



Test report No. : 11485104S-A  
Page : 1 of 46  
Issued date : November 21, 2016  
FCC ID : AK8XB950B1  
Revised date : November 24, 2016

# RADIO TEST REPORT

**Test Report No. : 11485104S-A**

**Applicant** : Sony Corporation  
**Type of Equipment** : Wireless Stereo Headset  
**Model No.** : MDR-XB950B1  
**FCC ID** : AK8XB950B1  
**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)

**Date of test:** October 26 to 30, 2016

**Representative test engineer:** M. Hosaka  
Makoto Hosaka  
Engineer  
Consumer Technology Division

**Approved by:** T. Imamura  
Toyokazu Imamura  
Leader  
Consumer Technology Division



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

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13-EM-F0429



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## **SECTION 1: Customer information**

Company Name : Sony Corporation  
Address : 1-7-1 Konan Minato-ku, Tokyo, 108-0075 Japan  
Telephone Number : +604-3835333  
Contact Person : Wan Nurfazwina binti Mat Soti

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

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

Type of Equipment : Wireless Stereo Headset  
Model No. : MDR-XB950B1  
Serial No. : Refer to Section 4, Clause 4.2  
Rating : DC 3.7 V: Built-in lithium-ion rechargeable battery  
DC 5 V: When charged using USB  
Receipt Date of Sample : October 21, 2016  
Country of Mass-production : China  
Condition of EUT : Engineering prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Modification of EUT : No Modification by the test lab.

### **2.2 Product Description**

Model: MDR-XB950B1 (referred to as the EUT in this report) is a Wireless Stereo Headset.

The clock frequency used in the EUT: 26 MHz

### **Radio Specification**

Radio Type : Transceiver  
Frequency of Operation : 2402 MHz - 2480 MHz  
Modulation : FHSS, GFSK  
Power Supply (radio part input) : DC 1.35 V  
Antenna type : Omni-Directional  
Antenna Gain : 1.83 dBi

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

### **3.1 Test Specification**

Test Specification : FCC Part 15 Subpart C  
FCC part 15 final revised on April 6, 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 EUT has been tested for compliance with FCC Part 15 Subpart B. Refer to the test report: 11485104S-E.

### **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 *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)		Complied	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	10.0 dB 2483.998 MHz, AV, Vertical, Tx 2480 MHz, DH5	Complied	Conducted/ Radiated (above 30 MHz) *1)

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.

\*1) The EUT operates with a battery. AC Line can be connected to the EUT via PC; however, the EUT stops transmission during recharging. Therefore, the test is not applicable to the EUT.

\*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 is a battery-operated device and test was performed with the full-charged battery. Therefore, this EUT complies with the requirement.

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

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement.

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### 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

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor  $k = 2$ .  
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Item	Frequency range	Uncertainty (+/-)			
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR	No. 4 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

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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	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**

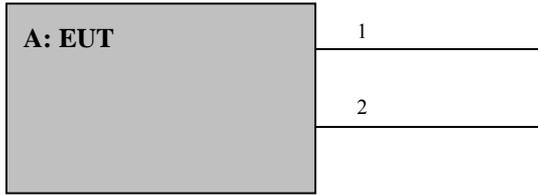
### **4.1 Operating Mode(s)**

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

Details of Operating Mode(s)

<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
20 dB 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)</p> <p>*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.</p> <p>* It is considered that the non-tested packet type (e.g. inquiry) can be omitted as it is complied with above all test items based on Bluetooth Core specification.</p> <p>*EUT has the power settings by the software as follows;  Power settings: BDR: Ext.=23, Int.=32, PA Att=1  EDR: Ext.=56, Int.=35, PA Att=0  Software: CSR BlueSuite BlueTest Version 2.5.0.93</p> <p>*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

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Wireless Noise Canceling Stereo Headset	MDR-XB950B1	0007 *1) 0008 *2)	Sony Corporation	EUT

\*1) Used for Antenna Terminal conducted test

\*2) Used for Radiated Emission test

### List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Audio	1.2	Unshielded	Unshielded	-
2	USB	0.5	Shielded	Shielded	-

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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, 0.5 m by 0.5 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	3.86 m*2) (1 GHz – 13 GHz), 1 m*3) (13 GHz – 25 GHz)		3.86 m*2) (1 GHz – 13 GHz), 1 m*3) (13 GHz – 25 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:  $20 \times \log(3.86 \text{ m}/3.0 \text{ m}) = 2.19 \text{ dB}$

\*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 (Band edge)	Spurious		
		Below 1 GHz	Above 1 GHz	
			1 GHz -13 GHz	13 GHz -25 GHz
Horizontal	Z	X	Z	X
Vertical	X	Y	X	X

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

**Measurement range** : 30 MHz - 25 GHz

**Test data** : APPENDIX

**Test result** : Pass

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

### **Test Procedure**

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

<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>
20 dB Bandwidth	3 MHz	30 kHz	100 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99 % Occupied Bandwidth *1)	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	10 kHz	30 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.

\*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

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## APPENDIX 1: Test data

### 20 dB Bandwidth and Carrier Frequency Separation

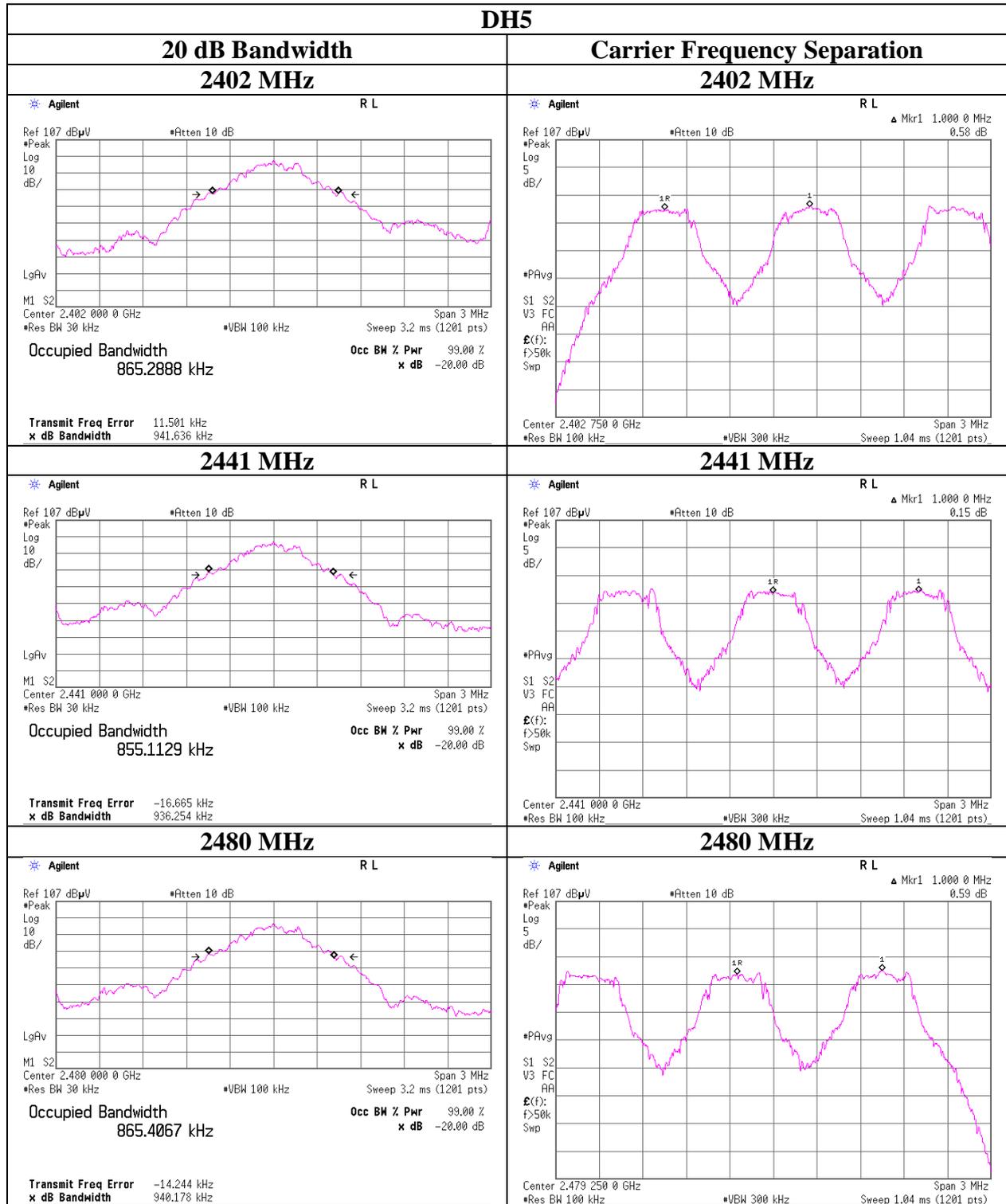
Test place Shonan EMC Lab. No.3 Shielded Room  
Report No. 11485104S-A  
Date October 26, 2016  
Temperature / Humidity 25 deg. C / 47 % RH  
Engineer Kenichi Adachi  
Mode Tx, Hopping On / Off

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.942	1.000	$\geq 0.628$
DH5	2441.0	0.936	1.000	$\geq 0.624$
DH5	2480.0	0.940	1.000	$\geq 0.627$
3DH5	2402.0	1.256	1.000	$\geq 0.837$
3DH5	2441.0	1.255	1.000	$\geq 0.837$
3DH5	2480.0	1.257	1.000	$\geq 0.838$

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

No limit applies to 20dB Bandwidth.

## 20 dB Bandwidth and Carrier Frequency Separation



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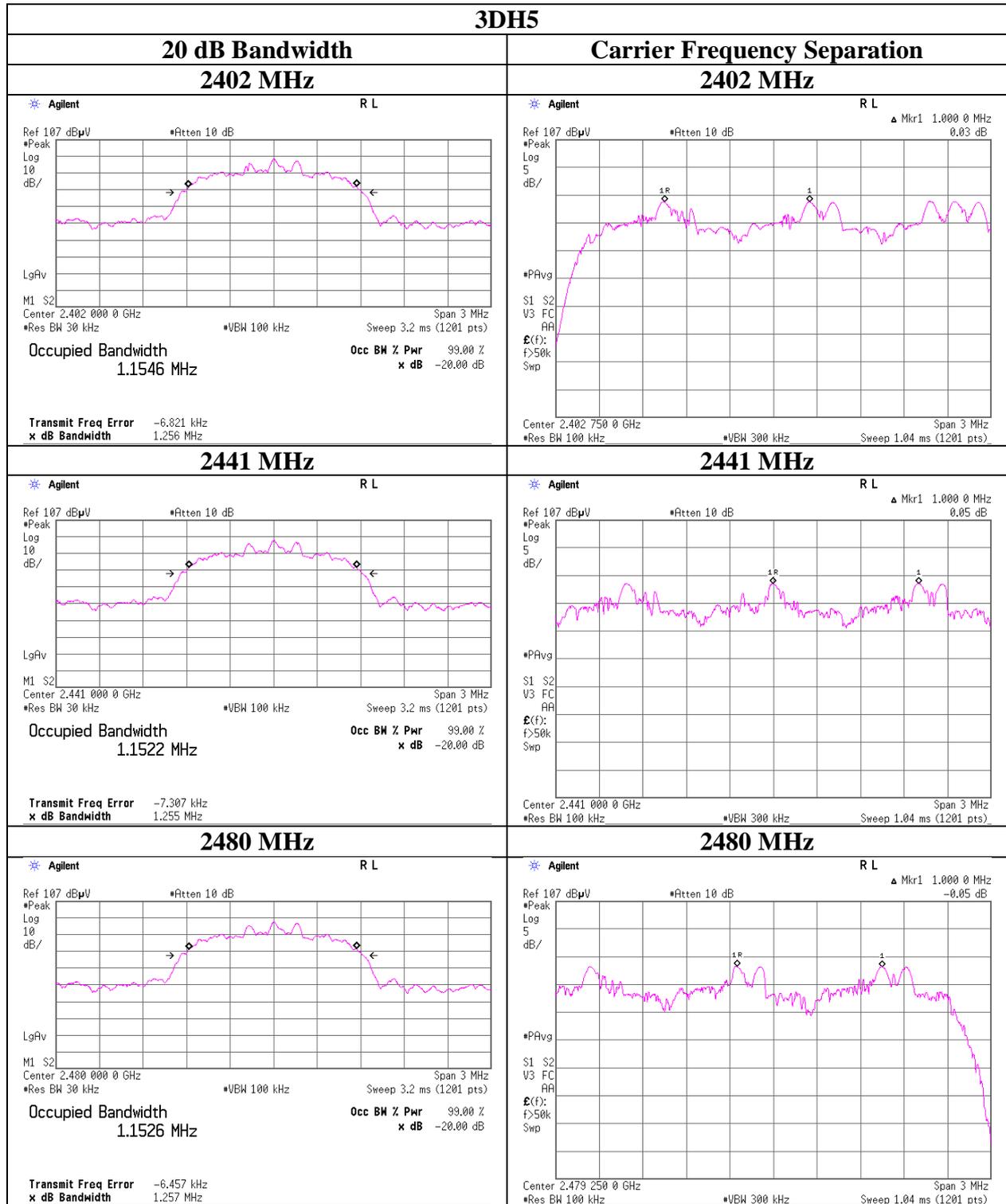
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## 20 dB Bandwidth and Carrier Frequency Separation



