




RADIO TEST REPORT


Test Report No. : 13854932S-B-R2

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
(*WLAN part)
Test item : Maximum Peak Output Power,
Spurious Emission,
Restricted Band Edges
Purpose of test : Spot check
Test Result : Complied (Refer to SECTION 3)

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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-B-R1. 13854932S-B-R1 is replaced with this report.

Date of test: June 15 to July 4, 2021

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-B

Revision	Test report No.	Date	Page revised	Contents																																							
- (Original)	13854932S-B	August 31, 2021	-	-																																							
1	13854932S-B-R1	January 12, 2022	P.1	Addition of "Purpose of test"																																							
2	13854932S-B-R2	January 18, 2022	P.5	Addition of WLAN "Clock frequency"																																							
			P.7	Addition of "Duty cycle and Time Measurement" Uncertainty																																							
			P.9	<p>Correction of "**The details of Operating mode(s)":</p> <p>From:</p> <table border="1"> <thead> <tr> <th colspan="3">*The details of Operating mode(s)</th> </tr> <tr> <th>Test Item</th> <th>Operating Mode</th> <th>Tested frequency</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Radiated Spurious Emission (Below 1 GHz)</td> <td>11g Tx</td> <td>2437 MHz</td> </tr> <tr> <td rowspan="4">Radiated Spurious Emission (Above 1 GHz)</td> <td>11b Tx</td> <td>2412 MHz 2462 MHz</td> </tr> <tr> <td rowspan="2">11g Tx 11n-20 Tx</td> <td>2412 MHz 2417 MHz 2457 MHz 2462 MHz</td> </tr> <tr> <td>11b Tx 11g Tx 11n-20 Tx</td> <td>2412 MHz 2437 MHz 2462 MHz</td> </tr> </tbody> </table> <p>To:</p> <table border="1"> <thead> <tr> <th colspan="3">*The details of Operating mode(s)</th> </tr> <tr> <th>Test Item</th> <th>Operating Mode</th> <th>Tested frequency</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Conducted Spurious Emission, Radiated Spurious Emission (Below 1 GHz)</td> <td>11g Tx</td> <td>2437 MHz *1)</td> </tr> <tr> <td rowspan="4">Radiated Spurious Emission (Above 1 GHz)</td> <td>11b Tx</td> <td>2412 MHz *2) 2462 MHz *2)</td> </tr> <tr> <td rowspan="2">11g Tx</td> <td>2412 MHz *2) 2417 MHz *2) 2457 MHz *2) 2462 MHz *2)</td> </tr> <tr> <td>11n-20 Tx</td> <td>2412 MHz *2) 2417 MHz *2) 2457 MHz *2) 2462 MHz *3)</td> </tr> <tr> <td rowspan="3">Maximum Peak Output Power</td> <td>11b Tx</td> <td>2412 MHz</td> </tr> <tr> <td>11g Tx</td> <td>2437 MHz</td> </tr> <tr> <td>11n-20 Tx</td> <td>2462 MHz</td> </tr> </tbody> </table> <p>*1) The mode was tested as representative, because it had the highest power at antenna terminal test. *2) Band-edge only *3) The mode was tested as representative, because it had the worst margin mode in the original report. (Refer to the test report: 12952598S-B.)</p>	*The details of Operating mode(s)			Test Item	Operating Mode	Tested frequency	Radiated Spurious Emission (Below 1 GHz)	11g Tx	2437 MHz	Radiated Spurious Emission (Above 1 GHz)	11b Tx	2412 MHz 2462 MHz	11g Tx 11n-20 Tx	2412 MHz 2417 MHz 2457 MHz 2462 MHz	11b Tx 11g Tx 11n-20 Tx	2412 MHz 2437 MHz 2462 MHz	*The details of Operating mode(s)			Test Item	Operating Mode	Tested frequency	Conducted Spurious Emission, Radiated Spurious Emission (Below 1 GHz)	11g Tx	2437 MHz *1)	Radiated Spurious Emission (Above 1 GHz)	11b Tx	2412 MHz *2) 2462 MHz *2)	11g Tx	2412 MHz *2) 2417 MHz *2) 2457 MHz *2) 2462 MHz *2)	11n-20 Tx	2412 MHz *2) 2417 MHz *2) 2457 MHz *2) 2462 MHz *3)	Maximum Peak Output Power	11b Tx	2412 MHz	11g Tx	2437 MHz	11n-20 Tx	2462 MHz
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			P.40	<p>Correction of Test equipment:</p> <p>From: SCC-G56 To: SCC-G57</p>																																							

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
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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: Section 15.247(b)(3) ISED: RSS-247 5.4(d)	See data.	Complied a)	Conducted
Spurious Emission Restricted Band Edges	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.13	FCC: Section 15.247(d) ISED: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	4.5 dB 9848.000 MHz, AV, Hori. Mode: Tx 11n-20 2462 MHz	Complied# b), c)	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *1)
<p>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) and KDB 558074 D01 15.247 Meas Guidance v05r02 8.5 and 8.6.</p> <p>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)</p> <p>Symbols: Complied The data of this test item has enough margin, more than the measurement uncertainty. Complied# The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.</p>					

* 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.

SECTION 4: Operation of EUT during testing

4.1 Operating Mode(s)

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

Mode	Remarks*
IEEE 802.11b (11b)	2 Mbps, PN9
IEEE 802.11g (11g)	48 Mbps, PN9
IEEE 802.11n 20 MHz BW (11n-20)	MCS 4 (Long GI), PN9
*The worst condition was determined based on the test result of Maximum Peak Output Power. (Refer to the test report: 12952598S-B.)	
*Power of the EUT was set 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.	

*The details of Operating mode(s)

Test Item	Operating Mode	Tested frequency
Conducted Spurious Emission, Radiated Spurious Emission (Below 1 GHz)	11g Tx	2437 MHz *1)
Radiated Spurious Emission (Above 1 GHz)	11b Tx	2412 MHz *2) 2462 MHz *2)
	11g Tx	2412 MHz *2) 2417 MHz *2) 2457 MHz *2) 2462 MHz *2)
	11n-20 Tx	2412 MHz *2) 2417 MHz *2) 2457 MHz *2) 2462 MHz *3)
Maximum Peak Output Power	11b Tx 11g Tx 11n-20 Tx	2412 MHz 2437 MHz 2462 MHz

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

*2) Band-edge only

*3) The mode was tested as representative, because it had the worst margin mode in the original report.

(Refer to the test report: 12952598S-B.)

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

It was measured based on "8.5 and 8.6 of KDB 558074 D01 15.247 Meas Guidance v05r02".

[For below 1 GHz]

EUT was placed on a urethane platform of nominal size, 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(ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *1)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	11,12,2,5,2 RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (Linear voltage) Trace: 100 traces Duty factor was added to the results.	RBW: 100 kHz VBW: 300 kHz

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

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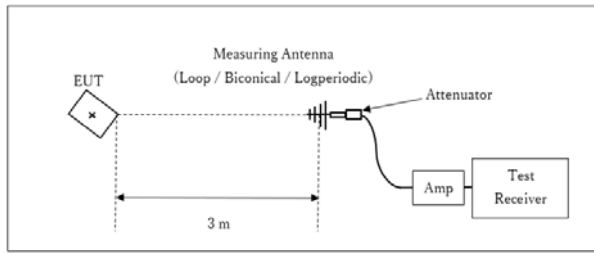
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Figure 2: Test Setup

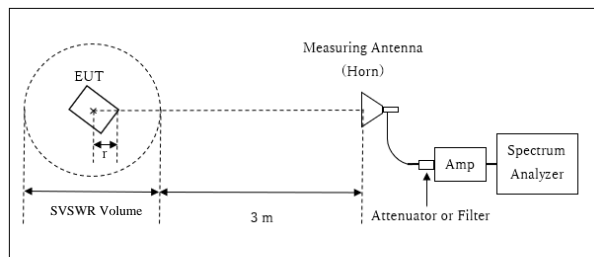
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz - 10 GHz



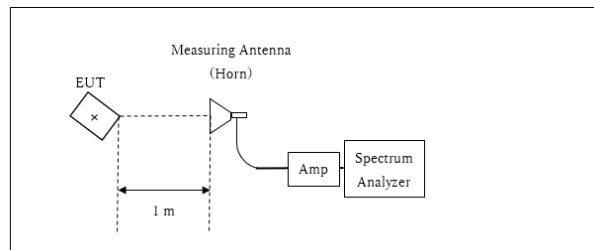
r : Radius of an outer periphery of EUT
× : Center of turn table

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

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

10 GHz - 26.5 GHz



× : 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

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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				

*1) Reference data

*2) In the frequency range below 30 MHz, 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

UL Japan, Inc.

Shonan EMC Lab.

