



# RADIO TEST REPORT

Test Report No. : 12208081S-C

**Applicant** : Nintendo Co., Ltd.  
**Type of Equipment** : Wireless Game Device  
**Model No.** : HAC-015  
**FCC ID** : BKEHAC015  
**Test regulation** : FCC Part 15 Subpart C: 2018  
**Test item** : Radiated Spurious Emission  
**Test Result** : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
6. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)

**Date of test:** March 15 to 21, 2018

**Representative test engineer:**

*K. Takeyama*

Kazutaka Takeyama  
Engineer  
Consumer Technology Division

**Approved by:**

*A. Hayashi*

Akio Hayashi  
Leader  
Consumer Technology Division



**JAB**  
Testing  
RTL02610

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

**UL Japan, Inc.**  
**Shonan EMC Lab.**

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## **SECTION 1: Customer information**

Company Name : Nintendo Co., Ltd.  
Address : 11-1 Hokotate-cho, Kamitoba, Minami-ku, Kyoto 601-8501, Japan  
Telephone Number : +81-75-662-9600  
Facsimile Number : +81-75-662-9624  
Contact Person : Kazuya Kuramoto

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

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

Type of Equipment : Wireless Game Device  
Model No. : HAC-015  
Serial No. : Refer to Section 4, Clause 4.2  
Rating : Vbat: DC 3.2 V to DC 4.5 V (Typical: DC 3.7 V)  
Vin: DC 5.0 V  
Receipt Date of Sample : March 12, 2018  
Country of Mass-production : China  
Condition of EUT : Production 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: HAC-015 (referred to as the EUT in this report) is a Wireless Game Device.

## **Radio Specification**

### **Bluetooth:**

Radio Type : Transceiver  
Frequency of Operation : 2402 MHz - 2480 MHz  
Modulation : FHSS  
Power Supply (radio part input) : DC 1.8 V  
Antenna type : Inverted-F Antenna  
Antenna Gain : 0.54 dBi  
Operation temperature : +5 deg.C to +35 deg.C

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

### **3.1 Test Specification**

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

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators  
Section 15.207 Conducted limits  
Section 15.247 Operation within the bands 902-928 MHz,  
2400-2483.5 MHz, and 5725-5850 MHz

\* The revision on March 12, 2018, does not affect the test specification applied to the EUT.

### **3.2 Procedures and results**

Item *1)	Test Procedure	Specification	Worst Margin	Results	Remarks
Spurious Emission & Band Edge Compliance	FCC: FCC Public Notice DA 00-705 IC: RSS-Gen 6.13	FCC: Section15.247(d) IC: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	7.6 dB 12400.000 MHz, AV, Hori. Tx 2480 MHz DH5	Complied	Conducted/ Radiated (above 30 MHz) *2)
<p>Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.  *1) Regarding as other items, refer to the test report: 11257132S-A-R3.  *2) Radiated test was selected over 30 MHz based on section 15.247(d).  Conducted test was selected below 30 MHz. Refer to the test report: 11257132S-A-R3.</p>					

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

#### **FCC Part 15.31 (e)**

The EUT is supplied the power from battery or host device.  
In either method, the EUT provides stable voltage (DC 1.8 V) constantly to RF Module regardless of input voltage.  
In the case of battery method, the test was performed with the full-charged battery.  
Therefore, the EUT complies with the requirement.

#### **FCC Part 15.203 Antenna requirement**

The equipment and its antenna comply with the requirement since the antenna is built in the equipment and it cannot be replaced by end users.

### **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  $k=2$ .  
Shonan EMC Lab.

Item	Frequency range	Uncertainty (+/-)				
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR	No. 4 SAC / SR	No. 5,6,8 SR
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.2 dB	3.2 dB	3.3 dB	-	-
	30 MHz-200 MHz	4.3 dB	4.3 dB	4.3 dB	-	-
	200 MHz-1 GHz	5.9 dB	5.9 dB	5.9 dB	-	-
	1 GHz-6 GHz	4.7 dB	4.7 dB	4.7 dB	-	-
	6 GHz-18 GHz	5.3 dB	5.3 dB	5.3 dB	-	-
	18 GHz-40 GHz	5.6 dB	5.6 dB	5.6 dB	-	-
Radiated emission (Measurement distance: 1 m)	1 GHz-18 GHz	5.6 dB	5.6 dB	5.6 dB	-	-
	18 GHz-40 GHz	5.9 dB	5.9 dB	5.9 dB	-	-

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

#### Radiated emission test

The data listed in this test report has enough margin, more than the site margin.

### 3.5 Test Location

UL Japan, Inc. Shonan EMC Lab.

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Telephone: +81 463 50 6400, Facsimile: +81 463 50 6401

JAB Accreditation No. RTL02610

FCC Test Firm Registration Number: 839876

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

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

Refer to APPENDIX.

## **SECTION 4: Operation of E.U.T. during testing**

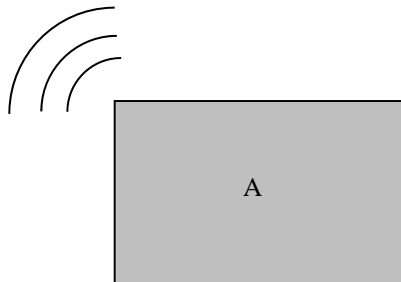
### **4.1 Operating Mode(s)**

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

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Spurious Emission (Radiated)	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
<p>*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length (except Dwell time test)  *2DH mode (2Mb/s EDR: pi/4DQPSK) was excluded for other tests than power measurement by using 3DH mode (3 Mb/s EDR: 8DPSK) as a representative.  * It is considered that the non-tested packet type (e.g. inquiry) can be omitted as it is complied with above all the test items based on Bluetooth Core specification.  Power settings: Fixed  Software: cmd.exe, Ver. 10.0.14393,                Bluetool.exe, Ver.1.9.6.5  *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.</p>		

### **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 and Support equipment**

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Wireless Game Device	HAC-015	XBW01000010563	Nintendo Co., Ltd.	EUT

#### Accessory and model differences

There are Type-A and Type-B in HAC-015 and the difference is the manufacturer of parts.

The difference between Type-A and Type-B is as following table.

The two crystals and 1.8 V LDO are compatible and are electrically identical having same radio parameters.

	Type-A	Type-B
Crystal (X1)	DSX211SH	7R24080002
1.8 V LDO (U32)	LD39020DTPU18R	RP202K181D

Because of only the change of antenna, the test was performed with Type-B as a representative.

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## **SECTION 5: Radiated Spurious Emission**

### **Test Procedure**

[For below 1 GHz]

EUT was placed on a urethane platform of nominal size, 1.5 m by 1.0 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane.

The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

The height of the measuring antenna varied between 1 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.

### **Test Antennas are used as below;**

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



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

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

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	RBW: 1 MHz VBW: 10 Hz *1)	RBW: 100 kHz VBW: 300 kHz
Test Distance	3 m	3.95 m*2) (1 GHz – 10 GHz), 1 m*3) (10 GHz – 26.5 GHz)		3.95 m*2) (1 GHz – 10 GHz), 1 m*3) (10 GHz – 26.5 GHz)

\*1) Although DA 00-705 accepts VBW = 10 Hz for AV measurements, it was confirmed that superfluous smoothing was not performed.

\*2) Distance Factor:  $20 \times \log(3.95 \text{ m}/3.0 \text{ m}) = 2.39 \text{ dB}$

\*3) Distance Factor:  $20 \times \log(1.0 \text{ m}/3.0 \text{ m}) = -9.54 \text{ dB}$

- 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.

