



# RADIO TEST REPORT

Test Report No. : 10910945S-E

**Applicant** : Sony Corporation  
**Type of Equipment** : FM/AM Digital Media Player  
**Model No.** : DSX-A400BT  
**FCC ID** : AK8DSXA400BT  
**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:** August 19 to 24, 2015

**Representative test engineer:**

*S. Takano*

Shinichi Takano

Engineer

Consumer Technology Division

**Approved by:**

*T. Imamura*

Toyokazu Imamura

Leader

Consumer Technology Division



**JAB**  
Testing  
RTL02610

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

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**Shonan EMC Lab.**

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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 : FM/AM Digital Media Player  
Model No. : DSX-A400BT  
Serial No. : Refer to Section 4, Clause 4.2  
Rating : DC 12 V  
Receipt Date of Sample : August 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: DSX-A400BT (referred to as the EUT in this report) is a FM/AM Digital Media Player.

### **General Specification**

Clock frequency(ies) in the system : 26 MHz

### **Radio Specification**

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 : -6.259 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 902-928 MHz, 2400-2483.5 MHz, and  
5725-5850 MHz

\* The revision on September 8, 2015 does not affect the test specification applied to the EUT.

The EUT has been tested for compliance with FCC Part 15 Subpart B. Refer to the test report 10910945S-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		8.0 dB Tx DH5 2402 MHz 12010 MHz, AV, Vertical Tx 3-DH5 2402 MHz 12010 MHz, AV, Horizontal	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 C63.4: 2009 is also referred.

#### **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  $k = 2$ .  
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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 - 15 GHz	4.9 dB	4.9 dB	4.9 dB
Radiated emission (Measurement distance: 1 m)	15 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	0.68 dB
Spurious emission (Conducted) below 1 GHz	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
Bandwidth Measurement	0.66 %

#### 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**

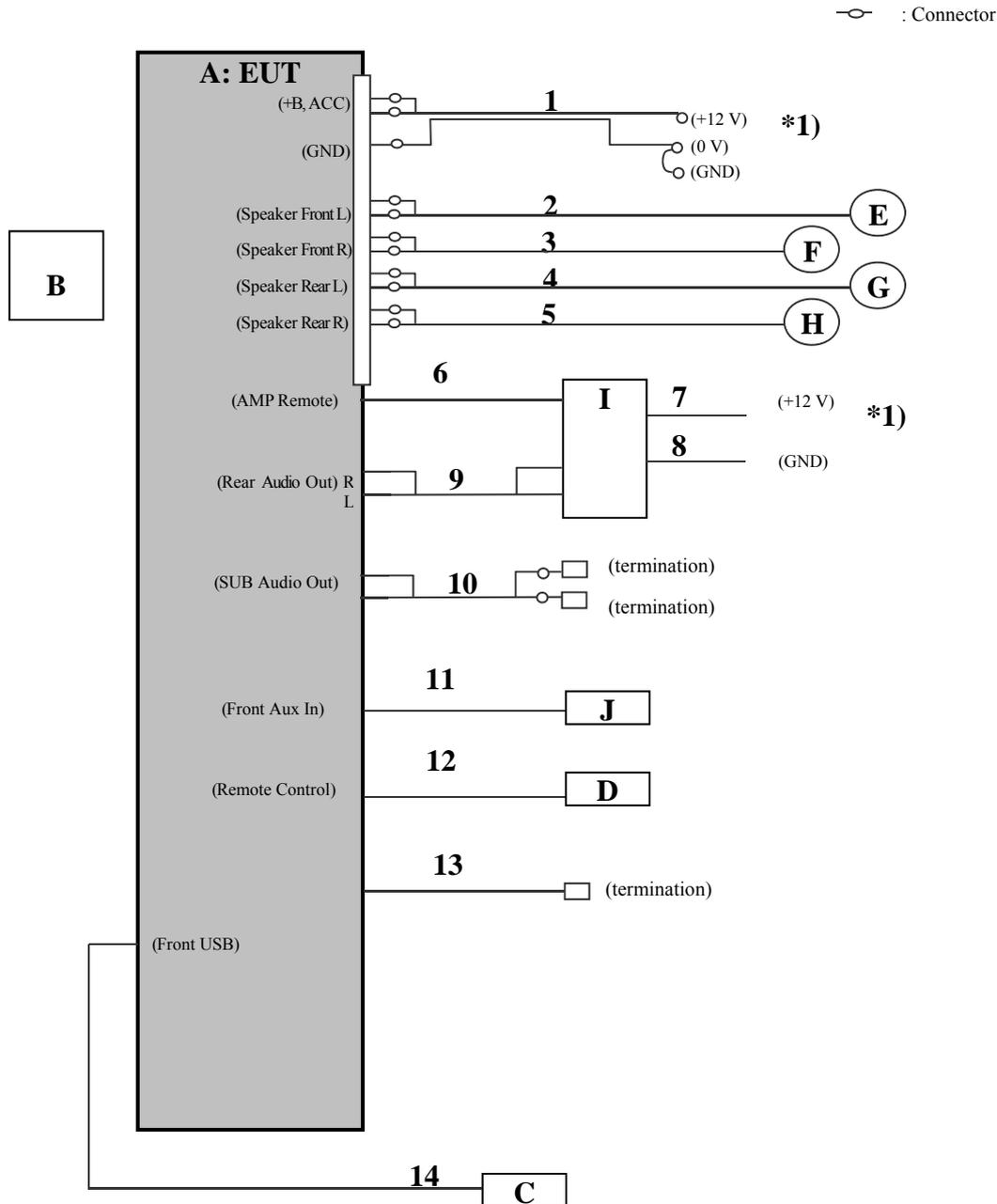
### **4.1 Operating Mode(s)**

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

Details of Operating Mode(s)

<b>Test Item</b>	<b>Mode</b>	<b>Tested frequency</b>
Conducted Emission, 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 (2 Mb/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 were taken into consideration and test data was taken under worse case conditions.

\*1) DC power supply (Model No.: PAN35-10A) was used for DC 12V input.

**Description of EUT and support equipment**

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	FM/AM Digital Media Player	DSX-A400BT	89 *2), 91 *3)	Sony	EUT
B	Remote commander	RM-X231	-	Sony	-
C	USB memory	-	-	Sony	-
D	Wired Remote Controller	RM-X25	-	Sony	-
E	Speaker 1	KFC-RS160	-	KENWOOD	-
F	Speaker 2	KFC-RS160	-	KENWOOD	-
G	Speaker 3	KFC-RS160	-	KENWOOD	-
H	Speaker 4	KFC-RS160	-	KENWOOD	-
I	Monaural Power Amplifier	XM-4S-020	-	Sony	-
J	Walkman	NW-A829	5017289	Sony	-