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Facsimile : +81 463 50 6401

APPENDIX 1: Test data

Maximum Peak Output Power

Report No. 13854932S-B-R2
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

11b, 2 Mbps				Conducted Power					e.i.r.p. for RSS-247					
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
2412	1.82	2.36	9.97	14.15	26.00	30.00	1000	15.85	2.00	16.15	41.21	36.02	4000	19.87
2437	1.83	2.36	9.98	14.17	26.12	30.00	1000	15.83	2.00	16.17	41.40	36.02	4000	19.85
2462	1.89	2.37	9.98	14.24	26.55	30.00	1000	15.76	2.00	16.24	42.07	36.02	4000	19.78

Sample Calculation:

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

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

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

11g, 48 Mbps				Conducted Power					e.i.r.p. for RSS-247					
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
2412	8.33	2.36	9.97	20.66	116.41	30.00	1000	9.34	2.00	22.66	184.50	36.02	4000	13.36
2437	10.73	2.36	9.98	23.07	202.77	30.00	1000	6.93	2.00	25.07	321.37	36.02	4000	10.95
2462	9.75	2.37	9.98	22.10	162.18	30.00	1000	7.90	2.00	24.10	257.04	36.02	4000	11.92

Sample Calculation:

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

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

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

11n-20, MCS 4 (800 ns GI)				Conducted Power					e.i.r.p. for RSS-247					
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
2412	8.09	2.36	9.97	20.42	110.15	30.00	1000	9.58	2.00	22.42	174.58	36.02	4000	13.60
2437	10.45	2.36	9.98	22.79	190.11	30.00	1000	7.21	2.00	24.79	301.30	36.02	4000	11.23
2462	9.40	2.37	9.98	21.75	149.62	30.00	1000	8.25	2.00	23.75	237.14	36.02	4000	12.27

Sample Calculation:

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

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

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

Average Output Power
(Reference data for RF Exposure)

Report No. 13854932S-B-R2
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

11b 2 Mbps

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-0.88	2.36	9.97	11.45	13.96	0.01	11.46	14.00
2437	-0.96	2.36	9.98	11.38	13.74	0.01	11.39	13.77
2462	-0.92	2.37	9.98	11.43	13.90	0.01	11.44	13.93

11g 48 Mbps

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-3.17	2.36	9.97	9.16	8.24	0.15	9.31	8.53
2437	0.80	2.36	9.98	13.14	20.61	0.15	13.29	21.33
2462	-1.11	2.37	9.98	11.24	13.30	0.15	11.39	13.77

11n-20 MCS 7 (800 ns GI)

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-3.06	2.36	9.97	9.27	8.45	0.21	9.48	8.87
2437	-0.44	2.36	9.98	11.90	15.49	0.21	12.11	16.26
2462	-2.27	2.37	9.98	10.08	10.19	0.21	10.29	10.69

Sample Calculation:

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

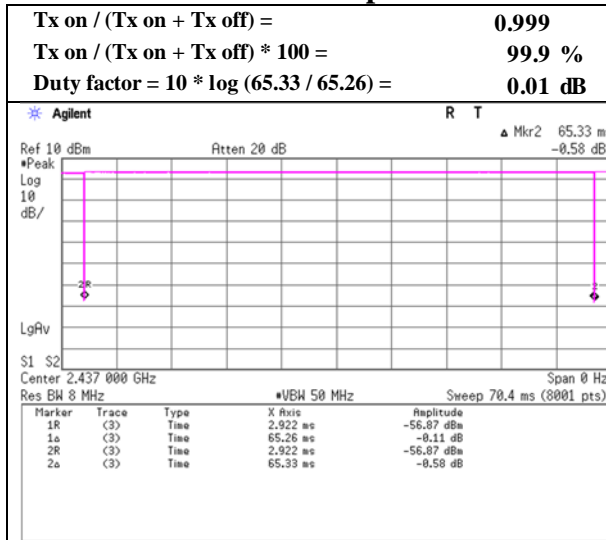
Result (Burst power average) = Time average + Duty factor

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

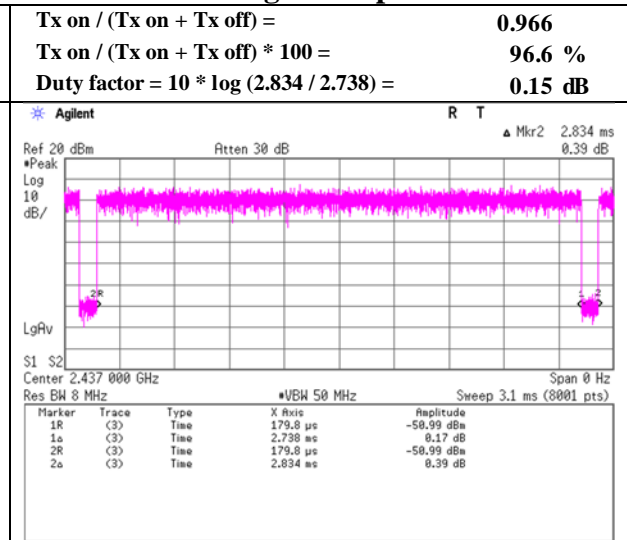
Burst rate confirmation (for Average Output Power)

Report No. 13854932S-B-R2
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

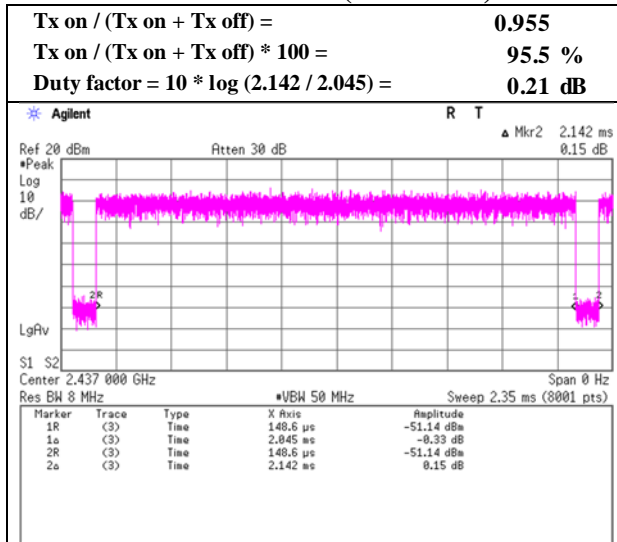
11b 2 Mbps



11g 48 Mbps



11n-20 MCS 7 (800 ns GI)

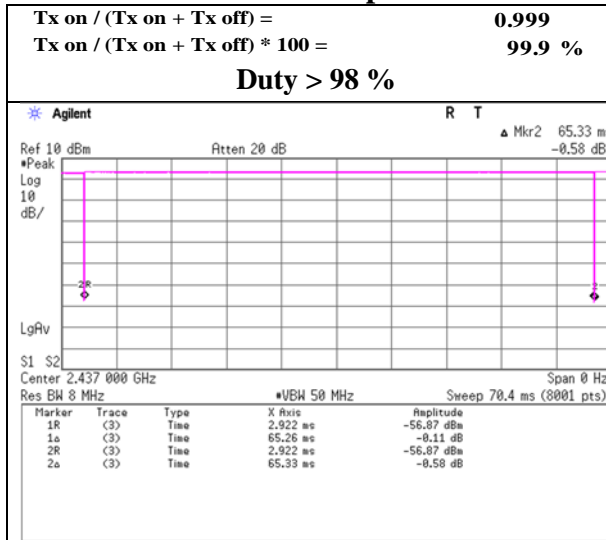


* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

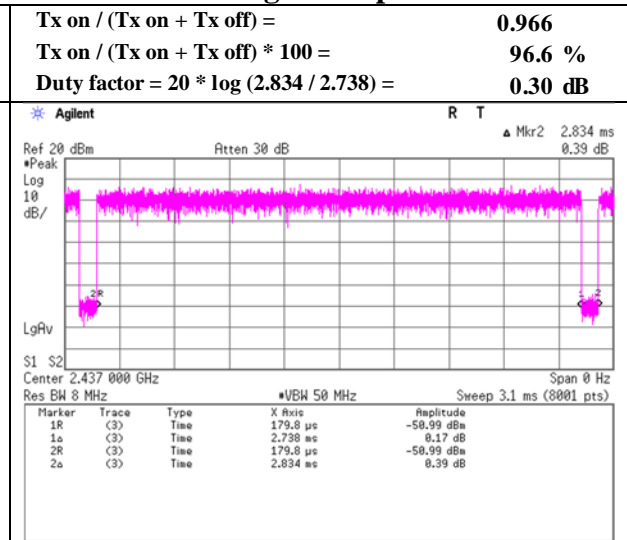
Burst rate confirmation (for Radiated Spurious Emission)

Report No. 13854932S-B-R2
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

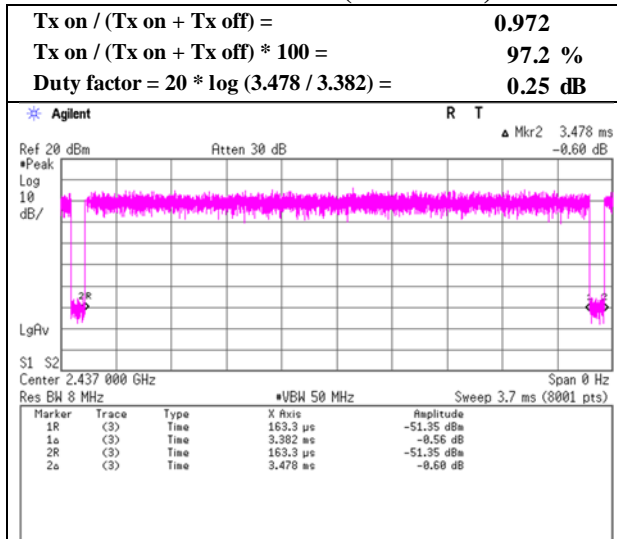
11b 2 Mbps



11g 48 Mbps



11n-20 MCS 4 (800 ns GI)