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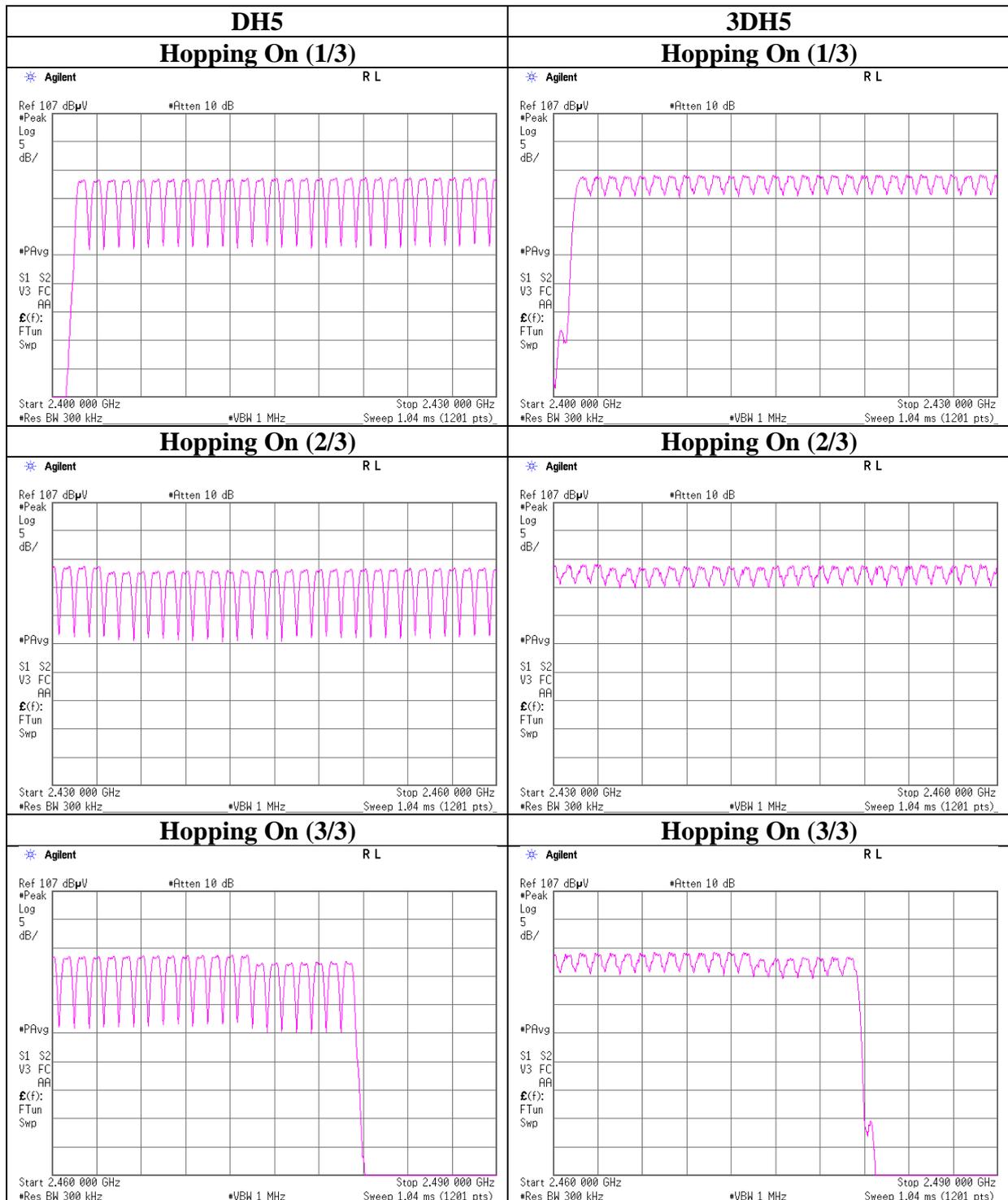
### **Number of Hopping Frequency**

Test place Shonan EMC Lab. No.3 Shielded Room  
Report No. 11485104S-A  
Date October 26, 2016  
Temperature / Humidity 25 deg. C / 47 % RH  
Engineer Kenichi Adachi  
Mode Tx, Hopping On

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

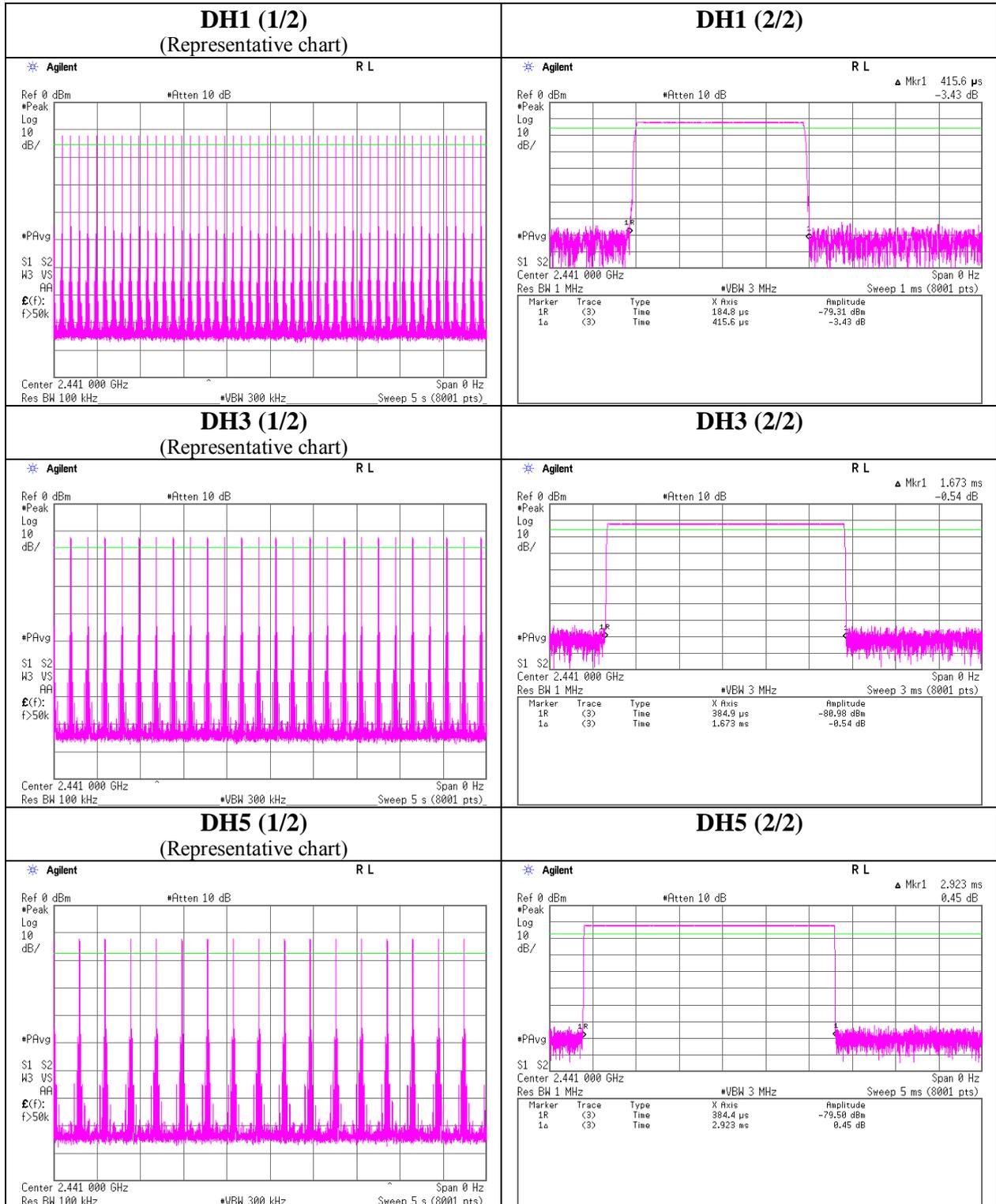
Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth Specification.

**Number of Hopping Frequency**





### Dwell time



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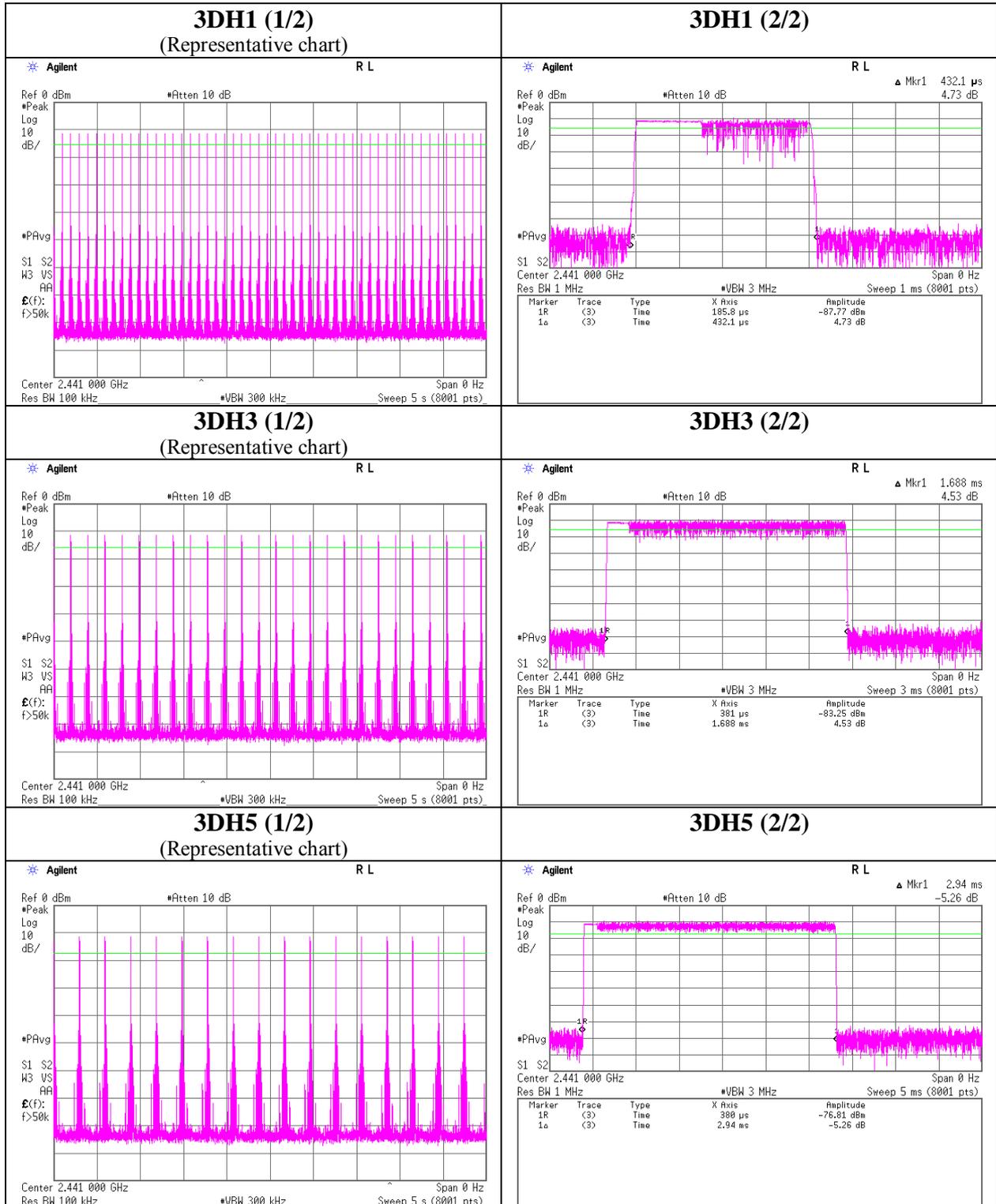
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### Dwell time



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## Maximum Peak Output Power

Test place : Shonan EMC Lab. No.3 Shielded Room  
Report No. : 11485104S-A  
Date : October 26, 2016  
Temperature / Humidity : 25 deg. C / 47 % RH  
Engineer : Kenichi Adachi  
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	-11.14	0.93	9.67	-0.54	0.88	20.96	125	21.50
DH5	2441.0	-11.49	0.94	9.67	-0.88	0.82	20.96	125	21.84
DH5	2480.0	-11.82	0.94	9.67	-1.21	0.76	20.96	125	22.17
2DH5	2402.0	-8.85	0.93	9.67	1.75	1.50	20.96	125	19.21
2DH5	2441.0	-8.97	0.94	9.67	1.64	1.46	20.96	125	19.32
2DH5	2480.0	-9.16	0.94	9.67	1.45	1.40	20.96	125	19.51
3DH5	2402.0	-8.06	0.93	9.67	2.54	1.79	20.96	125	18.42
3DH5	2441.0	-8.33	0.94	9.67	2.28	1.69	20.96	125	18.68
3DH5	2480.0	-8.59	0.94	9.67	2.02	1.59	20.96	125	18.94

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 20 dB BW without 2/3 relaxation, 125mW power limit was applied to it.