\*2) Used for Antenna Terminal Conducted tests

\*3) Used for Conducted Emission test and Radiated Emission test

**List of cables used**

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Power	0.15+3.2	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	AMP Remote	0.15+1.5	Unshielded	Unshielded	-
7	DC Power(+)	1.3	Unshielded	Unshielded	-
8	DC Power(-)	1.3	Unshielded	Unshielded	-
9	RCA (Rear Audio Out)	5.0	Shielded	Shielded	-
10	RCA (SUB Audio Out)	5.0	Shielded	Shielded	-
11	Stereo mini(Front AUX)	2.0	Shielded	Shielded	-
12	REMOTE Control	2.0	Shielded	Shielded	-
13	Tuner Antenna In	1.0	Shielded	Shielded	-
14	USB	1.0	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 2.0 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 15 GHz), 1 m*2) (above 15 GHz)		3 m (below 15 GHz), 1 m*2) (above 15 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 -45 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 or 2.5 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	5 MHz or 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) 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.							
*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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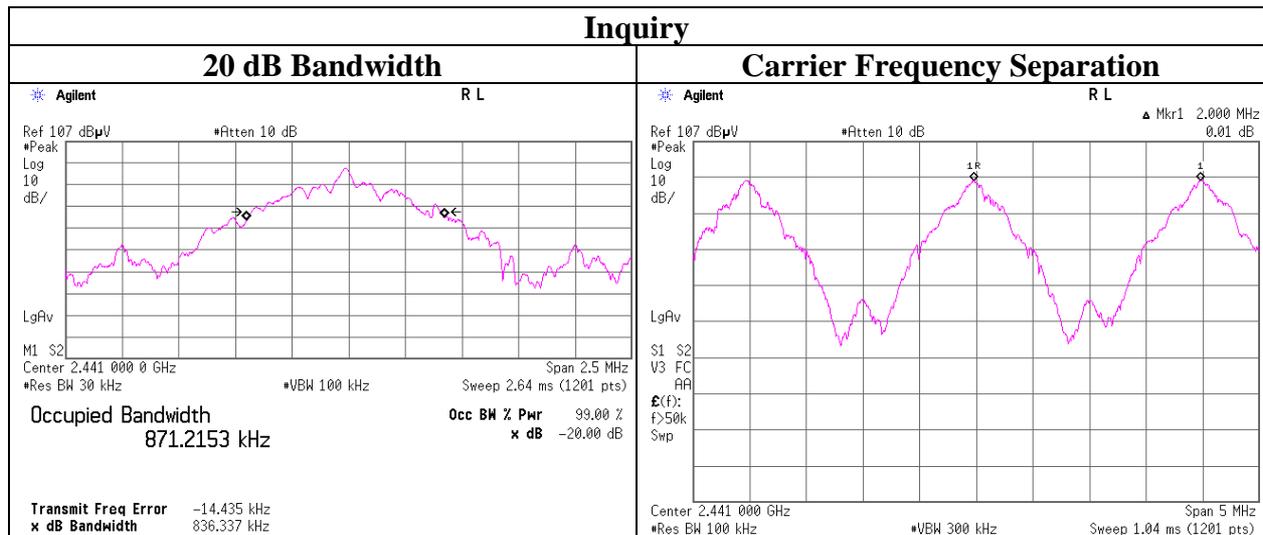
**APPENDIX 1: Test data**

**20dB Bandwidth and Carrier Frequency Separation**

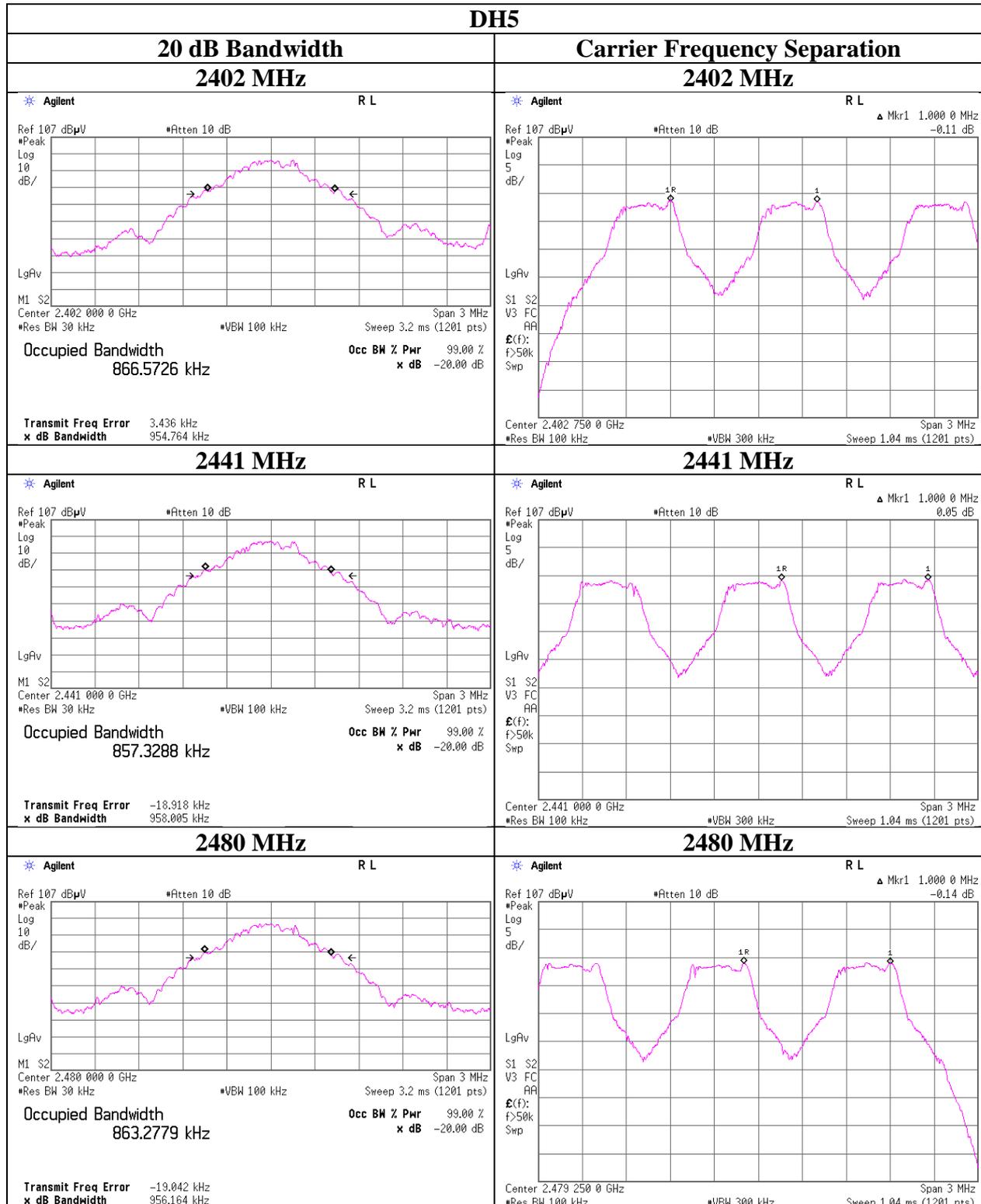
Test place : Shonan EMC Lab. No.1 Measurement Room  
Report No. : 10910945S-E  
Date : August 19, 2015  
Temperature / Humidity : 25 deg. C / 54 % RH  
Engineer : Shinichi Takano  
Mode : Tx, Hopping Off, DH5