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

Radiated Spurious Emission

Report No. 13854932S-B-R2
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 11b 2412 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	46.93	27.73	14.82	39.61	2.36	52.23	73.9	21.6	396	21	-
Hori.	2390.000	AV	37.76	27.73	14.82	39.61	2.36	43.06	53.9	10.8	396	21	-
Vert.	2390.000	PK	46.24	27.73	14.82	39.61	2.36	51.54	73.9	22.3	335	261	-
Vert.	2390.000	AV	36.65	27.73	14.82	39.61	2.36	41.95	53.9	11.9	335	261	-

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

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	95.50	27.69	14.84	39.62	2.36	100.77	-	-	Carrier
Hori.	2400.000	PK	47.04	27.71	14.83	39.62	2.36	52.32	80.7	28.3	-
Vert.	2412.000	PK	89.27	27.69	14.84	39.62	2.36	94.54	-	-	Carrier
Vert.	2400.000	PK	43.64	27.71	14.83	39.62	2.36	48.92	74.5	25.5	-

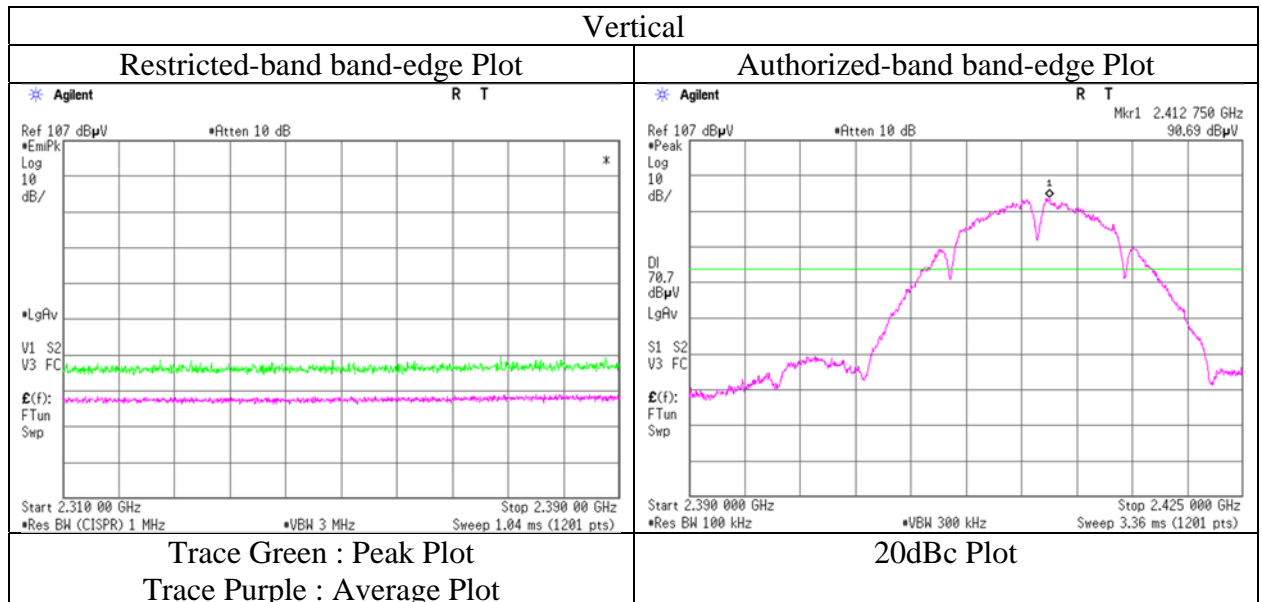
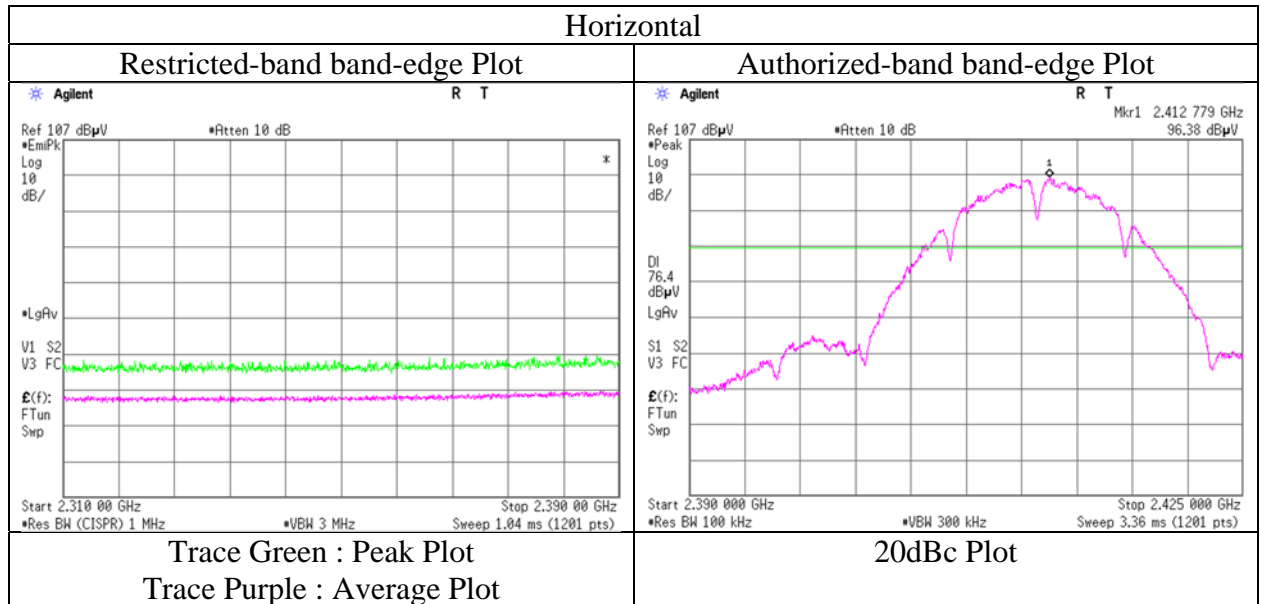
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log(3.94 m / 3.0 m) = 2.36 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. 13854932S-B-R2
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 11b 2412 MHz



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

Radiated Spurious Emission

Report No. 13854932S-B-R2
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 11b 2462 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	47.74	27.61	14.93	39.64	2.36	53.00	73.9	20.9	398	15	-
Hori.	2483.500	AV	37.82	27.61	14.93	39.64	2.36	43.08	53.9	10.8	398	15	-
Vert.	2483.500	PK	45.44	27.61	14.93	39.64	2.36	50.70	73.9	23.2	206	356	-
Vert.	2483.500	AV	36.96	27.61	14.93	39.64	2.36	42.22	53.9	11.6	206	356	-

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

UL Japan, Inc.

Shonan EMC Lab.

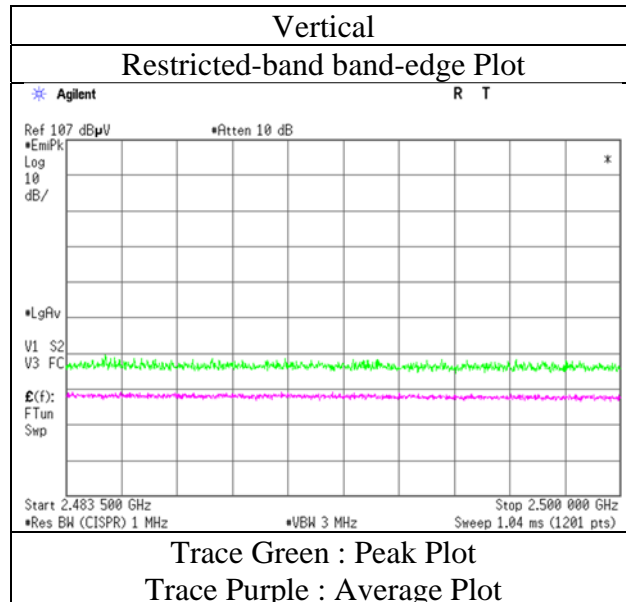
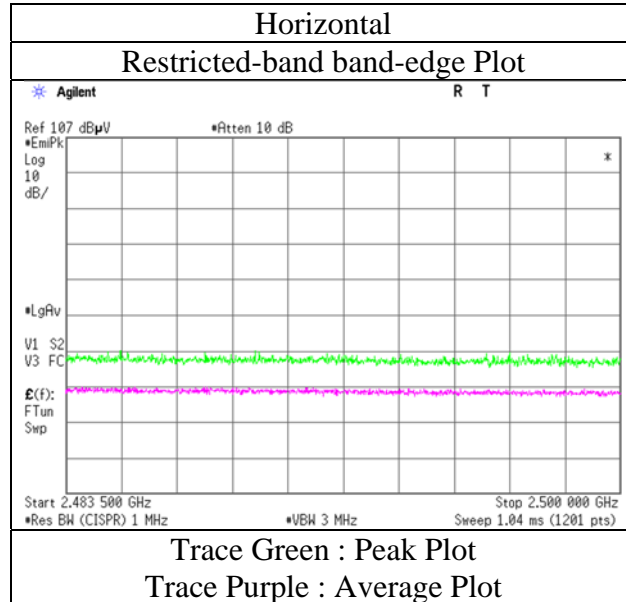
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 13854932S-B-R2
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 11b 2462 MHz