**Average Output Power**  
**(Reference data for RF Exposure / SAR testing)**

Test place : Shonan EMC Lab. No.3 Shielded Room  
Report No. : 11485104S-A  
Date : October 26, 2016  
Temperature / Humidity : 25 deg. C / 47 % RH  
Engineer : Kenichi Adachi  
Mode : Tx, Hopping Off

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
					[dBm]	[mW]		[dBm]	[mW]
DH5	2402.0	-12.92	0.93	9.67	-2.32	0.59	1.08	-1.24	0.75
DH5	2441.0	-13.24	0.94	9.67	-2.63	0.55	1.08	-1.55	0.70
DH5	2480.0	-13.59	0.94	9.67	-2.98	0.50	1.08	-1.90	0.65
2DH5	2402.0	-13.48	0.93	9.67	-2.88	0.52	1.06	-1.82	0.66
2DH5	2441.0	-13.66	0.94	9.67	-3.05	0.50	1.06	-1.99	0.63
2DH5	2480.0	-13.90	0.94	9.67	-3.29	0.47	1.06	-2.23	0.60
3DH5	2402.0	-13.46	0.93	9.67	-2.86	0.52	1.07	-1.79	0.66
3DH5	2441.0	-13.68	0.94	9.67	-3.07	0.49	1.07	-2.00	0.63
3DH5	2480.0	-13.90	0.94	9.67	-3.29	0.47	1.07	-2.22	0.60

Sample Calculation:

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

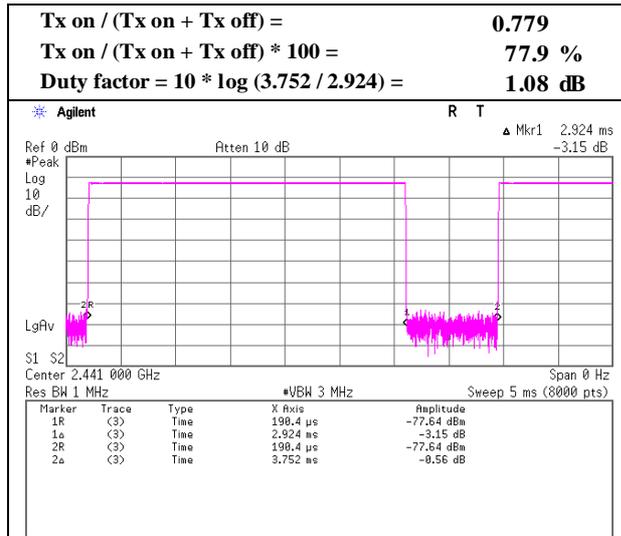
Result (Burst power average) = Time average + Duty factor

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

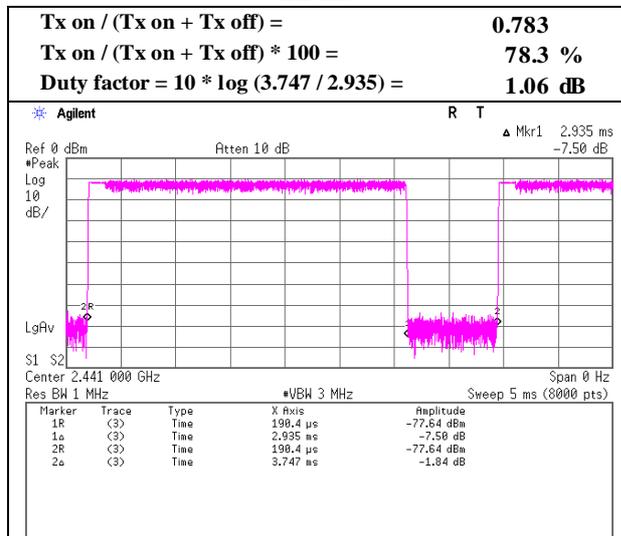
## Burst Rate Confirmation

Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11485104S-A
Date	October 26, 2016
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kenichi Adachi
Mode	Tx, Hopping Off

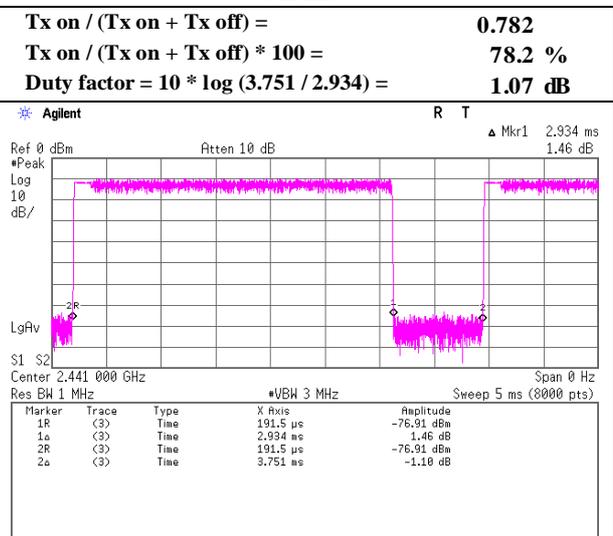
### DH5



### 2DH5



### 3DH5



## Radiated Spurious Emission

Report No. 11485104S-A  
Test Place(AC No) 1 1 2  
Date October 26, 2016 October 27, 2016 October 30, 2016  
Temperature / Humidity 26 deg. C / 49 % RH 24 deg. C / 44 % RH 20 deg. C / 52 % RH  
Engineer Yosuke Ishikawa Yosuke Ishikawa Makoto Hosaka  
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.	392.006	QP	27.80	16.07	7.17	31.63	0.00	19.41	46.00	26.5	100	165	
Hori.	400.000	QP	29.00	16.29	7.22	31.63	0.00	20.88	46.00	25.1	100	273	190
Hori.	2390.000	PK	45.65	27.21	13.77	40.70	2.19	48.12	73.90	25.8	100	209	
Hori.	2558.003	PK	47.51	27.69	13.92	40.72	2.19	50.59	73.90	23.3	100	185	
Hori.	4804.000	PK	51.54	31.13	5.93	41.54	2.19	49.25	73.90	24.7	200	201	
Hori.	7206.000	PK	47.41	36.24	7.14	41.12	2.19	51.86	73.90	22.0	100	0	
Hori.	9608.000	PK	45.09	38.13	8.04	40.49	2.19	52.96	73.90	20.9	100	0	
Hori.	2390.000	AV	33.02	27.21	13.77	40.70	2.19	35.49	53.90	18.4	100	209	
Hori.	2558.003	AV	38.17	27.69	13.92	40.72	2.19	41.25	53.90	12.7	100	185	
Hori.	4804.000	AV	43.59	31.13	5.93	41.54	2.19	41.30	53.90	12.6	200	201	
Hori.	7206.000	AV	35.11	36.24	7.14	41.12	2.19	39.56	53.90	14.3	100	0	
Hori.	9608.000	AV	33.72	38.13	8.04	40.49	2.19	41.59	53.90	12.3	100	0	
Vert.	108.003	QP	26.80	11.31	7.92	31.84	0.00	14.19	43.50	29.3	100	45	
Vert.	112.005	QP	28.20	11.91	7.91	31.84	0.00	16.18	43.50	27.3	100	33	
Vert.	116.008	QP	32.40	12.52	7.92	31.84	0.00	21.00	43.50	22.5	100	52	
Vert.	120.002	QP	26.80	13.12	7.95	31.83	0.00	16.04	43.50	27.4	100	81	
Vert.	444.001	QP	28.90	16.84	7.51	31.64	0.00	21.61	46.00	24.3	117	68	
Vert.	2390.000	PK	45.18	27.21	13.77	40.70	2.19	47.65	73.90	26.3	133	282	
Vert.	2558.002	PK	47.41	27.69	13.92	40.72	2.19	50.49	73.90	23.4	100	120	
Vert.	4804.000	PK	50.43	31.13	5.93	41.54	2.19	48.14	73.90	25.8	100	175	
Vert.	7206.000	PK	45.89	36.24	7.14	41.12	2.19	50.34	73.90	23.6	100	0	
Vert.	9608.000	PK	45.08	38.13	8.04	40.49	2.19	52.95	73.90	21.0	100	0	
Vert.	2390.000	AV	32.80	27.21	13.77	40.70	2.19	35.27	53.90	18.6	133	282	
Vert.	2558.002	AV	38.52	27.69	13.92	40.72	2.19	41.60	53.90	12.3	100	120	
Vert.	4804.000	AV	42.82	31.13	5.93	41.54	2.19	40.53	53.90	13.4	100	175	
Vert.	7206.000	AV	34.96	36.24	7.14	41.12	2.19	39.41	53.90	14.5	100	0	
Vert.	9608.000	AV	34.11	38.13	8.04	40.49	2.19	41.98	53.90	11.9	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(3.86 m / 3.0 m) = 2.19 dB  
13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.54 dB

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant. Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	91.94	27.25	13.78	40.70	2.19	94.46	-	-	Carrier
Hori.	2397.948	PK	43.37	27.24	13.77	40.70	2.19	45.87	74.46	28.6	
Hori.	2400.000	PK	46.69	27.25	13.78	40.70	2.19	49.21	74.46	25.3	
Vert.	2402.000	PK	90.03	27.25	13.78	40.70	2.19	92.55	-	-	Carrier
Vert.	2398.005	PK	42.00	27.24	13.77	40.70	2.19	44.50	72.55	28.1	
Vert.	2400.000	PK	45.01	27.25	13.78	40.70	2.19	47.53	72.55	25.0	

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

Distance factor : 1 GHz - 13 GHz : 20log(3.86 m / 3.0 m) = 2.19 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.**

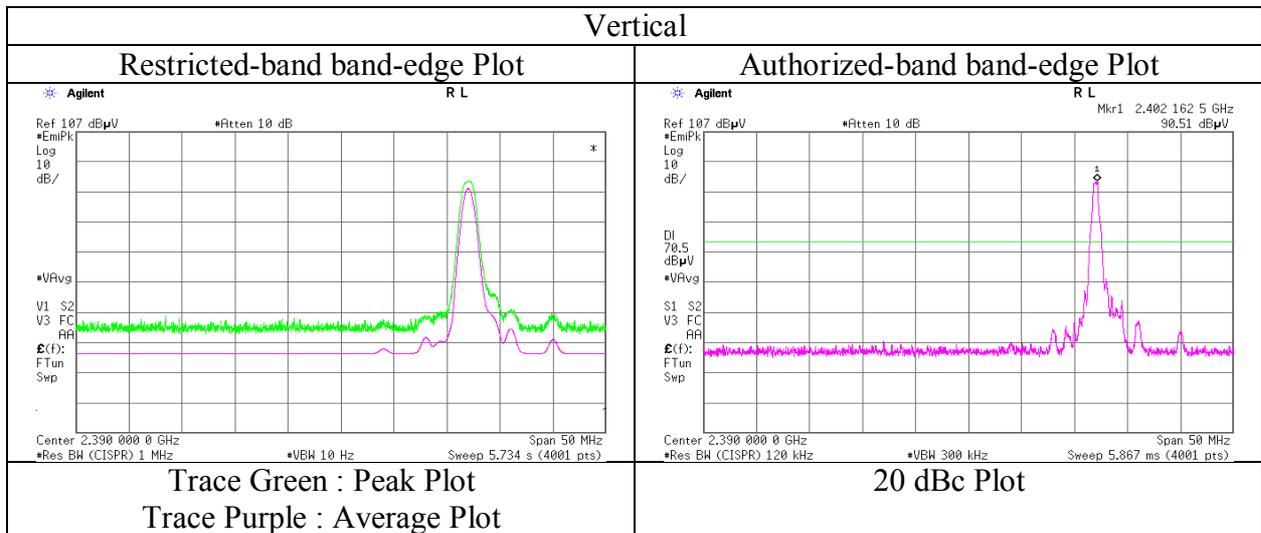
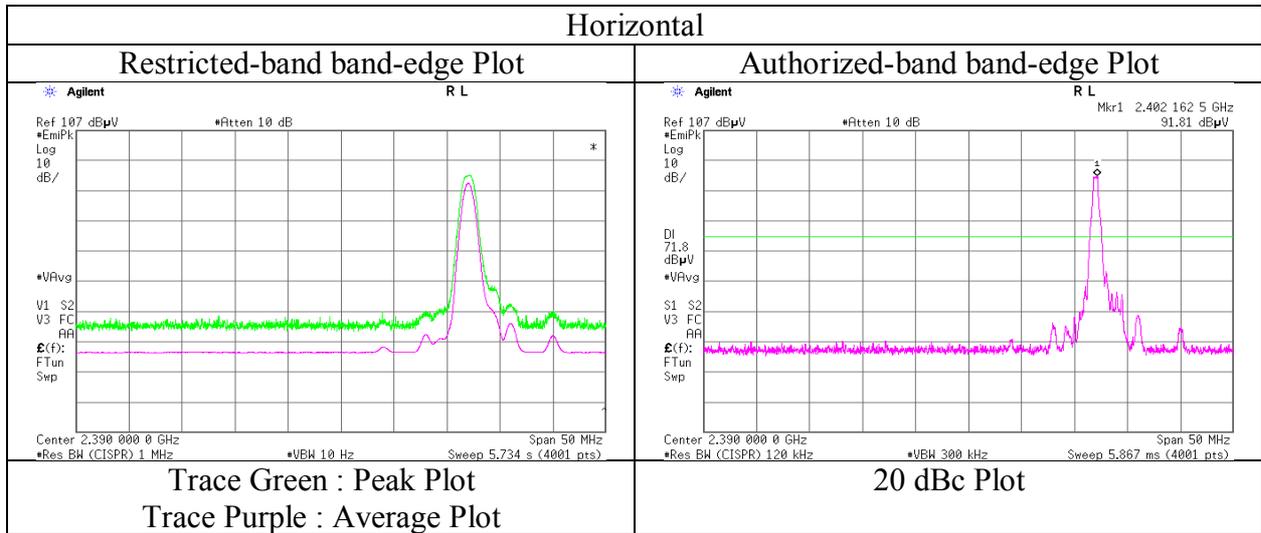
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

