



# RADIO TEST REPORT

Test Report No. : 10955171S-E

**Applicant** : Sony Corporation  
**Type of Equipment** : Bluetooth Audio System  
**Model No.** : WX-900BT  
**FCC ID** : AK8WX900BT  
**Test regulation** : FCC Part 15 Subpart C: 2015  
**Test Result** : Complied

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

**Date of test:** September 15 to 16, 2015

**Representative test engineer:**

Hiroyuki Morikawa  
Engineer  
Consumer Technology Division

**Approved by:**

Toyokazu Imamura  
Leader  
Consumer Technology Division



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

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13-EM-F0429



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## **SECTION 1: Customer information**

Company Name : Sony Corporation  
Address : 2-10-1 Osaki, Shinagawa-ku, Tokyo 141-8610 Japan  
Telephone Number : +81-50-3750-7634  
Contact Person : Shigeru Higai

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

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

Type of Equipment : Bluetooth Audio System  
Model No. : WX-900BT  
Serial No. : Refer to Section 4, Clause 4.2  
Rating : DC 12 V  
Receipt Date of Sample : September 10, 2015  
Country of Mass-production : Thailand  
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: WX-900BT (referred to as the EUT in this report) is a Bluetooth Audio System.

### **General Specification**

Clock frequency(ies) in the system : 32.768 kHz, 48 MHz, 13.333 MHz, 16.9344 MHz, 12 MHz, 26 MHz

### **Radio Specification**

Radio Type : Transceiver  
Frequency of Operation : 2402 MHz - 2480 MHz  
Modulation : FHSS  
Power Supply (radio part input) : DC 3.3 V  
Antenna type : Top-GND-coupled loop  
Antenna Gain : -5.245 dBi

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

### **3.1 Test Specification**

Test Specification : FCC Part 15 Subpart C: 2015, final revised on September 8, 2015  
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 10955171S-G.

### **3.2 Procedures and results**

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.4-2009 7. AC powerline conducted emission measurements 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 Tx DH5 2402 MHz 189.931 MHz, QP, Vertical	Complied
Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422. *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) and KDB 558074 D01 12.2.7.					

\* In case any questions arise about test procedure, ANSI C 63.10:2013 is also referred.

However, there is one deviation from ANSI C 63.10:2013. (ANSI C63.10:20013 is Non-accreditation)  
Measurement height is not 1.5 m, but 0.8 m.

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

The equipment provides the wireless transmitter with stable power supply (DC 3.3 V).

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 15.203**

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

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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  $k = 2$ .  
Shonan EMC Lab.

Item	Frequency range	Uncertainty (+/-)		
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	3.6 dB	3.4 dB	3.4 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.7 dB	3.5 dB	3.5 dB
	30 MHz-300 MHz	4.9 dB	4.9 dB	4.7 dB
	300 MHz-1 GHz	5.0 dB	5.0 dB	4.8 dB
	1 GHz-13 GHz	4.9 dB	4.9 dB	4.9 dB
Radiated emission (Measurement distance: 1 m)	13 GHz-18 GHz	5.7 dB	5.7 dB	5.7 dB
	18 GHz-40 GHz	4.5 dB	4.3 dB	4.3 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

#### 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	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**

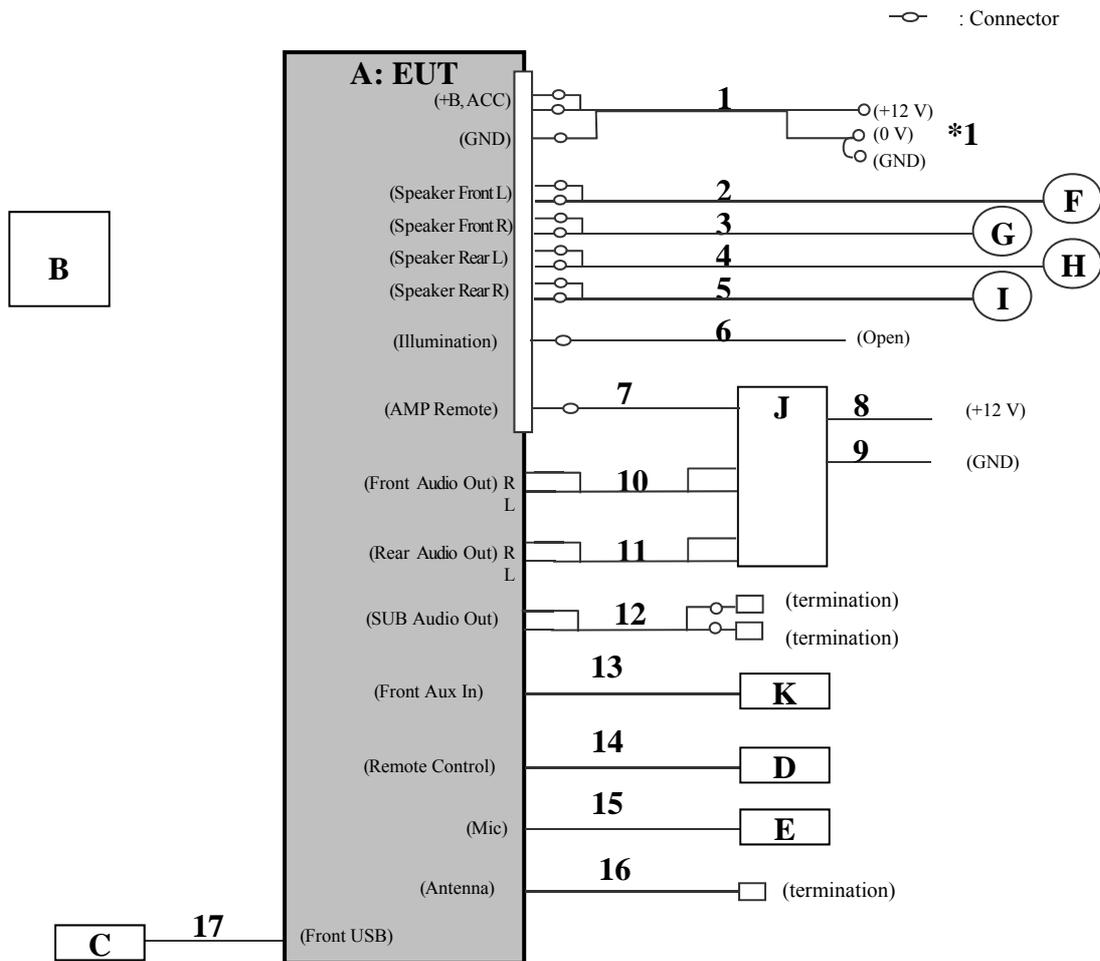
### **4.1 Operating Mode(s)**

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

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 Inquiry	2402 MHz 2441 MHz 2480 MHz
20dB Bandwidth	Tx (Hopping Off) DH5, 3DH5 Inquiry	2402 MHz 2441 MHz 2480 MHz
Number of Hopping Frequency	Tx (Hopping On) DH5, 3DH5 Inquiry	-
Dwell time	Tx (Hopping On), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5 Inquiry	-
Maximum Peak Output Power	Tx (Hopping Off) DH5, 2DH5, 3DH5 Inquiry	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>*EUT has the power settings by the software as follows;  Power settings: BDR: Ext.=23, Int.=39  EDR: Ext.=73, Int.=48  Software: CSR BlueSuite BlueTest Version 2.5.0.93  CSR BlueSuite BtCliCtrl Version 2.5.0.93 (Inquiry mode only)</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 and support equipment**

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Bluetooth Audio System	WX-900BT	36 *1), 40 *2)	Sony	EUT
B	Remote Commander	RM-X231	-	Sony	-
C	USB memory	USM4GL	-	Sony	-
D	Wired Remote Controller	RM-X25	-	Sony	-
E	Mic	-	-	Sony	-
F	Speaker 1	LV-002	S11014200773	L&V	-
G	Speaker 2	LV-002	S11014200773	L&V	-
H	Speaker 3	LV-002	S11014200775	L&V	-
I	Speaker 4	LV-002	S11014200775	L&V	-
J	Monaural Power Amplifier	XM-4S-020	-	Sony	-
K	Walkman	NW-A829	5017289	Sony	-

\*1) Used for Antenna Terminal conducted test

\*2) Used for Radiated Emission test

**List of cables used**

No.	Name	Length (m)	Shield (Cable)		Remarks
			Cable	Connector	
1	DC Power	0.15+3.0	Unshielded	Unshielded	-
2	Speaker (1)	0.15+2.0	Unshielded	Unshielded	-
3	Speaker (2)	0.15+2.0	Unshielded	Unshielded	-
4	Speaker (3)	0.15+2.0	Unshielded	Unshielded	-
5	Speaker (4)	0.15+2.0	Unshielded	Unshielded	-
6	Illumination	0.15+1.0	Unshielded	Unshielded	
7	AMP Remote	0.15+2.0	Unshielded	Unshielded	-
8	DC Power (+)	1.3	Unshielded	Unshielded	-
9	DC Power (-)	1.3	Unshielded	Unshielded	-
10	RCA (Front Audio Out)	5.0	Shielded	Shielded	-
11	RCA (Rear Audio Out)	5.0	Shielded	Shielded	-
12	RCA (SUB Audio Out)	2.4	Shielded	Shielded	-
13	Stereo mini (Front AUX)	2.0	Shielded	Shielded	-
14	Remote Control	2.0	Shielded	Shielded	-
15	Mic	4.0	Shielded	Shielded	-
16	Tuner Antenna In	1.5	Shielded	Shielded	-
17	USB (Front USB)	3.0	Shielded	Shielded	-

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

### **Test Procedure**

EUT was placed on a platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.

The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane. The height of the measuring antenna varied between 1 m and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.

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 (below 13 GHz), 1 m*2) (above 13 GHz)		3 m (below 13 GHz), 1 m*2) (above 13 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:  $20 \times \log(3.0 \text{ m} / 1.0 \text{ m}) = 9.5 \text{ dB}$

The carrier level and noise levels were confirmed at angle of 0 to 45 deg. based on the product specification to see the position of maximum noise, and the test was made at the position (0 deg.) 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 M - 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>
20dB 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	Peak	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) Peak hold was applied as Worst-case measurement. *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**

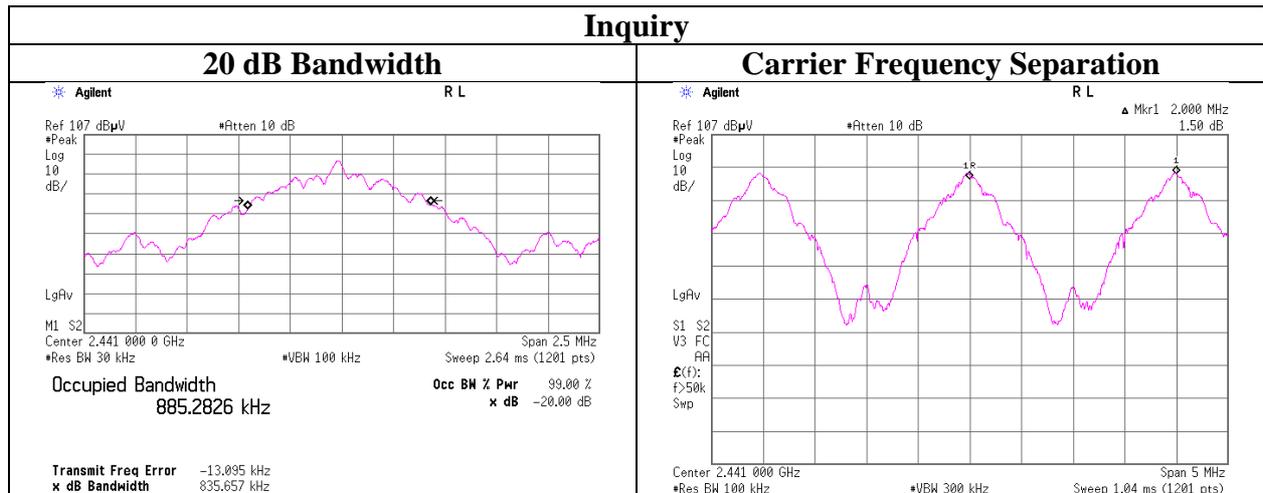
**APPENDIX 1: Test data**

**20dB Bandwidth and Carrier Frequency Separation**

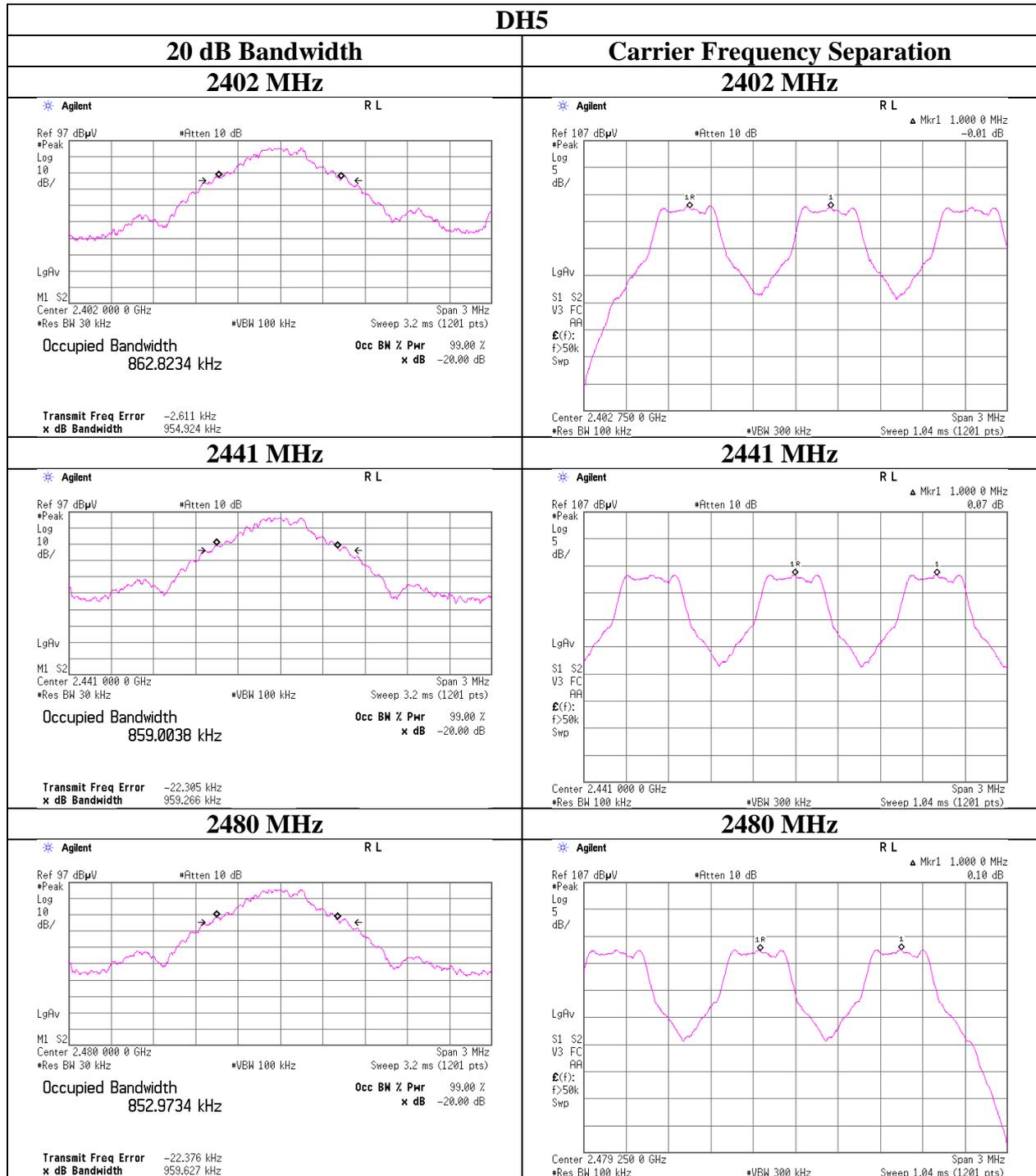
Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10955171S-E
Date	September 16, 2015
Temperature / Humidity	25 deg. C / 41 % RH
Engineer	Tomohiro Hara
Mode	Tx, Hopping Off, DH5

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.955	1.000	>= 0.637
DH5	2441.0	0.959	1.000	>= 0.640
DH5	2480.0	0.960	1.000	>= 0.640
3DH5	2402.0	1.291	1.000	>= 0.861
3DH5	2441.0	1.287	1.000	>= 0.858
3DH5	2480.0	1.286	1.000	>= 0.857
Inquiry	2441.0	0.836	2.000	>= 0.557

Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).  
 No limit applies to 20dB Bandwidth.



