



RADIO TEST REPORT

Test Report No. : 13854932S-A-R3

Applicant : Panasonic Corporation
Type of EUT : AV Control Unit for In-Vehicle Infotainment
Model Number of EUT : AM1905
FCC ID : ACJ932AM1905
Test regulation : FCC Part 15 Subpart C: 2021
(*Bluetooth BR/EDR part)
Test item : Maximum Peak Output Power,
Spurious Emission & Band Edge Compliance
Purpose of test : Spot check
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 13854932S-A-R2. 13854932S-A-R2 is replaced with this report.

Date of test: June 15 2021 to January 18, 2022

Representative test engineer:

Shiro Kobayashi
Engineer

Approved by:

Shinichi Takano
Engineer



CERTIFICATE 1266.03

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

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REVISION HISTORY

Original Test Report No.: 13854932S-A

Revision	Test report No.	Date	Page revised	Contents																																													
- (Original)	13854932S-A	August 31, 2021	-	-																																													
1	13854932S-A-R1	January 12, 2022	P.1	Addition of “Purpose of test”																																													
2	13854932S-A-R2	January 18, 2022	P.1	Update Date of test: From: “June 15 to July 22, 2021” To: “June 15 2021 to January 18, 2022”																																													
			P.5	Addition of WLAN “Clock frequency”																																													
			P.7	Addition of “Duty cycle and Time Measurement” Uncertainty																																													
			P.9	Correction of “*Details of Operating Mode(s)”: From: <table><tr><th colspan="3">Details of Operating Mode(s)</th></tr><tr><th>Test Item</th><th>Mode</th><th>Tested frequency</th></tr><tr><td>Spurious Emission (Conducted)</td><td>Tx (Hopping Off) DH5, 3DH5</td><td>2402 MHz 2441 MHz 2480 MHz</td></tr><tr><td>Spurious Emission & Band Edge Compliance (Radiated)</td><td>Tx (Hopping Off) DH5, 3DH5</td><td>2402 MHz 2441 MHz 2480 MHz</td></tr><tr><td>Maximum Peak Output Power</td><td>Tx (Hopping Off) DH5, 2DH5, 3DH5</td><td>2402 MHz 2441 MHz 2480 MHz</td></tr><tr><td>Band Edge Compliance (Conducted)</td><td>Tx DH5, 3DH5 -Hopping On -Hopping Off</td><td>2402 MHz 2441 MHz 2480 MHz</td></tr><tr><td colspan="3">*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 (2Mb/s EDR: ps4DQPSK) 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 test items based on Bluetooth Core specification.</td></tr></table> To: <table><tr><th colspan="3">Details of Operating Mode(s)</th></tr><tr><th>Test Item</th><th>Mode</th><th>Tested frequency</th></tr><tr><td>Spurious Emission (Conducted)</td><td>Tx (Hopping Off) DH5, 3DH5</td><td>2402 MHz 2441 MHz 2480 MHz</td></tr><tr><td>Band Edge Compliance (Radiated)</td><td>Tx (Hopping Off) DH5, 3DH5</td><td>2402 MHz 2441 MHz 2480 MHz</td></tr><tr><td>Spurious Emission (Radiated) *1)</td><td>Tx (Hopping Off) DH5</td><td>2480 MHz</td></tr><tr><td>Maximum Peak Output Power</td><td>Tx (Hopping Off) DH5, 2DH5, 3DH5</td><td>2402 MHz 2441 MHz 2480 MHz</td></tr><tr><td>Band Edge Compliance (Conducted)</td><td>Tx DH5, 3DH5 -Hopping On -Hopping Off</td><td>2402 MHz 2441 MHz 2480 MHz</td></tr><tr><td colspan="3">*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length. *2DH mode (2Mb/s EDR: ps4DQPSK) 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 test items based on Bluetooth Core specification. *1) The mode was tested as representative, because it had the highest power at antenna terminal test.</td></tr></table>	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 & Band Edge Compliance (Radiated)	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz	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 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 (2Mb/s EDR: ps4DQPSK) 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 test items based on Bluetooth Core specification.			Details of Operating Mode(s)			Test Item	Mode	Tested frequency	Spurious Emission (Conducted)	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz	Band Edge Compliance (Radiated)	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz	Spurious Emission (Radiated) *1)	Tx (Hopping Off) DH5	2480 MHz	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 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. *2DH mode (2Mb/s EDR: ps4DQPSK) 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 test items based on Bluetooth Core specification. *1) The mode was tested as representative, because it had the highest power at antenna terminal test.		
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P.15	Addition of VBW calculation																																																
P.24 to P.29	Update of Conducted Spurious Emission chart																																																
P.32	Addition of Test equipment: KSA-08, SAT10-21 and SCC-G13. Update of Last Calibration Date of KTS-07: From: 2020/10/21, To: 2021/09/14 Update of Last Calibration Date of SOS-27: From: 2020/09/29, To: 2021/08/02 Addition of Cat Int “*1)”: KAT6-04 and SAT10-05																																																
P.33	Addition of Cat Int “*1)”: SFL-02, SOS-20, and SOS-23 Correction of Test equipment: From: SCC-G56 To: SCC-G57																																																
P.34	Addition of Cat Int “*1)”: SSA-03, STS-01, and STS-03																																																
3	13854932S-A-R3	January 19, 2022	P.32	Addition of Cat Int “*1)”: SAT3-09																																													
			P.34	Addition of “The expiration*1) This test equipment was used for the tests before the expiration date of the calibration.”																																													

Reference: Abbreviations (Including words undescribed in this report)

A2LA	The American Association for Laboratory Accreditation	MCS	Modulation and Coding Scheme
AC	Alternating Current	MRA	Mutual Recognition Arrangement
AFH	Adaptive Frequency Hopping	N/A	Not Applicable
AM	Amplitude Modulation	NIST	National Institute of Standards and Technology
Amp, AMP	Amplifier	NS	No signal detect.
ANSI	American National Standards Institute	NSA	Normalized Site Attenuation
Ant, ANT	Antenna	NVLAP	National Voluntary Laboratory Accreditation Program
AP	Access Point	OBW	Occupied Band Width
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	Quadri-Phase Shift Keying
CW	Continuous Wave	RBW	Resolution Band Width
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	RSS	Radio Standards Specifications
DSSS	Direct Sequence Spread Spectrum	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	Test Receiver
EN	European Norm	Tx	Transmitting
ERP, e.r.p.	Effective Radiated Power	VBW	Video BandWidth
EU	European Union	Vert.	Vertical
EUT	Equipment Under Test	WLAN	Wireless LAN
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		

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SECTION 1: Customer information

Company Name	:	Panasonic Corporation
Address	:	4261 Ikonobe-cho, Tsuzuki-ku, Yokohama-shi, Kanagawa 224-8520 Japan
Telephone Number	:	+81-50-3689-7389
Facsimile Number	:	+81-45-931-0806
Contact Person	:	Yoshinori Nagatani

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 Control Unit for In-Vehicle Infotainment
Model Number	:	AM1905
Serial Number	:	Refer to SECTION 4.2
Rating	:	DC 13.2 V
Receipt Date	:	June 14, 2021
Country of Mass-production	:	Thailand, Mexico
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: AM1905 (referred to as the EUT in this report) is a AV Control Unit for In-Vehicle Infotainment.

Radio Specification

Bluetooth (BR / EDR function)

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	FHSS
Antenna type	:	Pattern antenna
Antenna Gain	:	2 dBi
Clock frequency (Maxmum)	:	48 MHz

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

Radio Type	:	Transceiver
Frequency of Operation	:	2412 MHz - 2462 MHz
Modulation	:	DSSS, OFDM
Antenna type	:	Pattern antenna
Antenna Gain	:	2 dBi
Clock frequency (Maxmum)	:	48 MHz

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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

* The revision does not affect the test result conducted before its effective date.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
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)	See data.	Complied a)	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	6.3 dB 4804.000 MHz, AV, Vert. Mode: Tx, DH5 2480 MHz	Complied b) / c)	Conducted/ Radiated (above 30 MHz) *1)
Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422. *1) Radiated test was selected over 30 MHz based on section 15.247(d). a) Refer to APPENDIX 1 (data of Maximum Peak Output Power) b) Refer to APPENDIX 1 (data of Conducted Spurious Emission) c) 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 equipment provides the wireless transmitter with stable power supply.
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

The equipment and its antenna comply with the requirement since the antenna is built in the equipment and it cannot be replaced by end users. Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.3 Addition to standard

No addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

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

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

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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
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.0 dB	2.7 dB	2.7 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	5.3 dB	5.3 dB	5.3 dB	-
Radiated emission (Measurement distance: 1 m)	1 GHz-18 GHz	5.7 dB	5.7 dB	5.7 dB	-
	18 GHz-40 GHz	5.6 dB	5.6 dB	5.6 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-13	0.91 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-13	1.2 dB
Spurious emission (Conducted) below 1GHz	0.87 dB
Spurious emission (Conducted) 1 GHz-3 GHz	0.96 dB
Spurious emission (Conducted) 3 GHz-18 GHz	3.0 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.6 dB
Duty cycle and Time Measurement	0.27 %

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.

