



# RADIO TEST REPORT

Test Report No. : 11274193S-A-R4

**Applicant** : Alpine Electronics, Inc.  
**Type of Equipment** : Entry Evo  
**Model No.** : EE0002  
**FCC ID** : A269ZUA150  
**Test regulation** : FCC Part 15 Subpart C: 2016  
**Test Result** : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the 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)
7. This report is a revised version of 11274193S-A-R3. 11274193S-A-R3 is replaced with this report.

**Date of test:** Radiated Spurious Emission: May 11, 2016  
Antenna Terminal Conducted Tests: June 7, 2016

**Representative test engineer:**



Kazuoka Takeyama

Engineer

Consumer Technology Division

**Approved by:**



Akiyo 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.**

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

13-EM-F0429



---

<b>CONTENTS</b>	<b>PAGE</b>
<b>SECTION 1: Customer information.....</b>	<b>4</b>
<b>SECTION 2: Equipment under test (E.U.T.).....</b>	<b>4</b>
<b>SECTION 3: Test specification, procedures &amp; results.....</b>	<b>5</b>
<b>SECTION 4: Operation of E.U.T. during testing.....</b>	<b>8</b>
<b>SECTION 5: Radiated Spurious Emission .....</b>	<b>11</b>
<b>SECTION 6: Antenna Terminal Conducted Tests.....</b>	<b>13</b>
<b>APPENDIX 1: Test data .....</b>	<b>14</b>
20dB Bandwidth and Carrier Frequency Separation.....	14
Number of Hopping Frequency .....	17
Dwell time.....	19
Maximum Peak Output Power .....	22
Average Output Power .....	23
Burst Rate Confirmation .....	24
Radiated Spurious Emission .....	25
Conducted Spurious Emission .....	36
Conducted Emission Band Edge compliance .....	42
99%Occupied Bandwidth .....	44
<b>APPENDIX 2: Test instruments .....</b>	<b>46</b>
<b>APPENDIX 3: Photographs of test setup .....</b>	<b>47</b>
Radiated Spurious Emission .....	47
Worst Case Position .....	48

## **SECTION 1: Customer information**

Company Name : Alpine Electronics, Inc.  
Address : 20-1 Yoshima-Kogyodanchi, Iwaki-shi, Fukushima, 970-1192 Japan  
Telephone Number : +81-246-36-4111  
Facsimile Number : +81-246-36-6492  
Contact Person : Mitsuru Yoshida

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

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

Type of Equipment : Entry Evo  
Model No. : EE0002  
Serial No. : Refer to Section 4, Clause 4.2  
Rating : DC 14 V  
Receipt Date of Sample : March 10, 2016  
Country of Mass-production : Hungary, 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: EE0002 (referred to as the EUT in this report) is a Entry Evo.

### **General Specification**

Clock frequency(ies) in the system : 26 MHz, 32.768 kHz

### **Radio Specification**

#### **[Bluetooth Ver.4.0]**

Radio Type : Transceiver  
Frequency of Operation : 2402 - 2480 MHz  
Modulation : GFSK,  $\pi/4$ -DQPSK, 8DPSK  
Power Supply (radio part input) : DC 3.3 V, DC 1.8 V  
Antenna type :  $\lambda/4$  Monopole Antenna  
Antenna Gain : -3 dBi (including cable loss)  
Operating Temperature : -40 deg. C - +65 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 November 14, 2016 and effective December 14, 2016  
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators  
Section 15.207 Conducted limits  
Section 15.247 Operation within the bands 902-928MHz,  
2400-2483.5MHz, and 5725-5850MHz

\* The revision on November 14, 2016, does not affect the test specification applied to the EUT.

### **3.2 Procedures and results**

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.10-2013 6. Standard test methods ----- IC: RSS-Gen 8.8	FCC: Section 15.207 ----- IC: RSS-Gen 8.8	N/A	N/A *1)	-
Carrier Frequency Separation	FCC: FCC Public Notice DA 00-705 ----- IC: -	FCC: Section15.247(a)(1) ----- IC: RSS-247 5.1 (2)	See data.	Complied	Conducted
20dB Bandwidth	FCC: FCC Public Notice DA 00-705 ----- IC: -	FCC: Section15.247(a)(1) ----- IC: RSS-247 5.1 (1)		-	Conducted
Number of Hopping Frequency	FCC: FCC Public Notice DA 00-705 ----- IC: -	FCC: Section15.247(a)(1)(iii) ----- IC: RSS-247 5.1 (4)		Complied	Conducted
Dwell time	FCC: FCC Public Notice DA 00-705 ----- IC: -	FCC: Section15.247(a)(1)(iii) ----- IC: RSS-247 5.1 (4)		Complied	Conducted
Maximum Peak Output Power	FCC: FCC Public Notice DA 00-705 ----- IC: RSS-Gen 6.12	FCC: Section15.247(a)(b)(1) ----- IC: RSS-247 5.4 (2)		Complied	Conducted
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		5.6 dB 499.212 MHz, QP, Hori. Tx, Hopping Off, DH5 2402 MHz	Complied

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420.  
\*1) The test is not applicable since the EUT has no AC mains.  
\*2) Radiated test was selected over 30 MHz based on section 15.247(d).

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

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

The EUT provides stable voltage (DC 3.3 V/ 1.8 V) constantly to the wireless transmitter regardless of input voltage. Instead of a new battery, DC power supply was used for the test. That does not affect the test result, therefore the EUT complies with the requirement.

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

The EUT has a unique coupling/antenna connector. Therefore, the equipment complies with the antenna requirement of Section 15.203.

**UL Japan, Inc.**

**Shonan EMC Lab.**

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

### 3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	IC: RSS-Gen 6.6	IC: -	N/A	-	Conducted

Other than above, 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
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.1 dB	2.1 dB	2.6 dB	2.2 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	2.7 dB	2.7 dB	3.1 dB	-
	30 MHz-300 MHz	4.4 dB	4.4 dB	4.6 dB	-
	300 MHz-1 GHz	5.6 dB	5.5 dB	5.3 dB	-
	1 GHz-13 GHz	5.2 dB	5.2 dB	5.2 dB	-
Radiated emission (Measurement distance: 1 m)	13 GHz-18 GHz	4.9 dB	4.9 dB	4.9 dB	-
	18 GHz-40 GHz	4.9 dB	4.9 dB	4.9 dB	-

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)_SPM-06	0.76 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	0.79 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.74 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	1.08 dB
Spurious emission (Conducted) below 1GHz	1.5 dB
Spurious emission (Conducted) 1 GHz-3 GHz	1.7 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.4 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.5 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.5 dB
Bandwidth Measurement	0.66 %
Duty cycle and Time Measurement	0.012 %

#### 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.  
1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN  
Telephone: +81 463 50 6400, Facsimile: +81 463 50 6401  
JAB Accreditation No. RTL02610

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	10m
No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
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

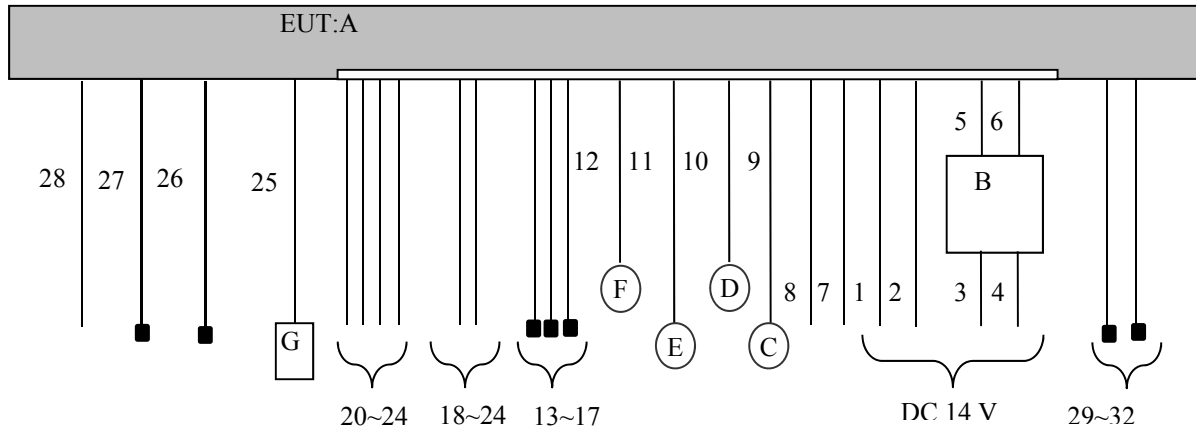
Details of Operating Mode(s)

<b>Test Item</b>	<b>Mode</b>	<b>Tested frequency</b>
Spurious Emission (Conducted/Radiated)	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Carrier Frequency Separation	Tx (Hopping On) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
20dB Bandwidth	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Number of Hopping Frequency	Tx (Hopping On) DH5, 3DH5	-
Dwell time	Tx (Hopping On), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5	-
Maximum Peak Output Power	Tx (Hopping Off) DH5, 2DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping On -Hopping Off	2402 MHz 2480 MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping On -Hopping Off	2402 MHz 2441 MHz 2480 MHz
<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.  *EUT has the power settings by the software as follows;  Power settings: BDR: Ext.=0, Int.=53  EDR: Ext.=0, Int.=95  Software: Tera Term Ver. 4.88  *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

■ : Termination



\* 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	Remark
A	Entry Evo	EE0002	AL038BF0710005	Alpine Electronics, Inc.	EUT
B	CAN-BOX	NEW CAN-BOX HS	G0032437	Harman/Backer Automotive Systems	-
C	Speaker	LV-002	S11014200775	L&V	-
D	Speaker	LV-002	S11014200775	L&V	-
E	Speaker	LV-002	S11014200773	L&V	-
F	Speaker	LV-002	S11014200773	L&V	-
G	BT ANT	-	-	-	-

**List of cables used**

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC (+)	0.3+2.0	Unshielded	Unshielded	-
2	DC (-)	0.3+2.0	Unshielded	Unshielded	-
3	DC (+)	0.3+2.0	Unshielded	Unshielded	-
4	DC (-)	0.3+2.0	Unshielded	Unshielded	-
5	B-CAN+	0.3+0.3	Unshielded	Unshielded	-
6	B-CAN-	0.3+0.3	Unshielded	Unshielded	-
7	LAN	0.3+1.0	Unshielded	Unshielded	-
8	RS232C	0.3+1.0	Shielded	Shielded	-
9	Speaker	0.3+2.0	Unshielded	Unshielded	-
10	Speaker	0.3+2.0	Unshielded	Unshielded	-
11	Speaker	0.3+2.0	Unshielded	Unshielded	-
12	Speaker	0.3+2.0	Unshielded	Unshielded	-
13	Signal	0.3+1.5	Shielded	Shielded	-
14	Signal	0.3+1.5	Shielded	Shielded	-
15	Signal	0.3+1.5	Shielded	Shielded	-
16	Signal	0.3+1.5	Shielded	Shielded	-
17	Signal	0.3+2.0	Shielded	Shielded	-
18	Signal	0.3+1.0	Unshielded	Unshielded	-
19	Signal	0.3+1.0	Unshielded	Unshielded	-
20	Signal	0.3+1.0	Unshielded	Unshielded	-
21	Signal	0.3+1.0	Unshielded	Unshielded	-
22	Signal	0.3+1.0	Unshielded	Unshielded	-
23	Signal	0.3+1.0	Unshielded	Unshielded	-
24	Signal	0.3+1.0	Unshielded	Unshielded	-
25	ANT	2.0	Shielded	Shielded	-
26	USB	5.3	Shielded	Shielded	-
27	Signal	4.8	Shielded	Shielded	-
28	Signal	4.4	Shielded	Shielded	-
29	Signal	5.3	Shielded	Shielded	-
30	Signal	5.3	Shielded	Shielded	-
31	Signal	5.3	Shielded	Shielded	-
32	Signal	5.3	Shielded	Shielded	-

**UL Japan, Inc.**

**Shonan EMC Lab.**

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

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

### **Test Procedure**

[For below 1 GHz]

EUT was placed on a urethane platform of nominal size, 1.0 m by 2.0 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 300 MHz	300 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.

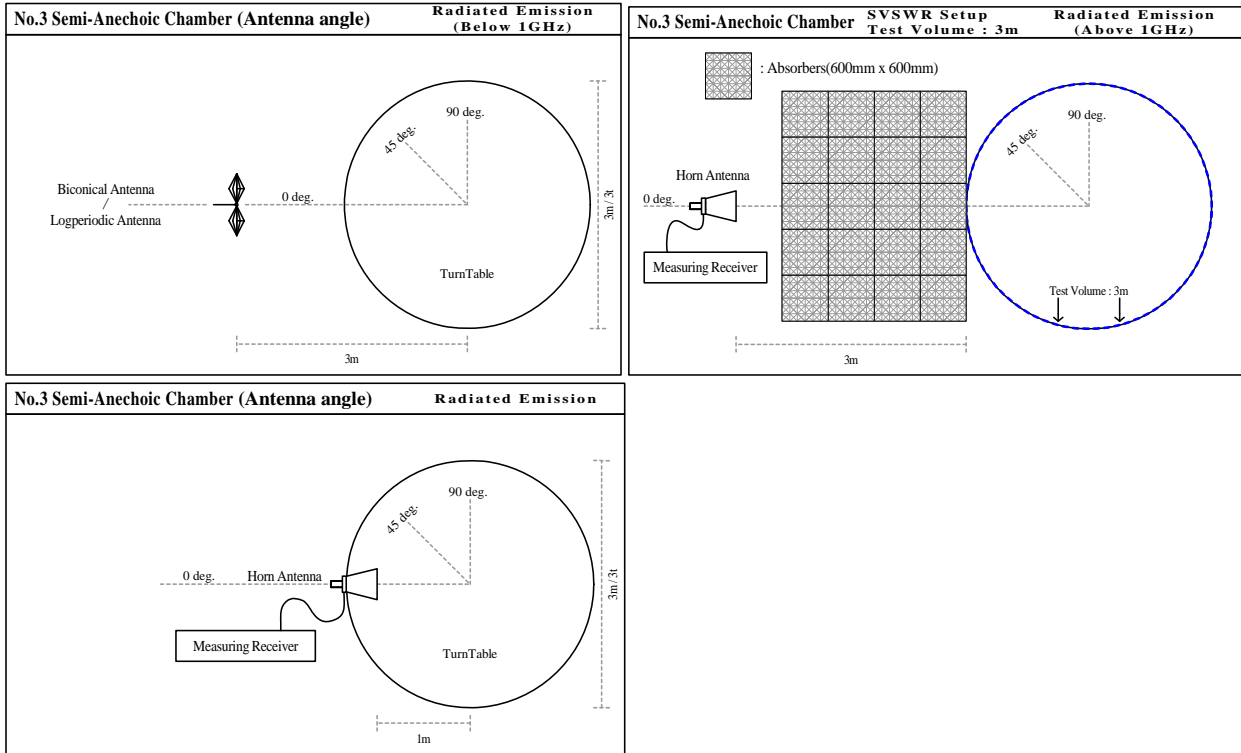
### **20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9 (IC) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (IC).**

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 m*2) (1 GHz – 13 GHz), 1 m*3) (13 GHz – 26.5 GHz)		3 m*2) (1 GHz – 13 GHz), 1 m*3) (13 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:  $20 \times \log(4.3 \text{ m}/3.0 \text{ m}) = 3.1 \text{ dB}$

\*3) Distance Factor:  $20 \times \log(1.0 \text{ m}/3.0 \text{ m}) = -9.5 \text{ dB}$



- The carrier level and noise levels were confirmed at angle of -90 to 30 deg. of EUT and at each position of X and Y axis of antenna to see the position of maximum noise, and the test was made at the position (30 deg. and X axis) 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 – 26.5 GHz  
**Test data** : APPENDIX  
**Test result** : Pass

## **SECTION 6: Antenna Terminal Conducted Tests**

### **Test Procedure**

The tests were made with below setting connected to the antenna port.

