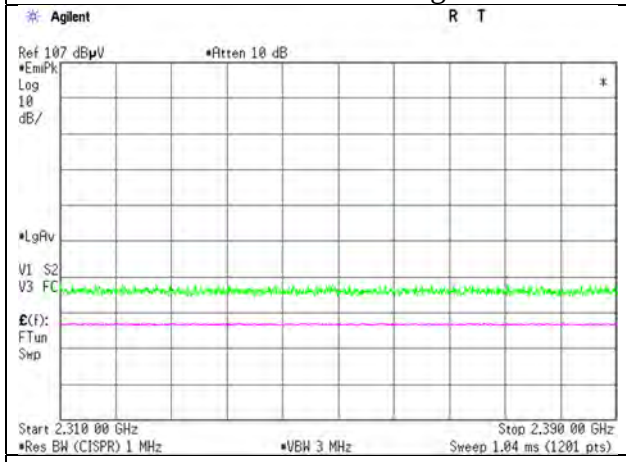
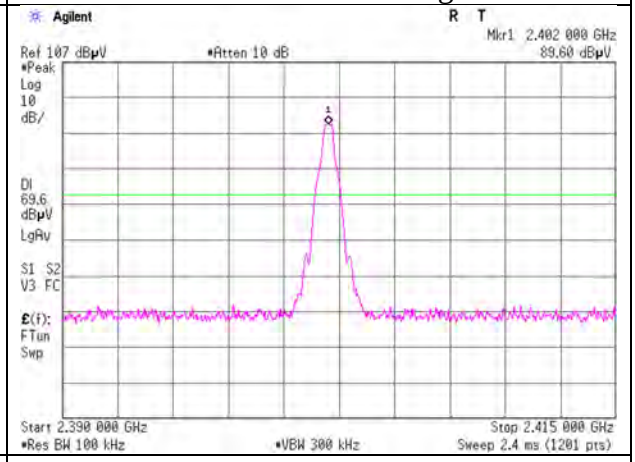
20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

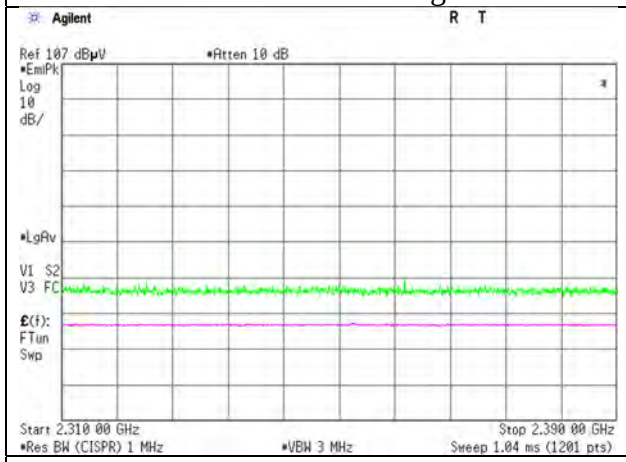
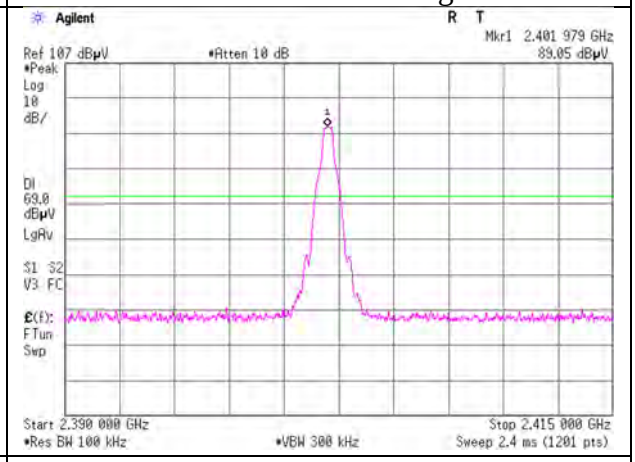
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	89.38	27.71	14.84	39.62	2.28	94.59	-	-	Carrier
Hori.	2400.000	PK	36.82	27.71	14.83	39.62	2.28	42.02	74.5	32.4	-
Vert.	2402.000	PK	88.78	27.71	14.84	39.62	2.28	93.99	-	-	Carrier
Vert.	2400.000	PK	37.07	27.71	14.83	39.62	2.28	42.27	73.9	31.6	-

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

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	14011702S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.1
Date	November 4, 2021
Temperature / Humidity	25 deg.C, 44 %RH
Engineer	Hiromasa Sato
	(1 GHz -10 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz

Horizontal	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

Vertical	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

* 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.	14011702S-A-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.1	No.1	No.1
Date	November 4, 2021	November 4, 2021	November 5, 2021
Temperature / Humidity	24 deg.C, 41 %RH	25 deg.C, 44 %RH	20 deg.C, 42 %RH
Engineer	Yosuke Murakami	Hiromasa Sato	Yasumasa Owaki
	(30 MHz -1 GHz)	(1 GHz -10 GHz)	(10 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.	65.362	QP	41.70	7.15	7.25	31.81	0.00	24.29	40.0	15.7	308	321	-
Hori.	70.501	QP	41.90	6.49	7.58	31.81	0.00	24.16	40.0	15.8	280	230	-
Hori.	86.019	QP	47.60	7.38	8.42	31.80	0.00	31.60	40.0	8.4	356	151	-
Hori.	277.262	QP	51.30	13.26	6.38	31.76	0.00	39.18	46.0	6.8	124	198	-
Hori.	442.369	QP	45.00	16.34	7.51	31.88	0.00	36.97	46.0	9.0	100	308	-
Hori.	454.656	QP	44.80	16.66	7.58	31.89	0.00	37.15	46.0	8.8	100	296	-
Hori.	600.000	QP	39.90	19.27	8.35	32.03	0.00	35.49	46.0	10.5	100	142	-
Hori.	1000.001	PK	47.23	23.84	13.14	39.31	2.28	47.18	73.9	26.7	144	8	-
Hori.	4882.000	PK	46.02	31.25	7.48	39.70	2.28	47.33	73.9	26.5	183	92	-
Hori.	7323.000	PK	44.72	36.69	9.17	39.46	2.28	53.40	73.9	20.5	150	0	-
Hori.	9764.000	PK	45.74	38.63	10.71	39.60	2.28	57.76	73.9	16.1	150	0	-
Hori.	1000.001	AV	38.40	23.84	13.14	39.31	2.28	38.35	53.9	15.5	144	8	VBW:10 Hz
Hori.	4882.000	AV	35.91	31.25	7.48	39.70	2.28	37.22	53.9	16.6	183	92	VBW:360 Hz
Hori.	7323.000	AV	32.82	36.69	9.17	39.46	2.28	41.50	53.9	12.4	150	0	VBW:360 Hz, Floor noise
Hori.	9764.000	AV	33.51	38.63	10.71	39.60	2.28	45.53	53.9	8.3	150	0	VBW:360 Hz, Floor noise
Vert.	33.616	QP	36.10	17.27	7.12	31.83	0.00	28.66	40.0	11.3	100	1	-
Vert.	42.966	QP	33.60	13.78	7.34	31.82	0.00	22.90	40.0	17.1	100	2	-
Vert.	599.999	QP	42.00	19.27	8.35	32.03	0.00	37.59	46.0	8.4	100	118	-
Vert.	1000.004	PK	50.13	23.84	13.14	39.31	2.28	50.08	73.9	23.8	147	1	-
Vert.	4882.000	PK	46.37	31.25	7.48	39.70	2.28	47.68	73.9	26.2	323	38	-
Vert.	7323.000	PK	44.31	36.69	9.17	39.46	2.28	52.99	73.9	20.9	150	0	-
Vert.	9764.000	PK	45.50	38.63	10.71	39.60	2.28	57.52	73.9	16.3	150	0	-
Vert.	1000.004	AV	47.16	23.84	13.14	39.31	2.28	47.11	53.9	**6.7**	147	1	VBW:10 Hz
Vert.	4882.000	AV	36.17	31.25	7.48	39.70	2.28	37.48	53.9	16.4	323	38	VBW:360 Hz
Vert.	7323.000	AV	32.78	36.69	9.17	39.46	2.28	41.46	53.9	12.4	150	0	VBW:360 Hz, Floor noise
Vert.	9764.000	AV	33.45	38.63	10.71	39.60	2.28	45.47	53.9	8.4	150	0	VBW:360 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 (3.90 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.