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	0.958	1.000	>= 0.639
DH5	2480.0	0.956	1.000	>= 0.637
3DH5	2402.0	1.289	1.000	>= 0.860
3DH5	2441.0	1.283	1.000	>= 0.855
3DH5	2480.0	1.304	1.000	>= 0.870
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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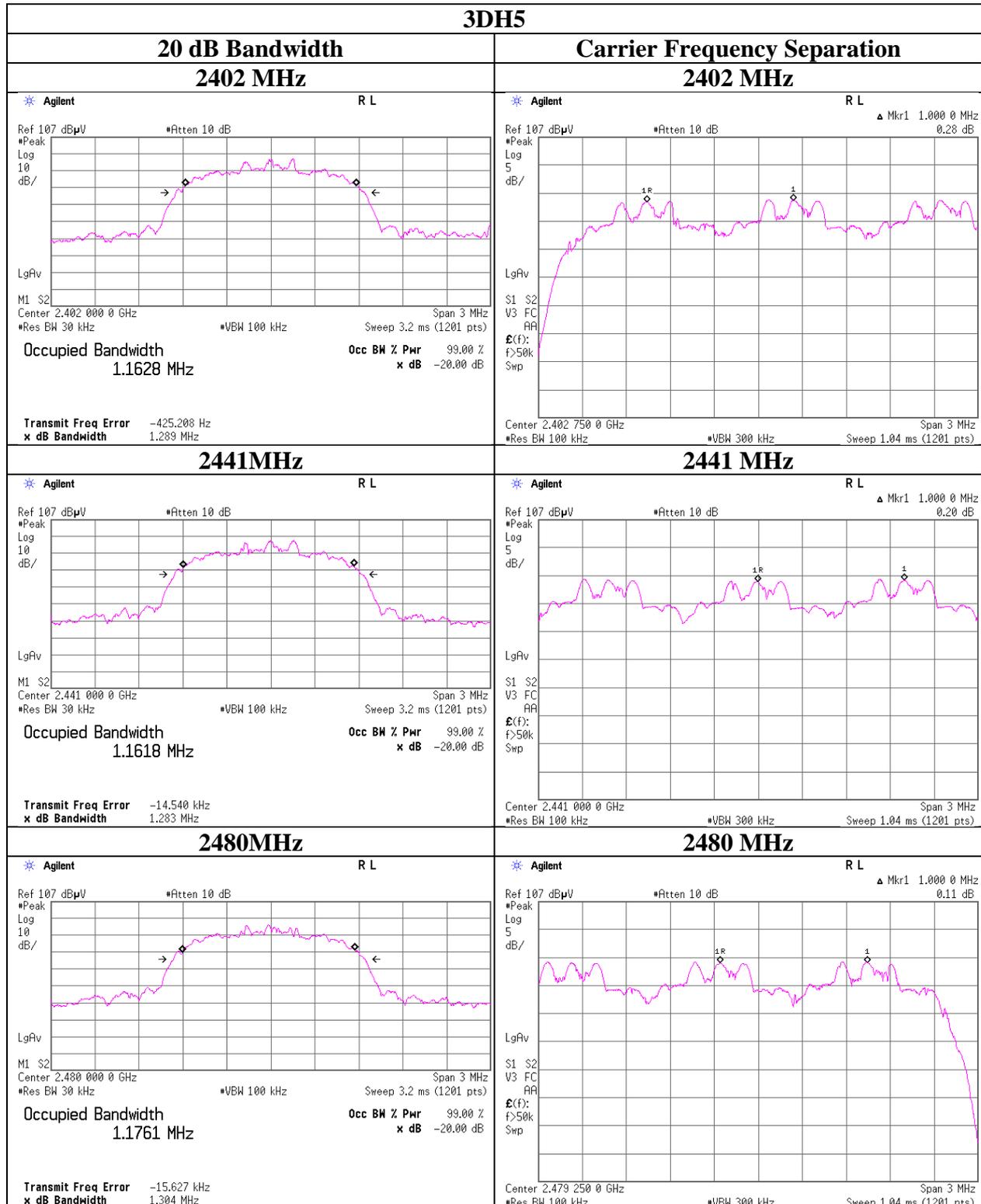
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## 20dB Bandwidth and Carrier Frequency Separation



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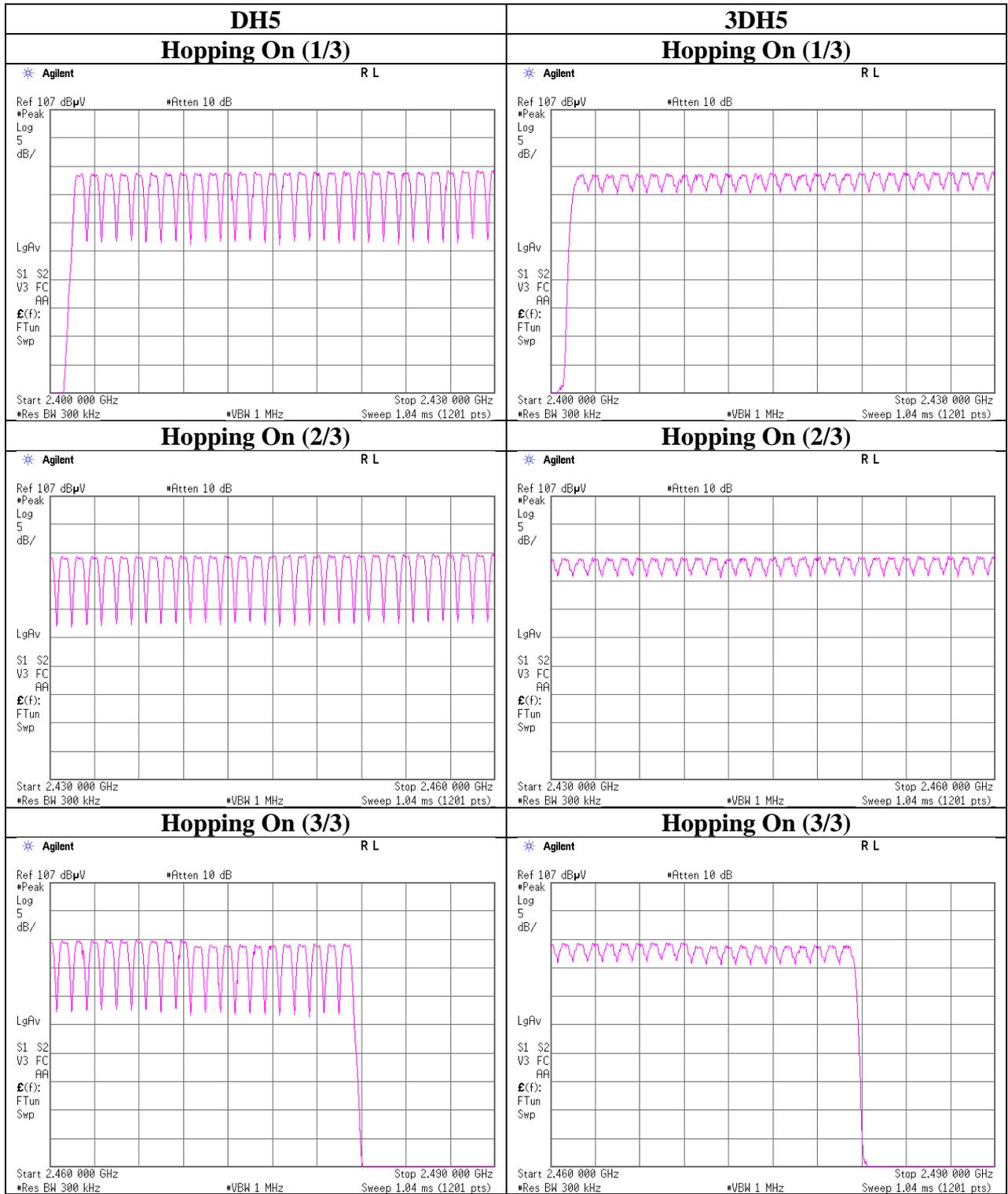
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**Number of Hopping Frequency**