<b>Test</b>	<b>Span</b>	<b>RBW</b>	<b>VBW</b>	<b>Sweep time</b>	<b>Detector</b>	<b>Trace</b>	<b>Instrument used</b>
20dB Bandwidth	3 MHz	30 kHz	100 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Sample	Max Hold *1)	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak Average *3)	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	3 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30 MHz	300 kHz	1 MHz	Auto	Peak	Max Hold	Spectrum Analyzer
Dwell Time	Zero Span	100 kHz, 1 MHz	300 kHz, 3 MHz	As necessary capture the entire dwell time per hopping channel	Peak	Clear Write	Spectrum Analyzer
Conducted Spurious Emission *2)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	9.1 kHz	27 kHz				
	30 MHz to 25 GHz	100 kHz	300 kHz				
Conducted Spurious Emission Band Edge compliance	10 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer

\*1) The measurement was performed with Max Hold since the duty cycle was not 100 %.

\*2) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.

Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.  
(9 kHz -150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 10 kHz)

\*3) Reference data

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

**Test data** : **APPENDIX**  
**Test result** : **Pass**

## APPENDIX 1: Test data

### 20dB Bandwidth and Carrier Frequency Separation

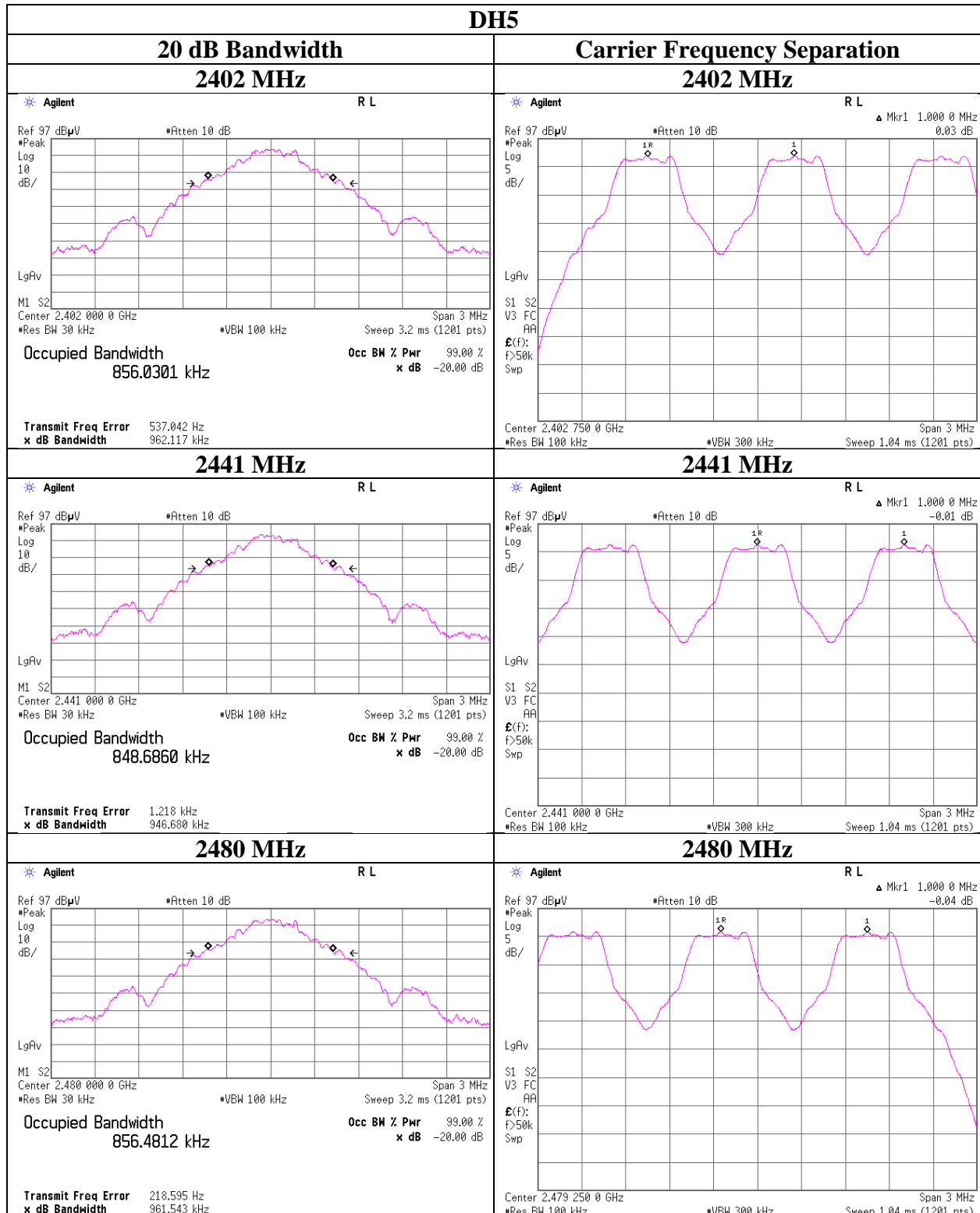
Test place Shonan EMC Lab. No.6 Shielded Room  
Report No. 11274193S-A-R4  
Date June 7, 2016  
Temperature / Humidity 26 deg. C / 48 % RH  
Engineer Hiroyuki Morikawa  
Mode Tx, Hopping Off, DH5

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.962	1.000	$\geq 0.641$
DH5	2441.0	0.947	1.000	$\geq 0.631$
DH5	2480.0	0.962	1.000	$\geq 0.641$
3DH5	2402.0	1.326	1.000	$\geq 0.884$
3DH5	2441.0	1.328	1.000	$\geq 0.885$
3DH5	2480.0	1.326	1.000	$\geq 0.884$

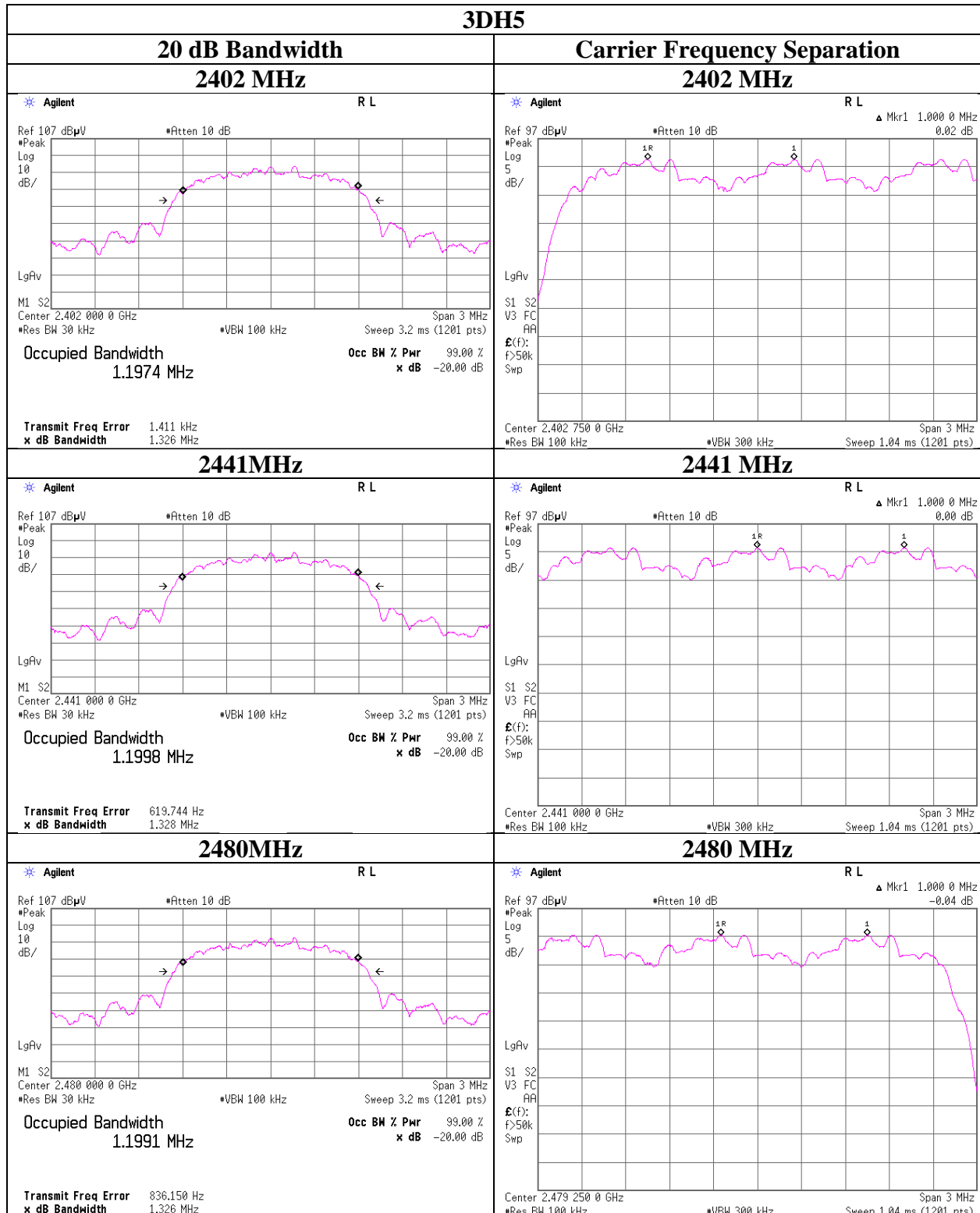
Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).

No limit applies to 20dB Bandwidth.

## 20dB Bandwidth and Carrier Frequency Separation



## 20dB Bandwidth and Carrier Frequency Separation



**UL Japan, Inc.**

**Shonan EMC Lab.**

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401



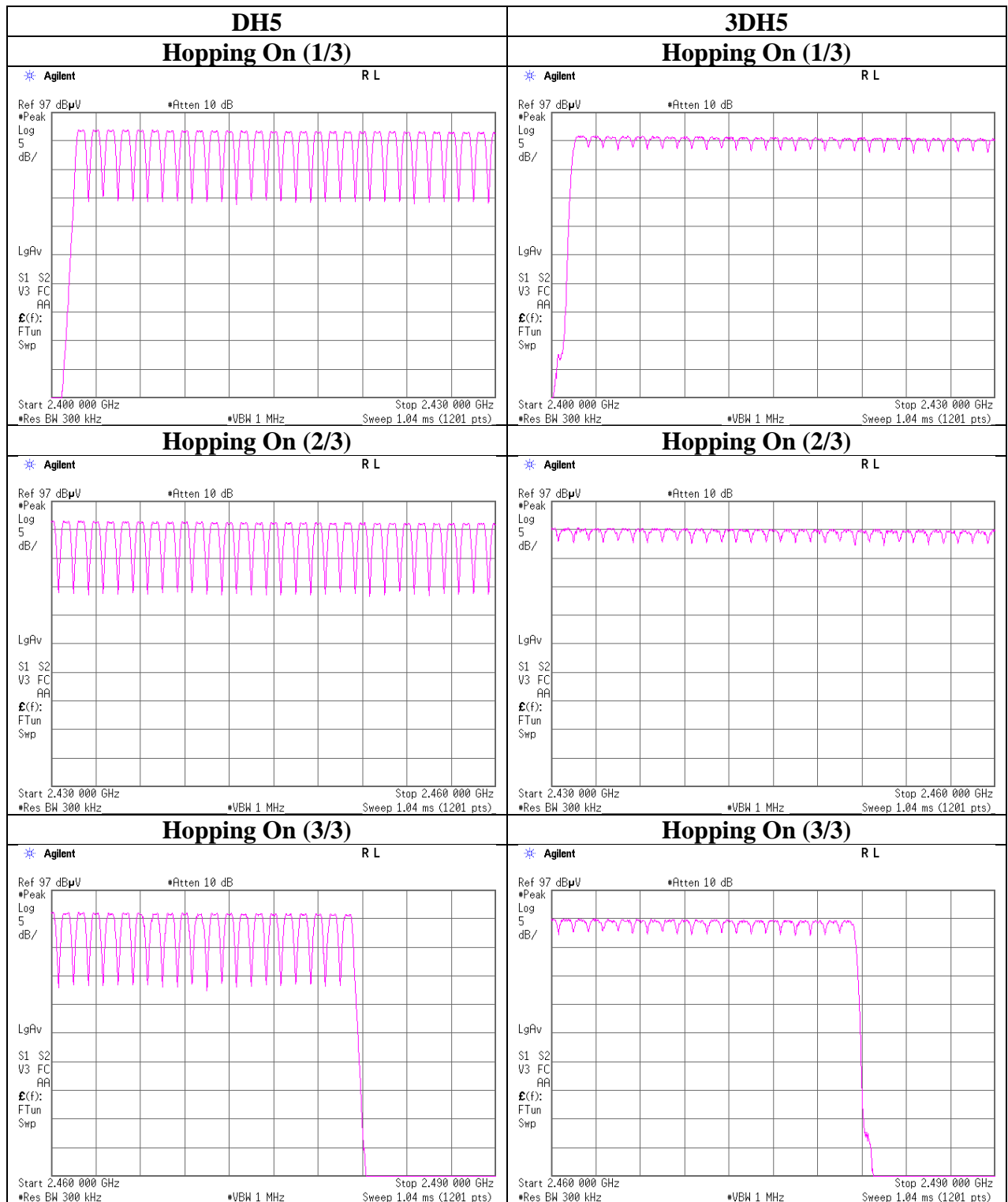
### Number of Hopping Frequency

Test place                      Shonan EMC Lab. No.6 Shielded Room  
Report No.                      11274193S-A-R4  
Date                              June 7, 2016  
Temperature / Humidity      26 deg. C / 48 % RH  
Engineer                        Hiroyuki Morikawa  
Mode                              Tx, Hopping On

Mode	Number of channel [channels]	Limit [channels]
DH5	79	$\geq 15$
3DH5	79	$\geq 15$

Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth Specification.