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

Radiated Spurious Emission

Report No. 13854932S-B-R2
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 11g 2412 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	50.22	27.73	14.82	39.61	2.36	55.52	73.9	18.3	311	12	-
Vert.	2390.000	PK	47.33	27.73	14.82	39.61	2.36	52.63	73.9	21.2	150	359	-

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

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	38.88	27.73	14.82	39.61	0.30	2.36	44.48	53.9	9.4	*1)
Vert.	2390.000	AV	36.67	27.73	14.82	39.61	0.30	2.36	42.27	53.9	11.6	*1)

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

Duty factor refer to "Burst rate confirmation" sheet.

*1) Not out of band emission (Leakage Power)

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	88.02	27.69	14.84	39.62	2.36	93.29	-	-	Carrier
Hori.	2400.000	PK	52.25	27.71	14.83	39.62	2.36	57.53	73.2	15.6	-
Vert.	2412.000	PK	83.23	27.69	14.84	39.62	2.36	88.50	-	-	Carrier
Vert.	2400.000	PK	48.63	27.71	14.83	39.62	2.36	53.91	68.5	14.5	-

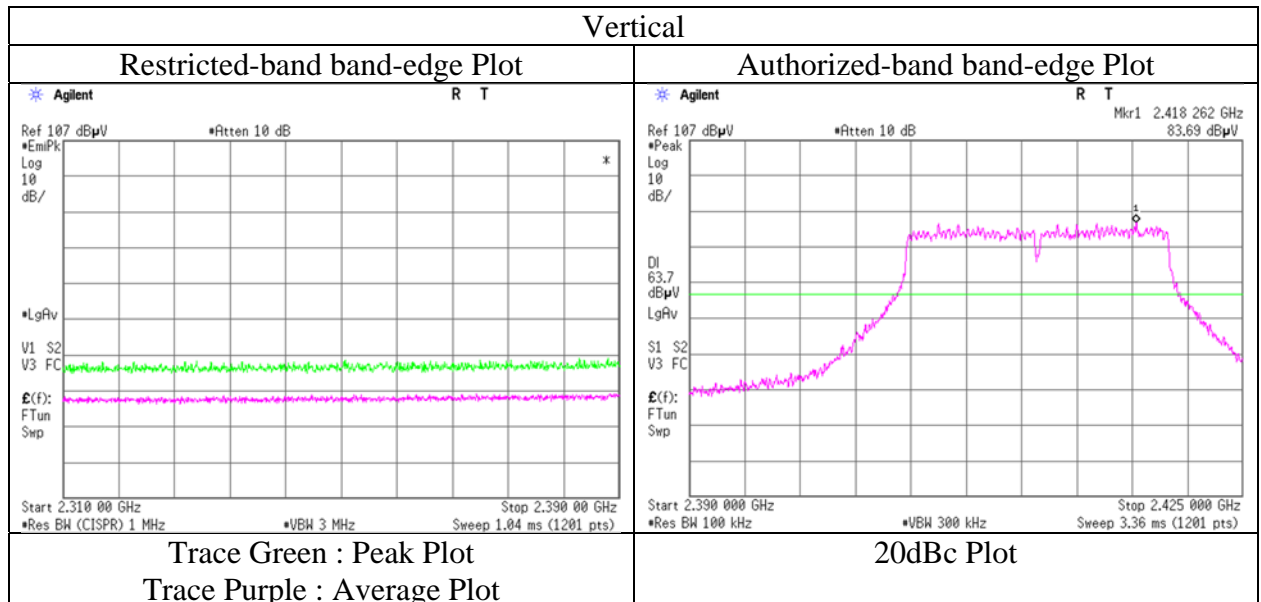
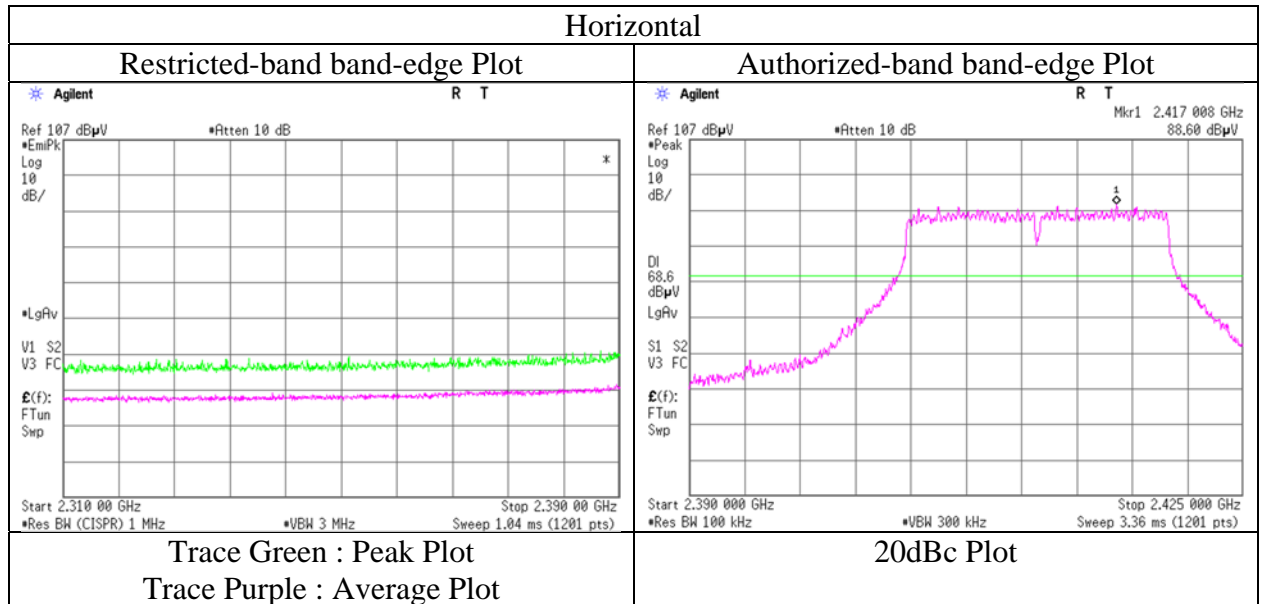
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

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-B-R2
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 11g 2412 MHz



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

Radiated Spurious Emission

Report No. 13854932S-B-R2
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 11g 2417 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	56.55	27.73	14.82	39.61	2.36	61.85	73.9	12.0	324	26	-
Vert.	2390.000	PK	51.49	27.73	14.82	39.61	2.36	56.79	73.9	17.1	221	206	-

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

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	41.76	27.73	14.82	39.61	0.30	2.36	47.36	53.9	6.5	*1)
Vert.	2390.000	AV	38.34	27.73	14.82	39.61	0.30	2.36	43.94	53.9	9.9	*1)

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

Duty factor refer to "Burst rate confirmation" sheet.

*1) Not out of band emission (Leakage Power)

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.	2417.000	PK	92.75	27.68	14.86	39.62	2.36	98.03	-	-	Carrier
Hori.	2400.000	PK	47.21	27.71	14.83	39.62	2.36	52.49	78.0	25.5	-
Vert.	2417.000	PK	87.35	27.68	14.86	39.62	2.36	92.63	-	-	Carrier
Vert.	2400.000	PK	45.31	27.71	14.83	39.62	2.36	50.59	72.6	22.0	-