Radiated Spurious Emission

Report No.	14011702S-A-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.1	No.1	No.1
Date	November 4, 2021	November 4, 2021	November 5, 2021
Temperature / Humidity	24 deg.C, 41 %RH	25 deg.C, 44 %RH	20 deg.C, 42 %RH
Engineer	Yosuke Murakami	Hiromasa Sato	Yasumasa Owaki
	(30 MHz -1 GHz)	(1 GHz -10 GHz)	(10 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.	63.504	QP	37.80	7.50	7.23	31.81	0.00	20.72	40.0	19.2	331	166	-
Hori.	65.354	QP	42.10	7.15	7.25	31.81	0.00	24.69	40.0	15.3	296	305	-
Hori.	86.011	QP	46.50	7.38	8.42	31.80	0.00	30.50	40.0	9.5	372	141	-
Hori.	285.657	QP	51.80	13.46	6.44	31.77	0.00	39.93	46.0	**6.0**	118	199	-
Hori.	307.203	QP	49.30	13.77	6.61	31.78	0.00	37.90	46.0	8.1	100	32	-
Hori.	442.371	QP	46.10	16.34	7.51	31.88	0.00	38.07	46.0	7.9	100	292	-
Hori.	600.001	QP	41.10	19.27	8.35	32.03	0.00	36.69	46.0	9.3	100	115	-
Hori.	786.432	QP	36.40	20.71	9.32	31.94	0.00	34.49	46.0	11.5	104	13	-
Hori.	1000.004	PK	47.56	23.84	13.14	39.31	2.28	47.51	73.9	26.3	141	10	-
Hori.	2483.500	PK	46.54	27.61	14.93	39.64	2.28	51.72	73.9	22.1	353	108	-
Hori.	4960.000	PK	45.84	31.43	7.55	39.72	2.28	47.38	73.9	26.5	188	137	-
Hori.	7440.000	PK	44.61	36.84	9.23	39.42	2.28	53.54	73.9	20.3	150	0	-
Hori.	9920.000	PK	44.57	38.71	10.72	39.52	2.28	56.76	73.9	17.1	150	0	-
Hori.	1000.004	AV	38.37	23.84	13.14	39.31	2.28	38.32	53.9	15.5	141	10	VBW:10 Hz
Hori.	2483.500	AV	34.56	27.61	14.93	39.64	2.28	39.74	53.9	14.1	353	108	VBW:360 Hz
Hori.	4960.000	AV	35.70	31.43	7.55	39.72	2.28	37.24	53.9	16.6	188	137	VBW:360 Hz
Hori.	7440.000	AV	32.43	36.84	9.23	39.42	2.28	41.36	53.9	12.5	150	0	VBW:360 Hz, Floor noise
Hori.	9920.000	AV	32.78	38.71	10.72	39.52	2.28	44.97	53.9	8.9	150	0	VBW:360 Hz, Floor noise
Vert.	36.867	QP	37.50	15.95	7.20	31.82	0.00	28.83	40.0	11.1	100	308	-
Vert.	261.400	QP	46.70	12.29	6.26	31.75	0.00	33.50	46.0	12.5	100	3	-
Vert.	600.000	QP	42.80	19.27	8.35	32.03	0.00	38.39	46.0	7.6	100	116	-
Vert.	1000.003	PK	50.22	23.84	13.14	39.31	2.28	50.17	73.9	23.7	143	4	-
Vert.	2483.500	PK	46.02	27.61	14.93	39.64	2.28	51.20	73.9	22.7	279	180	-
Vert.	4960.000	PK	46.13	31.43	7.55	39.72	2.28	47.67	73.9	26.2	124	51	-
Vert.	7440.000	PK	43.74	36.84	9.23	39.42	2.28	52.67	73.9	21.2	150	0	-
Vert.	9920.000	PK	44.98	38.71	10.72	39.52	2.28	57.17	73.9	16.7	150	0	-
Vert.	1000.003	AV	47.08	23.84	13.14	39.31	2.28	47.03	53.9	6.8	143	4	VBW:10 Hz
Vert.	2483.500	AV	33.90	27.61	14.93	39.64	2.28	39.08	53.9	14.8	279	180	VBW:360 Hz
Vert.	4960.000	AV	35.77	31.43	7.55	39.72	2.28	37.31	53.9	16.5	124	51	VBW:360 Hz
Vert.	7440.000	AV	33.10	36.84	9.23	39.42	2.28	42.03	53.9	11.8	150	0	VBW:360 Hz, Floor noise
Vert.	9920.000	AV	32.55	38.71	10.72	39.52	2.28	44.74	53.9	9.1	150	0	VBW:360 Hz, Floor noise

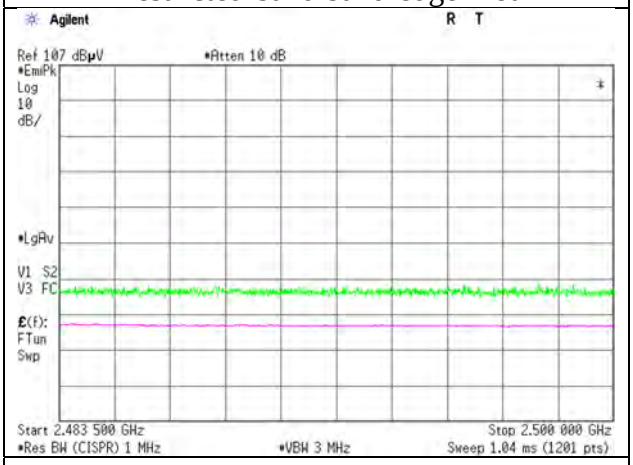
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
*These results have sufficient margin without taking account Duty cycle correction factor.

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	14011702S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.1
Date	November 4, 2021
Temperature / Humidity	25 deg.C, 44 %RH
Engineer	Hiromasa Sato
	(1 GHz -10 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz

Horizontal

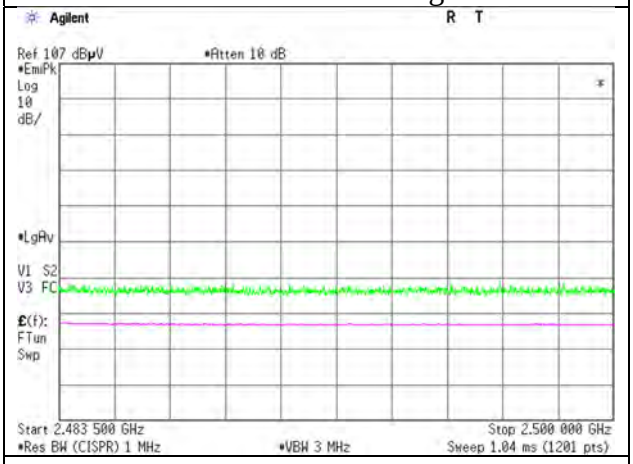
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* 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.	14011702S-A-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.1	No.1	No.1
Date	November 4, 2021	November 4, 2021	November 5, 2021
Temperature / Humidity	24 deg.C, 41 %RH	25 deg.C, 44 %RH	20 deg.C, 42 %RH
Engineer	Yosuke Murakami	Hiromasa Sato	Yasumasa Owaki
	(30 MHz -1 GHz)	(1 GHz -10 GHz)	(10 GHz -26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 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.	70.504	QP	42.30	6.49	7.58	31.81	0.00	24.56	40.0	15.4	263	220	-
Hori.	75.669	QP	41.50	6.25	8.04	31.80	0.00	23.99	40.0	16.0	254	304	-
Hori.	86.019	QP	46.70	7.38	8.42	31.80	0.00	30.70	40.0	9.3	231	144	-
Hori.	277.338	QP	51.50	13.26	6.38	31.76	0.00	39.38	46.0	**6.6**	123	201	-
Hori.	442.367	QP	45.40	16.34	7.51	31.88	0.00	37.37	46.0	8.6	100	303	-
Hori.	454.656	QP	44.80	16.66	7.58	31.89	0.00	37.15	46.0	8.8	100	293	-
Hori.	600.002	QP	43.20	19.27	8.35	32.03	0.00	38.79	46.0	7.2	100	151	-
Hori.	1000.021	PK	47.37	23.84	13.14	39.31	2.28	47.32	73.9	26.5	140	9	-
Hori.	2390.000	PK	45.39	27.73	14.82	39.61	2.28	50.61	73.9	23.2	173	103	-
Hori.	4804.000	PK	45.67	31.22	7.44	39.69	2.28	46.92	73.9	26.9	183	142	-
Hori.	7206.000	PK	44.74	36.56	9.10	39.49	2.28	53.19	73.9	20.7	150	0	-
Hori.	9608.000	PK	44.81	38.15	10.71	39.68	2.28	56.27	73.9	17.6	150	0	-
Hori.	1000.021	AV	38.24	23.84	13.14	39.31	2.28	38.19	53.9	15.7	140	9	VBW:10 Hz
Hori.	2390.000	AV	33.59	27.73	14.82	39.61	2.28	38.81	53.9	15.0	173	103	VBW:360 Hz
Hori.	4804.000	AV	35.86	31.22	7.44	39.69	2.28	37.11	53.9	16.7	183	142	VBW:360 Hz
Hori.	7206.000	AV	34.23	36.56	9.10	39.49	2.28	42.68	53.9	11.2	150	0	VBW:360 Hz, Floor noise
Hori.	9608.000	AV	34.70	38.15	10.71	39.68	2.28	46.16	53.9	7.7	150	0	VBW:360 Hz, Floor noise
Vert.	42.961	QP	34.70	13.78	7.34	31.82	0.00	24.00	40.0	16.0	100	1	-
Vert.	49.153	QP	39.20	11.52	7.46	31.81	0.00	26.37	40.0	13.6	100	281	-
Vert.	268.769	QP	47.60	12.78	6.32	31.76	0.00	34.94	46.0	11.0	100	359	-
Vert.	600.003	QP	43.20	19.27	8.35	32.03	0.00	38.79	46.0	7.2	100	119	-
Vert.	1000.004	PK	45.81	23.84	13.14	39.31	2.28	45.76	73.9	28.1	143	5	-
Vert.	2390.000	PK	44.80	27.73	14.82	39.61	2.28	50.02	73.9	23.8	299	358	-
Vert.	4804.000	PK	45.33	31.22	7.44	39.69	2.28	46.58	73.9	27.3	103	36	-
Vert.	7206.000	PK	45.21	36.56	9.10	39.49	2.28	53.66	73.9	20.2	150	0	-
Vert.	9608.000	PK	45.10	38.15	10.71	39.68	2.28	56.56	73.9	17.3	150	0	-
Vert.	1000.004	AV	47.30	23.84	13.14	39.31	2.28	47.25	53.9	**6.6**	143	5	VBW:10 Hz
Vert.	2390.000	AV	33.42	27.73	14.82	39.61	2.28	38.64	53.9	15.2	299	358	VBW:360 Hz
Vert.	4804.000	AV	35.38	31.22	7.44	39.69	2.28	36.63	53.9	17.2	103	36	VBW:360 Hz
Vert.	7206.000	AV	34.19	36.56	9.10	39.49	2.28	42.64	53.9	11.2	150	0	VBW:360 Hz, Floor noise
Vert.	9608.000	AV	34.93	38.15	10.71	39.68	2.28	46.39	53.9	7.5	150	0	VBW:360 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 (3.90 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.