### Number of Hopping Frequency



### Dwell time

Test place : Shonan EMC Lab. No.6 Shielded Room  
Report No. : 11274193S-A-R4  
Date : June 7, 2016  
Temperature / Humidity : 26 deg. C / 48 % RH  
Engineer : Hiroyuki Morikawa  
Mode : Tx, Hopping On

Mode	Number of transmission in a 31.6(79 Hopping x 0.4) / 12.8 (32 Hopping x 0.4) second period			Length of transmission [msec]	Result [msec]	Limit [msec]
DH1	48.0 times / 5 sec. x	31.6 sec. =	304 times	0.391	119	400
DH3	24.4 times / 5 sec. x	31.6 sec. =	155 times	1.655	257	400
DH5	17.0 times / 5 sec. x	31.6 sec. =	108 times	2.904	314	400
3DH1	47.4 times / 5 sec. x	31.6 sec. =	300 times	0.428	128	400
3DH3	26.0 times / 5 sec. x	31.6 sec. =	165 times	1.683	278	400
3DH5	17.0 times / 5 sec. x	31.6 sec. =	108 times	2.931	317	400

Sample Calculation

Result = Number of transmission x Length of transmission

\*Average data of 5 tests.(except Inquiry)

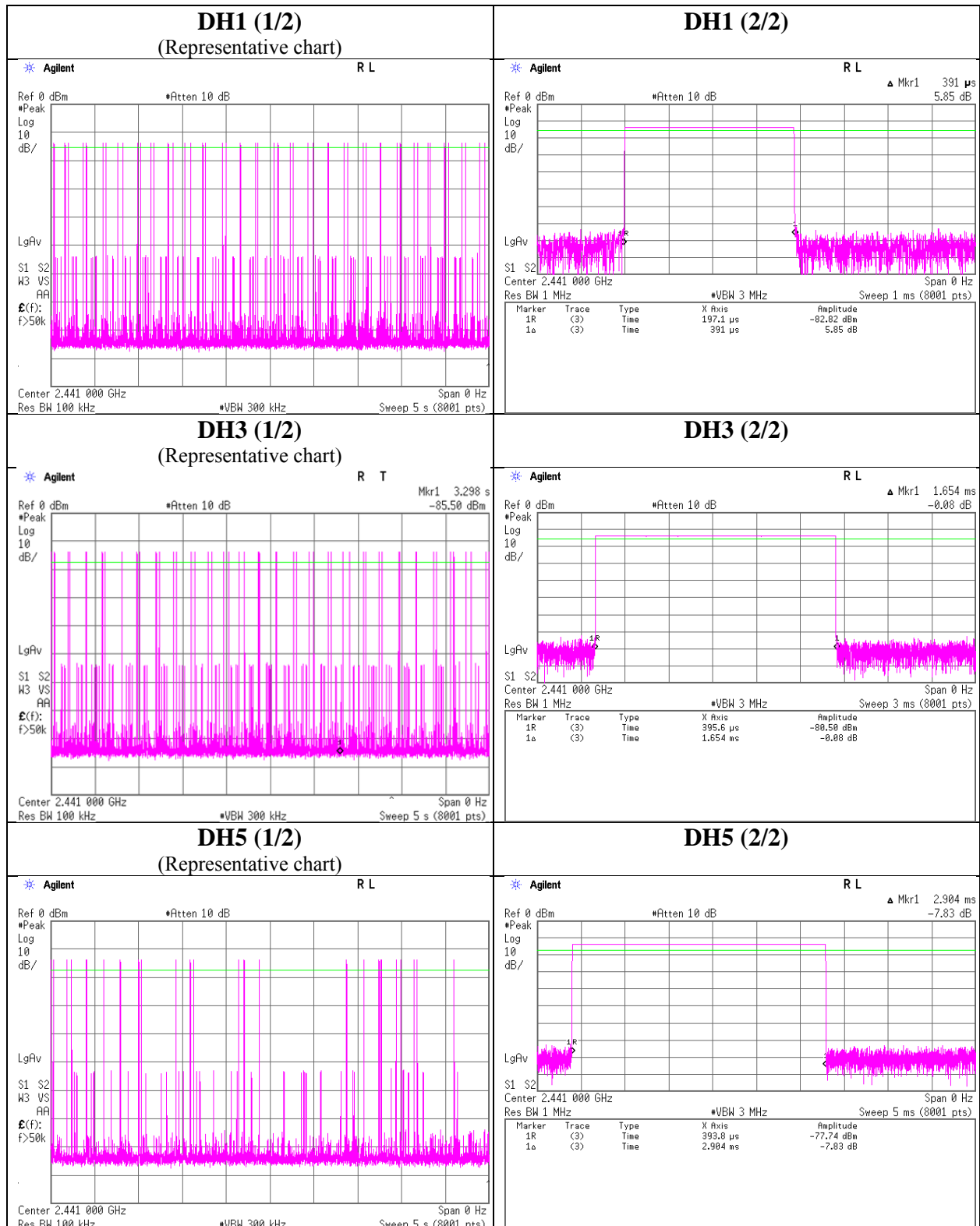
Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	46	46	51	50	47	48
DH3	24	28	26	23	21	24.4
DH5	23	16	10	16	20	17
3DH1	48	48	45	51	45	47.4
3DH3	23	25	29	26	27	26
3DH5	14	23	12	18	18	17

Sample Calculation

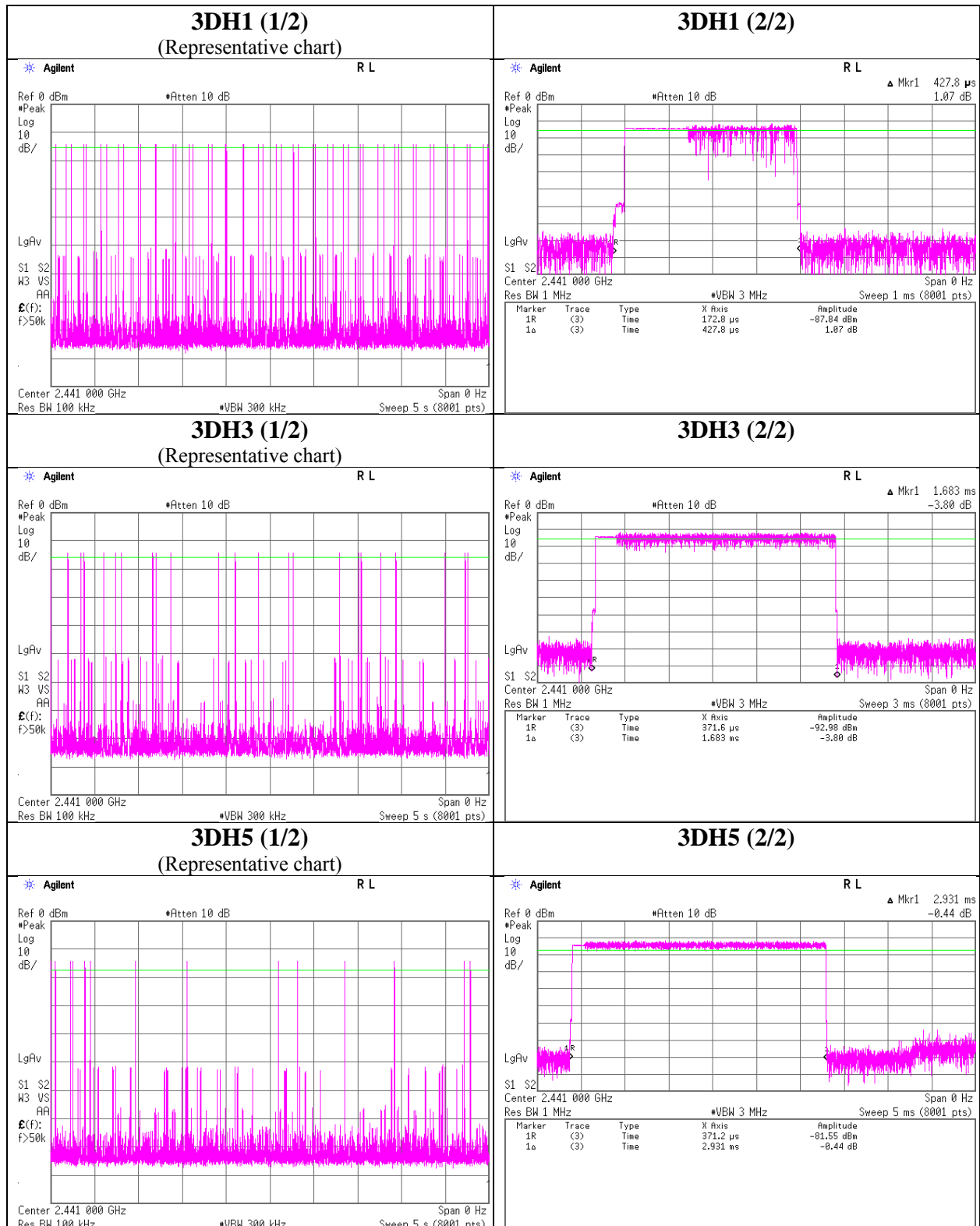
Average = Summation (Sampling 1 to 5) / 5

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

### Dwell time



**Dwell time**



## Maximum Peak Output Power

Test place : Shonan EMC Lab. No.6 Shielded Room  
Report No. : 11274193S-A-R4  
Date : June 7, 2016  
Temperature / Humidity : 26 deg. C / 48 % RH  
Engineer : Hiroyuki Morikawa  
Mode : Tx, Hopping Off

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-13.35	1.98	10.01	-1.36	0.73	20.96	125	22.32
DH5	2441.0	-13.85	1.99	10.01	-1.85	0.65	20.96	125	22.81
DH5	2480.0	-14.25	2.00	10.01	-2.24	0.60	20.96	125	23.20
2DH5	2402.0	-11.43	1.98	10.01	0.56	1.14	20.96	125	20.40
2DH5	2441.0	-12.01	1.99	10.01	-0.01	1.00	20.96	125	20.97
2DH5	2480.0	-12.54	2.00	10.01	-0.53	0.89	20.96	125	21.49
3DH5	2402.0	-10.96	1.98	10.01	1.03	1.27	20.96	125	19.93
3DH5	2441.0	-11.53	1.99	10.01	0.47	1.11	20.96	125	20.49
3DH5	2480.0	-12.03	2.00	10.01	-0.02	1.00	20.96	125	20.98

Sample Calculation:

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

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

Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not influence on the output power and bandwidth of the EUT.

As this device had AFH mode and frequency separation could not meet the requirement of over 20dB BW without 2/3 relaxation, 125mW power limit was applied to it.

**Average Output Power**  
**(Reference data)**

Test place Shonan EMC Lab. No.6 Shielded Room  
Report No. 11274193S-A-R4  
Date June 7, 2016  
Temperature / Humidity 26 deg. C / 48 % RH  
Engineer Hiroyuki Morikawa  
Mode Tx, Hopping Off

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Frame power)		Duty factor [dB]	Result (Burst power)	
					[dBm]	[mW]		[dBm]	[mW]
DH5	2402.0	-15.05	1.98	10.01	-3.06	0.49	1.12	-1.94	0.64
DH5	2441.0	-15.81	1.99	10.01	-3.81	0.42	1.12	-2.69	0.54
DH5	2480.0	-16.25	2.00	10.01	-4.24	0.38	1.12	-3.12	0.49
2DH5	2402.0	-15.37	1.98	10.01	-3.38	0.46	1.06	-2.32	0.59
2DH5	2441.0	-16.15	1.99	10.01	-4.15	0.38	1.06	-3.09	0.49
2DH5	2480.0	-16.59	2.00	10.01	-4.58	0.35	1.06	-3.52	0.44
3DH5	2402.0	-15.38	1.98	10.01	-3.39	0.46	1.06	-2.33	0.58
3DH5	2441.0	-16.16	1.99	10.01	-4.16	0.38	1.06	-3.10	0.49
3DH5	2480.0	-16.58	2.00	10.01	-4.57	0.35	1.06	-3.51	0.45

Sample Calculation:

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

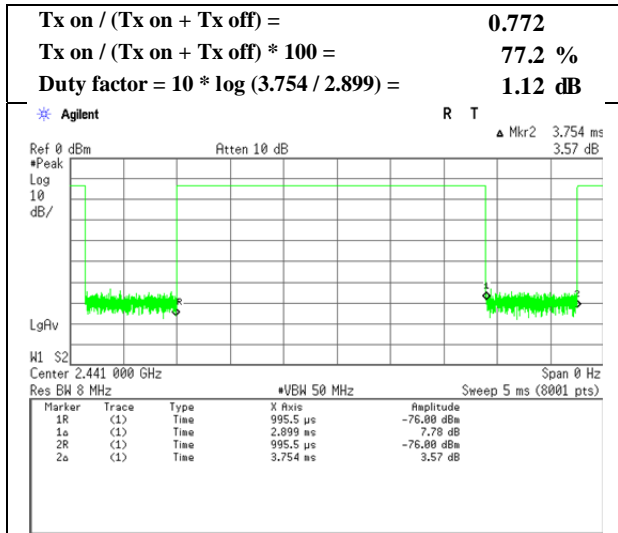
Result (Burst power) = Frame power + Duty factor

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

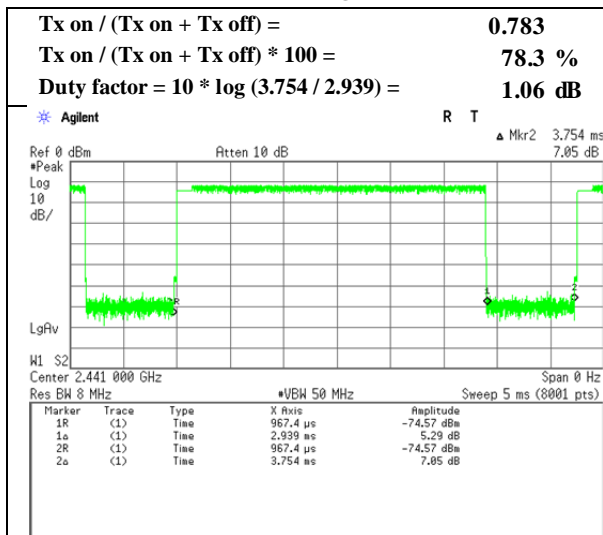
### Burst Rate Confirmation

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	11274193S-A-R4
Date	June 7, 2016
Temperature / Humidity	26 deg. C / 48 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx, Hopping Off