Antenna polarization	Carrier	Spurious (Below 1 GHz)	Spurious (2.8 GHz -13 GHz)	Spurious (13 GHz -26.5 GHz)
Horizontal	X	X	Y	X
Vertical	Y	X	Y	X

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

**Measurement range : 30 MHz - 26.5 GHz**

**Test data : APPENDIX**

**Test result : Pass**

**APPENDIX 1: Test data**

**Radiated Spurious Emission**

Report No. 12208081S-C  
Test place Shonan EMC Lab.  
Semi Anechoic Chamber No.3 No.3 No.3  
Date March 15, 2018 March 19, 2018 March 15, 2018  
Temperature / Humidity 24 deg. C / 37 % RH 24 deg. C / 38 % RH 24 deg. C / 37 % RH  
Engineer Hiroyuki Morikawa Kazutaka Takeyama Hiroyuki Morikawa  
(30 MHz -1 GHz) (1 GHz -13 GHz) (13 GHz -26.5 GHz)  
Mode Tx, Hopping Off, DH5 2402 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	48.000	QP	22.10	11.35	6.94	32.19	0.00	8.20	40.00	31.8	100	0	
Hori.	72.000	QP	22.60	6.21	7.11	32.18	0.00	3.74	40.00	36.2	100	0	
Hori.	96.000	QP	22.10	9.29	7.60	32.16	0.00	6.83	43.50	36.6	100	0	
Hori.	120.000	QP	22.60	12.97	7.40	32.14	0.00	10.83	43.50	32.6	100	0	
Hori.	144.000	QP	21.90	14.50	7.83	32.12	0.00	12.11	43.50	31.3	100	0	
Hori.	168.000	QP	22.10	15.54	8.03	32.10	0.00	13.57	43.50	29.9	100	0	
Hori.	192.000	QP	21.80	16.16	7.97	32.08	0.00	13.85	43.50	29.6	100	0	
Hori.	1441.200	PK	47.84	24.94	13.21	43.79	2.39	44.59	73.90	29.3	238	276	
Hori.	2390.000	PK	47.70	27.26	14.19	44.13	2.39	47.41	73.90	26.4	238	276	
Hori.	3843.183	PK	49.60	29.45	6.35	44.30	2.39	43.49	73.90	30.4	100	207	
Hori.	4794.056	PK	47.90	31.38	6.67	44.45	2.39	43.89	73.90	30.0	100	0	
Hori.	4804.000	PK	48.40	31.40	6.68	44.45	2.39	44.42	73.90	29.4	100	0	
Hori.	7206.000	PK	47.00	36.56	8.24	43.99	2.39	50.20	73.90	23.7	100	0	
Hori.	9608.000	PK	46.40	38.61	9.27	43.83	2.39	52.84	73.90	21.0	100	0	
Hori.	12010.000	PK	45.50	39.30	10.48	43.36	2.39	54.31	73.90	19.5	100	0	
Hori.	1441.200	AV	36.30	24.94	13.21	43.79	2.39	33.05	53.90	20.8	238	276	
Hori.	2390.000	AV	36.80	27.26	14.19	44.13	2.39	36.51	53.90	17.3	238	276	
Hori.	3843.183	AV	41.20	29.45	6.35	44.30	2.39	35.09	53.90	18.8	100	207	
Hori.	4794.056	AV	38.30	31.38	6.67	44.45	2.39	34.29	53.90	19.6	100	0	
Hori.	4804.000	AV	38.30	31.40	6.68	44.45	2.39	34.32	53.90	19.5	100	0	
Hori.	7206.000	AV	36.80	36.56	8.24	43.99	2.39	40.00	53.90	13.9	100	0	
Hori.	9608.000	AV	37.80	38.61	9.27	43.83	2.39	44.24	53.90	9.6	100	0	
Hori.	12010.000	AV	37.00	39.30	10.48	43.36	2.39	45.81	53.90	8.0	100	0	
Vert.	48.000	QP	22.20	11.35	6.94	32.19	0.00	8.30	40.00	31.7	100	0	
Vert.	72.000	QP	22.80	6.21	7.11	32.18	0.00	3.94	40.00	36.0	100	0	
Vert.	96.000	QP	22.30	9.29	7.60	32.16	0.00	7.03	43.50	36.4	100	0	
Vert.	120.000	QP	22.60	12.97	7.40	32.14	0.00	10.83	43.50	32.6	100	0	
Vert.	144.000	QP	21.90	14.50	7.83	32.12	0.00	12.11	43.50	31.3	100	0	
Vert.	168.000	QP	22.30	15.54	8.03	32.10	0.00	13.77	43.50	29.7	100	0	
Vert.	192.000	QP	21.90	16.16	7.97	32.08	0.00	13.95	43.50	29.5	100	0	
Vert.	1441.200	PK	47.10	24.94	13.21	43.79	2.39	43.85	73.90	30.0	237	107	
Vert.	2390.000	PK	47.00	27.26	14.19	44.13	2.39	46.71	73.90	27.1	237	107	
Vert.	3843.183	PK	50.10	29.45	6.35	44.30	2.39	43.99	73.90	29.9	100	355	
Vert.	4794.056	PK	49.40	31.38	6.67	44.45	2.39	45.39	73.90	28.5	100	0	
Vert.	4804.000	PK	48.20	31.40	6.68	44.45	2.39	44.22	73.90	29.6	100	0	
Vert.	7206.000	PK	46.70	36.56	8.24	43.99	2.39	49.90	73.90	24.0	100	0	
Vert.	9608.000	PK	48.10	38.61	9.27	43.83	2.39	54.54	73.90	19.3	100	0	
Vert.	12010.000	PK	47.90	39.30	10.48	43.36	2.39	56.71	73.90	17.1	100	0	
Vert.	1441.200	AV	36.30	24.94	13.21	43.79	2.39	33.05	53.90	20.8	237	107	
Vert.	2390.000	AV	38.30	27.26	14.19	44.13	2.39	38.01	53.90	15.8	237	107	
Vert.	3843.183	AV	42.70	29.45	6.35	44.30	2.39	36.59	53.90	17.3	100	355	
Vert.	4794.056	AV	38.50	31.38	6.67	44.45	2.39	34.49	53.90	19.4	100	0	
Vert.	4804.000	AV	39.00	31.40	6.68	44.45	2.39	35.02	53.90	18.8	100	0	
Vert.	7206.000	AV	36.90	36.56	8.24	43.99	2.39	40.10	53.90	13.8	100	0	
Vert.	9608.000	AV	37.80	38.61	9.27	43.83	2.39	44.24	53.90	9.6	100	0	
Vert.	12010.000	AV	37.30	39.30	10.48	43.36	2.39	46.11	53.90	7.7	100	0	

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

Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB

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

\* These results have sufficient margin without taking account Dwell time factor.

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	94.50	27.29	14.20	44.14	2.39	94.24	-	-	Carrier
Hori.	2400.000	PK	39.40	27.29	14.19	44.14	2.39	39.13	74.24	35.1	
Vert.	2402.000	PK	93.85	27.29	14.20	44.14	2.39	93.59	-	-	Carrier
Vert.	2400.000	PK	39.30	27.29	14.19	44.14	2.39	39.03	73.59	34.6	