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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
Band Edge Compliance (Radiated)	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2480 MHz
Spurious Emission (Radiated) *1)	Tx (Hopping Off) DH5	2480 MHz
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
*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length. *2DH mode (2Mb/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 test items based on Bluetooth Core specification. *1) The mode was tested as representative, because it had the highest power at antenna terminal test. *EUT has the power settings by the software as follows; Power settings: Fixed Software: SI Ver.06254 (Date: 2021.6.12, Storage location: EUT memory) *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.		

4.2 Configuration and peripherals

This page has been submitted for separate exhibit (refer to APPENDIX 4).

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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

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

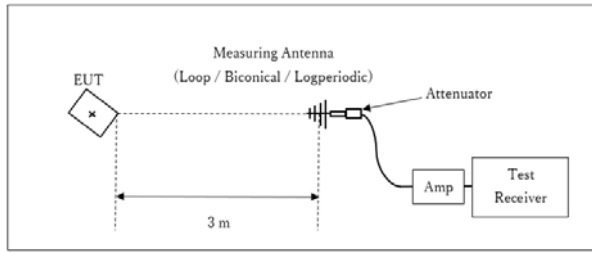
20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9 (IC) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (IC).

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

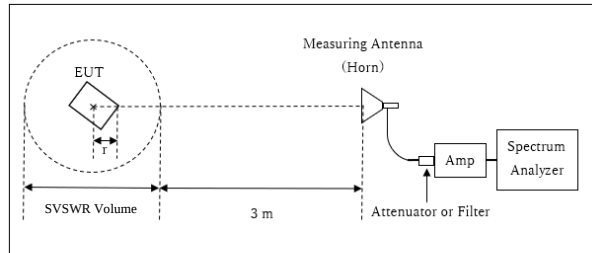
Below 1 GHz



x : Center of turn table

Test Distance: 3 m

1 GHz - 10 GHz



r : Radius of an outer periphery of EUT

x : Center of turn table

Distance Factor: $20 \times \log (3.94 \text{ m} / 3.0 \text{ m}) = 2.36 \text{ dB}$

* Test Distance: $(3 + \text{SVSWR Volume} / 2) - r = 3.94 \text{ m}$

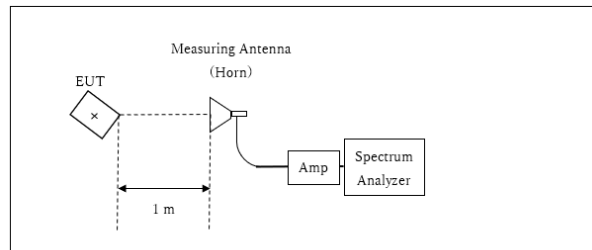
SVSWR Volume : 2.0 m

(SVSWR Volume has been calibrated based on CISPR 16-1-4.)

$r = 0.06 \text{ m}$

* The test was performed with $r = 0.0 \text{ m}$ since EUT is small and it was the rather conservative condition.

10 GHz - 26.5 GHz



x : Center of turn table

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 28 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 - 26.5 GHz)
Horizontal	28 deg.	0 deg.	28 deg.	0 deg.	0 deg.
Vertical	28 deg.	0 deg.	28 deg.	0 deg.	0 deg.

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

Measurement range : 30 MHz - 26.5 GHz

Test data : APPENDIX

Test result : Pass

UL Japan, Inc.

Shonan EMC Lab.

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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
Maximum Peak Output Power	-	-	-	Auto	Peak Average *1)	-	Power Meter (Sensor: 160 MHz BW)
Conducted Spurious Emission *2) *3)	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	13 MHz / 10 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
*1) Reference data *2) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents. Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart. (9 kHz -150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 10 kHz) *3) 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

Maximum Peak Output Power

Report No.	13854932S-A-R3
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	June 15, 2021
Temperature / Humidity	24 deg. C / 55 % RH
Engineer	Shiro Kobayashi
Mode	Tx, Hopping Off

Mode	Freq.	Reading	Cable Loss	Atten. Loss	Conducted Power					e.i.r.p. for RSS-247					
					Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
					[dBm]	[mW]	[dBm]	[mW]	[dB]		[dBm]	[mW]	[dBm]	[mW]	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	[dB]
DH5	2402.0	-4.64	2.35	9.97	7.68	5.86	20.96	125	13.28	2.00	9.68	9.29	36.02	4000	26.34
DH5	2441.0	-3.73	2.36	9.98	8.61	7.26	20.96	125	12.35	2.00	10.61	11.51	36.02	4000	25.41
DH5	2480.0	-3.25	2.37	9.98	9.10	8.13	20.96	125	11.86	2.00	11.10	12.88	36.02	4000	24.92
2DH5	2402.0	-5.56	2.35	9.97	6.76	4.74	20.96	125	14.20	2.00	8.76	7.52	36.02	4000	27.26
2DH5	2441.0	-4.53	2.36	9.98	7.81	6.04	20.96	125	13.15	2.00	9.81	9.57	36.02	4000	26.21
2DH5	2480.0	-4.06	2.37	9.98	8.29	6.75	20.96	125	12.67	2.00	10.29	10.69	36.02	4000	25.73
3DH5	2402.0	-5.06	2.35	9.97	7.26	5.32	20.96	125	13.70	2.00	9.26	8.43	36.02	4000	26.76
3DH5	2441.0	-4.11	2.36	9.98	8.23	6.65	20.96	125	12.73	2.00	10.23	10.54	36.02	4000	25.79
3DH5	2480.0	-3.67	2.37	9.98	8.68	7.38	20.96	125	12.28	2.00	10.68	11.69	36.02	4000	25.34

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. 13854932S-A-R3
Test place Shonan EMC Lab. No.5 Shielded Room
Date June 15, 2021
Temperature / Humidity 24 deg. C / 55 % RH
Engineer Shiro Kobayashi
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	-6.11	2.35	9.97	6.21	4.18	1.12	7.33	5.41
DH5	2441.0	-5.15	2.36	9.98	7.19	5.24	1.12	8.31	6.78
DH5	2480.0	-4.70	2.37	9.98	7.65	5.82	1.12	8.77	7.53
2DH5	2402.0	-9.36	2.35	9.97	2.96	1.98	1.12	4.08	2.56
2DH5	2441.0	-8.31	2.36	9.98	4.03	2.53	1.12	5.15	3.27
2DH5	2480.0	-7.79	2.37	9.98	4.56	2.86	1.12	5.68	3.70
3DH5	2402.0	-9.34	2.35	9.97	2.98	1.99	1.12	4.10	2.57
3DH5	2441.0	-8.29	2.36	9.98	4.05	2.54	1.12	5.17	3.29
3DH5	2480.0	-7.76	2.37	9.98	4.59	2.88	1.12	5.71	3.72

Sample Calculation:

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

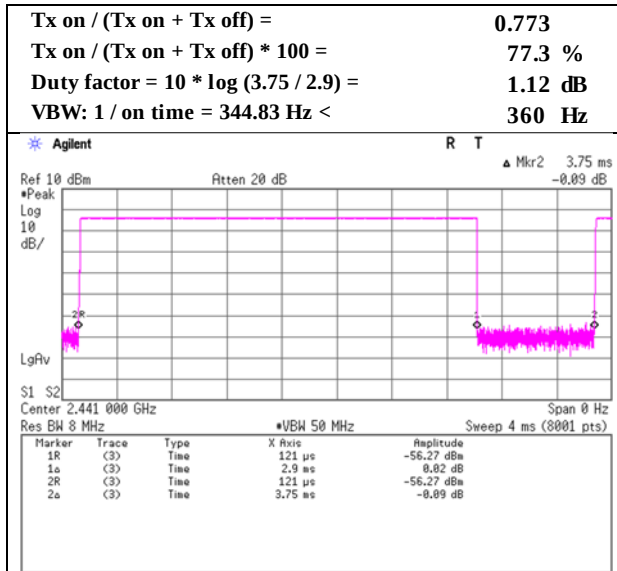
Result (Burst power average) = Time average + Duty factor

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

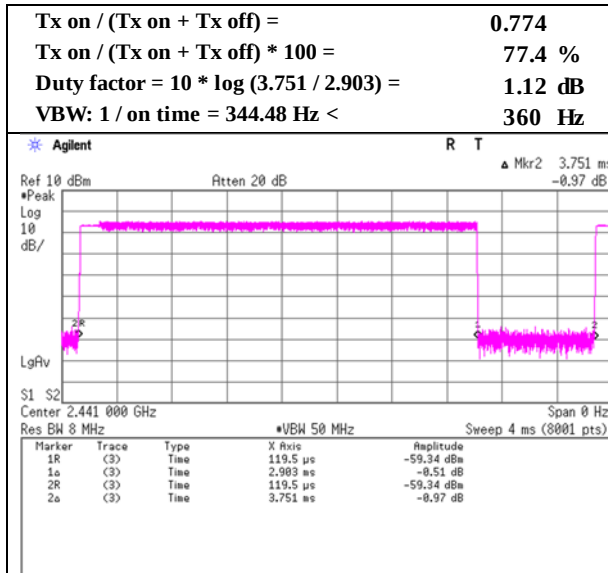
Burst Rate Confirmation

Report No. 13854932S-A-R3
Test place Shonan EMC Lab. No.5 Shielded Room
Date June 15, 2021
Temperature / Humidity 24 deg. C / 55 % RH
Engineer Shiro Kobayashi
Mode Tx, Hopping Off