## Dwell time

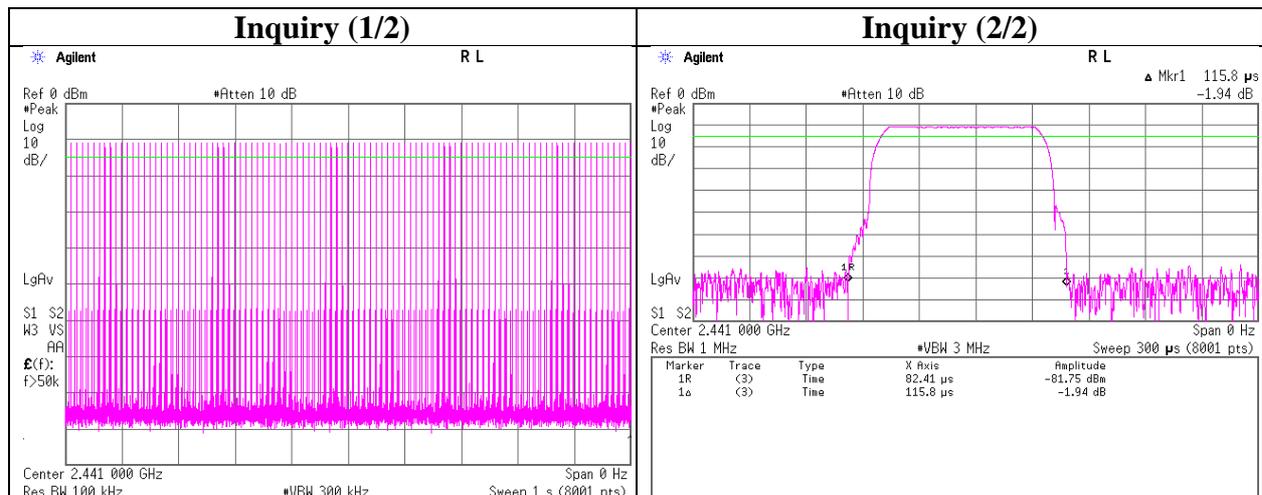
Test place	Shonan EMC Lab. No.1 Measurement Room
Report No.	10910945S-E
Date	August 19, 2015
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Shinichi Takano
Mode	Tx, Hopping On

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	51.0 times / 5 sec. x 31.6 sec. = 323 times	0.415	134	400
DH3	26.0 times / 5 sec. x 31.6 sec. = 165 times	1.671	276	400
DH5	17.0 times / 5 sec. x 31.6 sec. = 108 times	2.919	315	400
3DH1	51.0 times / 5 sec. x 31.6 sec. = 323 times	0.431	139	400
3DH3	26.0 times / 5 sec. x 31.6 sec. = 165 times	1.681	277	400
3DH5	17.0 times / 5 sec. x 31.6 sec. = 108 times	2.934	317	400
Inquiry	100.0 times / 1 sec. x 12.8 sec. = 1280 times	0.116	148	400