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

Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB

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

**UL Japan, Inc.**

**Shonan EMC Lab.**

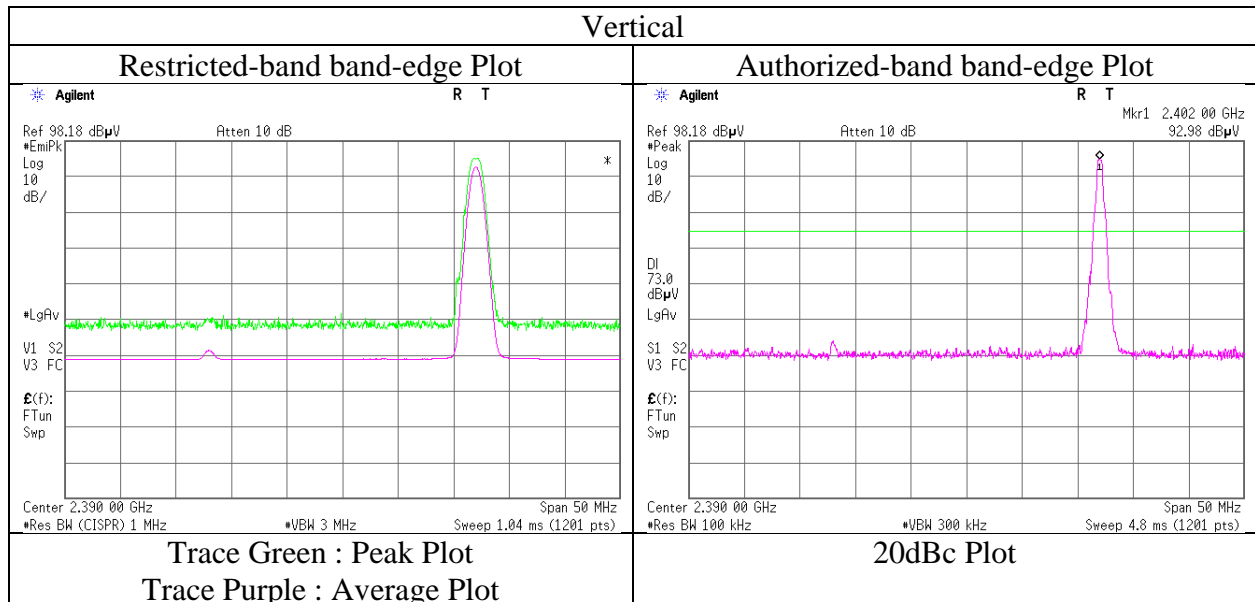
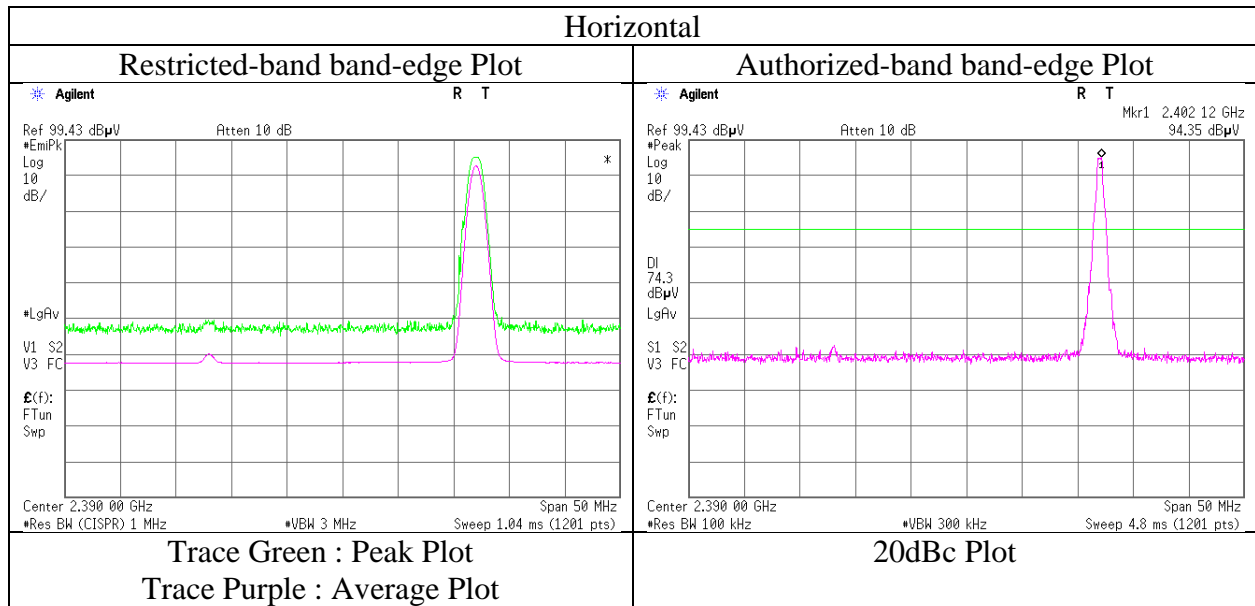
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**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

Report No. 12208081S-C  
Test place Shonan EMC Lab.  
Semi Anechoic Chamber No.3  
Date March 19, 2018  
Temperature / Humidity 24 deg. C / 38 % RH  
Engineer Kazutaka Takeyama  
(1 GHz -13 GHz)  
Mode Tx, Hopping Off, DH5 2402 MHz



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

## Radiated Spurious Emission

Report No. 12208081S-C  
Test place No.3  
Semi Anechoic Chamber March 15, 2018      March 19, 2018      March 15, 2018  
Date 24 deg. C / 37 % RH      24 deg. C / 38 % RH      24 deg. C / 37 % RH  
Temperature / Humidity Hiroyuki Morikawa      Kazutaka Takeyama      Hiroyuki Morikawa  
Engineer (30 MHz -1 GHz)      (1 GHz -13 GHz)      (13 GHz -26.5 GHz)  
No.3      No.3      No.3  
Mode Tx, Hopping Off, DH5 2441 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	48.000	QP	22.10	11.35	6.94	32.19	0.00	8.20	40.00	31.8	100	0	
Hori.	72.000	QP	22.60	6.21	7.11	32.18	0.00	3.74	40.00	36.2	100	0	
Hori.	96.000	QP	22.10	9.29	7.60	32.16	0.00	6.83	43.50	36.6	100	0	
Hori.	120.000	QP	22.60	12.97	7.40	32.14	0.00	10.83	43.50	32.6	100	0	
Hori.	144.000	QP	21.90	14.50	7.83	32.12	0.00	12.11	43.50	31.3	100	0	
Hori.	168.000	QP	22.10	15.54	8.03	32.10	0.00	13.57	43.50	29.9	100	0	
Hori.	192.000	QP	21.80	16.16	7.97	32.08	0.00	13.85	43.50	29.6	100	0	
Hori.	1464.610	PK	49.80	24.96	13.25	43.79	2.39	46.61	73.90	27.2	100	0	
Hori.	3905.591	PK	49.60	29.57	6.38	44.24	2.39	43.70	73.90	30.2	200	200	
Hori.	4793.980	PK	48.80	31.38	6.67	44.45	2.39	44.79	73.90	29.1	100	0	
Hori.	4882.000	PK	48.30	31.62	6.70	44.48	2.39	44.53	73.90	29.3	100	0	
Hori.	7323.000	PK	46.40	36.77	8.26	44.03	2.39	49.79	73.90	24.1	100	0	
Hori.	9764.000	PK	46.40	38.80	9.33	43.85	2.39	53.07	73.90	20.8	100	0	
Hori.	12205.000	PK	47.60	39.28	10.50	43.36	2.39	56.41	73.90	17.4	100	0	
Hori.	1464.610	AV	38.00	24.96	13.25	43.79	2.39	34.81	53.90	19.0	100	0	
Hori.	3905.591	AV	41.60	29.57	6.38	44.24	2.39	35.70	53.90	18.2	200	200	
Hori.	4793.980	AV	38.30	31.38	6.67	44.45	2.39	34.29	53.90	19.6	100	0	
Hori.	4882.000	AV	38.10	31.62	6.70	44.48	2.39	34.33	53.90	19.5	100	0	
Hori.	7323.000	AV	37.30	36.77	8.26	44.03	2.39	40.69	53.90	13.2	100	0	
Hori.	9764.000	AV	37.20	38.80	9.33	43.85	2.39	43.87	53.90	10.0	100	0	
Hori.	12205.000	AV	37.30	39.28	10.50	43.36	2.39	46.11	53.90	7.7	100	0	
Vert.	48.000	QP	22.10	11.35	6.94	32.19	0.00	8.20	40.00	31.8	100	0	
Vert.	72.000	QP	22.70	6.21	7.11	32.18	0.00	3.84	40.00	36.1	100	0	
Vert.	96.000	QP	22.30	9.29	7.60	32.16	0.00	7.03	43.50	36.4	100	0	
Vert.	120.000	QP	22.60	12.97	7.40	32.14	0.00	10.83	43.50	32.6	100	0	
Vert.	144.000	QP	21.80	14.50	7.83	32.12	0.00	12.01	43.50	31.4	100	0	
Vert.	168.000	QP	22.30	15.54	8.03	32.10	0.00	13.77	43.50	29.7	100	0	
Vert.	192.000	QP	21.90	16.16	7.97	32.08	0.00	13.95	43.50	29.5	100	0	
Vert.	1464.610	PK	49.50	24.96	13.25	43.79	2.39	46.31	73.90	27.5	100	2	
Vert.	3905.591	PK	51.50	29.57	6.38	44.24	2.39	45.60	73.90	28.3	142	2	
Vert.	4793.980	PK	50.00	31.38	6.67	44.45	2.39	45.99	73.90	27.9	103	347	
Vert.	4882.000	PK	49.20	31.62	6.70	44.48	2.39	45.43	73.90	28.4	100	0	
Vert.	7323.000	PK	48.66	36.77	8.26	44.03	2.39	52.05	73.90	21.8	100	0	
Vert.	9764.000	PK	49.40	38.80	9.33	43.85	2.39	56.07	73.90	17.8	100	0	
Vert.	12205.000	PK	48.70	39.28	10.50	43.36	2.39	57.51	73.90	16.3	100	0	
Vert.	1464.610	AV	37.90	24.96	13.25	43.79	2.39	34.71	53.90	19.1	100	2	
Vert.	3905.591	AV	44.20	29.57	6.38	44.24	2.39	38.30	53.90	15.6	142	2	
Vert.	4793.980	AV	38.60	31.38	6.67	44.45	2.39	34.59	53.90	19.3	103	347	
Vert.	4882.000	AV	38.60	31.62	6.70	44.48	2.39	34.83	53.90	19.0	100	0	
Vert.	7323.000	AV	37.20	36.77	8.26	44.03	2.39	40.59	53.90	13.3	100	0	
Vert.	9764.000	AV	37.60	38.80	9.33	43.85	2.39	44.27	53.90	9.6	100	0	
Vert.	12205.000	AV	37.30	39.28	10.50	43.36	2.39	46.11	53.90	7.7	100	0	

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

Distance factor : 1 GHz - 13 GHz : 20log(3.95 m / 3.0 m) = 2.39 dB

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

\* These results have sufficient margin without taking account Dwell time factor.