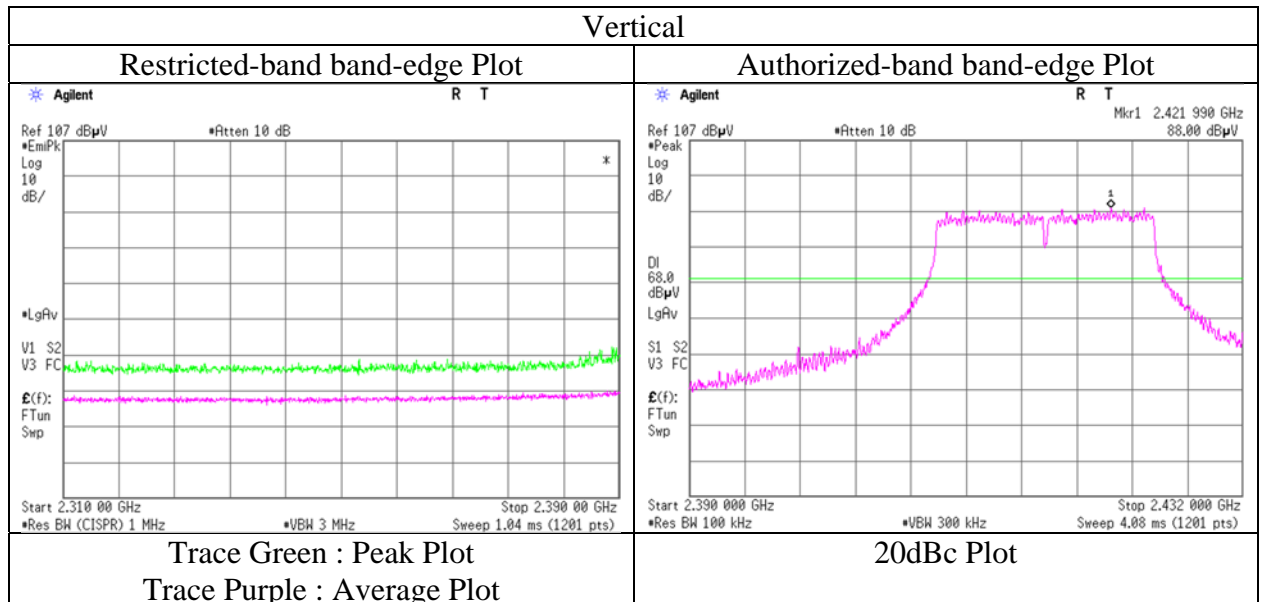
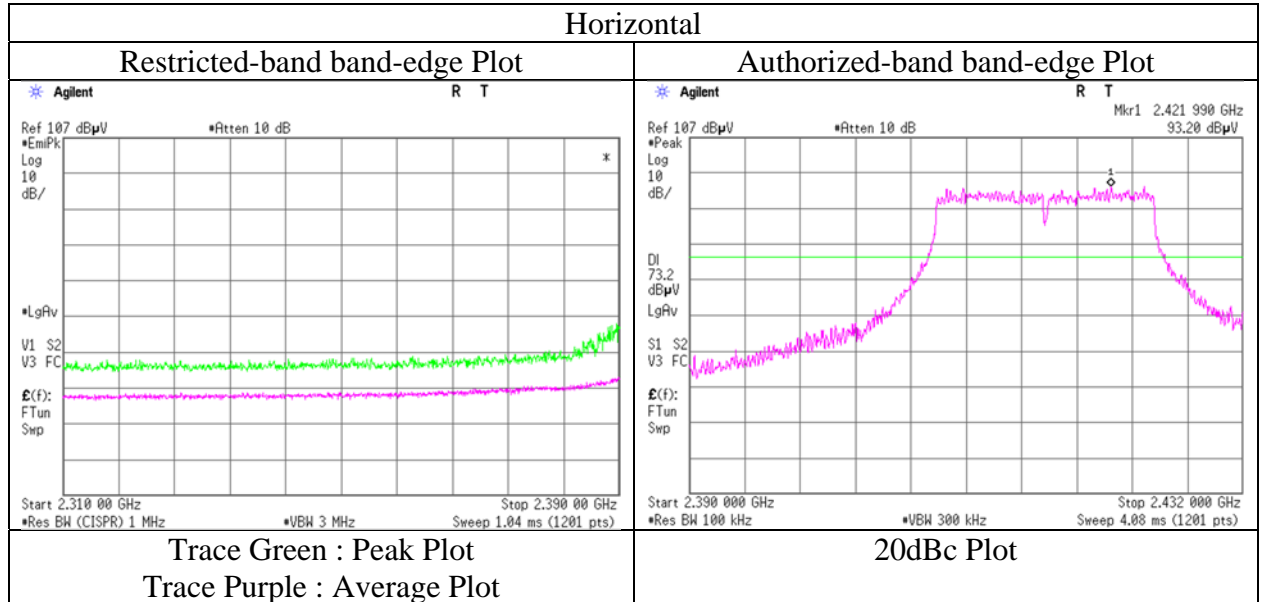
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

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

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-B-R2
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 11g 2417 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-B-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber No.1
Date July 3, 2021
Temperature / Humidity 23 deg. C / 68 % RH
Engineer Yosuke Murakami
(30 MHz -1000 MHz)
Mode Tx 11g 2437 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	133.052	QP	39.70	14.06	8.45	31.79	0.00	30.42	43.5	13.0	246	322	-
Hori.	196.901	QP	32.40	16.66	9.03	31.77	0.00	26.32	43.5	17.1	279	117	-
Hori.	388.135	QP	44.50	15.43	7.17	31.82	0.00	35.28	46.0	10.7	100	179	-
Hori.	436.889	QP	43.50	16.22	7.46	31.87	0.00	35.31	46.0	10.6	100	188	-
Hori.	492.376	QP	44.10	17.69	7.78	31.92	0.00	37.65	46.0	8.3	100	128	-
Vert.	133.052	QP	36.50	14.06	8.45	31.79	0.00	27.22	43.5	16.2	100	129	-
Vert.	394.083	QP	38.40	15.62	7.21	31.82	0.00	29.41	46.0	16.5	131	164	-
Vert.	537.508	QP	38.50	17.65	8.04	32.00	0.00	32.19	46.0	13.8	100	181	-

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

Radiated Spurious Emission

Report No. 13854932S-B-R2
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 11g 2457 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	50.38	27.61	14.93	39.64	2.36	55.64	73.9	18.2	356	9	-
Vert.	2483.500	PK	48.04	27.61	14.93	39.64	2.36	53.30	73.9	20.6	209	358	-

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

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	39.88	27.61	14.93	39.64	0.30	2.36	45.44	53.9	8.4	*1)
Vert.	2483.500	AV	37.79	27.61	14.93	39.64	0.30	2.36	43.35	53.9	10.5	*1)

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

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

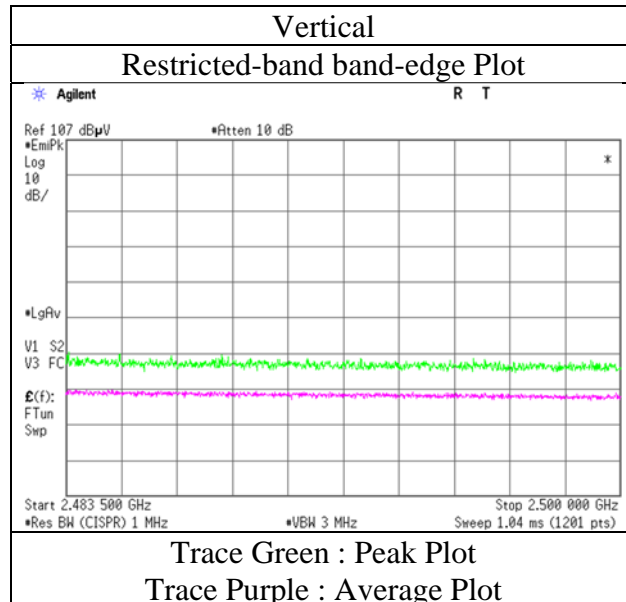
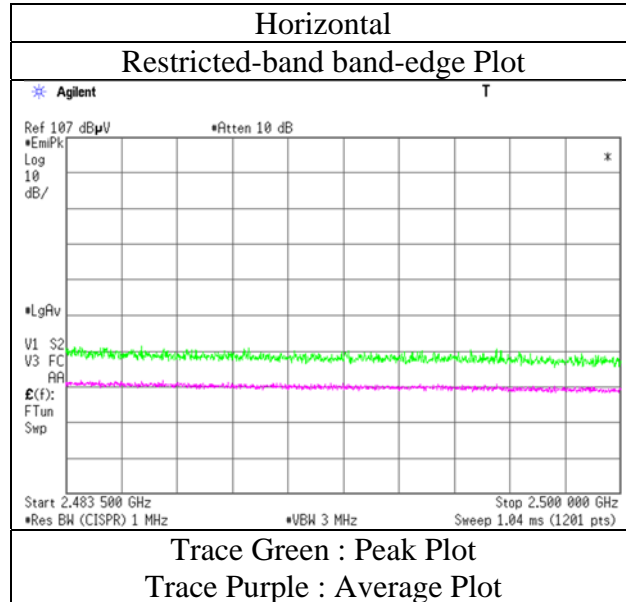
10 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Duty factor refer to "Burst rate confirmation" sheet.