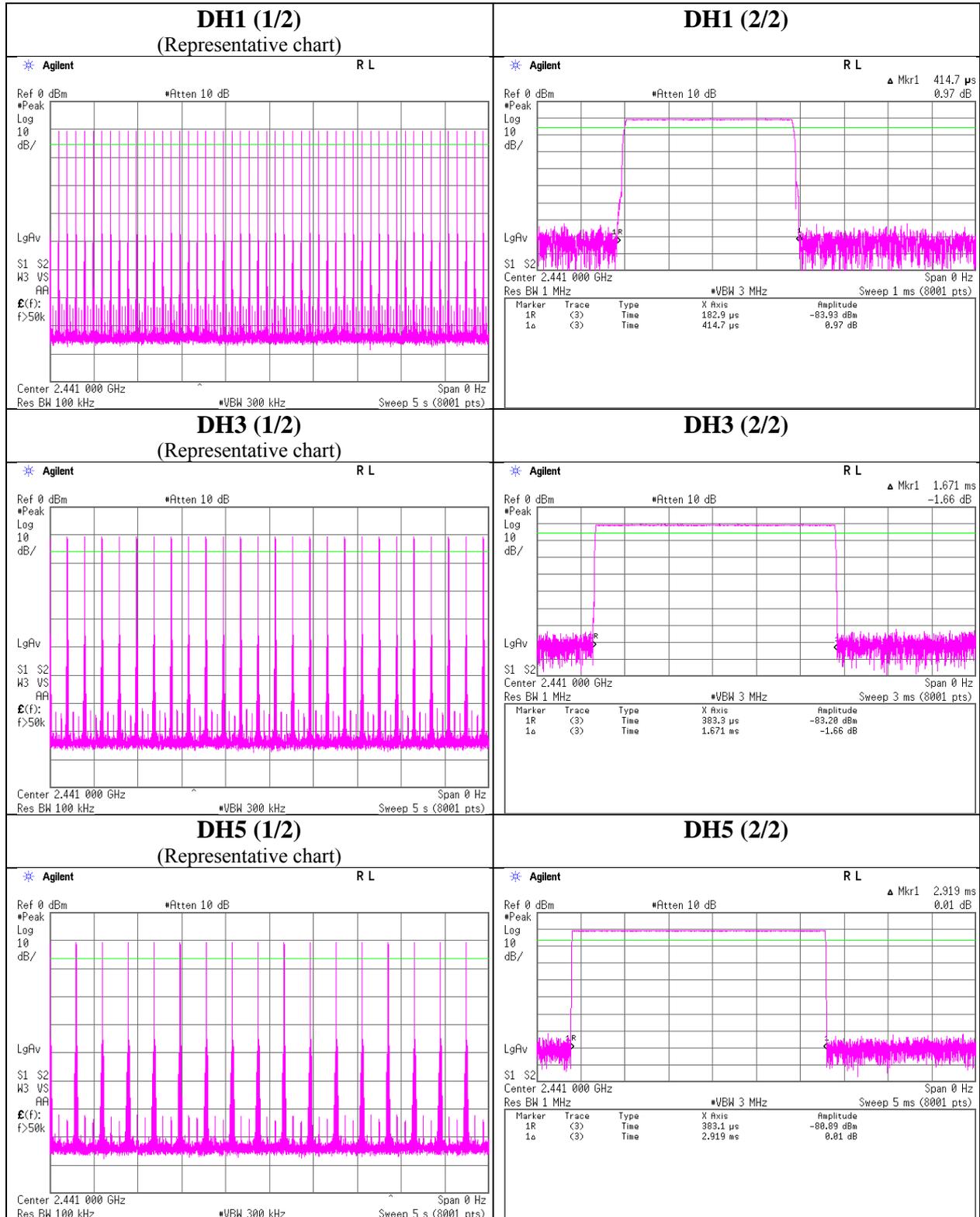
Sample Calculation

Result = Number of transmission x Length of transmission

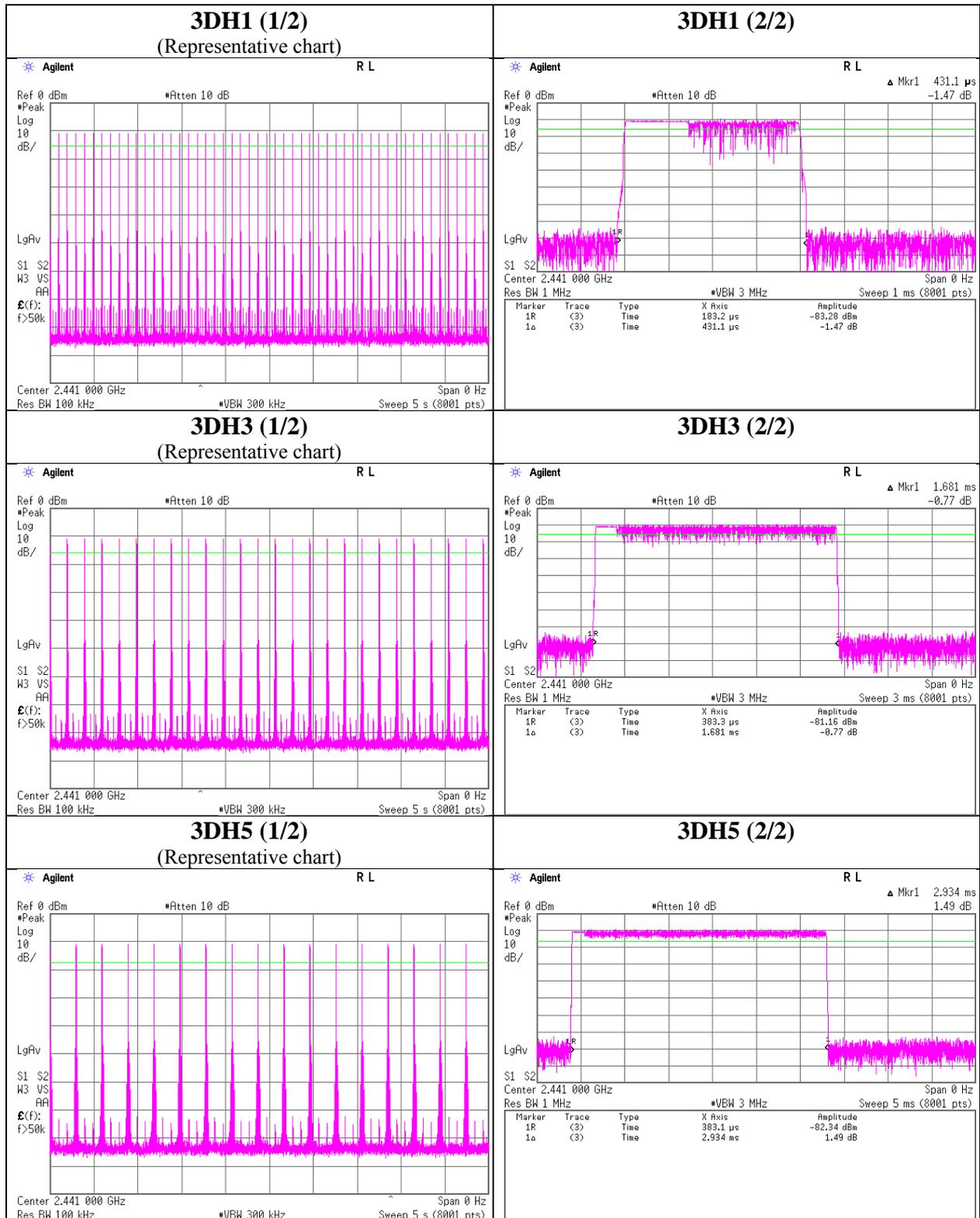
This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in  $N \times 0.4s$ , where  $N$  is the number of channels being used in the hopping sequence ( $20 \leq N \leq 79$ ), is always less than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



### Dwell time



### Dwell time



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## Maximum Peak Output Power

Test place : Shonan EMC Lab. No.1 Measurement Room  
Report No. : 10910945S-E  
Date : August 19, 2015  
Temperature / Humidity : 25 deg. C / 54 % RH  
Engineer : Shinichi Takano  
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	-11.16	1.22	9.63	-0.31	0.93	20.96	125	21.27
DH5	2441.0	-10.42	1.22	9.63	0.43	1.10	20.96	125	20.53
DH5	2480.0	-10.62	1.23	9.63	0.24	1.06	20.96	125	20.72
2DH5	2402.0	-10.05	1.22	9.63	0.80	1.20	20.96	125	20.16
2DH5	2441.0	-9.41	1.22	9.63	1.44	1.39	20.96	125	19.52
2DH5	2480.0	-9.58	1.23	9.63	1.28	1.34	20.96	125	19.68
3DH5	2402.0	-9.55	1.22	9.63	1.30	1.35	20.96	125	19.66
3DH5	2441.0	-9.06	1.22	9.63	1.79	1.51	20.96	125	19.17
3DH5	2480.0	-9.15	1.23	9.63	1.71	1.48	20.96	125	19.25
Inquiry	2441.0	-9.97	1.22	9.63	0.88	1.22	20.96	125	20.08

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 for RF Exposure)**

Test place : Shonan EMC Lab. No.1 Measurement Room  
Report No. : 10910945S-E  
Date : August 19, 2015  
Temperature / Humidity : 25 deg. C / 54 % RH  
Engineer : Shinichi Takano  
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	-12.79	1.22	9.63	-1.94	0.64	1.09	-0.85	0.82
DH5	2441.0	-12.04	1.22	9.63	-1.19	0.76	1.09	-0.10	0.98
DH5	2480.0	-12.26	1.23	9.63	-1.40	0.72	1.09	-0.31	0.93
2DH5	2402.0	-13.74	1.22	9.63	-2.89	0.51	1.07	-1.82	0.66
2DH5	2441.0	-13.20	1.22	9.63	-2.35	0.58	1.07	-1.28	0.74
2DH5	2480.0	-13.28	1.23	9.63	-2.42	0.57	1.07	-1.35	0.73
3DH5	2402.0	-13.73	1.22	9.63	-2.88	0.52	1.07	-1.81	0.66
3DH5	2441.0	-13.18	1.22	9.63	-2.33	0.58	1.07	-1.26	0.75
3DH5	2480.0	-13.27	1.23	9.63	-2.41	0.57	1.07	-1.34	0.73

Sample Calculation:

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

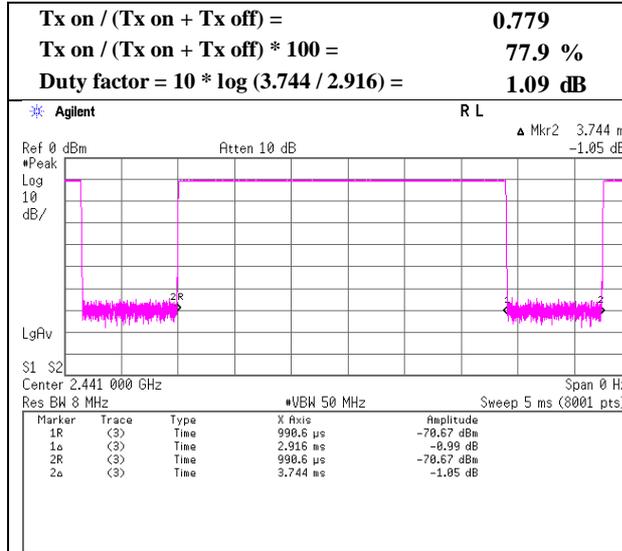
Result (Burst power) = Frame power + Duty factor