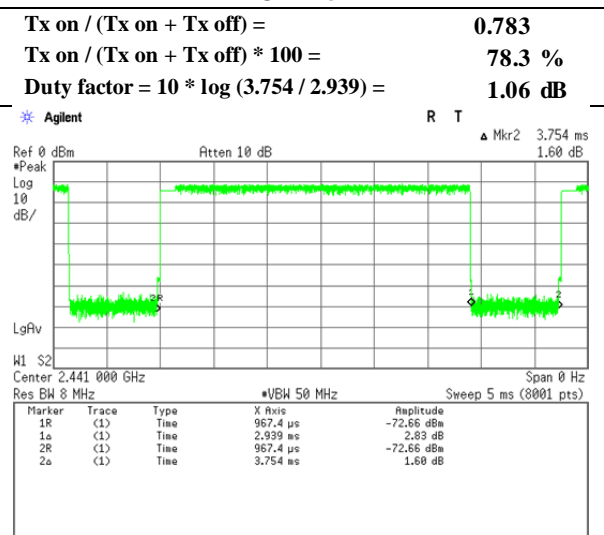
#### DH5



#### 2DH5



#### 3DH5





## Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. : 11274193S-A-R4  
Date : May 11, 2016      May 11, 2016  
Temperature / Humidity : 23 deg. C / 68 % RH      23 deg. C / 64 % RH  
Engineer : Kazutaka Takeyama      Yosuke Ishikawa  
(30-1000 MHz      (1-18 GHz)  
18-26.5 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.	255.766	QP	38.6	17.4	8.4	32.0	0.0	32.4	46.0	13.6	136	67	
Hori.	282.047	QP	25.0	18.5	8.6	32.0	0.0	20.1	46.0	25.9	200	153	
Hori.	306.027	QP	31.6	14.0	8.7	32.0	0.0	22.3	46.0	23.7	150	319	
Hori.	318.019	QP	33.0	14.3	8.8	32.0	0.0	24.1	46.0	21.9	150	302	
Hori.	329.953	QP	38.5	14.5	8.9	32.0	0.0	29.9	46.0	16.1	100	80	
Hori.	332.799	QP	38.7	14.6	8.9	31.9	0.0	30.3	46.0	15.7	100	64	
Hori.	366.028	QP	32.3	15.3	9.0	31.9	0.0	24.7	46.0	21.3	101	318	
Hori.	499.212	QP	45.3	17.4	9.6	31.9	0.0	40.4	46.0	5.6	150	343	
Hori.	2390.000	PK	45.9	27.8	13.7	41.0	3.1	49.5	73.9	24.4	100	132	
Hori.	2999.959	PK	50.8	28.2	5.3	40.7	3.1	46.7	73.9	27.2	155	205	
Hori.	4804.000	PK	44.8	31.4	5.8	39.6	3.1	45.5	73.9	28.4	112	129	
Hori.	7206.000	PK	45.0	36.9	7.2	40.1	3.1	52.1	73.9	21.8	100	0	
Hori.	9608.000	PK	44.6	38.5	8.2	39.6	3.1	54.8	73.9	19.1	100	0	
Hori.	2390.000	AV	33.5	27.8	13.7	41.0	3.1	37.1	53.9	16.8	100	132	
Hori.	2999.959	AV	46.1	28.2	5.3	40.7	3.1	42.0	53.9	11.9	155	205	
Hori.	4804.000	AV	34.3	31.4	5.8	39.6	3.1	35.0	53.9	18.9	112	129	
Hori.	7206.000	AV	33.9	36.9	7.2	40.1	3.1	41.0	53.9	12.9	100	0	
Hori.	9608.000	AV	33.1	38.5	8.2	39.6	3.1	43.3	53.9	10.6	100	0	
Vert.	243.006	QP	31.0	17.0	8.4	32.0	0.0	24.4	46.0	21.6	100	143	
Vert.	255.796	QP	39.0	17.4	8.4	32.0	0.0	32.8	46.0	13.2	100	349	
Vert.	258.036	QP	27.0	17.4	8.5	32.0	0.0	20.9	46.0	25.1	100	157	
Vert.	499.212	QP	43.9	17.4	9.6	31.9	0.0	39.0	46.0	7.0	100	219	
Vert.	2390.000	PK	45.6	27.8	13.7	41.0	3.1	49.2	73.9	24.7	123	146	
Vert.	2999.980	PK	50.6	28.2	5.3	40.7	3.1	46.5	73.9	27.4	186	184	
Vert.	4804.000	PK	45.8	31.4	5.8	39.6	3.1	46.5	73.9	27.4	100	333	
Vert.	7206.000	PK	45.5	36.9	7.2	40.1	3.1	52.6	73.9	21.3	100	0	
Vert.	9608.000	PK	44.8	38.5	8.2	39.6	3.1	55.0	73.9	18.9	100	0	
Vert.	2390.000	AV	33.1	27.8	13.7	41.0	3.1	36.7	53.9	17.2	123	146	
Vert.	2999.980	AV	45.5	28.2	5.3	40.7	3.1	41.4	53.9	12.5	186	184	
Vert.	4804.000	AV	35.3	31.4	5.8	39.6	3.1	36.0	53.9	17.9	100	333	
Vert.	7206.000	AV	33.9	36.9	7.2	40.1	3.1	41.0	53.9	12.9	100	0	
Vert.	9608.000	AV	32.8	38.5	8.2	39.6	3.1	43.0	53.9	10.9	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(4.3 m / 3.0 m) = 3.1 dB

13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 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	92.9	27.8	13.7	41.0	3.1	96.5	-	-	Carrier
Hori.	2400.000	PK	37.5	27.8	13.7	41.0	3.1	41.1	76.5	35.4	
Vert.	2402.000	PK	88.2	27.8	13.7	41.0	3.1	91.8	-	-	Carrier
Vert.	2400.000	PK	36.2	27.8	13.7	41.0	3.1	39.8	71.8	32.0	

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

Distance factor : 1 GHz - 13 GHz : 20log(4.3 m / 3.0 m) = 3.1 dB

13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

**UL Japan, Inc.**

**Shonan EMC Lab.**

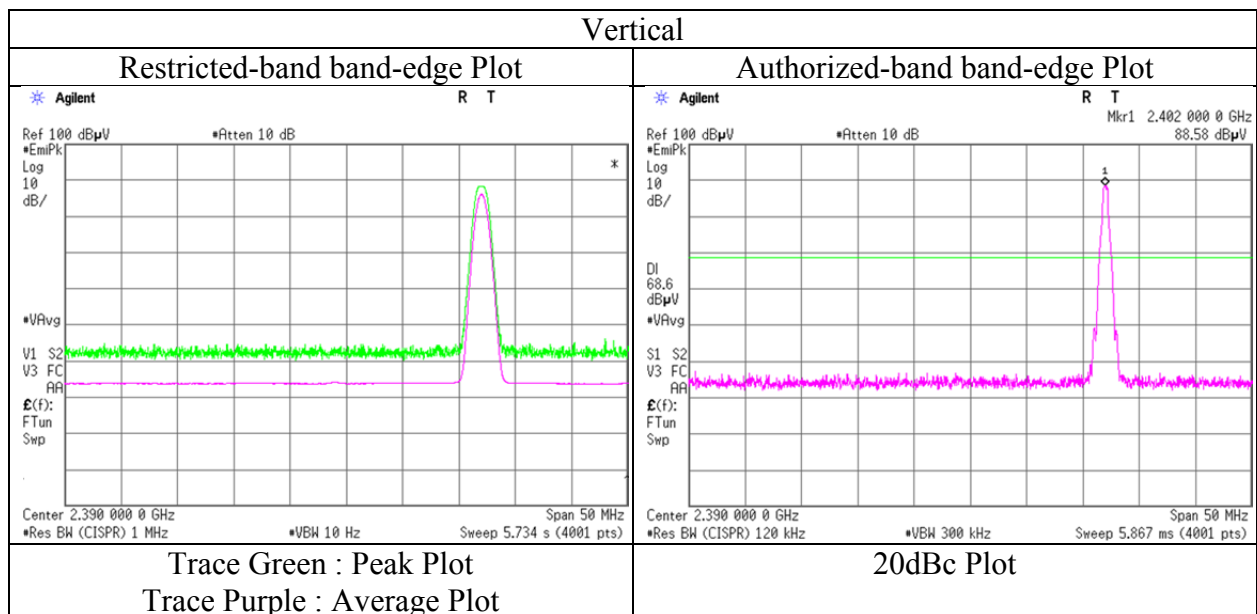
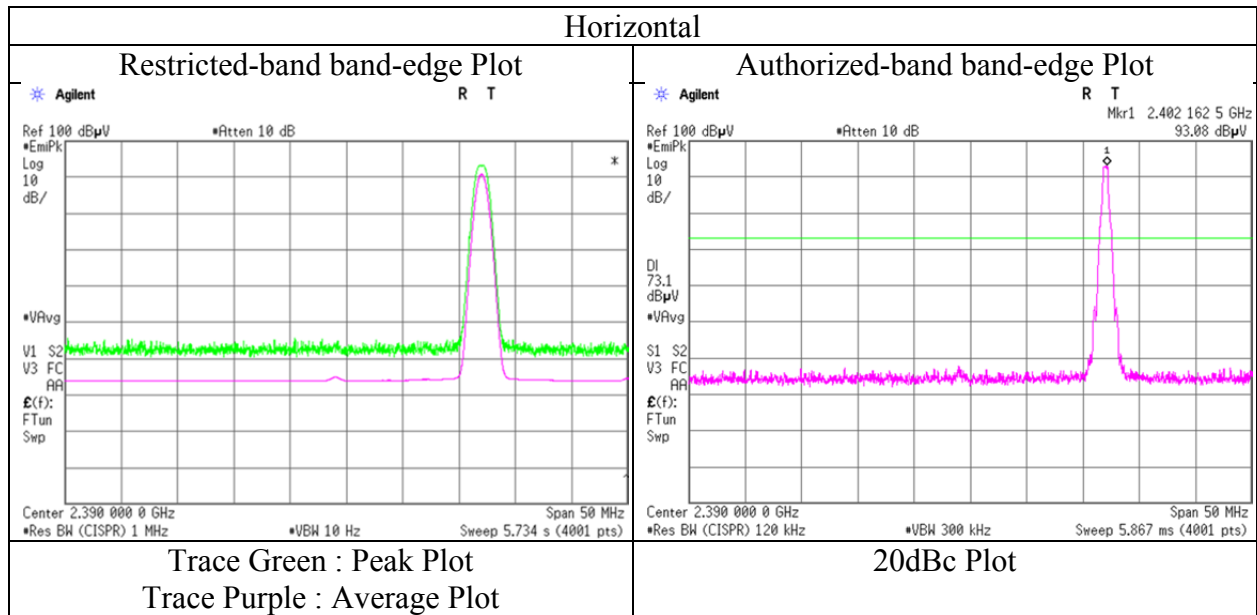
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

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

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11274193S-A-R4
Date	May 11, 2016
Temperature / Humidity	23 deg. C / 64 % RH
Engineer	Yosuke Ishikawa (1-18 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz



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

## Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. : 11274193S-A-R4  
Date : May 11, 2016      May 11, 2016  
Temperature / Humidity : 23 deg. C / 68 % RH      23 deg. C / 64 % RH  
Engineer : Kazutaka Takeyama      Yosuke Ishikawa  
            (30-1000 MHz      (1-18 GHz)  
            18-26.5 GHz)  
Mode : Tx, Hopping Off, DH5 2441 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	114.240	QP	26.2	11.8	7.4	32.1	0.0	13.3	43.5	30.2	300	166	
Hori.	255.760	QP	39.3	17.4	8.4	32.0	0.0	33.1	46.0	12.9	133	70	
Hori.	282.183	QP	24.4	18.5	8.6	32.0	0.0	19.5	46.0	26.5	199	158	
Hori.	329.869	QP	34.4	14.5	8.9	32.0	0.0	25.8	46.0	20.2	100	77	
Hori.	332.798	QP	37.5	14.6	8.9	31.9	0.0	29.1	46.0	16.9	100	65	
Hori.	342.281	QP	32.3	14.8	8.9	31.9	0.0	24.1	46.0	21.9	100	317	
Hori.	402.223	QP	29.5	16.0	9.2	32.0	0.0	22.7	46.0	23.3	100	279	
Hori.	499.193	QP	45.0	17.4	9.6	31.9	0.0	40.1	46.0	5.9	150	341	
Hori.	665.589	QP	33.0	19.8	10.2	31.9	0.0	31.1	46.0	14.9	100	231	
Hori.	3000.000	PK	51.4	28.2	5.3	40.7	3.1	47.3	73.9	26.6	128	204	
Hori.	4882.000	PK	44.1	31.7	5.9	39.5	3.1	45.3	73.9	28.6	129	220	
Hori.	7323.000	PK	45.1	36.9	7.3	40.2	3.1	52.2	73.9	21.7	100	0	
Hori.	9764.000	PK	43.8	38.5	8.3	39.5	3.1	54.2	73.9	19.7	100	0	
Hori.	3000.000	AV	46.7	28.2	5.3	40.7	3.1	42.6	53.9	11.3	128	204	
Hori.	4882.000	AV	33.5	31.7	5.9	39.5	3.1	34.7	53.9	19.2	129	220	
Hori.	7323.000	AV	34.3	36.9	7.3	40.2	3.1	41.4	53.9	12.5	100	0	
Hori.	9764.000	AV	33.3	38.5	8.3	39.5	3.1	43.7	53.9	10.2	100	0	
Vert.	173.981	QP	28.5	15.6	8.0	32.1	0.0	20.0	43.5	23.5	100	7	
Vert.	255.759	QP	38.3	17.4	8.4	32.0	0.0	32.1	46.0	13.9	100	344	
Vert.	294.222	QP	23.3	19.0	8.7	32.0	0.0	19.0	46.0	27.0	100	284	
Vert.	332.802	QP	36.6	14.6	8.9	31.9	0.0	28.2	46.0	17.8	100	93	
Vert.	354.074	QP	26.0	15.0	9.0	31.9	0.0	18.1	46.0	27.9	100	120	
Vert.	499.199	QP	43.7	17.4	9.6	31.9	0.0	38.8	46.0	7.2	100	219	
Vert.	3000.002	PK	51.2	28.2	5.3	40.7	3.1	47.1	73.9	26.8	114	184	
Vert.	4882.000	PK	44.9	31.7	5.9	39.5	3.1	46.1	73.9	27.8	106	358	
Vert.	7323.000	PK	45.3	36.9	7.3	40.2	3.1	52.4	73.9	21.5	100	0	
Vert.	9764.000	PK	44.3	38.5	8.3	39.5	3.1	54.7	73.9	19.2	100	0	
Vert.	3000.002	AV	46.6	28.2	5.3	40.7	3.1	42.5	53.9	11.4	114	184	
Vert.	4882.000	AV	34.1	31.7	5.9	39.5	3.1	35.3	53.9	18.6	106	358	
Vert.	7323.000	AV	34.2	36.9	7.3	40.2	3.1	41.3	53.9	12.6	100	0	
Vert.	9764.000	AV	33.2	38.5	8.3	39.5	3.1	43.6	53.9	10.3	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(4.3 m / 3.0 m) = 3.1 dB

13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

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

## Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. : 11274193S-A-R4  
Date : May 11, 2016      May 11, 2016  
Temperature / Humidity : 23 deg. C / 68 % RH      23 deg. C / 64 % RH  
Engineer : Kazutaka Takeyama      Yosuke Ishikawa  
(30-1000 MHz      (1-18 GHz)  
18-26.5 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.	255.759	QP	39.2	17.4	8.4	32.0	0.0	33.0	46.0	13.0	135	62	
Hori.	317.930	QP	31.0	14.3	8.8	32.0	0.0	22.1	46.0	23.9	100	95	
Hori.	330.084	QP	32.6	14.5	8.9	32.0	0.0	24.0	46.0	22.0	100	85	
Hori.	341.990	QP	38.5	14.8	8.9	31.9	0.0	30.3	46.0	15.7	100	77	
Hori.	354.241	QP	33.0	15.0	9.0	31.9	0.0	25.1	46.0	20.9	150	259	
Hori.	499.196	QP	44.4	17.4	9.6	31.9	0.0	39.5	46.0	6.5	150	344	
Hori.	665.590	QP	32.0	19.8	10.2	31.9	0.0	30.1	46.0	15.9	100	211	
Hori.	2483.500	PK	44.4	27.9	13.8	41.0	3.1	48.2	73.9	25.7	172	134	
Hori.	2999.970	PK	50.3	28.2	5.3	40.7	3.1	46.2	73.9	27.7	156	206	
Hori.	4960.000	PK	45.1	32.0	6.0	39.4	3.1	46.8	73.9	27.1	147	74	
Hori.	7440.000	PK	45.1	37.0	7.5	40.4	3.1	52.3	73.9	21.6	100	0	
Hori.	9920.000	PK	44.4	38.4	8.4	39.4	3.1	54.9	73.9	19.0	100	0	
Hori.	2483.500	AV	32.8	27.9	13.8	41.0	3.1	36.6	53.9	17.3	172	134	
Hori.	2999.970	AV	45.8	28.2	5.3	40.7	3.1	41.7	53.9	12.2	156	206	
Hori.	4960.000	AV	33.8	32.0	6.0	39.4	3.1	35.5	53.9	18.4	147	74	
Hori.	7440.000	AV	34.4	37.0	7.5	40.4	3.1	41.6	53.9	12.3	100	0	
Hori.	9920.000	AV	33.2	38.4	8.4	39.4	3.1	43.7	53.9	10.2	100	0	
Vert.	255.759	QP	38.0	17.4	8.4	32.0	0.0	31.8	46.0	14.2	100	356	
Vert.	282.129	QP	28.0	18.5	8.6	32.0	0.0	23.1	46.0	22.9	100	295	
Vert.	499.196	QP	44.8	17.4	9.6	31.9	0.0	39.9	46.0	6.1	100	219	
Vert.	2483.500	PK	45.7	27.9	13.8	41.0	3.1	49.5	73.9	24.4	176	150	
Vert.	2999.986	PK	50.5	28.2	5.3	40.7	3.1	46.4	73.9	27.5	113	186	
Vert.	4960.000	PK	45.1	32.0	6.0	39.4	3.1	46.8	73.9	27.1	147	142	
Vert.	7440.000	PK	44.8	37.0	7.5	40.4	3.1	52.0	73.9	21.9	100	0	
Vert.	9920.000	PK	44.8	38.4	8.4	39.4	3.1	55.3	73.9	18.6	100	0	
Vert.	2483.500	AV	33.1	27.9	13.8	41.0	3.1	36.9	53.9	17.0	176	150	
Vert.	2999.986	AV	46.1	28.2	5.3	40.7	3.1	42.0	53.9	11.9	113	186	
Vert.	4960.000	AV	33.8	32.0	6.0	39.4	3.1	35.5	53.9	18.4	147	142	
Vert.	7440.000	AV	34.5	37.0	7.5	40.4	3.1	41.7	53.9	12.2	100	0	
Vert.	9920.000	AV	33.4	38.4	8.4	39.4	3.1	43.9	53.9	10.0	100	0	