## 20dB Bandwidth and Carrier Frequency Separation



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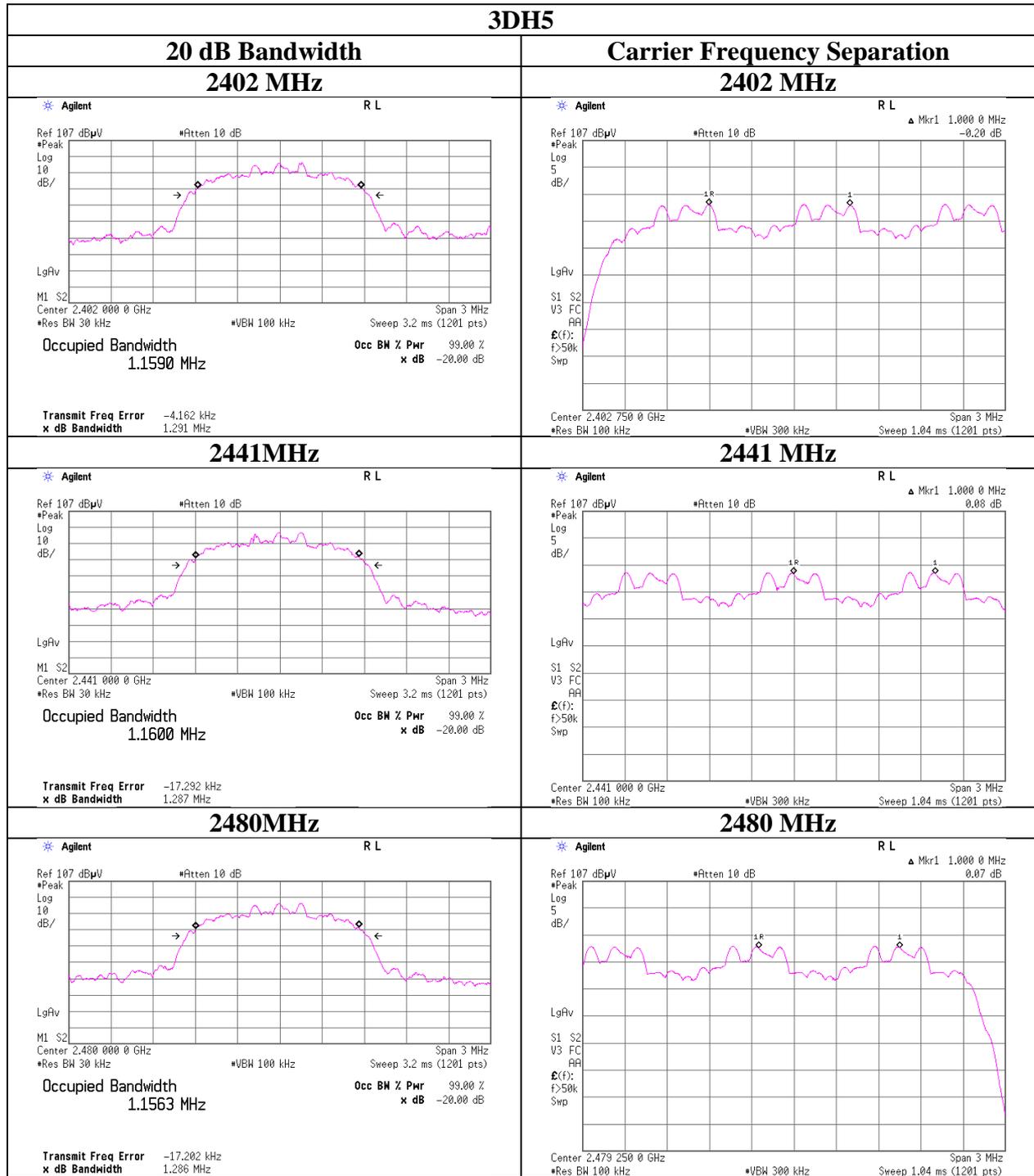
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## 20dB Bandwidth and Carrier Frequency Separation



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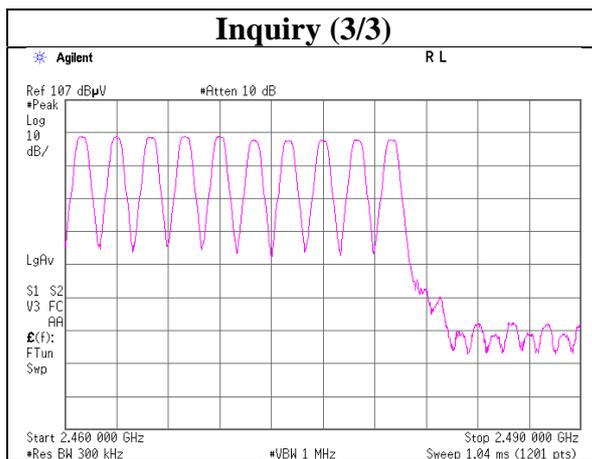
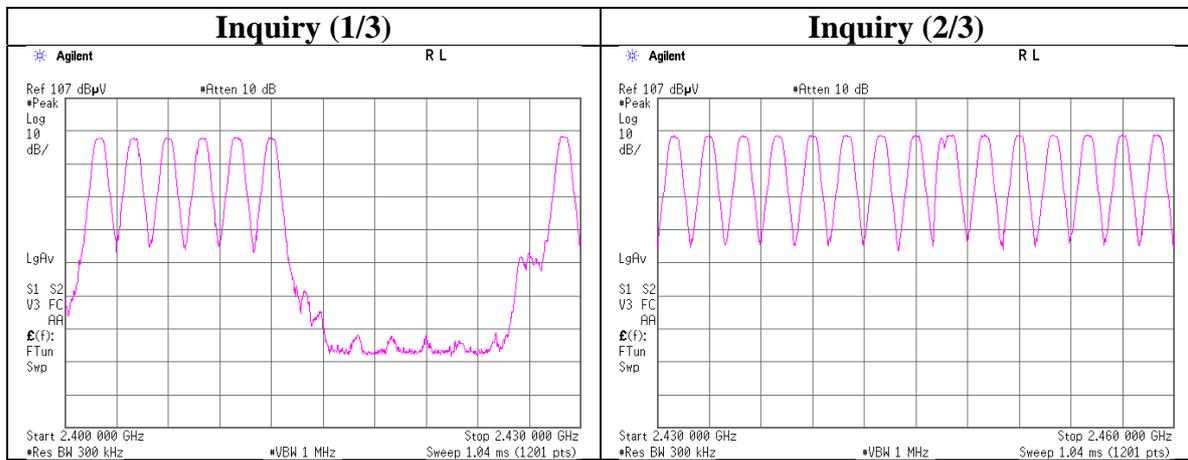
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## Number of Hopping Frequency

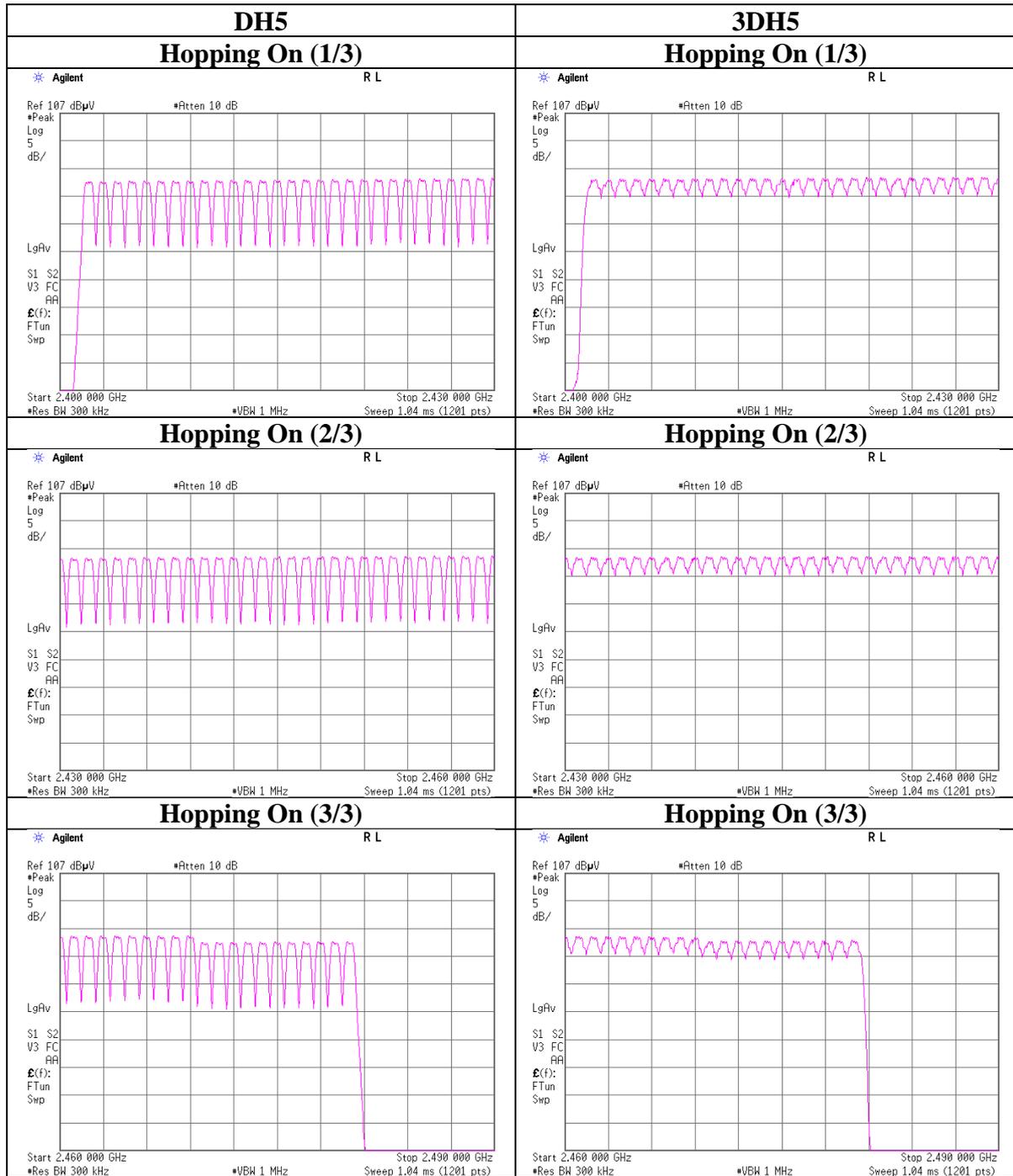
Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10955171S-E
Date	September 16, 2015
Temperature / Humidity	25 deg. C / 41 % RH
Engineer	Tomohiro Hara
Mode	Tx, Hopping On

Mode	Number of channel [channels]	Limit [channels]
DH5	79	≥ 15
3DH5	79	≥ 15
Inquiry	32	≥ 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

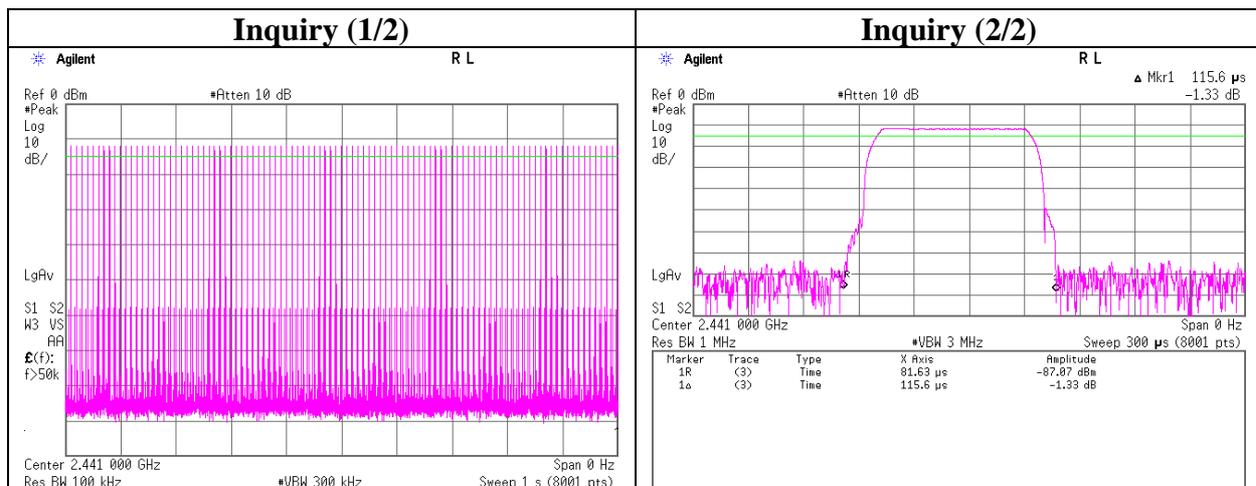
Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10955171S-E
Date	September 16, 2015
Temperature / Humidity	25 deg. C / 41 % RH
Engineer	Tomohiro Hara
Mode	Tx, Hopping On

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	50.0 times / 5 sec. x 31.6 sec. = 316 times	0.415	131	400
DH3	26.0 times / 5 sec. x 31.6 sec. = 165 times	1.676	277	400
DH5	17.0 times / 5 sec. x 31.6 sec. = 108 times	2.929	316	400
3DH1	50.0 times / 5 sec. x 31.6 sec. = 316 times	0.432	137	400
3DH3	26.0 times / 5 sec. x 31.6 sec. = 165 times	1.687	278	400
3DH5	17.0 times / 5 sec. x 31.6 sec. = 108 times	2.943	318	400
Inquiry	100.0 times / 1 sec. x 12.8 sec. = 1280 times	0.116	148	400

Sample Calculation

Result = Number of transmission x Length of transmission

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  $N = 79$ .



