



# **RADIO TEST REPORT**


**Test Report No. : 12530177H-A-R1**

**Applicant** : Murata Manufacturing Co., Ltd.  
**Type of Equipment** : Communication Module  
**Model No.** : Type1JS  
**FCC ID** : VPYLB1JS955  
**Test regulation** : FCC Part 15 Subpart E: 2018  
For Permissive change  
(Radiated Spurious Emission tests only)  
**Test Result** : Complied

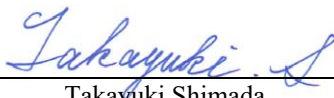
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3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
6. The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
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8. This report is a revised version of 12530177H-A. 12530177H-A is replaced with this report.

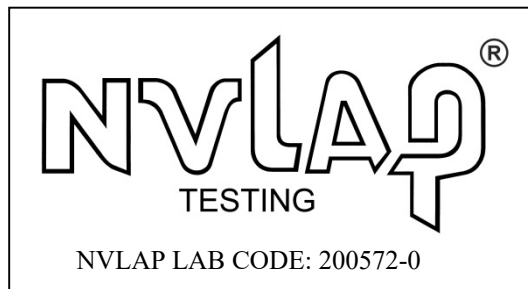
**Date of test:** October 3 to 9, 2018

**Representative test engineer:**

  
Takafumi Noguchi  
Engineer  
Consumer Technology Division

**Approved by:**

  
Takayuki Shimada  
Leader  
Consumer Technology Division



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☒ There is no testing item of "Non-accreditation".

**UL Japan, Inc.**

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13-EM-F0429

## REVISION HISTORY

**Original Test Report No.: 12530177H-A**

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## **SECTION 1: Customer information**

Company Name	:	Murata Manufacturing Co., Ltd.
Address	:	1-10-1 Higashikotari, Nagaokakyo-shi, Kyoto 617-8555 Japan
Telephone Number	:	+81-75-955-6736
Facsimile Number	:	+81-75-955-6634
Contact Person	:	Motoo Hayashi

## **SECTION 2: Equipment under test (E.U.T.)**

### **2.1 Identification of E.U.T.**

Type of Equipment	:	Communication Module
Model No.	:	Type1JS
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	VBAT : Typ. 3.4 V, Min. 3.0 V, Max. 3.93 V *VDDIO : Typ. 1.8 V, Min. 1.62 V, Max. 1.98 V or Typ. 2.8 V, Min. 2.0 V, Max. 3.3 V *VRTC : Typ. 1.8 V, Min. 1.62 V, Max. 1.98 V or Typ. 2.8 V, Min. 2.52 V, Max. 3.08 V *VDDIO and VRTC don't influence the RF characteristic.
Receipt Date of Sample	:	September 29, 2018
Country of Mass-production	:	China & Japan
Condition of EUT	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab

### **2.2 Product Description**

Model: Type1JS (referred to as the EUT in this report) is a Communication Module.

### **General Specification**

Clock frequency(ies) in the system	:	26.0 MHz, 32.768 KHz (X'tal)
------------------------------------	---	------------------------------

## Radio Specification

Radio Type : Transceiver

### Specification of Wireless LAN (IEEE802.11b/g/a/n-20/n-40/11ac-20/11ac-40/11ac-80)

Type of radio	IEEE802.11b	IEEE802.11g/n (20 M band)	IEEE802.11a/n/ac (20 M band) *1)	IEEE802.11n/ac (40 M band) *1)	IEEE802.11ac (80 M band) *1)
Frequency of operation	2412 MHz - 2462 MHz	2412 MHz - 2462 MHz	5180 MHz - 5240 MHz 5260 MHz - 5320 MHz 5500 MHz - 5720 MHz 5745 MHz - 5825 MHz	5190 MHz - 5230 MHz 5270 MHz - 5310 MHz 5510 MHz - 5710 MHz 5755 MHz - 5795 MHz	5210 MHz 5290 MHz 5530 MHz - 5690 MHz 5775 MHz
Type of modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (64QAM, 16QAM, QPSK, BPSK)	OFDM (64QAM, 16QAM, QPSK, BPSK, 256QAM(IEEE802.11ac only))		
Channel spacing	5 MHz		20 MHz	40 MHz	80 MHz
Antenna type	Monopole Antenna				
Antenna Gain	2GHz: -3.1 dBi 5GHz: +3.9 dBi				

### Specification of Bluetooth (Low Energy: LE)

	Bluetooth Ver.4.1 with EDR function
Frequency of operation	2402 MHz - 2480 MHz
Type of modulation	GFSK
Channel spacing	2 MHz
Antenna type	Monopole Antenna
Antenna Gain	-3.1 dBi

\*1) This test report applies to Wireless LAN (5GHz Band).

## **SECTION 3: Test specification, procedures & results**

### **3.1 Test Specification**

Test Specification : FCC Part 15 Subpart E  
FCC Part 15 final revised on March 12, 2018 and effective April 11, 2018

\*Some parts are effective on and after December 17, 2015.  
The revision does not affect the test specification applied to the EUT.

Title : FCC 47CFR Part15 Radio Frequency Device Subpart E  
Unlicensed National Information Infrastructure Devices  
Section 15.407 General technical requirements

### **3.2 Procedures and results**

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Spurious Emission Restricted Band Edge	FCC: ANSI C63.10-2013 KDB Publication Number 789033	FCC: 15.407 (b), 15.205 and 15.209	4.1 dB 5150.000 MHz, AV, Horizontal	Complied#	Conducted (< 30 MHz) / Radiated (> 30 MHz) *1)
	IC: -	IC: RSS-247 6.2.1.2 6.2.2.2 6.2.3.2 6.2.4.2			
	IC: -	IC: RSS-247 6.2.4.1			
	IC: -	IC: RSS-247 6.2.4.1			

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 FCC 15.407 (b) and KDB 789033 D02 G.3.b).

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 worst case stable voltage was provided to the EUT during the all tests.  
Therefore, the EUT complies with the requirement.

#### **FCC Part 15.203/212 Antenna requirement**

The antenna is not removable from the EUT.  
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

#### EMI

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

#### Radiated emission

Measurement distance	Frequency range		Uncertainty (+/-)
3 m	9 kHz to 30 MHz		3.3 dB
10 m			3.2 dB
3 m	30 MHz to 200 MHz	(Horizontal)	4.8 dB
		(Vertical)	5.0 dB
	200 MHz to 1000 MHz	(Horizontal)	5.2 dB
		(Vertical)	6.3 dB
10 m	30 MHz to 200 MHz	(Horizontal)	4.8 dB
		(Vertical)	4.9 dB
	200 MHz to 1000 MHz	(Horizontal)	5.0 dB
		(Vertical)	5.0 dB
3 m	1 GHz to 6 GHz		5.0 dB
	6 GHz to 18 GHz		5.3 dB
1 m	10 GHz to 26.5 GHz		5.8 dB
	26.5 GHz to 40 GHz		5.8 dB
10 m	1 GHz to 18 GHz		5.2 dB

### 3.5 Test Location

UL Japan, Inc. Ise EMC Lab.

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NVLAP Lab. code: 200572-0 / FCC Test Firm Registration Number: 199967

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.6 shielded room	-	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	-	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	-	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	-	3.1 x 5.0 x 2.7	N/A	-	-
No.9 measurement room	-	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.11 measurement room	-	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

\* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0 m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

### 3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.



## SECTION 4: Operation of E.U.T. 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 and also was judged the necessity of 802.11ac mode by the pre-test.

Mode	Remarks*
IEEE 802.11a (11a)	54 Mbps, PN9
IEEE 802.11ac 20MHz BW (11ac-20)	MCS 7, PN9
IEEE 802.11ac 40MHz BW (11ac-40)	MCS 7, PN9
IEEE 802.11ac 80MHz BW (11ac-80)	MCS 7, PN9
*The worst condition was determined based on the test result of Maximum Conducted Output Power.	
*EUT has the power settings by the software as follows (power setting value might be different from product specification value); Power settings: 11a: Setting Parameter value 5, 11ac: Setting Parameter value 5 Software: CPM_P162170_F159430 *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 Operation mode(s)

Test Item	Operating Mode	Tested Frequency			
		Low Band	Middle Band	Additional Band	Upper Band
Radiated Spurious Emission (Below 1GHz)	11a Tx *1)	-	-	-	5825 MHz
Radiated Spurious Emission (Above 1GHz)	11a Tx	5180 MHz 5240 MHz	5320 MHz	5500 MHz 5580 MHz 5700 MHz	5745 MHz 5785 MHz 5825 MHz
	11ac-20 Tx *2)	5180 MHz	5320 MHz	5500 MHz 5700 MHz	5745 MHz 5825 MHz
	11ac-40 Tx *2)	5190 MHz	5230 MHz 5310 MHz	5510 MHz 5550 MHz 5670 MHz	5755 MHz 5795 MHz
	11ac-80 Tx	5210 MHz	5290 MHz	5530 MHz 5610 MHz	5775 MHz
*1) The mode was tested as a representative, because it had the highest power at antenna terminal test. *2) Since 11a, 11n-20 and 11ac-20, 11n-40 and 11ac-40, have the same modulation method and no differences in transmitting specification, test was performed on the representative mode that had the highest output power.					

\*Simultaneously transmission

Test Item	Operating Mode*1)
Radiated Spurious Emission	Tx 11ac-80 5290 MHz + Tx BT LE 2402 MHz
*1) The test was performed on the mode as a representative, because it had the worst margin of 5GHz band at radiated emission test.	

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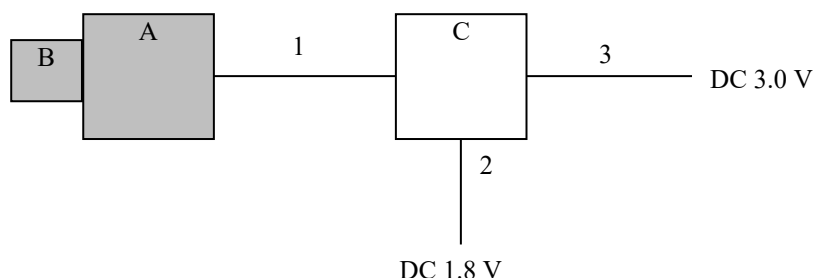
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## 4.2 Configuration and peripherals



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

### Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Communication Module	Type1JS	4	Murata Manufacturing Co., Ltd.	EUT
B	Antenna	DVLD1152ZA	c2	SUIWA	EUT
C	Jig Board	-	-	Murata Manufacturing Co., Ltd.	-

### List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Signal Cable	0.05	Unshielded	Unshielded	-
2	DC Cable	2.50	Unshielded	Unshielded	-
3	DC Cable	2.50	Unshielded	Unshielded	-

## **SECTION 5: Radiated Spurious Emission and Band Edge Compliance**

### **Test Procedure**

< Below 1GHz >

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

< Above 1GHz >

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 and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.

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.

< Below 1GHz >

The result also satisfied with the general limits specified in section 15.209 (a).

< Above 1GHz >

Inside of restricted bands (Section 15.205):

Apply to limit in the Section 15.209 (a).

Outside of the restricted bands:

Apply to limit 68.2 dBuV/m, 3 m (-27 dBm e.i.r.p. \*) in the Section 15.407 (b) (1) (2) (3).

For W58 Bandedge

-27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge in the section 15.407(b)(4)(i).

Restricted band edge:

Apply to limit in the Section 15.209 (a).

Since this limit is severer than the limit of the inside of restricted bands.

\*Electric field strength to e.i.r.p. conversion:

$$E = \frac{1000000 \sqrt{30 P}}{3} \text{ (uV/m)} \quad : P \text{ is the e.i.r.p. (Watts)}$$

**Test Antennas are used as below;**

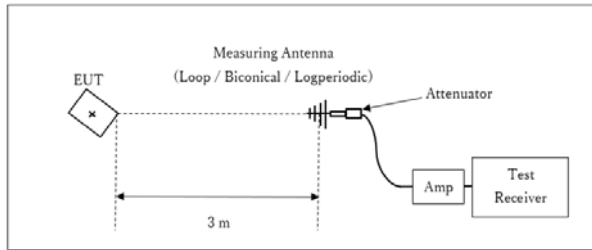
Frequency	30 MHz to 200 MHz	200 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

Frequency	Below 1 GHz	Above 1 GHz	
Instrument used	Test Receiver	Spectrum Analyzer	
Detector	QP	Peak	Average
IF Bandwidth	BW: 120 kHz	RBW: 1 MHz VBW: 3 MHz	Method AD *1) RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: $\geq 100$ traces If duty cycle was less than 98%, a duty factor was added to the results.

\*1) The test method was also referred to KDB 789033 D02 General UNII Test Procedures New Rules v02r01 "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E".

**Figure 1: Test Setup**

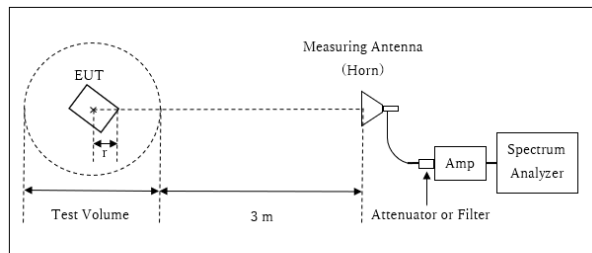
Below 1 GHz



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:  $20 \times \log (4.0 \text{ m} / 3.0 \text{ m}) = 2.5 \text{ dB}$

\* Test Distance:  $(3 + \text{Test Volume} / 2) - r = 4.0 \text{ m}$

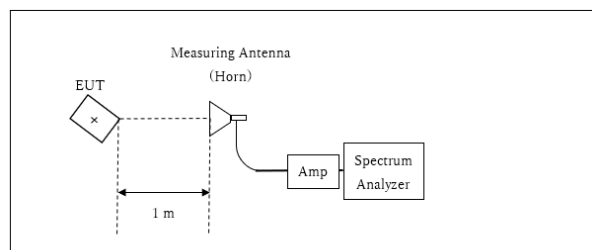
Test Volume : 2.0 m

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

$r = 0.0 \text{ m}$

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

10 GHz - 40 GHz



x : Center of turn table

Distance Factor:  $20 \times \log (1.0 \text{ m} / 3.0 \text{ m}) = -9.5 \text{ dB}$

\* Test Distance: 1 m

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

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

Measurement range	: 30 MHz - 40 GHz
Test data	: APPENDIX
Test result	: Pass

## APPENDIX 1: Test data

### Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4 No.3 No.4  
Date October 3, 2018 October 7, 2018 October 9, 2018  
Temperature / Humidity 22 deg. C / 45 % RH 25 deg. C / 65 % RH 23 deg. C / 58 % RH  
Engineer Junki Nagatomi Takafumi Noguchi Akihiko Maeda  
(1 GHz - 10 GHz) (10 GHz - 26.5 GHz) (26.5 GHz - 40 GHz)  
Mode Tx 11a 5180 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5150.000	PK	45.3	32.1	6.4	31.3	-	52.5	73.9	21.4	
Hori	10360.000	PK	43.5	39.6	-2.4	33.5	-	47.2	73.9	26.7	Floor noise
Hori	15540.000	PK	44.2	37.7	-0.4	33.0	-	48.5	73.9	25.4	Floor noise
Hori	20720.000	PK	45.2	36.7	-1.1	33.2	-	47.6	73.9	26.3	Floor noise
Hori	5150.000	AV	32.7	32.1	6.4	31.3	1.8	41.7	53.9	12.2	*1)
Hori	10360.000	AV	35.2	39.6	-2.4	33.5	-	38.9	53.9	15.0	Floor noise
Hori	15540.000	AV	35.9	37.7	-0.4	33.0	-	40.2	53.9	13.7	Floor noise
Hori	20720.000	AV	36.6	36.7	-1.1	33.2	-	39.0	53.9	14.9	Floor noise
Vert	5150.000	PK	43.7	32.1	6.4	31.3	-	50.9	73.9	23.0	
Vert	10360.000	PK	43.4	39.6	-2.4	33.5	-	47.1	73.9	26.8	Floor noise
Vert	15540.000	PK	44.3	37.7	-0.4	33.0	-	48.6	73.9	25.3	Floor noise
Vert	20720.000	PK	45.3	36.7	-1.1	33.2	-	47.7	73.9	26.2	Floor noise
Vert	5150.000	AV	32.2	32.1	6.4	31.3	1.8	41.2	53.9	12.7	*1)
Vert	10360.000	AV	35.2	39.6	-2.4	33.5	-	38.9	53.9	15.0	Floor noise
Vert	15540.000	AV	36.0	37.7	-0.4	33.0	-	40.3	53.9	13.6	Floor noise
Vert	20720.000	AV	36.7	36.7	-1.1	33.2	-	39.1	53.9	14.8	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

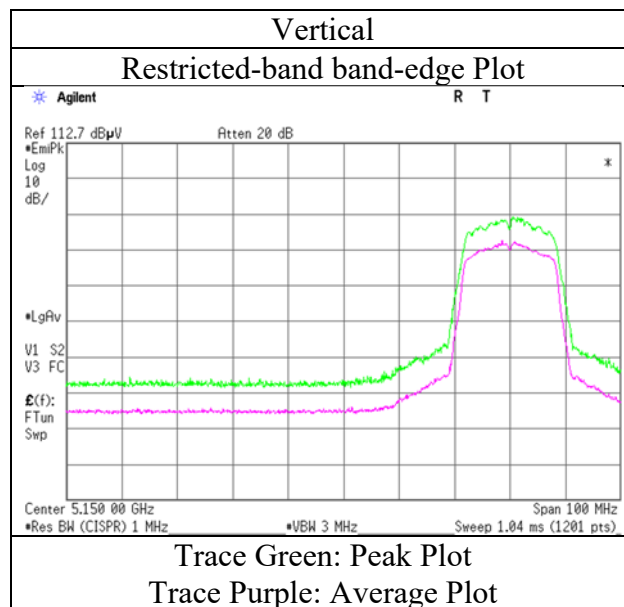
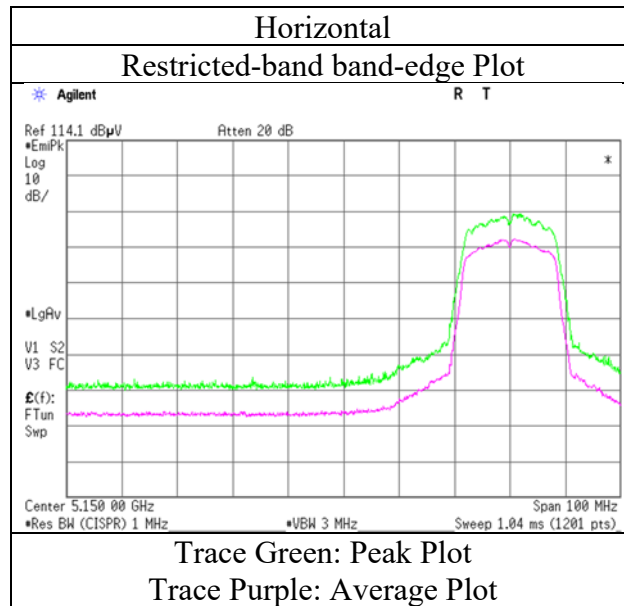
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4 m / 3.0 m) = 2.5 dB  
10 GHz - 40 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

\*1) Not Out of Band emission(Leakage Power)

## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 3, 2018  
Temperature / Humidity 22 deg. C / 45 % RH  
Engineer Junki Nagatomi  
(1 GHz - 10 GHz)  
Mode Tx 11a 5180 MHz



\* Final result of restricted band edge was shown in tabular data.