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

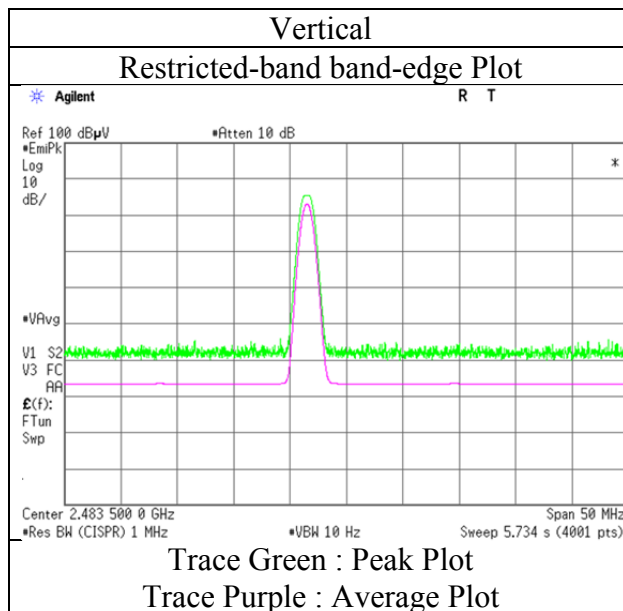
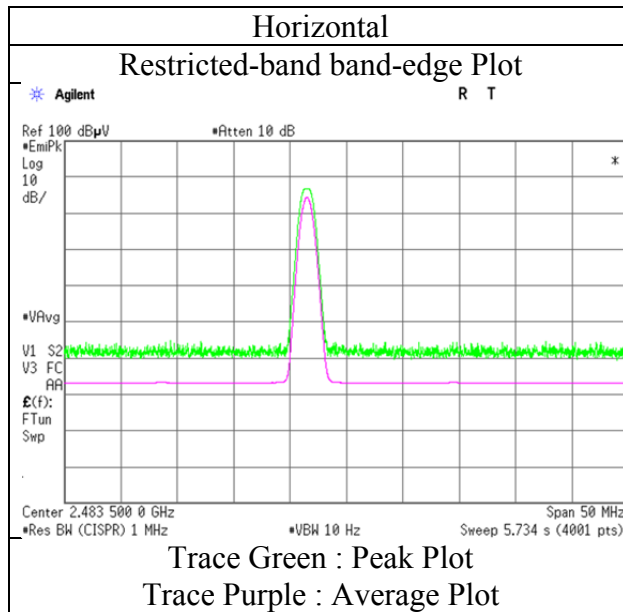
Distance factor : 1 GHz - 13 GHz : 20log(4.3 m / 3.0 m) = 3.1 dB

13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

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

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

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. : 11274193S-A-R4  
Date : May 11, 2016  
Temperature / Humidity : 23 deg. C / 64 % RH  
Engineer : Yosuke Ishikawa  
(1-18 GHz)  
Mode : Tx, Hopping Off, DH5 2480 MHz



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

## Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. : 11274193S-A-R4  
Date : May 11, 2016      May 11, 2016  
Temperature / Humidity : 23 deg. C / 68 % RH      23 deg. C / 64 % RH  
Engineer : Kazutaka Takeyama      Yosuke Ishikawa  
(30-1000 MHz      (1-18 GHz)  
18-26.5 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.	255.762	QP	38.1	17.4	8.4	32.0	0.0	31.9	46.0	14.1	140	66	
Hori.	317.982	QP	32.2	14.3	8.8	32.0	0.0	23.3	46.0	22.7	100	136	
Hori.	329.979	QP	37.0	14.5	8.9	32.0	0.0	28.4	46.0	17.6	100	179	
Hori.	353.902	QP	33.3	15.0	9.0	31.9	0.0	25.4	46.0	20.6	150	359	
Hori.	499.193	QP	44.5	17.4	9.6	31.9	0.0	39.6	46.0	6.4	100	208	
Hori.	2390.000	PK	46.2	27.8	13.7	41.0	3.1	49.8	73.9	24.1	120	129	
Hori.	2999.994	PK	51.0	28.2	5.3	40.7	3.1	46.9	73.9	27.0	100	204	
Hori.	4804.000	PK	49.4	31.4	5.8	39.6	3.1	50.1	73.9	23.8	100	198	
Hori.	7206.000	PK	44.6	36.9	7.2	40.1	3.1	51.7	73.9	22.2	100	0	
Hori.	9608.000	PK	44.1	38.5	8.2	39.6	3.1	54.3	73.9	19.6	100	0	
Hori.	2390.000	AV	33.4	27.8	13.7	41.0	3.1	37.0	53.9	16.9	120	129	
Hori.	2999.994	AV	46.7	28.2	5.3	40.7	3.1	42.6	53.9	11.3	100	204	
Hori.	4804.000	AV	39.0	31.4	5.8	39.6	3.1	39.7	53.9	14.2	100	198	
Hori.	7206.000	AV	33.8	36.9	7.2	40.1	3.1	40.9	53.9	13.0	100	0	
Hori.	9608.000	AV	33.2	38.5	8.2	39.6	3.1	43.4	53.9	10.5	100	0	
Vert.	174.018	QP	28.4	15.6	8.0	32.1	0.0	19.9	43.5	23.6	100	344	
Vert.	249.998	QP	38.3	17.1	8.4	32.0	0.0	31.8	46.0	14.2	100	106	
Vert.	255.762	QP	37.7	17.4	8.4	32.0	0.0	31.5	46.0	14.5	100	10	
Vert.	281.937	QP	28.2	18.5	8.6	32.0	0.0	23.3	46.0	22.7	100	300	
Vert.	499.193	QP	44.7	17.4	9.6	31.9	0.0	39.8	46.0	6.2	100	203	
Vert.	2390.000	PK	45.0	27.8	13.7	41.0	3.1	48.6	73.9	25.3	100	167	
Vert.	3000.005	PK	50.8	28.2	5.3	40.7	3.1	46.7	73.9	27.2	110	184	
Vert.	4804.000	PK	49.9	31.4	5.8	39.6	3.1	50.6	73.9	23.3	179	188	
Vert.	7206.000	PK	45.6	36.9	7.2	40.1	3.1	52.7	73.9	21.2	100	0	
Vert.	9608.000	PK	44.7	38.5	8.2	39.6	3.1	54.9	73.9	19.0	100	0	
Vert.	2390.000	AV	33.2	27.8	13.7	41.0	3.1	36.8	53.9	17.1	100	167	
Vert.	3000.005	AV	46.3	28.2	5.3	40.7	3.1	42.2	53.9	11.7	110	184	
Vert.	4804.000	AV	41.1	31.4	5.8	39.6	3.1	41.8	53.9	12.1	179	188	
Vert.	7206.000	AV	33.8	36.9	7.2	40.1	3.1	40.9	53.9	13.0	100	0	
Vert.	9608.000	AV	32.9	38.5	8.2	39.6	3.1	43.1	53.9	10.8	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(4.3 m / 3.0 m) = 3.1 dB

13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 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	90.6	27.8	13.7	41.0	3.1	94.2	-	-	Carrier
Hori.	2400.000	PK	40.6	27.8	13.7	41.0	3.1	44.2	74.2	30.0	
Vert.	2402.000	PK	86.9	27.8	13.7	41.0	3.1	90.5	-	-	Carrier
Vert.	2400.000	PK	37.9	27.8	13.7	41.0	3.1	41.5	70.5	29.0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor  
Distance factor : 1 GHz - 13 GHz : 20log(4.3 m / 3.0 m) = 3.1 dB

13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

**UL Japan, Inc.**

**Shonan EMC Lab.**

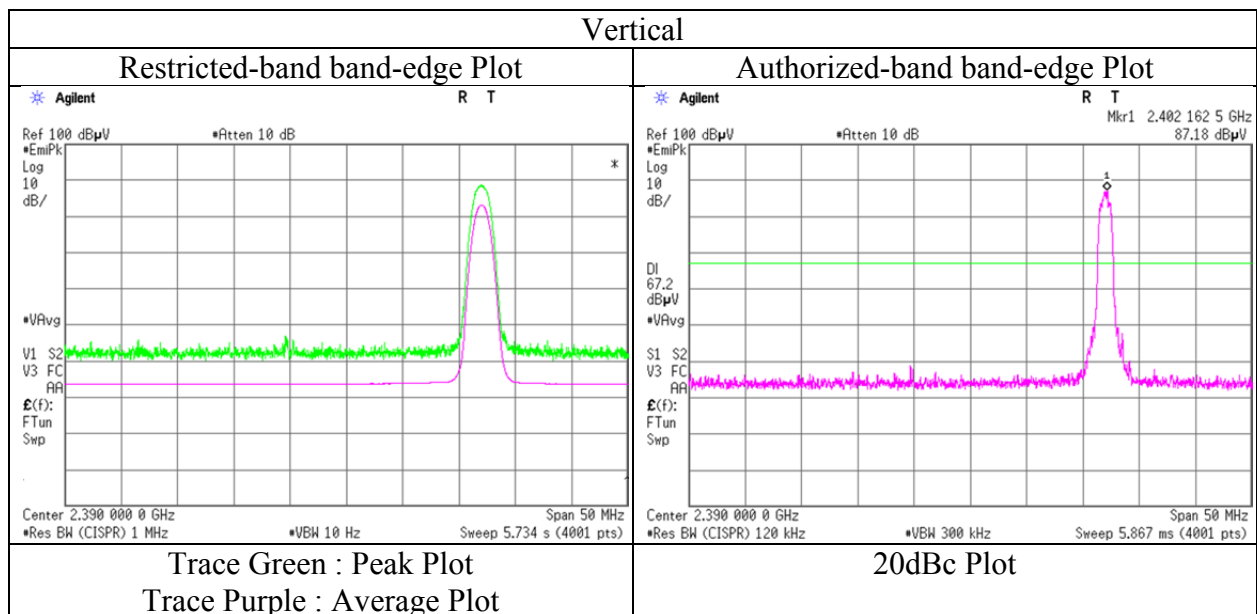
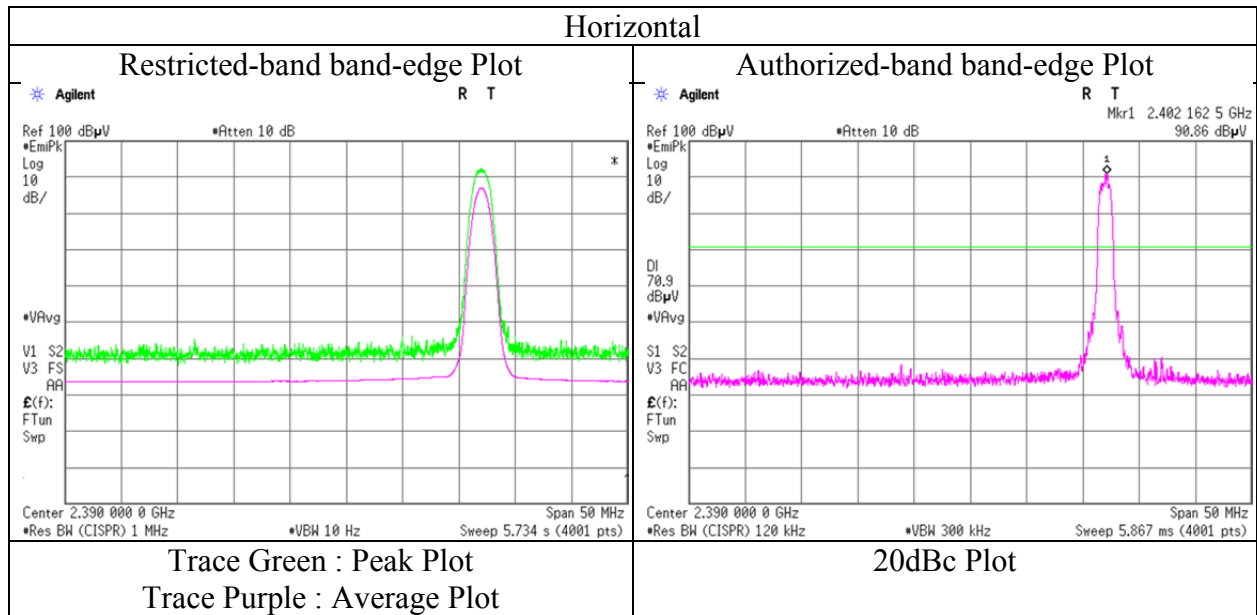
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

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

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. : 11274193S-A-R4  
Date : May 11, 2016  
Temperature / Humidity : 23 deg. C / 64 % RH  
Engineer : Yosuke Ishikawa  
(1-18 GHz)  
Mode : Tx, Hopping Off, 3DH5 2402 MHz



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

## Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. : 11274193S-A-R4  
Date : May 11, 2016      May 11, 2016  
Temperature / Humidity : 23 deg. C / 68 % RH      23 deg. C / 64 % RH  
Engineer : Kazutaka Takeyama      Yosuke Ishikawa  
            (30-1000 MHz      (1-18 GHz)  
            18-26.5 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.	255.792	QP	39.3	17.4	8.4	32.0	0.0	33.1	46.0	12.9	133	60	
Hori.	330.076	QP	32.7	14.5	8.9	32.0	0.0	24.1	46.0	21.9	100	88	
Hori.	332.799	QP	37.7	14.6	8.9	31.9	0.0	29.3	46.0	16.7	100	323	
Hori.	342.038	QP	38.0	14.8	8.9	31.9	0.0	29.8	46.0	16.2	100	88	
Hori.	354.104	QP	34.0	15.0	9.0	31.9	0.0	26.1	46.0	19.9	150	275	
Hori.	499.195	QP	45.0	17.4	9.6	31.9	0.0	40.1	46.0	5.9	150	344	
Hori.	511.531	QP	32.8	17.6	9.6	31.9	0.0	28.1	46.0	17.9	100	129	
Hori.	800.676	QP	33.6	21.0	10.7	31.6	0.0	33.7	46.0	12.3	130	83	
Hori.	2999.981	PK	50.5	28.2	5.3	40.7	3.1	46.4	73.9	27.5	182	201	
Hori.	4882.000	PK	47.7	31.7	5.9	39.5	3.1	48.9	73.9	25.0	100	204	
Hori.	7323.000	PK	45.0	36.9	7.3	40.2	3.1	52.1	73.9	21.8	100	0	
Hori.	9764.000	PK	44.0	38.5	8.3	39.5	3.1	54.4	73.9	19.5	100	0	
Hori.	2999.981	AV	46.0	28.2	5.3	40.7	3.1	41.9	53.9	12.0	182	201	
Hori.	4882.000	AV	38.1	31.7	5.9	39.5	3.1	39.3	53.9	14.6	100	204	
Hori.	7323.000	AV	34.3	36.9	7.3	40.2	3.1	41.4	53.9	12.5	100	0	
Hori.	9764.000	AV	33.4	38.5	8.3	39.5	3.1	43.8	53.9	10.1	100	0	
Vert.	250.018	QP	38.4	17.1	8.4	32.0	0.0	31.9	46.0	14.1	100	115	
Vert.	255.794	QP	37.9	17.4	8.4	32.0	0.0	31.7	46.0	14.3	100	10	
Vert.	318.134	QP	31.0	14.3	8.8	32.0	0.0	22.1	46.0	23.9	100	90	
Vert.	499.195	QP	45.2	17.4	9.6	31.9	0.0	40.3	46.0	5.7	100	210	
Vert.	3000.005	PK	50.7	28.2	5.3	40.7	3.1	46.6	73.9	27.3	111	183	
Vert.	4882.000	PK	49.5	31.7	5.9	39.5	3.1	50.7	73.9	23.2	100	359	
Vert.	7323.000	PK	44.5	36.9	7.3	40.2	3.1	51.6	73.9	22.3	100	0	
Vert.	9764.000	PK	44.3	38.5	8.3	39.5	3.1	54.7	73.9	19.2	100	0	
Vert.	3000.005	AV	45.7	28.2	5.3	40.7	3.1	41.6	53.9	12.3	111	183	
Vert.	4882.000	AV	41.0	31.7	5.9	39.5	3.1	42.2	53.9	11.7	100	359	
Vert.	7323.000	AV	34.2	36.9	7.3	40.2	3.1	41.3	53.9	12.6	100	0	
Vert.	9764.000	AV	33.2	38.5	8.3	39.5	3.1	43.6	53.9	10.3	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(4.3 m / 3.0 m) = 3.1 dB