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## Radiated Spurious Emission

Report No.	1220801S-C		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	March 15, 2018	March 21, 2018	March 15, 2018
Temperature / Humidity	24 deg. C / 37 % RH	22 deg. C / 38 % RH	24 deg. C / 37 % RH
Engineer	Hiroyuki Morikawa	Hiroyuki Morikawa	Hiroyuki Morikawa
	(30 MHz -1 GHz)	(1 GHz -13 GHz)	(13 GHz -26.5 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	48.000	QP	22.20	11.35	6.94	32.19	0.00	8.30	40.00	31.7	100	0	
Hori.	72.000	QP	22.60	6.21	7.11	32.18	0.00	3.74	40.00	36.2	100	0	
Hori.	96.000	QP	22.10	9.29	7.60	32.16	0.00	6.83	43.50	36.6	100	0	
Hori.	120.000	QP	22.60	12.97	7.40	32.14	0.00	10.83	43.50	32.6	100	0	
Hori.	144.000	QP	21.90	14.50	7.83	32.12	0.00	12.11	43.50	31.3	100	0	
Hori.	168.000	QP	22.10	15.54	8.03	32.10	0.00	13.57	43.50	29.9	100	0	
Hori.	192.000	QP	21.90	16.16	7.97	32.08	0.00	13.95	43.50	29.5	100	0	
Hori.	1488.014	PK	49.02	24.99	13.28	43.79	2.39	45.89	73.90	28.0	100	0	
Hori.	2483.500	PK	49.90	27.55	14.29	44.16	2.39	49.97	73.90	23.9	244	321	
Hori.	3968.004	PK	50.87	29.68	6.41	44.19	2.39	45.16	73.90	28.7	182	24	
Hori.	4793.969	PK	51.34	31.38	6.67	44.45	2.39	47.33	73.90	26.5	205	40	
Hori.	4960.000	PK	50.57	31.83	6.72	44.51	2.39	47.00	73.90	26.9	100	0	
Hori.	7440.000	PK	49.79	36.97	8.27	44.08	2.39	53.34	73.90	20.5	100	0	
Hori.	9920.000	PK	49.85	38.98	9.38	43.87	2.39	56.73	73.90	17.1	100	0	
Hori.	12400.000	PK	48.90	39.26	10.52	43.36	2.39	57.71	73.90	16.1	100	0	
Hori.	1488.014	AV	37.27	24.99	13.28	43.79	2.39	34.14	53.90	19.7	100	0	
Hori.	2483.500	AV	37.10	27.55	14.29	44.16	2.39	37.17	53.90	16.7	244	321	
Hori.	3968.004	AV	42.42	29.68	6.41	44.19	2.39	36.71	53.90	17.1	182	24	
Hori.	4793.969	AV	38.76	31.38	6.67	44.45	2.39	34.75	53.90	19.1	205	40	
Hori.	4960.000	AV	38.65	31.83	6.72	44.51	2.39	35.08	53.90	18.8	100	0	
Hori.	7440.000	AV	38.11	36.97	8.27	44.08	2.39	41.66	53.90	12.2	100	0	
Hori.	9920.000	AV	37.91	38.98	9.38	43.87	2.39	44.79	53.90	9.1	100	0	
Hori.	12400.000	AV	37.40	39.26	10.52	43.36	2.39	46.21	53.90	7.6	100	0	
Vert.	48.000	QP	22.20	11.35	6.94	32.19	0.00	8.30	40.00	31.7	100	0	
Vert.	72.000	QP	22.80	6.21	7.11	32.18	0.00	3.94	40.00	36.0	100	0	
Vert.	96.000	QP	22.30	9.29	7.60	32.16	0.00	7.03	43.50	36.4	100	0	
Vert.	120.000	QP	22.60	12.97	7.40	32.14	0.00	10.83	43.50	32.6	100	0	
Vert.	144.000	QP	21.90	14.50	7.83	32.12	0.00	12.11	43.50	31.3	100	0	
Vert.	168.000	QP	22.30	15.54	8.03	32.10	0.00	13.77	43.50	29.7	100	0	
Vert.	192.000	QP	21.90	16.16	7.97	32.08	0.00	13.95	43.50	29.5	100	0	
Vert.	1488.007	PK	48.89	24.99	13.28	43.79	2.39	45.76	73.90	28.1	100	0	
Vert.	2483.500	PK	49.35	27.55	14.29	44.16	2.39	49.42	73.90	24.4	238	77	
Vert.	3968.015	PK	51.20	29.68	6.41	44.19	2.39	45.49	73.90	28.4	168	175	
Vert.	4793.989	PK	50.95	31.38	6.67	44.45	2.39	46.94	73.90	26.9	152	177	
Vert.	4960.000	PK	50.24	31.83	6.72	44.51	2.39	46.67	73.90	27.2	100	0	
Vert.	7440.000	PK	49.33	36.97	8.27	44.08	2.39	52.88	73.90	21.0	100	0	
Vert.	9920.000	PK	49.14	38.98	9.38	43.87	2.39	56.02	73.90	17.8	100	0	
Vert.	12400.000	PK	48.12	39.26	10.52	43.36	2.39	56.93	73.90	16.9	100	0	
Vert.	1488.007	AV	37.08	24.99	13.28	43.79	2.39	33.95	53.90	19.9	100	0	
Vert.	2483.500	AV	37.18	27.55	14.29	44.16	2.39	37.25	53.90	16.6	238	77	
Vert.	3968.015	AV	43.86	29.68	6.41	44.19	2.39	38.15	53.90	15.7	168	175	
Vert.	4793.989	AV	38.41	31.38	6.67	44.45	2.39	34.40	53.90	19.5	152	177	
Vert.	4960.000	AV	38.76	31.83	6.72	44.51	2.39	35.19	53.90	18.7	100	0	
Vert.	7440.000	AV	37.85	36.97	8.27	44.08	2.39	41.40	53.90	12.5	100	0	
Vert.	9920.000	AV	37.72	38.98	9.38	43.87	2.39	44.60	53.90	9.3	100	0	
Vert.	12400.000	AV	37.37	39.26	10.52	43.36	2.39	46.18	53.90	7.7	100	0	

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

Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB

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

\* These results have sufficient margin without taking account Dwell time factor.