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

Report No. 11485104S-A  
Test Place(AC No) 1  
Date October 26, 2016  
Temperature / Humidity 26 deg. C / 49 % RH  
Engineer Yosuke Ishikawa  
Mode Tx, Hopping Off, DH5 2402 MHz



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

## Radiated Spurious Emission

Report No. 11485104S-A  
Test Place(AC No) 1 1 2  
Date October 26, 2016 October 27, 2016 October 30, 2016  
Temperature / Humidity 26 deg. C / 49 % RH 24 deg. C / 44 % RH 20 deg. C / 52 % RH  
Engineer Yosuke Ishikawa Yosuke Ishikawa Makoto Hosaka  
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.	388.000	QP	28.80	15.96	7.15	31.63	0.00	20.28	46.00	25.7	100	180	
Hori.	428.000	QP	28.90	16.64	7.41	31.64	0.00	21.31	46.00	24.6	100	185	
Hori.	4882.000	PK	50.14	31.29	5.96	41.39	2.19	48.19	73.90	25.7	220	196	
Hori.	7323.000	PK	45.79	36.41	7.17	41.25	2.19	50.31	73.90	23.6	100	0	
Hori.	9764.000	PK	44.21	38.36	8.10	40.41	2.19	52.45	73.90	21.5	100	0	
Hori.	4882.000	AV	42.18	31.29	5.96	41.39	2.19	40.23	53.90	13.7	220	196	
Hori.	7323.000	AV	34.57	36.41	7.17	41.25	2.19	39.09	53.90	14.8	100	0	
Hori.	9764.000	AV	33.28	38.36	8.10	40.41	2.19	41.52	53.90	12.4	100	0	
Vert.	108.000	QP	26.20	11.31	7.92	31.84	0.00	13.59	43.50	29.9	100	18	
Vert.	112.000	QP	27.90	11.91	7.91	31.84	0.00	15.88	43.50	27.6	100	354	
Vert.	116.000	QP	32.50	12.52	7.92	31.84	0.00	21.10	43.50	22.4	100	24	
Vert.	120.000	QP	26.70	13.12	7.95	31.83	0.00	15.94	43.50	27.5	100	58	
Vert.	416.007	QP	27.30	16.49	7.33	31.63	0.00	19.49	46.00	26.5	138	13	
Vert.	4882.000	PK	50.50	31.29	5.96	41.39	2.19	48.55	73.90	25.4	191	70	
Vert.	7323.000	PK	45.90	36.41	7.17	41.25	2.19	50.42	73.90	23.5	100	0	
Vert.	9764.000	PK	44.26	38.36	8.10	40.41	2.19	52.50	73.90	21.4	100	0	
Vert.	4882.000	AV	42.76	31.29	5.96	41.39	2.19	40.81	53.90	13.1	191	70	
Vert.	7323.000	AV	34.79	36.41	7.17	41.25	2.19	39.31	53.90	14.6	100	0	
Vert.	9764.000	AV	33.51	38.36	8.10	40.41	2.19	41.75	53.90	12.2	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 (3.86 m / 3.0 m) = 2.19 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.**

## Radiated Spurious Emission

Report No. 11485104S-A  
Test Place(AC No) 1 1 2  
Date October 26, 2016 October 27, 2016 October 30, 2016  
Temperature / Humidity 26 deg. C / 49 % RH 24 deg. C / 44 % RH 20 deg. C / 52 % RH  
Engineer Yosuke Ishikawa Yosuke Ishikawa Makoto Hosaka  
Mode Tx, Hopping Off, DH5 2480 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant. Fac. [dBm]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	396.000	QP	28.90	16.18	7.19	31.63	0.00	20.64	46.00	25.3	100	164	
Hori.	444.000	QP	29.20	16.84	7.51	31.64	0.00	21.91	46.00	24.0	207	173	
Hori.	2483.500	PK	47.92	27.52	13.86	40.69	2.19	50.80	73.90	23.1	100	204	
Hori.	2484.022	PK	49.55	27.53	13.86	40.69	2.19	52.44	73.90	21.5	100	204	
Hori.	4960.000	PK	49.91	31.45	5.99	41.23	2.19	48.31	73.90	25.6	100	189	
Hori.	7440.000	PK	45.03	36.57	7.19	41.37	2.19	49.61	73.90	24.3	100	0	
Hori.	9920.000	PK	43.93	38.58	8.18	40.32	2.19	52.56	73.90	21.3	100	0	
Hori.	2483.500	AV	36.49	27.52	13.86	40.69	2.19	39.37	53.90	14.5	100	204	
Hori.	2484.022	AV	40.70	27.53	13.86	40.69	2.19	43.59	53.90	10.3	100	204	
Hori.	4960.000	AV	41.64	31.45	5.99	41.23	2.19	40.04	53.90	13.9	100	189	
Hori.	7440.000	AV	34.24	36.57	7.19	41.37	2.19	38.82	53.90	15.1	100	0	
Hori.	9920.000	AV	32.55	38.58	8.18	40.32	2.19	41.18	53.90	12.7	100	0	
Vert.	111.998	QP	26.30	11.91	7.91	31.84	0.00	14.28	43.50	29.2	100	23	
Vert.	116.000	QP	32.20	12.52	7.92	31.84	0.00	20.80	43.50	22.7	100	28	
Vert.	120.000	QP	26.30	13.12	7.95	31.83	0.00	15.54	43.50	27.9	100	260	
Vert.	436.000	QP	29.80	16.74	7.46	31.64	0.00	22.36	46.00	23.6	128	78	
Vert.	576.006	QP	26.40	18.60	8.24	31.63	0.00	21.61	46.00	24.3	100	323	
Vert.	2483.500	PK	48.25	27.52	13.86	40.69	2.19	51.13	73.90	22.8	129	124	
Vert.	2483.998	PK	49.46	27.53	13.86	40.69	2.19	52.35	73.90	21.6	129	124	
Vert.	4960.000	PK	50.22	31.45	5.99	41.23	2.19	48.62	73.90	25.3	100	199	
Vert.	7440.000	PK	45.93	36.57	7.19	41.37	2.19	50.51	73.90	23.4	100	0	
Vert.	9920.000	PK	43.52	38.58	8.18	40.32	2.19	52.15	73.90	21.8	100	0	
Vert.	2483.500	AV	36.54	27.52	13.86	40.69	2.19	39.42	53.90	14.5	129	124	
Vert.	2483.998	AV	40.98	27.53	13.86	40.69	2.19	43.87	53.90	10.0	129	124	
Vert.	4960.000	AV	41.31	31.45	5.99	41.23	2.19	39.71	53.90	14.2	100	199	
Vert.	7440.000	AV	34.26	36.57	7.19	41.37	2.19	38.84	53.90	15.1	100	0	
Vert.	9920.000	AV	32.61	38.58	8.18	40.32	2.19	41.24	53.90	12.7	100	0	

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

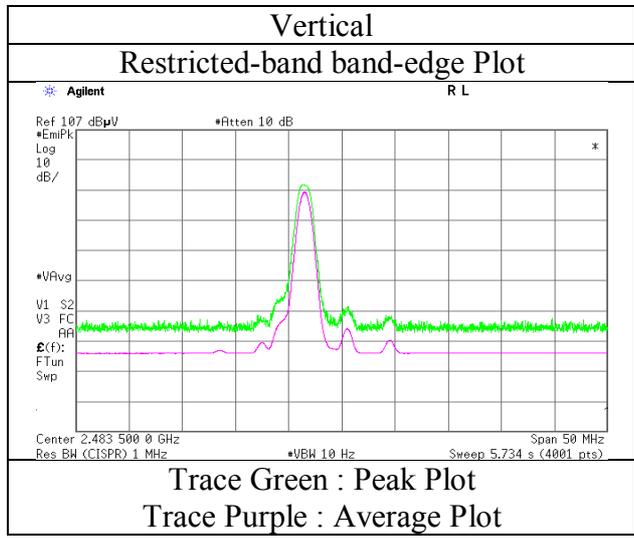
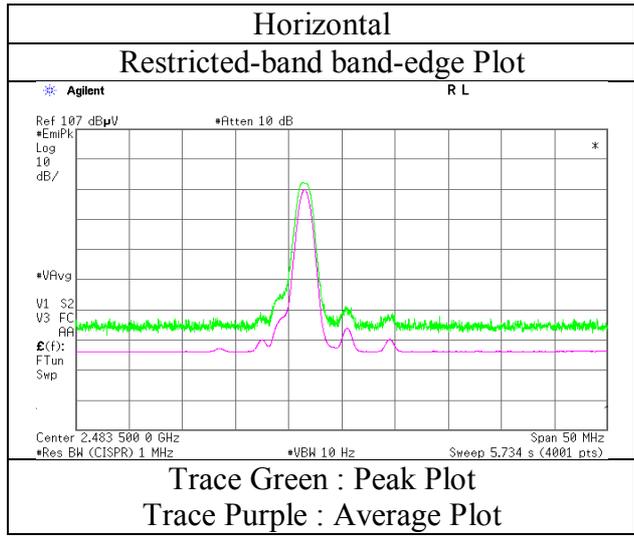
Distance factor : 1 GHz - 13 GHz :  $20\log(3.86\text{ m} / 3.0\text{ m}) = 2.19\text{ dB}$

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

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

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

Report No. 11485104S-A  
 Test Place(AC No) 1  
 Date October 26, 2016  
 Temperature / Humidity 26 deg. C / 49 % RH  
 Engineer Yosuke Ishikawa  
 Mode Tx, Hopping Off, DH5 2480 MHz



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

## Radiated Spurious Emission

Report No. 11485104S-A  
Test Place(AC No) 1 1 2  
Date October 26, 2016 October 27, 2016 October 30, 2016  
Temperature / Humidity 26 deg. C / 49 % RH 24 deg. C / 44 % RH 20 deg. C / 52 % RH  
Engineer Yosuke Ishikawa Yosuke Ishikawa Makoto Hosaka  
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.	392.000	QP	29.20	16.07	7.17	31.63	0.00	20.81	46.00	25.1	100	170	
Hori.	400.000	QP	29.30	16.29	7.22	31.63	0.00	21.18	46.00	24.8	100	173	
Hori.	2390.000	PK	44.80	27.21	13.77	40.70	2.19	47.27	73.90	26.6	100	53	
Hori.	4804.000	PK	51.32	31.13	5.93	41.54	2.19	49.03	73.90	24.9	222	200	
Hori.	7206.000	PK	45.83	36.24	7.14	41.12	2.19	50.28	73.90	23.6	100	0	
Hori.	9608.000	PK	44.93	38.13	8.04	40.49	2.19	52.80	73.90	21.1	100	0	
Hori.	2390.000	AV	32.80	27.21	13.77	40.70	2.19	35.27	53.90	18.6	100	53	
Hori.	4804.000	AV	40.70	31.13	5.93	41.54	2.19	38.41	53.90	15.5	222	200	
Hori.	7206.000	AV	35.17	36.24	7.14	41.12	2.19	39.62	53.90	14.3	100	0	
Hori.	9608.000	AV	34.27	38.13	8.04	40.49	2.19	42.14	53.90	11.8	100	0	
Vert.	112.004	QP	28.90	11.91	7.91	31.84	0.00	16.88	43.50	26.6	100	12	
Vert.	116.000	QP	32.30	12.52	7.92	31.84	0.00	20.90	43.50	22.6	100	68	
Vert.	120.000	QP	26.20	13.12	7.95	31.83	0.00	15.44	43.50	28.0	100	25	
Vert.	428.000	QP	29.80	16.64	7.41	31.64	0.00	22.21	46.00	23.7	132	77	
Vert.	564.000	QP	26.90	18.43	8.18	31.64	0.00	21.87	46.00	24.1	100	319	
Vert.	2390.000	PK	44.17	27.21	13.77	40.70	2.19	46.64	73.90	27.3	254	284	
Vert.	4804.000	PK	50.49	31.13	5.93	41.54	2.19	48.20	73.90	25.7	100	158	
Vert.	7206.000	PK	46.44	36.24	7.14	41.12	2.19	50.89	73.90	23.0	100	0	
Vert.	9608.000	PK	47.41	38.13	8.04	40.49	2.19	55.28	73.90	18.6	100	0	
Vert.	2390.000	AV	32.60	27.21	13.77	40.70	2.19	35.07	53.90	18.8	254	284	
Vert.	4804.000	AV	40.05	31.13	5.93	41.54	2.19	37.76	53.90	16.1	100	158	
Vert.	7206.000	AV	35.22	36.24	7.14	41.12	2.19	39.67	53.90	14.2	100	0	
Vert.	9608.000	AV	34.45	38.13	8.04	40.49	2.19	42.32	53.90	11.6	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(3.86 m / 3.0 m) = 2.19 dB  
13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.54 dB