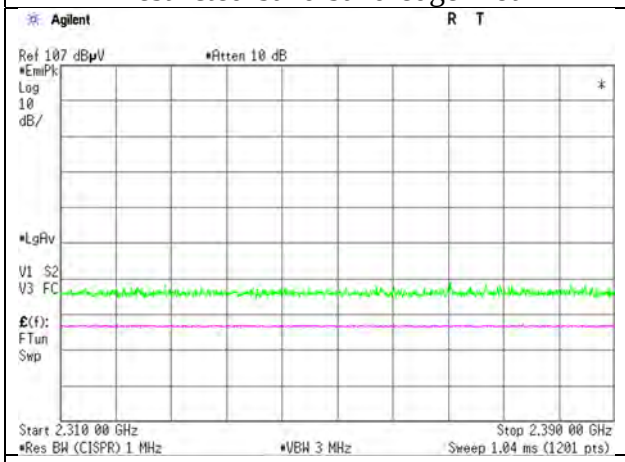
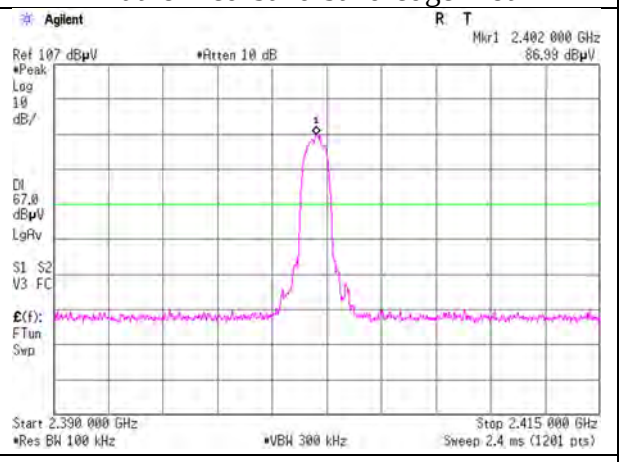
20 dBc Data Sheet **(RBW 100 kHz, VBW 300 kHz)**

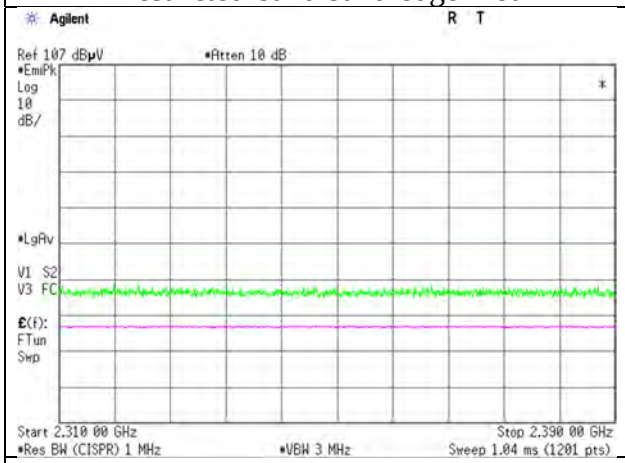
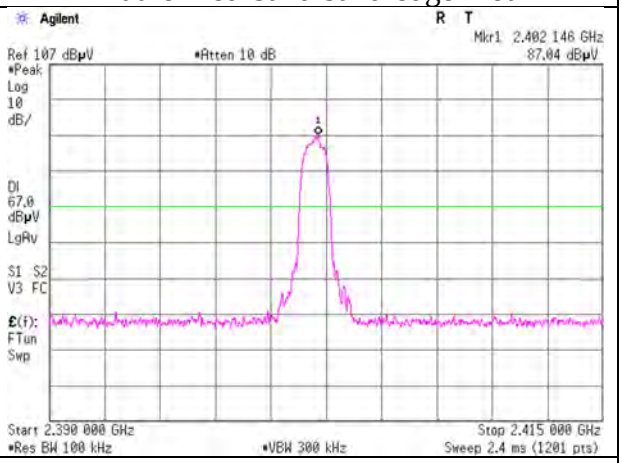
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	86.98	27.71	14.84	39.62	2.28	92.19	-	-	Carrier
Hori.	2400.000	PK	37.47	27.71	14.83	39.62	2.28	42.67	72.1	29.4	-
Vert.	2402.000	PK	87.02	27.71	14.84	39.62	2.28	92.23	-	-	Carrier
Vert.	2400.000	PK	36.50	27.71	14.83	39.62	2.28	41.70	72.2	30.5	-

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

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	14011702S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.1
Date	November 4, 2021
Temperature / Humidity	25 deg.C, 44 %RH
Engineer	Hiromasa Sato
	(1 GHz -10 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz