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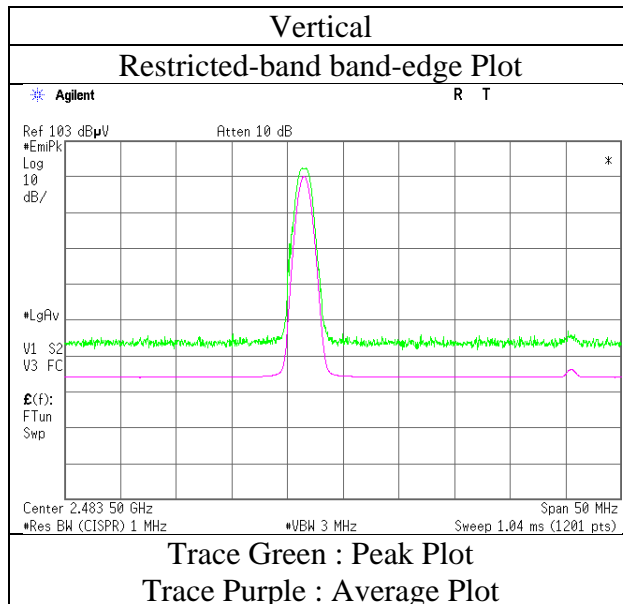
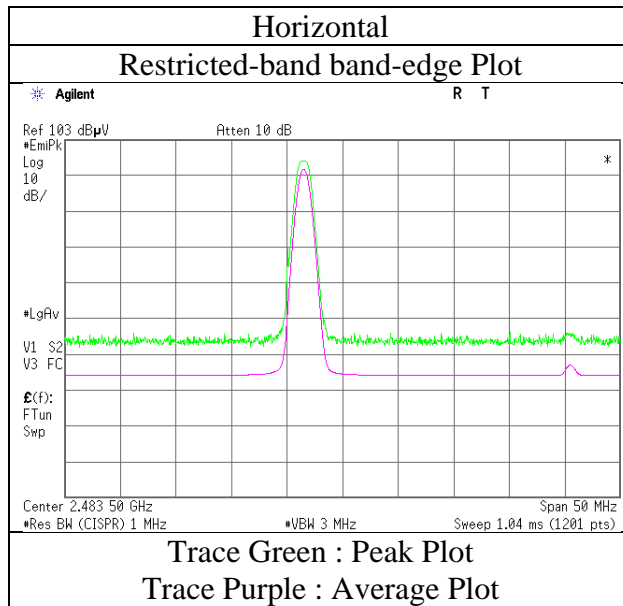
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**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

Report No.	12208081S-C
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	March 21, 2018
Temperature / Humidity	22 deg. C / 38 % RH
Engineer	Hiroyuki Morikawa (1 GHz -13 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz



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

## Radiated Spurious Emission

Report No. 12208081S-C  
Test place Shonan EMC Lab.  
Semi Anechoic Chamber No.3 No.3 No.3  
Date March 15, 2018 March 21, 2018 March 15, 2018  
Temperature / Humidity 24 deg. C / 37 % RH 22 deg. C / 38 % RH 24 deg. C / 37 % RH  
Engineer Hiroyuki Morikawa Hiroyuki Morikawa Hiroyuki Morikawa  
(30 MHz -1 GHz) (1 GHz -13 GHz) (13 GHz -26.5 GHz)  
Mode Tx, Hopping Off, 3DH5 2402 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	48.000	QP	22.20	11.35	6.94	32.19	0.00	8.30	40.00	31.7	100	0	
Hori.	72.000	QP	22.60	6.21	7.11	32.18	0.00	3.74	40.00	36.2	100	0	
Hori.	96.000	QP	22.10	9.29	7.60	32.16	0.00	6.83	43.50	36.6	100	0	
Hori.	120.000	QP	22.70	12.97	7.40	32.14	0.00	10.93	43.50	32.5	100	0	
Hori.	144.000	QP	21.90	14.50	7.83	32.12	0.00	12.11	43.50	31.3	100	0	
Hori.	168.000	QP	22.10	15.54	8.03	32.10	0.00	13.57	43.50	29.9	100	0	
Hori.	192.000	QP	21.80	16.16	7.97	32.08	0.00	13.85	43.50	29.6	100	0	
Hori.	1441.208	PK	48.35	24.94	13.21	43.79	2.39	45.10	73.90	28.8	100	0	
Hori.	2390.000	PK	48.78	27.26	14.19	44.13	2.39	48.49	73.90	25.4	214	122	
Hori.	3843.182	PK	51.70	29.45	6.35	44.30	2.39	45.59	73.90	28.3	155	33	
Hori.	4793.969	PK	50.16	31.38	6.67	44.45	2.39	46.15	73.90	27.7	168	47	
Hori.	4804.000	PK	49.14	31.40	6.68	44.45	2.39	45.16	73.90	28.7	100	0	
Hori.	7206.000	PK	47.91	36.56	8.24	43.99	2.39	51.11	73.90	22.7	100	0	
Hori.	9608.000	PK	48.22	38.61	9.27	43.83	2.39	54.66	73.90	19.2	100	0	
Hori.	12010.000	PK	48.63	39.30	10.48	43.36	2.39	57.44	73.90	16.4	100	0	
Hori.	1441.208	AV	36.27	24.94	13.21	43.79	2.39	33.02	53.90	20.8	100	0	
Hori.	2390.000	AV	36.68	27.26	14.19	44.13	2.39	36.39	53.90	17.5	214	122	
Hori.	3843.182	AV	42.24	29.45	6.35	44.30	2.39	36.13	53.90	17.7	155	33	
Hori.	4793.969	AV	38.53	31.38	6.67	44.45	2.39	34.52	53.90	19.3	168	47	
Hori.	4804.000	AV	38.53	31.40	6.68	44.45	2.39	34.55	53.90	19.3	100	0	
Hori.	7206.000	AV	36.24	36.56	8.24	43.99	2.39	39.44	53.90	14.4	100	0	
Hori.	9608.000	AV	37.67	38.61	9.27	43.83	2.39	44.11	53.90	9.7	100	0	
Hori.	12010.000	AV	37.11	39.30	10.48	43.36	2.39	45.92	53.90	7.9	100	0	
Vert.	48.000	QP	22.20	11.35	6.94	32.19	0.00	8.30	40.00	31.7	100	0	
Vert.	72.000	QP	22.80	6.21	7.11	32.18	0.00	3.94	40.00	36.0	100	0	
Vert.	96.000	QP	22.40	9.29	7.60	32.16	0.00	7.13	43.50	36.3	100	0	
Vert.	120.000	QP	22.60	12.97	7.40	32.14	0.00	10.83	43.50	32.6	100	0	
Vert.	144.000	QP	21.90	14.50	7.83	32.12	0.00	12.11	43.50	31.3	100	0	
Vert.	168.000	QP	22.30	15.54	8.03	32.10	0.00	13.77	43.50	29.7	100	0	
Vert.	192.000	QP	21.90	16.16	7.97	32.08	0.00	13.95	43.50	29.5	100	0	
Vert.	1441.194	PK	48.60	24.94	13.21	43.79	2.39	45.35	73.90	28.5	100	0	
Vert.	2390.000	PK	48.57	27.26	14.19	44.13	2.39	48.28	73.90	25.6	152	112	
Vert.	3843.196	PK	52.47	29.45	6.35	44.30	2.39	46.36	73.90	27.5	153	191	
Vert.	4794.096	PK	51.15	31.38	6.67	44.45	2.39	47.14	73.90	26.7	148	176	
Vert.	4804.000	PK	49.73	31.40	6.68	44.45	2.39	45.75	73.90	28.1	100	0	
Vert.	7206.000	PK	47.29	36.56	8.24	43.99	2.39	50.49	73.90	23.4	100	0	
Vert.	9608.000	PK	48.08	38.61	9.27	43.83	2.39	54.52	73.90	19.3	100	0	
Vert.	12010.000	PK	47.98	39.30	10.48	43.36	2.39	56.79	73.90	17.1	100	0	
Vert.	1441.194	AV	36.31	24.94	13.21	43.79	2.39	33.06	53.90	20.8	100	0	
Vert.	2390.000	AV	36.72	27.26	14.19	44.13	2.39	36.43	53.90	17.4	152	112	
Vert.	3843.196	AV	43.87	29.45	6.35	44.30	2.39	37.76	53.90	16.1	153	191	
Vert.	4794.096	AV	37.66	31.38	6.67	44.45	2.39	33.65	53.90	20.2	148	176	
Vert.	4804.000	AV	38.95	31.40	6.68	44.45	2.39	34.97	53.90	18.9	100	0	
Vert.	7206.000	AV	36.26	36.56	8.24	43.99	2.39	39.46	53.90	14.4	100	0	
Vert.	9608.000	AV	37.65	38.61	9.27	43.83	2.39	44.09	53.90	9.8	100	0	
Vert.	12010.000	AV	37.36	39.30	10.48	43.36	2.39	46.17	53.90	7.7	100	0	

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

Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB

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

\* These results have sufficient margin without taking account Dwell time factor.