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## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda (1 GHz - 10 GHz)	Takafumi Noguchi (10 GHz - 26.5 GHz)	Akihiko Maeda (26.5 GHz - 40 GHz)
Mode	Tx 11a 5240 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	10480.000	PK	43.3	39.7	-2.4	33.5	-	47.1	73.9	26.8	Floor noise
Hori	15720.000	PK	43.3	37.4	-0.3	33.0	-	47.4	73.9	26.5	Floor noise
Hori	20960.000	PK	44.4	36.8	-1.0	33.3	-	46.9	73.9	27.0	Floor noise
Hori	10480.000	AV	34.9	39.7	-2.4	33.5	-	38.7	53.9	15.2	Floor noise
Hori	15720.000	AV	35.4	37.4	-0.3	33.0	-	39.5	53.9	14.4	Floor noise
Hori	20960.000	AV	36.2	36.8	-1.0	33.3	-	38.7	53.9	15.2	Floor noise
Vert	10480.000	PK	43.2	39.7	-2.4	33.5	-	47.0	73.9	26.9	Floor noise
Vert	15720.000	PK	43.4	37.4	-0.3	33.0	-	47.5	73.9	26.4	Floor noise
Vert	20960.000	PK	44.5	36.8	-1.0	33.3	-	47.0	73.9	26.9	Floor noise
Vert	10480.000	AV	34.8	39.7	-2.4	33.5	-	38.6	53.9	15.3	Floor noise
Vert	15720.000	AV	35.5	37.4	-0.3	33.0	-	39.6	53.9	14.3	Floor noise
Vert	20960.000	AV	36.2	36.8	-1.0	33.3	-	38.7	53.9	15.2	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:      1 GHz - 10 GHz       $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
                                 10 GHz - 40 GHz       $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$



## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda (1 GHz - 10 GHz)	Takafumi Noguchi (10 GHz - 26.5 GHz)	Akihiko Maeda (26.5 GHz - 40 GHz)
Mode	Tx 11a 5320 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5350.000	PK	41.8	31.7	6.5	31.3	-	48.7	73.9	25.2	
Hori	10640.000	PK	42.1	39.9	-2.4	33.6	-	46.0	73.9	27.9	Floor noise
Hori	15960.000	PK	43.3	37.3	-0.2	33.0	-	47.4	73.9	26.5	Floor noise
Hori	21280.000	PK	45.1	36.9	-0.9	33.2	-	47.9	73.9	26.0	Floor noise
Hori	5350.000	AV	33.4	31.7	6.5	31.3	1.8	42.1	53.9	11.9	*1)
Hori	10640.000	AV	34.3	39.9	-2.4	33.6	-	38.2	53.9	15.7	Floor noise
Hori	15960.000	AV	35.0	37.3	-0.2	33.0	-	39.1	53.9	14.8	Floor noise
Hori	21280.000	AV	36.9	36.9	-0.9	33.2	-	39.7	53.9	14.2	Floor noise
Vert	5350.000	PK	43.8	31.7	6.5	31.3	-	50.7	73.9	23.2	
Vert	10640.000	PK	42.3	39.9	-2.4	33.6	-	46.2	73.9	27.7	Floor noise
Vert	15960.000	PK	43.2	37.3	-0.2	33.0	-	47.3	73.9	26.6	Floor noise
Vert	21280.000	PK	45.1	36.9	-0.9	33.2	-	47.9	73.9	26.0	Floor noise
Vert	5350.000	AV	33.1	31.7	6.5	31.3	1.8	41.8	53.9	12.2	*1)
Vert	10640.000	AV	34.4	39.9	-2.4	33.6	-	38.3	53.9	15.6	Floor noise
Vert	15960.000	AV	34.9	37.3	-0.2	33.0	-	39.0	53.9	14.9	Floor noise
Vert	21280.000	AV	37.1	36.9	-0.9	33.2	-	39.9	53.9	14.0	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

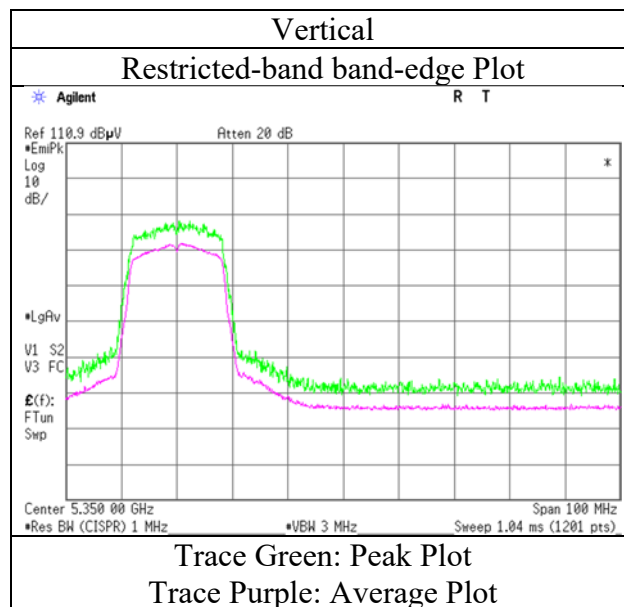
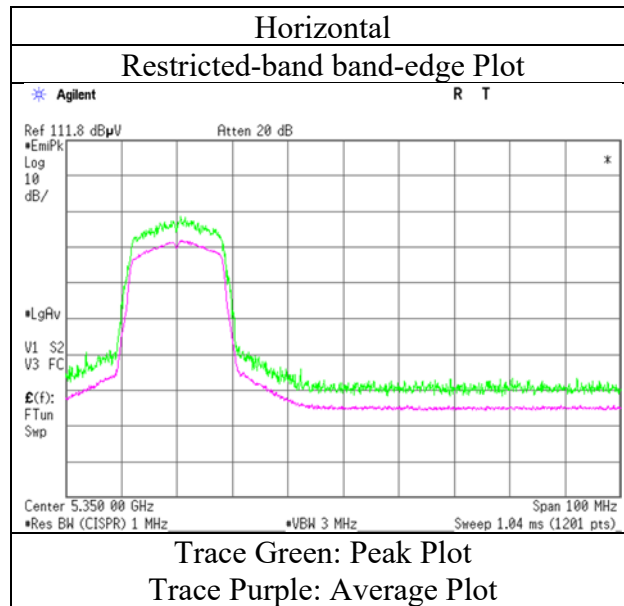
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:      1 GHz - 10 GHz      20log (4.0 m / 3.0 m) = 2.5 dB  
                                 10 GHz - 40 GHz      20log (1.0 m / 3.0 m) = -9.5 dB

\*1) Not Out of Band emission(Leakage Power)

## Radiated Spurious Emission

Report No.	12530177H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	October 3, 2018
Temperature / Humidity	23 deg. C / 59 % RH
Engineer	Akihiko Maeda
	(1 GHz - 10 GHz)
Mode	Tx 11a 5320 MHz



\* Final result of restricted band edge was shown in tabular data.

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## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda (1 GHz - 10 GHz)	Takafumi Noguchi (10 GHz - 26.5 GHz)	Akihiko Maeda (26.5 GHz - 40 GHz)
Mode	Tx 11a 5500 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5460.000	PK	41.8	31.8	6.5	31.3	-	48.8	73.9	25.1	
Hori	5470.000	PK	42.6	31.8	6.5	31.3	-	49.6	68.2	18.6	
Hori	11000.000	PK	42.9	40.3	-2.2	33.6	-	47.4	73.9	26.5	Floor noise
Hori	16500.000	PK	44.0	38.4	0.0	33.0	-	49.4	73.9	24.5	Floor noise
Hori	22000.000	PK	45.1	37.0	-0.7	32.9	-	48.5	73.9	25.4	Floor noise
Hori	5460.000	AV	33.0	31.8	6.5	31.3	1.8	41.8	53.9	12.2	*1)
Hori	11000.000	AV	34.1	40.3	-2.2	33.6	-	38.6	53.9	15.3	Floor noise
Hori	16500.000	AV	35.6	38.4	0.0	33.0	-	41.0	53.9	12.9	Floor noise
Hori	22000.000	AV	36.8	37.0	-0.7	32.9	-	40.2	53.9	13.7	Floor noise
Vert	5460.000	PK	40.9	31.8	6.5	31.3	-	47.9	73.9	26.0	
Vert	5470.000	PK	41.6	31.8	6.5	31.3	-	48.6	68.2	19.6	
Vert	11000.000	PK	43.1	40.3	-2.2	33.6	-	47.6	73.9	26.3	Floor noise
Vert	16500.000	PK	44.2	38.4	0.0	33.0	-	49.6	73.9	24.3	Floor noise
Vert	22000.000	PK	45.3	37.0	-0.7	32.9	-	48.7	73.9	25.2	Floor noise
Vert	5460.000	AV	32.9	31.8	6.5	31.3	1.8	41.7	53.9	12.3	*1)
Vert	11000.000	AV	34.3	40.3	-2.2	33.6	-	38.8	53.9	15.1	Floor noise
Vert	16500.000	AV	35.8	38.4	0.0	33.0	-	41.2	53.9	12.7	Floor noise
Vert	22000.000	AV	36.9	37.0	-0.7	32.9	-	40.3	53.9	13.6	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

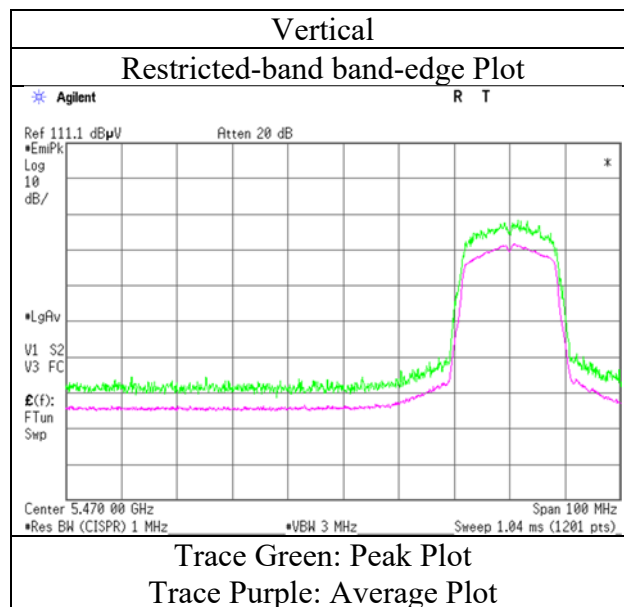
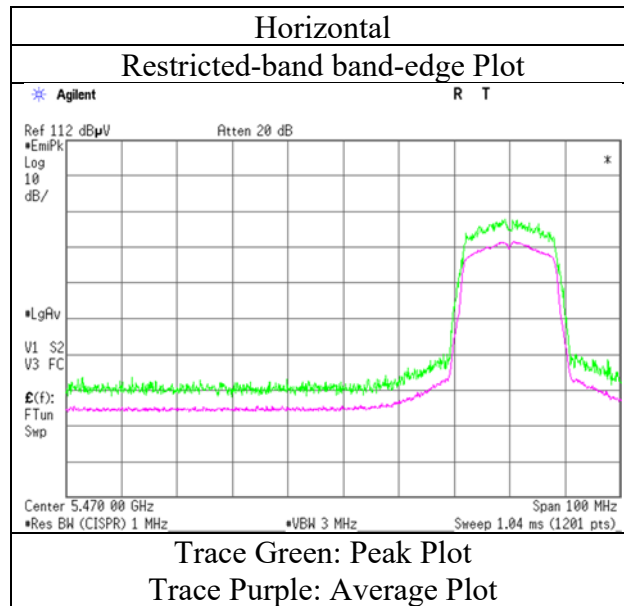
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:      1 GHz - 10 GHz     $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
                                 10 GHz - 40 GHz     $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

\*1) Not Out of Band emission(Leakage Power)

## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 3, 2018  
Temperature / Humidity 23 deg. C / 59 % RH  
Engineer Akihiko Maeda  
(1 GHz - 10 GHz)  
Mode Tx 11a 5500 MHz



\* Final result of restricted band edge was shown in tabular data.

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## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda (1 GHz - 10 GHz)	Takafumi Noguchi (10 GHz - 26.5 GHz)	Akihiko Maeda (26.5 GHz - 40 GHz)
Mode	Tx 11a 5580 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	11160.000	PK	43.2	40.0	-2.1	33.6	-	47.5	73.9	26.4	Floor noise
Hori	16740.000	PK	43.8	39.5	0.1	33.0	-	50.4	73.9	23.5	Floor noise
Hori	22320.000	PK	44.9	37.3	-0.6	32.8	-	48.8	73.9	25.1	Floor noise
Hori	11160.000	AV	34.8	40.0	-2.1	33.6	-	39.1	53.9	14.8	Floor noise
Hori	16740.000	AV	35.2	39.5	0.1	33.0	-	41.8	53.9	12.1	Floor noise
Hori	22320.000	AV	36.3	37.3	-0.6	32.8	-	40.2	53.9	13.7	Floor noise
Vert	11160.000	PK	43.2	40.0	-2.1	33.6	-	47.5	73.9	26.4	Floor noise
Vert	16740.000	PK	43.6	39.5	0.1	33.0	-	50.2	73.9	23.7	Floor noise
Vert	22320.000	PK	44.8	37.3	-0.6	32.8	-	48.7	73.9	25.2	Floor noise
Vert	11160.000	AV	34.8	40.0	-2.1	33.6	-	39.1	53.9	14.8	Floor noise
Vert	16740.000	AV	35.0	39.5	0.1	33.0	-	41.6	53.9	12.3	Floor noise
Vert	22320.000	AV	36.2	37.3	-0.6	32.8	-	40.1	53.9	13.8	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:      1 GHz - 10 GHz       $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
                                 10 GHz - 40 GHz       $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda (1 GHz - 10 GHz)	Takafumi Noguchi (10 GHz - 26.5 GHz)	Akihiko Maeda (26.5 GHz - 40 GHz)
Mode	Tx 11a 5700 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5725.000	PK	42.8	32.4	6.6	31.4	-	50.4	68.2	17.8	
Hori	11400.000	PK	43.2	40.4	-2.0	33.5	-	48.1	73.9	25.8	Floor noise
Hori	17100.000	PK	43.8	40.9	0.3	32.9	-	52.1	73.9	21.8	Floor noise
Hori	22800.000	PK	44.9	37.7	-0.6	32.7	-	49.3	73.9	24.6	Floor noise
Hori	11400.000	AV	34.7	40.4	-2.0	33.5	-	39.6	53.9	14.3	Floor noise
Hori	17100.000	AV	35.5	40.9	0.3	32.9	-	43.8	53.9	10.1	Floor noise
Hori	22800.000	AV	36.6	37.7	-0.6	32.7	-	41.0	53.9	12.9	Floor noise
Vert	5725.000	PK	43.0	32.4	6.6	31.4	-	50.6	68.2	17.6	
Vert	11400.000	PK	43.0	40.4	-2.0	33.5	-	47.9	73.9	26.0	Floor noise
Vert	17100.000	PK	43.8	40.9	0.3	32.9	-	52.1	73.9	21.8	Floor noise
Vert	22800.000	PK	45.0	37.7	-0.6	32.7	-	49.4	73.9	24.5	Floor noise
Vert	11400.000	AV	34.5	40.4	-2.0	33.5	-	39.4	53.9	14.5	Floor noise
Vert	17100.000	AV	35.4	40.9	0.3	32.9	-	43.7	53.9	10.2	Floor noise
Vert	22800.000	AV	36.8	37.7	-0.6	32.7	-	41.2	53.9	12.7	Floor noise

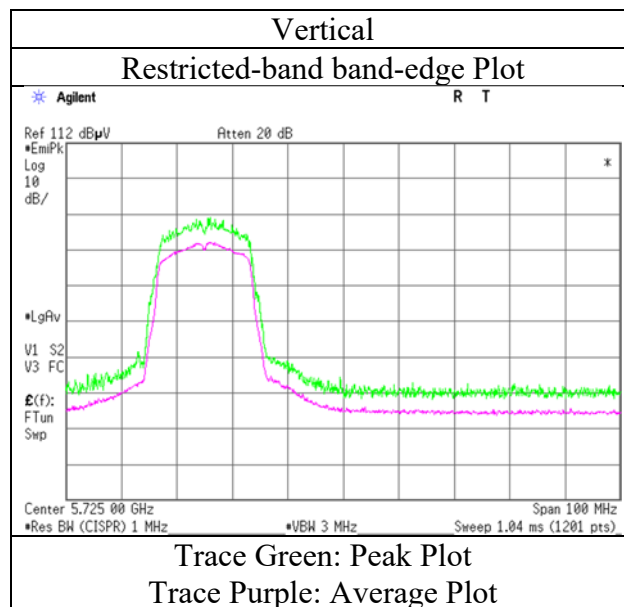
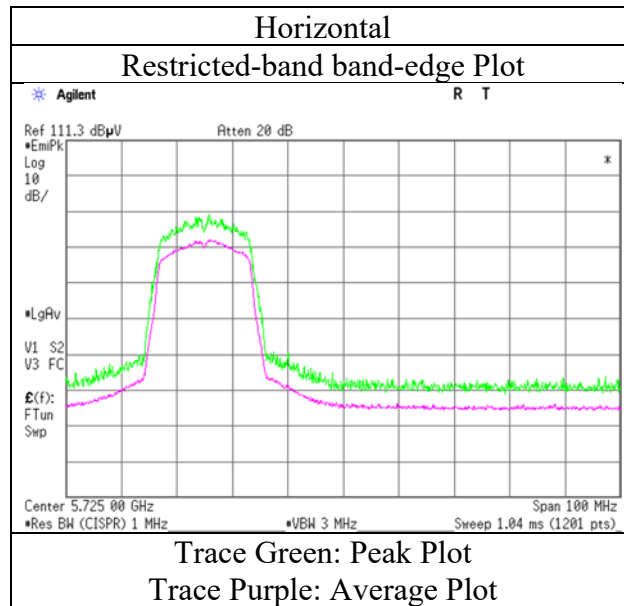
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:      1 GHz - 10 GHz       $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
                                 10 GHz - 40 GHz       $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

## Radiated Spurious Emission

Report No.	12530177H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	October 3, 2018
Temperature / Humidity	23 deg. C / 59 % RH
Engineer	Akihiko Maeda
	(1 GHz - 10 GHz)
Mode	Tx 11a 5700 MHz



\* Final result of restricted band edge was shown in tabular data.