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

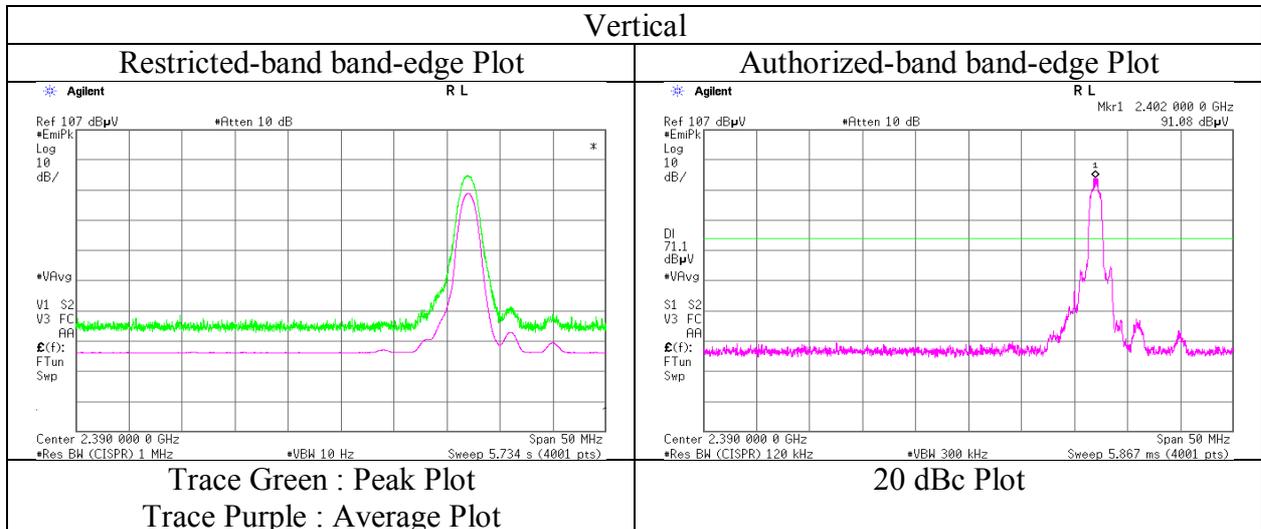
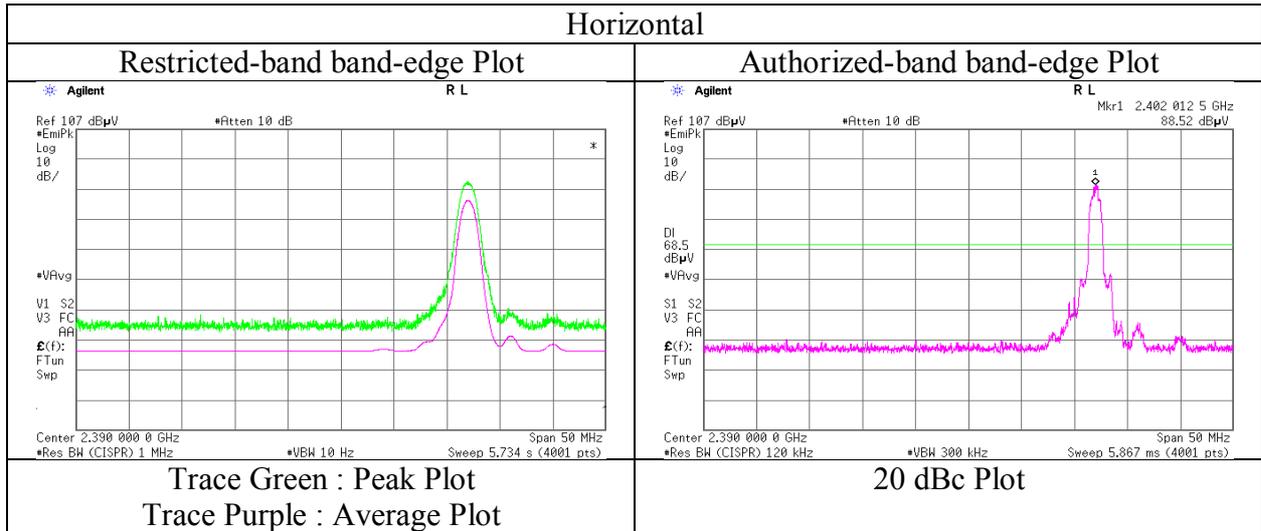
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant. Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	88.32	27.25	13.78	40.70	2.19	90.84	-	-	Carrier
Hori.	2400.000	PK	51.45	27.25	13.78	40.70	2.19	53.97	70.84	16.9	
Vert.	2402.000	PK	90.65	27.25	13.78	40.70	2.19	93.17	-	-	Carrier
Vert.	2400.000	PK	53.49	27.25	13.78	40.70	2.19	56.01	73.17	17.2	

Result = Reading + Ant. Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor  
Distance factor : 1 GHz - 13 GHz : 20log(3.86 m / 3.0 m) = 2.19 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.**

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

Report No. 11485104S-A  
Test Place(AC No) 1  
Date October 26, 2016  
Temperature / Humidity 26 deg. C / 49 % RH  
Engineer Yosuke Ishikawa  
Mode Tx, Hopping Off, 3DH5 2402 MHz



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

## Radiated Spurious Emission

Report No. 11485104S-A  
Test Place(AC No) 1 1 2  
Date October 26, 2016 October 27, 2016 October 30, 2016  
Temperature / Humidity 26 deg. C / 49 % RH 24 deg. C / 44 % RH 20 deg. C / 52 % RH  
Engineer Yosuke Ishikawa Yosuke Ishikawa Makoto Hosaka  
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.	428.000	QP	30.90	16.64	7.41	31.64	0.00	23.31	46.00	22.6	100	174	
Hori.	436.000	QP	30.90	16.74	7.46	31.64	0.00	23.46	46.00	22.5	131	180	
Hori.	4882.000	PK	49.73	31.29	5.96	41.39	2.19	47.78	73.90	26.1	216	201	
Hori.	7323.000	PK	45.92	36.41	7.17	41.25	2.19	50.44	73.90	23.5	100	0	
Hori.	9764.000	PK	44.79	38.36	8.10	40.41	2.19	53.03	73.90	20.9	100	0	
Hori.	4882.000	AV	40.23	31.29	5.96	41.39	2.19	38.28	53.90	15.6	216	201	
Hori.	7323.000	AV	34.93	36.41	7.17	41.25	2.19	39.45	53.90	14.5	100	0	
Hori.	9764.000	AV	33.52	38.36	8.10	40.41	2.19	41.76	53.90	12.1	100	0	
Vert.	112.000	QP	29.10	11.91	7.91	31.84	0.00	17.08	43.50	26.4	100	81	
Vert.	116.000	QP	32.10	12.52	7.92	31.84	0.00	20.70	43.50	22.8	100	36	
Vert.	128.000	QP	25.00	13.61	8.09	31.83	0.00	14.87	43.50	28.6	100	102	
Vert.	134.000	QP	22.30	13.97	8.22	31.82	0.00	12.67	43.50	30.8	100	245	
Vert.	415.999	QP	28.90	16.49	7.33	31.63	0.00	21.09	46.00	24.9	129	73	
Vert.	4882.000	PK	48.96	31.29	5.96	41.39	2.19	47.01	73.90	26.9	100	200	
Vert.	7323.000	PK	46.50	36.41	7.17	41.25	2.19	51.02	73.90	22.9	100	0	
Vert.	9764.000	PK	45.44	38.36	8.10	40.41	2.19	53.68	73.90	20.2	100	0	
Vert.	4882.000	AV	38.98	31.29	5.96	41.39	2.19	37.03	53.90	16.9	100	200	
Vert.	7323.000	AV	34.81	36.41	7.17	41.25	2.19	39.33	53.90	14.6	100	0	
Vert.	9764.000	AV	33.51	38.36	8.10	40.41	2.19	41.75	53.90	12.2	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 (3.86 m / 3.0 m) = 2.19 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.**

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## Radiated Spurious Emission

Report No. 11485104S-A  
Test Place(AC No) 1 1 2  
Date October 26, 2016 October 27, 2016 October 30, 2016  
Temperature / Humidity 26 deg. C / 49 % RH 24 deg. C / 44 % RH 20 deg. C / 52 % RH  
Engineer Yosuke Ishikawa Yosuke Ishikawa Makoto Hosaka  
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.	408.000	QP	28.20	16.39	7.27	31.63	0.00	20.23	46.00	25.7	100	154	
Hori.	436.000	QP	29.50	16.74	7.46	31.64	0.00	22.06	46.00	23.9	100	172	
Hori.	2483.500	PK	47.81	27.52	13.86	40.69	2.19	50.69	73.90	23.2	125	219	
Hori.	2484.001	PK	49.37	27.53	13.86	40.69	2.19	52.26	73.90	21.6	125	219	
Hori.	4960.000	PK	48.48	31.45	5.99	41.23	2.19	46.88	73.90	27.0	241	192	
Hori.	7440.000	PK	45.50	36.57	7.19	41.37	2.19	50.08	73.90	23.8	100	0	
Hori.	9920.000	PK	43.97	38.58	8.18	40.32	2.19	52.60	73.90	21.3	100	0	
Hori.	2483.500	AV	37.24	27.52	13.86	40.69	2.19	40.12	53.90	13.8	125	219	
Hori.	2484.001	AV	39.07	27.53	13.86	40.69	2.19	41.96	53.90	11.9	125	219	
Hori.	4960.000	AV	38.93	31.45	5.99	41.23	2.19	37.33	53.90	16.6	241	192	
Hori.	7440.000	AV	34.25	36.57	7.19	41.37	2.19	38.83	53.90	15.1	100	0	
Hori.	9920.000	AV	32.55	38.58	8.18	40.32	2.19	41.18	53.90	12.7	100	0	
Vert.	108.000	QP	27.10	11.31	7.92	31.84	0.00	14.49	43.50	29.0	100	86	
Vert.	112.000	QP	26.60	11.91	7.91	31.84	0.00	14.58	43.50	28.9	100	51	
Vert.	116.000	QP	31.90	12.52	7.92	31.84	0.00	20.50	43.50	23.0	100	68	
Vert.	120.006	QP	27.50	13.12	7.95	31.83	0.00	16.74	43.50	26.7	100	357	
Vert.	444.000	QP	29.20	16.84	7.51	31.64	0.00	21.91	46.00	24.0	136	70	
Vert.	2483.500	PK	47.74	27.52	13.86	40.69	2.19	50.62	73.90	23.3	254	127	
Vert.	2483.965	PK	49.98	27.53	13.86	40.69	2.19	52.87	73.90	21.0	254	127	
Vert.	4960.000	PK	49.25	31.45	5.99	41.23	2.19	47.65	73.90	26.3	100	175	
Vert.	7440.000	PK	45.26	36.57	7.19	41.37	2.19	49.84	73.90	24.1	100	0	
Vert.	9920.000	PK	43.73	38.58	8.18	40.32	2.19	52.36	73.90	21.5	100	0	
Vert.	2483.500	AV	37.83	27.52	13.86	40.69	2.19	40.71	53.90	13.2	254	127	
Vert.	2483.965	AV	39.86	27.53	13.86	40.69	2.19	42.75	53.90	11.2	254	127	
Vert.	4960.000	AV	39.00	31.45	5.99	41.23	2.19	37.40	53.90	16.5	100	175	
Vert.	7440.000	AV	34.38	36.57	7.19	41.37	2.19	38.96	53.90	14.9	100	0	
Vert.	9920.000	AV	32.69	38.58	8.18	40.32	2.19	41.32	53.90	12.6	100	0	