13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

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



## Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. : 11274193S-A-R4  
Date : May 11, 2016      May 11, 2016  
Temperature / Humidity : 23 deg. C / 68 % RH      23 deg. C / 64 % RH  
Engineer : Kazutaka Takeyama      Yosuke Ishikawa  
            (30-1000 MHz      (1-18 GHz)  
            18-26.5 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.	255.768	QP	39.4	17.4	8.4	32.0	0.0	33.2	46.0	12.8	135	68	
Hori.	318.056	QP	32.8	14.3	8.8	32.0	0.0	23.9	46.0	22.1	100	283	
Hori.	329.881	QP	37.0	14.5	8.9	32.0	0.0	28.4	46.0	17.6	100	315	
Hori.	332.801	QP	38.3	14.6	8.9	31.9	0.0	29.9	46.0	16.1	100	310	
Hori.	402.121	QP	27.0	16.0	9.2	32.0	0.0	20.2	46.0	25.8	150	117	
Hori.	481.902	QP	35.2	17.1	9.5	31.9	0.0	29.9	46.0	16.1	100	217	
Hori.	499.192	QP	44.2	17.4	9.6	31.9	0.0	39.3	46.0	6.7	140	332	
Hori.	511.511	QP	33.3	17.6	9.6	31.9	0.0	28.6	46.0	17.4	100	137	
Hori.	665.585	QP	31.9	19.8	10.2	31.9	0.0	30.0	46.0	16.0	100	211	
Hori.	2483.500	PK	46.2	27.9	13.8	41.0	3.1	50.0	73.9	23.9	118	138	
Hori.	3000.014	PK	51.2	28.2	5.3	40.7	3.1	47.1	73.9	26.8	158	205	
Hori.	4960.000	PK	47.5	32.0	6.0	39.4	3.1	49.2	73.9	24.7	145	69	
Hori.	7440.000	PK	45.8	37.0	7.5	40.4	3.1	53.0	73.9	20.9	100	0	
Hori.	9920.000	PK	44.2	38.4	8.4	39.4	3.1	54.7	73.9	19.2	100	0	
Hori.	2483.500	AV	33.8	27.9	13.8	41.0	3.1	37.6	53.9	16.3	118	138	
Hori.	3000.014	AV	45.8	28.2	5.3	40.7	3.1	41.7	53.9	12.2	158	205	
Hori.	4960.000	AV	38.0	32.0	6.0	39.4	3.1	39.7	53.9	14.2	145	69	
Hori.	7440.000	AV	34.5	37.0	7.5	40.4	3.1	41.7	53.9	12.2	100	0	
Hori.	9920.000	AV	33.4	38.4	8.4	39.4	3.1	43.9	53.9	10.0	100	0	
Vert.	255.768	QP	37.3	17.4	8.4	32.0	0.0	31.1	46.0	14.9	100	345	
Vert.	499.192	QP	44.4	17.4	9.6	31.9	0.0	39.5	46.0	6.5	100	209	
Vert.	2483.500	PK	45.8	27.9	13.8	41.0	3.1	49.6	73.9	24.3	116	152	
Vert.	2999.995	PK	50.1	28.2	5.3	40.7	3.1	46.0	73.9	27.9	112	187	
Vert.	4960.000	PK	49.6	32.0	6.0	39.4	3.1	51.3	73.9	22.6	144	142	
Vert.	7440.000	PK	45.2	37.0	7.5	40.4	3.1	52.4	73.9	21.5	100	0	
Vert.	9920.000	PK	43.8	38.4	8.4	39.4	3.1	54.3	73.9	19.6	100	0	
Vert.	2483.500	AV	33.5	27.9	13.8	41.0	3.1	37.3	53.9	16.6	116	152	
Vert.	2999.995	AV	45.1	28.2	5.3	40.7	3.1	41.0	53.9	12.9	112	187	
Vert.	4960.000	AV	39.4	32.0	6.0	39.4	3.1	41.1	53.9	12.8	144	142	
Vert.	7440.000	AV	34.5	37.0	7.5	40.4	3.1	41.7	53.9	12.2	100	0	
Vert.	9920.000	AV	33.5	38.4	8.4	39.4	3.1	44.0	53.9	9.9	100	0	

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

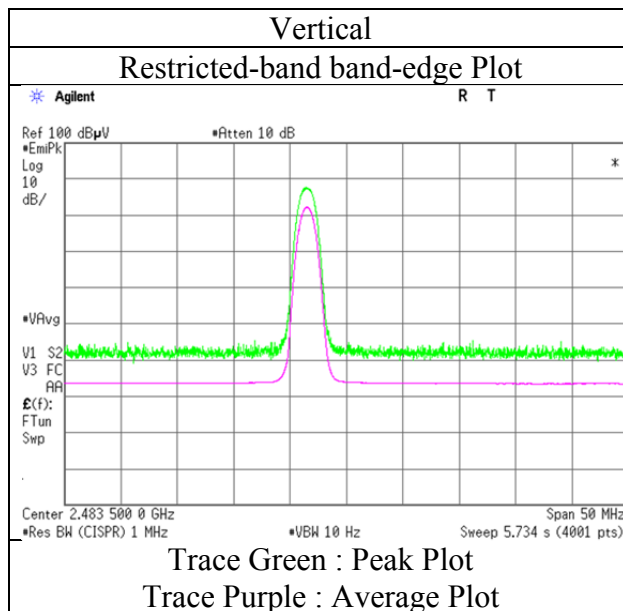
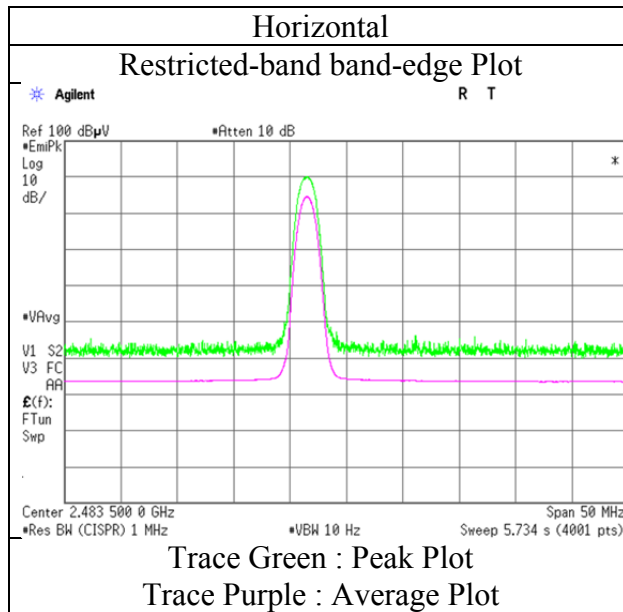
Distance factor : 1 GHz - 13 GHz :  $20\log(4.3\text{ m} / 3.0\text{ m}) = 3.1\text{ dB}$

13 GHz - 40 GHz :  $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

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

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

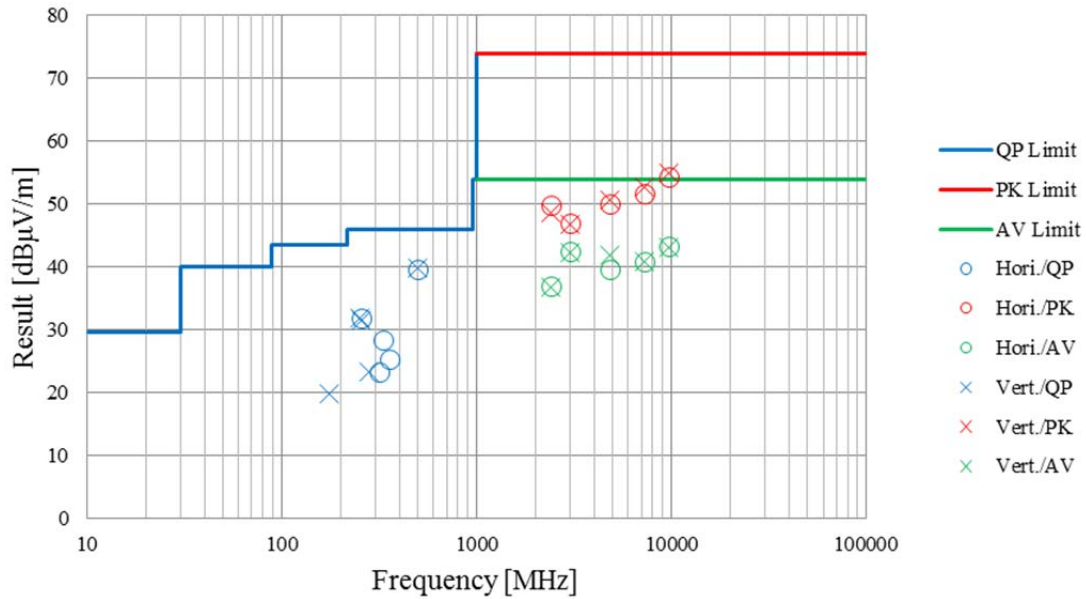
Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. : 11274193S-A-R4  
Date : May 11, 2016  
Temperature / Humidity : 23 deg. C / 64 % RH  
Engineer : Yosuke Ishikawa  
(1-18 GHz)  
Mode : Tx, Hopping Off, 3DH5 2480 MHz



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

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

Test place Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. 11274193S-A-R4  
Date May 11, 2016  
Temperature / Humidity 23 deg. C / 68 % RH 23 deg. C / 64 % RH  
Engineer Kazutaka Takeyama Yosuke Ishikawa  
(30-1000 MHz (1-18 GHz)  
18-26.5 GHz)  
Mode Tx, Hopping Off, 3DH5 2402 MHz

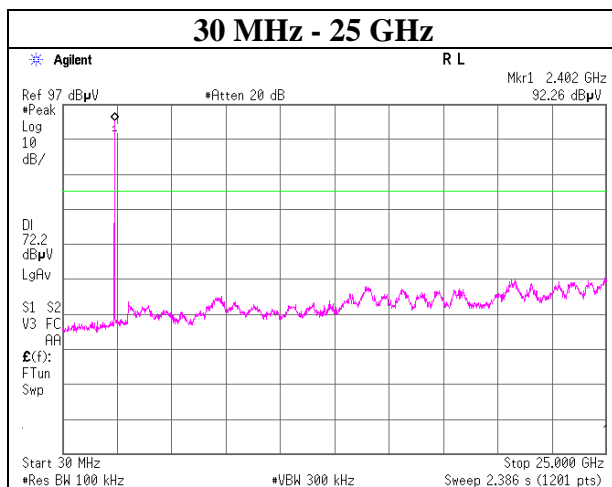
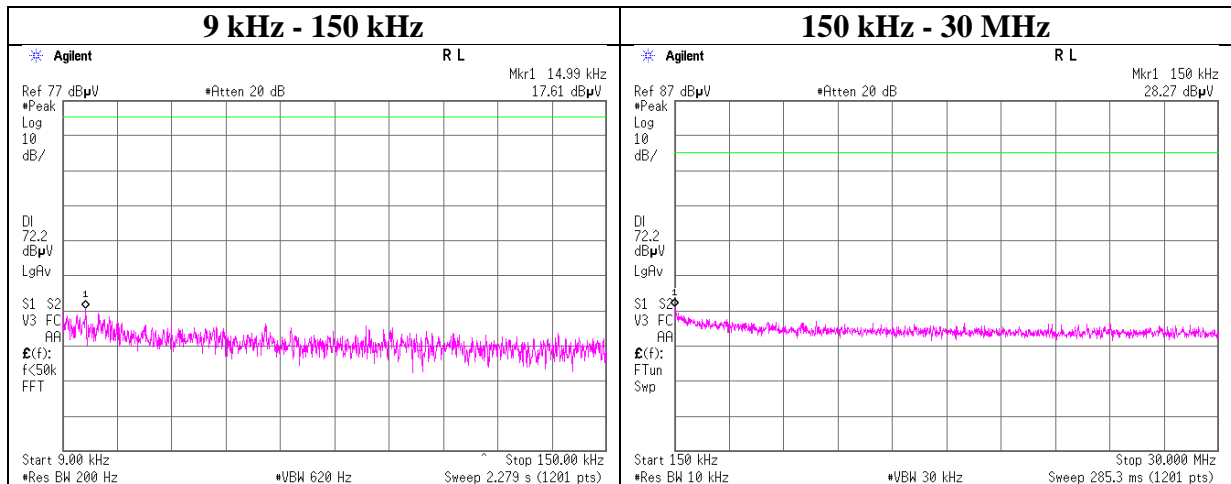


\*These plots data contains sufficient number to show the trend of characteristic features for EUT.

## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	11274193S-A-R4
Date	June 7, 2016
Temperature / Humidity	26 deg. C / 48 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx, Hopping Off, DH5

### 2402 MHz



**UL Japan, Inc.**

**Shonan EMC Lab.**

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

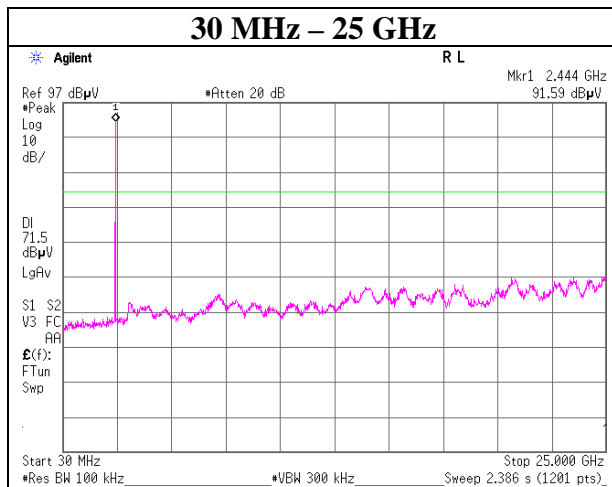
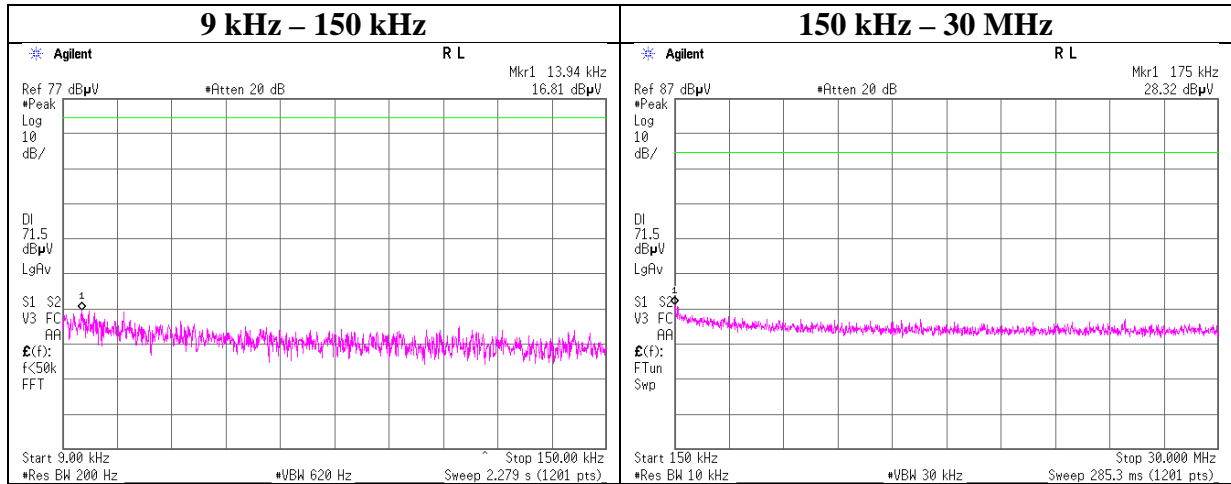
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	11274193S-A-R4
Date	June 7, 2016
Temperature / Humidity	26 deg. C / 48 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx, Hopping Off, DH5

### 2441 MHz



**UL Japan, Inc.**

**Shonan EMC Lab.**

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

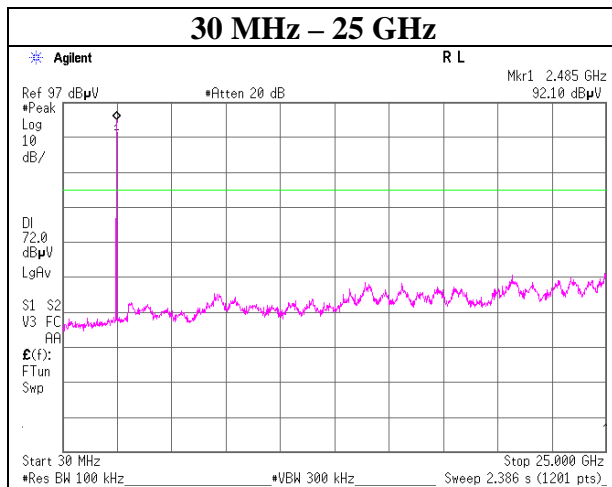
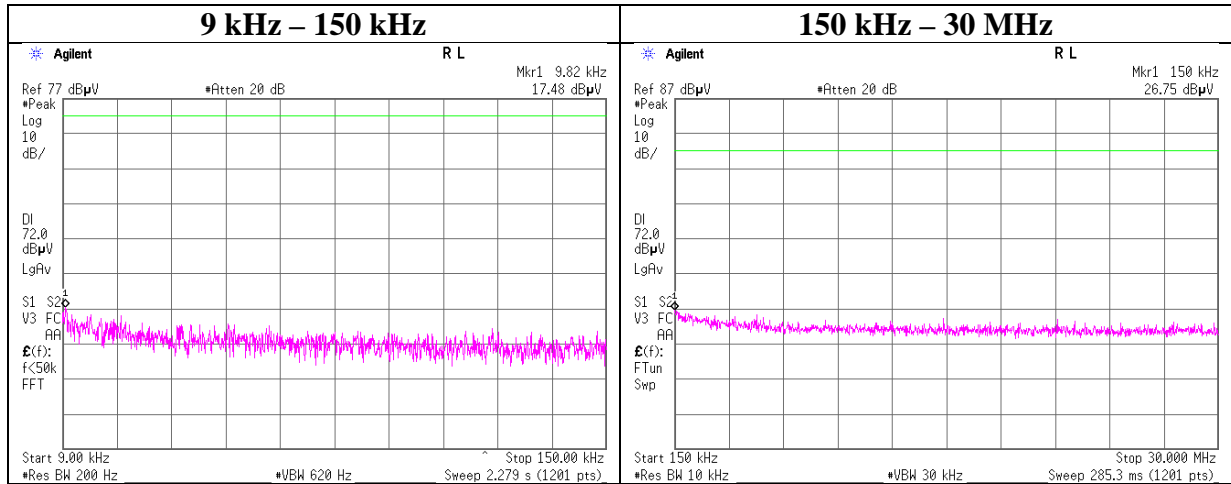
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	11274193S-A-R4
Date	June 7, 2016
Temperature / Humidity	26 deg. C / 48 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx, Hopping Off, DH5

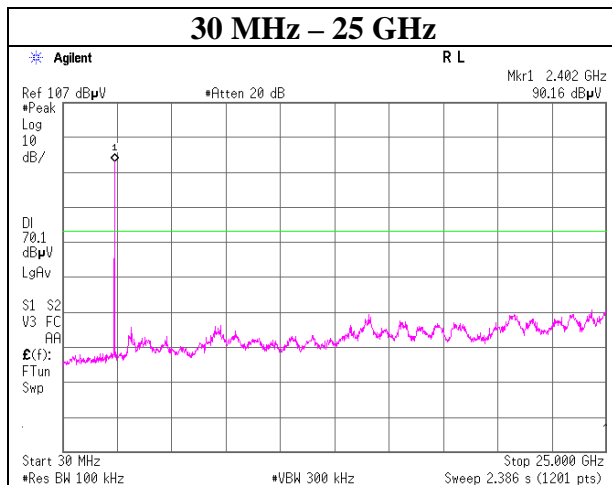
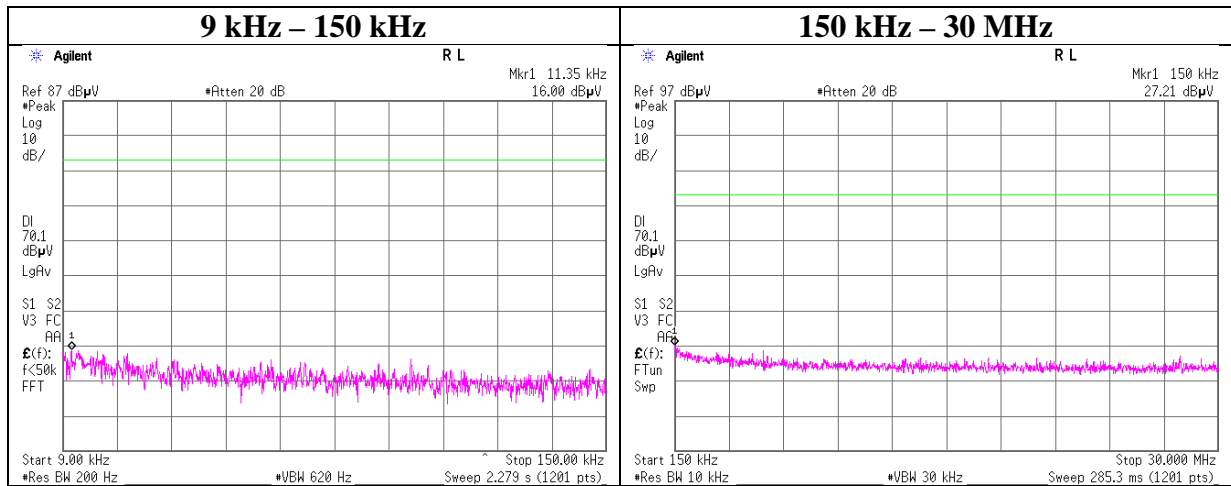
### 2480 MHz



## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	11274193S-A-R4
Date	June 7, 2016
Temperature / Humidity	26 deg. C / 48 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx, Hopping Off, 3DH5

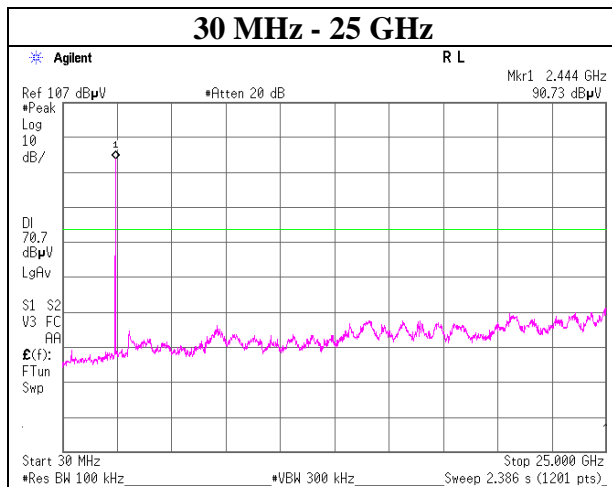
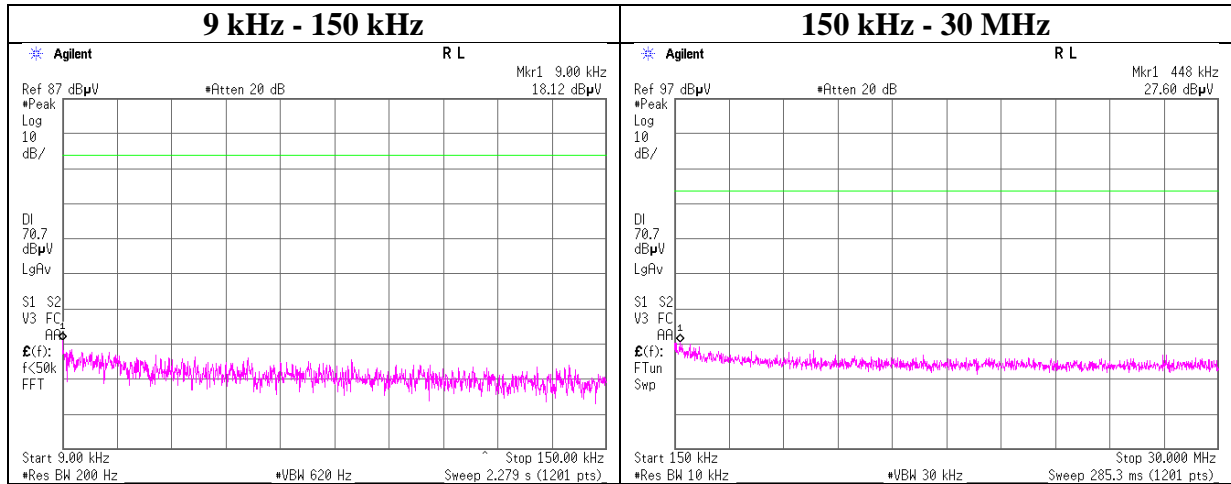
### 2402 MHz



## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	11274193S-A-R4
Date	June 7, 2016
Temperature / Humidity	26 deg. C / 48 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx, Hopping Off, 3DH5

### 2441 MHz

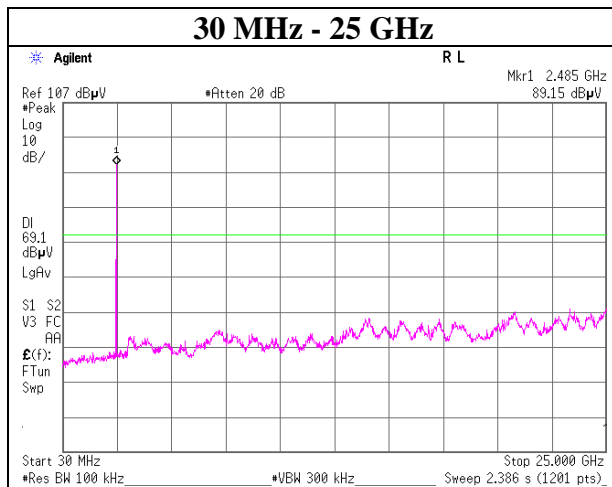
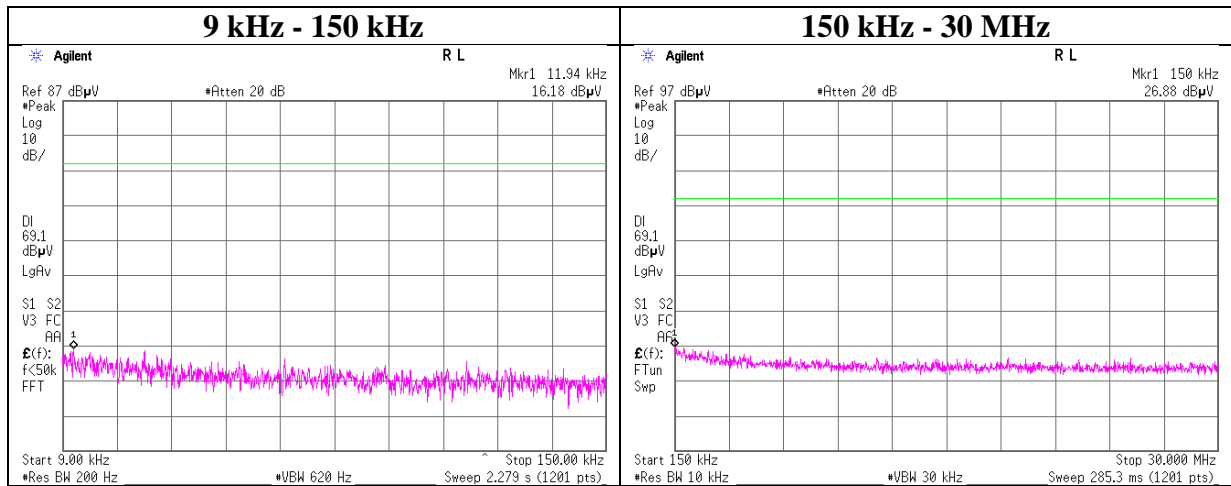




## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	11274193S-A-R4
Date	June 7, 2016
Temperature / Humidity	26 deg. C / 48 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx, Hopping Off, 3DH5