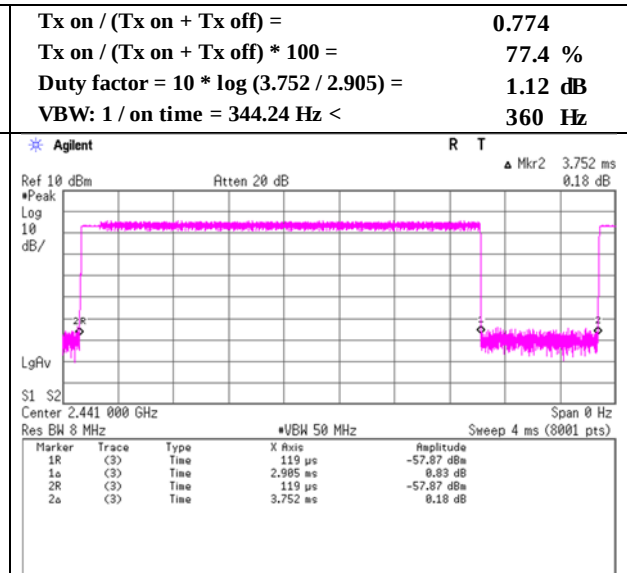
DH5



2DH5



3DH5



Radiated Spurious Emission

Report No.	13854932S-A-R3		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.1	No.1	No.3
Date	July 3, 2021	July 4, 2021	July 22, 2021
Temperature / Humidity	23 deg. C / 68 % RH	23 deg. C / 68 % RH	25 deg. C / 48 % RH
Engineer	Yosuke Murakami	Hiromasa Sato	Hiromasa Sato
	(30 MHz -1000 MHz)	(1 GHz -2.8 GHz)	(2.8 GHz -10 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.	133.070	QP	39.30	14.06	8.45	31.79	0.00	30.02	43.5	13.4	243	318	-
Hori.	388.150	QP	45.80	15.43	7.17	31.82	0.00	36.58	46.0	9.4	100	177	-
Hori.	434.715	QP	44.60	16.18	7.45	31.87	0.00	36.36	46.0	9.6	100	189	-
Hori.	480.004	QP	41.00	17.30	7.71	31.91	0.00	34.10	46.0	11.9	100	136	-
Hori.	590.208	QP	37.70	19.05	8.30	32.03	0.00	33.02	46.0	12.9	100	165	-
Hori.	2390.000	PK	46.71	27.73	14.82	39.61	2.36	52.01	73.9	21.8	290	17	-
Hori.	4804.000	PK	53.56	31.77	6.88	42.89	2.36	51.68	73.9	22.2	141	309	-
Hori.	7206.000	PK	49.23	37.37	8.25	43.39	2.36	53.82	73.9	20.0	150	0	-
Hori.	9608.000	PK	49.02	39.12	9.45	43.18	2.36	56.77	73.9	17.1	150	0	-
Hori.	2390.000	AV	33.63	27.73	14.82	39.61	2.36	38.93	53.9	14.9	290	17	VBW:360 Hz
Hori.	4804.000	AV	47.32	31.77	6.88	42.89	2.36	45.44	53.9	8.4	141	309	VBW:360 Hz
Hori.	7206.000	AV	36.99	37.37	8.25	43.39	2.36	41.58	53.9	12.3	150	0	VBW:360 Hz,Floor noise
Hori.	9608.000	AV	37.01	39.12	9.45	43.18	2.36	44.76	53.9	9.1	150	0	VBW:360 Hz,Floor noise
Vert.	193.219	QP	31.50	16.55	9.00	31.77	0.00	25.28	43.5	18.2	100	22	-
Vert.	436.619	QP	39.60	16.21	7.46	31.87	0.00	31.40	46.0	14.6	152	135	-
Vert.	527.710	QP	39.50	17.64	7.98	31.98	0.00	33.14	46.0	12.8	100	184	-
Vert.	637.140	QP	31.90	19.39	8.57	32.08	0.00	27.78	46.0	18.2	134	184	-
Vert.	2390.000	PK	44.84	27.73	14.82	39.61	2.36	50.14	73.9	23.7	275	207	-
Vert.	4804.000	PK	55.13	31.77	6.88	42.89	2.36	53.25	73.9	20.6	195	326	-
Vert.	7206.000	PK	49.51	37.37	8.25	43.39	2.36	54.10	73.9	19.8	150	0	-
Vert.	9608.000	PK	49.37	39.12	9.45	43.18	2.36	57.12	73.9	16.7	150	0	-
Vert.	2390.000	AV	33.41	27.73	14.82	39.61	2.36	38.71	53.9	15.1	275	207	VBW:360 Hz
Vert.	4804.000	AV	49.42	31.77	6.88	42.89	2.36	47.54	53.9	6.3	195	326	VBW:360 Hz
Vert.	7206.000	AV	36.66	37.37	8.25	43.39	2.36	41.25	53.9	12.6	150	0	VBW:360 Hz,Floor noise
Vert.	9608.000	AV	36.95	39.12	9.45	43.18	2.36	44.70	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 (3.94 m / 3.0 m) = 2.36 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	98.88	27.71	14.84	39.62	2.36	104.17	-	-	Carrier
Hori.	2400.000	PK	39.35	27.71	14.83	39.62	2.36	44.63	84.1	39.4	-
Vert.	2402.000	PK	94.06	27.71	14.84	39.62	2.36	99.35	-	-	Carrier
Vert.	2400.000	PK	37.82	27.71	14.83	39.62	2.36	43.10	79.3	36.2	-

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

Distance factor : 1 GHz - 10 GHz : 20log (3.94 m / 3.0 m) = 2.36 dB

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

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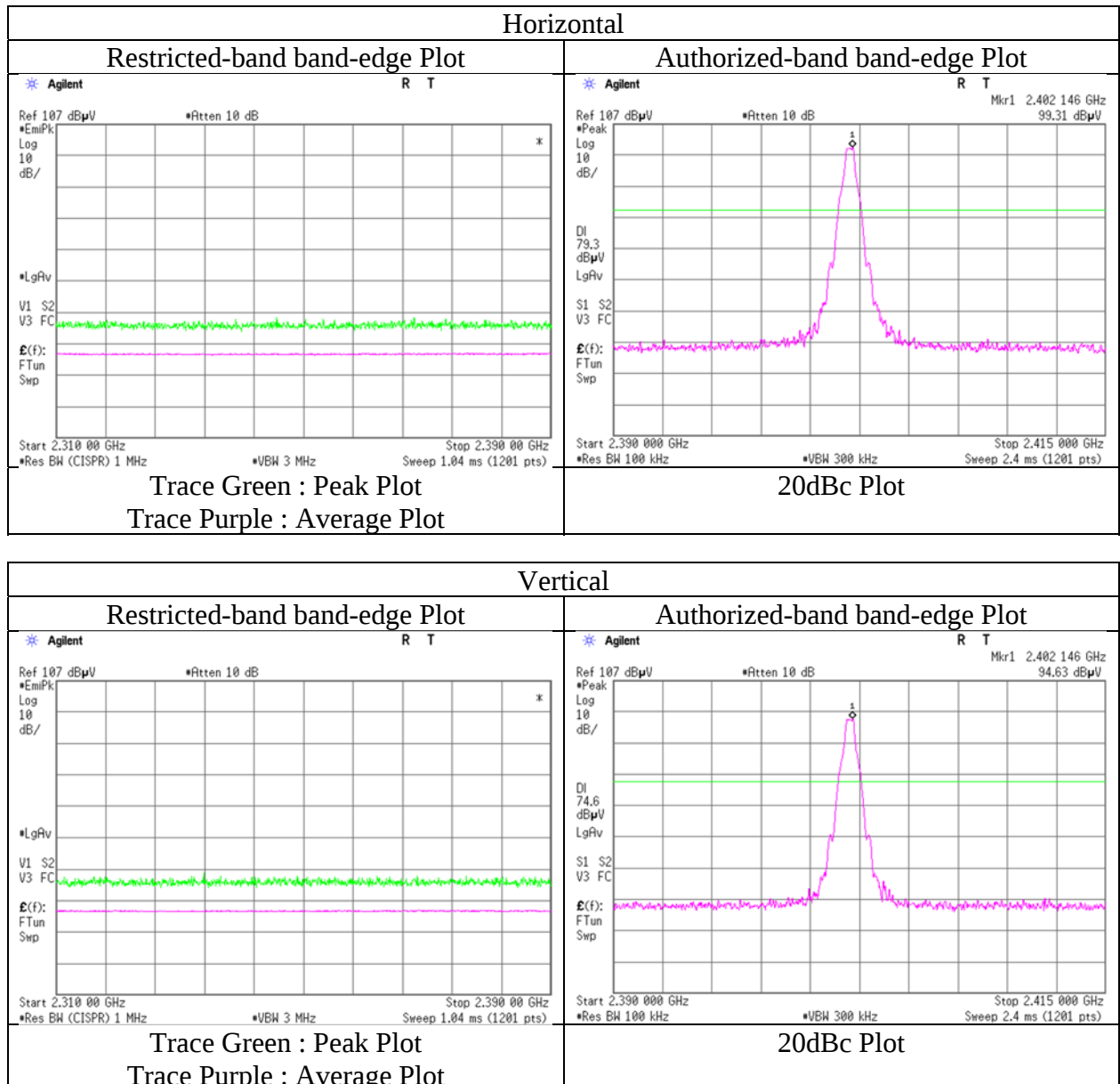
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13854932S-A-R3
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.1
Date	July 4, 2021
Temperature / Humidity	23 deg. C / 68 % RH
Engineer	Hiromasa Sato
	(1 GHz -2.8 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

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Radiated Spurious Emission

Report No. 13854932S-A-R3
Test place Shonan EMC Lab.
Semi Anechoic Chamber No.1
Date July 4, 2021
Temperature / Humidity 23 deg. C / 68 % RH
Engineer Hiromasa Sato
(1 GHz -2.8 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.	2483.500	PK	53.40	27.61	14.93	39.64	2.36	58.66	73.9	15.2	389	5	-
Hori.	2483.500	AV	35.12	27.61	14.93	39.64	2.36	40.38	53.9	13.5	389	5	VBW:360 Hz
Vert.	2483.500	PK	46.26	27.61	14.93	39.64	2.36	51.52	73.9	22.3	197	357	-
Vert.	2483.500	AV	34.56	27.61	14.93	39.64	2.36	39.82	53.9	14.0	197	357	VBW:360 Hz

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.94\text{ m} / 3.0\text{ m}) = 2.36\text{ dB}$

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.