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

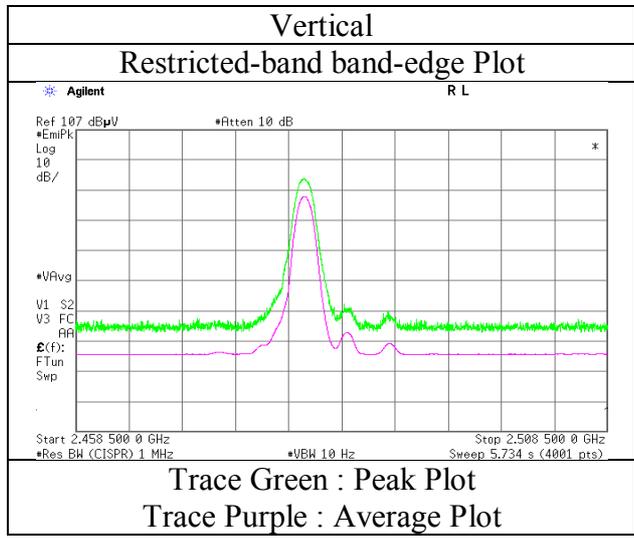
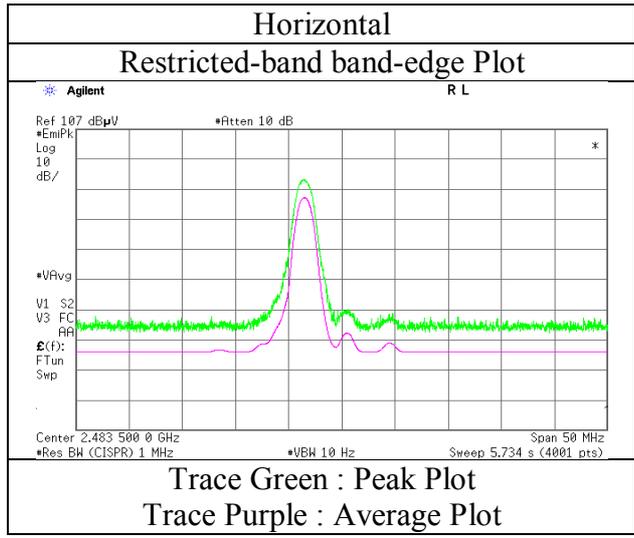
Distance factor : 1 GHz - 13 GHz :  $20\log(3.86\text{ m} / 3.0\text{ m}) = 2.19\text{ dB}$

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

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

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

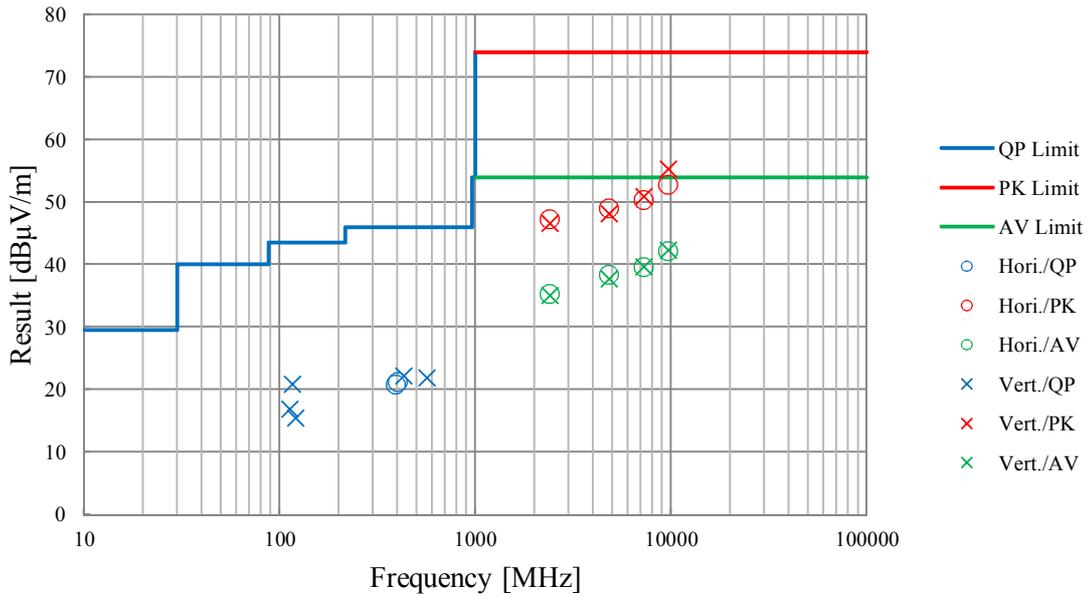
Report No. 11485104S-A  
 Test Place(AC No) 1  
 Date October 26, 2016  
 Temperature / Humidity 26 deg. C / 49 % RH  
 Engineer Yosuke Ishikawa  
 Mode Tx, Hopping Off, 3DH5 2480 MHz



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

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

Report No.	11485104S-A		
Test Place(AC No)	1	1	2
Date	October 26, 2016	October 27, 2016	October 30, 2016
Temperature / Humidity	26 deg. C / 49 % RH	24 deg. C / 44 % RH	20 deg. C / 52 % RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Makoto Hosaka
Mode	Tx, Hopping Off, 3DH5 2402 MHz		

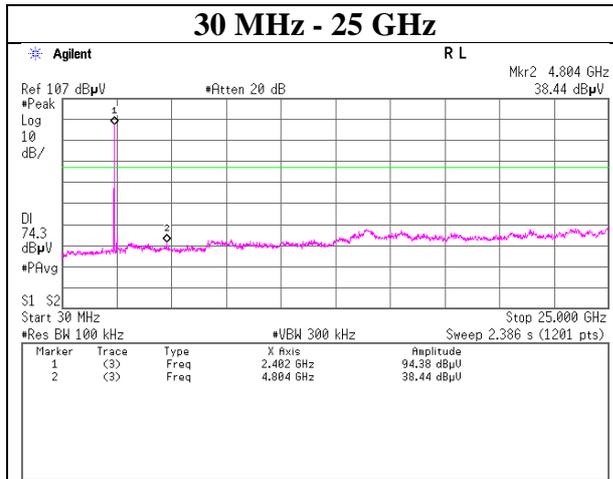


\*These plots data contains sufficient number to show the trend of characteristic features for EUT.

## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11485104S-A
Date	October 26, 2016
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kenichi Adachi
Mode	Tx, Hopping Off, DH5

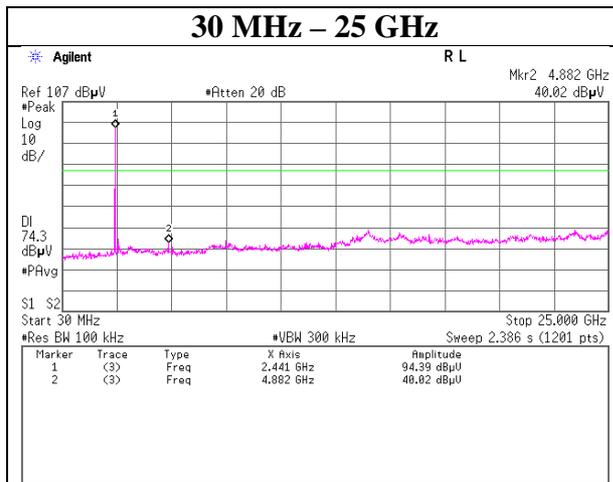
### 2402 MHz



## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11485104S-A
Date	October 26, 2016
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kenichi Adachi
Mode	Tx, Hopping Off, DH5

### 2441 MHz



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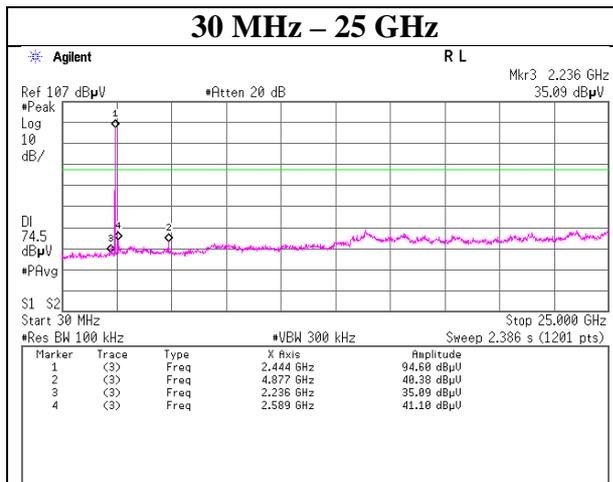
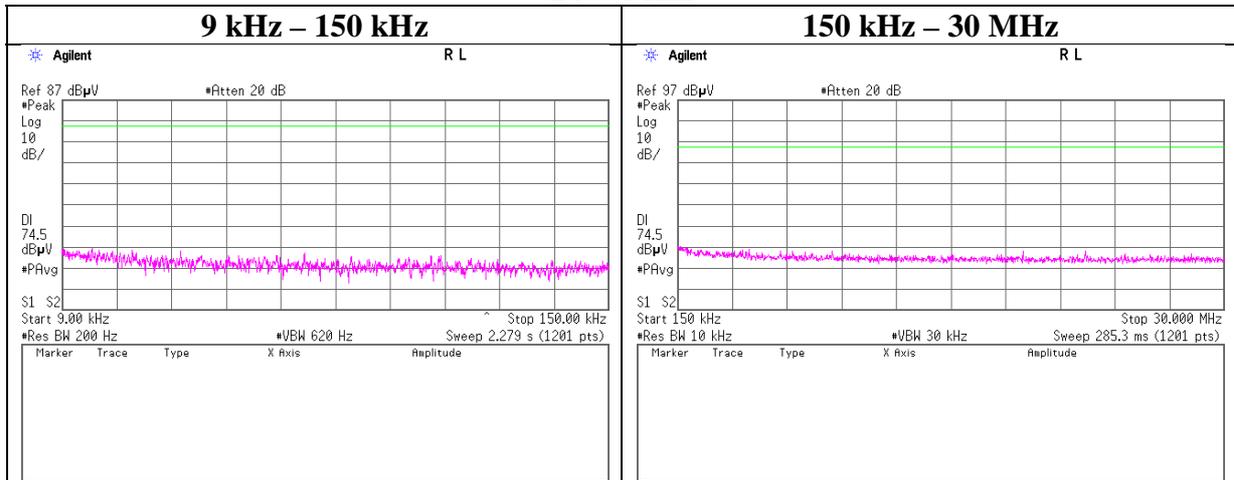
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11485104S-A
Date	October 26, 2016
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kenichi Adachi
Mode	Tx, Hopping Off, DH5

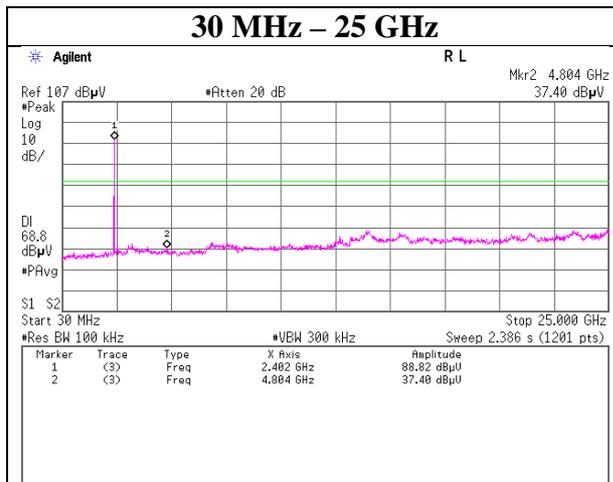
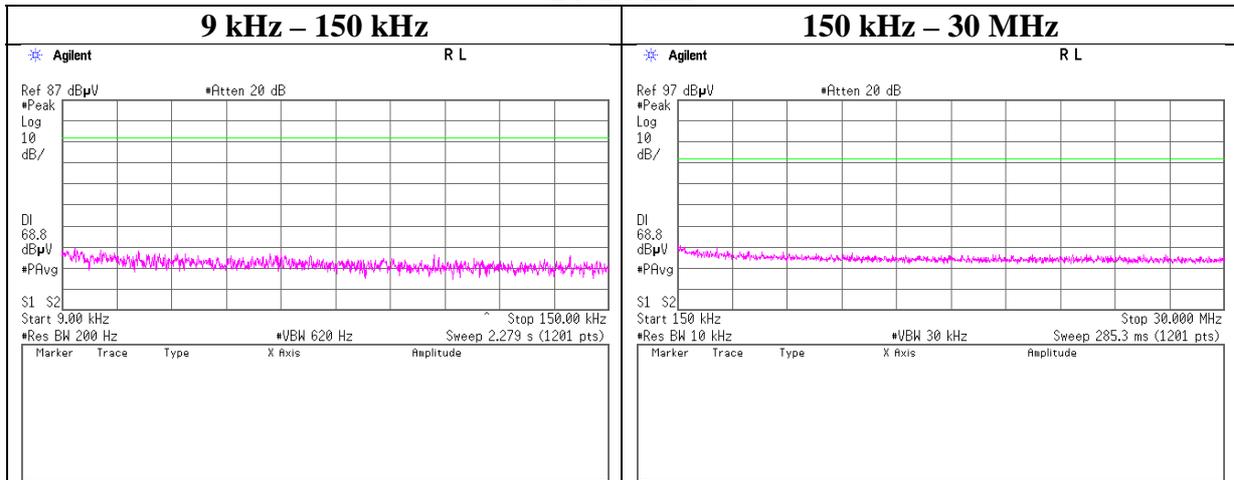
### 2480 MHz



## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11485104S-A
Date	October 26, 2016
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kenichi Adachi
Mode	Tx, Hopping Off, 3DH5

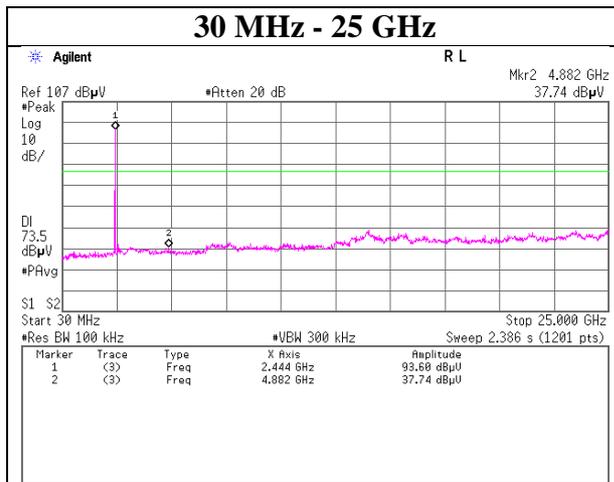
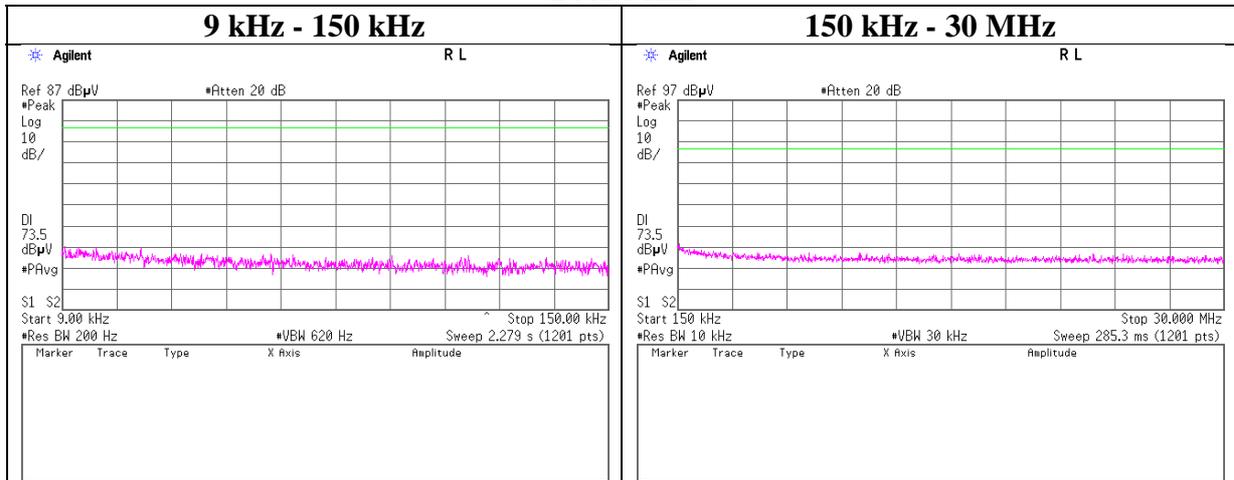
### 2402 MHz



## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11485104S-A
Date	October 26, 2016
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kenichi Adachi
Mode	Tx, Hopping Off, 3DH5

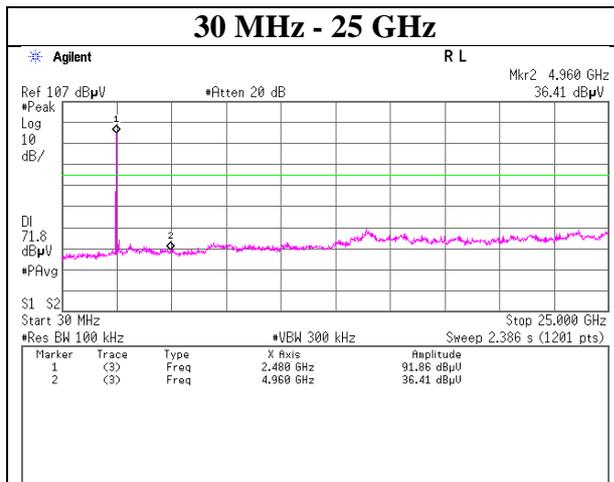
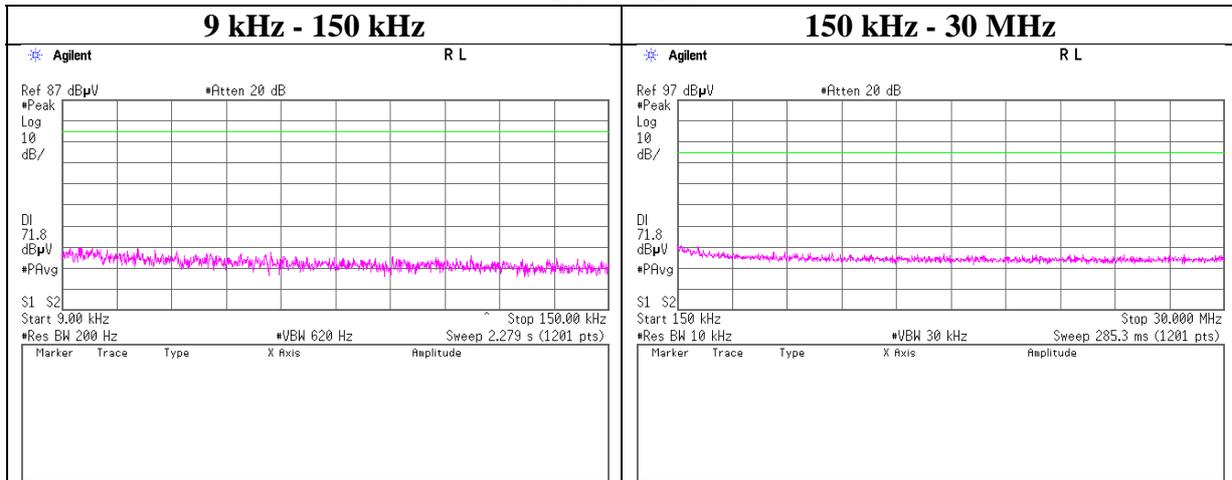
### 2441 MHz



## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11485104S-A
Date	October 26, 2016
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kenichi Adachi
Mode	Tx, Hopping Off, 3DH5

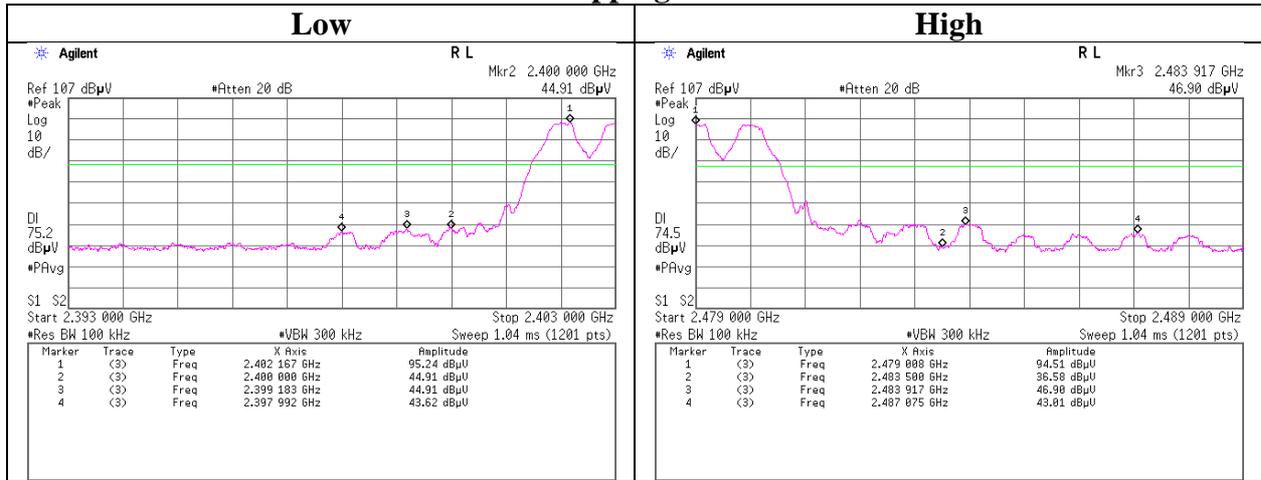
### 2480 MHz



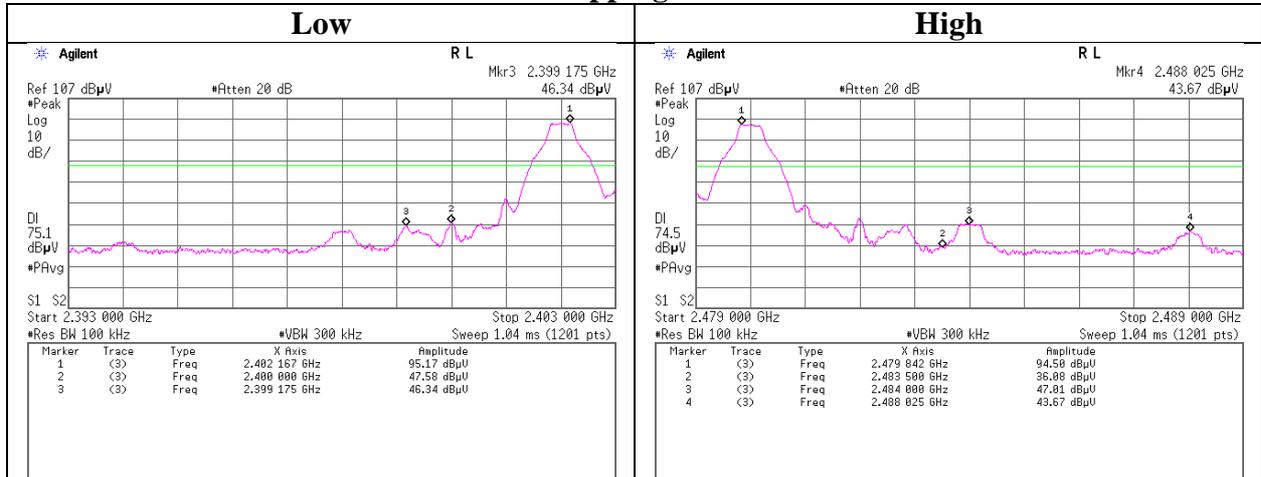
## Conducted Emission Band Edge compliance

Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11485104S-A
Date	October 26, 2016
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kenichi Adachi
Mode	Tx, Hopping On / Off, DH5

### Hopping On



### Hopping Off



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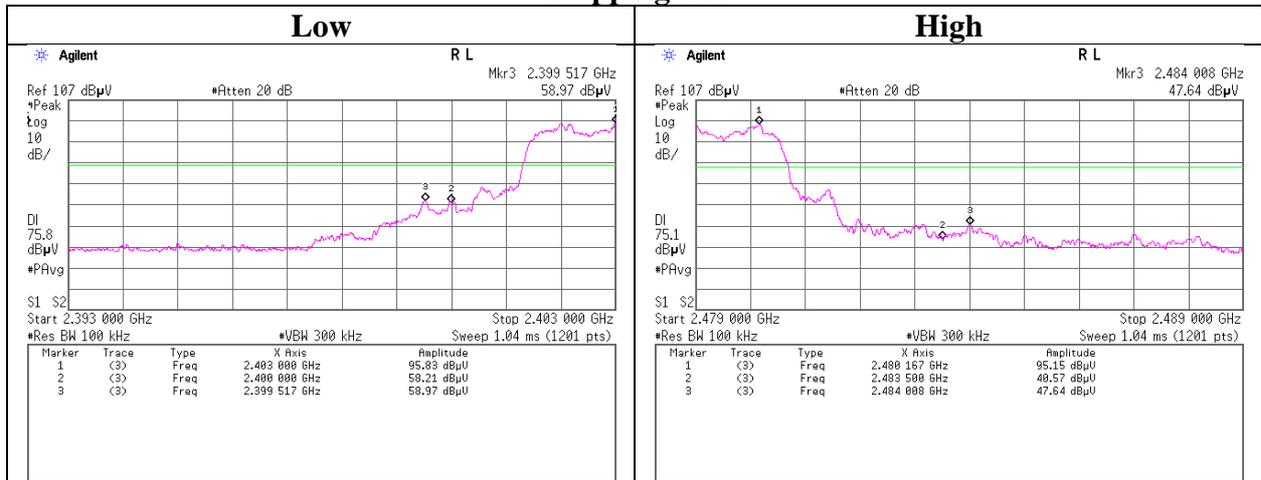
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