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	94.76	27.29	14.20	44.14	2.39	94.50	-	-	Carrier
Hori.	2400.000	PK	42.16	27.29	14.19	44.14	2.39	41.89	74.50	32.6	
Vert.	2402.000	PK	93.36	27.29	14.20	44.14	2.39	93.10	-	-	Carrier
Vert.	2400.000	PK	40.65	27.29	14.19	44.14	2.39	40.38	73.10	32.7	

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

Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB

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

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**Shonan EMC Lab.**

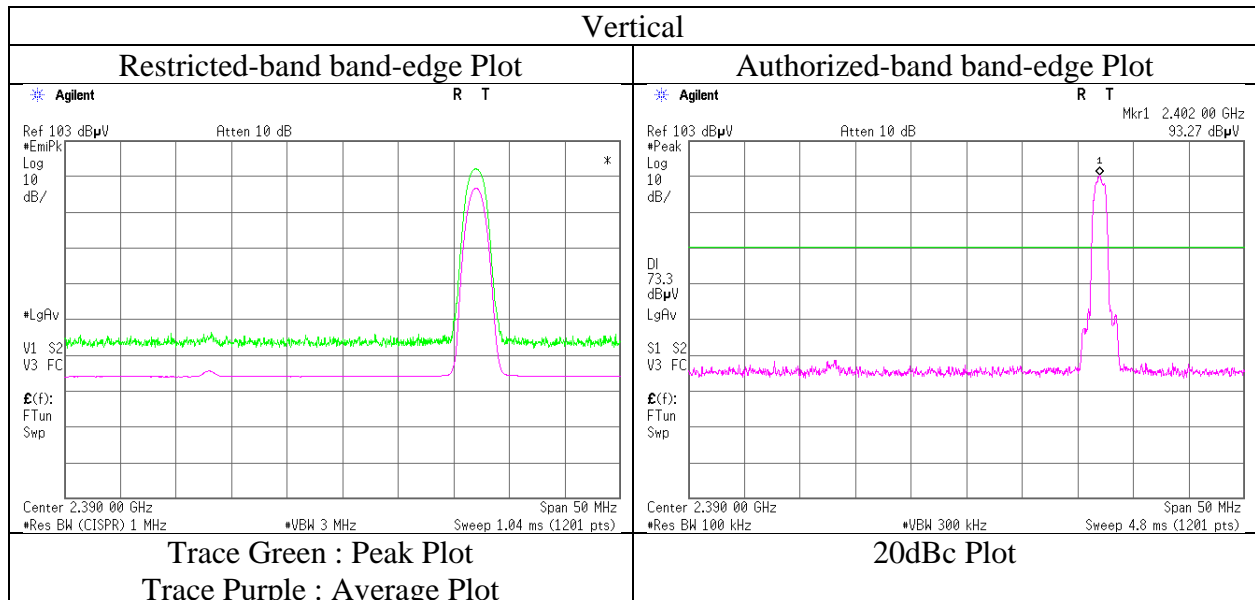
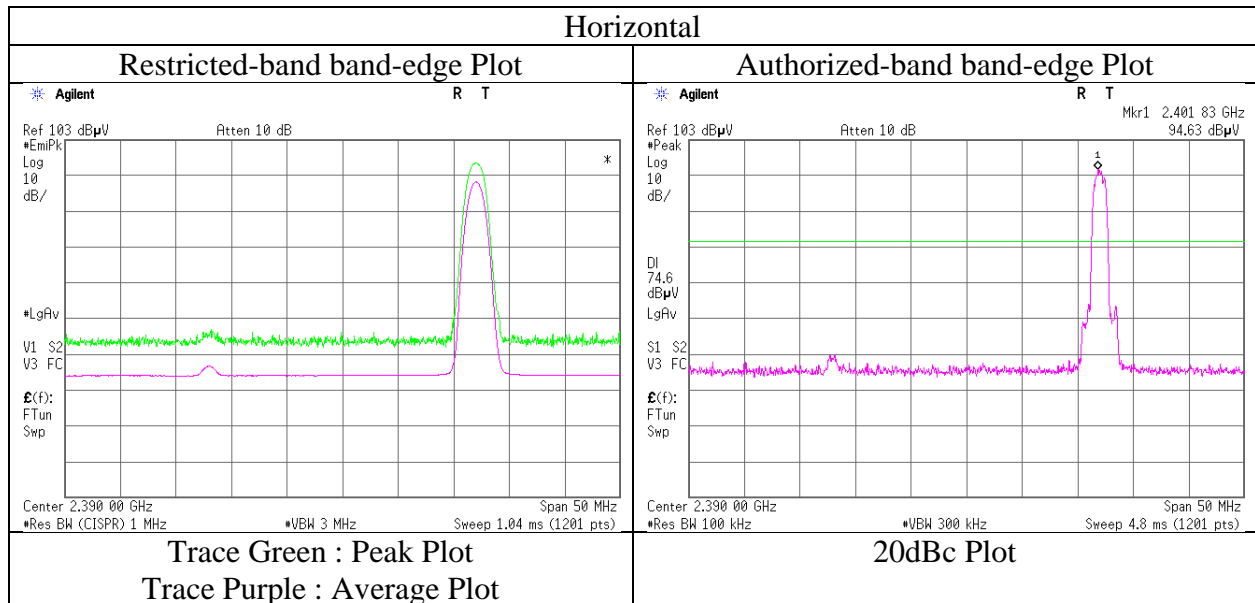
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**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

Report No. 12208081S-C  
Test place Shonan EMC Lab.  
Semi Anechoic Chamber No.3  
Date March 21, 2018  
Temperature / Humidity 22 deg. C / 38 % RH  
Engineer Hiroyuki Morikawa  
(1 GHz -13 GHz)  
Mode Tx, Hopping Off, 3DH5 2402 MHz