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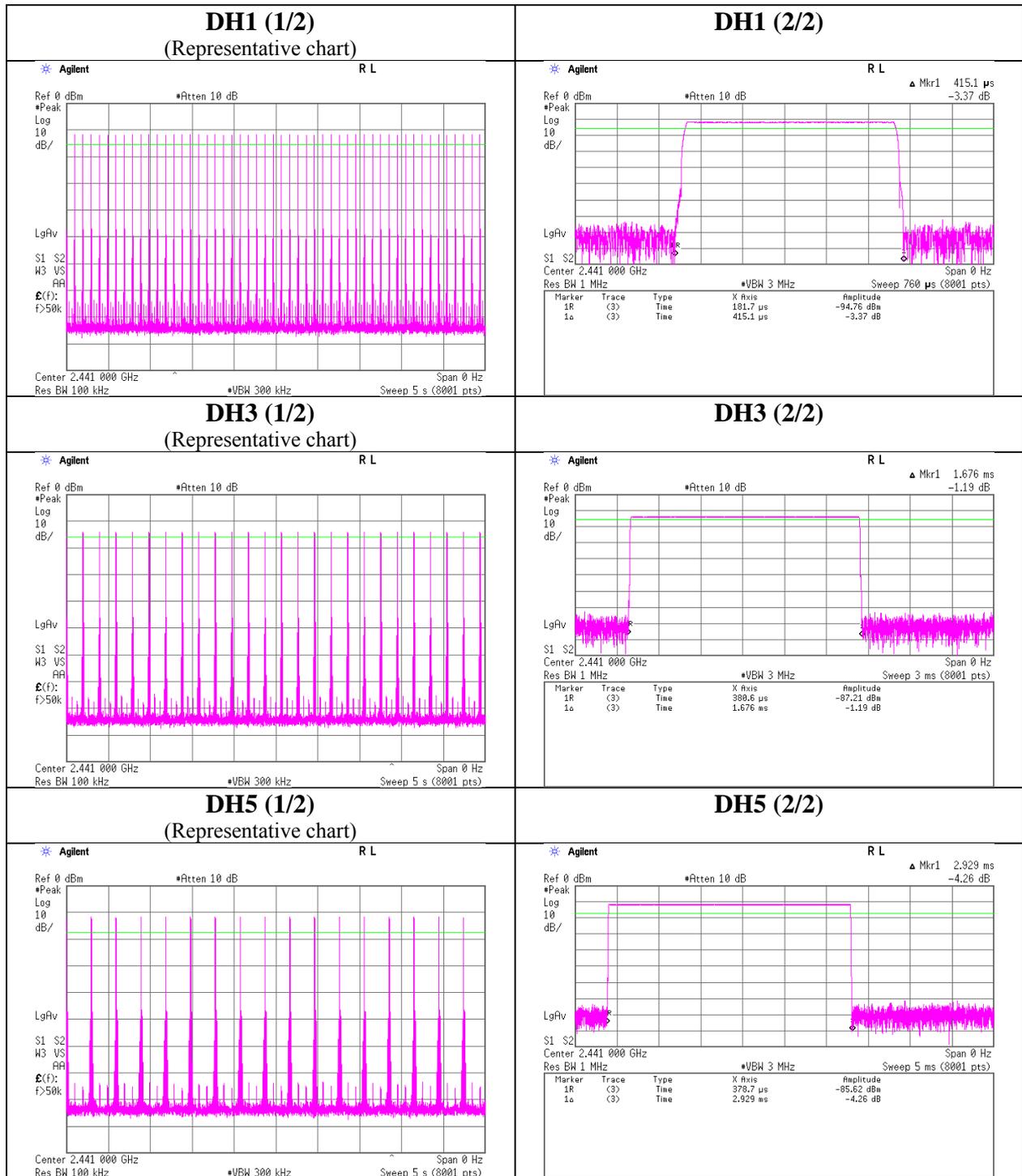
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## Dwell time



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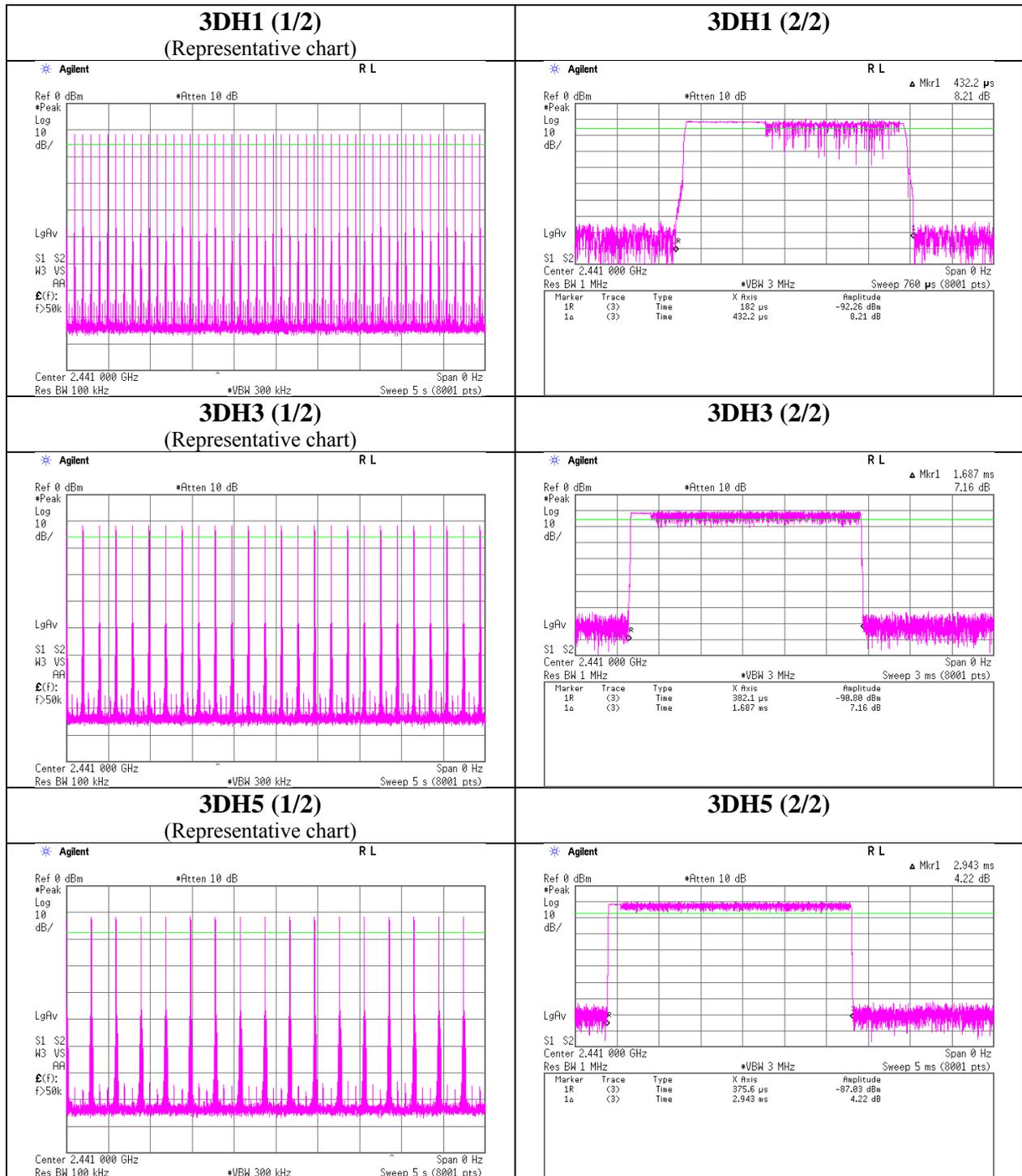
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### Dwell time



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## Maximum Peak Output Power

Test place : Shonan EMC Lab. No.5 Shielded Room  
Report No. : 10955171S-E  
Date : September 16, 2015  
Temperature / Humidity : 25 deg. C / 41 % RH  
Engineer : Tomohiro Hara  
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	-11.92	1.22	9.93	-0.77	0.84	20.96	125	21.73
DH5	2441.0	-11.09	1.22	9.93	0.06	1.01	20.96	125	20.90
DH5	2480.0	-11.80	1.23	9.93	-0.64	0.86	20.96	125	21.60
2DH5	2402.0	-10.75	1.22	9.93	0.40	1.10	20.96	125	20.56
2DH5	2441.0	-9.91	1.22	9.93	1.24	1.33	20.96	125	19.72
2DH5	2480.0	-10.49	1.23	9.93	0.67	1.17	20.96	125	20.29
3DH5	2402.0	-10.00	1.22	9.93	1.15	1.30	20.96	125	19.81
3DH5	2441.0	-9.38	1.22	9.93	1.77	1.50	20.96	125	19.19
3DH5	2480.0	-10.04	1.23	9.93	1.12	1.29	20.96	125	19.84
Inquiry	2441.0	-11.06	1.22	9.93	0.09	1.02	20.96	125	20.87

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.5 Shielded Room  
Report No. 10955171S-E  
Date September 16, 2015  
Temperature / Humidity 25 deg. C / 41 % RH  
Engineer Tomohiro Hara  
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	-13.57	1.22	9.93	-2.42	0.57	1.03	-1.39	0.73
DH5	2441.0	-12.77	1.22	9.93	-1.62	0.69	1.03	-0.59	0.87
DH5	2480.0	-13.49	1.23	9.93	-2.33	0.58	1.03	-1.30	0.74
2DH5	2402.0	-14.46	1.22	9.93	-3.31	0.47	1.02	-2.29	0.59
2DH5	2441.0	-13.58	1.22	9.93	-2.43	0.57	1.02	-1.41	0.72
2DH5	2480.0	-14.17	1.23	9.93	-3.01	0.50	1.02	-1.99	0.63
3DH5	2402.0	-14.15	1.22	9.93	-3.00	0.50	1.03	-1.97	0.64
3DH5	2441.0	-13.61	1.22	9.93	-2.46	0.57	1.03	-1.43	0.72
3DH5	2480.0	-14.17	1.23	9.93	-3.01	0.50	1.03	-1.98	0.63

Sample Calculation:

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

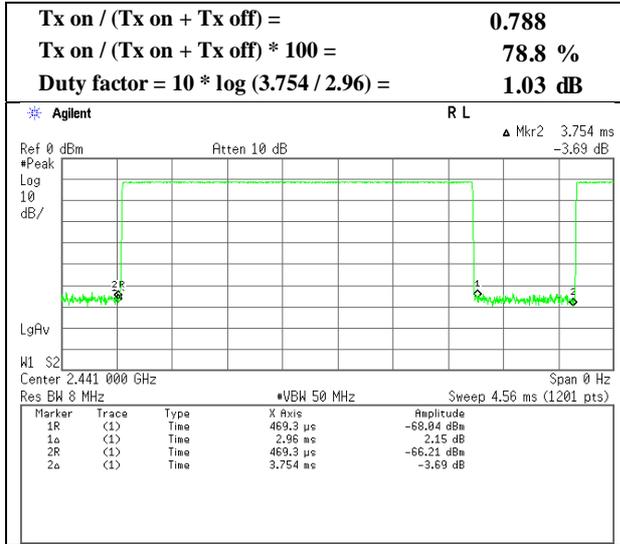
Result (Burst power) = Frame power + Duty factor

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

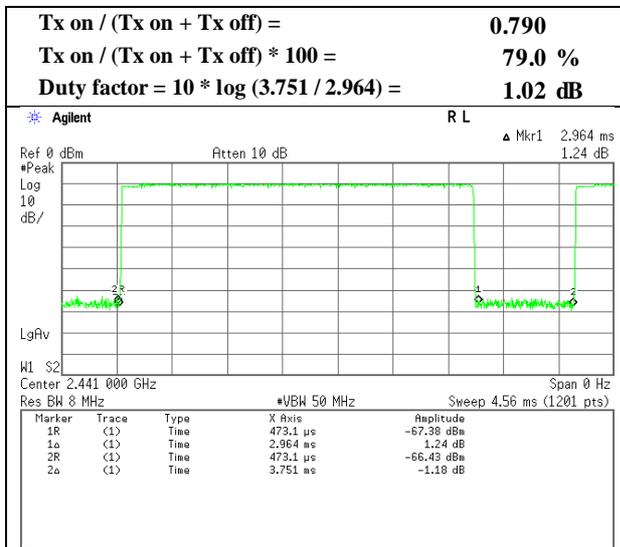
## Burst Rate Confirmation

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10955171S-E
Date	September 16, 2015
Temperature / Humidity	25 deg. C / 41 % RH
Engineer	Tomohiro Hara
Mode	Tx, Hopping Off