UL Japan, Inc.

Shonan EMC Lab.

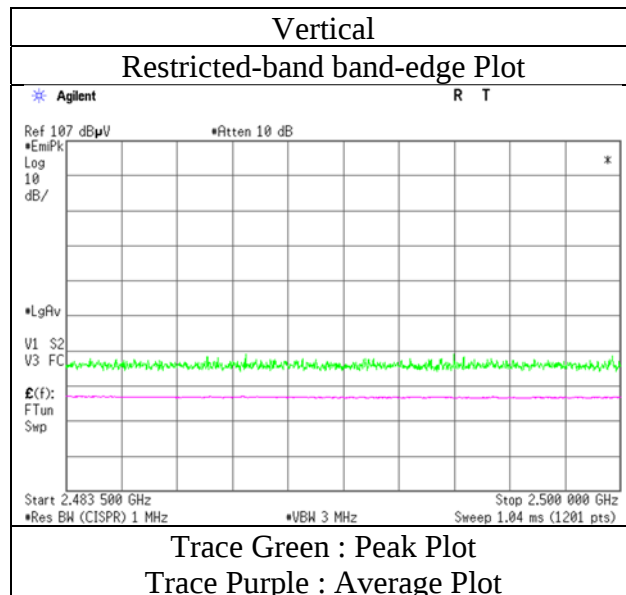
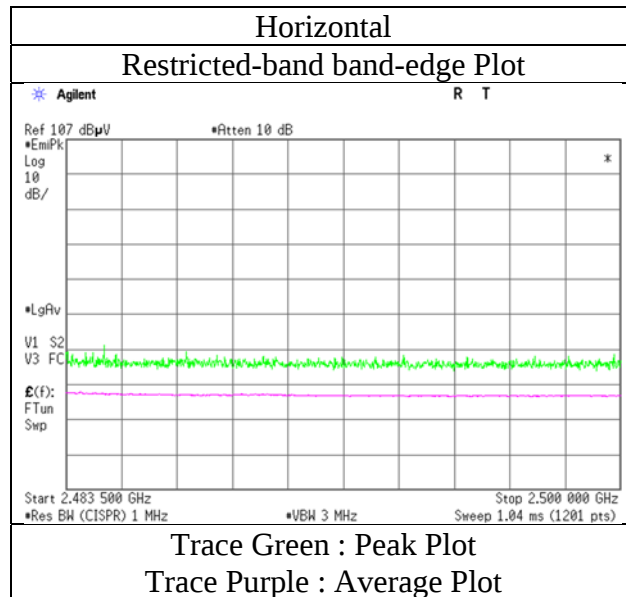
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13854932S-A-R3
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.1
Date	July 4, 2021
Temperature / Humidity	23 deg. C / 68 % RH
Engineer	Hiromasa Sato (1 GHz -2.8 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. 13854932S-A-R3
Test place Shonan EMC Lab.
Semi Anechoic Chamber No.1
Date July 4, 2021
Temperature / Humidity 23 deg. C / 68 % RH
Engineer Hiromasa Sato
(1 GHz -2.8 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.	2390.000	PK	45.96	27.73	14.82	39.61	2.36	51.26	73.9	22.6	318	16	-
Hori.	2390.000	AV	33.75	27.73	14.82	39.61	2.36	39.05	53.9	14.8	318	16	VBW:360 Hz
Vert.	2390.000	PK	45.32	27.73	14.82	39.61	2.36	50.62	73.9	23.2	282	208	-
Vert.	2390.000	AV	33.48	27.73	14.82	39.61	2.36	38.78	53.9	15.1	282	208	VBW:360 Hz

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.94 \text{ m} / 3.0 \text{ m}) = 2.36 \text{ dB}$

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	96.42	27.71	14.84	39.62	2.36	101.71	-	-	Carrier
Hori.	2400.000	PK	40.64	27.71	14.83	39.62	2.36	45.92	81.7	35.7	-
Vert.	2402.000	PK	91.32	27.71	14.84	39.62	2.36	96.61	-	-	Carrier
Vert.	2400.000	PK	37.88	27.71	14.83	39.62	2.36	43.16	76.6	33.4	-

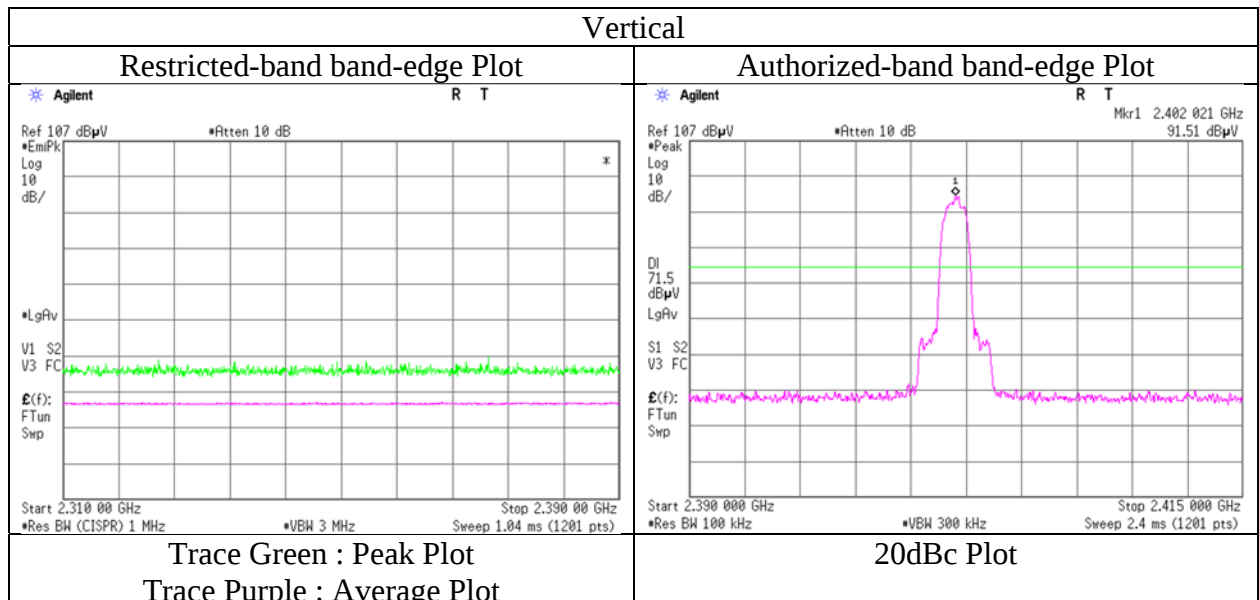
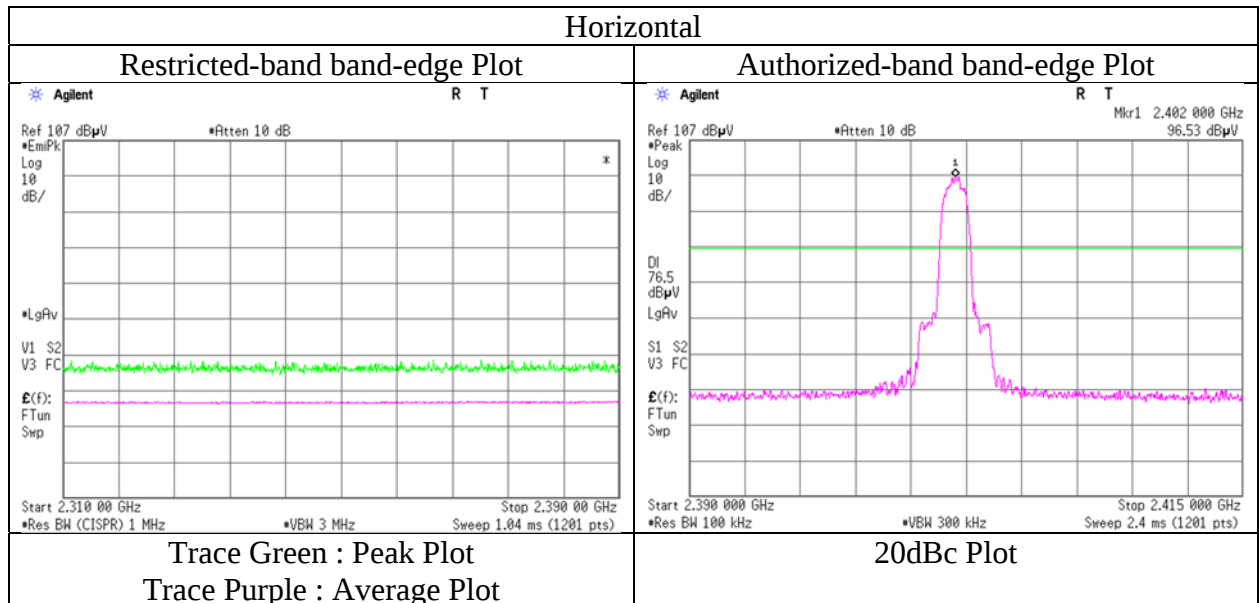
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.94 \text{ m} / 3.0 \text{ m}) = 2.36 \text{ dB}$

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

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13854932S-A-R3
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.1
Date	July 4, 2021
Temperature / Humidity	23 deg. C / 68 % RH
Engineer	Hiromasa Sato
	(1 GHz -2.8 GHz)
Mode	Tx, Hopping Off, 3DH5 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.