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



## Radiated Spurious Emission

Report No.	12208081S-C		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	March 15, 2018	March 21, 2018	March 15, 2018
Temperature / Humidity	24 deg. C / 37 % RH	22 deg. C / 38 % RH	24 deg. C / 37 % RH
Engineer	Hiroyuki Morikawa	Hiroyuki Morikawa	Hiroyuki Morikawa
	(30 MHz -1 GHz)	(1 GHz -13 GHz)	(13 GHz -26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2441 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	48.000	QP	22.20	11.35	6.94	32.19	0.00	8.30	40.00	31.7	100	0	
Hori.	72.000	QP	22.60	6.21	7.11	32.18	0.00	3.74	40.00	36.2	100	0	
Hori.	96.000	QP	22.20	9.29	7.60	32.16	0.00	6.93	43.50	36.5	100	0	
Hori.	120.000	QP	22.70	12.97	7.40	32.14	0.00	10.93	43.50	32.5	100	0	
Hori.	144.000	QP	22.00	14.50	7.83	32.12	0.00	12.21	43.50	31.2	100	0	
Hori.	168.000	QP	22.20	15.54	8.03	32.10	0.00	13.67	43.50	29.8	100	0	
Hori.	192.000	QP	21.90	16.16	7.97	32.08	0.00	13.95	43.50	29.5	100	0	
Hori.	1464.596	PK	48.87	24.96	13.25	43.79	2.39	45.68	73.90	28.2	100	0	
Hori.	3905.622	PK	51.16	29.57	6.38	44.24	2.39	45.26	73.90	28.6	155	36	
Hori.	4793.917	PK	50.09	31.38	6.67	44.45	2.39	46.08	73.90	27.8	172	49	
Hori.	4882.000	PK	49.04	31.62	6.70	44.48	2.39	45.27	73.90	28.6	100	0	
Hori.	7323.000	PK	47.66	36.77	8.26	44.03	2.39	51.05	73.90	22.8	100	0	
Hori.	9764.000	PK	47.23	38.80	9.33	43.85	2.39	53.90	73.90	20.0	100	0	
Hori.	12205.000	PK	48.52	39.28	10.50	43.36	2.39	57.33	73.90	16.5	100	0	
Hori.	1464.596	AV	37.82	24.96	13.25	43.79	2.39	34.63	53.90	19.2	100	0	
Hori.	3905.622	AV	42.19	29.57	6.38	44.24	2.39	36.29	53.90	17.6	155	36	
Hori.	4793.917	AV	38.86	31.38	6.67	44.45	2.39	34.85	53.90	19.0	172	49	
Hori.	4882.000	AV	38.43	31.62	6.70	44.48	2.39	34.66	53.90	19.2	100	0	
Hori.	7323.000	AV	37.59	36.77	8.26	44.03	2.39	40.98	53.90	12.9	100	0	
Hori.	9764.000	AV	37.51	38.80	9.33	43.85	2.39	44.18	53.90	9.7	100	0	
Hori.	12205.000	AV	37.21	39.28	10.50	43.36	2.39	46.02	53.90	7.8	100	0	
Vert.	48.000	QP	22.20	11.35	6.94	32.19	0.00	8.30	40.00	31.7	100	0	
Vert.	72.000	QP	22.90	6.21	7.11	32.18	0.00	4.04	40.00	35.9	100	0	
Vert.	96.000	QP	22.50	9.29	7.60	32.16	0.00	7.23	43.50	36.2	100	0	
Vert.	120.000	QP	22.70	12.97	7.40	32.14	0.00	10.93	43.50	32.5	100	0	
Vert.	144.000	QP	21.90	14.50	7.83	32.12	0.00	12.11	43.50	31.3	100	0	
Vert.	168.000	QP	22.40	15.54	8.03	32.10	0.00	13.87	43.50	29.6	100	0	
Vert.	192.000	QP	21.90	16.16	7.97	32.08	0.00	13.95	43.50	29.5	100	0	
Vert.	1464.570	PK	48.77	24.96	13.25	43.79	2.39	45.58	73.90	28.3	100	0	
Vert.	3905.646	PK	51.95	29.57	6.38	44.24	2.39	46.05	73.90	27.8	178	171	
Vert.	4793.949	PK	50.89	31.38	6.67	44.45	2.39	46.88	73.90	27.0	151	173	
Vert.	4882.000	PK	48.74	31.62	6.70	44.48	2.39	44.97	73.90	28.9	100	0	
Vert.	7323.000	PK	48.52	36.77	8.26	44.03	2.39	51.91	73.90	21.9	100	0	
Vert.	9764.000	PK	48.18	38.80	9.33	43.85	2.39	54.85	73.90	19.0	100	0	
Vert.	12205.000	PK	48.61	39.28	10.50	43.36	2.39	57.42	73.90	16.4	100	0	
Vert.	1464.570	AV	37.74	24.96	13.25	43.79	2.39	34.55	53.90	19.3	100	0	
Vert.	3905.646	AV	43.10	29.57	6.38	44.24	2.39	37.20	53.90	16.7	178	171	
Vert.	4793.949	AV	38.11	31.38	6.67	44.45	2.39	34.10	53.90	19.8	151	173	
Vert.	4882.000	AV	38.63	31.62	6.70	44.48	2.39	34.86	53.90	19.0	100	0	
Vert.	7323.000	AV	37.62	36.77	8.26	44.03	2.39	41.01	53.90	12.8	100	0	
Vert.	9764.000	AV	37.57	38.80	9.33	43.85	2.39	44.24	53.90	9.6	100	0	
Vert.	12205.000	AV	37.35	39.28	10.50	43.36	2.39	46.16	53.90	7.7	100	0	

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

Distance factor : 1 GHz - 13 GHz : 20log(3.95 m / 3.0 m) = 2.39 dB

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

\* These results have sufficient margin without taking account Dwell time factor.

**UL Japan, Inc.**

**Shonan EMC Lab.**

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## Radiated Spurious Emission

Report No.	12208081S-C		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	March 15, 2018	March 21, 2018	March 15, 2018
Temperature / Humidity	24 deg. C / 37 % RH	22 deg. C / 38 % RH	24 deg. C / 37 % RH
Engineer	Hiroyuki Morikawa	Hiroyuki Morikawa	Hiroyuki Morikawa
	(30 MHz -1 GHz)	(1 GHz -13 GHz)	(13 GHz -26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	48.000	QP	22.20	11.35	6.94	32.19	0.00	8.30	40.00	31.7	100	0	
Hori.	72.000	QP	22.70	6.21	7.11	32.18	0.00	3.84	40.00	36.1	100	0	
Hori.	96.000	QP	22.20	9.29	7.60	32.16	0.00	6.93	43.50	36.5	100	0	
Hori.	120.000	QP	22.70	12.97	7.40	32.14	0.00	10.93	43.50	32.5	100	0	
Hori.	144.000	QP	21.90	14.50	7.83	32.12	0.00	12.11	43.50	31.3	100	0	
Hori.	168.000	QP	22.30	15.54	8.03	32.10	0.00	13.77	43.50	29.7	100	0	
Hori.	192.000	QP	21.90	16.16	7.97	32.08	0.00	13.95	43.50	29.5	100	0	
Hori.	1488.019	PK	48.81	24.99	13.28	43.79	2.39	45.68	73.90	28.2	100	0	
Hori.	2483.500	PK	49.47	27.55	14.29	44.16	2.39	49.54	73.90	24.3	237	128	
Hori.	3968.082	PK	51.24	29.68	6.41	44.19	2.39	45.53	73.90	28.3	158	23	
Hori.	4793.985	PK	50.67	31.38	6.67	44.45	2.39	46.66	73.90	27.2	191	37	
Hori.	4960.000	PK	49.85	31.83	6.72	44.51	2.39	46.28	73.90	27.6	100	0	
Hori.	7440.000	PK	49.90	36.97	8.27	44.08	2.39	53.45	73.90	20.4	100	0	
Hori.	9920.000	PK	48.98	38.98	9.38	43.87	2.39	55.86	73.90	18.0	100	0	
Hori.	12400.000	PK	48.53	39.26	10.52	43.36	2.39	57.34	73.90	16.5	100	0	
Hori.	1488.019	AV	37.92	24.99	13.28	43.79	2.39	34.79	53.90	19.1	100	0	
Hori.	2483.500	AV	37.26	27.55	14.29	44.16	2.39	37.33	53.90	16.5	237	128	
Hori.	3968.082	AV	42.27	29.68	6.41	44.19	2.39	36.56	53.90	17.3	158	23	
Hori.	4793.985	AV	38.81	31.38	6.67	44.45	2.39	34.80	53.90	19.1	191	37	
Hori.	4960.000	AV	38.70	31.83	6.72	44.51	2.39	35.13	53.90	18.7	100	0	
Hori.	7440.000	AV	38.09	36.97	8.27	44.08	2.39	41.64	53.90	12.2	100	0	
Hori.	9920.000	AV	37.90	38.98	9.38	43.87	2.39	44.78	53.90	9.1	100	0	
Hori.	12400.000	AV	37.38	39.26	10.52	43.36	2.39	46.19	53.90	7.7	100	0	
Vert.	48.000	QP	22.20	11.35	6.94	32.19	0.00	8.30	40.00	31.7	100	0	
Vert.	72.000	QP	22.90	6.21	7.11	32.18	0.00	4.04	40.00	35.9	100	0	
Vert.	96.000	QP	22.40	9.29	7.60	32.16	0.00	7.13	43.50	36.3	100	0	
Vert.	120.000	QP	22.70	12.97	7.40	32.14	0.00	10.93	43.50	32.5	100	0	
Vert.	144.000	QP	21.90	14.50	7.83	32.12	0.00	12.11	43.50	31.3	100	0	
Vert.	168.000	QP	22.30	15.54	8.03	32.10	0.00	13.77	43.50	29.7	100	0	
Vert.	192.000	QP	21.90	16.16	7.97	32.08	0.00	13.95	43.50	29.5	100	0	
Vert.	1488.021	PK	48.29	24.99	13.28	43.79	2.39	45.16	73.90	28.7	100	0	
Vert.	2483.500	PK	49.11	27.55	14.29	44.16	2.39	49.18	73.90	24.7	264	80	
Vert.	3968.041	PK	51.45	29.68	6.41	44.19	2.39	45.74	73.90	28.1	149	207	
Vert.	4793.977	PK	50.09	31.38	6.67	44.45	2.39	46.08	73.90	27.8	152	182	
Vert.	4960.000	PK	50.11	31.83	6.72	44.51	2.39	46.54	73.90	27.3	100	0	
Vert.	7440.000	PK	49.58	36.97	8.27	44.08	2.39	53.13	73.90	20.7	100	0	
Vert.	9920.000	PK	48.93	38.98	9.38	43.87	2.39	55.81	73.90	18.0	100	0	
Vert.	12400.000	PK	47.86	39.26	10.52	43.36	2.39	56.67	73.90	17.2	100	0	
Vert.	1488.021	AV	37.91	24.99	13.28	43.79	2.39	34.78	53.90	19.1	100	0	
Vert.	2483.500	AV	37.04	27.55	14.29	44.16	2.39	37.11	53.90	16.7	264	80	
Vert.	3968.041	AV	42.73	29.68	6.41	44.19	2.39	37.02	53.90	16.8	149	207	
Vert.	4793.977	AV	38.84	31.38	6.67	44.45	2.39	34.83	53.90	19.0	152	182	
Vert.	4960.000	AV	38.80	31.83	6.72	44.51	2.39	35.23	53.90	18.6	100	0	
Vert.	7440.000	AV	37.98	36.97	8.27	44.08	2.39	41.53	53.90	12.3	100	0	
Vert.	9920.000	AV	37.84	38.98	9.38	43.87	2.39	44.72	53.90	9.1	100	0	
Vert.	12400.000	AV	37.38	39.26	10.52	43.36	2.39	46.19	53.90	7.7	100	0	