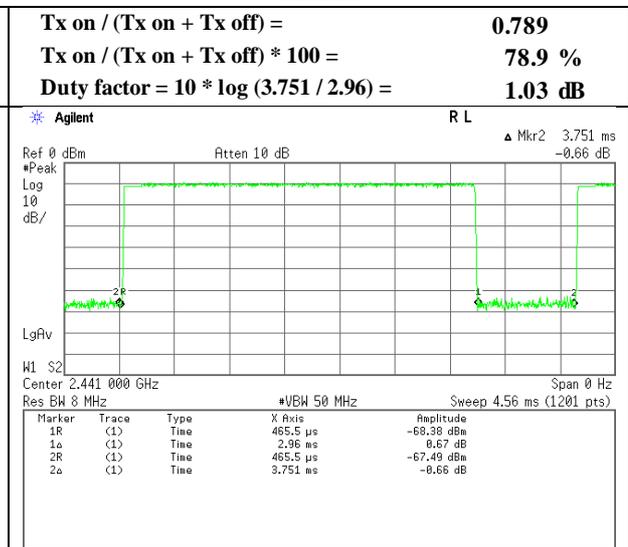
### DH5



### 2DH5



### 3DH5



## Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. : 10955171S-E  
Date : September 15, 2015      September 16, 2015  
Temperature / Humidity : 22 deg. C / 61 % RH      20 deg. C / 56 % RH  
Engineer : Hiroyuki Morikawa      Hiroyuki Morikawa  
            (1-26.5GHz)                      (30-1000MHz)  
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.	65.502	QP	40.6	6.9	6.7	32.1	0.0	22.1	40.0	17.9	258	268	
Hori.	183.712	QP	44.8	16.1	7.9	32.0	0.0	36.8	43.5	6.7	100	183	
Hori.	247.057	QP	33.5	16.9	8.4	32.0	0.0	26.8	46.0	19.2	129	315	
Hori.	2390.000	PK	45.6	27.8	13.7	41.0	2.1	48.2	73.9	25.7	118	69	
Hori.	4804.000	PK	48.7	31.4	5.7	39.6	2.1	48.3	73.9	25.6	193	287	
Hori.	7206.000	PK	46.6	36.9	7.1	40.1	2.1	52.6	73.9	21.3	100	0	
Hori.	9608.000	PK	45.0	38.5	8.2	39.6	2.1	54.2	73.9	19.7	100	0	
Hori.	2390.000	AV	33.7	27.8	13.7	41.0	2.1	36.3	53.9	17.6	118	69	
Hori.	4804.000	AV	39.3	31.4	5.7	39.6	2.1	38.9	53.9	15.0	193	287	
Hori.	7206.000	AV	33.8	36.9	7.1	40.1	2.1	39.8	53.9	14.1	100	0	
Hori.	9608.000	AV	33.6	38.5	8.2	39.6	2.1	42.8	53.9	11.1	100	0	
Vert.	73.636	QP	40.3	6.3	7.2	32.1	0.0	21.7	40.0	18.3	100	278	
Vert.	128.290	QP	43.4	13.5	7.5	32.1	0.0	32.3	43.5	11.2	100	85	
Vert.	189.931	QP	45.8	16.2	7.9	32.0	0.0	37.9	43.5	5.6	100	199	
Vert.	2390.000	PK	46.3	27.8	13.7	41.0	2.1	48.9	73.9	25.0	100	14	
Vert.	4804.000	PK	48.9	31.4	5.7	39.6	2.1	48.5	73.9	25.4	149	116	
Vert.	7206.000	PK	46.1	36.9	7.1	40.1	2.1	52.1	73.9	21.8	100	0	
Vert.	9608.000	PK	45.1	38.5	8.2	39.6	2.1	54.3	73.9	19.6	100	0	
Vert.	2390.000	AV	33.8	27.8	13.7	41.0	2.1	36.4	53.9	17.5	100	14	
Vert.	4804.000	AV	40.3	31.4	5.7	39.6	2.1	39.9	53.9	14.0	149	116	
Vert.	7206.000	AV	33.9	36.9	7.1	40.1	2.1	39.9	53.9	14.0	100	0	
Vert.	9608.000	AV	33.6	38.5	8.2	39.6	2.1	42.8	53.9	11.1	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(3.8 m / 3.0 m) = 2.1 dB  
13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

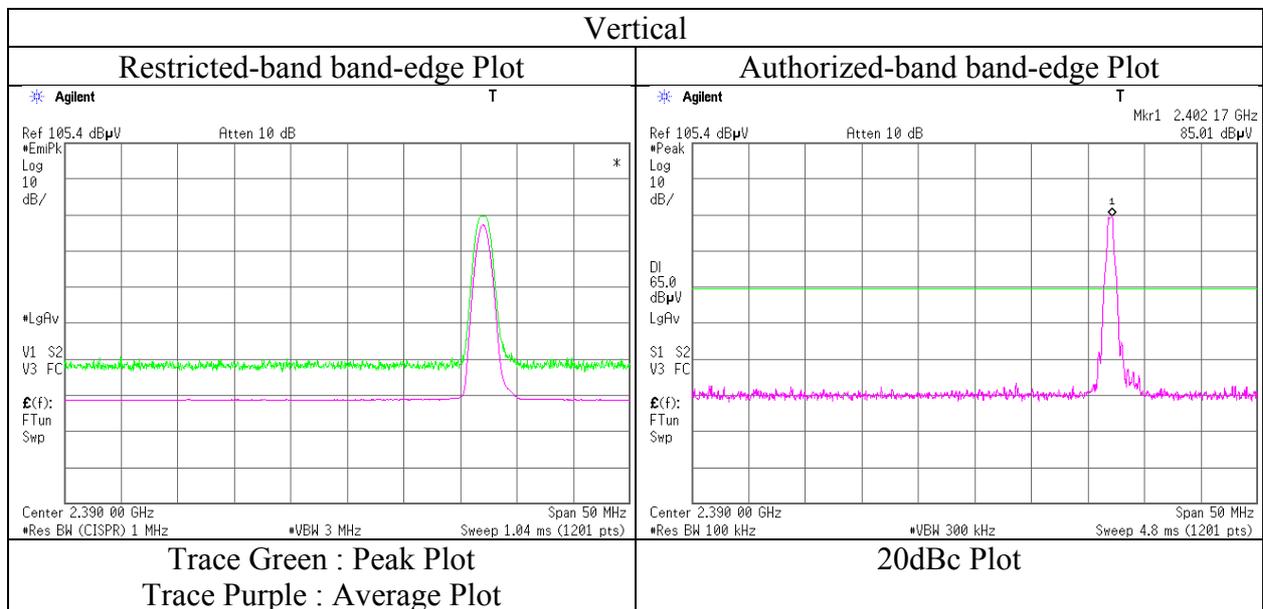
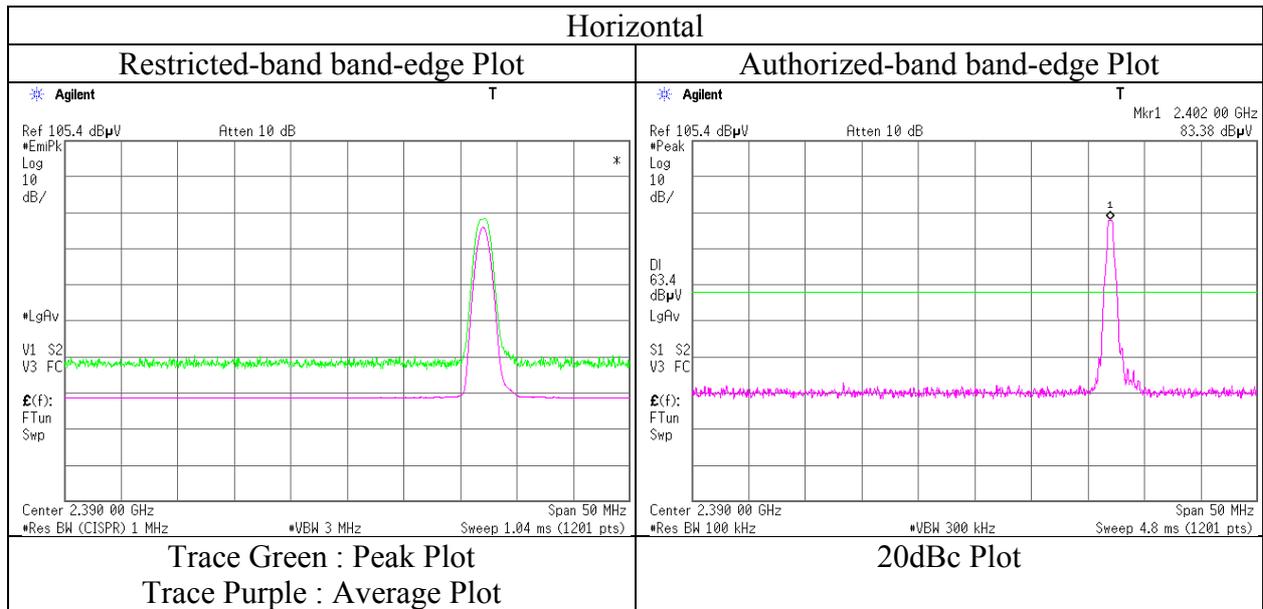
### 20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

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	83.6	27.8	13.7	41.0	2.1	86.2	-	-	Carrier
Hori.	2400.000	PK	37.7	27.8	13.7	41.0	2.1	40.3	66.2	25.9	
Vert.	2402.000	PK	84.9	27.8	13.7	41.0	2.1	87.5	-	-	Carrier
Vert.	2400.000	PK	39.0	27.8	13.7	41.0	2.1	41.6	67.5	25.9	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor  
Distance factor : 1 GHz - 13 GHz : 20log(3.8 m / 3.0 m) = 2.1 dB  
13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

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

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. : 10955171S-E  
Date : September 15, 2015  
Temperature / Humidity : 22 deg. C / 61 % RH  
Engineer : Hiroyuki Morikawa  
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. : 10955171S-E  
Date : September 15, 2015      September 16, 2015  
Temperature / Humidity : 22 deg. C / 61 % RH      20 deg. C / 56 % RH  
Engineer : Hiroyuki Morikawa      Hiroyuki Morikawa  
            (1-26.5GHz)                      (30-1000MHz)  
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.	188.357	QP	44.7	16.2	7.9	32.0	0.0	36.8	43.5	6.7	100	183	
Hori.	237.084	QP	32.7	16.8	8.3	32.0	0.0	25.8	46.0	20.2	133	152	
Hori.	333.039	QP	32.7	14.8	8.8	31.9	0.0	24.4	46.0	21.6	100	136	
Hori.	4882.000	PK	50.1	31.7	5.8	39.5	2.1	50.2	73.9	23.7	167	277	
Hori.	7323.000	PK	44.2	36.9	7.2	40.2	2.1	50.2	73.9	23.7	100	0	
Hori.	9764.000	PK	44.1	38.5	8.2	39.5	2.1	53.4	73.9	20.5	100	0	
Hori.	4882.000	AV	42.4	31.7	5.8	39.5	2.1	42.5	53.9	11.4	167	277	
Hori.	7323.000	AV	32.9	36.9	7.2	40.2	2.1	38.9	53.9	15.0	100	0	
Hori.	9764.000	AV	32.3	38.5	8.2	39.5	2.1	41.6	53.9	12.3	100	0	
Vert.	45.349	QP	36.2	12.4	6.9	32.1	0.0	23.4	40.0	16.6	100	166	
Vert.	126.742	QP	44.1	13.4	7.5	32.1	0.0	32.9	43.5	10.6	100	80	
Vert.	189.131	QP	45.1	16.2	7.9	32.0	0.0	37.2	43.5	6.3	100	206	
Vert.	4882.000	PK	49.5	31.7	5.8	39.5	2.1	49.6	73.9	24.3	145	117	
Vert.	7323.000	PK	44.7	36.9	7.2	40.2	2.1	50.7	73.9	23.2	100	0	
Vert.	9764.000	PK	44.5	38.5	8.2	39.5	2.1	53.8	73.9	20.1	100	0	
Vert.	4882.000	AV	42.3	31.7	5.8	39.5	2.1	42.4	53.9	11.5	145	117	
Vert.	7323.000	AV	33.0	36.9	7.2	40.2	2.1	39.0	53.9	14.9	100	0	
Vert.	9764.000	AV	32.4	38.5	8.2	39.5	2.1	41.7	53.9	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 :  $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.1\text{ dB}$   
13 GHz - 40 GHz :  $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

## Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. : 10955171S-E  
Date : September 15, 2015      September 16, 2015  
Temperature / Humidity : 22 deg. C / 61 % RH      20 deg. C / 56 % RH  
Engineer : Hiroyuki Morikawa      Hiroyuki Morikawa  
            (1-26.5GHz)                      (30-1000MHz)  
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.	44.197	QP	32.3	12.8	6.9	32.1	0.0	19.9	40.0	20.1	379	67	
Hori.	62.402	QP	42.0	7.4	6.7	32.1	0.0	24.0	40.0	16.0	368	225	
Hori.	183.721	QP	45.1	16.1	7.9	32.0	0.0	37.1	43.5	<b>6.4</b>	174	181	
Hori.	2483.500	PK	46.6	27.9	13.7	41.0	2.1	49.3	73.9	24.6	100	68	
Hori.	4960.000	PK	49.7	32.0	5.8	39.4	2.1	50.2	73.9	23.7	163	279	
Hori.	7440.000	PK	44.6	37.0	7.2	40.4	2.1	50.5	73.9	23.4	100	0	
Hori.	9920.000	PK	43.4	38.4	8.2	39.4	2.1	52.7	73.9	21.2	100	0	
Hori.	2483.500	AV	33.7	27.9	13.7	41.0	2.1	36.4	53.9	17.5	100	68	
Hori.	4960.000	AV	42.5	32.0	5.8	39.4	2.1	43.0	53.9	10.9	163	279	
Hori.	7440.000	AV	32.7	37.0	7.2	40.4	2.1	38.6	53.9	15.3	100	0	
Hori.	9920.000	AV	31.7	38.4	8.2	39.4	2.1	41.0	53.9	12.9	100	0	
Vert.	45.355	QP	37.2	12.4	6.9	32.1	0.0	24.4	40.0	15.6	100	91	
Vert.	126.742	QP	44.0	13.4	7.5	32.1	0.0	32.8	43.5	10.7	100	86	
Vert.	189.913	QP	44.5	16.2	7.9	32.0	0.0	36.6	43.5	6.9	100	198	
Vert.	2483.500	PK	45.6	27.9	13.7	41.0	2.1	48.3	73.9	25.6	100	11	
Vert.	4960.000	PK	49.4	32.0	5.8	39.4	2.1	49.9	73.9	24.0	139	116	
Vert.	7440.000	PK	44.3	37.0	7.2	40.4	2.1	50.2	73.9	23.7	100	0	
Vert.	9920.000	PK	43.1	38.4	8.2	39.4	2.1	52.4	73.9	21.5	100	0	
Vert.	2483.500	AV	33.7	27.9	13.7	41.0	2.1	36.4	53.9	17.5	100	11	
Vert.	4960.000	AV	41.7	32.0	5.8	39.4	2.1	42.2	53.9	11.7	139	116	
Vert.	7440.000	AV	32.7	37.0	7.2	40.4	2.1	38.6	53.9	15.3	100	0	
Vert.	9920.000	AV	31.8	38.4	8.2	39.4	2.1	41.1	53.9	12.8	100	0	

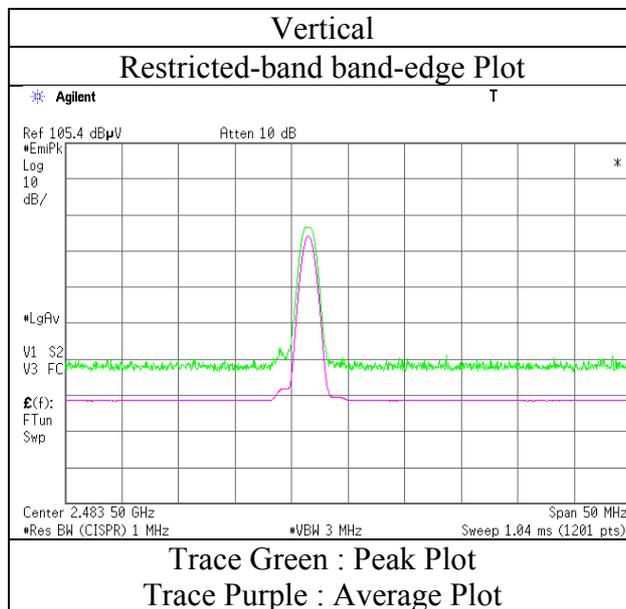
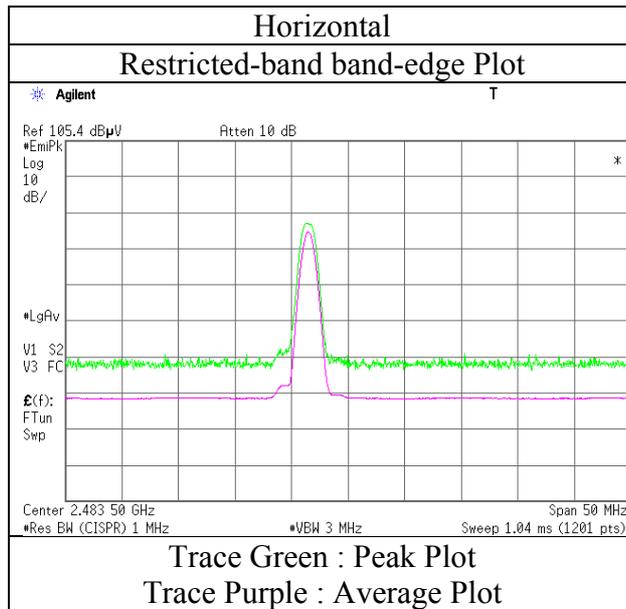
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : 20log(3.8 m / 3.0 m) = 2.1 dB