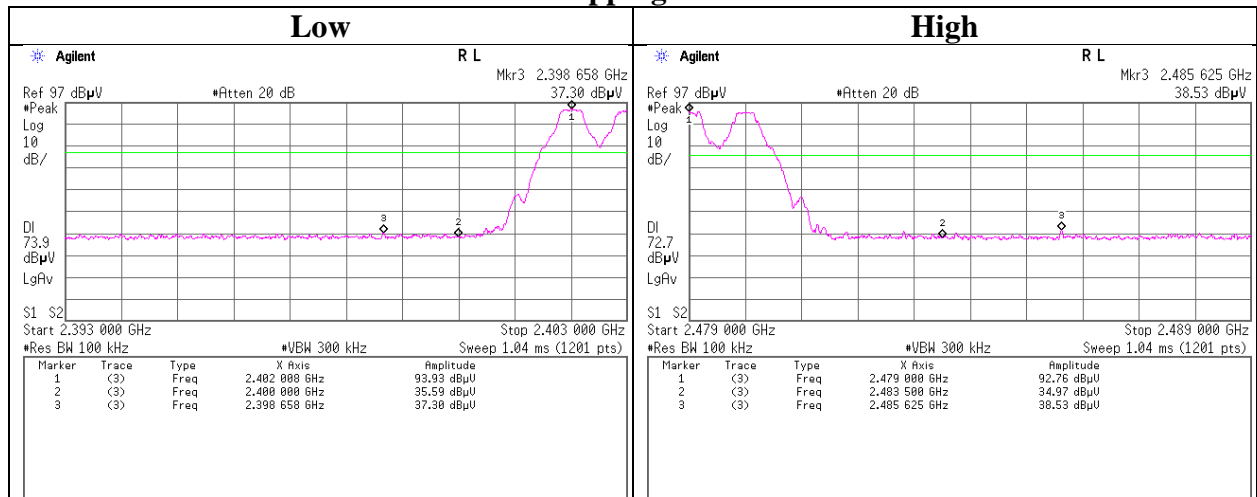
### 2480 MHz



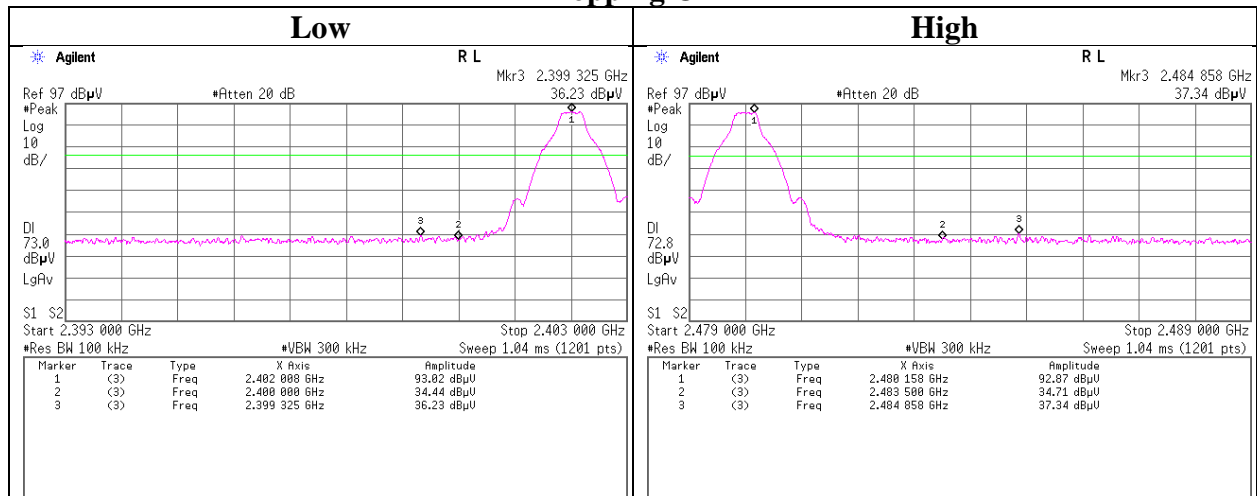
## Conducted Emission Band Edge compliance

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	11274193S-A-R4
Date	June 7, 2016
Temperature / Humidity	26 deg. C / 48 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx DH5

### Hopping On



### Hopping Off



**UL Japan, Inc.**

**Shonan EMC Lab.**

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

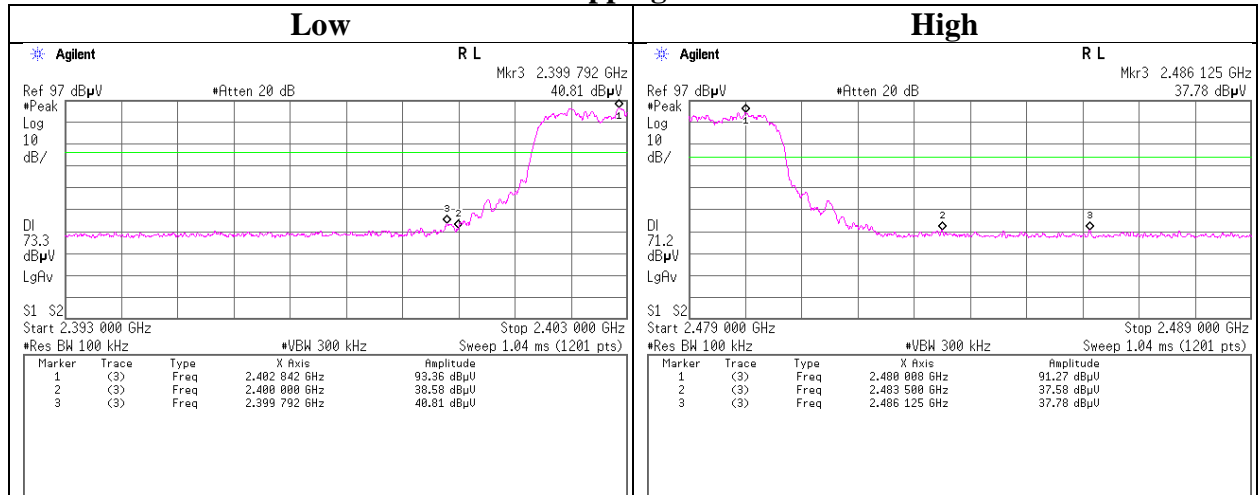
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

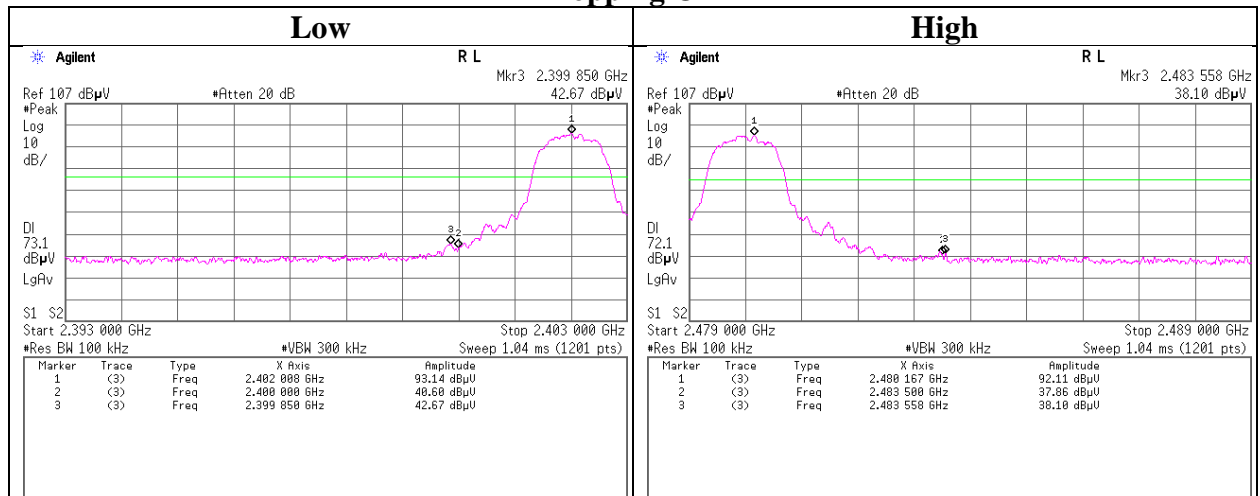
## Conducted Emission Band Edge compliance

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	11274193S-A-R4
Date	June 7, 2016
Temperature / Humidity	26 deg. C / 48 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx 3DH5

### Hopping On



### Hopping Off



**UL Japan, Inc.**

**Shonan EMC Lab.**

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

Telephone : +81 463 50 6400

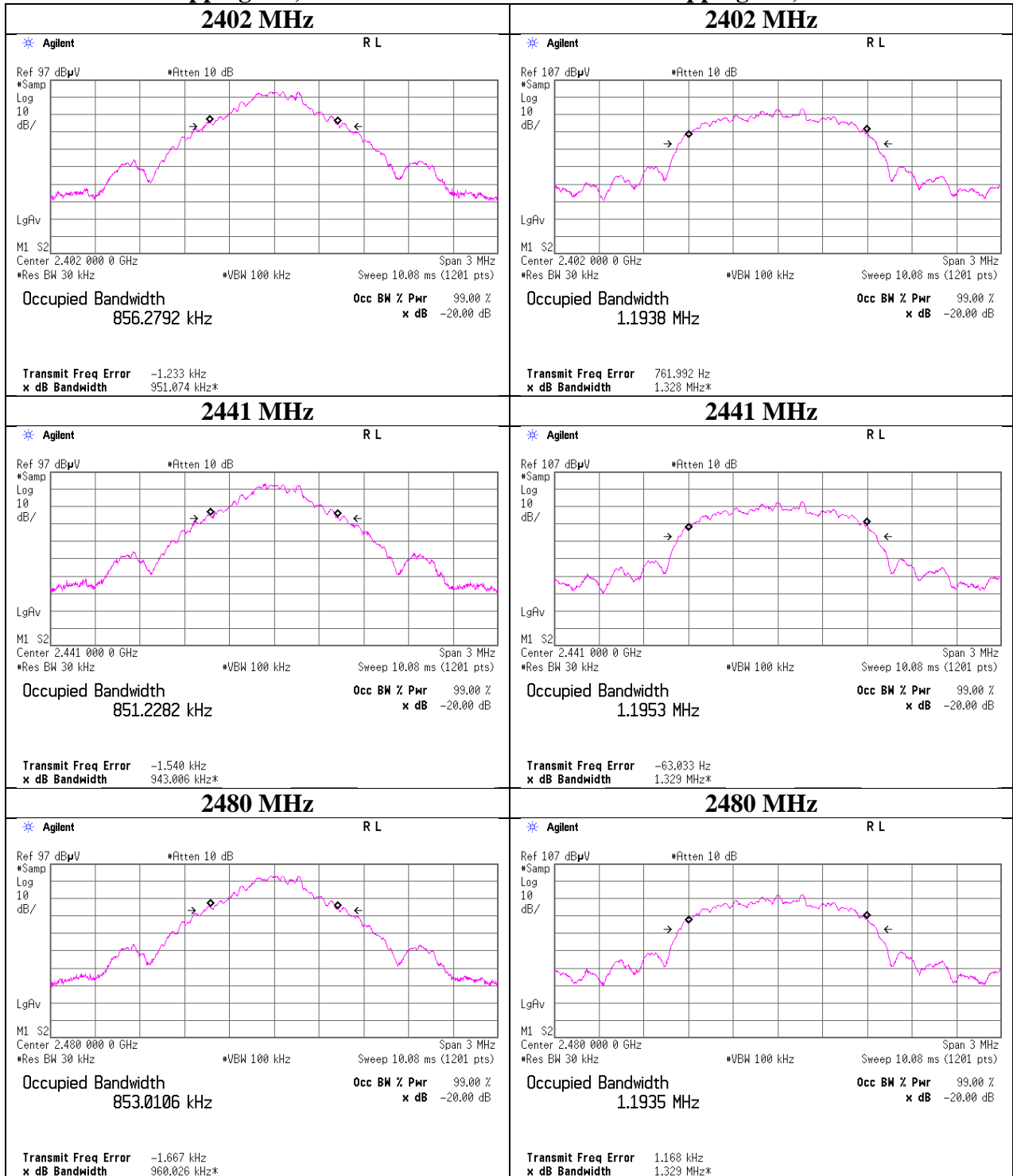
Facsimile : +81 463 50 6401

## 99% Occupied Bandwidth

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	11274193S-A-R4
Date	June 7, 2016
Temperature / Humidity	26 deg. C / 48 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx Hopping Off

### Hopping Off, DH5

### Hopping Off, 3DH5



**UL Japan, Inc.**

**Shonan EMC Lab.**

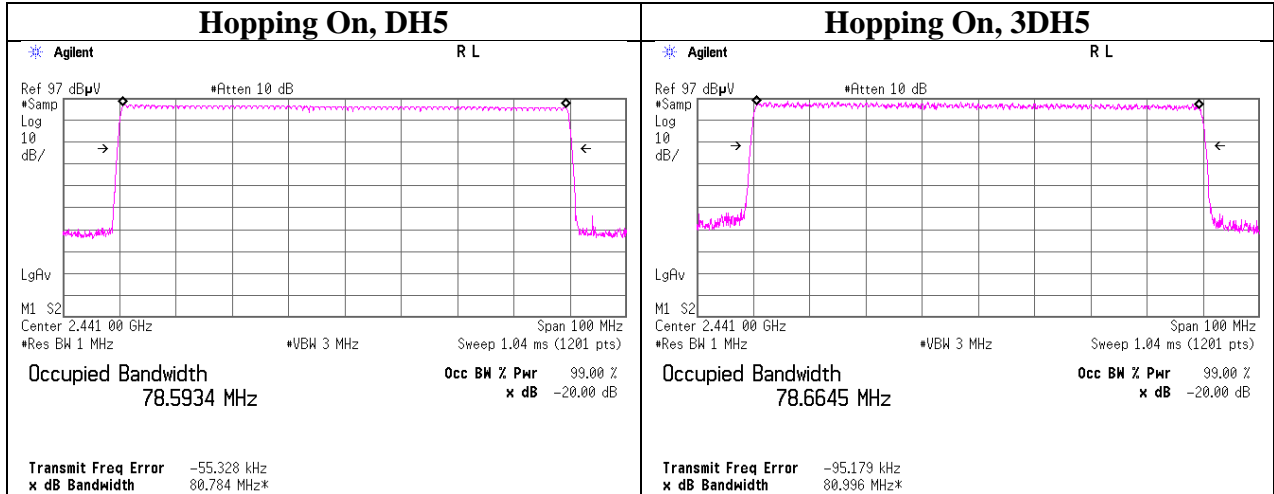
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## 99% Occupied Bandwidth

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	11274193S-A-R4
Date	June 7, 2016
Temperature / Humidity	26 deg. C / 48 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx Hopping On



**UL Japan, Inc.**

**Shonan EMC Lab.**

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## **APPENDIX 2: Test instruments**

### **Test equipment**

<b>Control No.</b>	<b>Instrument</b>	<b>Manufacturer</b>	<b>Model No</b>	<b>Serial No</b>	<b>Test Item</b>	<b>Calibration Date * Interval(month)</b>
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2015/07/16 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2015/10/11 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2015/10/11 * 12
SAT6-08	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-406(40)	-	RE	2015/08/31 * 12
SCC-C1/C2/C3/ C4/C5/C10/SRS E-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/NS4906	-/0901-271(R F Selector)	RE	2016/04/22 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2016/02/25 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE	2016/03/28 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE _CE,RFI,MF)	-	RE	-
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2015/10/22 * 12
SJM-15	Measure	ASKUL	-	-	RE	-
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2015/11/18 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	RE	2016/03/28 * 12
SCC-G20	Coaxial Cable	Junkosha	J12J102518-00	APR-15-15-003	RE	2016/04/18 * 12
SCC-G33	Coaxial Cable	Junkosha	MWX241-0100 0KMSKMS	-	RE	2016/04/18 * 12
SHA-05	Horn Antenna	ETS LINDGREN	3160-09	LM4210	RE	2016/03/24 * 12
SAF-09	Pre Amplifier	TOYO Corporation	HAP18-26W	00000018	RE	2015/09/07 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2015/05/27 * 12
SCC-G04	Coaxial Cable	Junkosha	J12J102207-00	JUN-12-14-018	RE	2015/06/08 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2016/05/11 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2015/08/11 * 12
SAEC-03(SVSWR)	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	RE	2015/08/28 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE, AT	2015/11/04 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2015/11/16 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	AT	2015/09/16 * 12
SPM-07	Power Meter	Agilent	8990B	MY5100272	AT	2016/04/04 * 12
SPSS-04	Power sensor	Agilent	N1923A	MY5326009	AT	2016/04/04 * 12
SCC-G13	Coaxial Cable	Suhner	SUCOFLEX 102	31599/2	AT	2016/03/23 * 12
STS-06	Digital Hitester	Hioki	3805-50	080997830	AT	2016/03/22 * 12
SOS-10	Humidity Indicator	A&D	AD-5681	4064561	AT	2015/10/22 * 12

**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  
AT: Antenna Terminal Conducted test**

**UL Japan, Inc.**

**Shonan EMC Lab.**

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401