Horizontal	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

Vertical	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

* 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.	14011702S-A-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.1	No.1	No.1
Date	November 4, 2021	November 4, 2021	November 5, 2021
Temperature / Humidity	24 deg.C, 41 %RH	25 deg.C, 44 %RH	20 deg.C, 42 %RH
Engineer	Yosuke Murakami	Hiromasa Sato	Yasumasa Owaki
	(30 MHz -1 GHz)	(1 GHz -10 GHz)	(10 GHz -26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 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.	68.793	QP	41.30	6.67	7.46	31.81	0.00	23.62	40.0	16.3	261	221	-
Hori.	75.669	QP	43.90	6.25	8.04	31.80	0.00	26.39	40.0	13.6	238	106	-
Hori.	86.017	QP	47.10	7.38	8.42	31.80	0.00	31.10	40.0	8.9	345	150	-
Hori.	277.309	QP	51.50	13.26	6.38	31.76	0.00	39.38	46.0	6.6	117	198	-
Hori.	442.368	QP	45.10	16.34	7.51	31.88	0.00	37.07	46.0	8.9	100	298	-
Hori.	454.657	QP	44.60	16.66	7.58	31.89	0.00	36.95	46.0	9.0	100	294	-
Hori.	600.001	QP	43.50	19.27	8.35	32.03	0.00	39.09	46.0	6.9	100	146	-
Hori.	1000.013	PK	47.47	23.84	13.14	39.31	2.28	47.42	73.9	26.4	149	25	-
Hori.	4882.000	PK	45.41	31.25	7.48	39.70	2.28	46.72	73.9	27.1	193	148	-
Hori.	7323.000	PK	43.78	36.69	9.17	39.46	2.28	52.46	73.9	21.4	150	0	-
Hori.	9764.000	PK	44.22	38.63	10.71	39.60	2.28	56.24	73.9	17.6	150	0	-
Hori.	1000.013	AV	38.35	23.84	13.14	39.31	2.28	38.30	53.9	15.6	149	25	VBW:10 Hz
Hori.	4882.000	AV	35.64	31.25	7.48	39.70	2.28	36.95	53.9	16.9	193	148	VBW:360 Hz
Hori.	7323.000	AV	33.49	36.69	9.17	39.46	2.28	42.17	53.9	11.7	150	0	VBW:360 Hz, Floor noise
Hori.	9764.000	AV	34.30	38.63	10.71	39.60	2.28	46.32	53.9	7.5	150	0	VBW:360 Hz, Floor noise
Vert.	33.611	QP	36.40	17.27	7.12	31.83	0.00	28.96	40.0	11.0	100	4	-
Vert.	46.699	QP	35.00	12.39	7.42	31.81	0.00	23.00	40.0	17.0	100	262	-
Vert.	49.874	QP	39.40	11.26	7.47	31.81	0.00	26.32	40.0	13.6	100	345	-
Vert.	265.157	QP	48.70	12.55	6.29	31.75	0.00	35.79	46.0	10.2	100	358	-
Vert.	600.001	QP	44.20	19.27	8.35	32.03	0.00	39.79	46.0	**6.2**	100	126	-
Vert.	1000.020	PK	50.24	23.84	13.14	39.31	2.28	50.19	73.9	23.7	133	1	-
Vert.	4882.000	PK	45.58	31.25	7.48	39.70	2.28	46.89	73.9	27.0	121	57	-
Vert.	7323.000	PK	44.12	36.69	9.17	39.46	2.28	52.80	73.9	21.1	150	0	-
Vert.	9764.000	PK	44.41	38.63	10.71	39.60	2.28	56.43	73.9	17.4	150	0	-
Vert.	1000.020	AV	47.16	23.84	13.14	39.31	2.28	47.11	53.9	6.7	133	1	VBW:10 Hz
Vert.	4882.000	AV	35.34	31.25	7.48	39.70	2.28	36.65	53.9	17.2	121	57	VBW:360 Hz
Vert.	7323.000	AV	33.53	36.69	9.17	39.46	2.28	42.21	53.9	11.6	150	0	VBW:360 Hz, Floor noise
Vert.	9764.000	AV	34.32	38.63	10.71	39.60	2.28	46.34	53.9	7.5	150	0	VBW:360 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 (3.90 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.

Radiated Spurious Emission

Report No.	14011702S-A-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.1	No.1	No.1
Date	November 4, 2021	November 4, 2021	November 5, 2021
Temperature / Humidity	24 deg.C, 41 %RH	25 deg.C, 44 %RH	20 deg.C, 42 %RH
Engineer	Yosuke Murakami	Hiromasa Sato	Yasumasa Owaki
	(30 MHz -1 GHz)	(1 GHz -10 GHz)	(10 GHz -26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 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.	65.358	QP	40.90	7.15	7.25	31.81	0.00	23.49	40.0	16.5	250	283	-
Hori.	86.019	QP	46.40	7.38	8.42	31.80	0.00	30.40	40.0	9.6	243	158	-
Hori.	120.381	QP	37.80	13.12	8.21	31.79	0.00	27.34	43.5	16.1	288	176	-
Hori.	278.489	QP	51.70	13.31	6.39	31.76	0.00	39.64	46.0	**6.3**	112	199	-
Hori.	442.368	QP	45.20	16.34	7.51	31.88	0.00	37.17	46.0	8.8	100	303	-
Hori.	454.656	QP	44.70	16.66	7.58	31.89	0.00	37.05	46.0	8.9	100	294	-
Hori.	600.000	QP	41.20	19.27	8.35	32.03	0.00	36.79	46.0	9.2	100	152	-
Hori.	1000.080	PK	47.37	23.84	13.14	39.31	2.28	47.32	73.9	26.5	140	11	-
Hori.	2483.500	PK	45.19	27.61	14.93	39.64	2.28	50.37	73.9	23.5	359	109	-
Hori.	4960.000	PK	45.39	31.43	7.55	39.72	2.28	46.93	73.9	26.9	181	129	-
Hori.	7440.000	PK	44.95	36.84	9.23	39.42	2.28	53.88	73.9	20.0	150	0	-
Hori.	9920.000	PK	43.04	38.71	10.72	39.52	2.28	55.23	73.9	18.6	150	0	-
Hori.	1000.080	AV	38.71	23.84	13.14	39.31	2.28	38.66	53.9	15.2	140	11	VBW:10 Hz
Hori.	2483.500	AV	33.76	27.61	14.93	39.64	2.28	38.94	53.9	14.9	359	109	VBW:360 Hz
Hori.	4960.000	AV	35.23	31.43	7.55	39.72	2.28	36.77	53.9	17.1	181	129	VBW:360 Hz
Hori.	7440.000	AV	33.10	36.84	9.23	39.42	2.28	42.03	53.9	11.8	150	0	VBW:360 Hz, Floor noise
Hori.	9920.000	AV	32.50	38.71	10.72	39.52	2.28	44.69	53.9	9.2	150	0	VBW:360 Hz, Floor noise
Vert.	33.616	QP	36.30	17.27	7.12	31.83	0.00	28.86	40.0	11.1	100	334	-
Vert.	48.559	QP	37.30	11.73	7.45	31.81	0.00	24.67	40.0	15.3	100	331	-
Vert.	57.882	QP	37.80	8.74	7.34	31.81	0.00	22.07	40.0	17.9	100	329	-
Vert.	265.162	QP	49.10	12.55	6.29	31.75	0.00	36.19	46.0	9.8	100	352	-
Vert.	600.003	QP	41.40	19.27	8.35	32.03	0.00	36.99	46.0	9.0	100	118	-
Vert.	1000.003	PK	50.44	23.84	13.14	39.31	2.28	50.39	73.9	23.5	143	359	-
Vert.	2483.500	PK	47.84	27.61	14.93	39.64	2.28	53.02	73.9	20.8	188	2	-
Vert.	4960.000	PK	46.01	31.43	7.55	39.72	2.28	47.55	73.9	26.3	130	32	-
Vert.	7440.000	PK	43.57	36.84	9.23	39.42	2.28	52.50	73.9	21.4	150	0	-
Vert.	9920.000	PK	43.86	38.71	10.72	39.52	2.28	56.05	73.9	17.8	150	0	-
Vert.	1000.003	AV	47.25	23.84	13.14	39.31	2.28	47.20	53.9	6.7	143	359	VBW:10 Hz
Vert.	2483.500	AV	33.84	27.61	14.93	39.64	2.28	39.02	53.9	14.8	188	2	VBW:360 Hz
Vert.	4960.000	AV	35.44	31.43	7.55	39.72	2.28	36.98	53.9	16.9	130	32	VBW:360 Hz
Vert.	7440.000	AV	33.19	36.84	9.23	39.42	2.28	42.12	53.9	11.7	150	0	VBW:360 Hz, Floor noise
Vert.	9920.000	AV	32.43	38.71	10.72	39.52	2.28	44.62	53.9	9.2	150	0	VBW:360 Hz, Floor noise

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

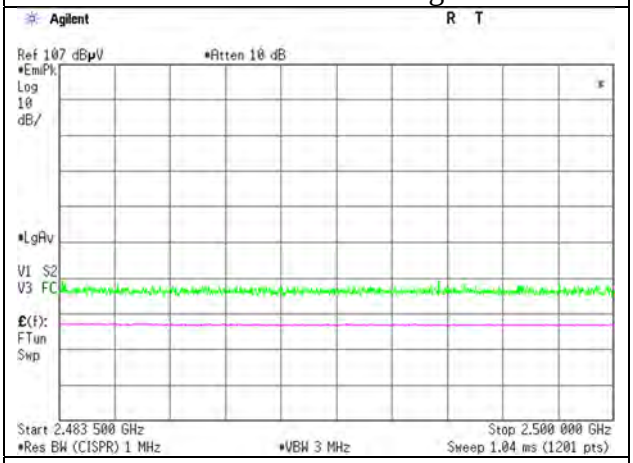
Distance factor : 1 GHz - 10 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB

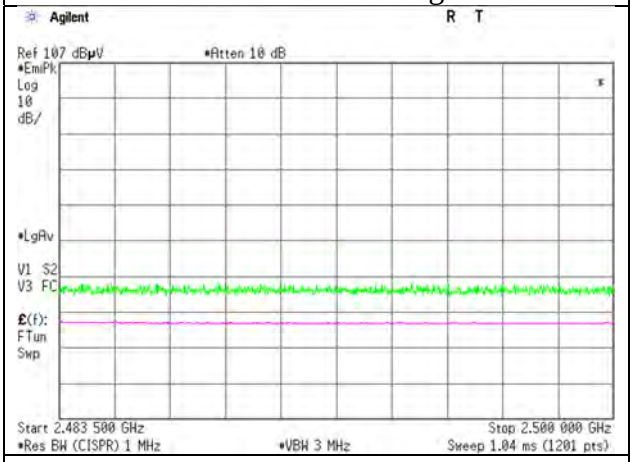
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