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

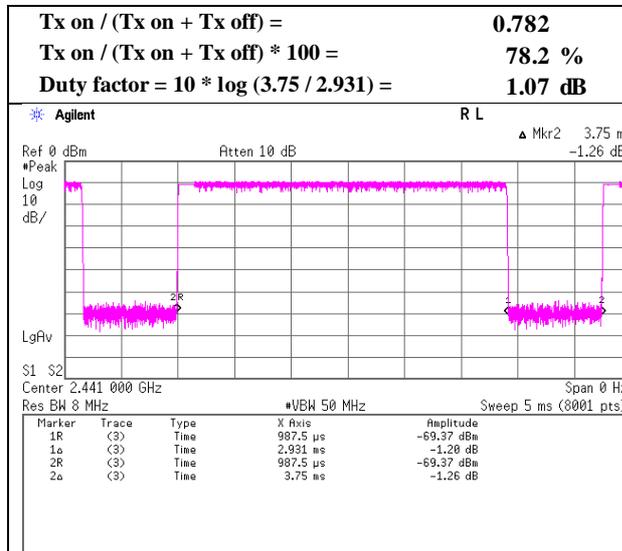
## Burst Rate Confirmation

Test place	Shonan EMC Lab. No.1 Measurement Room
Report No.	10910945S-E
Date	August 19, 2015
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Shinichi Takano
Mode	Tx, Hopping Off

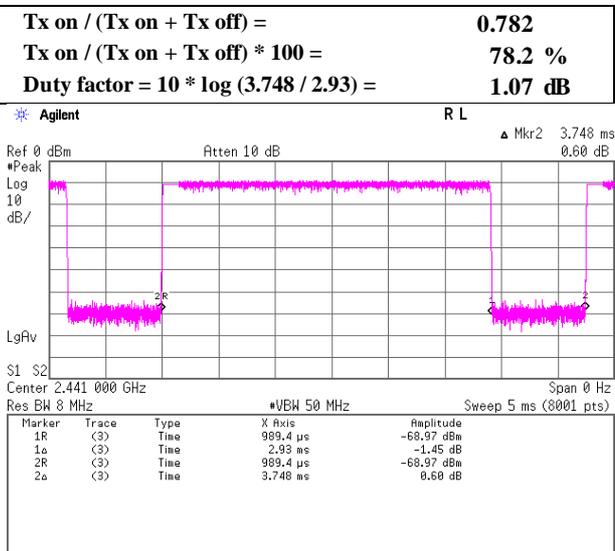
### DH5



### 2DH5



### 3DH5



## Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. : 10910945S-E  
Date : August 23, 2015      August 24, 2015  
Temperature / Humidity : 23 deg. C / 56 % RH      27 deg. C / 56 % RH  
Engineer : Kenichi Adachi      Shinichi Takano  
            (1 GHz-18 GHz)      (30 MHz-1 GHz, 18 GHz-25 GHz)  
Mode : Tx, Hopping Off, DH5 2402 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	63.076	QP	41.9	7.3	6.7	32.1	0.0	23.8	40.0	16.2	315	63	
Hori.	96.000	QP	42.4	9.3	7.6	32.1	0.0	27.2	43.5	16.3	291	97	
Hori.	120.000	QP	37.9	12.9	7.4	32.1	0.0	26.1	43.5	17.4	308	333	
Hori.	144.000	QP	27.9	14.5	7.8	32.1	0.0	18.1	43.5	25.4	236	235	
Hori.	320.000	QP	33.7	14.5	8.8	31.9	0.0	25.1	46.0	20.9	104	71	
Hori.	2390.000	PK	45.8	27.2	13.7	41.0	2.1	47.8	73.9	26.1	148	355	
Hori.	4804.000	PK	47.9	32.0	5.7	39.6	2.1	48.1	73.9	25.8	131	182	
Hori.	7206.000	PK	45.8	36.2	7.1	40.1	2.1	51.1	73.9	22.8	100	0	
Hori.	9608.000	PK	43.9	38.4	8.2	39.6	2.1	53.0	73.9	20.9	100	0	
Hori.	12010.000	PK	45.3	40.8	9.3	39.3	2.1	58.2	73.9	15.7	100	0	
Hori.	2390.000	AV	34.1	27.2	13.7	41.0	2.1	36.1	53.9	17.8	148	355	
Hori.	4804.000	AV	37.6	32.0	5.7	39.6	2.1	37.8	53.9	16.1	131	182	
Hori.	7206.000	AV	33.8	36.2	7.1	40.1	2.1	39.1	53.9	14.8	100	0	
Hori.	9608.000	AV	32.3	38.4	8.2	39.6	2.1	41.4	53.9	12.5	100	0	
Hori.	12010.000	AV	32.9	40.8	9.3	39.3	2.1	45.8	53.9	8.1	100	0	
Vert.	48.000	QP	32.1	11.4	6.9	32.1	0.0	18.3	40.0	21.7	100	150	
Vert.	60.000	QP	32.9	7.7	6.7	32.1	0.0	15.2	40.0	24.8	102	257	
Vert.	63.154	QP	37.3	7.3	6.7	32.1	0.0	19.2	40.0	20.8	100	301	
Vert.	320.000	QP	29.2	14.5	8.8	31.9	0.0	20.6	46.0	25.4	100	92	
Vert.	2390.000	PK	45.8	27.2	13.7	41.0	2.1	47.8	73.9	26.1	100	2	
Vert.	4804.000	PK	48.4	32.0	5.7	39.6	2.1	48.6	73.9	25.3	100	291	
Vert.	7206.000	PK	45.7	36.2	7.1	40.1	2.1	51.0	73.9	22.9	100	0	
Vert.	9608.000	PK	44.0	38.4	8.2	39.6	2.1	53.1	73.9	20.8	100	0	
Vert.	12010.000	PK	45.4	40.8	9.3	39.3	2.1	58.3	73.9	15.6	100	0	
Vert.	2390.000	AV	34.2	27.2	13.7	41.0	2.1	36.2	53.9	17.7	100	2	
Vert.	4804.000	AV	38.9	32.0	5.7	39.6	2.1	39.1	53.9	14.8	100	291	
Vert.	7206.000	AV	33.7	36.2	7.1	40.1	2.1	39.0	53.9	14.9	100	0	
Vert.	9608.000	AV	32.4	38.4	8.2	39.6	2.1	41.5	53.9	12.4	100	0	
Vert.	12010.000	AV	33.0	40.8	9.3	39.3	2.1	45.9	53.9	8.0	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor  
Distance factor : 1 GHz - 15 GHz : 20log(3.8 m / 3.0 m) = 2.1 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	78.1	27.2	13.7	41.0	2.1	80.1	-	-	Carrier
Hori.	2400.000	PK	37.8	27.2	13.7	41.0	2.1	39.8	60.1	20.3	
Vert.	2402.000	PK	82.9	27.2	13.7	41.0	2.1	84.9	-	-	Carrier
Vert.	2400.000	PK	38.6	27.2	13.7	41.0	2.1	40.6	64.9	24.3	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor  
Distance factor : 1 GHz - 15 GHz : 20log(3.8 m / 3.0 m) = 2.1 dB