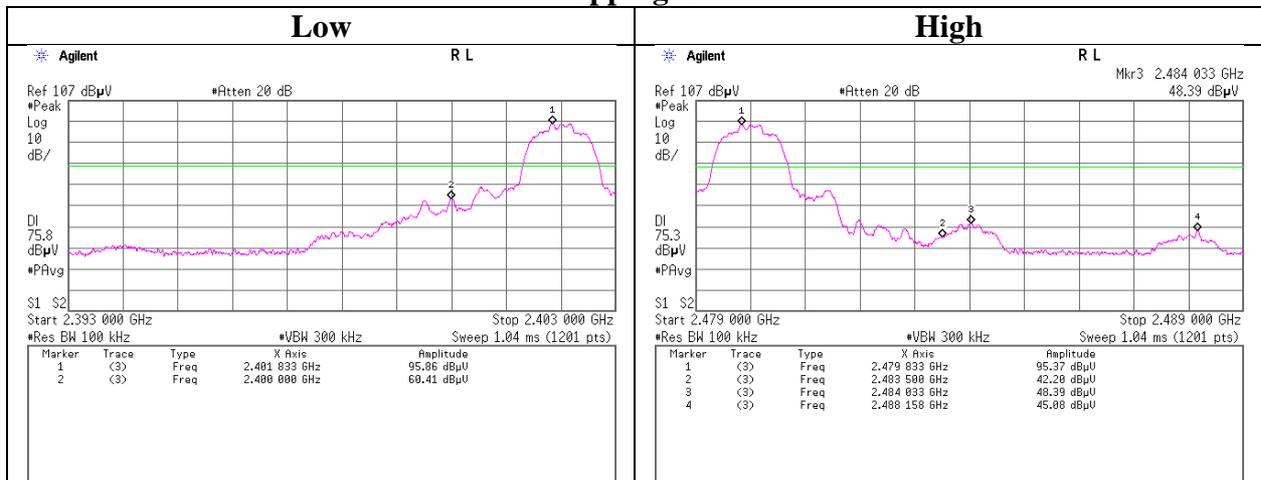
## Conducted Emission Band Edge compliance

Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11485104S-A
Date	October 26, 2016
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kenichi Adachi
Mode	Tx, Hopping On / Off, 3DH5

### Hopping On



### Hopping Off



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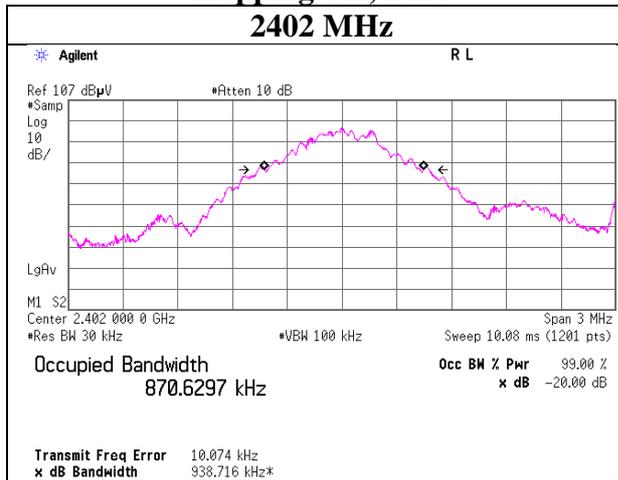
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

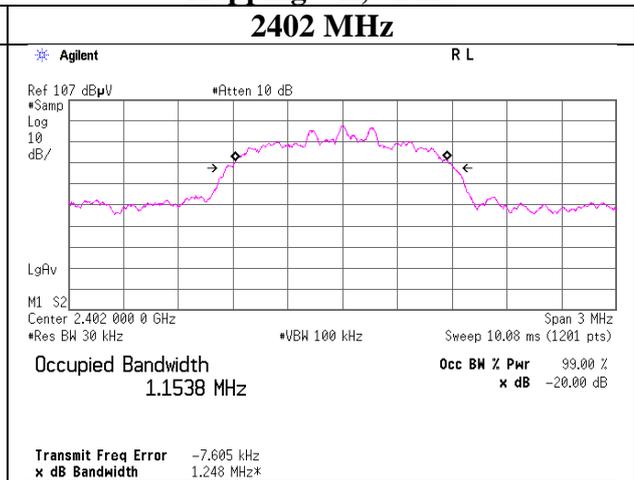
## 99 %Occupied Bandwidth

Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11485104S-A
Date	October 26, 2016
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kenichi Adachi
Mode	Tx, Hopping Off

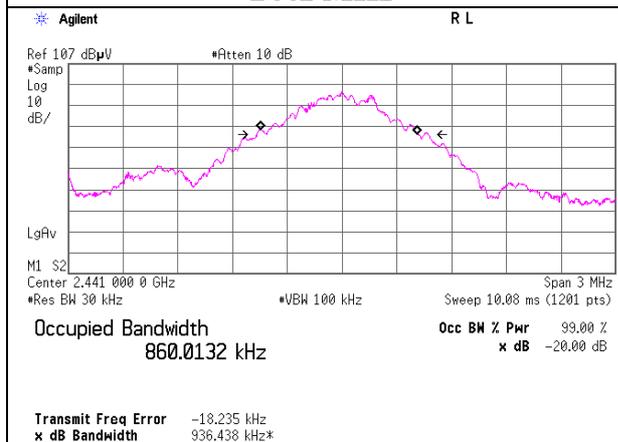
### Hopping Off, DH5



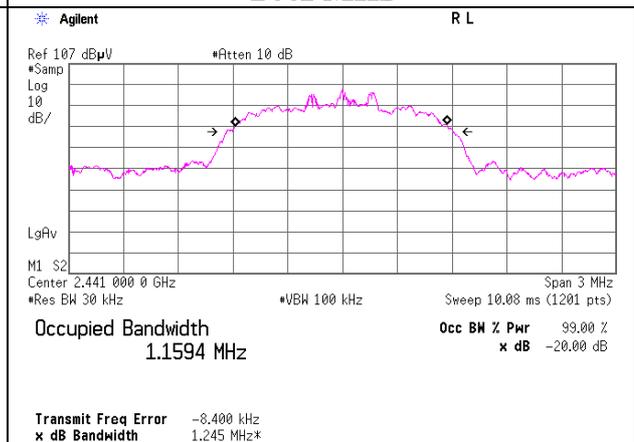
### Hopping Off, 3DH5



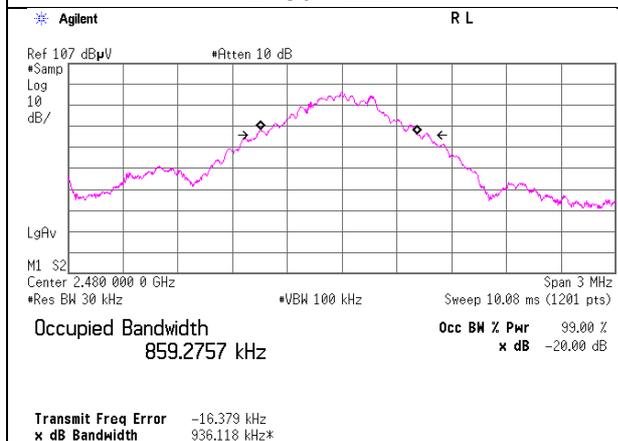
### 2441 MHz



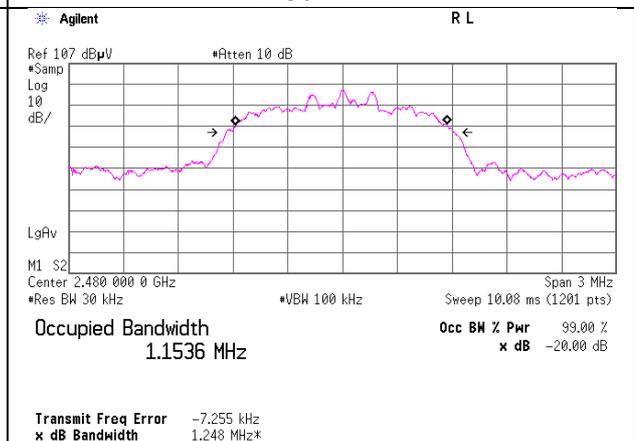
### 2441 MHz



### 2480 MHz



### 2480 MHz



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**Shonan EMC Lab.**

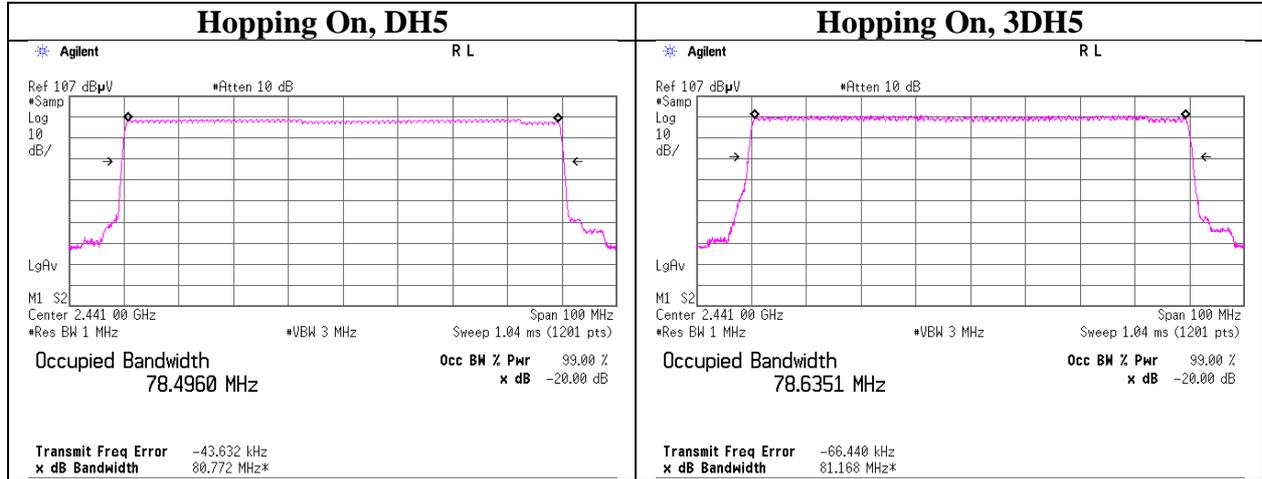
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## 99 % Occupied Bandwidth

Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11485104S-A
Date	October 26, 2016
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kenichi Adachi
Mode	Tx, Hopping On



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## **APPENDIX 2: Test instruments**

### **Test equipment**

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2016/04/01 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2016/04/01 * 12
SRENT-08	Spectrum Analyzer	Agilent	E4448A	MY50180019	AT	2016/10/24 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2015/11/04 * 12
SCC-G12	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	AT	2016/03/23 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	AT	2015/12/07 * 12
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2016/03/22 * 12
SCC-G06	Coaxial Cable	Junkosha	J12J102207-00	MAY-23-16-09 1	RE	2016/06/14 * 12
SCC-G21	Coaxial Cable	Suhner	SUCOFLEX 104	296169/4	RE	2016/05/11 * 12
SHA-01	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	RE	2016/08/09 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2016/10/12 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2016/03/23 * 12
KJM-09	Measure	KOMELON	KMC-36	-	RE	-
SAEC-01(SVSWR)	Semi-Anechoic Chamber	TDK	SAEC-01(SVSWR)	1	RE	2016/07/24 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE	-
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2015/11/04 * 12
SFL-18	Highpass Filter	MICRO-TRONICS	HPM50111	119	RE	2016/04/18 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2015/11/16 * 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	2016/09/27 * 12
SCC-G20	Coaxial Cable	Junkosha	J12J102518-00	APR-15-15-003	RE	2016/04/18 * 12
SCC-G33	Coaxial Cable	Junkosha	MWX241-01000K MSKMS	-	RE	2016/04/18 * 12
SRENT-08	Spectrum Analyzer	Agilent	E4448A	MY50180019	RE	2016/10/24 * 12
SAF-02	Pre Amplifier	SONOMA	310N	290212	RE	2016/02/19 * 12
SAT6-02	Attenuator	JFW	50HF-006N	-	RE	2016/02/25 * 12
KAT3-10	Attenuator	JFW IND. INC.	50HF-003N	-	RE	2016/07/26 * 12
SBA-02	Biconical Antenna	Schwarzbeck	BBA9106	91032665	RE	2015/11/02 * 12
SCC-B1/B3/B5/B7/B8/B13/SRS E-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2016/04/22 * 12
SCC-B2/B4/B6/B7/B8/B13/SRS E-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2016/04/22 * 12
SLA-02	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0893	RE	2015/11/03 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2016/10/12 * 12
TR-09	Test Receiver	Rohde & Schwarz	ESCI	100769	RE	2016/10/07 * 12
SJM-09	Measure	PROMART	SEN1935	-	RE	-
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2016/07/13 * 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.**

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