*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 13854932S-B-R2
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 11g 2457 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-B-R2
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 11g 2462 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	54.56	27.61	14.93	39.64	2.36	59.82	73.9	14.0	396	13	-
Vert.	2483.500	PK	51.41	27.61	14.93	39.64	2.36	56.67	73.9	17.2	205	356	-

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

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	40.90	27.61	14.93	39.64	0.30	2.36	46.46	53.9	7.4	*1)
Vert.	2483.500	AV	39.00	27.61	14.93	39.64	0.30	2.36	44.56	53.9	9.3	*1)

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

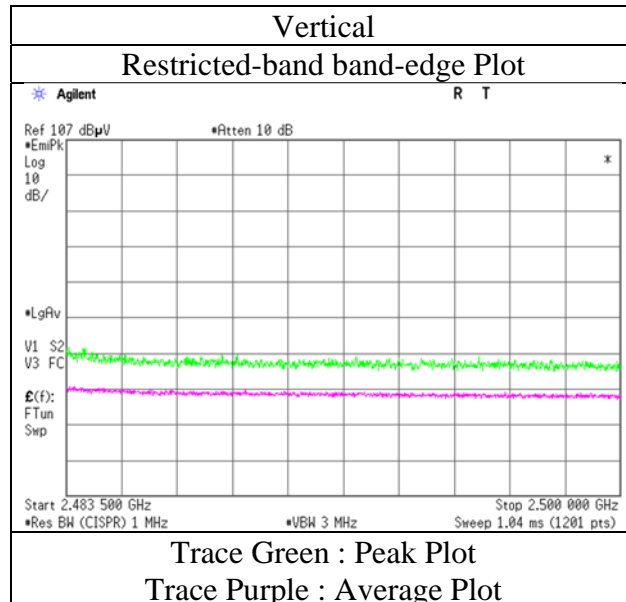
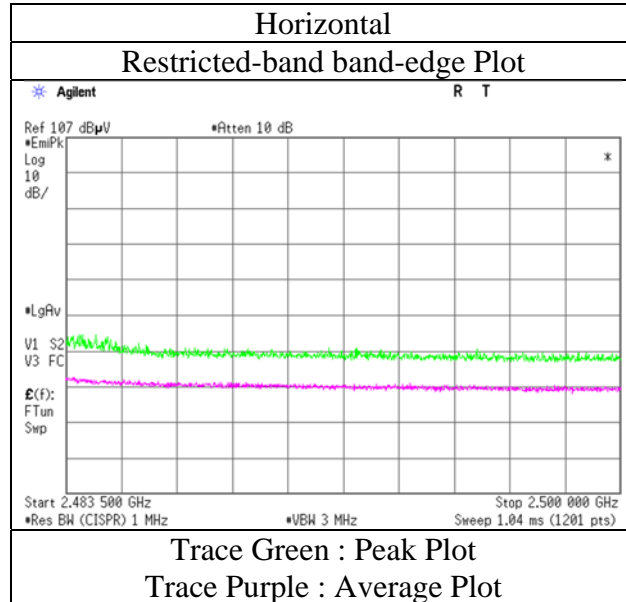
Distance factor : 1 GHz - 10 GHz : $20\log(3.94\text{ m} / 3.0\text{ m}) = 2.36\text{ dB}$
10 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Duty factor refer to "Burst rate confirmation" sheet.

*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 13854932S-B-R2
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 11g 2462 MHz



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

Radiated Spurious Emission

Report No. 13854932S-B-R2
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 11n-20 2412 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	50.61	27.73	14.82	39.61	2.36	55.91	73.9	17.9	393	17	-
Vert.	2390.000	PK	47.12	27.73	14.82	39.61	2.36	52.42	73.9	21.4	143	205	-

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

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	39.46	27.73	14.82	39.61	0.25	2.36	45.01	53.9	8.8	*1)
Vert.	2390.000	AV	37.70	27.73	14.82	39.61	0.25	2.36	43.25	53.9	10.6	*1)

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

Duty factor refer to "Burst rate confirmation" sheet.

*1) Not out of band emission (Leakage Power)

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	86.95	27.69	14.84	39.62	2.36	92.22	-	-	Carrier
Hori.	2400.000	PK	54.03	27.71	14.83	39.62	2.36	59.31	72.2	12.8	-
Vert.	2412.000	PK	83.07	27.69	14.84	39.62	2.36	88.34	-	-	Carrier
Vert.	2400.000	PK	47.63	27.71	14.83	39.62	2.36	52.91	68.3	15.3	-

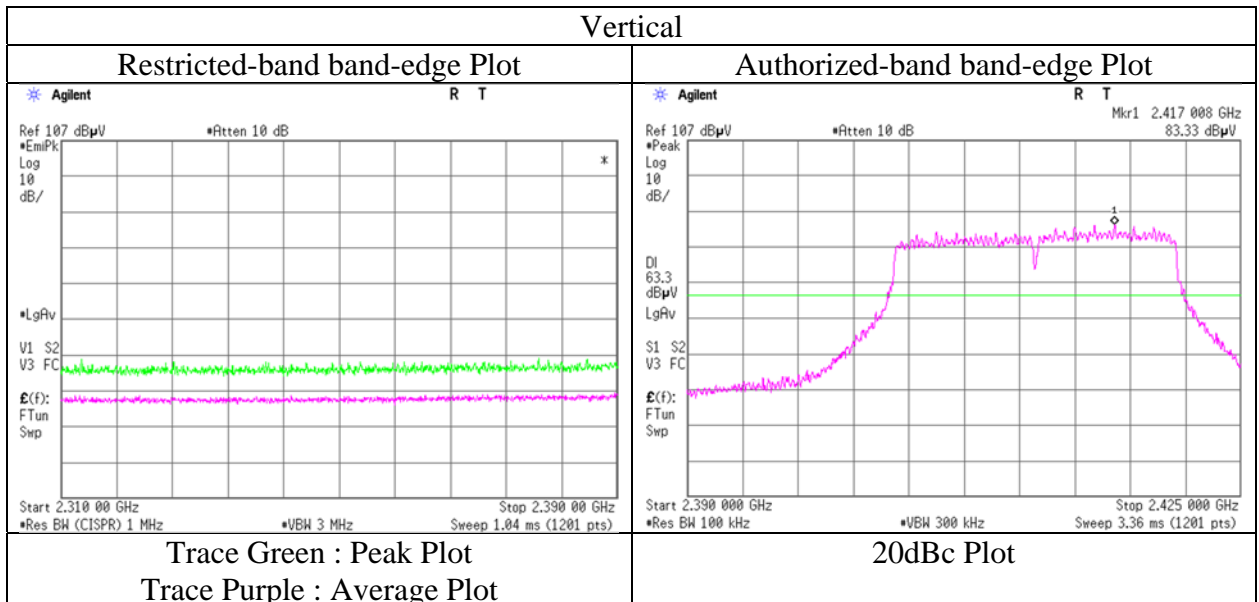
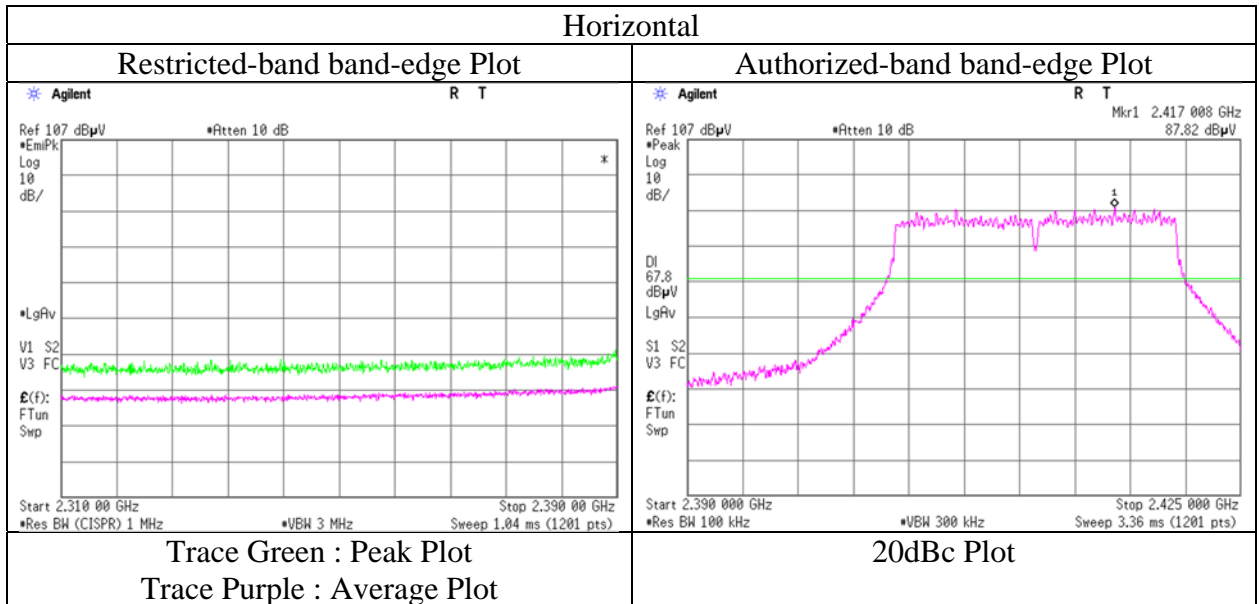
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

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-B-R2
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 11n-20 2412 MHz



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

Radiated Spurious Emission

Report No. 13854932S-B-R2
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 11n-20 2417 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	54.20	27.73	14.82	39.61	2.36	59.50	73.9	14.4	363	14	-
Vert.	2390.000	PK	49.39	27.73	14.82	39.61	2.36	54.69	73.9	19.2	225	206	-

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

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	40.05	27.73	14.82	39.61	0.25	2.36	45.60	53.9	8.3	*1)
Vert.	2390.000	AV	37.48	27.73	14.82	39.61	0.25	2.36	43.03	53.9	10.8	*1)

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

Duty factor refer to "Burst rate confirmation" sheet.