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Radiated Spurious Emission

Report No. 13854932S-A-R3
Test place Shonan EMC Lab.
Semi Anechoic Chamber No.1
Date July 4, 2021
Temperature / Humidity 23 deg. C / 68 % RH
Engineer Hiromasa Sato
(1 GHz -2.8 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.	2483.500	PK	52.01	27.61	14.93	39.64	2.36	57.27	73.9	16.6	383	5	-
Hori.	2483.500	AV	34.50	27.61	14.93	39.64	2.36	39.76	53.9	14.1	383	5	VBW:360 Hz
Vert.	2483.500	PK	47.67	27.61	14.93	39.64	2.36	52.93	73.9	20.9	262	233	-
Vert.	2483.500	AV	33.95	27.61	14.93	39.64	2.36	39.21	53.9	14.6	262	233	VBW:360 Hz

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

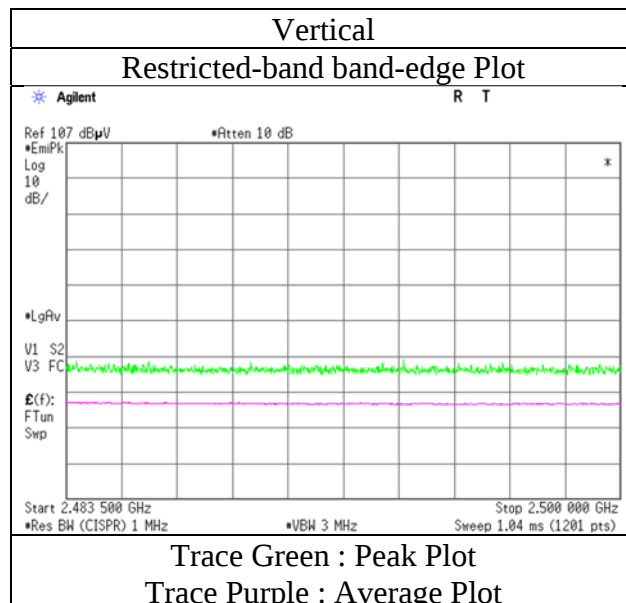
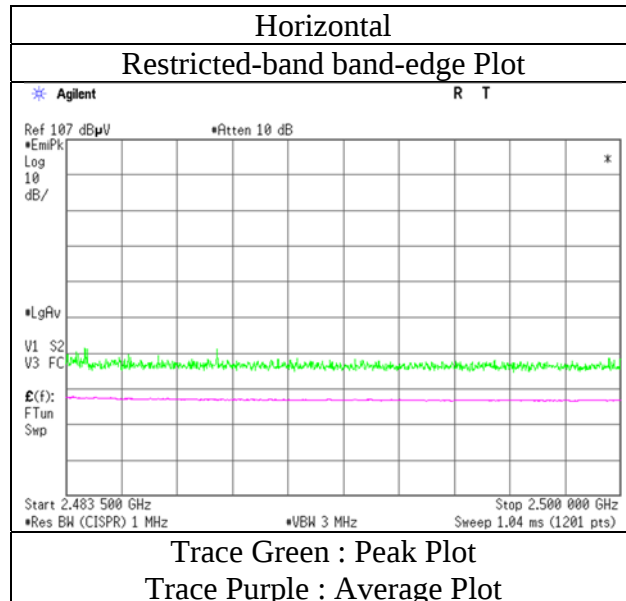
Distance factor : 1 GHz - 10 GHz : $20\log(3.94\text{ m} / 3.0\text{ m}) = 2.36\text{ dB}$

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.

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13854932S-A-R3
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.1
Date	July 4, 2021
Temperature / Humidity	23 deg. C / 68 % RH
Engineer	Hiromasa Sato (1 GHz -2.8 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz

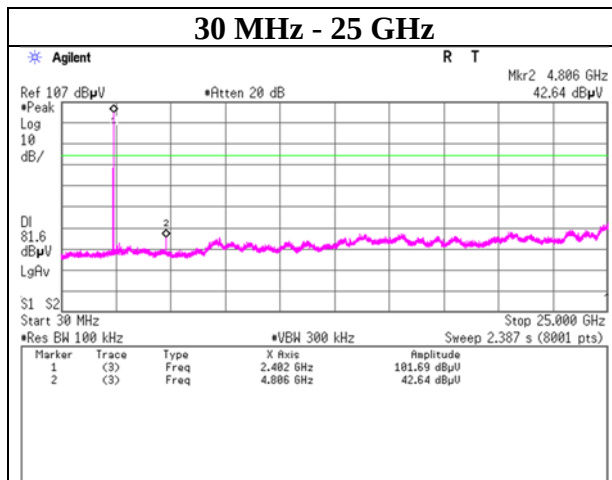
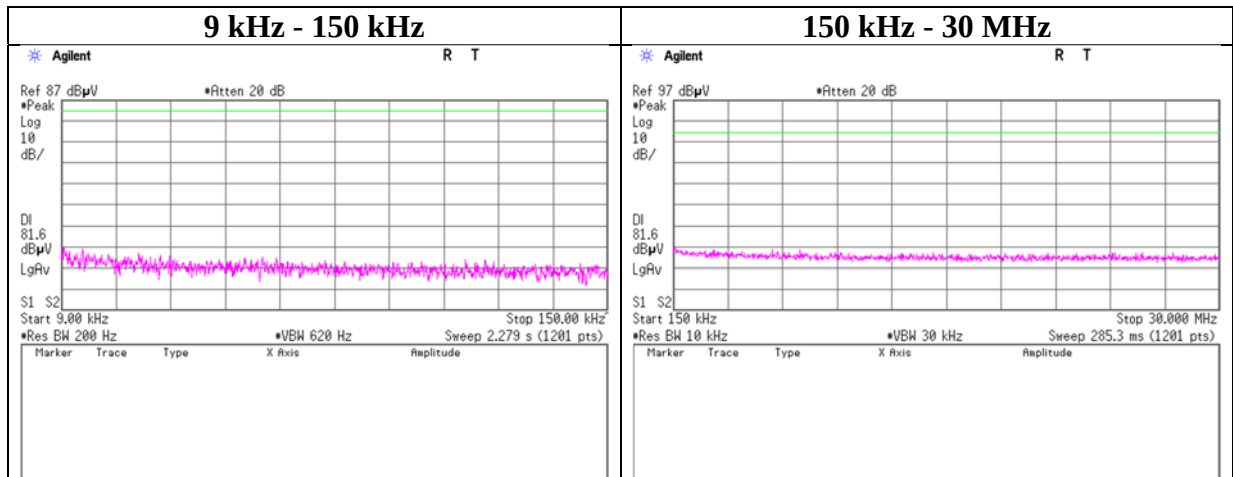


* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions. Final result of restricted band edge was shown in tabular data.