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**Shonan EMC Lab.**

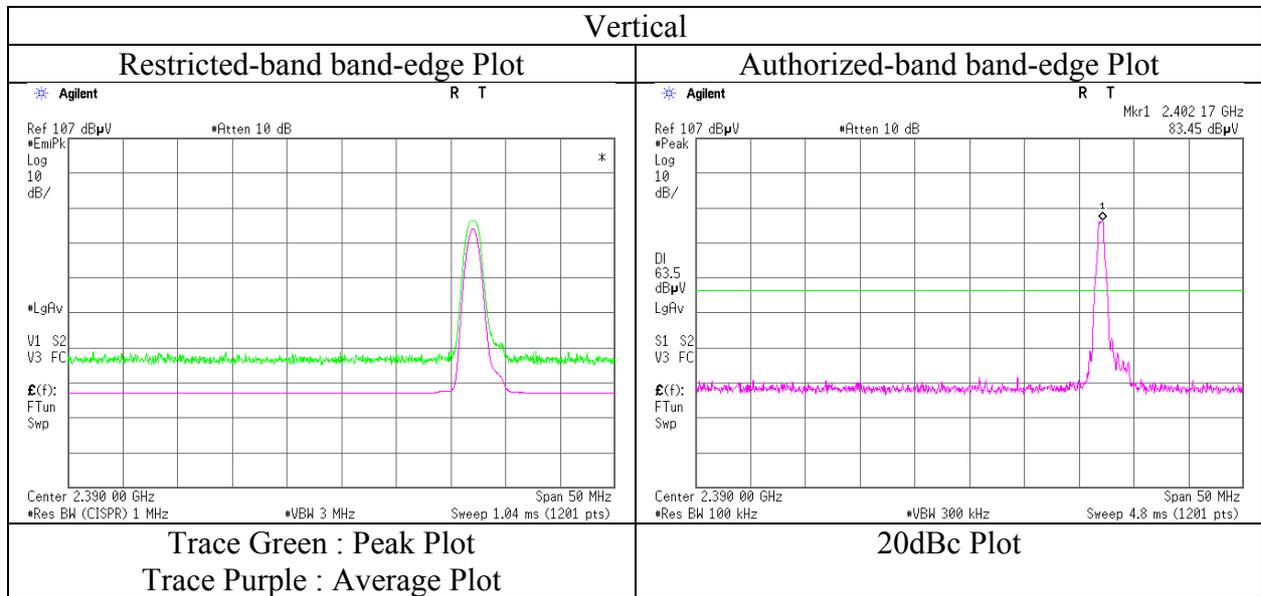
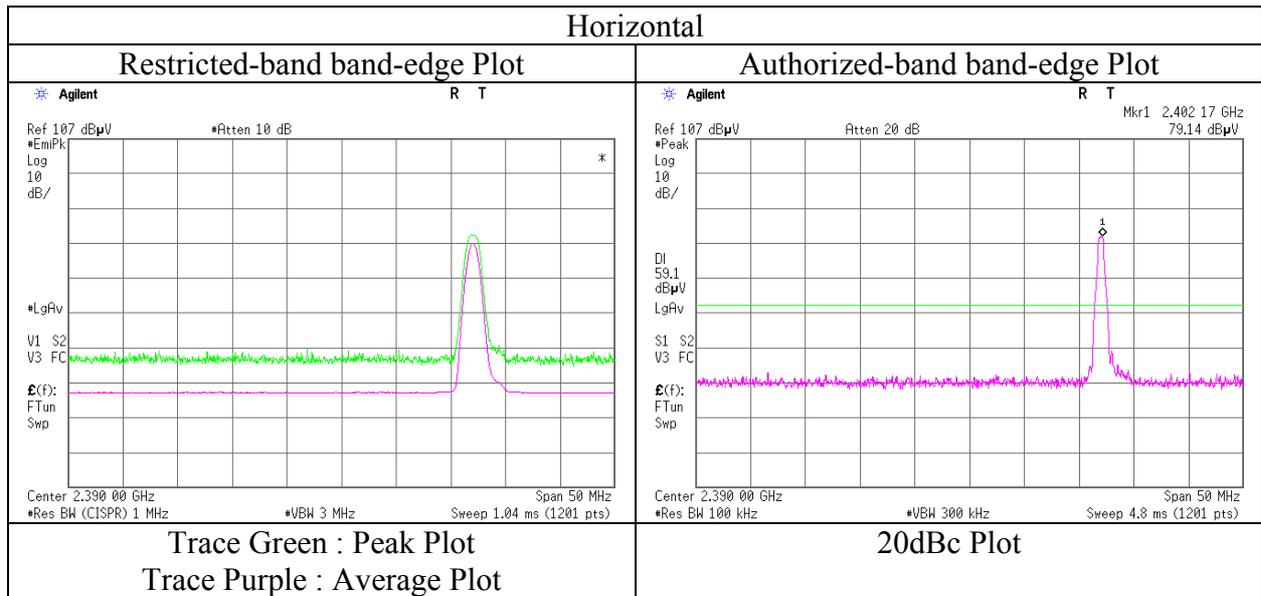
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

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

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
 Report No. : 10910945S-E  
 Date : August 23, 2015  
 Temperature / Humidity : 23 deg. C / 56 % RH  
 Engineer : Kenichi Adachi  
 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. : 10910945S-E  
Date : August 23, 2015      August 24, 2015  
Temperature / Humidity : 23 deg. C / 56 % RH      27 deg. C / 56 % RH  
Engineer : Kenichi Adachi      Shinichi Takano  
            (1 GHz-18 GHz)      (30 MHz-1 GHz, 18 GHz-25 GHz)  
Mode : Tx, Hopping Off, DH5 2441 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	63.014	QP	40.9	7.3	6.7	32.1	0.0	22.8	40.0	17.2	387	62	
Hori.	96.000	QP	42.2	9.3	7.6	32.1	0.0	27.0	43.5	16.5	316	95	
Hori.	120.000	QP	37.4	12.9	7.4	32.1	0.0	25.6	43.5	17.9	309	336	
Hori.	320.000	QP	32.5	14.5	8.8	31.9	0.0	23.9	46.0	22.1	146	23	
Hori.	4882.000	PK	46.2	32.2	5.8	39.5	2.1	46.8	73.9	27.1	129	181	
Hori.	7323.000	PK	44.4	36.3	7.2	40.2	2.1	49.8	73.9	24.1	100	0	
Hori.	9764.000	PK	43.5	38.3	8.2	39.5	2.1	52.6	73.9	21.3	100	0	
Hori.	12205.000	PK	43.7	40.7	9.4	39.4	2.1	56.5	73.9	17.4	100	0	
Hori.	4882.000	AV	35.9	32.2	5.8	39.5	2.1	36.5	53.9	17.4	129	181	
Hori.	7323.000	AV	33.1	36.3	7.2	40.2	2.1	38.5	53.9	15.4	100	0	
Hori.	9764.000	AV	32.0	38.3	8.2	39.5	2.1	41.1	53.9	12.8	100	0	
Hori.	12205.000	AV	32.6	40.7	9.4	39.4	2.1	45.4	53.9	8.5	100	0	
Vert.	48.000	QP	31.9	11.4	6.9	32.1	0.0	18.1	40.0	21.9	100	130	
Vert.	63.126	QP	37.1	7.3	6.7	32.1	0.0	19.0	40.0	21.0	100	278	
Vert.	96.000	QP	38.7	9.3	7.6	32.1	0.0	23.5	43.5	20.0	100	52	
Vert.	144.000	QP	27.6	14.5	7.8	32.1	0.0	17.8	43.5	25.7	100	136	
Vert.	320.000	QP	28.6	14.5	8.8	31.9	0.0	20.0	46.0	26.0	197	190	
Vert.	4882.000	PK	47.1	32.2	5.8	39.5	2.1	47.7	73.9	26.2	100	293	
Vert.	7323.000	PK	44.3	36.3	7.2	40.2	2.1	49.7	73.9	24.2	100	0	
Vert.	9764.000	PK	43.5	38.3	8.2	39.5	2.1	52.6	73.9	21.3	100	0	
Vert.	12205.000	PK	43.8	40.7	9.4	39.4	2.1	56.6	73.9	17.3	100	0	
Vert.	4882.000	AV	37.6	32.2	5.8	39.5	2.1	38.2	53.9	15.7	100	293	
Vert.	7323.000	AV	33.0	36.3	7.2	40.2	2.1	38.4	53.9	15.5	100	0	
Vert.	9764.000	AV	32.1	38.3	8.2	39.5	2.1	41.2	53.9	12.7	100	0	
Vert.	12205.000	AV	32.7	40.7	9.4	39.4	2.1	45.5	53.9	8.4	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor  
Distance factor : 1 GHz - 15 GHz : 20log(3.8 m / 3.0 m) = 2.1 dB