*1) Not out of band emission (Leakage Power)

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.	2417.000	PK	90.74	27.68	14.86	39.62	2.36	96.02	-	-	Carrier
Hori.	2400.000	PK	47.17	27.71	14.83	39.62	2.36	52.45	76.0	23.5	-
Vert.	2417.000	PK	86.06	27.68	14.86	39.62	2.36	91.34	-	-	Carrier
Vert.	2400.000	PK	44.05	27.71	14.83	39.62	2.36	49.33	71.3	21.9	-

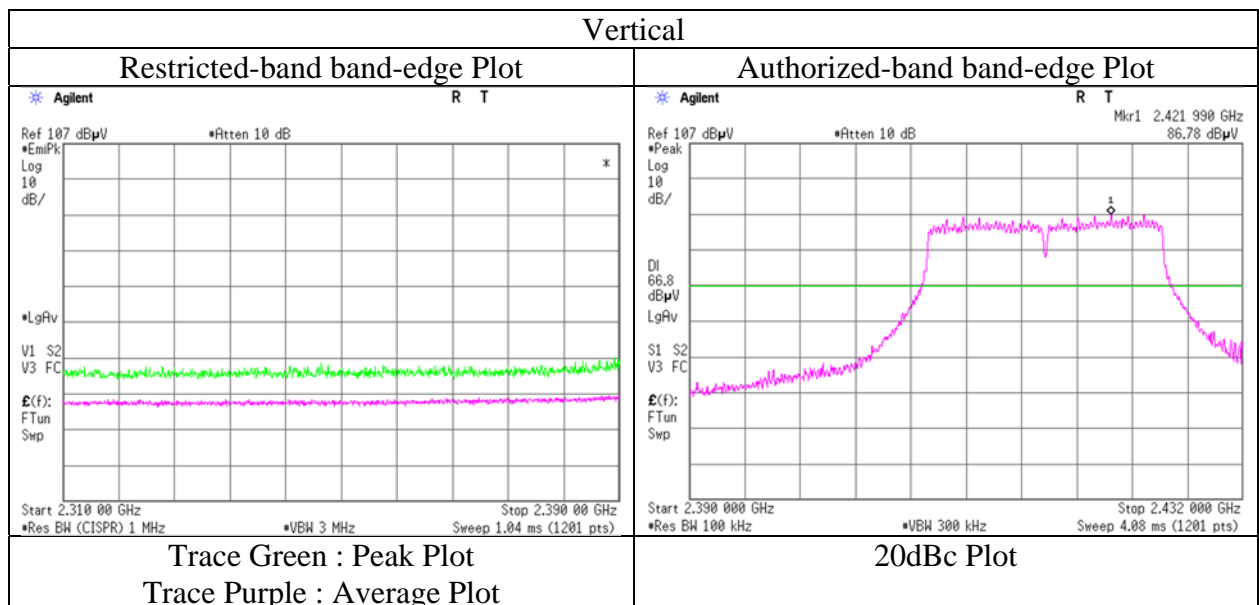
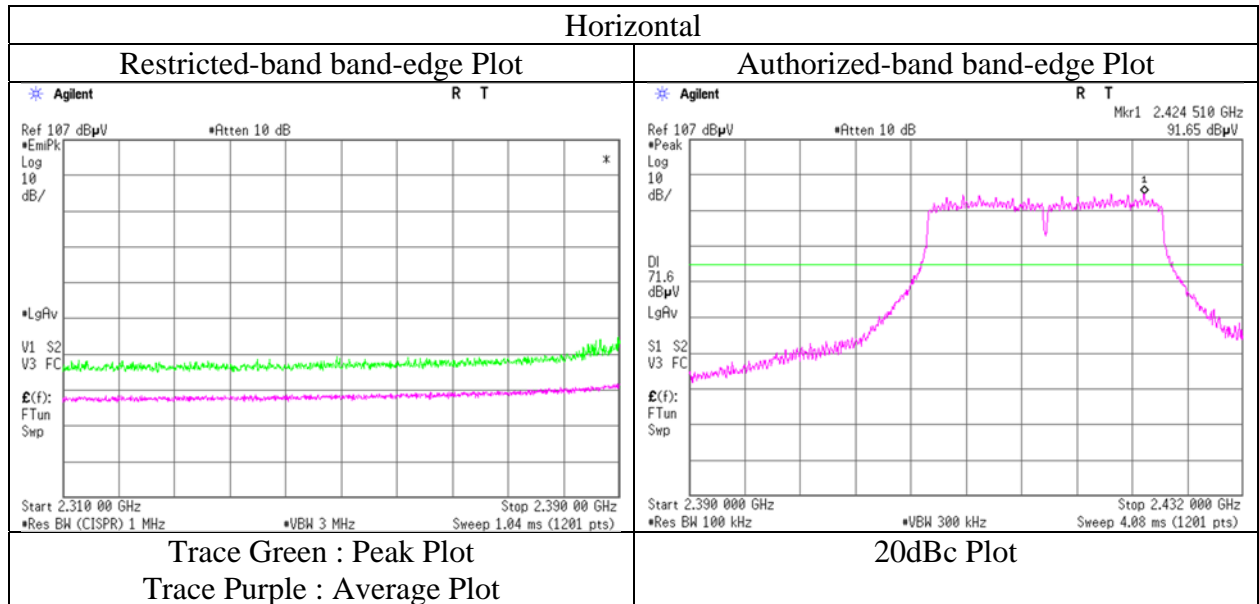
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

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

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-B-R2
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 11n-20 2417 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-B-R2
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 11n-20 2457 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	48.90	27.61	14.93	39.64	2.36	54.16	73.9	19.7	315	15	-
Vert.	2483.500	PK	47.11	27.61	14.93	39.64	2.36	52.37	73.9	21.5	204	357	-

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

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	39.48	27.61	14.93	39.64	0.25	2.36	44.99	53.9	8.9	*1)
Vert.	2483.500	AV	37.63	27.61	14.93	39.64	0.25	2.36	43.14	53.9	10.7	*1)

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

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

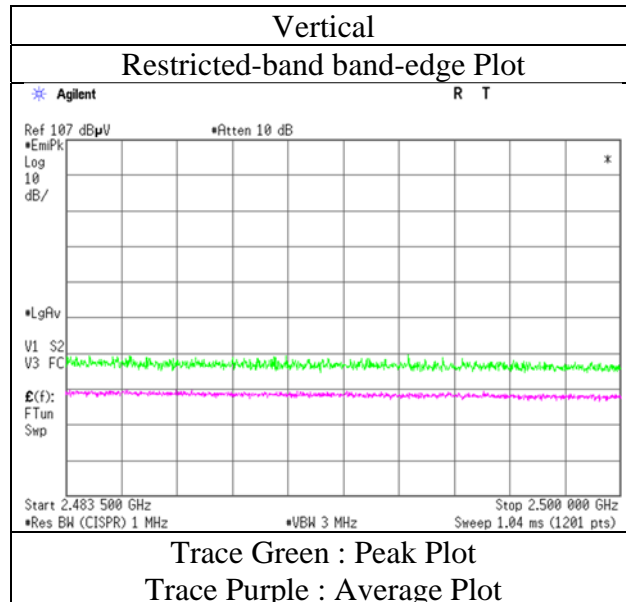
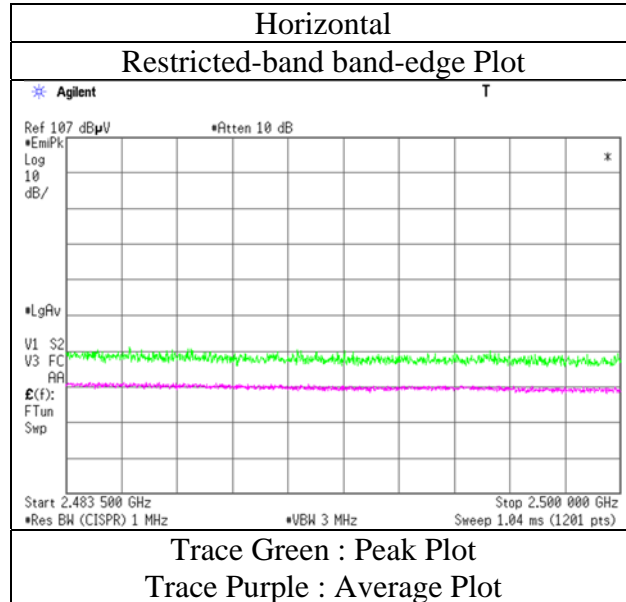
10 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Duty factor refer to "Burst rate confirmation" sheet.