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## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda (1 GHz - 10 GHz)	Takafumi Noguchi (10 GHz - 26.5 GHz)	Akihiko Maeda (26.5 GHz - 40 GHz)
Mode	Tx 11a 5745 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5650.000	PK	41.5	32.2	6.6	31.4	-	48.9	68.2	19.3	
Hori	5700.000	PK	42.2	32.3	6.6	31.4	-	49.7	105.2	55.5	
Hori	5720.000	PK	42.5	32.4	6.6	31.4	-	50.1	110.8	60.7	
Hori	5725.000	PK	48.3	32.4	6.6	31.4	-	55.9	122.2	66.3	
Hori	11490.000	PK	43.5	40.1	-2.0	33.5	-	48.1	73.9	25.8	Floor noise
Hori	17235.000	PK	43.4	41.4	0.2	32.9	-	52.1	73.9	21.8	Floor noise
Hori	22980.000	PK	45.6	37.8	-0.6	32.6	-	50.2	73.9	23.7	Floor noise
Hori	11490.000	AV	34.6	40.1	-2.0	33.5	-	39.2	53.9	14.7	Floor noise
Hori	17235.000	AV	35.5	41.4	0.2	32.9	-	44.2	53.9	9.7	Floor noise
Hori	22980.000	AV	37.2	37.8	-0.6	32.6	-	41.8	53.9	12.1	Floor noise
Vert	5650.000	PK	41.5	32.2	6.6	31.4	-	48.9	68.2	19.3	
Vert	5700.000	PK	41.5	32.3	6.6	31.4	-	49.0	105.2	56.2	
Vert	5720.000	PK	42.2	32.4	6.6	31.4	-	49.8	110.8	61.0	
Vert	5725.000	PK	47.2	32.4	6.6	31.4	-	54.8	122.2	67.4	
Vert	11490.000	PK	43.4	40.1	-2.0	33.5	-	48.0	73.9	25.9	Floor noise
Vert	17235.000	PK	43.4	41.4	0.2	32.9	-	52.1	73.9	21.8	Floor noise
Vert	22980.000	PK	45.6	37.8	-0.6	32.6	-	50.2	73.9	23.7	Floor noise
Vert	11490.000	AV	34.5	40.1	-2.0	33.5	-	39.1	53.9	14.8	Floor noise
Vert	17235.000	AV	35.5	41.4	0.2	32.9	-	44.2	53.9	9.7	Floor noise
Vert	22980.000	AV	37.2	37.8	-0.6	32.6	-	41.8	53.9	12.1	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

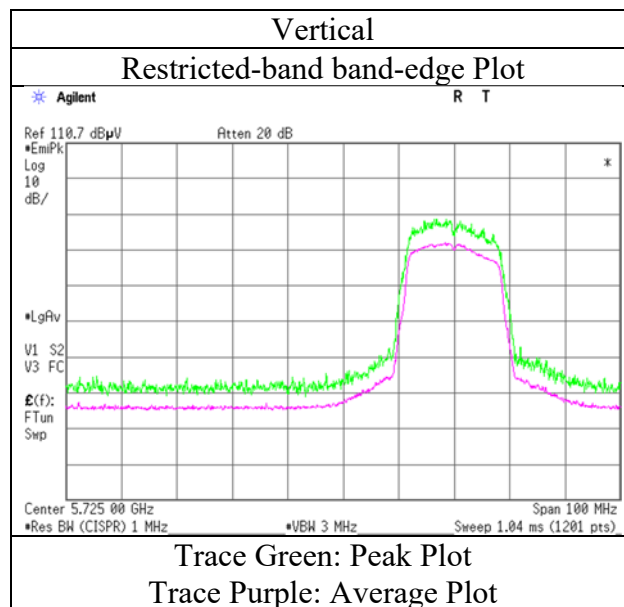
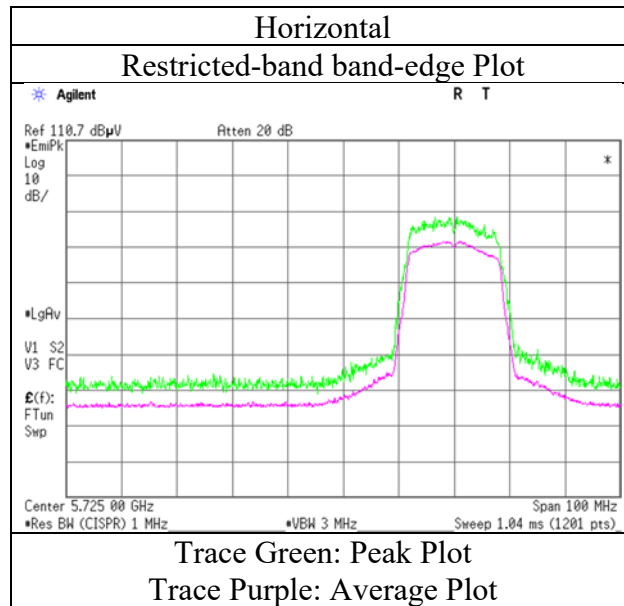
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:      1 GHz - 10 GHz       $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
                                 10 GHz - 40 GHz       $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$



## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 3, 2018  
Temperature / Humidity 23 deg. C / 59 % RH  
Engineer Akihiko Maeda  
(1 GHz - 10 GHz)  
Mode Tx 11a 5745 MHz



\* Final result of restricted band edge was shown in tabular data.

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## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda	Takafumi Noguchi	Akihiko Maeda
	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)	(26.5 GHz - 40 GHz)
Mode	Tx 11a 5785 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	11570.000	PK	42.6	39.9	-2.0	33.5	-	47.0	73.9	26.9	Floor noise
Hori	17355.000	PK	43.7	42.1	0.3	32.9	-	53.2	73.9	20.7	Floor noise
Hori	23140.000	PK	45.5	37.9	-0.5	32.6	-	50.3	73.9	23.6	Floor noise
Hori	11570.000	AV	34.3	39.9	-2.0	33.5	-	38.7	53.9	15.2	Floor noise
Hori	17355.000	AV	35.3	42.1	0.3	32.9	-	44.8	53.9	9.1	Floor noise
Hori	23140.000	AV	37.5	37.9	-0.5	32.6	-	42.3	53.9	11.6	Floor noise
Vert	11570.000	PK	42.4	39.9	-2.0	33.5	-	46.8	73.9	27.1	Floor noise
Vert	17355.000	PK	43.8	42.1	0.3	32.9	-	53.3	73.9	20.6	Floor noise
Vert	23140.000	PK	45.5	37.9	-0.5	32.6	-	50.3	73.9	23.6	Floor noise
Vert	11570.000	AV	34.2	39.9	-2.0	33.5	-	38.6	53.9	15.3	Floor noise
Vert	17355.000	AV	35.3	42.1	0.3	32.9	-	44.8	53.9	9.1	Floor noise
Vert	23140.000	AV	37.6	37.9	-0.5	32.6	-	42.4	53.9	11.5	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:      1 GHz - 10 GHz       $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
                                 10 GHz - 40 GHz       $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda (1 GHz - 10 GHz)	Takafumi Noguchi (10 GHz - 26.5 GHz)	Akihiko Maeda (26.5 GHz - 40 GHz , 30 MHz - 1000 MHz)
Mode	Tx 11a 5825 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	76.674	QP	38.1	6.7	7.9	32.2	-	20.5	40.0	19.5	
Hori	186.599	QP	34.3	16.5	9.1	32.1	-	27.8	43.5	15.7	
Hori	298.564	QP	44.2	13.7	10.0	32.1	-	35.8	46.0	10.2	
Hori	360.748	QP	41.0	15.2	10.5	32.1	-	34.6	46.0	11.4	
Hori	373.199	QP	43.2	15.1	10.6	32.1	-	36.8	46.0	9.2	
Hori	522.461	QP	34.1	17.6	11.6	32.1	-	31.2	46.0	14.8	
Hori	5850.000	PK	41.9	32.6	6.7	31.4	-	49.8	122.2	72.4	
Hori	5855.000	PK	41.4	32.6	6.7	31.4	-	49.3	110.8	61.5	
Hori	5875.000	PK	41.1	32.6	6.7	31.4	-	49.0	105.2	56.2	
Hori	5925.000	PK	40.7	32.6	6.7	31.5	-	48.5	68.2	19.7	
Hori	11650.000	PK	43.0	39.6	-2.0	33.4	-	47.2	73.9	26.7	Floor noise
Hori	17475.000	PK	42.7	42.8	0.3	32.9	-	52.9	73.9	21.0	Floor noise
Hori	23300.000	PK	45.4	37.9	-0.4	32.5	-	50.4	73.9	23.5	Floor noise
Hori	11650.000	AV	34.5	39.6	-2.0	33.4	-	38.7	53.9	15.2	Floor noise
Hori	17475.000	AV	35.0	42.8	0.3	32.9	-	45.2	53.9	8.7	Floor noise
Hori	23300.000	AV	38.0	37.9	-0.4	32.5	-	43.0	53.9	10.9	Floor noise
Vert	76.674	QP	50.1	6.7	7.9	32.2	-	32.5	40.0	7.5	
Vert	186.599	QP	31.3	16.5	9.1	32.1	-	24.8	43.5	18.7	
Vert	298.564	QP	40.3	13.7	10.0	32.1	-	31.9	46.0	14.1	
Vert	360.748	QP	40.6	15.2	10.5	32.1	-	34.2	46.0	11.8	
Vert	373.199	QP	42.7	15.1	10.6	32.1	-	36.3	46.0	9.7	
Vert	522.461	QP	32.1	17.6	11.6	32.1	-	29.2	46.0	16.8	
Vert	5850.000	PK	41.5	32.6	6.7	31.4	-	49.4	122.2	72.8	
Vert	5855.000	PK	40.9	32.6	6.7	31.4	-	48.8	110.8	62.0	
Vert	5875.000	PK	41.0	32.6	6.7	31.4	-	48.9	105.2	56.3	
Vert	5925.000	PK	40.6	32.6	6.7	31.5	-	48.4	68.2	19.8	
Vert	11650.000	PK	42.8	39.6	-2.0	33.4	-	47.0	73.9	26.9	Floor noise
Vert	17475.000	PK	42.8	42.8	0.3	32.9	-	53.0	73.9	20.9	Floor noise
Vert	23300.000	PK	45.6	37.9	-0.4	32.5	-	50.6	73.9	23.3	Floor noise
Vert	11650.000	AV	34.2	39.6	-2.0	33.4	-	38.4	53.9	15.5	Floor noise
Vert	17475.000	AV	35.1	42.8	0.3	32.9	-	45.3	53.9	8.6	Floor noise
Vert	23300.000	AV	38.0	37.9	-0.4	32.5	-	43.0	53.9	10.9	Floor noise

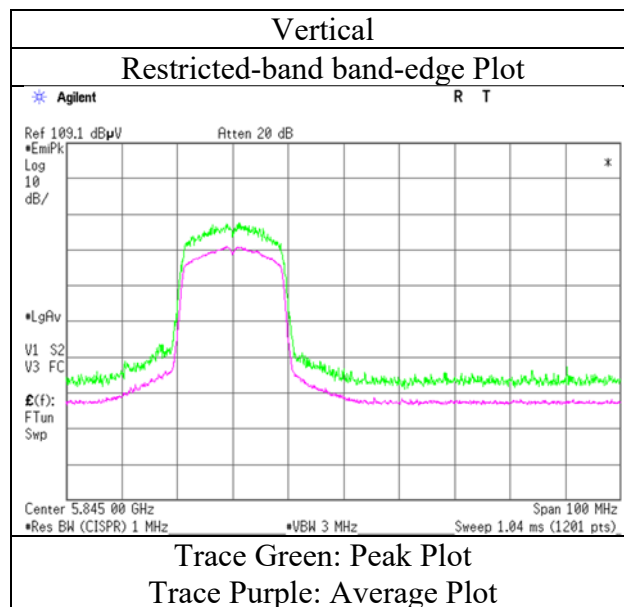
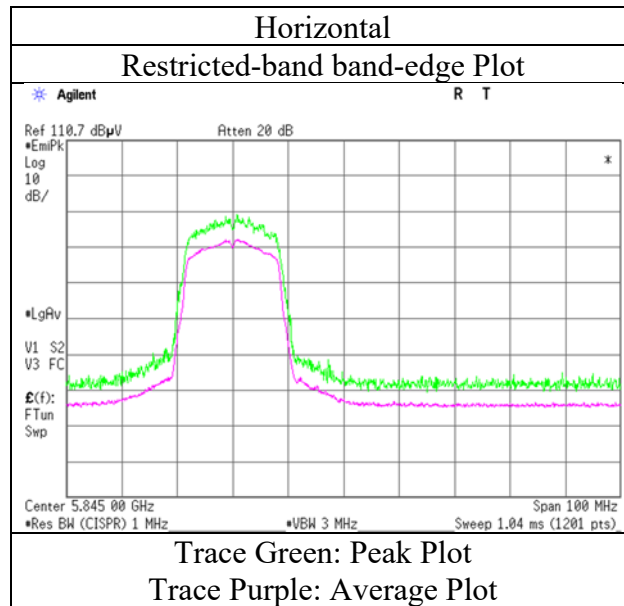
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:    1 GHz - 10 GHz     $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
                             10 GHz - 40 GHz     $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

## Radiated Spurious Emission

Report No.	12530177H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	October 3, 2018
Temperature / Humidity	23 deg. C / 59 % RH
Engineer	Akihiko Maeda
	(1 GHz - 10 GHz)
Mode	Tx 11a 5825 MHz



\* Final result of restricted band edge was shown in tabular data.

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## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 3, 2018  
Temperature / Humidity 23 deg. C / 59 % RH  
Engineer Akihiko Maeda  
(1 GHz - 10 GHz)  
Mode Tx 11ac-20 5180 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5150.000	PK	41.8	32.1	6.4	31.3	-	49.0	73.9	24.9	
Hori	5150.000	AV	33.2	32.1	6.4	31.3	1.8	42.2	53.9	11.7	*1)
Vert	5150.000	PK	42.9	32.1	6.4	31.3	-	50.1	73.9	23.8	
Vert	5150.000	AV	33.2	32.1	6.4	31.3	1.8	42.2	53.9	11.7	*1)

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

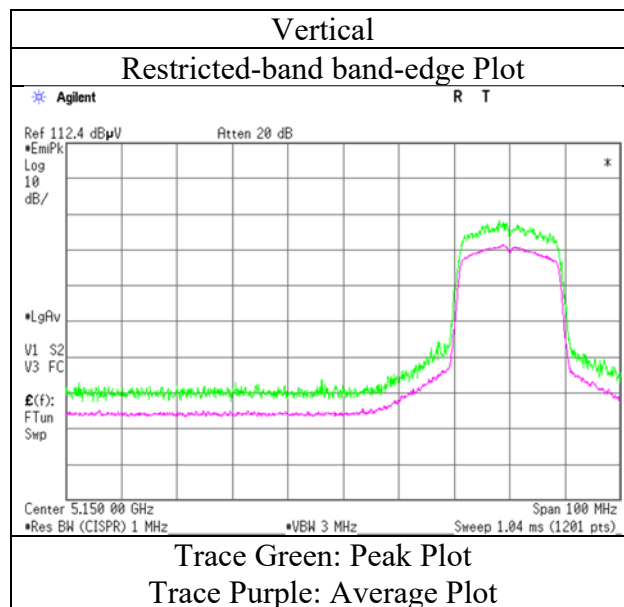
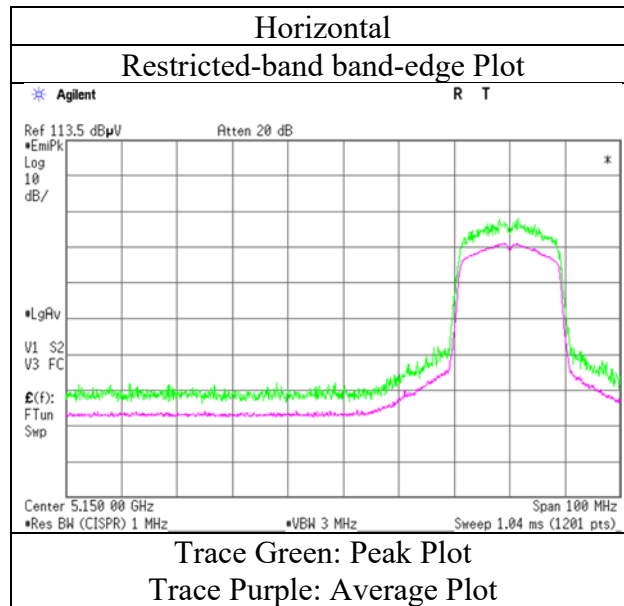
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz  $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
10 GHz - 40 GHz  $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

\*1) Not Out of Band emission(Leakage Power)

## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 3, 2018  
Temperature / Humidity 23 deg. C / 59 % RH  
Engineer Akihiko Maeda  
(1 GHz - 10 GHz)  
Mode Tx 11ac-20 5180 MHz



\* Final result of restricted band edge was shown in tabular data.

## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 3, 2018  
Temperature / Humidity 23 deg. C / 59 % RH  
Engineer Akihiko Maeda  
(1 GHz - 10 GHz)  
Mode Tx 11ac-20 5320 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5350.000	PK	41.6	31.7	6.5	31.3	-	48.5	73.9	25.4	
Hori	5350.000	AV	33.0	31.7	6.5	31.3	1.8	41.7	53.9	12.2	*1)
Vert	5350.000	PK	41.8	31.7	6.5	31.3	-	48.7	73.9	25.2	
Vert	5350.000	AV	33.1	31.7	6.5	31.3	1.8	41.8	53.9	12.1	*1)

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

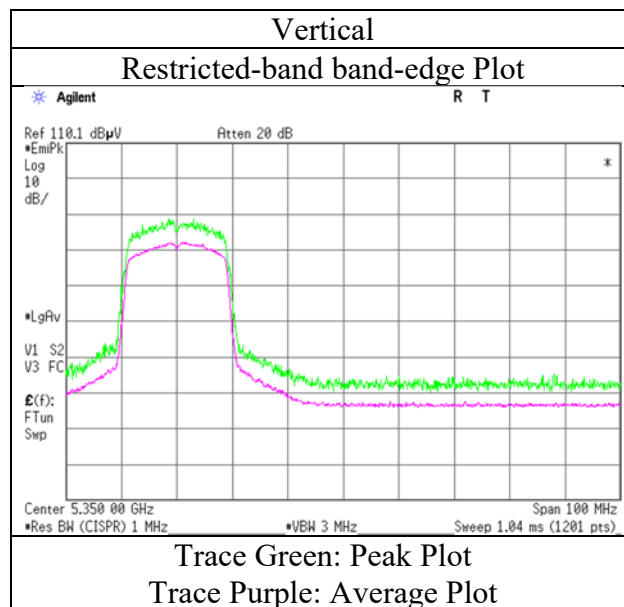
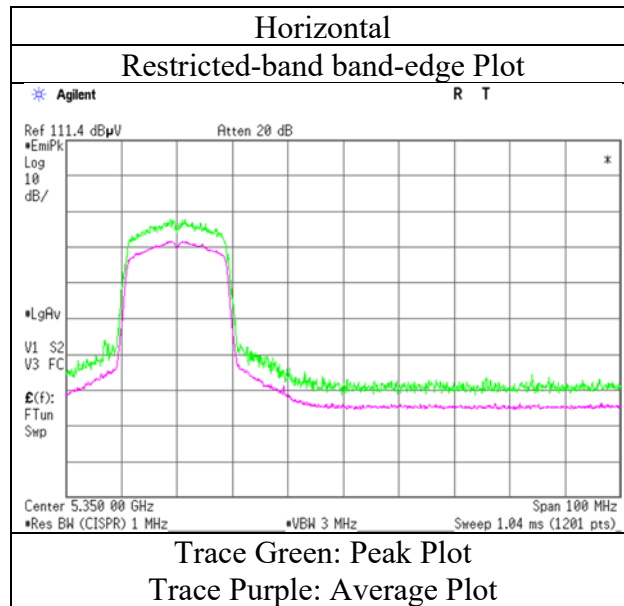
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz  $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
10 GHz - 40 GHz  $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

\*1) Not Out of Band emission(Leakage Power)

## Radiated Spurious Emission

Report No.	12530177H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	October 3, 2018
Temperature / Humidity	23 deg. C / 59 % RH
Engineer	Akihiko Maeda
	(1 GHz - 10 GHz)
Mode	Tx 11ac-20 5320 MHz



\* Final result of restricted band edge was shown in tabular data.