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

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

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10955171S-E
Date	September 15, 2015
Temperature / Humidity	22 deg. C / 61 % RH
Engineer	Hiroyuki Morikawa
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. : 10955171S-E  
Date : September 15, 2015      September 16, 2015  
Temperature / Humidity : 22 deg. C / 61 % RH      20 deg. C / 56 % RH  
Engineer : Hiroyuki Morikawa      Hiroyuki Morikawa  
            (1-26.5GHz)                      (30-1000MHz)  
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.	60.058	QP	42.8	7.7	6.7	32.1	0.0	25.1	40.0	14.9	159	0	
Hori.	164.779	QP	42.3	15.4	8.0	32.1	0.0	33.6	43.5	9.9	202	336	
Hori.	183.722	QP	38.5	16.1	7.9	32.0	0.0	30.5	43.5	13.0	158	260	
Hori.	2390.000	PK	46.0	27.8	13.7	41.0	2.1	48.6	73.9	25.3	100	89	
Hori.	4804.000	PK	47.0	31.4	5.7	39.6	2.1	46.6	73.9	27.3	174	280	
Hori.	7206.000	PK	45.5	36.9	7.1	40.1	2.1	51.5	73.9	22.4	100	0	
Hori.	9608.000	PK	45.2	38.5	8.2	39.6	2.1	54.4	73.9	19.5	100	0	
Hori.	2390.000	AV	33.6	27.8	13.7	41.0	2.1	36.2	53.9	17.7	100	89	
Hori.	4804.000	AV	35.9	31.4	5.7	39.6	2.1	35.5	53.9	18.4	174	280	
Hori.	7206.000	AV	33.7	36.9	7.1	40.1	2.1	39.7	53.9	14.2	100	0	
Hori.	9608.000	AV	33.7	38.5	8.2	39.6	2.1	42.9	53.9	11.0	100	0	
Vert.	48.463	QP	33.4	11.2	6.9	32.1	0.0	19.4	40.0	20.6	100	0	
Vert.	127.515	QP	44.0	13.4	7.5	32.1	0.0	32.8	43.5	10.7	108	92	
Vert.	183.722	QP	37.3	16.1	7.9	32.0	0.0	29.3	43.5	14.2	100	277	
Vert.	2390.000	PK	46.2	27.8	13.7	41.0	2.1	48.8	73.9	25.1	100	13	
Vert.	4804.000	PK	47.8	31.4	5.7	39.6	2.1	47.4	73.9	26.5	149	113	
Vert.	7206.000	PK	45.5	36.9	7.1	40.1	2.1	51.5	73.9	22.4	100	0	
Vert.	9608.000	PK	45.6	38.5	8.2	39.6	2.1	54.8	73.9	19.1	100	0	
Vert.	2390.000	AV	33.5	27.8	13.7	41.0	2.1	36.1	53.9	17.8	100	13	
Vert.	4804.000	AV	37.1	31.4	5.7	39.6	2.1	36.7	53.9	17.2	149	113	
Vert.	7206.000	AV	33.8	36.9	7.1	40.1	2.1	39.8	53.9	14.1	100	0	
Vert.	9608.000	AV	33.7	38.5	8.2	39.6	2.1	42.9	53.9	11.0	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(3.8 m / 3.0 m) = 2.1 dB  
13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 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	83.4	27.8	13.7	41.0	2.1	86.0	-	-	Carrier
Hori.	2400.000	PK	38.1	27.8	13.7	41.0	2.1	40.7	65.9	25.2	
Vert.	2402.000	PK	86.6	27.8	13.7	41.0	2.1	89.2	-	-	Carrier
Vert.	2400.000	PK	40.8	27.8	13.7	41.0	2.1	43.4	69.2	25.8	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor  
Distance factor : 1 GHz - 13 GHz : 20log(3.8 m / 3.0 m) = 2.1 dB  
13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

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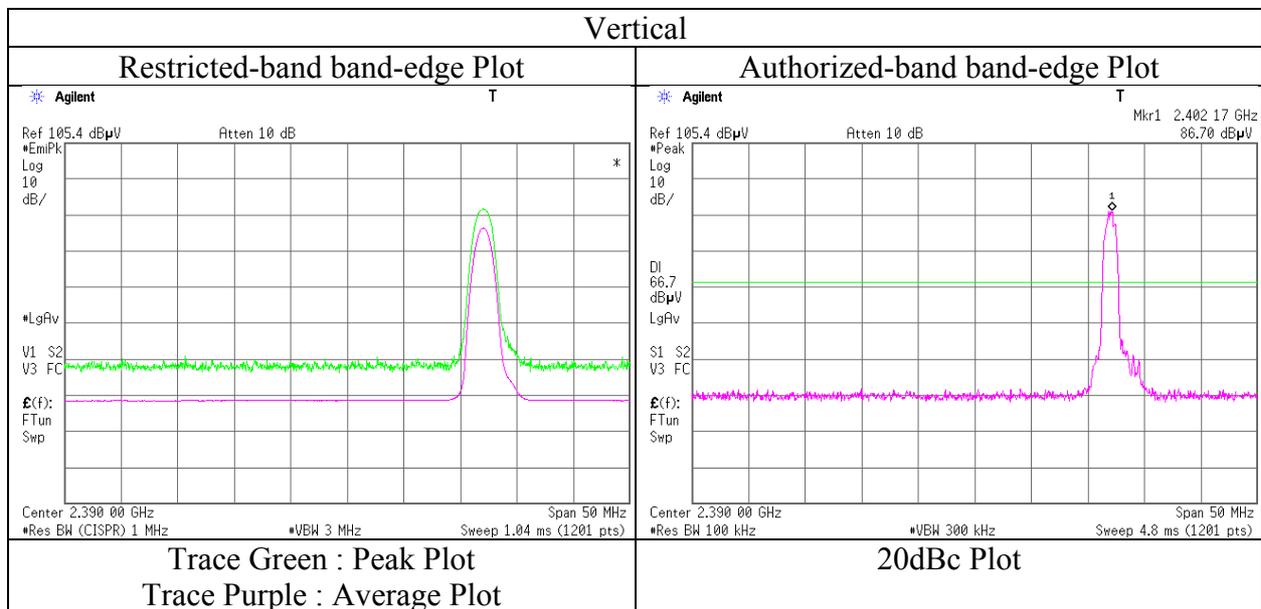
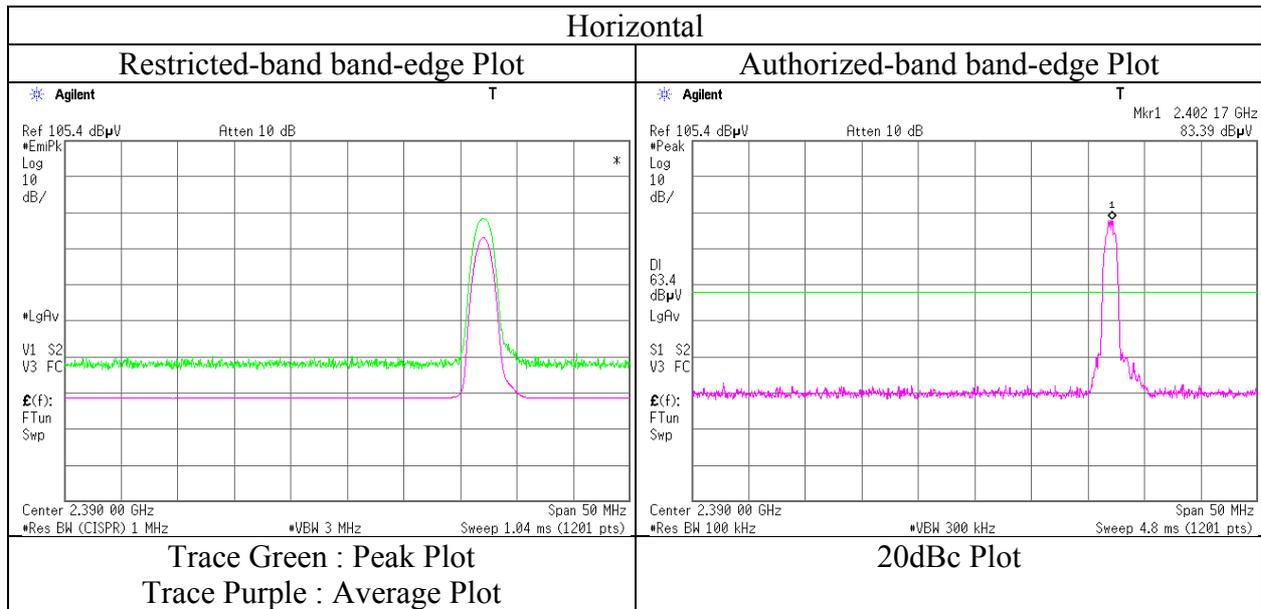
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Telephone : +81 463 50 6400

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. : 10955171S-E  
Date : September 15, 2015  
Temperature / Humidity : 22 deg. C / 61 % RH  
Engineer : Hiroyuki Morikawa  
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. : 10955171S-E  
Date : September 15, 2015      September 16, 2015  
Temperature / Humidity : 22 deg. C / 61 % RH      20 deg. C / 56 % RH  
Engineer : Hiroyuki Morikawa      Hiroyuki Morikawa  
            (1-26.5GHz)                      (30-1000MHz)  
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.	44.145	QP	31.6	12.9	6.9	32.1	0.0	19.3	40.0	20.7	320	94	
Hori.	63.939	QP	39.5	7.2	6.7	32.1	0.0	21.3	40.0	18.7	286	183	
Hori.	67.431	QP	42.8	6.7	6.8	32.1	0.0	24.2	40.0	15.8	295	188	
Hori.	144.621	QP	44.5	14.5	7.8	32.1	0.0	34.7	43.5	<b>8.8</b>	118	181	
Hori.	169.827	QP	43.1	15.6	8.0	32.0	0.0	34.7	43.5	<b>8.8</b>	174	0	
Hori.	180.617	QP	37.7	16.0	8.0	32.0	0.0	29.7	43.5	13.8	176	164	
Hori.	241.449	QP	30.3	16.8	8.3	32.0	0.0	23.4	46.0	22.6	128	340	
Hori.	4882.000	PK	47.4	31.7	5.8	39.5	2.1	47.5	73.9	26.4	166	276	
Hori.	7323.000	PK	44.7	36.9	7.2	40.2	2.1	50.7	73.9	23.2	100	0	
Hori.	9764.000	PK	44.4	38.5	8.2	39.5	2.1	53.7	73.9	20.2	100	0	
Hori.	4882.000	AV	37.7	31.7	5.8	39.5	2.1	37.8	53.9	16.1	166	276	
Hori.	7323.000	AV	33.0	36.9	7.2	40.2	2.1	39.0	53.9	14.9	100	0	
Hori.	9764.000	AV	32.1	38.5	8.2	39.5	2.1	41.4	53.9	12.5	100	0	
Vert.	38.383	QP	32.0	14.9	6.8	32.2	0.0	21.5	40.0	18.5	100	0	
Vert.	48.055	QP	30.1	11.3	6.9	32.1	0.0	16.2	40.0	23.8	271	81	
Vert.	63.957	QP	38.8	7.2	6.7	32.1	0.0	20.6	40.0	19.4	268	205	
Vert.	127.522	QP	45.0	13.4	7.5	32.1	0.0	33.8	43.5	9.7	100	88	
Vert.	144.045	QP	40.6	14.5	7.8	32.1	0.0	30.8	43.5	12.7	100	64	
Vert.	186.047	QP	32.3	16.1	7.9	32.0	0.0	24.3	43.5	19.2	129	227	
Vert.	243.919	QP	26.8	16.9	8.4	32.0	0.0	20.1	46.0	25.9	100	316	
Vert.	4882.000	PK	47.9	31.7	5.8	39.5	2.1	48.0	73.9	25.9	146	113	
Vert.	7323.000	PK	44.7	36.9	7.2	40.2	2.1	50.7	73.9	23.2	100	0	
Vert.	9764.000	PK	43.6	38.5	8.2	39.5	2.1	52.9	73.9	21.0	100	0	
Vert.	4882.000	AV	38.4	31.7	5.8	39.5	2.1	38.5	53.9	15.4	146	113	
Vert.	7323.000	AV	33.0	36.9	7.2	40.2	2.1	39.0	53.9	14.9	100	0	
Vert.	9764.000	AV	32.2	38.5	8.2	39.5	2.1	41.5	53.9	12.4	100	0	

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

Distance factor : 1 GHz - 13 GHz :  $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.1\text{ dB}$