*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 13854932S-B-R2
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 11n-20 2457 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-B-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.1	No.1
Date	July 4, 2021	July 3, 2021
Temperature / Humidity	23 deg. C / 68 % RH	23 deg. C / 68 % RH
Engineer	Hiromasato Sato	Yosuke Murakami
	(1 GHz -10 GHz)	(10 GHz -26.5 GHz)
Mode	Tx 11n-20 2462 MHz	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	53.36	27.61	14.93	39.64	2.36	58.62	73.9	15.2	398	12	-
Hori.	4924.000	PK	46.25	31.31	7.68	39.71	2.36	47.89	73.9	26.0	135	304	-
Hori.	7386.000	PK	44.37	36.78	9.46	39.44	2.36	53.53	73.9	20.3	150	0	-
Hori.	9848.000	PK	45.49	38.75	10.94	39.56	2.36	57.98	73.9	15.9	150	0	-
Vert.	2483.500	PK	50.11	27.61	14.93	39.64	2.36	55.37	73.9	18.5	222	217	-
Vert.	4924.000	PK	46.04	31.31	7.68	39.71	2.36	47.68	73.9	26.2	154	40	-
Vert.	7386.000	PK	43.54	36.78	9.46	39.44	2.36	52.70	73.9	21.2	150	0	-
Vert.	9848.000	PK	45.60	38.75	10.94	39.56	2.36	58.09	73.9	15.8	150	0	-

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

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

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

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	41.15	27.61	14.93	39.64	0.25	2.36	46.66	53.9	7.2	*1)
Hori.	4924.000	AV	38.10	31.31	7.68	39.71	0.25	2.36	39.99	53.9	13.9	-
Hori.	7386.000	AV	35.54	36.78	9.46	39.44	0.25	2.36	44.95	53.9	8.9	-
Hori.	9848.000	AV	36.60	38.75	10.94	39.56	0.25	2.36	49.34	53.9	4.5	-
Vert.	2483.500	AV	38.02	27.61	14.93	39.64	0.25	2.36	43.53	53.9	10.3	*1)
Vert.	4924.000	AV	37.55	31.31	7.68	39.71	0.25	2.36	39.44	53.9	14.4	-
Vert.	7386.000	AV	35.56	36.78	9.46	39.44	0.25	2.36	44.97	53.9	8.9	-
Vert.	9848.000	AV	36.42	38.75	10.94	39.56	0.25	2.36	49.16	53.9	4.7	-

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

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

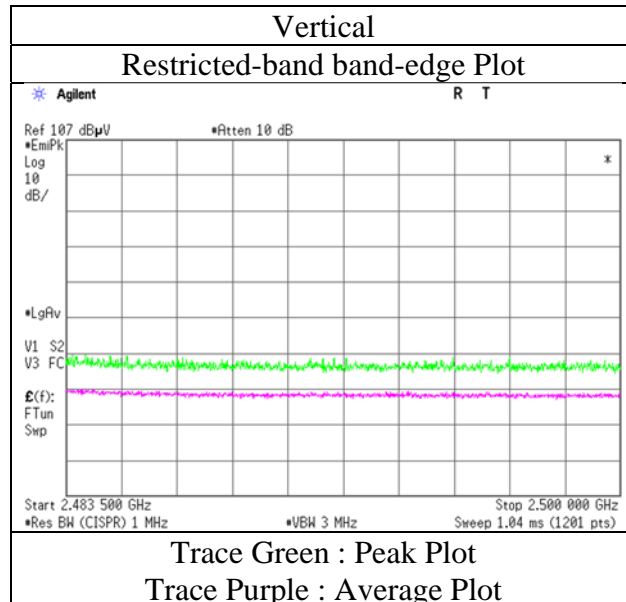
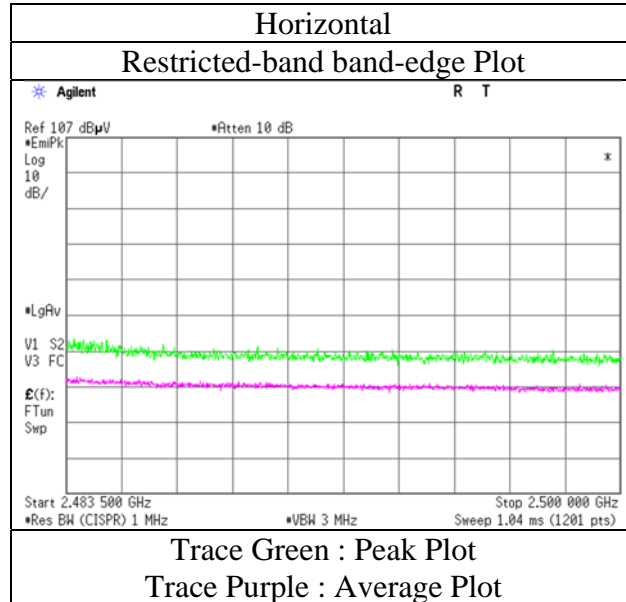
10 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.54 dB

Duty factor refer to "Burst rate confirmation" sheet.

*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

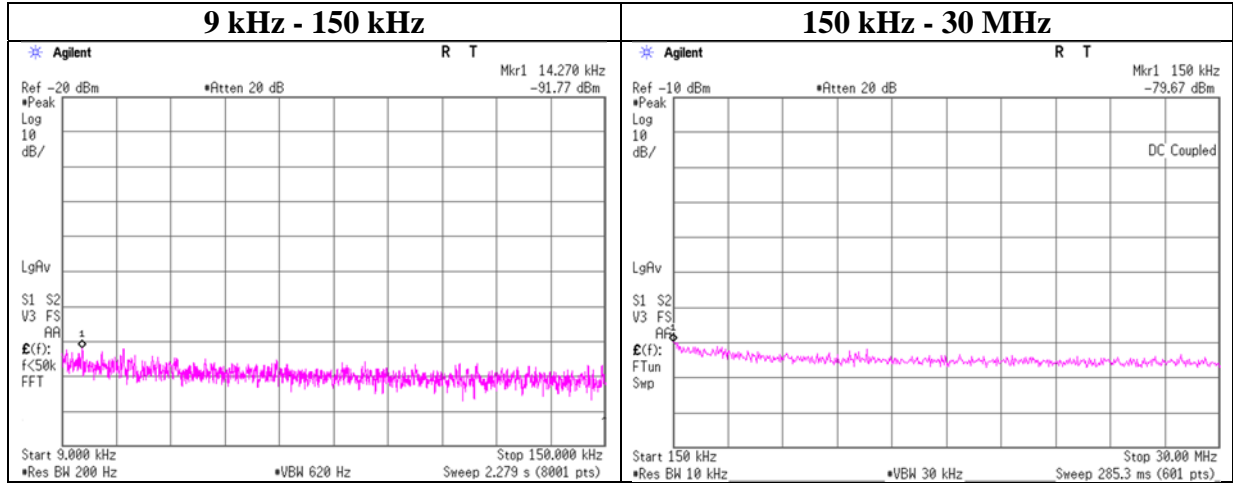
Report No. 13854932S-B-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber No.1
Date July 4, 2021
Temperature / Humidity 23 deg. C / 68 % RH
Engineer Hiromasa Sato
(1 GHz -2.8 GHz)
Mode Tx 11n-20 2462 MHz



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

Conducted Spurious Emission

Report No. 13854932S-B-R2
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 11g 2437 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
14.270	-91.77	0.01	9.91	2.00	1	-79.9	300	6.0	-18.6	44.5	63.1	-
150.000	-79.67	0.01	9.91	2.00	1	-67.8	300	6.0	-6.5	24.0	30.5	-

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

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

N: Number of output

APPENDIX 2: Test instruments

Test equipment(1 / 2)

Test Name	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Interval (Month)
AT	KTS-07	145111	Digital Tester	SANWA	PC500	7019232	2020/10/21	12
AT	SAT10-23	204927	Attenuator	Weinschel Corp.	54A-10	-	2021/02/09	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	-	2020/09/29	12
AT	SPSS-06	169911	Power sensor	Keysight Technologies Inc	N1923A	MY57270004	2021/01/25	12
AT	SPM-13	169910	Power Meter	Keysight Technologies Inc	8990B	MY51000448	2021/01/25	12
AT	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,ME,PE)	-	-	-
RE	KAT6-04	144899	Attenuator	Inmet	18N-6dB	-	2020/12/10	12
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 (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	SAT10-05	145136	Attenuator	Keysight Technologies Inc	8493C-010	74864	2020/10/05	12
RE	SAT3-09	144959	Attenuator	JFW	50HF-003N	-	2020/08/18	12
RE	SBA-01	145161	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	BBA9106	91032664	2021/04/10	12

UL Japan, Inc.

Shonan EMC Lab.

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Test equipment(2 / 2)

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/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/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-G41	151617	Coaxial Cable	Junkosha	MWX221-01000NFSNMS/B	1612S006	2021/01/19	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
RE	SFL-02	145301	Highpass Filter	MICRO-TRONICS	HPM50111	51	2020/10/05	12
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	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
RE	SSA-03	145801	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY48250152	2020/08/12	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	2020/10/19	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 test
AT: Antenna Terminal Conducted test