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## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 3, 2018  
Temperature / Humidity 23 deg. C / 59 % RH  
Engineer Akihiko Maeda  
(1 GHz - 10 GHz)  
Mode Tx 11ac-20 5500 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5460.000	PK	41.6	31.8	6.5	31.3	-	48.6	73.9	25.3	
Hori	5470.000	PK	42.7	31.8	6.5	31.3	-	49.7	68.2	18.5	
Hori	5460.000	AV	33.1	31.8	6.5	31.3	1.8	41.9	53.9	12.0	*1)
Vert	5460.000	PK	41.2	31.8	6.5	31.3	-	48.2	73.9	25.7	
Vert	5470.000	PK	42.0	31.8	6.5	31.3	-	49.0	68.2	19.2	
Vert	5460.000	AV	32.7	31.8	6.5	31.3	1.8	41.5	53.9	12.4	*1)

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

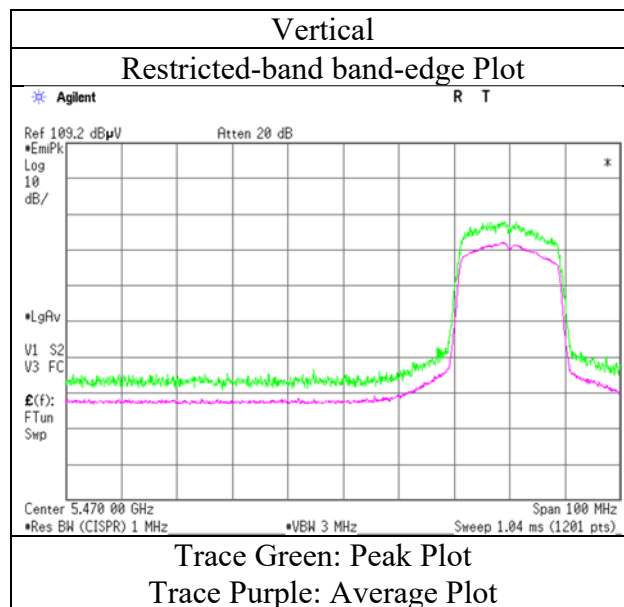
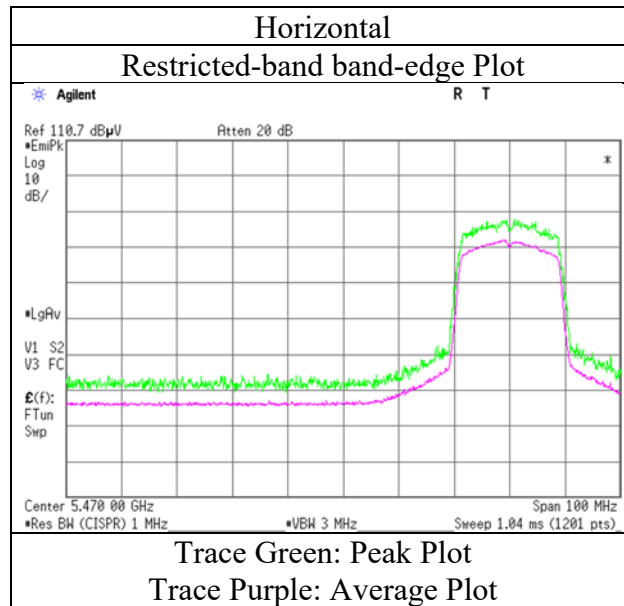
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz  $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
10 GHz - 40 GHz  $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

\*1) Not Out of Band emission(Leakage Power)

## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 3, 2018  
Temperature / Humidity 23 deg. C / 59 % RH  
Engineer Akihiko Maeda  
(1 GHz - 10 GHz)  
Mode Tx 11ac-20 5500 MHz



\* Final result of restricted band edge was shown in tabular data.

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## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 3, 2018  
Temperature / Humidity 23 deg. C / 59 % RH  
Engineer Akihiko Maeda  
(1 GHz - 10 GHz)  
Mode Tx 11ac-20 5700 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5725.000	PK	44.1	32.4	6.6	31.4	-	51.7	68.2	16.5	
Vert	5725.000	PK	44.6	32.4	6.6	31.4	-	52.2	68.2	16.0	

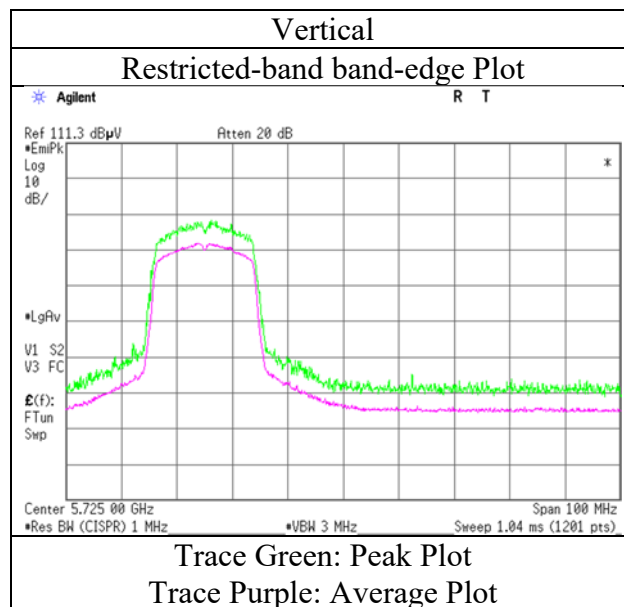
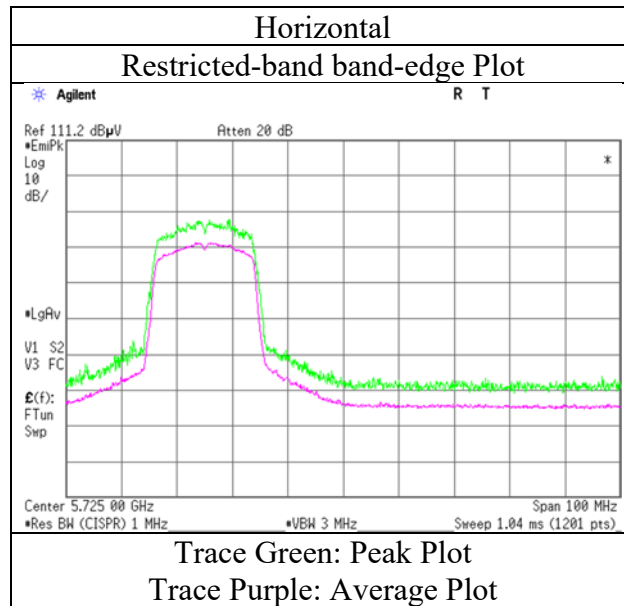
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz  $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
10 GHz - 40 GHz  $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

## Radiated Spurious Emission

Report No.	12530177H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	October 3, 2018
Temperature / Humidity	23 deg. C / 59 % RH
Engineer	Akihiko Maeda
	(1 GHz - 10 GHz)
Mode	Tx 11ac-20 5700 MHz



\* Final result of restricted band edge was shown in tabular data.

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## Radiated Spurious Emission

Report No.	12530177H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	October 3, 2018
Temperature / Humidity	23 deg. C / 59 % RH
Engineer	Akihiko Maeda
	(1 GHz - 10 GHz)
Mode	Tx 11ac-20 5745 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5650.000	PK	40.3	32.2	6.6	31.4	-	47.7	68.2	20.5	
Hori	5700.000	PK	40.9	32.3	6.6	31.4	-	48.4	105.2	56.8	
Hori	5720.000	PK	41.7	32.4	6.6	31.4	-	49.3	110.8	61.5	
Hori	5725.000	PK	47.1	32.4	6.6	31.4	-	54.7	122.2	67.5	
Vert	5650.000	PK	40.4	32.2	6.6	31.4	-	47.8	68.2	20.4	
Vert	5700.000	PK	40.9	32.3	6.6	31.4	-	48.4	105.2	56.8	
Vert	5720.000	PK	42.8	32.4	6.6	31.4	-	50.4	110.8	60.4	
Vert	5725.000	PK	47.9	32.4	6.6	31.4	-	55.5	122.2	66.7	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:	1 GHz - 10 GHz	$20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$
	10 GHz - 40 GHz	$20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

**UL Japan, Inc.**

**Ise EMC Lab.**

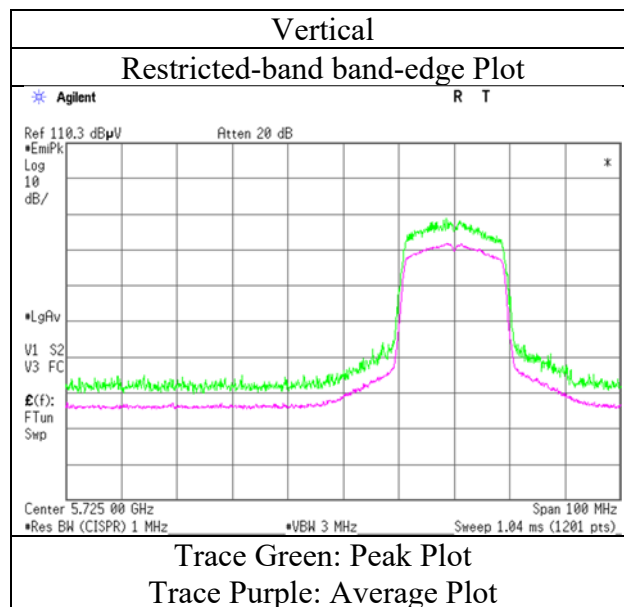
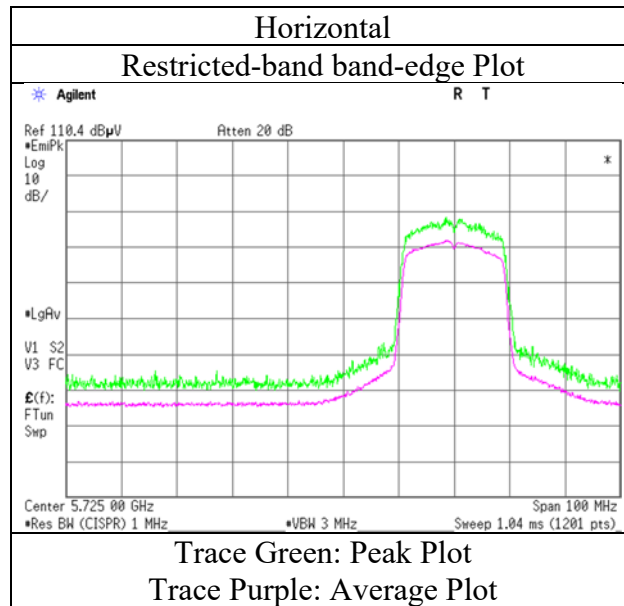
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## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 3, 2018  
Temperature / Humidity 23 deg. C / 59 % RH  
Engineer Akihiko Maeda  
(1 GHz - 10 GHz)  
Mode Tx 11ac-20 5745 MHz



\* Final result of restricted band edge was shown in tabular data.

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## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 3, 2018  
Temperature / Humidity 23 deg. C / 59 % RH  
Engineer Akihiko Maeda  
(1 GHz - 10 GHz)  
Mode Tx 11ac-20 5825 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5850.000	PK	41.6	32.6	6.7	31.4	-	49.5	122.2	72.7	
Hori	5855.000	PK	41.0	32.6	6.7	31.4	-	48.9	110.8	61.9	
Hori	5875.000	PK	40.8	32.6	6.7	31.4	-	48.7	105.2	56.5	
Hori	5925.000	PK	41.0	32.6	6.7	31.5	-	48.8	68.2	19.4	
Vert	5850.000	PK	41.4	32.6	6.7	31.4	-	49.3	122.2	72.9	
Vert	5855.000	PK	41.1	32.6	6.7	31.4	-	49.0	110.8	61.8	
Vert	5875.000	PK	40.6	32.6	6.7	31.4	-	48.5	105.2	56.7	
Vert	5925.000	PK	40.1	32.6	6.7	31.5	-	47.9	68.2	20.3	

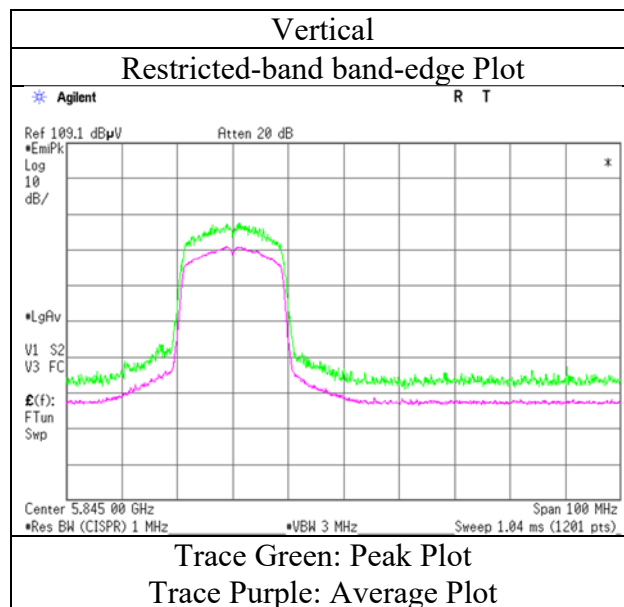
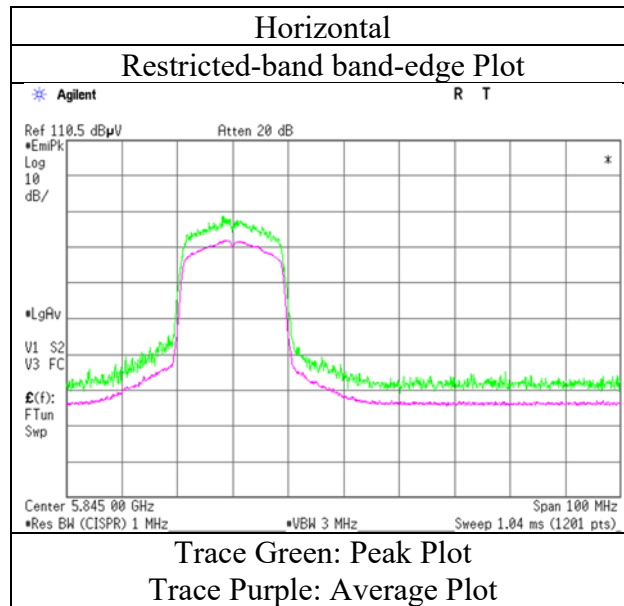
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.0 m / 3.0 m) = 2.5 dB  
10 GHz - 40 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

## Radiated Spurious Emission

Report No.	12530177H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	October 3, 2018
Temperature / Humidity	23 deg. C / 59 % RH
Engineer	Akihiko Maeda
	(1 GHz - 10 GHz)
Mode	Tx 11ac-20 5825 MHz



\* Final result of restricted band edge was shown in tabular data.

**UL Japan, Inc.**

**Ise EMC Lab.**

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## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda (1 GHz - 10 GHz)	Takafumi Noguchi (10 GHz - 26.5 GHz)	Akihiko Maeda (26.5 GHz - 40 GHz)
Mode	Tx 11ac-40 5190 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5150.000	PK	47.7	32.1	6.4	31.3	-	54.9	73.9	19.0	
Hori	10380.000	PK	42.6	39.6	-2.5	33.5	-	46.2	73.9	27.7	Floor noise
Hori	15570.000	PK	43.8	37.6	-0.4	33.0	-	48.0	73.9	25.9	Floor noise
Hori	20760.000	PK	45.2	36.7	-1.1	33.3	-	47.5	73.9	26.4	Floor noise
Hori	5150.000	AV	36.6	32.1	6.4	31.3	2.7	46.5	53.9	7.4	*1)
Hori	10380.000	AV	34.6	39.6	-2.5	33.5	-	38.2	53.9	15.7	Floor noise
Hori	15570.000	AV	35.6	37.6	-0.4	33.0	-	39.8	53.9	14.1	Floor noise
Hori	20760.000	AV	36.8	36.7	-1.1	33.3	-	39.1	53.9	14.8	Floor noise
Vert	5150.000	PK	46.7	32.1	6.4	31.3	-	53.9	73.9	20.0	
Vert	10380.000	PK	42.5	39.6	-2.5	33.5	-	46.1	73.9	27.8	Floor noise
Vert	15570.000	PK	43.8	37.6	-0.4	33.0	-	48.0	73.9	25.9	Floor noise
Vert	20760.000	PK	45.3	36.7	-1.1	33.3	-	47.6	73.9	26.3	Floor noise
Vert	5150.000	AV	35.6	32.1	6.4	31.3	2.7	45.5	53.9	8.4	*1)
Vert	10380.000	AV	34.5	39.6	-2.5	33.5	-	38.1	53.9	15.8	Floor noise
Vert	15570.000	AV	35.6	37.6	-0.4	33.0	-	39.8	53.9	14.1	Floor noise
Vert	20760.000	AV	36.9	36.7	-1.1	33.3	-	39.2	53.9	14.7	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

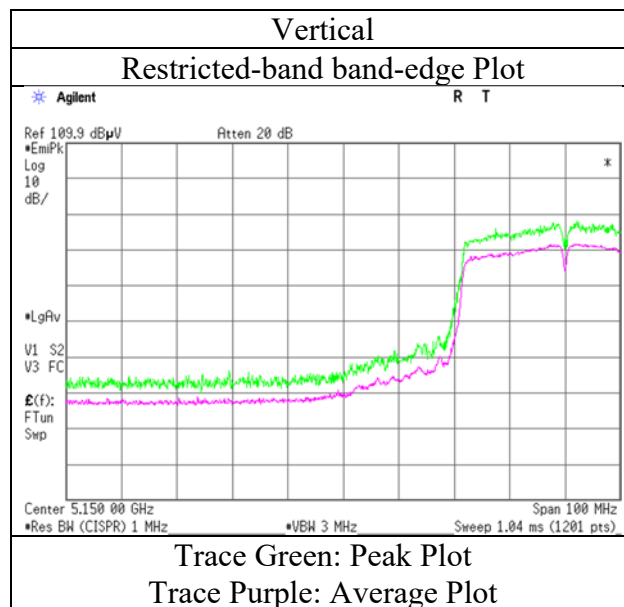
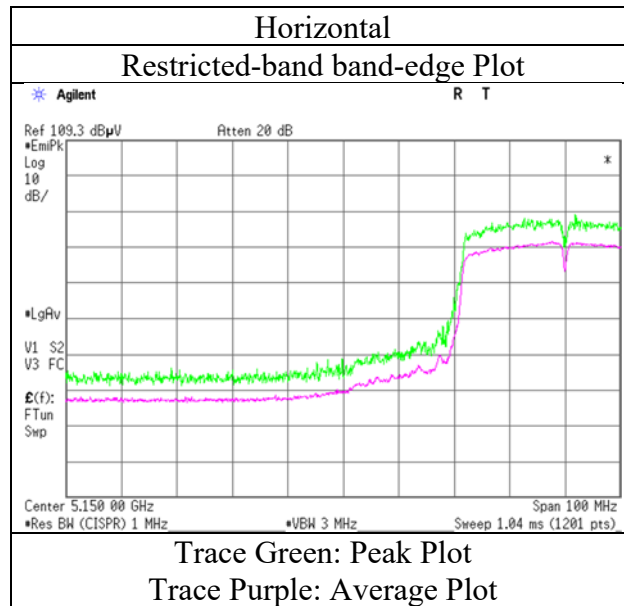
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:      1 GHz - 10 GHz      20log (4.0 m / 3.0 m) = 2.5 dB  
                                 10 GHz - 40 GHz      20log (1.0 m / 3.0 m) = -9.5 dB

\*1) Not Out of Band emission(Leakage Power)

## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 3, 2018  
Temperature / Humidity 23 deg. C / 59 % RH  
Engineer Akihiko Maeda  
(1 GHz - 10 GHz)  
Mode Tx 11ac-40 5190 MHz



\* Final result of restricted band edge was shown in tabular data.