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

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	14011702S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.1
Date	November 4, 2021
Temperature / Humidity	25 deg.C, 44 %RH
Engineer	Hiromasa Sato
	(1 GHz -10 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz

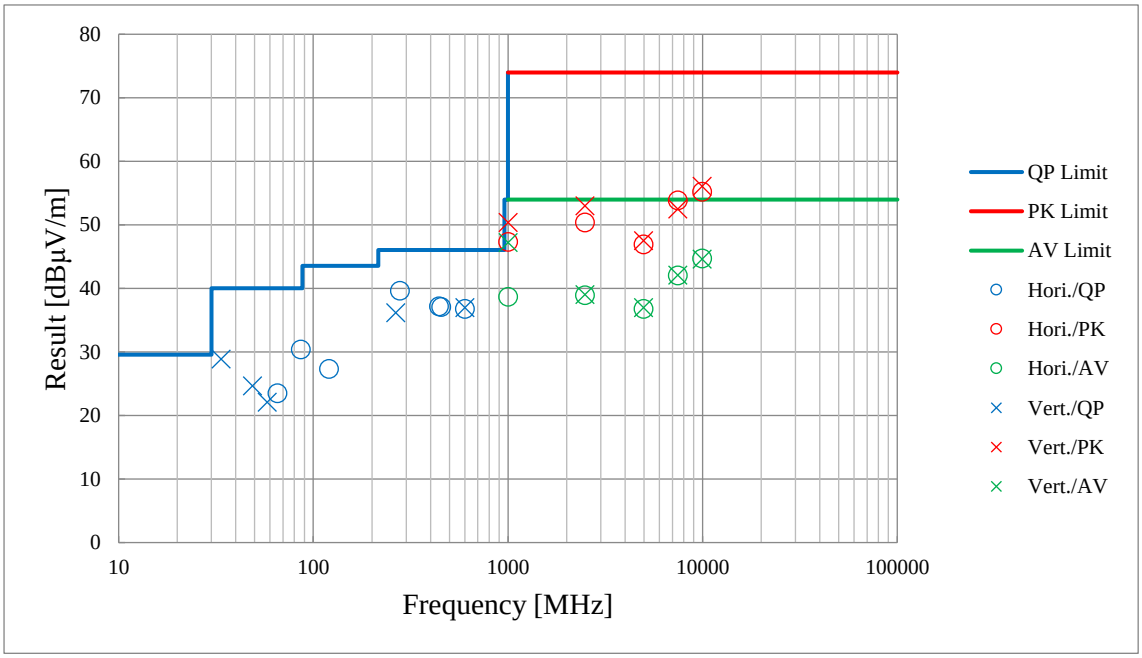
Horizontal
Restricted-band band-edge Plot

Trace Green : Peak Plot Trace Purple : Average Plot

Vertical
Restricted-band band-edge Plot

Trace Green : Peak Plot Trace Purple : Average Plot

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

Radiated Spurious Emission
(Plot data, Worst case)

Report No.	14011702S-A-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.1	No.1	No.1
Date	November 4, 2021	November 4, 2021	November 5, 2021
Temperature / Humidity	24 deg.C, 41 %RH	25 deg.C, 44 %RH	20 deg.C, 42 %RH
Engineer	Yosuke Murakami	Hiromasa Sato	Yasumasa Owaki
	(30 MHz -1 GHz)	(1 GHz -10 GHz)	(10 GHz -26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz		



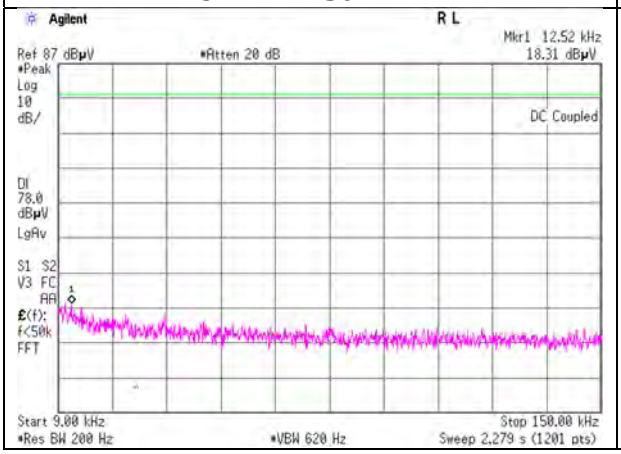
*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

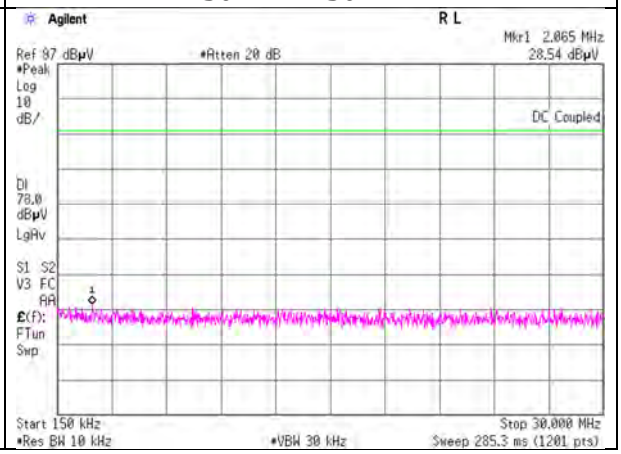
Report No.	14011702S-A-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	November 5, 2021
Temperature / Humidity	25 deg. C / 37 % RH
Engineer	Miku Ikudome
Mode	Tx, Hopping Off, DH5

2402 MHz

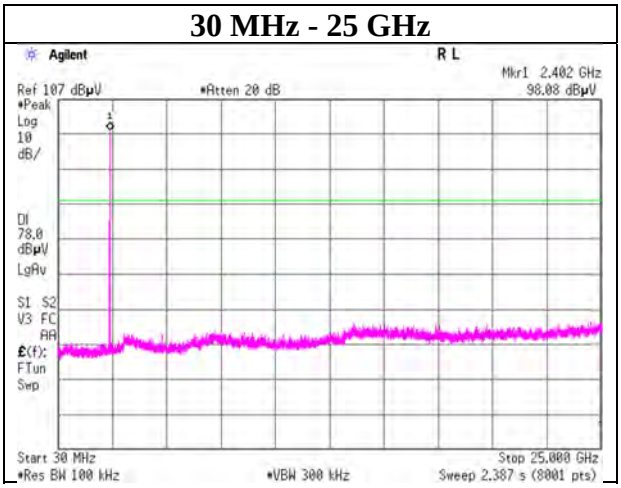
9 kHz - 150 kHz



150 kHz - 30 MHz



30 MHz - 25 GHz

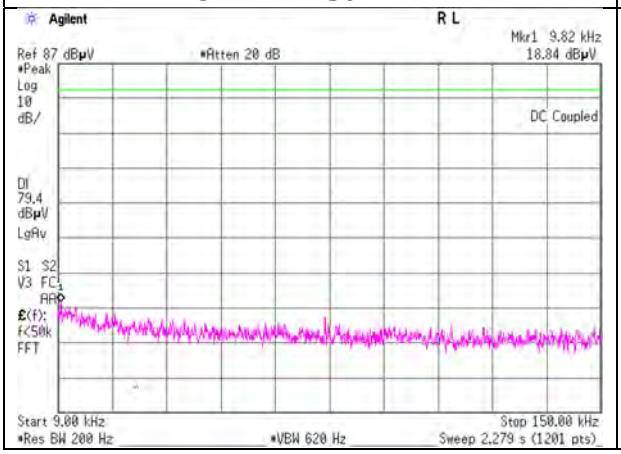


Conducted Spurious Emission

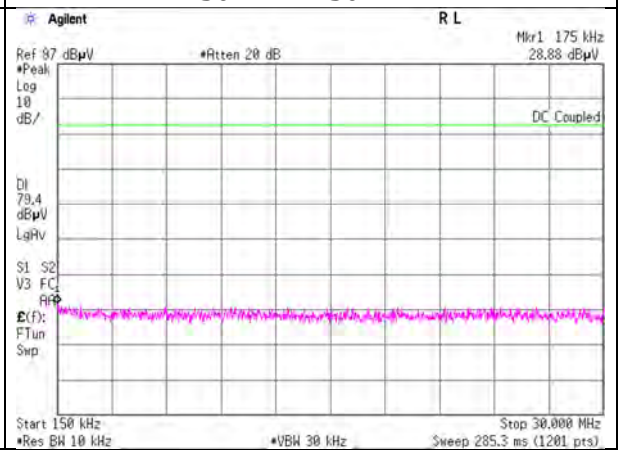
Report No.	14011702S-A-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	November 5, 2021
Temperature / Humidity	25 deg. C / 37 % RH
Engineer	Miku Ikudome
Mode	Tx, Hopping Off, DH5