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

Distance factor : 1 GHz - 13 GHz : 20log(3.95 m / 3.0 m) = 2.39 dB

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

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**Shonan EMC Lab.**

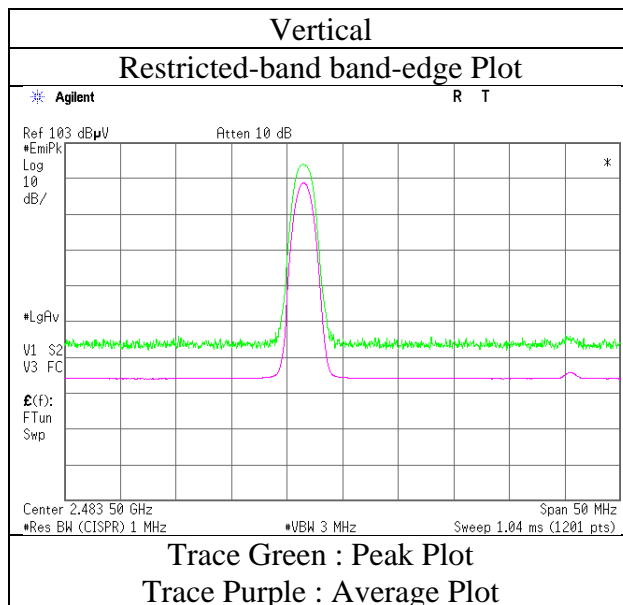
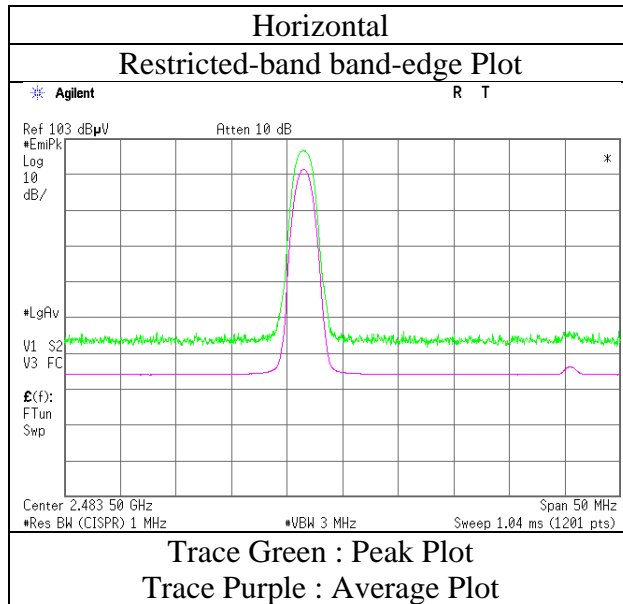
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**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

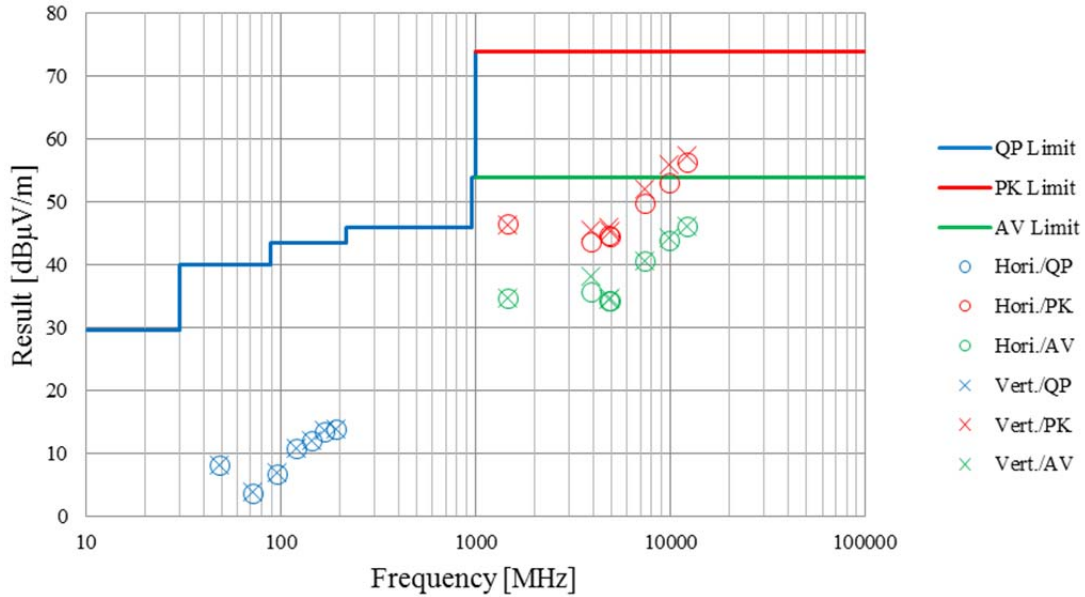
Report No.	12208081S-C
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	March 21, 2018
Temperature / Humidity	22 deg. C / 38 % RH
Engineer	Hiroyuki Morikawa (1 GHz -13 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz



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

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

Report No.	12208081S-C		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	March 15, 2018	March 21, 2018	March 15, 2018
Temperature / Humidity	24 deg. C / 37 % RH	22 deg. C / 38 % RH	24 deg. C / 37 % RH
Engineer	Hiroyuki Morikawa (30 MHz -1 GHz)	Hiroyuki Morikawa (1 GHz -13 GHz)	Hiroyuki Morikawa (13 GHz -26.5 GHz)
Mode	Tx, Hopping Off, DH5 2441 MHz		



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

## **APPENDIX 2: Test instruments**

### **Test Instruments**

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2017/06/11 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2017/10/02 * 12
SLA-07	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	196	RE	2018/01/30 * 12
SAT6-08	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-406(40)	-	RE	2017/08/24 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	RE	2017/04/07 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2018/02/16 * 12
STR-08	Test Receiver	Rohde & Schwarz	ESW44	101581	RE	2017/11/24 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,C E,RFI,MF)	-	RE	-
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2017/10/30 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2017/10/16 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2018/03/05 * 12
SHA-05	Horn Antenna	ETS LINDGREN	3160-09	LM4210	RE	2017/03/15 * 12
SAF-09	Pre Amplifier	TOYO Corporation	HAP18-26W	00000018	RE	2017/09/22 * 12
SCC-G19	Coaxial Cable	Suhner	SUCOFLEX 102A	1188/2A	RE	2017/03/23 * 12
SCC-G33	Coaxial Cable	Junkosha	MWX241-01000 KMSKMS	-	RE	2017/04/20 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	2046104	RE	2017/09/22 * 12
SCC-G06	Coaxial Cable	Junkosha	J12J102207-00	MAY-23-16-091	RE	2017/06/13 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2017/05/08 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2017/08/23 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2017/11/16 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	RE	2017/10/10 * 12
SAEC-03(SVSWR)	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	RE	2017/07/17 * 12
SCC-G40	Coaxial Cable	Junkosha	MWX221-01000 NFSNMS/B	1612S005	RE	2018/01/29 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	2046104	RE	2017/09/22 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2017/11/22 * 12

\*Hyphens for 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 test

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