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## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda (1 GHz - 10 GHz)	Takafumi Noguchi (10 GHz - 26.5 GHz)	Akihiko Maeda (26.5 GHz - 40 GHz)
Mode	Tx 11ac-40 5230 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	10460.000	PK	42.8	39.7	-2.5	33.5	-	46.5	73.9	27.4	Floor noise
Hori	15690.000	PK	43.8	37.4	-0.4	33.0	-	47.8	73.9	26.1	Floor noise
Hori	20920.000	PK	45.0	36.8	-1.0	33.3	-	47.5	73.9	26.4	Floor noise
Hori	10460.000	AV	34.8	39.7	-2.5	33.5	-	38.5	53.9	15.4	Floor noise
Hori	15690.000	AV	35.3	37.4	-0.4	33.0	-	39.3	53.9	14.6	Floor noise
Hori	20920.000	AV	36.7	36.8	-1.0	33.3	-	39.2	53.9	14.7	Floor noise
Vert	10460.000	PK	42.6	39.7	-2.5	33.5	-	46.3	73.9	27.6	Floor noise
Vert	15690.000	PK	44.0	37.4	-0.4	33.0	-	48.0	73.9	25.9	Floor noise
Vert	20920.000	PK	44.7	36.8	-1.0	33.3	-	47.2	73.9	26.7	Floor noise
Vert	10460.000	AV	34.6	39.7	-2.5	33.5	-	38.3	53.9	15.6	Floor noise
Vert	15690.000	AV	35.4	37.4	-0.4	33.0	-	39.4	53.9	14.5	Floor noise
Vert	20920.000	AV	36.5	36.8	-1.0	33.3	-	39.0	53.9	14.9	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:      1 GHz - 10 GHz       $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
                                 10 GHz - 40 GHz       $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda	Takafumi Noguchi	Akihiko Maeda
	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)	(26.5 GHz - 40 GHz)
Mode	Tx 11ac-40 5310 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5350.000	PK	45.3	31.7	6.5	31.3	-	52.2	73.9	21.7	
Hori	10620.000	PK	42.7	39.8	-2.4	33.6	-	46.5	73.9	27.4	Floor noise
Hori	15930.000	PK	43.0	37.3	-0.2	33.0	-	47.1	73.9	26.8	Floor noise
Hori	21240.000	PK	45.3	36.9	-0.9	33.2	-	48.1	73.9	25.8	Floor noise
Hori	5350.000	AV	34.8	31.7	6.5	31.3	2.7	44.4	53.9	9.5	*1)
Hori	10620.000	AV	34.5	39.8	-2.4	33.6	-	38.3	53.9	15.6	Floor noise
Hori	15930.000	AV	34.9	37.3	-0.2	33.0	-	39.0	53.9	14.9	Floor noise
Hori	21240.000	AV	36.6	36.9	-0.9	33.2	-	39.4	53.9	14.5	Floor noise
Vert	5350.000	PK	44.8	31.7	6.5	31.3	-	51.7	73.9	22.2	
Vert	10620.000	PK	42.6	39.8	-2.4	33.6	-	46.4	73.9	27.5	Floor noise
Vert	15930.000	PK	43.1	37.3	-0.2	33.0	-	47.2	73.9	26.7	Floor noise
Vert	21240.000	PK	45.4	36.9	-0.9	33.2	-	48.2	73.9	25.7	Floor noise
Vert	5350.000	AV	34.5	31.7	6.5	31.3	2.7	44.1	53.9	9.8	*1)
Vert	10620.000	AV	34.4	39.8	-2.4	33.6	-	38.2	53.9	15.7	Floor noise
Vert	15930.000	AV	35.0	37.3	-0.2	33.0	-	39.1	53.9	14.8	Floor noise
Vert	21240.000	AV	36.8	36.9	-0.9	33.2	-	39.6	53.9	14.3	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

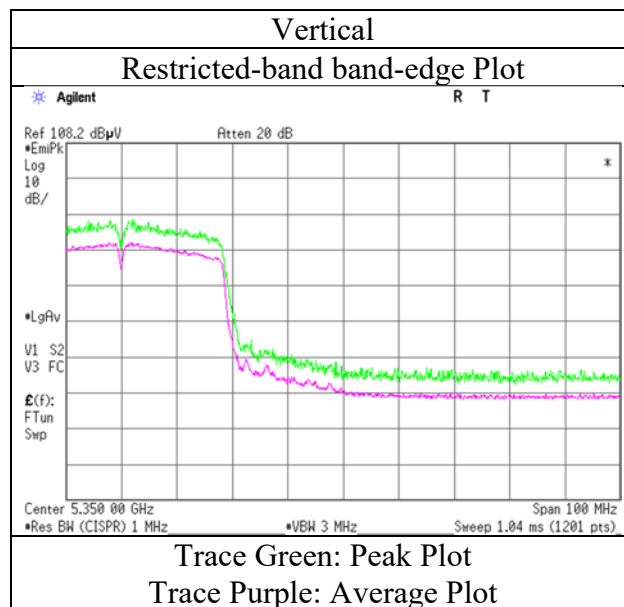
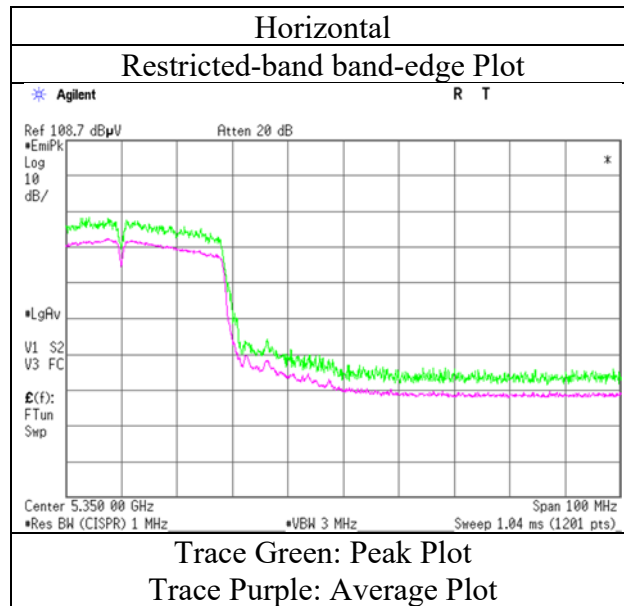
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:      1 GHz - 10 GHz       $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
                                 10 GHz - 40 GHz       $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

\*1) Not Out of Band emission(Leakage Power)

## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 3, 2018  
Temperature / Humidity 23 deg. C / 59 % RH  
Engineer Akihiko Maeda  
(1 GHz - 10 GHz)  
Mode Tx 11ac-40 5310 MHz



\* Final result of restricted band edge was shown in tabular data.

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## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda	Takafumi Noguchi	Akihiko Maeda
	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)	(26.5 GHz - 40 GHz)
Mode	Tx 11ac-40 5510 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5460.000	PK	41.7	31.8	6.5	31.3	-	48.7	73.9	25.2	
Hori	5470.000	PK	45.4	31.8	6.5	31.3	-	52.4	68.2	15.8	
Hori	11020.000	PK	42.3	40.3	-2.2	33.6	-	46.8	73.9	27.1	Floor noise
Hori	16530.000	PK	43.7	38.5	0.0	33.0	-	49.2	73.9	24.7	Floor noise
Hori	22040.000	PK	45.0	37.1	-0.7	32.9	-	48.5	73.9	25.4	Floor noise
Hori	5460.000	AV	33.3	31.8	6.5	31.3	2.7	43.0	53.9	10.9	*1)
Hori	11020.000	AV	34.2	40.3	-2.2	33.6	-	38.7	53.9	15.2	Floor noise
Hori	16530.000	AV	35.7	38.5	0.0	33.0	-	41.2	53.9	12.7	Floor noise
Hori	22040.000	AV	36.8	37.1	-0.7	32.9	-	40.3	53.9	13.6	Floor noise
Vert	5460.000	PK	42.1	31.8	6.5	31.3	-	49.1	73.9	24.8	
Vert	5470.000	PK	44.9	31.8	6.5	31.3	-	51.9	68.2	16.3	
Vert	11020.000	PK	42.6	40.3	-2.2	33.6	-	47.1	73.9	26.8	Floor noise
Vert	16530.000	PK	43.7	38.5	0.0	33.0	-	49.2	73.9	24.7	Floor noise
Vert	22040.000	PK	44.8	37.1	-0.7	32.9	-	48.3	73.9	25.6	Floor noise
Vert	5460.000	AV	33.0	31.8	6.5	31.3	2.7	42.7	53.9	11.2	*1)
Vert	11020.000	AV	34.4	40.3	-2.2	33.6	-	38.9	53.9	15.0	Floor noise
Vert	16530.000	AV	35.7	38.5	0.0	33.0	-	41.2	53.9	12.7	Floor noise
Vert	22040.000	AV	36.6	37.1	-0.7	32.9	-	40.1	53.9	13.8	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

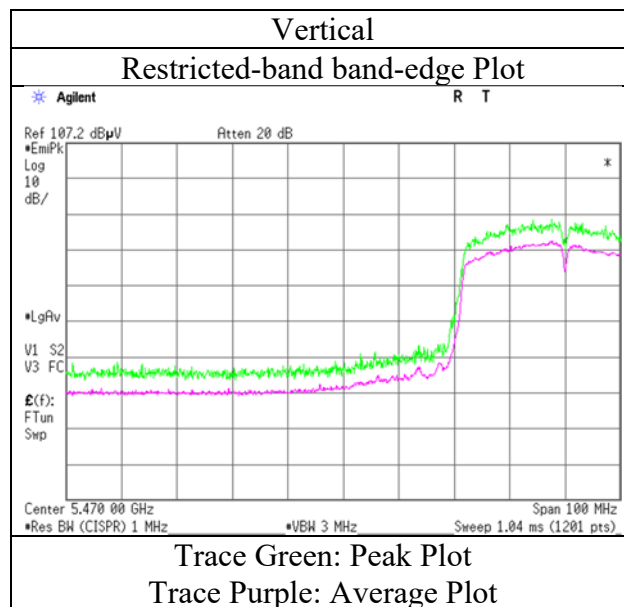
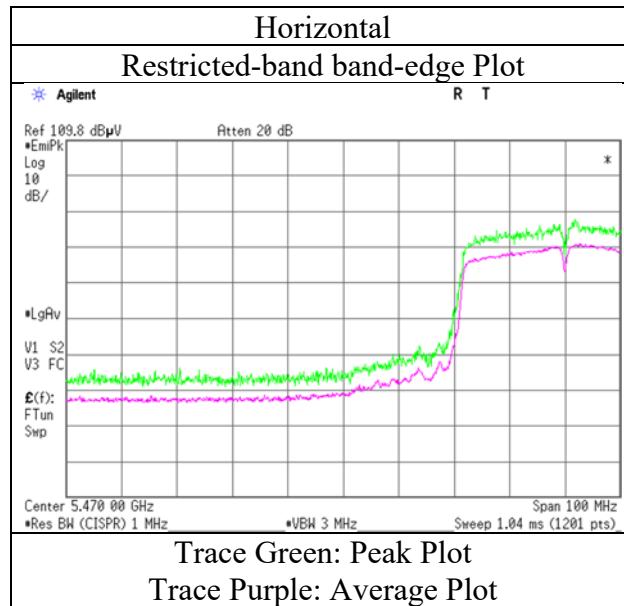
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:      1 GHz - 10 GHz     $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
                                 10 GHz - 40 GHz     $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

\*1) Not Out of Band emission(Leakage Power)

## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 3, 2018  
Temperature / Humidity 23 deg. C / 59 % RH  
Engineer Akihiko Maeda  
(1 GHz - 10 GHz)  
Mode Tx 11ac-40 5510 MHz



\* Final result of restricted band edge was shown in tabular data.

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## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda	Takafumi Noguchi	Akihiko Maeda
	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)	(26.5 GHz - 40 GHz)
Mode	Tx 11ac-40 5550 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	11100.000	PK	43.2	40.1	-2.2	33.6	-	47.5	73.9	26.4	Floor noise
Hori	16650.000	PK	43.7	39.0	0.1	33.0	-	49.8	73.9	24.1	Floor noise
Hori	22200.000	PK	45.3	37.2	-0.7	32.8	-	49.0	73.9	24.9	Floor noise
Hori	11100.000	AV	34.8	40.1	-2.2	33.6	-	39.1	53.9	14.8	Floor noise
Hori	16650.000	AV	35.7	39.0	0.1	33.0	-	41.8	53.9	12.1	Floor noise
Hori	22200.000	AV	36.5	37.2	-0.7	32.8	-	40.2	53.9	13.7	Floor noise
Vert	11100.000	PK	43.3	40.1	-2.2	33.6	-	47.6	73.9	26.3	Floor noise
Vert	16650.000	PK	43.6	39.0	0.1	33.0	-	49.7	73.9	24.2	Floor noise
Vert	22200.000	PK	45.2	37.2	-0.7	32.8	-	48.9	73.9	25.0	Floor noise
Vert	11100.000	AV	35.0	40.1	-2.2	33.6	-	39.3	53.9	14.6	Floor noise
Vert	16650.000	AV	35.7	39.0	0.1	33.0	-	41.8	53.9	12.1	Floor noise
Vert	22200.000	AV	36.5	37.2	-0.7	32.8	-	40.2	53.9	13.7	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:      1 GHz - 10 GHz       $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
                                 10 GHz - 40 GHz       $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$



## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda (1 GHz - 10 GHz)	Takafumi Noguchi (10 GHz - 26.5 GHz)	Akihiko Maeda (26.5 GHz - 40 GHz)
Mode	Tx 11ac-40 5670 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5725.000	PK	42.3	32.4	6.6	31.4	-	49.9	68.2	18.3	
Hori	11340.000	PK	43.0	40.2	-2.0	33.5	-	47.7	73.9	26.2	Floor noise
Hori	17010.000	PK	43.0	40.6	0.2	32.9	-	50.9	73.9	23.0	Floor noise
Hori	22680.000	PK	45.0	37.6	-0.6	32.7	-	49.3	73.9	24.6	Floor noise
Hori	11340.000	AV	34.5	40.2	-2.0	33.5	-	39.2	53.9	14.7	Floor noise
Hori	17010.000	AV	35.0	40.6	0.2	32.9	-	42.9	53.9	11.0	Floor noise
Hori	22680.000	AV	36.5	37.6	-0.6	32.7	-	40.8	53.9	13.1	Floor noise
Vert	5725.000	PK	42.6	32.4	6.6	31.4	-	50.2	68.2	18.0	
Vert	11340.000	PK	43.1	40.2	-2.0	33.5	-	47.8	73.9	26.1	Floor noise
Vert	17010.000	PK	43.1	40.6	0.2	32.9	-	51.0	73.9	22.9	Floor noise
Vert	22680.000	PK	45.0	37.6	-0.6	32.7	-	49.3	73.9	24.6	Floor noise
Vert	11340.000	AV	34.7	40.2	-2.0	33.5	-	39.4	53.9	14.5	Floor noise
Vert	17010.000	AV	35.0	40.6	0.2	32.9	-	42.9	53.9	11.0	Floor noise
Vert	22680.000	AV	36.3	37.6	-0.6	32.7	-	40.6	53.9	13.3	Floor noise

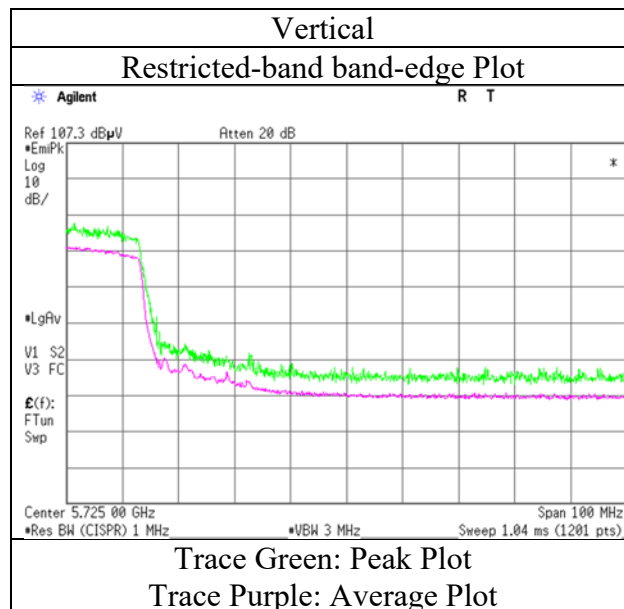
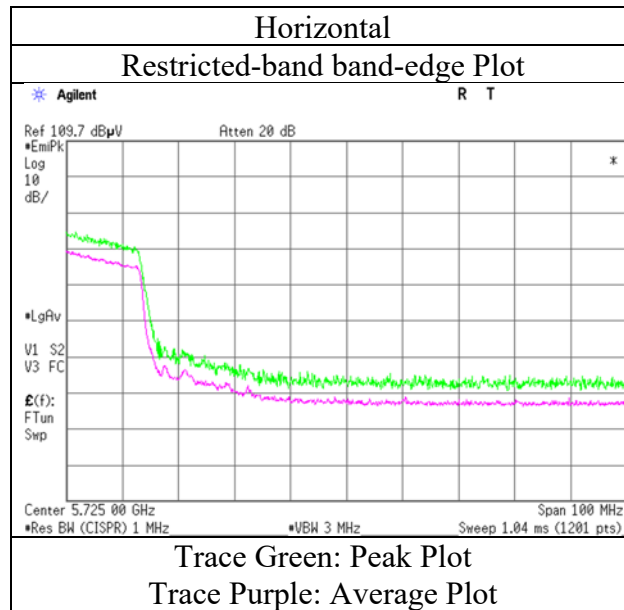
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:      1 GHz - 10 GHz       $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
                                 10 GHz - 40 GHz       $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 3, 2018  
Temperature / Humidity 23 deg. C / 59 % RH  
Engineer Akihiko Maeda  
(1 GHz - 10 GHz)  
Mode Tx 11ac-40 5670 MHz



\* Final result of restricted band edge was shown in tabular data.