2441 MHz

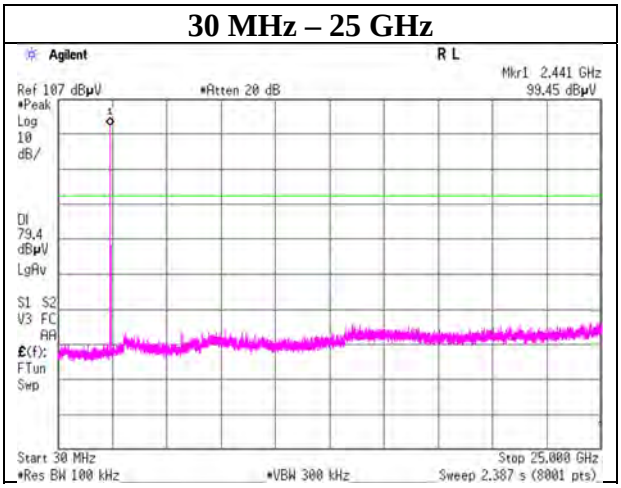
9 kHz – 150 kHz



150 kHz – 30 MHz



30 MHz – 25 GHz

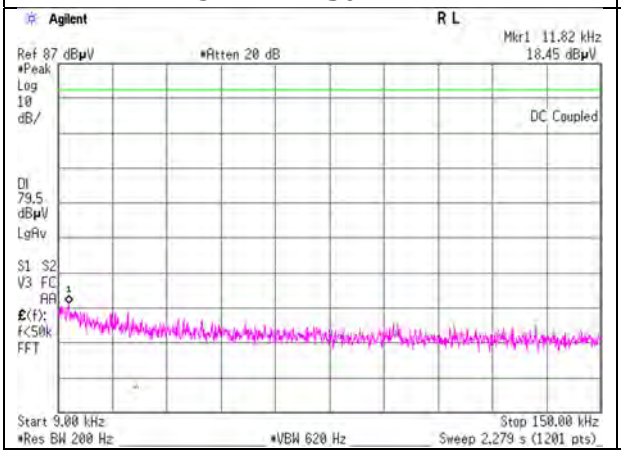


Conducted Spurious Emission

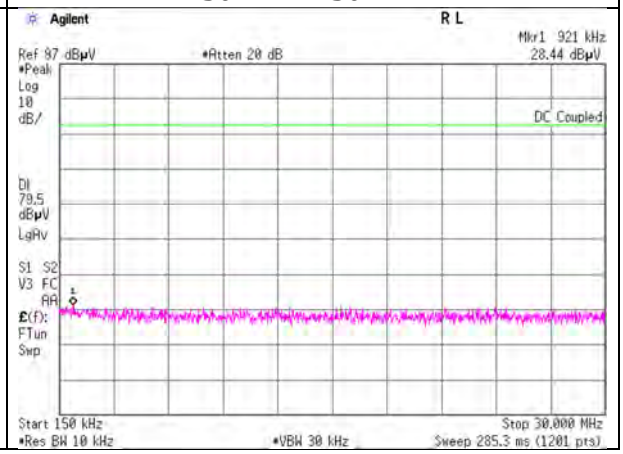
Report No.	14011702S-A-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	November 5, 2021
Temperature / Humidity	25 deg. C / 37 % RH
Engineer	Miku Ikudome
Mode	Tx, Hopping Off, DH5

2480 MHz

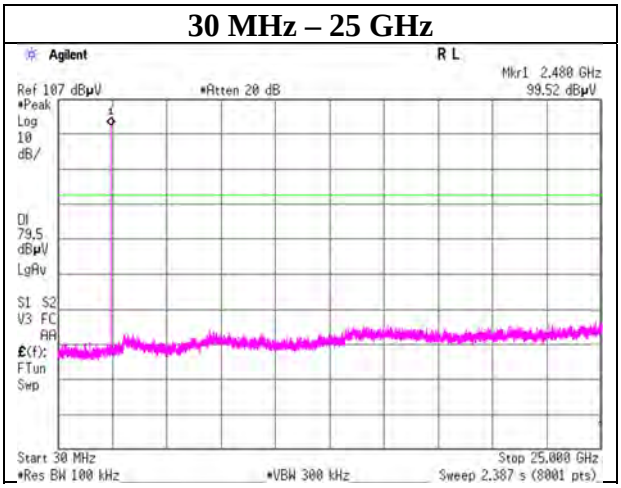
9 kHz – 150 kHz



150 kHz – 30 MHz



30 MHz – 25 GHz

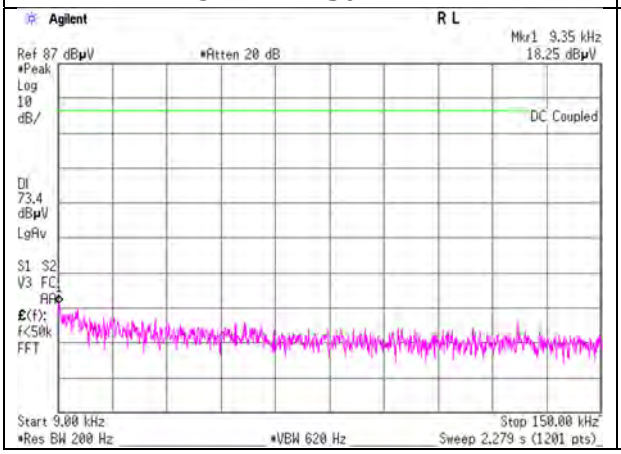


Conducted Spurious Emission

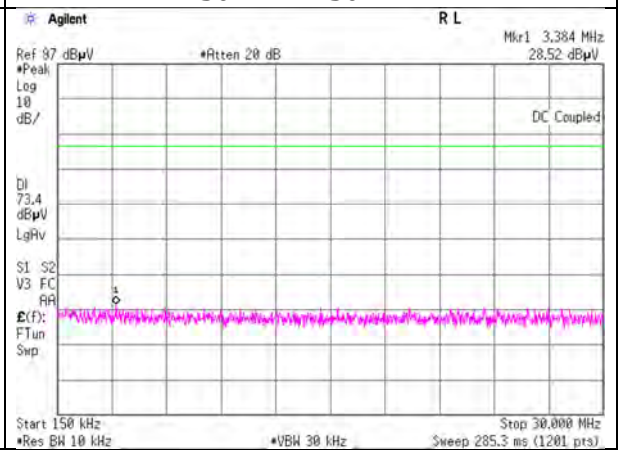
Report No.	14011702S-A-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	November 5, 2021
Temperature / Humidity	25 deg. C / 37 % RH
Engineer	Miku Ikudome
Mode	Tx, Hopping Off, 3DH5