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

## Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. : 10955171S-E  
Date : September 15, 2015      September 16, 2015  
Temperature / Humidity : 22 deg. C / 61 % RH      20 deg. C / 56 % RH  
Engineer : Hiroyuki Morikawa      Hiroyuki Morikawa  
            (1-26.5GHz)                      (30-1000MHz)  
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.	67.823	QP	42.5	6.6	6.8	32.1	0.0	23.8	40.0	16.2	288	223	
Hori.	147.724	QP	43.4	14.7	7.9	32.1	0.0	33.9	43.5	9.6	118	275	
Hori.	169.865	QP	43.5	15.6	8.0	32.0	0.0	35.1	43.5	8.4	188	0	
Hori.	2483.500	PK	45.4	27.9	13.7	41.0	2.1	48.1	73.9	25.8	100	67	
Hori.	4960.000	PK	48.5	32.0	5.8	39.4	2.1	49.0	73.9	24.9	164	279	
Hori.	7440.000	PK	44.0	37.0	7.2	40.4	2.1	49.9	73.9	24.0	100	0	
Hori.	9920.000	PK	43.1	38.4	8.2	39.4	2.1	52.4	73.9	21.5	100	0	
Hori.	2483.500	AV	33.6	27.9	13.7	41.0	2.1	36.3	53.9	17.6	100	67	
Hori.	4960.000	AV	37.9	32.0	5.8	39.4	2.1	38.4	53.9	15.5	164	279	
Hori.	7440.000	AV	32.6	37.0	7.2	40.4	2.1	38.5	53.9	15.4	100	0	
Hori.	9920.000	AV	31.7	38.4	8.2	39.4	2.1	41.0	53.9	12.9	100	0	
Vert.	45.738	QP	36.4	12.3	6.9	32.1	0.0	23.5	40.0	16.5	100	259	
Vert.	127.516	QP	44.9	13.4	7.5	32.1	0.0	33.7	43.5	9.8	100	78	
Vert.	146.194	QP	40.8	14.6	7.8	32.1	0.0	31.1	43.5	12.4	100	47	
Vert.	2483.500	PK	45.7	27.9	13.7	41.0	2.1	48.4	73.9	25.5	100	0	
Vert.	4960.000	PK	48.4	32.0	5.8	39.4	2.1	48.9	73.9	25.0	138	116	
Vert.	7440.000	PK	44.2	37.0	7.2	40.4	2.1	50.1	73.9	23.8	100	0	
Vert.	9920.000	PK	43.3	38.4	8.2	39.4	2.1	52.6	73.9	21.3	100	0	
Vert.	2483.500	AV	33.6	27.9	13.7	41.0	2.1	36.3	53.9	17.6	100	0	
Vert.	4960.000	AV	38.0	32.0	5.8	39.4	2.1	38.5	53.9	15.4	138	116	
Vert.	7440.000	AV	32.7	37.0	7.2	40.4	2.1	38.6	53.9	15.3	100	0	
Vert.	9920.000	AV	31.8	38.4	8.2	39.4	2.1	41.1	53.9	12.8	100	0	

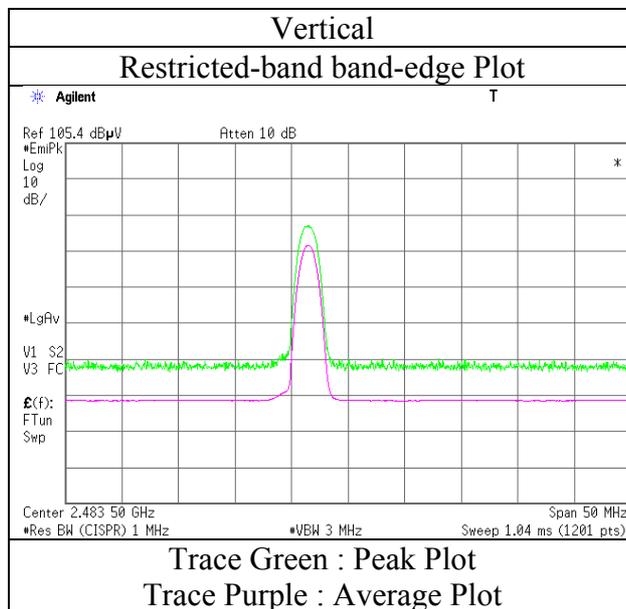
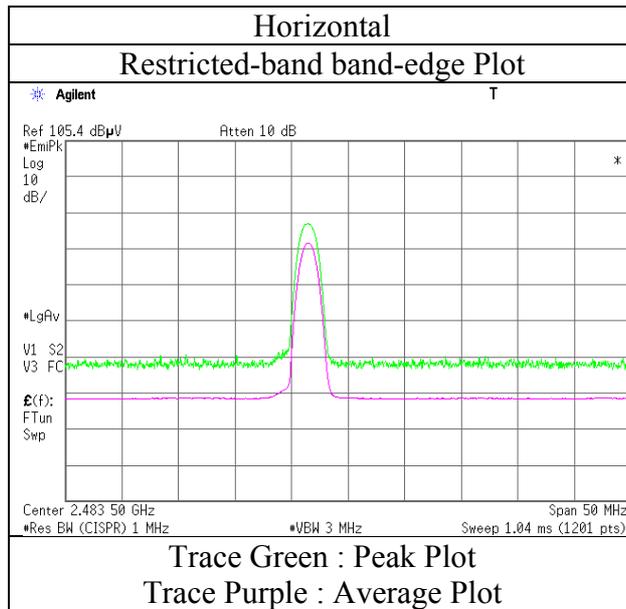
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : 20log(3.8 m / 3.0 m) = 2.1 dB

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

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

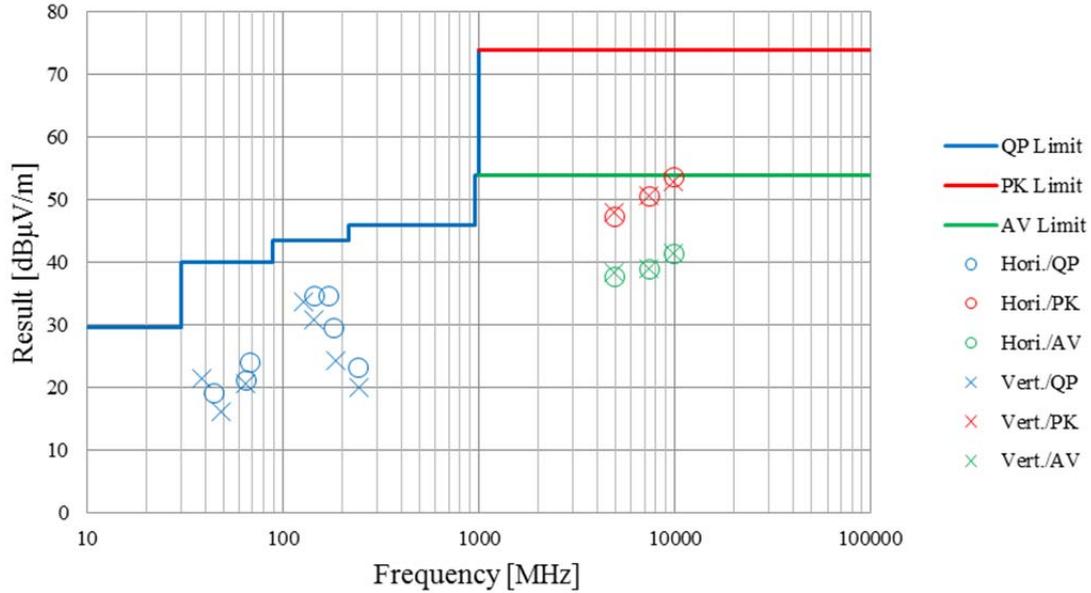
Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10955171S-E
Date	September 15, 2015
Temperature / Humidity	22 deg. C / 61 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx, Hopping Off, 3DH5 2480 MHz



\* 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.	10955171S-E	
Date	September 15, 2015	September 16, 2015
Temperature / Humidity	22 deg. C / 61 % RH	20 deg. C / 56 % RH
Engineer	Hiroyuki Morikawa	Hiroyuki Morikawa
	(1-26.5GHz)	(30-1000MHz)
Mode	Tx, Hopping Off, 3DH5 2441 MHz	

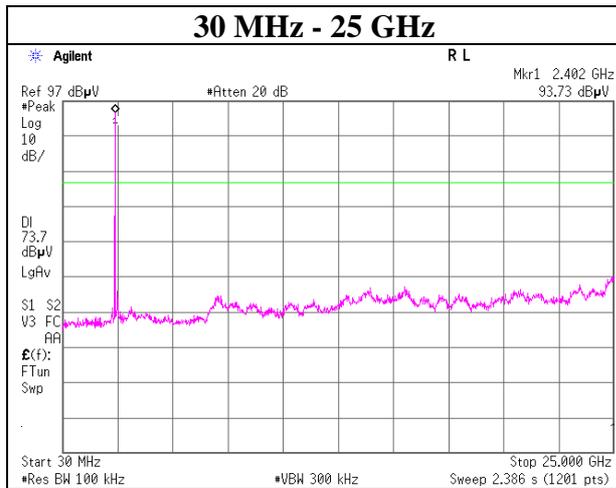
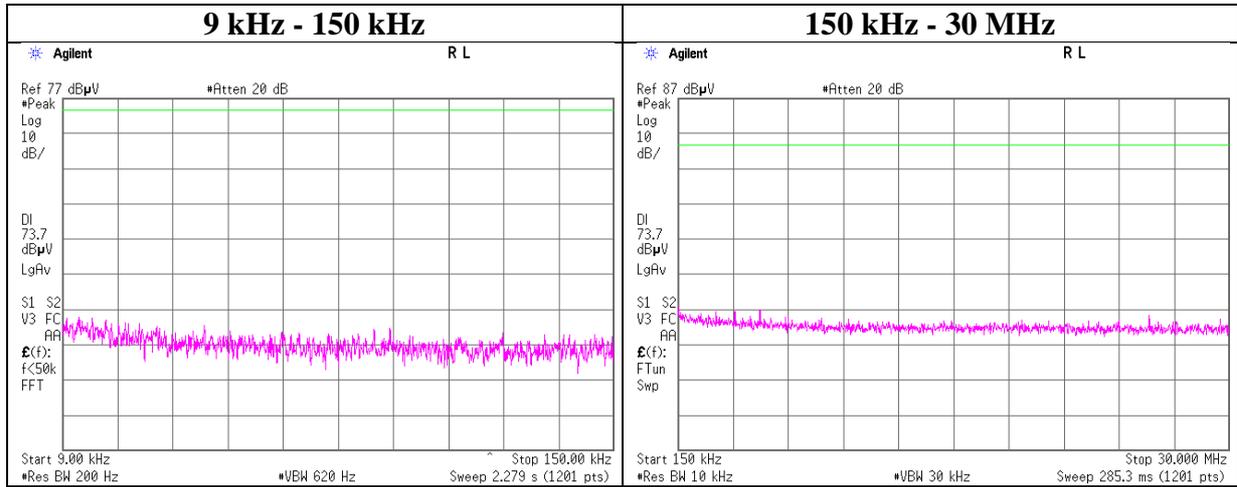


\*These plots data contains sufficient number to show the trend of characteristic features for EUT.

## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10955171S-E
Date	September 16, 2015
Temperature / Humidity	25 deg. C / 41 % RH
Engineer	Tomohiro Hara
Mode	Tx, Hopping Off, DH5

### 2402 MHz



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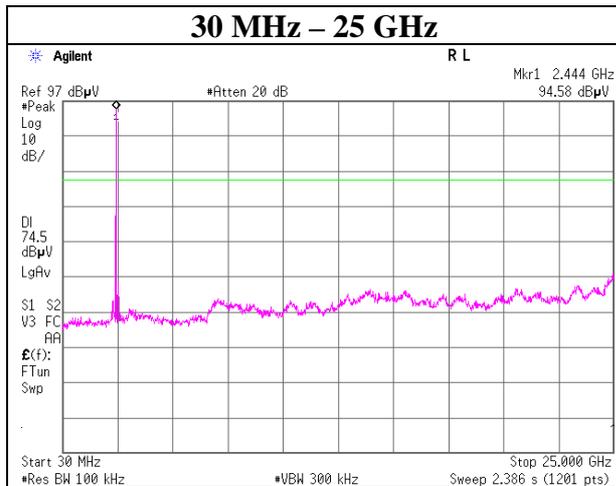
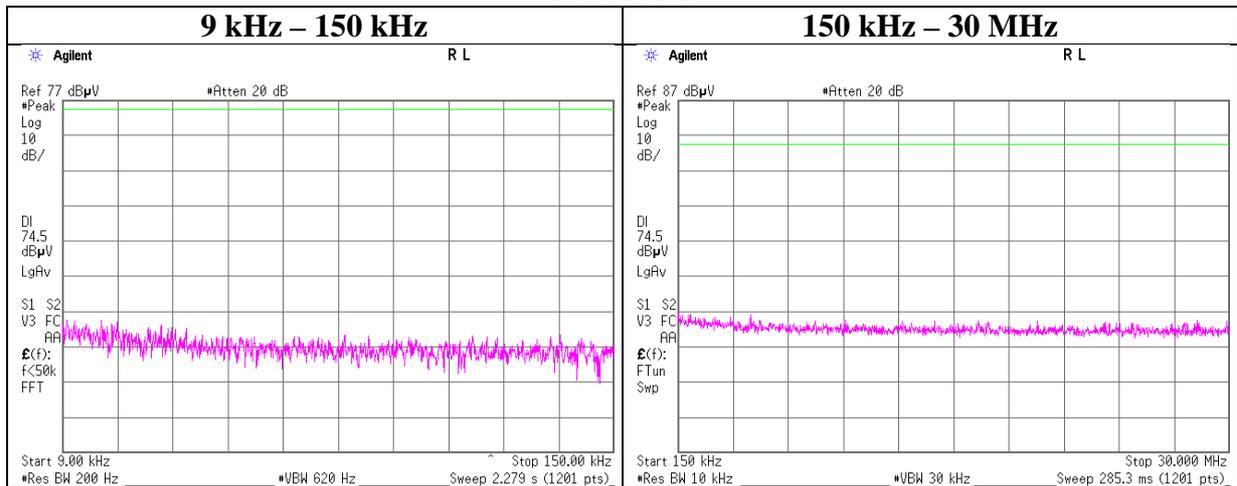
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10955171S-E
Date	September 16, 2015
Temperature / Humidity	25 deg. C / 41 % RH
Engineer	Tomohiro Hara
Mode	Tx, Hopping Off, DH5

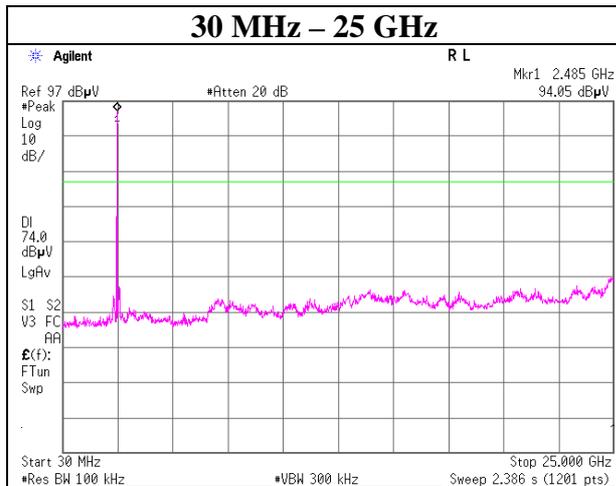
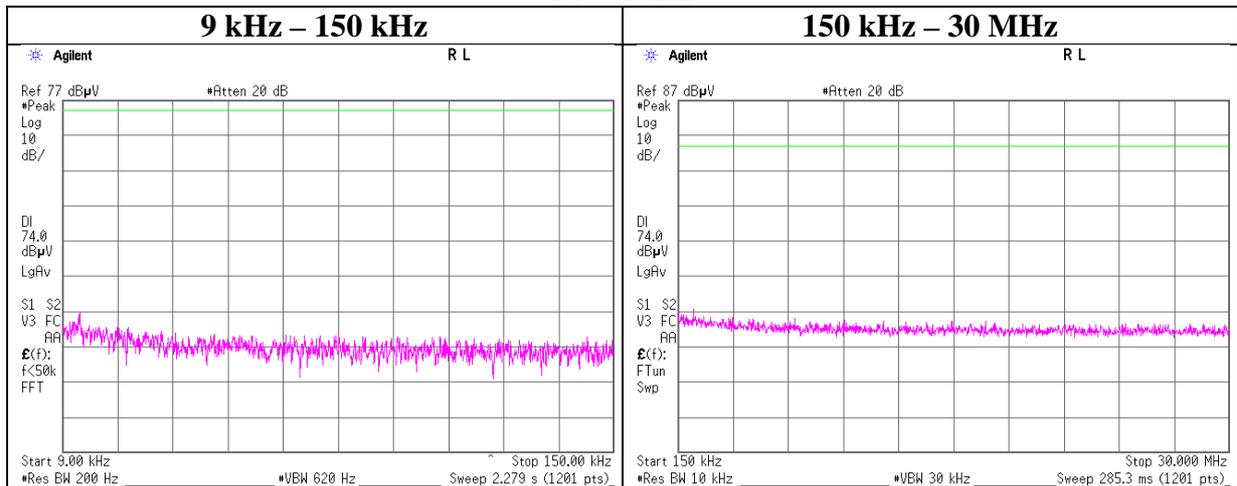
### 2441 MHz



## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10955171S-E
Date	September 16, 2015
Temperature / Humidity	25 deg. C / 41 % RH
Engineer	Tomohiro Hara
Mode	Tx, Hopping Off, DH5

### 2480 MHz



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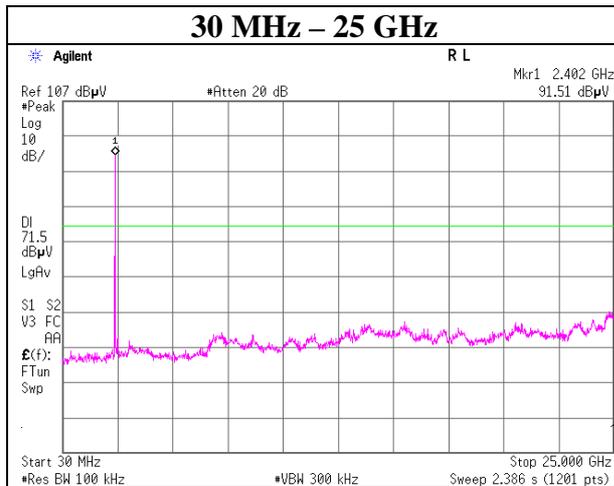
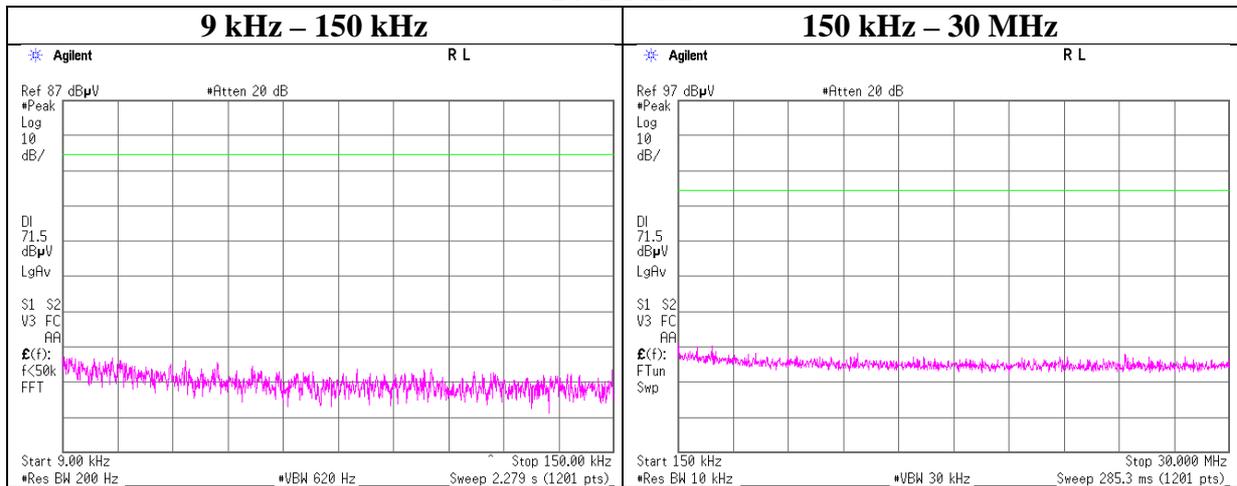
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10955171S-E
Date	September 16, 2015
Temperature / Humidity	25 deg. C / 41 % RH
Engineer	Tomohiro Hara
Mode	Tx, Hopping Off, DH5

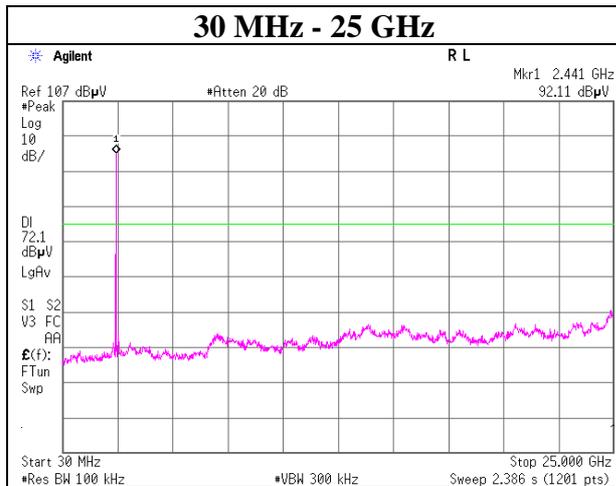
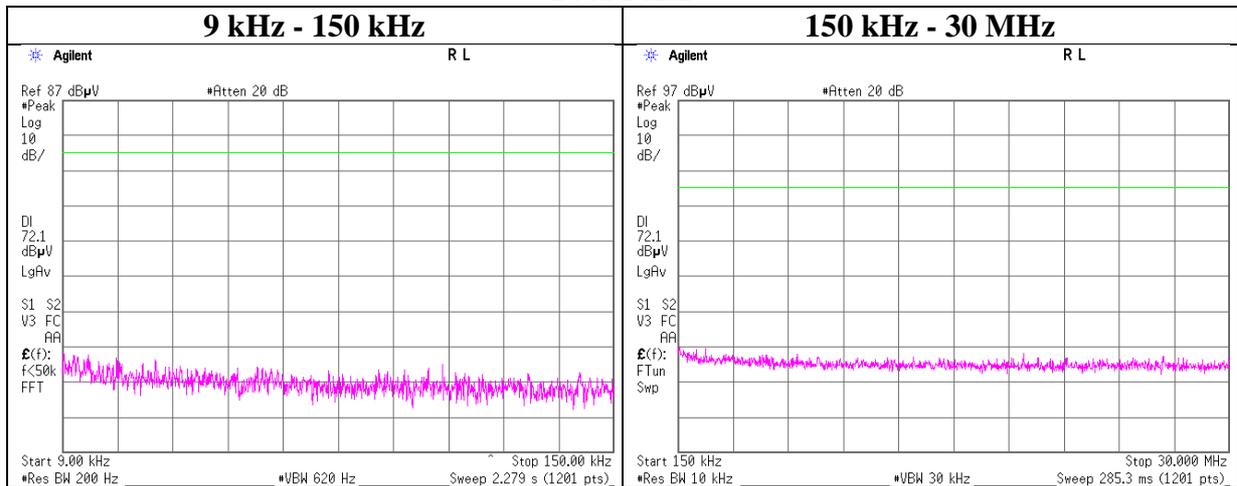
### 2402 MHz



## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10955171S-E
Date	September 16, 2015
Temperature / Humidity	25 deg. C / 41 % RH
Engineer	Tomohiro Hara
Mode	Tx, Hopping Off, 3DH5

### 2441 MHz



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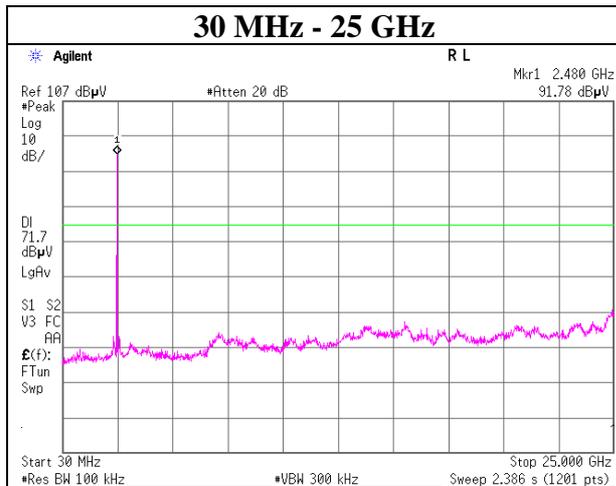
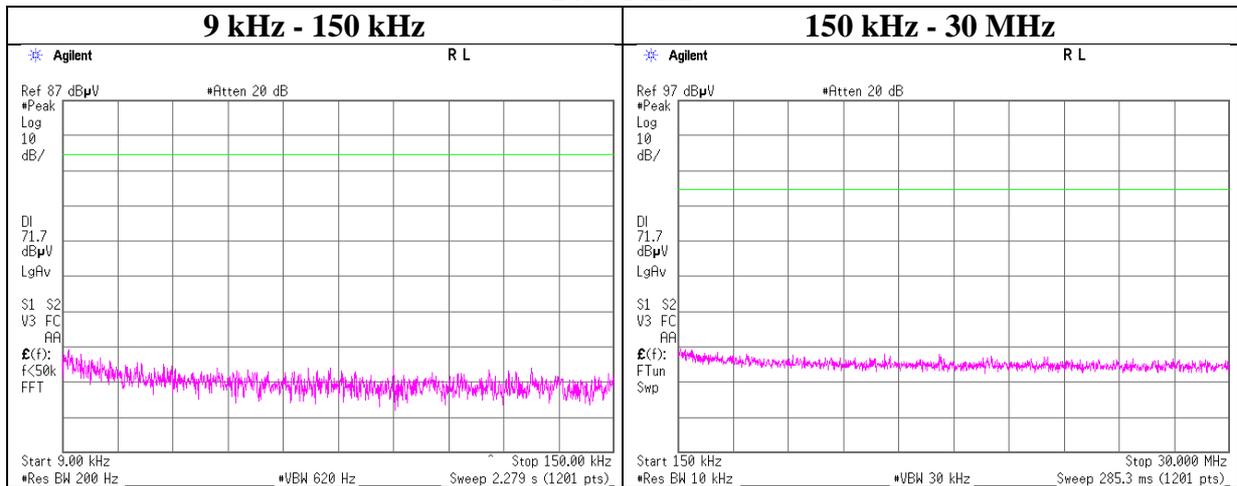
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10955171S-E
Date	September 16, 2015
Temperature / Humidity	25 deg. C / 41 % RH
Engineer	Tomohiro Hara
Mode	Tx, Hopping Off, 3DH5

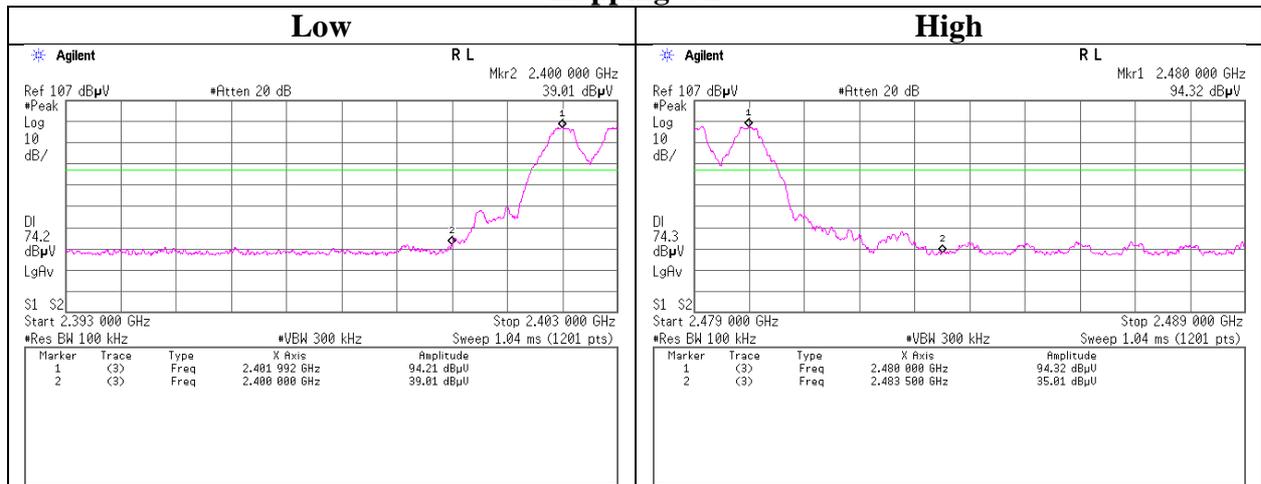
### 2480 MHz



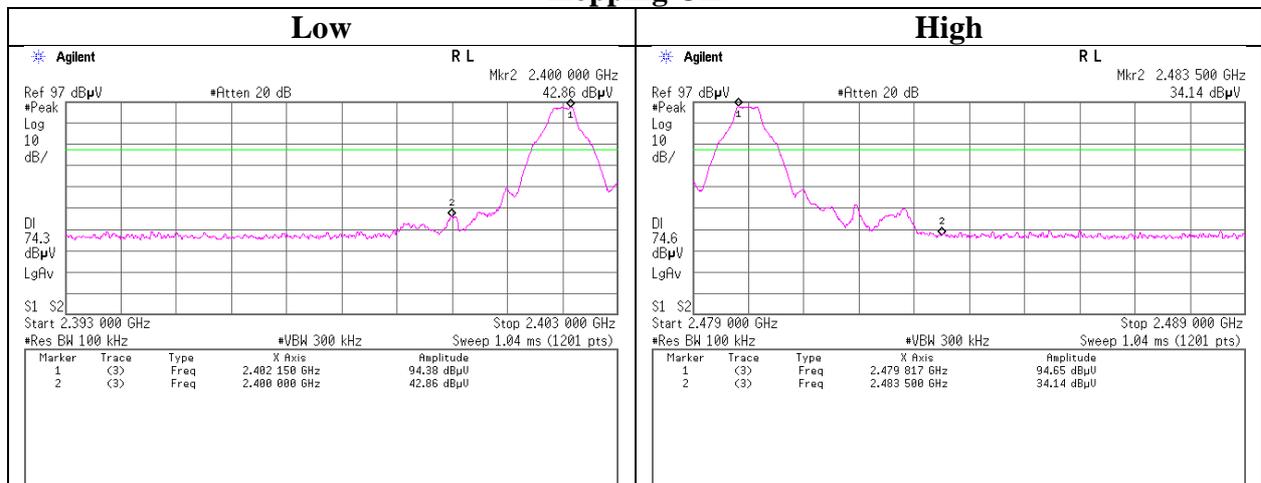
## Conducted Emission Band Edge compliance