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## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda	Takafumi Noguchi	Akihiko Maeda
	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)	(26.5 GHz - 40 GHz)
Mode	Tx 11ac-40 5755 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5650.000	PK	40.1	32.2	6.6	31.4	-	47.5	68.2	20.7	
Hori	5700.000	PK	41.2	32.3	6.6	31.4	-	48.7	105.2	56.5	
Hori	5720.000	PK	46.1	32.4	6.6	31.4	-	53.7	110.8	57.1	
Hori	5725.000	PK	49.0	32.4	6.6	31.4	-	56.6	122.2	65.6	
Hori	11510.000	PK	42.8	40.1	-2.0	33.5	-	47.4	73.9	26.5	Floor noise
Hori	17265.000	PK	43.4	41.6	0.2	32.9	-	52.3	73.9	21.6	Floor noise
Hori	23020.000	PK	45.3	37.9	-0.5	32.6	-	50.1	73.9	23.8	Floor noise
Hori	11510.000	AV	34.2	40.1	-2.0	33.5	-	38.8	53.9	15.1	Floor noise
Hori	17265.000	AV	35.5	41.6	0.2	32.9	-	44.4	53.9	9.5	Floor noise
Hori	23020.000	AV	37.1	37.9	-0.5	32.6	-	41.9	53.9	12.0	Floor noise
Vert	5650.000	PK	40.9	32.2	6.6	31.4	-	48.3	68.2	19.9	
Vert	5700.000	PK	41.5	32.3	6.6	31.4	-	49.0	105.2	56.2	
Vert	5720.000	PK	46.0	32.4	6.6	31.4	-	53.6	110.8	57.2	
Vert	5725.000	PK	48.6	32.4	6.6	31.4	-	56.2	122.2	66.0	
Vert	11510.000	PK	43.0	40.1	-2.0	33.5	-	47.6	73.9	26.3	Floor noise
Vert	17265.000	PK	43.3	41.6	0.2	32.9	-	52.2	73.9	21.7	Floor noise
Vert	23020.000	PK	45.4	37.9	-0.5	32.6	-	50.2	73.9	23.7	Floor noise
Vert	11510.000	AV	34.5	40.1	-2.0	33.5	-	39.1	53.9	14.8	Floor noise
Vert	17265.000	AV	35.3	41.6	0.2	32.9	-	44.2	53.9	9.7	Floor noise
Vert	23020.000	AV	37.2	37.9	-0.5	32.6	-	42.0	53.9	11.9	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:      1 GHz - 10 GHz       $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
                                 10 GHz - 40 GHz       $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

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**Ise EMC Lab.**

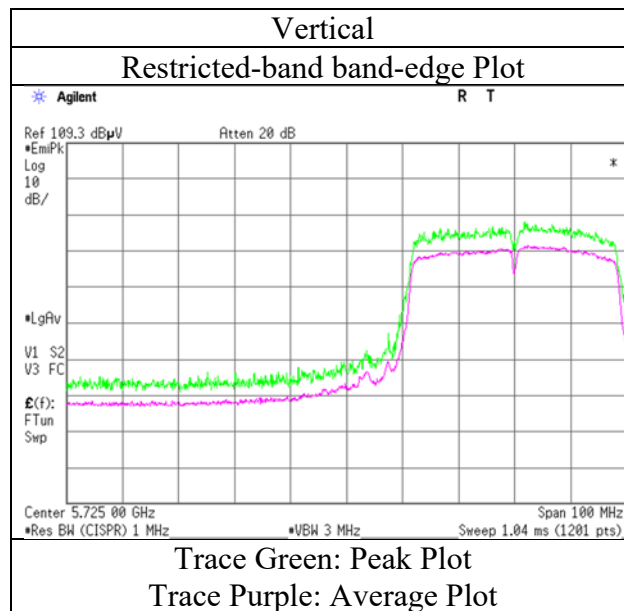
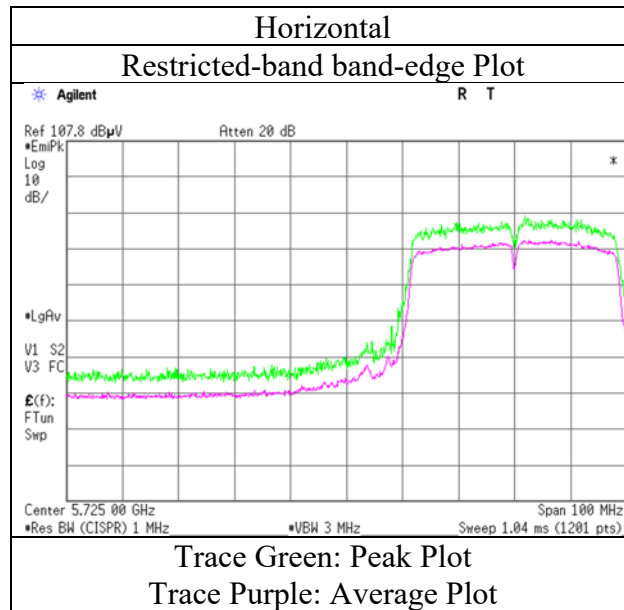
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

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## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 3, 2018  
Temperature / Humidity 23 deg. C / 59 % RH  
Engineer Akihiko Maeda  
(1 GHz - 10 GHz)  
Mode Tx 11ac-40 5755 MHz



\* Final result of restricted band edge was shown in tabular data.

## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda (1 GHz - 10 GHz)	Takafumi Noguchi (10 GHz - 26.5 GHz)	Akihiko Maeda (26.5 GHz - 40 GHz)
Mode	Tx 11ac-40 5795 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5850.000	PK	42.1	32.6	6.7	31.4	-	50.0	122.2	72.2	
Hori	5855.000	PK	41.4	32.6	6.7	31.4	-	49.3	110.8	61.5	
Hori	5875.000	PK	41.0	32.6	6.7	31.4	-	48.9	105.2	56.3	
Hori	5925.000	PK	40.3	32.6	6.7	31.5	-	48.1	68.2	20.1	
Hori	11590.000	PK	43.0	39.8	-2.0	33.5	-	47.3	73.9	26.6	Floor noise
Hori	17385.000	PK	43.3	42.3	0.3	32.9	-	53.0	73.9	20.9	Floor noise
Hori	23180.000	PK	45.5	37.9	-0.5	32.6	-	50.3	73.9	23.6	Floor noise
Hori	11590.000	AV	34.4	39.8	-2.0	33.5	-	38.7	53.9	15.2	Floor noise
Hori	17385.000	AV	35.3	42.3	0.3	32.9	-	45.0	53.9	8.9	Floor noise
Hori	23180.000	AV	37.7	37.9	-0.5	32.6	-	42.5	53.9	11.4	Floor noise
Vert	5850.000	PK	42.1	32.6	6.7	31.4	-	50.0	122.2	72.2	
Vert	5855.000	PK	41.1	32.6	6.7	31.4	-	49.0	110.8	61.8	
Vert	5875.000	PK	41.2	32.6	6.7	31.4	-	49.1	105.2	56.1	
Vert	5925.000	PK	40.7	32.6	6.7	31.5	-	48.5	68.2	19.7	
Vert	11590.000	PK	43.0	39.8	-2.0	33.5	-	47.3	73.9	26.6	Floor noise
Vert	17385.000	PK	43.1	42.3	0.3	32.9	-	52.8	73.9	21.1	Floor noise
Vert	23180.000	PK	45.3	37.9	-0.5	32.6	-	50.1	73.9	23.8	Floor noise
Vert	11590.000	AV	34.4	39.8	-2.0	33.5	-	38.7	53.9	15.2	Floor noise
Vert	17385.000	AV	35.2	42.3	0.3	32.9	-	44.9	53.9	9.0	Floor noise
Vert	23180.000	AV	37.7	37.9	-0.5	32.6	-	42.5	53.9	11.4	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:      1 GHz - 10 GHz      20log (4.0 m / 3.0 m) = 2.5 dB  
                                 10 GHz - 40 GHz      20log (1.0 m / 3.0 m) = -9.5 dB

**UL Japan, Inc.**

**Ise EMC Lab.**

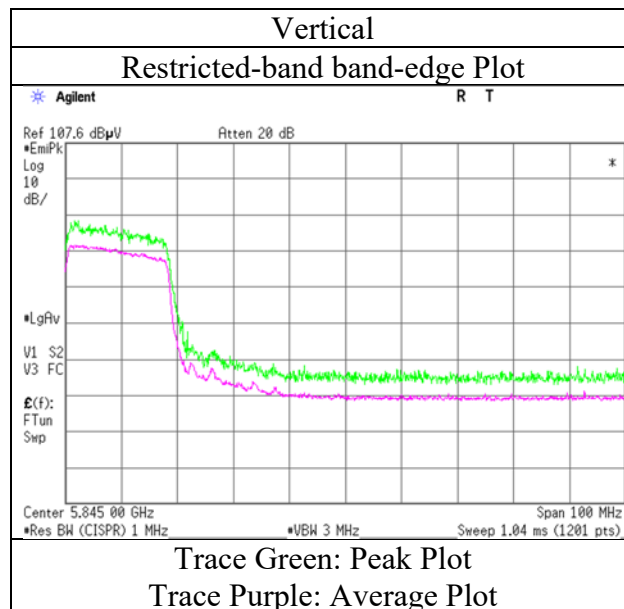
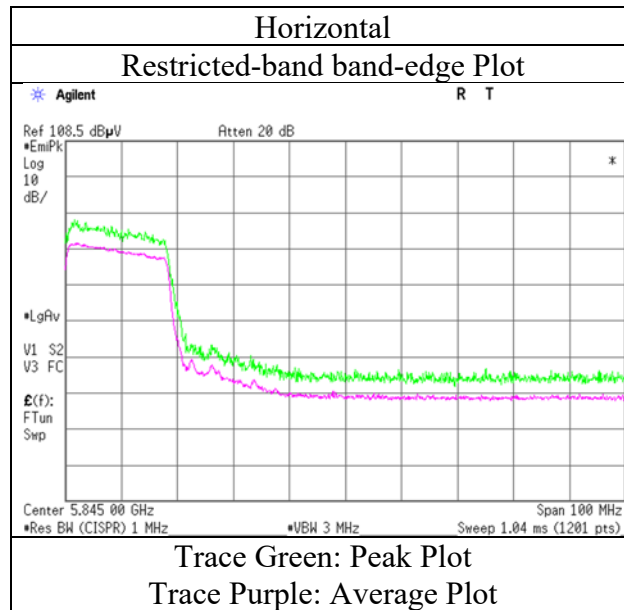
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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Facsimile : +81 596 24 8124

## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 3, 2018  
Temperature / Humidity 23 deg. C / 59 % RH  
Engineer Akihiko Maeda  
(1 GHz - 10 GHz)  
Mode Tx 11ac-40 5795 MHz



\* Final result of restricted band edge was shown in tabular data.

**UL Japan, Inc.**

**Ise EMC Lab.**

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Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda	Takafumi Noguchi	Akihiko Maeda
	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)	(26.5 GHz - 40 GHz)
Mode	Tx 11ac-80 5210 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5150.000	PK	51.7	32.1	6.4	31.3	-	58.9	73.9	15.0	
Hori	10420.000	PK	43.1	39.7	-2.5	33.5	-	46.8	73.9	27.1	Floor noise
Hori	15630.000	PK	43.6	37.5	-0.4	33.0	-	47.7	73.9	26.2	Floor noise
Hori	20840.000	PK	45.2	36.7	-1.0	33.3	-	47.6	73.9	26.3	Floor noise
Hori	5150.000	AV	39.1	32.1	6.4	31.3	3.5	49.8	53.9	4.1	*1)
Hori	10420.000	AV	34.8	39.7	-2.5	33.5	-	38.5	53.9	15.4	Floor noise
Hori	15630.000	AV	35.5	37.5	-0.4	33.0	-	39.6	53.9	14.3	Floor noise
Hori	20840.000	AV	36.8	36.7	-1.0	33.3	-	39.2	53.9	14.7	Floor noise
Vert	5150.000	PK	50.5	32.1	6.4	31.3	-	57.7	73.9	16.2	
Vert	10420.000	PK	42.9	39.7	-2.5	33.5	-	46.6	73.9	27.3	Floor noise
Vert	15630.000	PK	43.5	37.5	-0.4	33.0	-	47.6	73.9	26.3	Floor noise
Vert	20840.000	PK	45.4	36.7	-1.0	33.3	-	47.8	73.9	26.1	Floor noise
Vert	5150.000	AV	38.0	32.1	6.4	31.3	3.5	48.7	53.9	5.2	*1)
Vert	10420.000	AV	34.6	39.7	-2.5	33.5	-	38.3	53.9	15.6	Floor noise
Vert	15630.000	AV	35.6	37.5	-0.4	33.0	-	39.7	53.9	14.2	Floor noise
Vert	20840.000	AV	36.8	36.7	-1.0	33.3	-	39.2	53.9	14.7	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

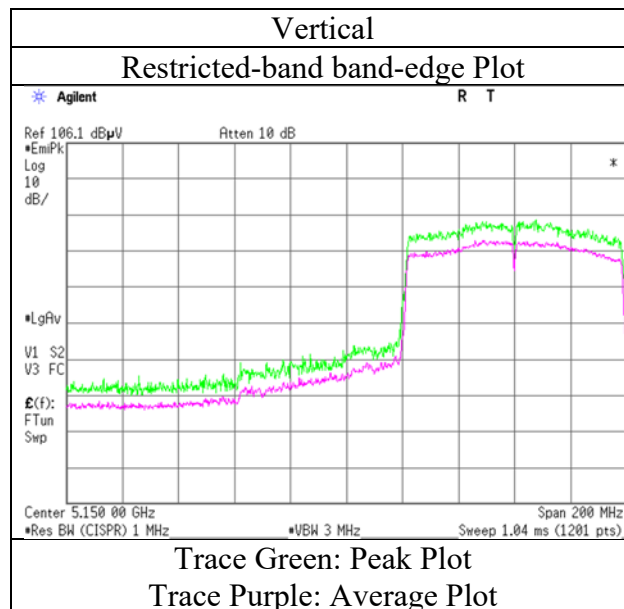
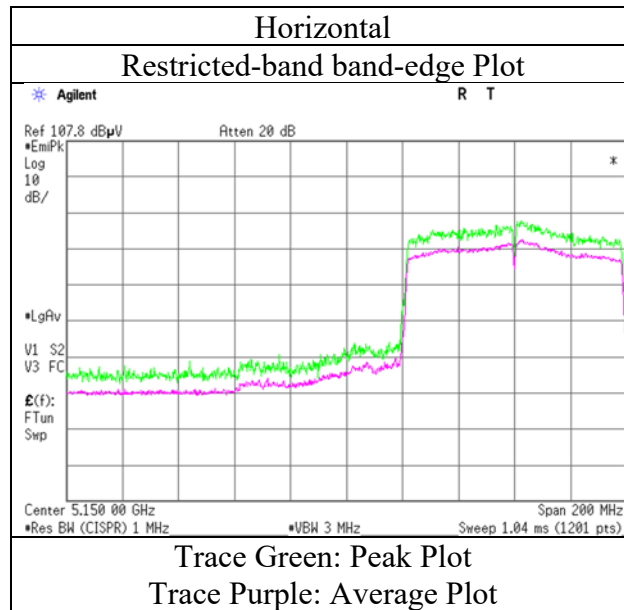
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:      1 GHz - 10 GHz       $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
                                 10 GHz - 40 GHz       $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

\*1) Not Out of Band emission(Leakage Power)

## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 3, 2018  
Temperature / Humidity 23 deg. C / 59 % RH  
Engineer Akihiko Maeda  
(1 GHz - 10 GHz)  
Mode Tx 11ac-80 5210 MHz



\* Final result of restricted band edge was shown in tabular data.

**UL Japan, Inc.**

**Ise EMC Lab.**

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## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda (1 GHz - 10 GHz)	Takafumi Noguchi (10 GHz - 26.5 GHz)	Akihiko Maeda (26.5 GHz - 40 GHz)
Mode	Tx 11ac-80 5290 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5350.000	PK	47.5	31.7	6.5	31.3	-	54.4	73.9	19.5	
Hori	10580.000	PK	43.5	39.8	-2.4	33.6	-	47.3	73.9	26.6	Floor noise
Hori	15870.000	PK	43.4	37.3	-0.2	33.0	-	47.5	73.9	26.4	Floor noise
Hori	21160.000	PK	45.3	36.9	-0.9	33.3	-	48.0	73.9	25.9	Floor noise
Hori	5350.000	AV	36.4	31.7	6.5	31.3	3.5	46.8	53.9	7.1	*1)
Hori	10580.000	AV	34.6	39.8	-2.4	33.6	-	38.4	53.9	15.5	Floor noise
Hori	15870.000	AV	35.3	37.3	-0.2	33.0	-	39.4	53.9	14.5	Floor noise
Hori	21160.000	AV	36.3	36.9	-0.9	33.3	-	39.0	53.9	14.9	Floor noise
Vert	5350.000	PK	46.9	31.7	6.5	31.3	-	53.8	73.9	20.1	
Vert	10580.000	PK	43.4	39.8	-2.4	33.6	-	47.2	73.9	26.7	Floor noise
Vert	15870.000	PK	43.1	37.3	-0.2	33.0	-	47.2	73.9	26.7	Floor noise
Vert	21160.000	PK	45.4	36.9	-0.9	33.3	-	48.1	73.9	25.8	Floor noise
Vert	5350.000	AV	35.4	31.7	6.5	31.3	3.5	45.8	53.9	8.1	*1)
Vert	10580.000	AV	34.5	39.8	-2.4	33.6	-	38.3	53.9	15.6	Floor noise
Vert	15870.000	AV	35.1	37.3	-0.2	33.0	-	39.2	53.9	14.7	Floor noise
Vert	21160.000	AV	36.4	36.9	-0.9	33.3	-	39.1	53.9	14.8	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

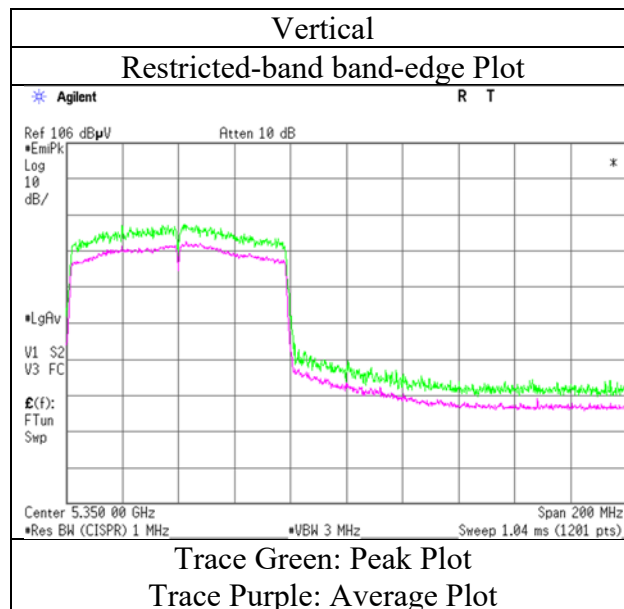
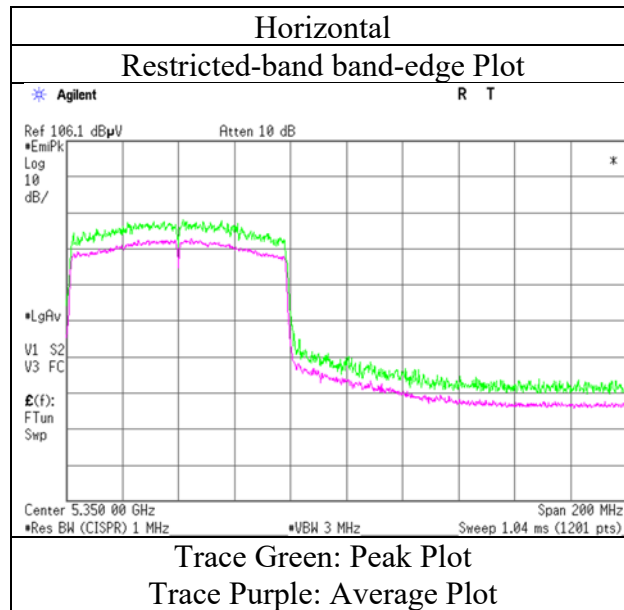
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:      1 GHz - 10 GHz       $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
                                 10 GHz - 40 GHz       $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

\*1) Not Out of Band emission(Leakage Power)

## Radiated Spurious Emission

Report No.	12530177H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	October 3, 2018
Temperature / Humidity	23 deg. C / 59 % RH
Engineer	Akihiko Maeda
	(1 GHz - 10 GHz)
Mode	Tx 11ac-80 5290 MHz



\* Final result of restricted band edge was shown in tabular data.

## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda	Takafumi Noguchi	Akihiko Maeda
	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)	(26.5 GHz - 40 GHz)
Mode	Tx 11ac-80 5530 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5460.000	PK	45.2	31.8	6.5	31.3	-	52.2	73.9	21.7	
Hori	5470.000	PK	47.6	31.8	6.5	31.3	-	54.6	68.2	13.6	
Hori	11060.000	PK	43.2	40.2	-2.2	33.6	-	47.6	73.9	26.3	Floor noise
Hori	16590.000	PK	43.6	38.6	0.0	33.0	-	49.2	73.9	24.7	Floor noise
Hori	22120.000	PK	45.0	37.1	-0.7	32.8	-	48.6	73.9	25.3	Floor noise
Hori	5460.000	AV	35.7	31.8	6.5	31.3	3.5	46.2	53.9	7.7	*1)
Hori	11060.000	AV	34.5	40.2	-2.2	33.6	-	38.9	53.9	15.0	Floor noise
Hori	16590.000	AV	35.8	38.6	0.0	33.0	-	41.4	53.9	12.5	Floor noise
Hori	22120.000	AV	36.8	37.1	-0.7	32.8	-	40.4	53.9	13.5	Floor noise
Vert	5460.000	PK	44.1	31.8	6.5	31.3	-	51.1	73.9	22.8	
Vert	5470.000	PK	44.6	31.8	6.5	31.3	-	51.6	68.2	16.6	
Vert	11060.000	PK	43.2	40.2	-2.2	33.6	-	47.6	73.9	26.3	Floor noise
Vert	16590.000	PK	43.5	38.6	0.0	33.0	-	49.1	73.9	24.8	Floor noise
Vert	22120.000	PK	45.0	37.1	-0.7	32.8	-	48.6	73.9	25.3	Floor noise
Vert	5460.000	AV	34.5	31.8	6.5	31.3	3.5	45.0	53.9	8.9	*1)
Vert	11060.000	AV	34.5	40.2	-2.2	33.6	-	38.9	53.9	15.0	Floor noise
Vert	16590.000	AV	35.7	38.6	0.0	33.0	-	41.3	53.9	12.6	Floor noise
Vert	22120.000	AV	36.9	37.1	-0.7	32.8	-	40.5	53.9	13.4	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

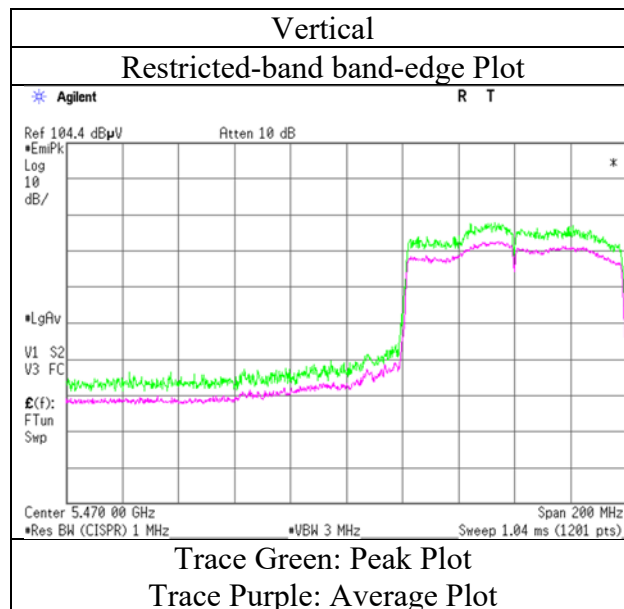
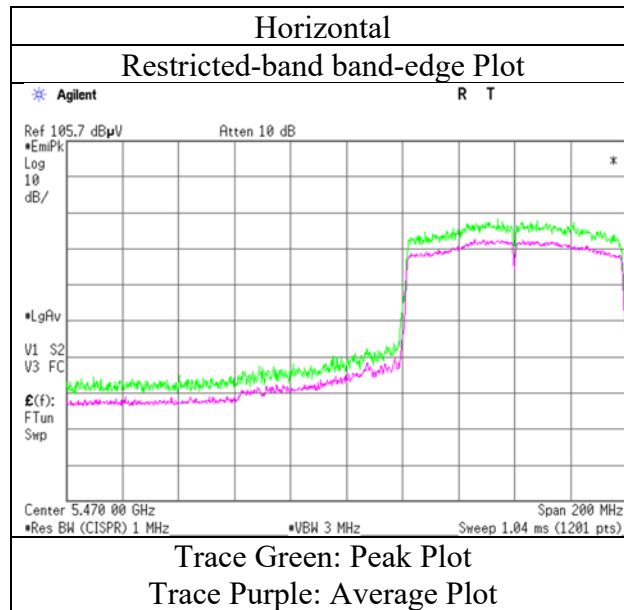
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:      1 GHz - 10 GHz       $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
                                 10 GHz - 40 GHz       $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

\*1) Not Out of Band emission(Leakage Power)

## Radiated Spurious Emission

Report No.	12530177H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	October 3, 2018
Temperature / Humidity	23 deg. C / 59 % RH
Engineer	Akihiko Maeda
	(1 GHz - 10 GHz)
Mode	Tx 11ac-80 5530 MHz



\* Final result of restricted band edge was shown in tabular data.

## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda (1 GHz - 10 GHz)	Takafumi Noguchi (10 GHz - 26.5 GHz)	Akihiko Maeda (26.5 GHz - 40 GHz)
Mode	Tx 11ac-80 5610 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5725.000	PK	41.0	32.4	6.6	31.4	-	48.6	68.2	19.6	
Hori	11220.000	PK	43.3	39.9	-2.1	33.6	-	47.5	73.9	26.4	Floor noise
Hori	16830.000	PK	43.0	40.0	0.2	33.0	-	50.2	73.9	23.7	Floor noise
Hori	22440.000	PK	44.4	37.4	-0.6	32.8	-	48.4	73.9	25.5	Floor noise
Hori	11220.000	AV	34.9	39.9	-2.1	33.6	-	39.1	53.9	14.8	Floor noise
Hori	16830.000	AV	35.0	40.0	0.2	33.0	-	42.2	53.9	11.7	Floor noise
Hori	22440.000	AV	36.4	37.4	-0.6	32.8	-	40.4	53.9	13.5	Floor noise
Vert	5725.000	PK	40.9	32.4	6.6	31.4	-	48.5	68.2	19.7	
Vert	11220.000	PK	43.2	39.9	-2.1	33.6	-	47.4	73.9	26.5	Floor noise
Vert	16830.000	PK	42.9	40.0	0.2	33.0	-	50.1	73.9	23.8	Floor noise
Vert	22440.000	PK	44.4	37.4	-0.6	32.8	-	48.4	73.9	25.5	Floor noise
Vert	11220.000	AV	34.9	39.9	-2.1	33.6	-	39.1	53.9	14.8	Floor noise
Vert	16830.000	AV	34.7	40.0	0.2	33.0	-	41.9	53.9	12.0	Floor noise
Vert	22440.000	AV	36.3	37.4	-0.6	32.8	-	40.3	53.9	13.6	Floor noise

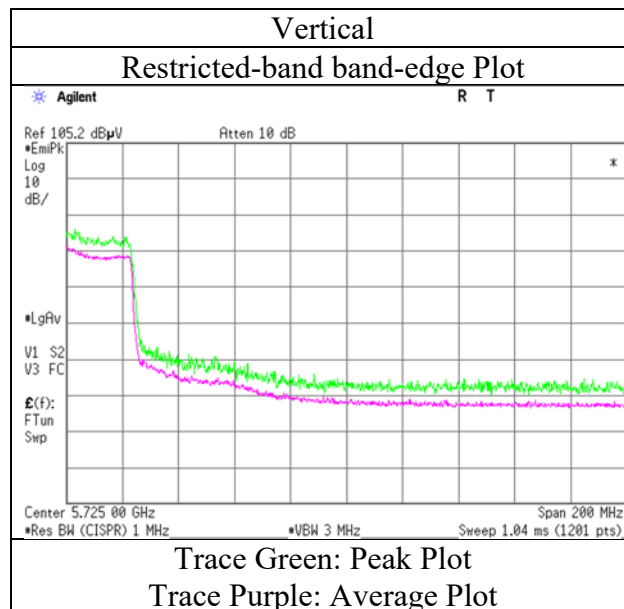
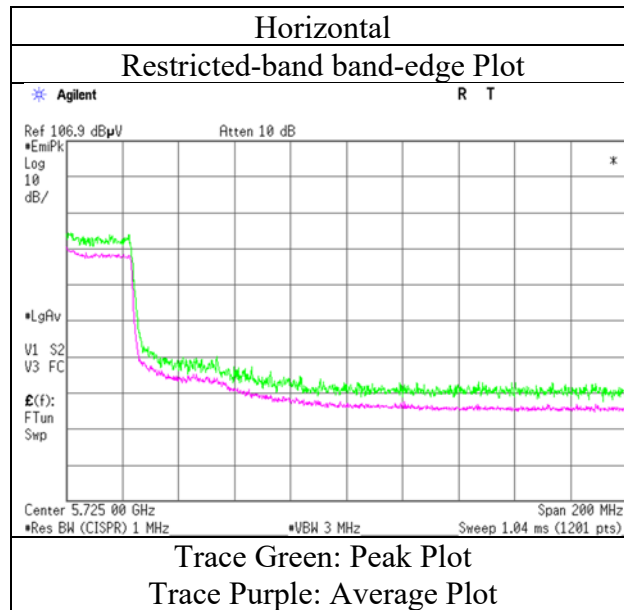
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:      1 GHz - 10 GHz       $20\log(4.0\text{ m} / 3.0\text{ m}) = 2.5\text{ dB}$   
                                 10 GHz - 40 GHz       $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 3, 2018  
Temperature / Humidity 23 deg. C / 59 % RH  
Engineer Akihiko Maeda  
(1 GHz - 10 GHz)  
Mode Tx 11ac-80 5610 MHz



\* Final result of restricted band edge was shown in tabular data.

**UL Japan, Inc.**

**Ise EMC Lab.**

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## Radiated Spurious Emission

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda	Takafumi Noguchi	Akihiko Maeda
	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)	(26.5 GHz - 40 GHz)
Mode	Tx 11ac-80 5775 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5650.000	PK	40.6	32.2	6.6	31.4	-	48.0	68.2	20.2	
Hori	5700.000	PK	44.6	32.3	6.6	31.4	-	52.1	105.2	53.1	
Hori	5720.000	PK	46.4	32.4	6.6	31.4	-	54.0	110.8	56.8	
Hori	5725.000	PK	47.5	32.4	6.6	31.4	-	55.1	122.2	67.1	
Hori	5850.000	PK	44.0	32.6	6.7	31.4	-	51.9	122.2	70.3	
Hori	5855.000	PK	42.6	32.6	6.7	31.4	-	50.5	110.8	60.3	
Hori	5875.000	PK	41.0	32.6	6.7	31.4	-	48.9	105.2	56.3	
Hori	5925.000	PK	40.6	32.6	6.7	31.5	-	48.4	68.2	19.8	
Hori	11550.000	PK	42.4	40.0	-2.0	33.5	-	46.9	73.9	27.0	Floor noise
Hori	17325.000	PK	43.4	41.9	0.3	32.9	-	52.7	73.9	21.2	Floor noise
Hori	23100.000	PK	45.9	37.9	-0.5	32.6	-	50.7	73.9	23.2	Floor noise
Hori	11550.000	AV	34.1	40.0	-2.0	33.5	-	38.6	53.9	15.3	Floor noise
Hori	17325.000	AV	35.5	41.9	0.3	32.9	-	44.8	53.9	9.1	Floor noise
Hori	23100.000	AV	37.5	37.9	-0.5	32.6	-	42.3	53.9	11.6	Floor noise
Vert	5650.000	PK	41.8	32.2	6.6	31.4	-	49.2	68.2	19.0	
Vert	5700.000	PK	43.2	32.3	6.6	31.4	-	50.7	105.2	54.5	
Vert	5720.000	PK	46.8	32.4	6.6	31.4	-	54.4	110.8	56.4	
Vert	5725.000	PK	47.8	32.4	6.6	31.4	-	55.4	122.2	66.8	
Vert	5850.000	PK	43.5	32.6	6.7	31.4	-	51.4	122.2	70.8	
Vert	5855.000	PK	41.6	32.6	6.7	31.4	-	49.5	110.8	61.3	
Vert	5875.000	PK	40.8	32.6	6.7	31.4	-	48.7	105.2	56.5	
Vert	5925.000	PK	40.2	32.6	6.7	31.5	-	48.0	68.2	20.2	
Vert	11550.000	PK	42.4	40.0	-2.0	33.5	-	46.9	73.9	27.0	Floor noise
Vert	17325.000	PK	43.5	41.9	0.3	32.9	-	52.8	73.9	21.1	Floor noise
Vert	23100.000	PK	45.5	37.9	-0.5	32.6	-	50.3	73.9	23.6	Floor noise
Vert	11550.000	AV	34.2	40.0	-2.0	33.5	-	38.7	53.9	15.2	Floor noise
Vert	17325.000	AV	35.7	41.9	0.3	32.9	-	45.0	53.9	8.9	Floor noise
Vert	23100.000	AV	37.7	37.9	-0.5	32.6	-	42.5	53.9	11.4	Floor noise

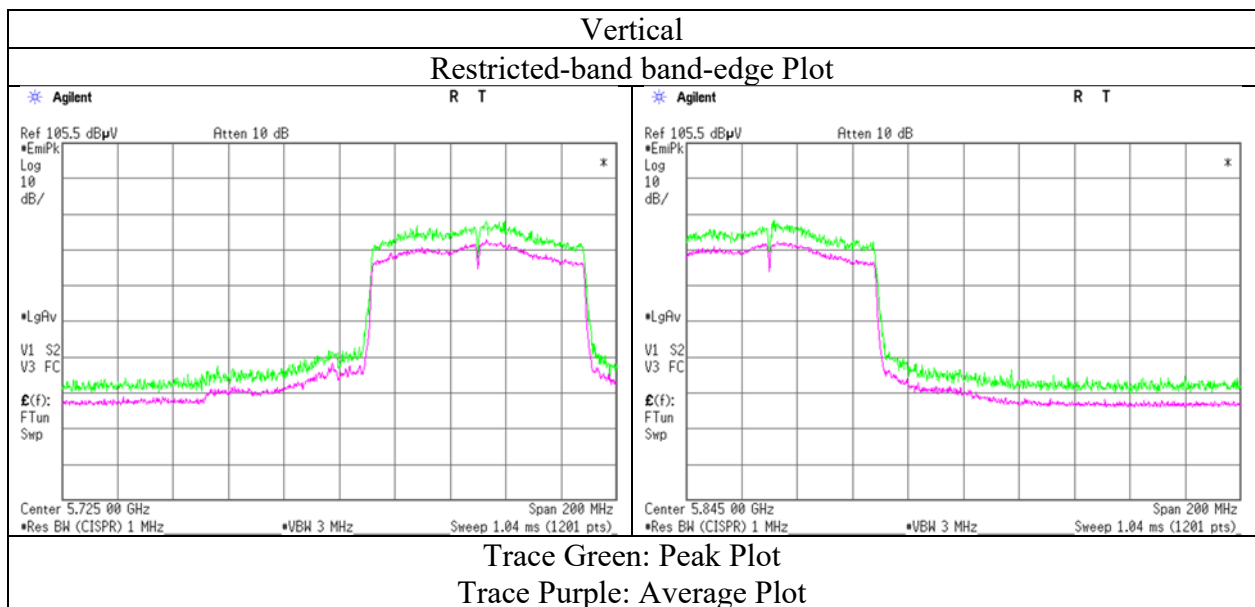
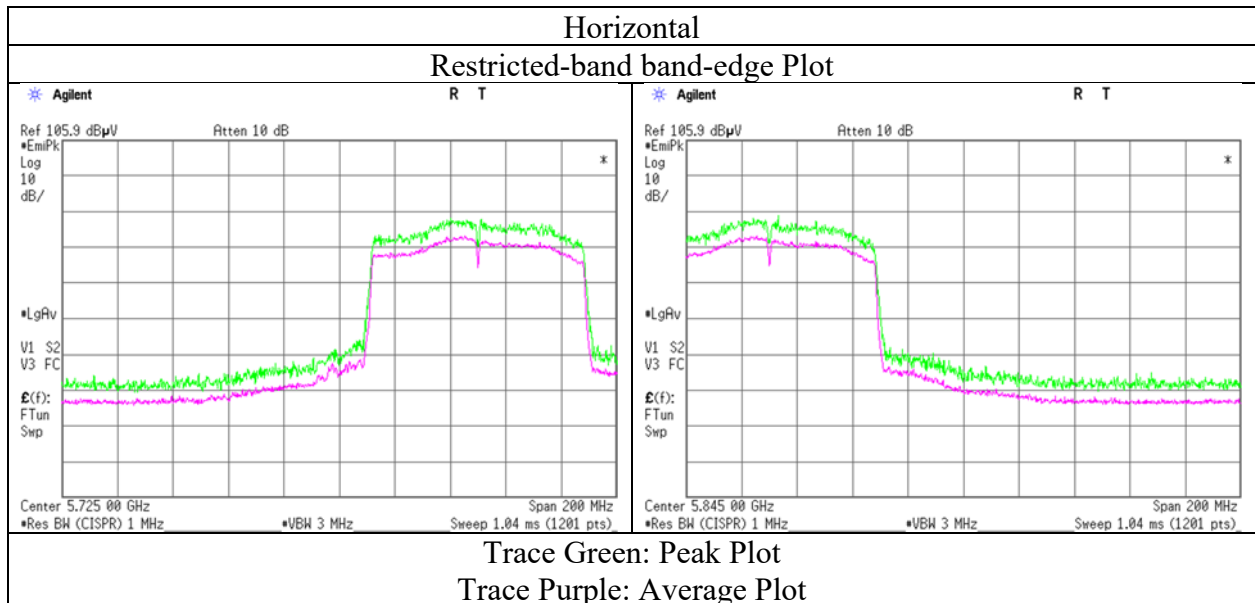
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:      1 GHz - 10 GHz      20log (4.0 m / 3.0 m) = 2.5 dB  
                                 10 GHz - 40 GHz      20log (1.0 m / 3.0 m) = -9.5 dB

## Radiated Spurious Emission

Report No.	12530177H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	October 3, 2018
Temperature / Humidity	23 deg. C / 59 % RH
Engineer	Akihiko Maeda
	(1 GHz - 10 GHz)
Mode	Tx 11ac-80 5775 MHz



\* Final result of restricted band edge was shown in tabular data.