2402 MHz

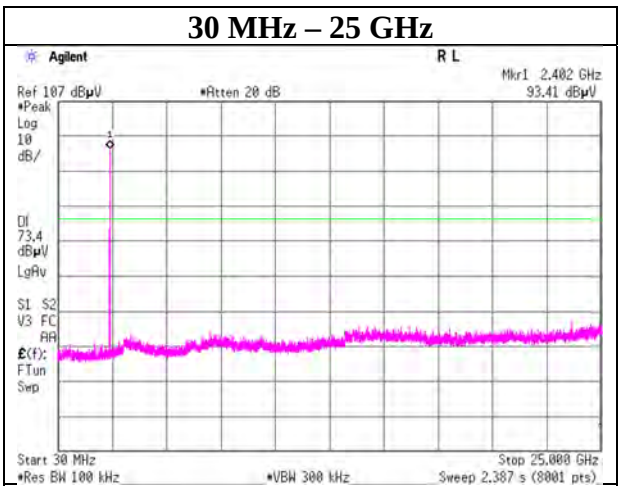
9 kHz – 150 kHz



150 kHz – 30 MHz



30 MHz – 25 GHz

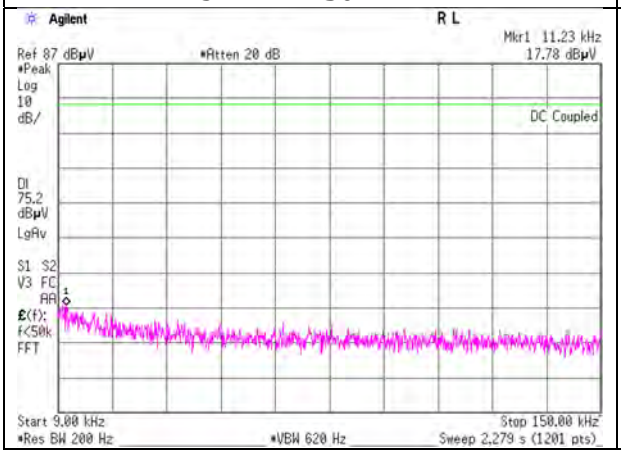


Conducted Spurious Emission

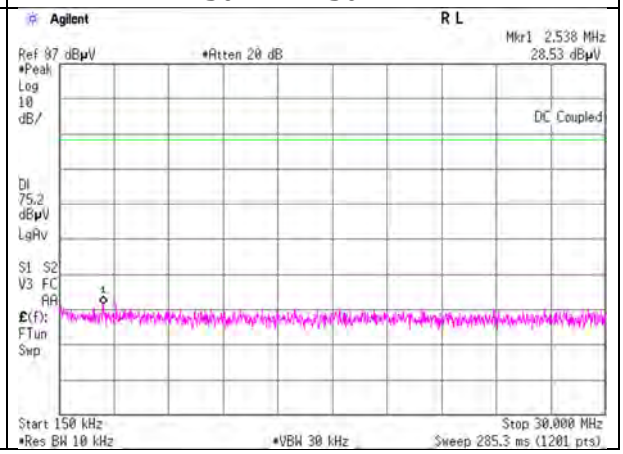
Report No.	14011702S-A-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	November 5, 2021
Temperature / Humidity	25 deg. C / 37 % RH
Engineer	Miku Ikudome
Mode	Tx, Hopping Off, 3DH5

2441 MHz

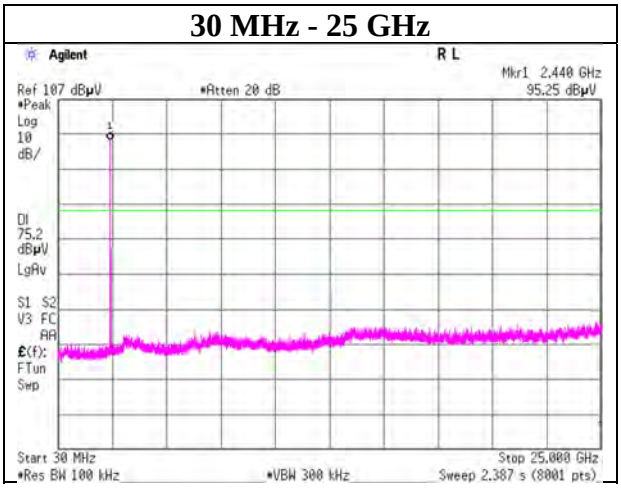
9 kHz - 150 kHz



150 kHz - 30 MHz



30 MHz - 25 GHz

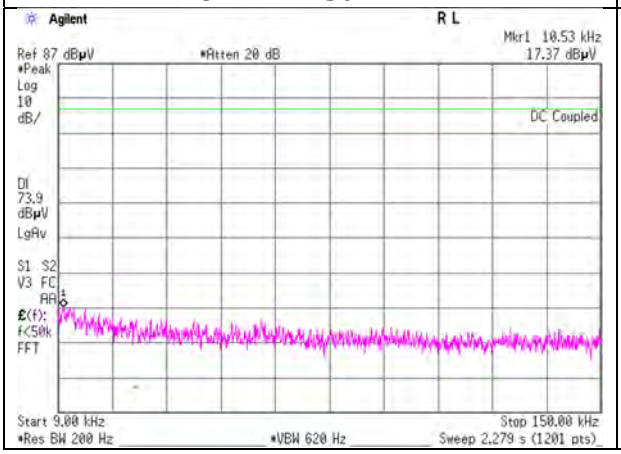


Conducted Spurious Emission

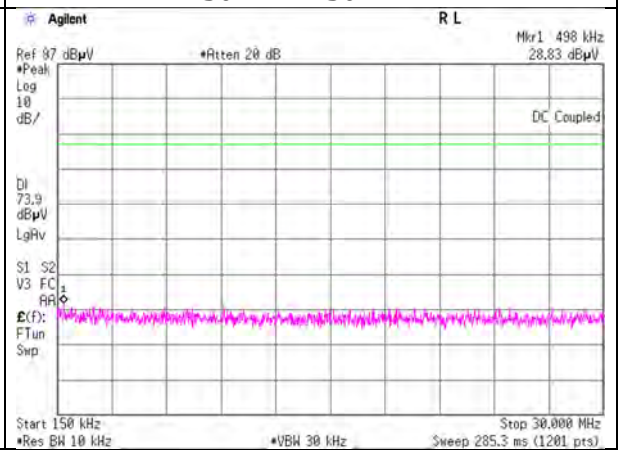
Report No.	14011702S-A-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	November 5, 2021
Temperature / Humidity	25 deg. C / 37 % RH
Engineer	Miku Ikudome
Mode	Tx, Hopping Off, 3DH5

2480 MHz

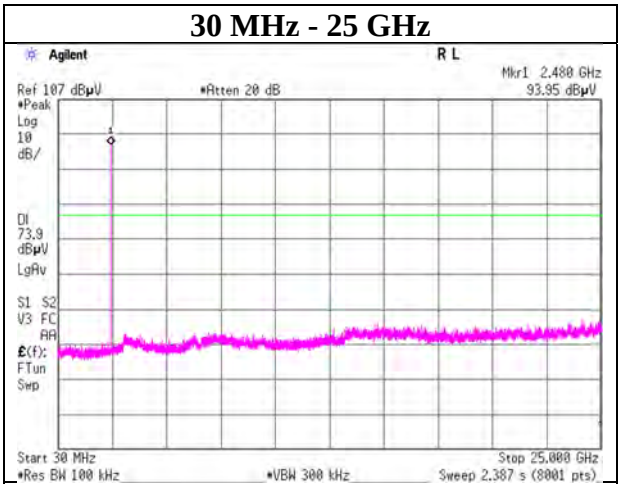
9 kHz - 150 kHz



150 kHz - 30 MHz



30 MHz - 25 GHz

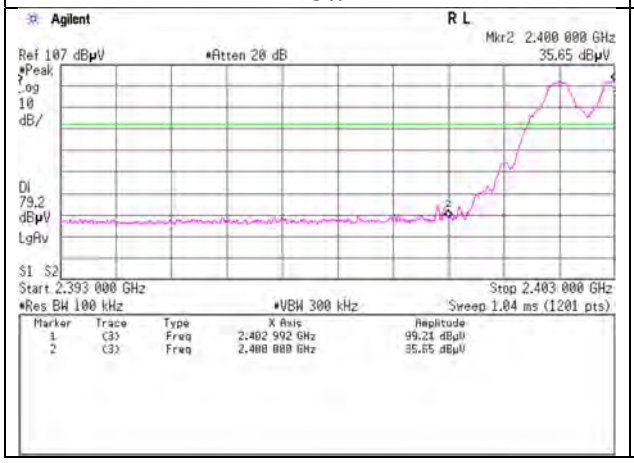


Conducted Emission Band Edge compliance

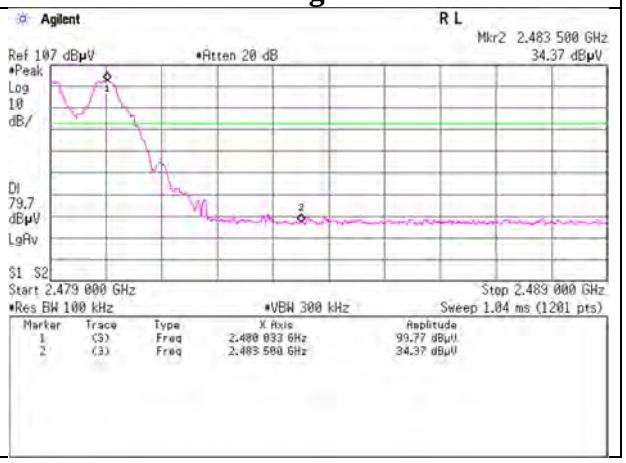
Report No.	14011702S-A-R1	
Test place	Shonan EMC Lab. No.5 Shielded Room	
Date	November 5, 2021	November 8, 2021
Temperature / Humidity	25 deg. C / 37 % RH	23 deg. C / 40 % RH
Engineer	Miku Ikudome	Miku Ikudome
Mode	Tx DH5	