Conducted Spurious Emission

Report No.	13854932S-A-R3
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	January 18, 2022
Temperature / Humidity	24 deg. C / 47 % RH
Engineer	Shiro Kobayashi
Mode	Tx, Hopping Off, DH5

2402 MHz



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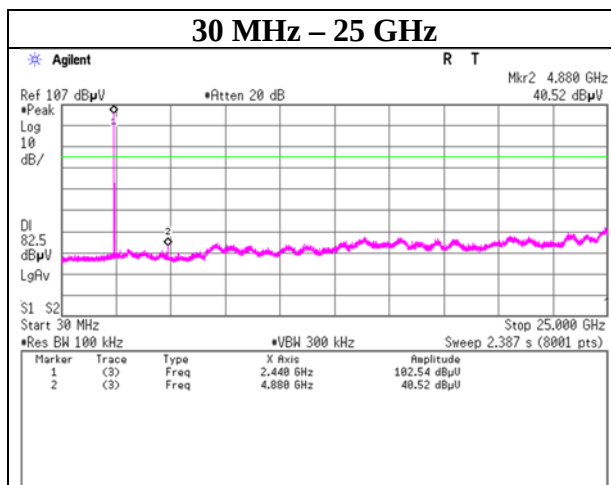
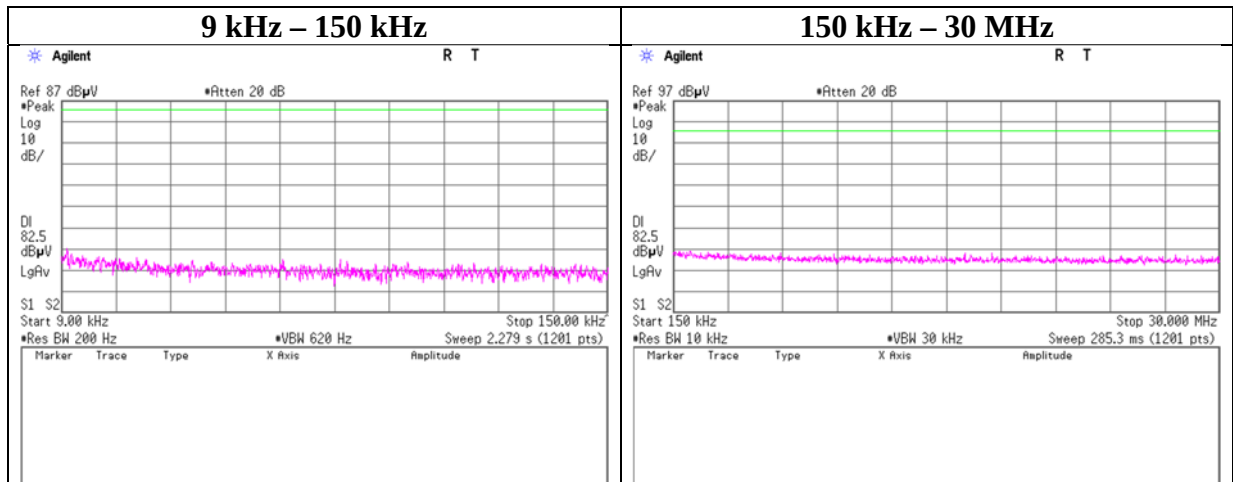
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Conducted Spurious Emission

Report No.	13854932S-A-R3
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	January 18, 2022
Temperature / Humidity	24 deg. C / 47 % RH
Engineer	Shiro Kobayashi
Mode	Tx, Hopping Off, DH5

2441 MHz



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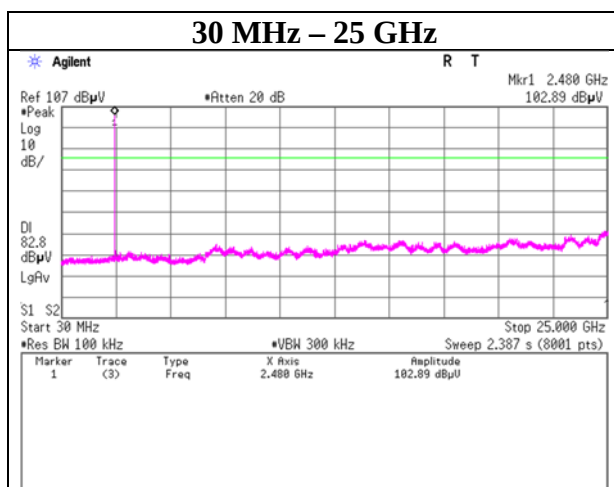
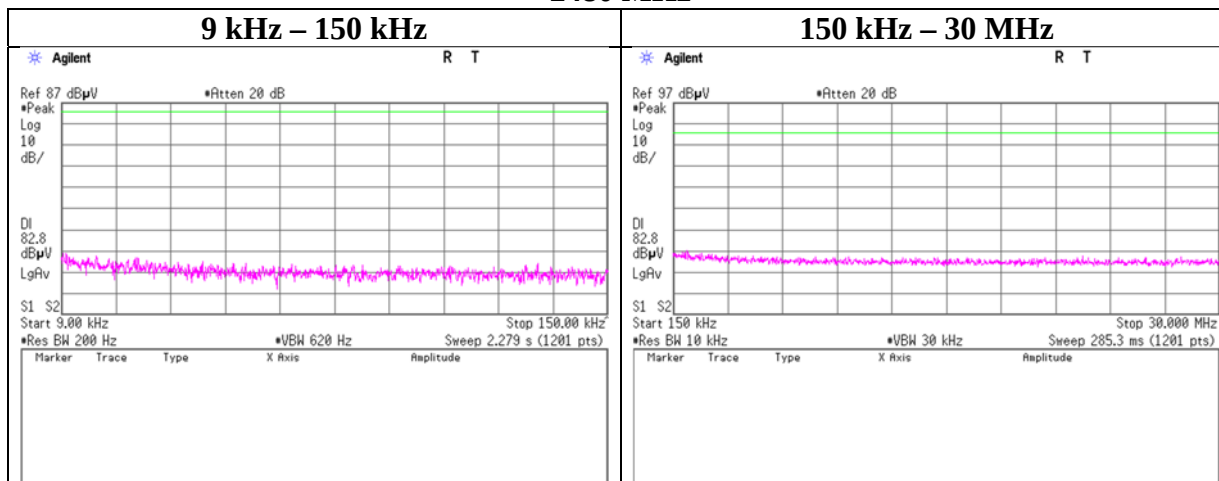
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Conducted Spurious Emission

Report No.	13854932S-A-R3
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	January 18, 2022
Temperature / Humidity	24 deg. C / 47 % RH
Engineer	Shiro Kobayashi
Mode	Tx, Hopping Off, DH5

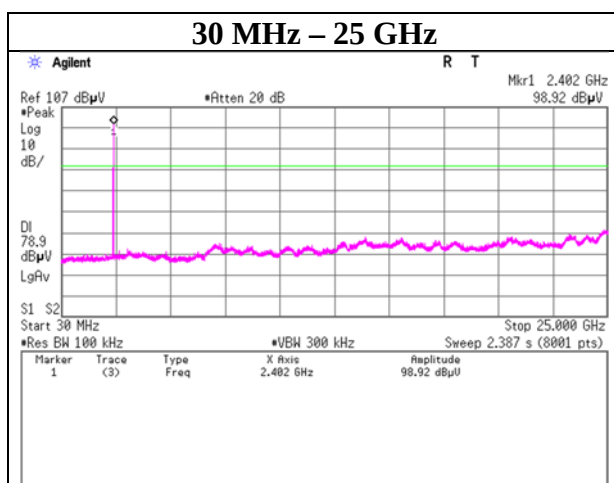
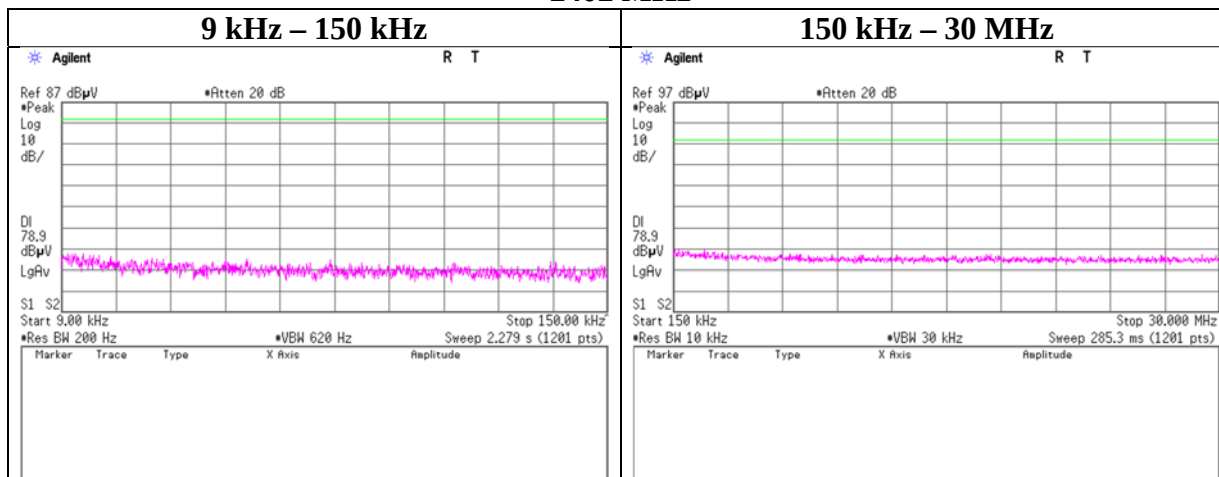
2480 MHz



Conducted Spurious Emission

Report No.	13854932S-A-R3
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	January 18, 2022
Temperature / Humidity	24 deg. C / 47 % RH
Engineer	Shiro Kobayashi
Mode	Tx, Hopping Off, 3DH5