**UL Japan, Inc.**

**Ise EMC Lab.**

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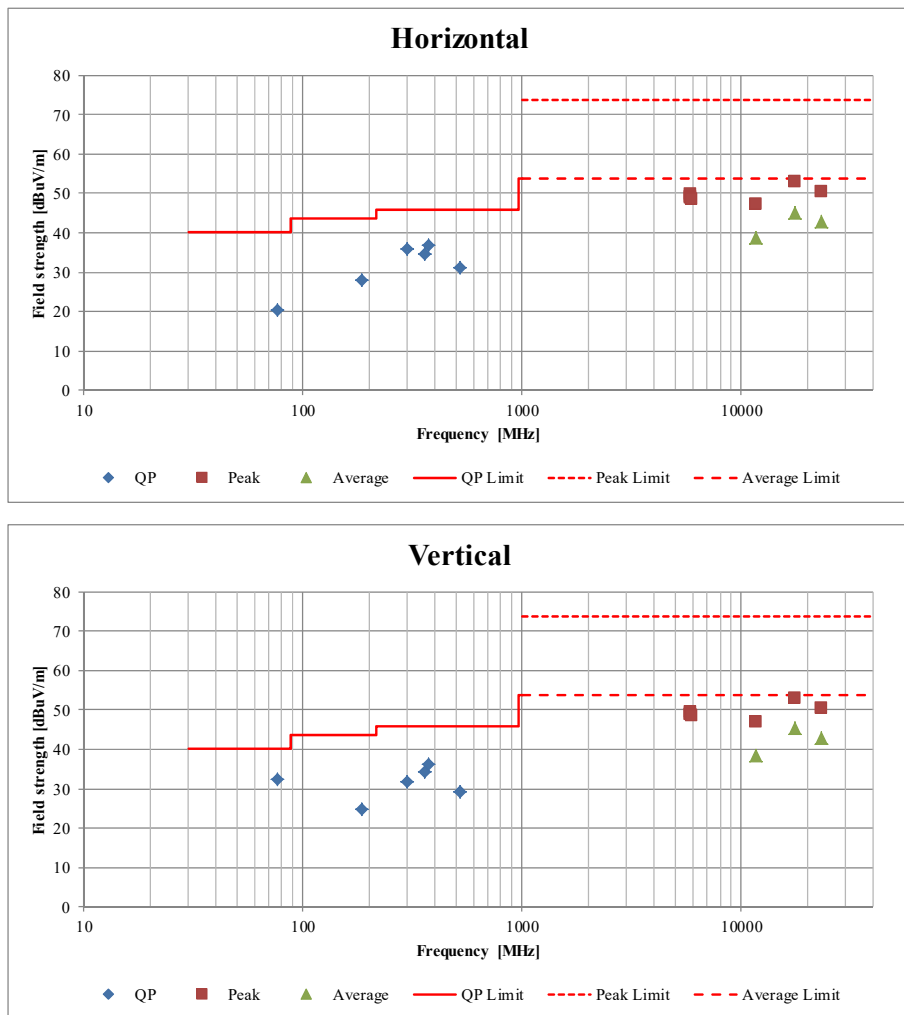
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124



## Radiated Spurious Emission (Plot data, Worst case)

Report No.	12530177H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.4
Date	October 3, 2018	October 7, 2018	October 9, 2018
Temperature / Humidity	23 deg. C / 59 % RH	25 deg. C / 65 % RH	23 deg. C / 58 % RH
Engineer	Akihiko Maeda (1 GHz - 10 GHz)	Takafumi Noguchi (10 GHz - 26.5 GHz)	Akihiko Maeda (26.5 GHz - 40 GHz , 30 MHz - 1000 MHz)
Mode	Tx 11a 5825 MHz		



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

## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4 No.3 No.4  
Date October 3, 2018 October 7, 2018 October 9, 2018  
Temperature / Humidity 23 deg. C / 59 % RH 25 deg. C / 65 % RH 23 deg. C / 58 % RH  
Engineer Akihiko Maeda Takafumi Noguchi Akihiko Maeda  
(1 GHz - 10 GHz) (10 GHz - 26.5 GHz) (26.5 GHz - 40 GHz ,  
30 MHz - 1000 MHz)  
Mode Tx 11ac-80 5290 MHz + Tx BTLE 2402MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	76.674	QP	37.9	6.7	7.9	32.2	-	20.3	40.0	19.7	
Hori	186.599	QP	34.2	16.5	9.1	32.1	-	27.7	43.5	15.8	
Hori	298.564	QP	44.3	13.7	10.0	32.1	-	35.9	46.0	10.1	
Hori	360.748	QP	40.5	15.2	10.5	32.1	-	34.1	46.0	11.9	
Hori	373.199	QP	43.4	15.1	10.6	32.1	-	37.0	46.0	9.0	
Hori	522.461	QP	34.8	17.6	11.6	32.1	-	31.9	46.0	14.1	
Hori	5350.000	PK	45.8	31.7	8.2	31.3	-	54.4	73.9	19.5	
Hori	10580.000	PK	43.4	39.8	-2.4	33.6	-	47.2	73.9	26.7	Floor noise
Hori	15870.000	PK	43.3	37.3	-0.2	33.0	-	47.4	73.9	26.5	Floor noise
Hori	21160.000	PK	45.3	36.9	-0.9	33.3	-	48.0	73.9	25.9	Floor noise
Hori	5350.000	AV	31.6	31.7	8.2	31.3	3.5	43.7	53.9	10.2	*1)
Hori	10580.000	AV	34.5	39.8	-2.4	33.6	-	38.3	53.9	15.6	Floor noise
Hori	15870.000	AV	35.3	37.3	-0.2	33.0	-	39.4	53.9	14.5	Floor noise
Hori	21160.000	AV	36.3	36.9	-0.9	33.3	-	39.0	53.9	14.9	Floor noise
Vert	76.674	QP	50.2	6.7	7.9	32.2	-	32.6	40.0	7.4	
Vert	186.599	QP	31.6	16.5	9.1	32.1	-	25.1	43.5	18.4	
Vert	298.564	QP	40.2	13.7	10.0	32.1	-	31.8	46.0	14.2	
Vert	360.748	QP	40.7	15.2	10.5	32.1	-	34.3	46.0	11.7	
Vert	373.199	QP	42.6	15.1	10.6	32.1	-	36.2	46.0	9.8	
Vert	522.461	QP	32.4	17.6	11.6	32.1	-	29.5	46.0	16.5	
Vert	5350.000	PK	45.0	31.7	8.2	31.3	-	53.6	73.9	20.3	
Vert	10580.000	PK	43.3	39.8	-2.4	33.6	-	47.1	73.9	26.8	Floor noise
Vert	15870.000	PK	43.1	37.3	-0.2	33.0	-	47.2	73.9	26.7	Floor noise
Vert	21160.000	PK	45.3	36.9	-0.9	33.3	-	48.0	73.9	25.9	Floor noise
Vert	5350.000	AV	35.0	31.7	8.2	31.3	3.5	47.1	53.9	6.8	*1)
Vert	10580.000	AV	34.5	39.8	-2.4	33.6	-	38.3	53.9	15.6	Floor noise
Vert	15870.000	AV	35.2	37.3	-0.2	33.0	-	39.3	53.9	14.6	Floor noise
Vert	21160.000	AV	36.3	36.9	-0.9	33.3	-	39.0	53.9	14.9	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

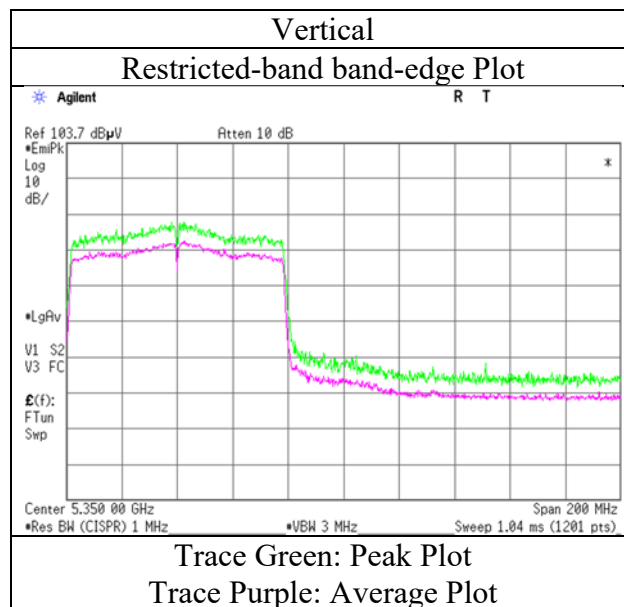
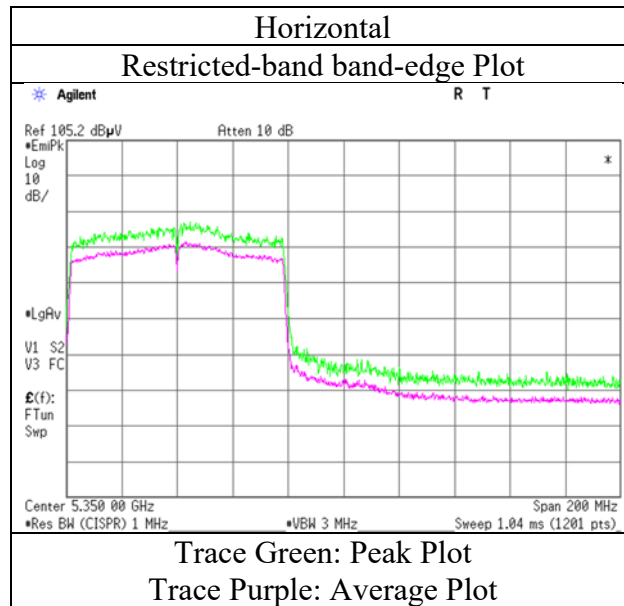
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.0 m / 3.0 m) = 2.5 dB  
10 GHz - 40 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

\*1) Not Out of Band emission(Leakage Power)

## Radiated Spurious Emission

Report No. 12530177H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date October 3, 2018  
Temperature / Humidity 23 deg. C / 59 % RH  
Engineer Akihiko Maeda  
(1 GHz - 10 GHz)  
Mode Tx 11ac-80 5290 MHz + Tx BTLE 2402MHz



\* Final result of restricted band edge was shown in tabular data.

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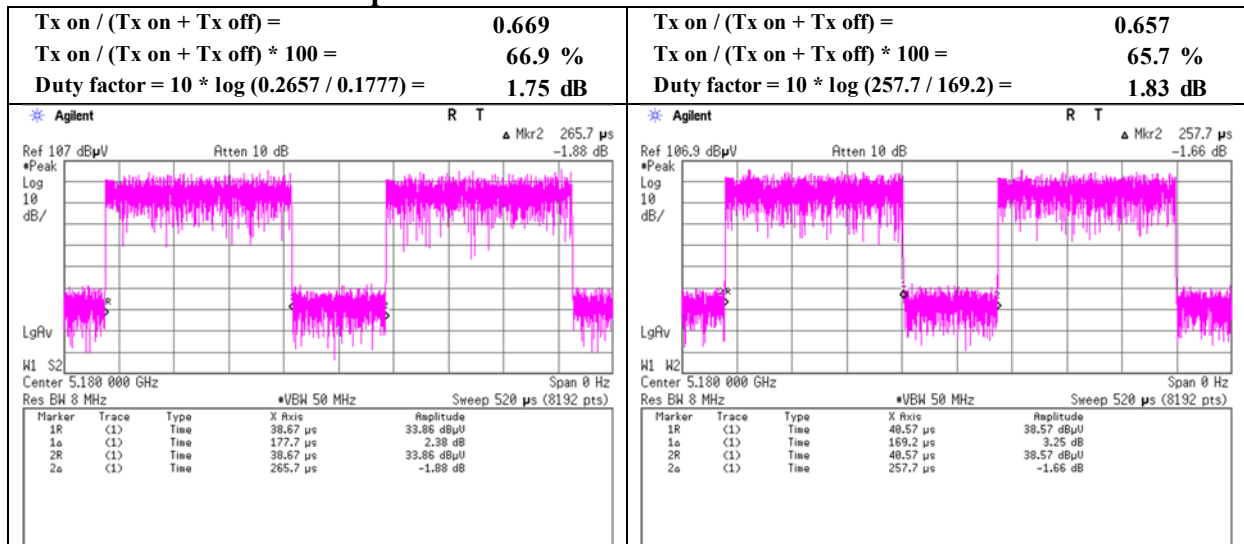
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## Burst rate confirmation

Test place : Ise EMC Lab. No.4 Semi Anechoic Chamber  
Report No. : 12530177H  
Date : October 3, 2018  
Temperature / Humidity : 23 deg. C / 59 % RH  
Engineer : Akihiko Maeda  
Mode : Tx

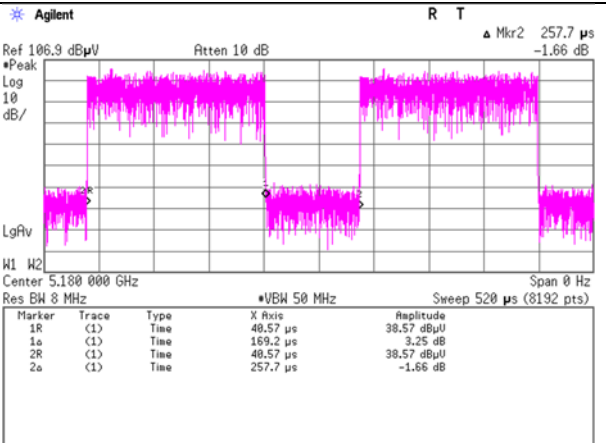
### 11a 54Mbps



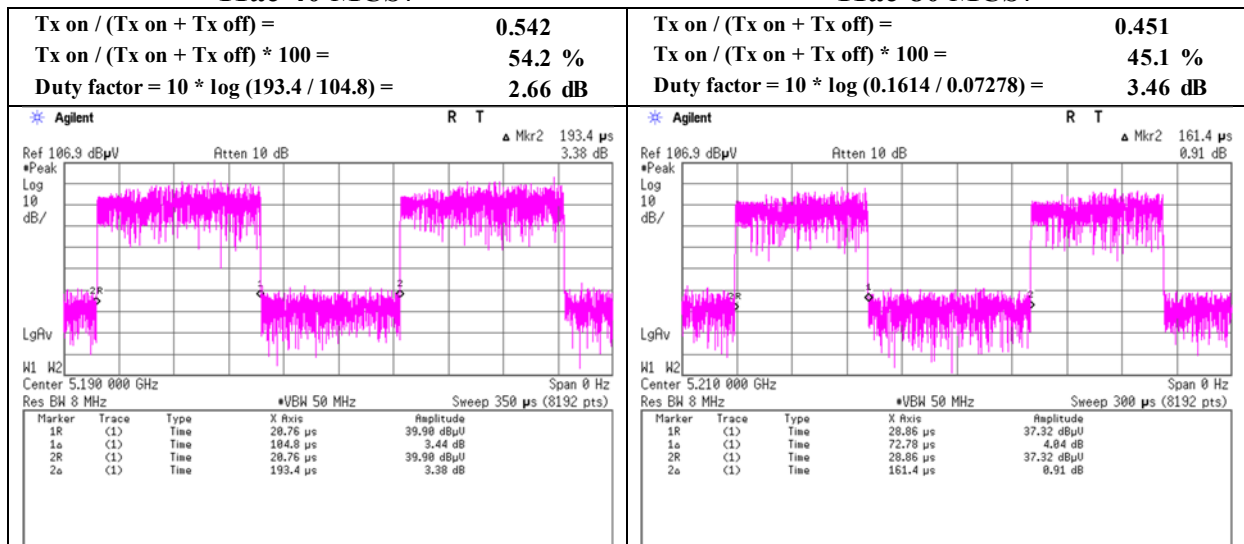
### 11ac-20 MCS7

**Tx on / (Tx on + Tx off) =**  
**Tx on / (Tx on + Tx off) \* 100 =**  
**Duty factor = 10 \* log (257.7 / 169.2) =**

**0.657**  
**65.7 %**  
**1.83 dB**



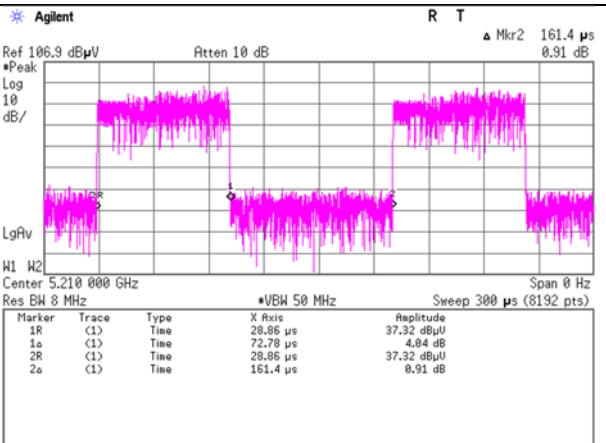
### 11ac-40 MCS7



### 11ac-80 MCS7

**Tx on / (Tx on + Tx off) =**  
**Tx on / (Tx on + Tx off) \* 100 =**  
**Duty factor = 10 \* log (0.1614 / 0.07278) =**

**0.451**  
**45.1 %**  
**3.46 dB**



## APPENDIX 2: Test instruments

### Test Instruments

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Cal Int
RE	141562	Thermo-Hygrometer	CUSTOM	CTH-180	1501	01/24/2018	01/31/2019	12
RE	142017	AC4_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-10005	-	04/20/2019	12
RE	141545	DIGITAL HiTESTER	HIOKI	3805	51201148	01/09/2018	01/31/2019	12
RE	141581	MicroWave System Amplifier	AGILENT	83017A	650	10/04/2018	10/31/2019	12
RE	141412	Microwave Cable	Junkosha	MWX221	1305S002R(1m) / 1405S146(5m)	06/14/2018	06/30/2019	12
RE	142227	Measure	KOMELON	KMC-36	-	-	-	-
RE	141152	EMI measurement program	TSJ	TEPTO-DV	-	-	-	-
RE	141899	Spectrum Analyzer	AGILENT	E4448A	MY46180655	08/10/2018	08/31/2019	12
RE	141508	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	06/08/2018	06/30/2019	12
RE	141296	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	002	09/19/2018	09/30/2019	12
RE	142183	Measure	KOMELON	KMC-36	-	-	-	-
RE	141227	Microwave Cable	Junkosha	MMX221-00500DM SDMS	1502S305	03/12/2018	03/31/2019	12
RE	141293	High Pass Filter 7-20GHz	TOKIMEC	TF37NCCB	602	01/18/2018	01/31/2019	12
RE	141554	Thermo-Hygrometer	CUSTOM	CTH-180	1301	01/24/2018	01/31/2019	12
RE	141417	Microwave Cable	Junkosha	MWX221	1404S374(1m) / 1405S074(5m)	05/07/2018	05/31/2019	12
RE	141580	MicroWave System Amplifier	AGILENT	83017A	MY39500779	03/13/2018	03/31/2019	12
RE	141513	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	06/07/2018	06/30/2019	12
RE	141507	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	06/07/2018	06/30/2019	12
RE	142013	AC3_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-10005	-	04/30/2019	12
RE	141532	DIGITAL HiTESTER	HIOKI	3805	51201197	01/09/2018	01/31/2019	12
RE	160324	Coaxial Cable	Huber+Suhner	SUCOFLEX 102A	MY009/2A	11/08/2017	11/30/2018	12
RE	141582	Pre Amplifier	SONOMA INSTRUMENT	11/5/1900	260834	02/27/2018	02/28/2019	12
RE	141323	Coaxial cable	UL Japan	-	-	07/03/2018	07/31/2019	12
RE	141266	Logperiodic Antenna (200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-191	06/04/2018	06/30/2019	12
RE	141424	Biconical Antenna	Schwarzbeck	BBA9106	1915	06/04/2018	06/30/2019	12
RE	141517	Horn Antenna 26.5-40GHz	ETS LINDGREN	Oct-60	152399	06/08/2018	06/30/2019	12
RE	142008	AC3_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	06/26/2018	06/30/2020	24
RE	148897	Attenuator	KEYSIGHT	8491A	MY52462349	12/18/2017	12/31/2018	12

\*Hyphens for Last Calibration Date, Calibration Due 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.

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

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

Test item:

RE: Radiated Emission

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