Hopping On

Low

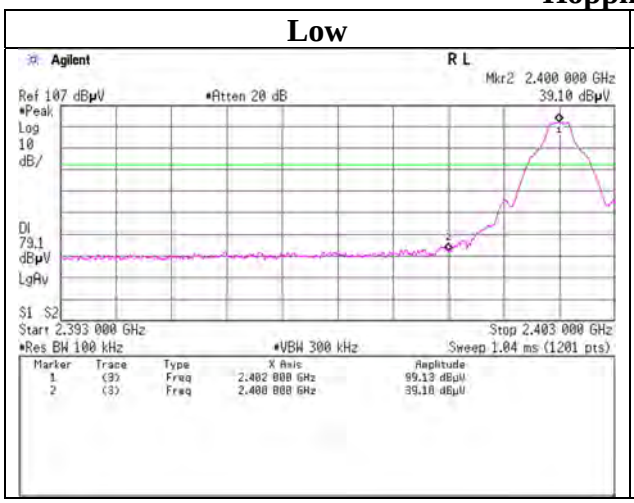


High

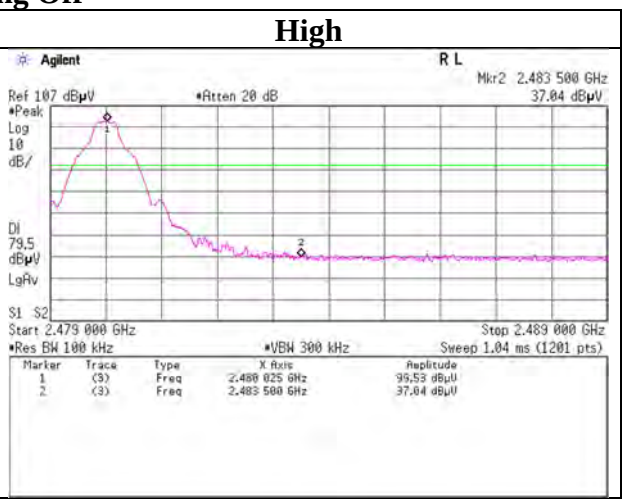


Hopping Off

Low



High

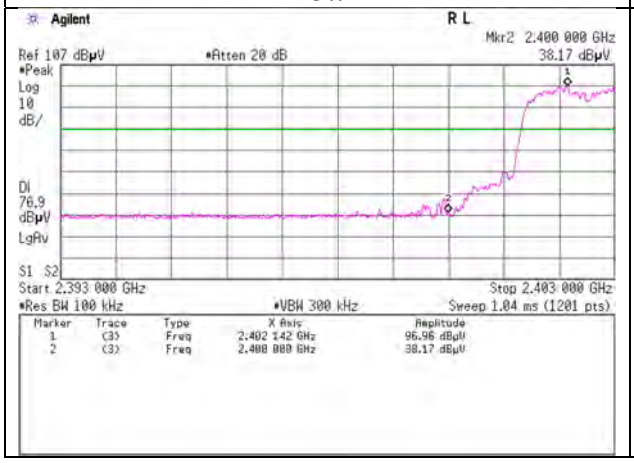


Conducted Emission Band Edge compliance

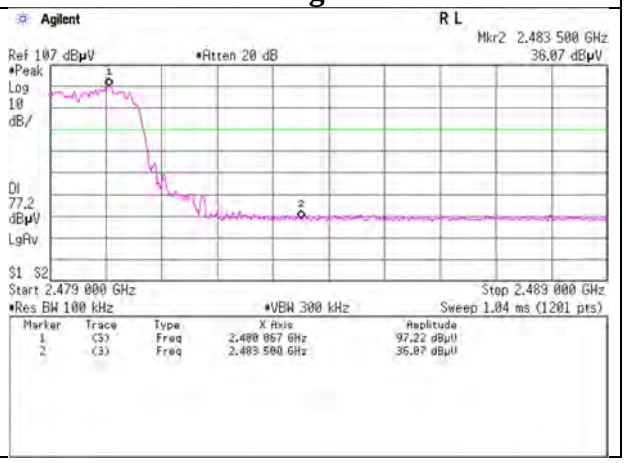
Report No.	14011702S-A-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	November 5, 2021
Temperature / Humidity	25 deg. C / 37 % RH
Engineer	Miku Ikudome
Mode	Tx 3DH5

Hopping On

Low

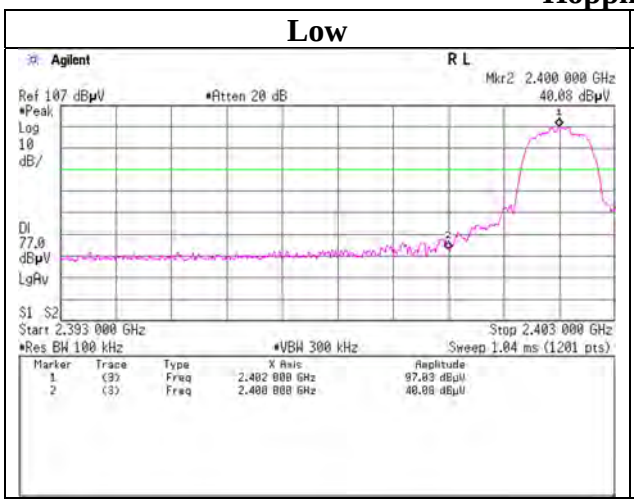


High

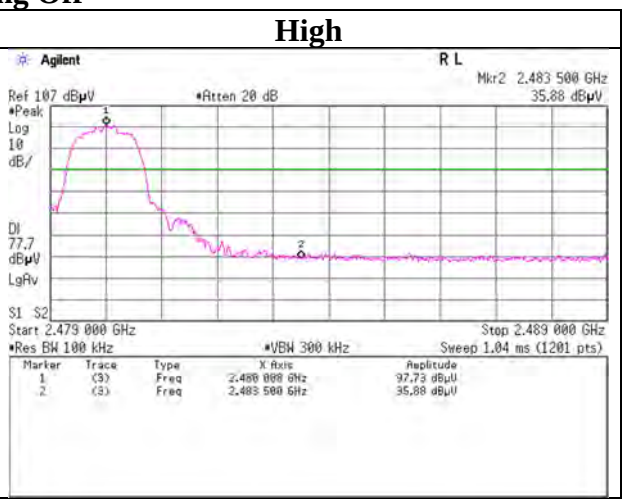


Hopping Off

Low



High



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-07	145111	Digital Tester	SANWA	PC500	7019232	2021/09/14	12
AT	KTS-08	145095	Digital Tester	SANWA	PC500	7019224	2021/04/26	12
AT	SAT10-15	160493	Attenuator	Weinschel Corp.	54A-10	83406	2020/12/21	12
AT	SCC-G64	196945	Coaxial Cable	Huber+Suhner	SUCOFLEX 102	803414/2	2021/03/01	12
AT	SOS-27	191845	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2021/08/02	12
AT	SOS-28	191846	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2021/08/02	12
AT	SPM-07	146247	Power Meter	Keysight Technologies Inc	8990B	MY5100272	2021/05/25	12
AT	SPSS-04	146310	Power sensor	Keysight Technologies Inc	N1923A	MY5326009	2021/05/25	12
AT	SRENT-09	150461	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46186392	2021/02/22	12
AT	SRENT-22	202830	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY48250036	2020/11/24	12
RE	COTS-SEMI-5	170932	EMI Software	TSJ (Techno Science Japan)	TEPTO-DV3(RE,CE,ME,PE)	-	-	-
RE	KAT6-04	144899	Attenuator	Inmet	18N-6dB	-	2020/12/10	12
RE	SAEC-01(NSA)	145597	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	2021/04/30	12
RE	SAEC-01(SVSWR)	145561	Semi-Anechoic Chamber	TDK	SAEC-01(SVSWR)	1	2021/05/09	12
RE	SAF-01	145003	Pre Amplifier	SONOMA	310N	290211	2021/02/10	12
RE	SAF-04	145127	Pre Amplifier	Toyo Corporation	TPA0118-36	2072554	2021/05/17	12
RE	SAF-08	145007	Pre Amplifier	Toyo Corporation	HAP18-26W	19	2021/03/01	12
RE	SAT10-06	145137	Attenuator	Keysight Technologies Inc	8493C-010	74865	2021/10/05	12
RE	SAT3-09	144959	Attenuator	JFW	50HF-003N	-	2021/08/16	12
RE	SBA-01	145161	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	BBA9106	91032664	2021/04/10	12
RE	SCC-A1/A3/A5/A7/A8/A13/SRSE-01	144967	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	2021/04/13	12
RE	SCC-A2/A4/A6/A7/A8/A13/SRSE-01	144968	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	2021/04/12	12
RE	SCC-G05	145039	Coaxial Cable	Junkosha	J12J102207-00	APR-30-15-037	2021/01/26	12
RE	SCC-G15	145176	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	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-01	145383	Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	9120D-725	2021/05/20	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-21	207278	Measuring Tool, Tape Measure	ASKUL	-	-	-	-
RE	SLA-05	145527	Logperiodic Antenna	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	193	2021/04/10	12
RE	SOS-20	191837	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2021/08/02	12
RE	SSA-02	145800	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY48250106	2021/04/13	12
RE	STR-01	145790	Test Receiver	Rohde & Schwarz	ESU40	100093	2021/04/27	12
RE	STS-01	145792	Digital Hitester	HIOKI E.E. CORPORATION	3805-50	80997812	2021/09/14	12

***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