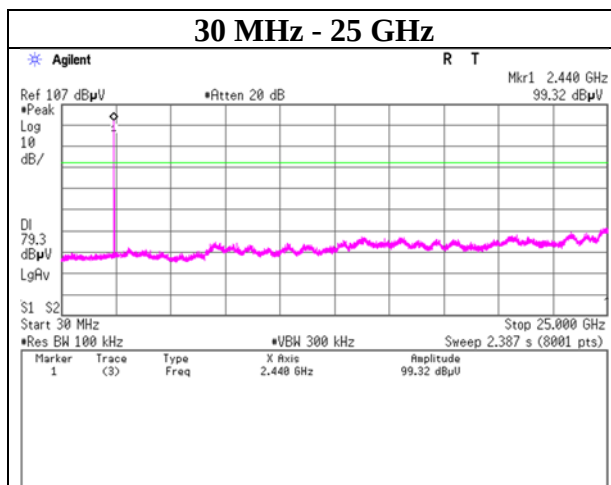
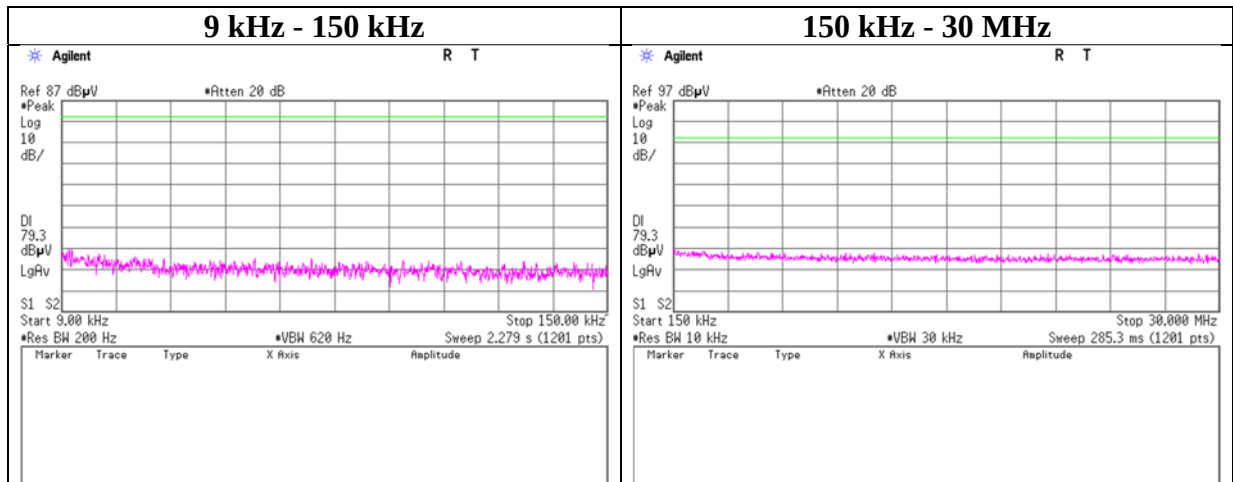
2402 MHz



Conducted Spurious Emission

Report No.	13854932S-A-R3
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	January 18, 2022
Temperature / Humidity	24 deg. C / 47 % RH
Engineer	Shiro Kobayashi
Mode	Tx, Hopping Off, 3DH5

2441 MHz



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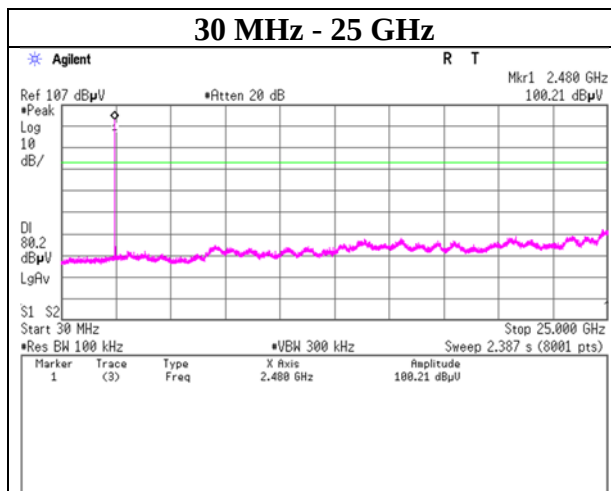
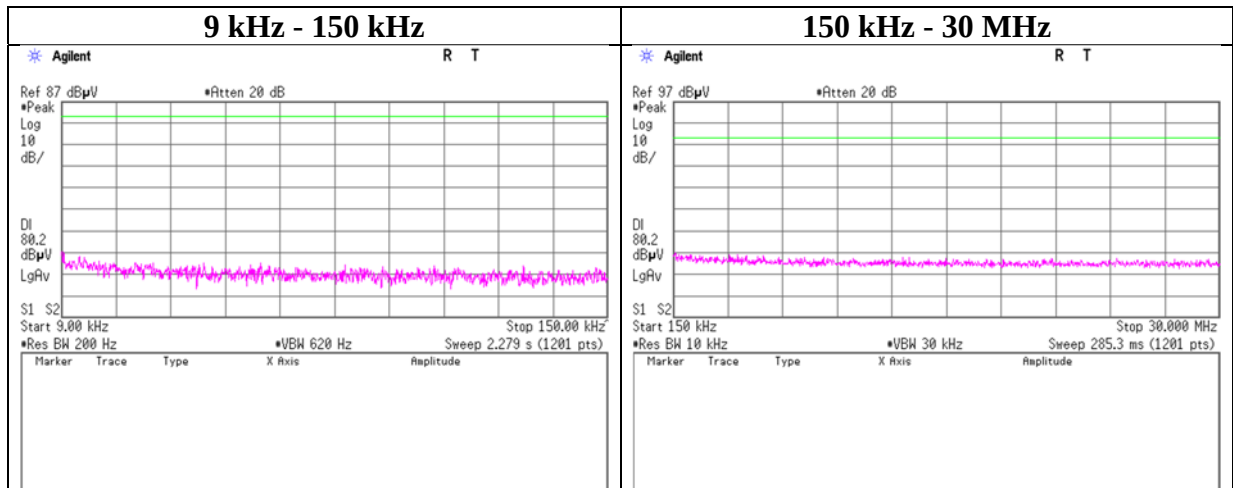
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Conducted Spurious Emission

Report No. 13854932S-A-R3
Test place Shonan EMC Lab. No.5 Shielded Room
Date January 18, 2022
Temperature / Humidity 24 deg. C / 47 % RH
Engineer Shiro Kobayashi
Mode Tx, Hopping Off, 3DH5

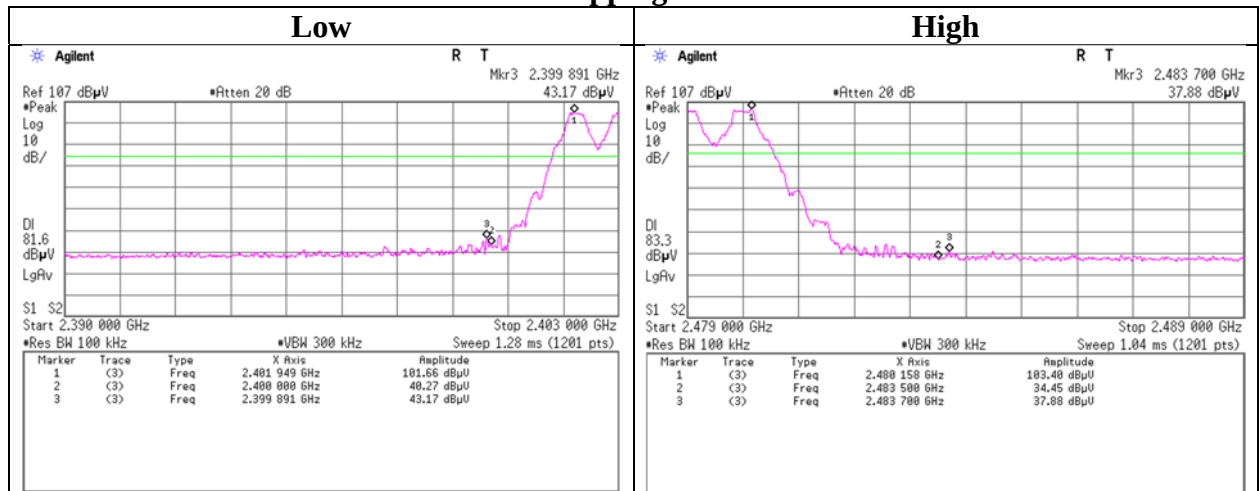
2480 MHz



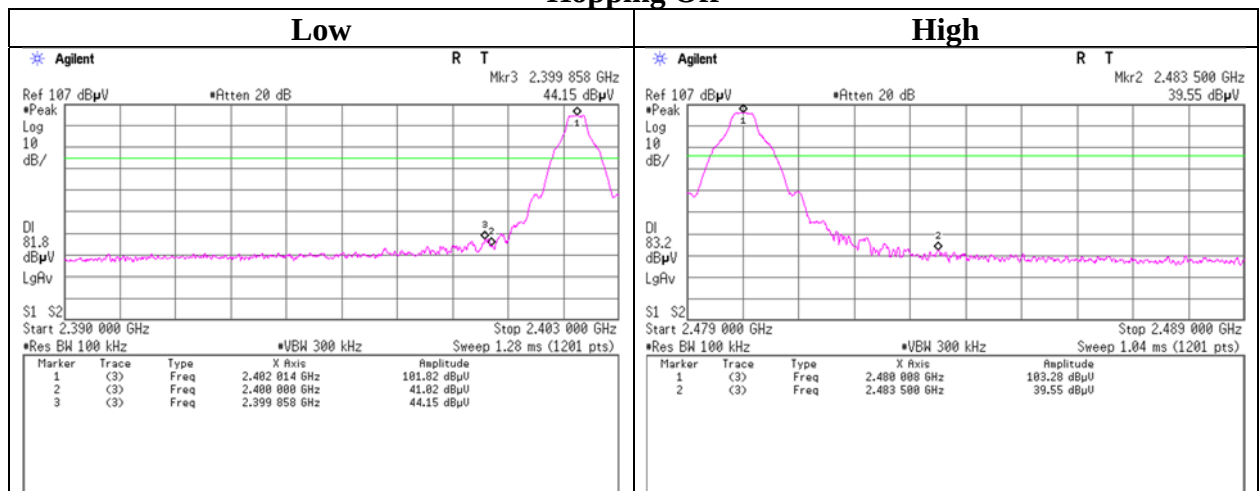
Conducted Emission Band Edge compliance

Report No. 13854932S-A-R3
Test place Shonan EMC Lab. No.5 Shielded Room
Date June 15, 2021
Temperature / Humidity 24 deg. C / 55 % RH
Engineer Shiro Kobayashi
Mode Tx DH5