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10955171S-E
Date	September 16, 2015
Temperature / Humidity	25 deg. C / 41 % RH
Engineer	Tomohiro Hara
Mode	Tx DH5

### Hopping On



### Hopping Off



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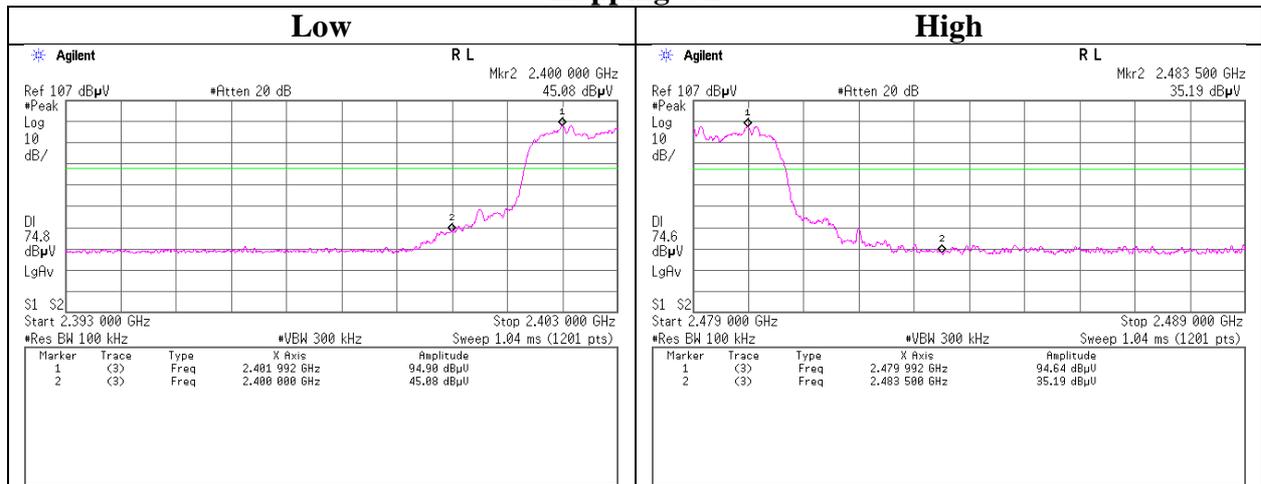
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

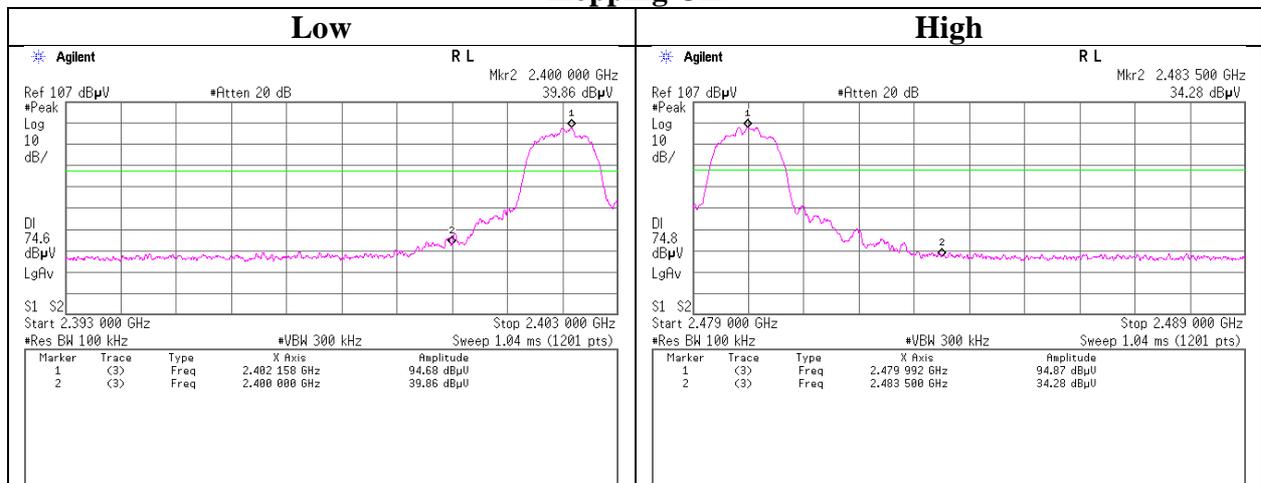
## Conducted Emission Band Edge compliance

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10955171S-E
Date	September 16, 2015
Temperature / Humidity	25 deg. C / 41 % RH
Engineer	Tomohiro Hara
Mode	Tx 3DH5

### Hopping On



### Hopping Off



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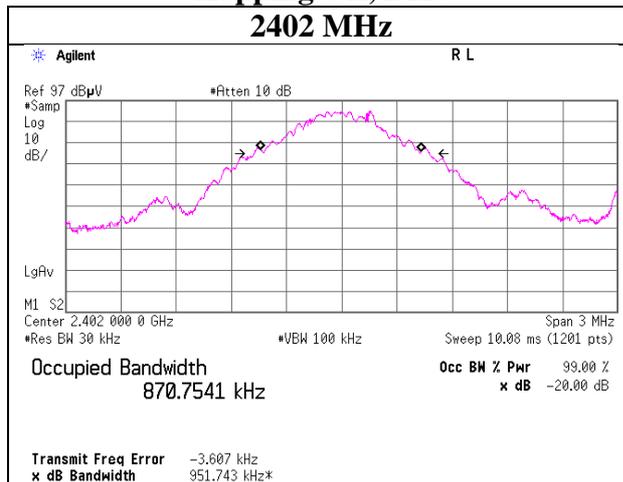
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

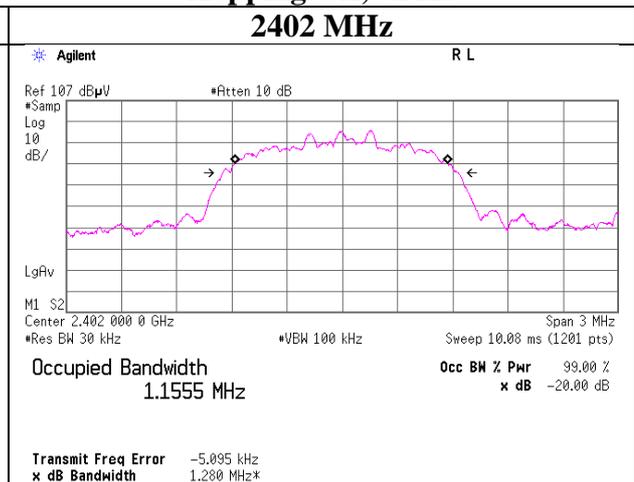
## 99% Occupied Bandwidth

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10955171S-E
Date	September 16, 2015
Temperature / Humidity	25 deg. C / 41 % RH
Engineer	Tomohiro Hara
Mode	Tx Hopping Off

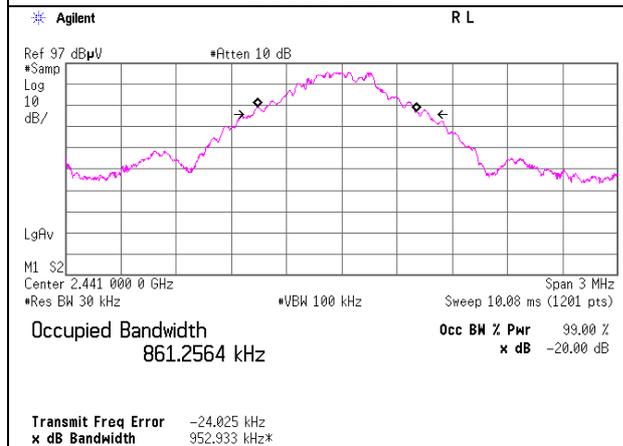
### Hopping Off, DH5



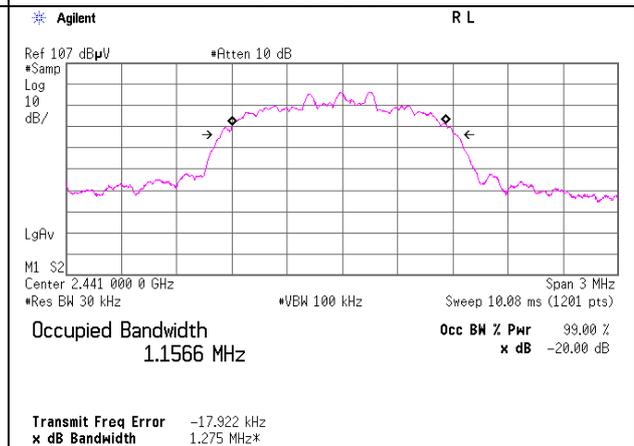
### Hopping Off, 3DH5



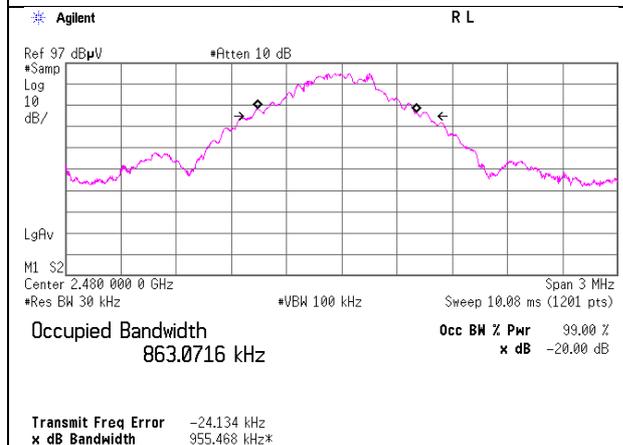
### 2441 MHz



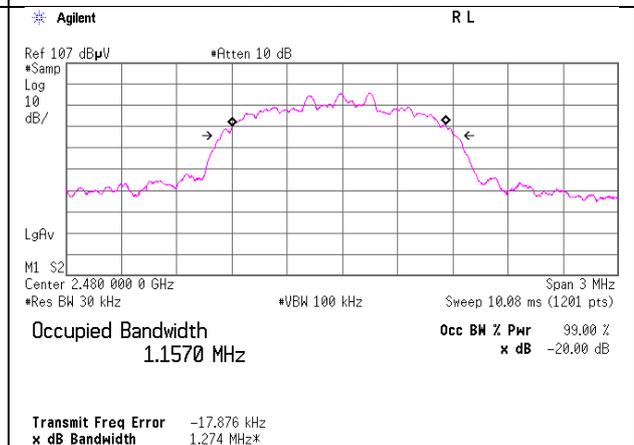
### 2441 MHz



### 2480 MHz



### 2480 MHz



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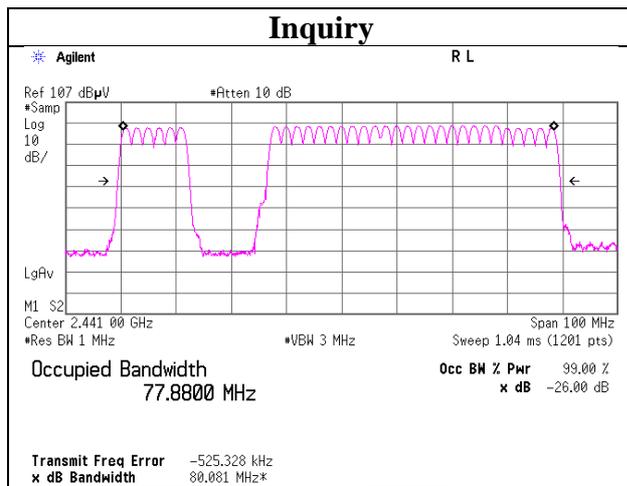
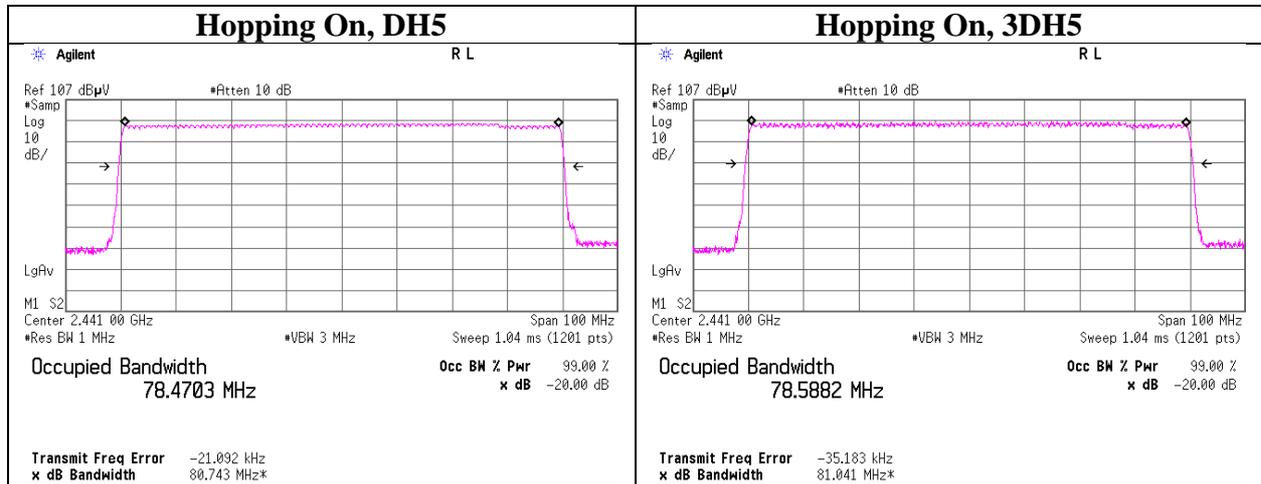
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## 99% Occupied Bandwidth

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10955171S-E
Date	September 16, 2015
Temperature / Humidity	25 deg. C / 41 % RH
Engineer	Tomohiro Hara
Mode	Tx Hopping On



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**Shonan EMC Lab.**

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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>
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	2015/05/19 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2015/08/11 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2014/10/30 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2015/03/26 * 12
SJM-15	Measure	ASKUL	-	-	RE	-
SAEC-03(SVS WR)	Semi-Anechoic Chamber	TDK	SAEC-03(SVS WR)	3	RE	2015/08/28 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFL,MF)	-	RE	-
SAT10-05	Attenuator(above 1GHz)	Agilent	8493C-010	74864	RE	2014/11/21 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2014/11/21 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2015/03/17 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2015/03/23 * 12
SCC-G15	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	RE	2015/03/11 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2015/07/16 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	AT	2015/03/23 * 12
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2015/04/07 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2015/04/07 * 12
SAT10-10	Attenuator	Weinschel Corp.	54A-10	37584	AT	2015/04/09 * 12
SCC-G12	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	AT	2015/03/11 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2014/12/24 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2014/10/18 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2014/10/18 * 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/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	RE	2015/04/17 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2015/02/18 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE	2015/03/24 * 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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