Hopping On



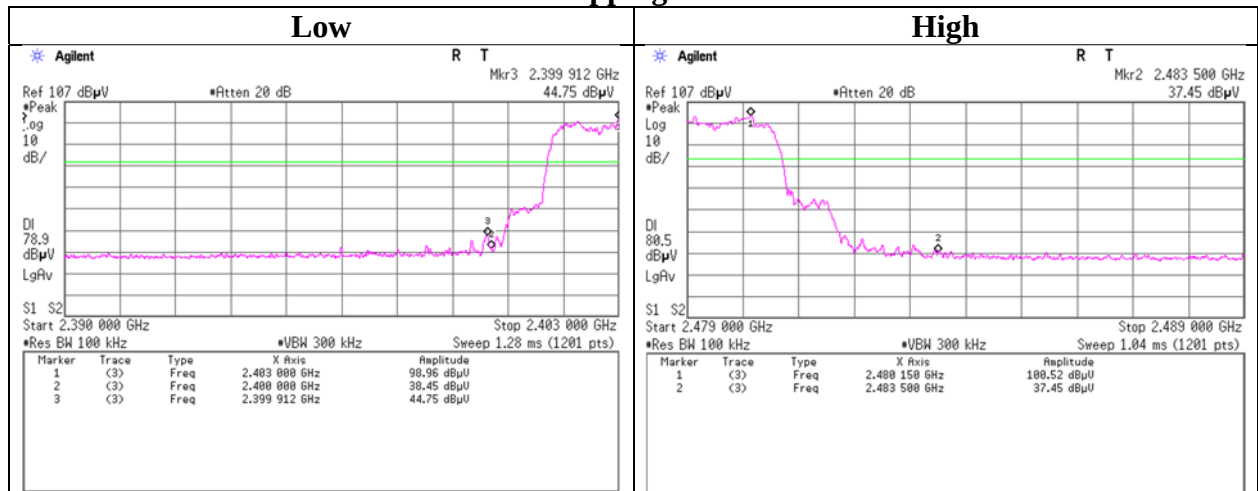
Hopping Off



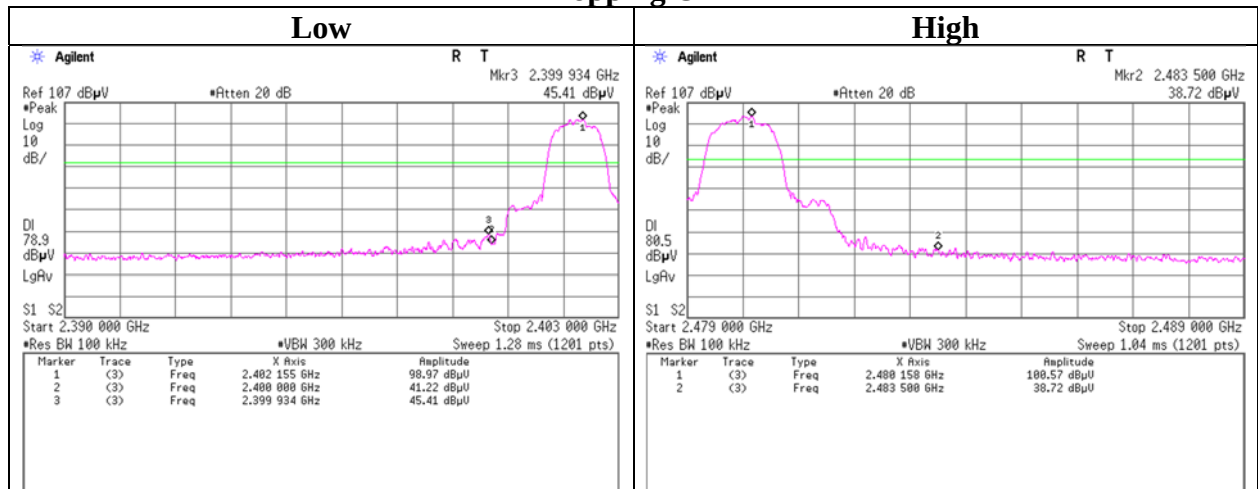
Conducted Emission Band Edge compliance

Report No. 13854932S-A-R3
Test place Shonan EMC Lab. No.5 Shielded Room
Date June 15, 2021
Temperature / Humidity 24 deg. C / 55 % RH
Engineer Shiro Kobayashi
Mode Tx 3DH5

Hopping On



Hopping Off



APPENDIX 2: Test instruments

Test equipment (1 / 3)

Test Name	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Interval (Month)
AT	KSA-08	145089	Spectrum Analyzer	Keysight Technologies Inc	E4446A	MY46180525	2021/10/13	12
AT	KTS-07	145111	Digital Tester	SANWA	PC500	7019232	2021/09/14	12
AT	SAT10-21	204925	Attenuator	Weinschel Corp.	54A-10	-	2021/02/09	12
AT	SAT10-23	204927	Attenuator	Weinschel Corp.	54A-10	-	2021/02/09	12
AT	SCC-G13	145166	Coaxial Cable	Suhner	SUCOFLEX 102	31599/2	2021/12/06	12
AT	SCC-G67	196949	Coaxial Cable	Huber+Suhner	SUCOFLEX 102	803480/2	2021/03/01	12
AT	SOS-27	191845	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2021/08/02	12
AT	SPM-13	169910	Power Meter	Keysight Technologies Inc	8990B	MY51000448	2021/01/25	12
AT	SPSS-06	169911	Power sensor	Keysight Technologies Inc	N1923A	MY57270004	2021/01/25	12
AT,RE	SSA-02	145800	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY48250106	2021/04/13	12
RE	COTS-SEMI-5	170932	EMI Software	TSJ (Techno Science Japan)	TEPTO-DV3(RE,CE,M E,PE)	-	-	-
RE	KAT6-04	144899	Attenuator	Inmet	18N-6dB	-	2020/12/10	12 *1)
RE	KJM-02	146432	Measure	TAJIMA	GL19-55	-	-	-
RE	KJM-09	145929	Measure	KOMELON	KMC-36	-	-	-
RE	SAEC-01(NSA)	145597	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	2021/04/30	12
RE	SAEC-01(SVS WR)	145561	Semi-Anechoic Chamber	TDK	SAEC-01(SVSWR)	1	2021/05/09	12
RE	SAEC-03(SVS WR)	145566	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	2021/05/21	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-06	145005	Pre Amplifier	Toyo Corporation	TPA0118-36	1440491	2021/02/08	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	2020/10/05	12 *1)
RE	SAT3-09	144959	Attenuator	JFW	50HF-003N	-	2020/08/18	12 *1)
RE	SBA-01	145161	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	BBA9106	91032664	2021/04/10	12

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Test equipment (2 / 3)

Test Name	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Interval (Month)
RE	SCC-A1/A3/A5/A7/A8/A13/SRSE-01	144967	Coaxial Cable&RF Selector	Fujikura/Fujikura/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/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-G40	166491	Coaxial Cable	Junkosha	MWX221-01000NFSNMS/B	1612S005	2021/01/19	12
RE	SCC-G41	151617	Coaxial Cable	Junkosha	MWX221-01000NFSNMS/B	1612S006	2021/01/19	12
RE	SCC-G43	156380	Coaxial Cable	Huber+Suhner	SUCOFLEX_104_E	SN MY 13406/4E	2021/05/17	12
RE	SCC-G57	179540	Coaxial Cable	Huber+Suhner	SUCOFLEX 102	802815/2	2021/05/18	12
RE	SCC-G58	183047	Coaxial Cable	Huber+Suhner	SUCOFLEX 104	800287/4A	2021/05/17	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
RE	SFL-02	145301	Highpass Filter	MICRO-TRONICS	HPM50111	51	2020/10/05	12 *1)
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-03	145501	Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	9120D-739	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	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	-	2020/09/28	12 *1)
RE	SOS-23	191840	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2020/09/28	12 *1)

Test equipment (3 / 3)

Test Name	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Interval (Month)
RE	SSA-03	145801	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY48250152	2020/08/12	12 *1)
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	2020/10/19	12 *1)
RE	STS-03	146210	Digital Hitester	HIOKI E.E. CORPORATION	3805-50	80997823	2020/10/19	12 *1)

***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.

The expiration*1) This test equipment was used for the tests before the expiration date of the calibration.

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

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