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**Shonan EMC Lab.**

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## Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. : 10910945S-E  
Date : August 23, 2015      August 24, 2015  
Temperature / Humidity : 23 deg. C / 56 % RH      27 deg. C / 56 % RH  
Engineer : Kenichi Adachi      Shinichi Takano  
            (1 GHz-18 GHz)      (30 MHz-1 GHz, 18 GHz-25 GHz)  
Mode : Tx, Hopping Off, DH5 2480 MHz

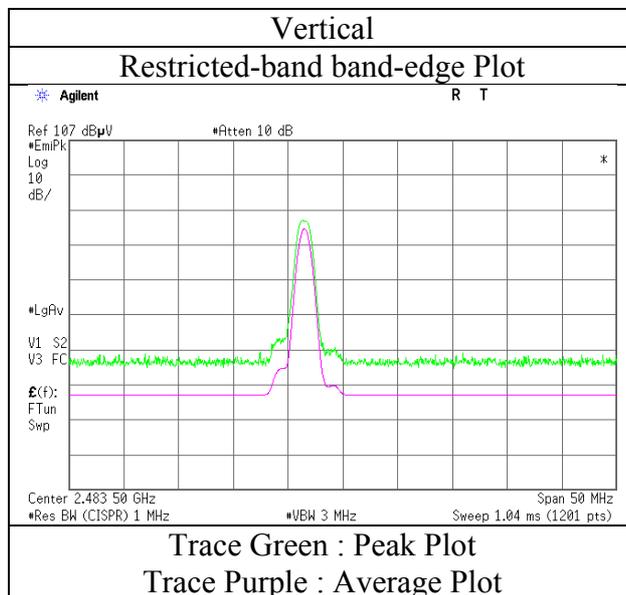
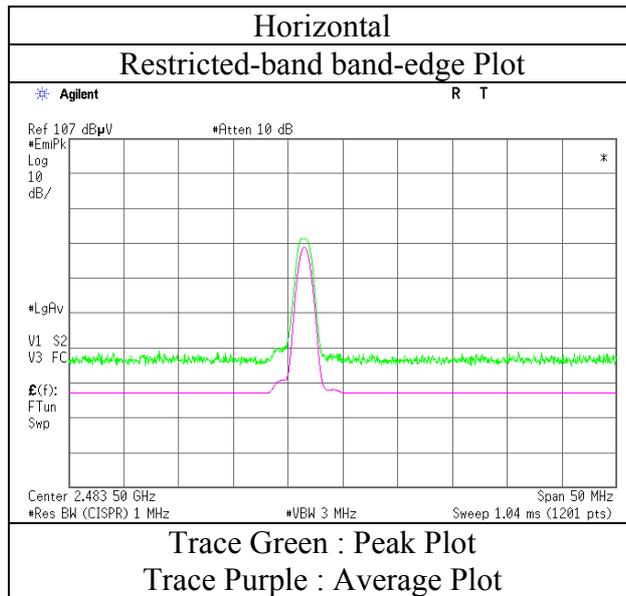
(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	63.084	QP	42.0	7.3	6.7	32.1	0.0	23.9	40.0	16.1	336	56	
Hori.	96.000	QP	42.2	9.3	7.6	32.1	0.0	27.0	43.5	16.5	289	100	
Hori.	108.000	QP	35.9	11.2	7.4	32.1	0.0	22.4	43.5	21.1	292	349	
Hori.	120.000	QP	37.9	12.9	7.4	32.1	0.0	26.1	43.5	17.4	296	332	
Hori.	144.000	QP	27.3	14.5	7.8	32.1	0.0	17.5	43.5	26.0	219	92	
Hori.	320.000	QP	31.7	14.5	8.8	31.9	0.0	23.1	46.0	22.9	171	78	
Hori.	2483.500	PK	46.0	27.3	13.7	41.0	2.1	48.1	73.9	25.8	149	355	
Hori.	4960.000	PK	47.1	32.4	5.8	39.4	2.1	48.0	73.9	25.9	130	180	
Hori.	7440.000	PK	44.9	36.3	7.2	40.4	2.1	50.1	73.9	23.8	100	0	
Hori.	9920.000	PK	43.9	38.3	8.2	39.4	2.1	53.1	73.9	20.8	100	0	
Hori.	12400.000	PK	45.2	40.6	9.6	39.6	2.1	57.9	73.9	16.0	100	0	
Hori.	2483.500	AV	33.9	27.3	13.7	41.0	2.1	36.0	53.9	17.9	149	355	
Hori.	4960.000	AV	36.2	32.4	5.8	39.4	2.1	37.1	53.9	16.8	130	180	
Hori.	7440.000	AV	33.8	36.3	7.2	40.4	2.1	39.0	53.9	14.9	100	0	
Hori.	9920.000	AV	31.9	38.3	8.2	39.4	2.1	41.1	53.9	12.8	100	0	
Hori.	12400.000	AV	32.8	40.6	9.6	39.6	2.1	45.5	53.9	8.4	100	0	
Vert.	48.000	QP	31.7	11.4	6.9	32.1	0.0	17.9	40.0	22.1	100	138	
Vert.	62.889	QP	36.2	7.3	6.7	32.1	0.0	18.1	40.0	21.9	100	286	
Vert.	96.000	QP	39.5	9.3	7.6	32.1	0.0	24.3	43.5	19.2	137	158	
Vert.	120.000	QP	31.7	12.9	7.4	32.1	0.0	19.9	43.5	23.6	100	248	
Vert.	320.000	QP	29.1	14.5	8.8	31.9	0.0	20.5	46.0	25.5	185	185	
Vert.	2483.500	PK	46.1	27.3	13.7	41.0	2.1	48.2	73.9	25.7	100	1	
Vert.	4960.000	PK	46.8	32.4	5.8	39.4	2.1	47.7	73.9	26.2	100	297	
Vert.	7440.000	PK	44.8	36.3	7.2	40.4	2.1	50.0	73.9	23.9	100	0	
Vert.	9920.000	PK	43.8	38.3	8.2	39.4	2.1	53.0	73.9	20.9	100	0	
Vert.	12400.000	PK	45.3	40.6	9.6	39.6	2.1	58.0	73.9	15.9	100	0	
Vert.	2483.500	AV	34.1	27.3	13.7	41.0	2.1	36.2	53.9	17.7	100	1	
Vert.	4960.000	AV	36.6	32.4	5.8	39.4	2.1	37.5	53.9	16.4	100	297	
Vert.	7440.000	AV	33.7	36.3	7.2	40.4	2.1	38.9	53.9	15.0	100	0	
Vert.	9920.000	AV	31.8	38.3	8.2	39.4	2.1	41.0	53.9	12.9	100	0	
Vert.	12400.000	AV	32.9	40.6	9.6	39.6	2.1	45.6	53.9	8.3	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor  
Distance factor : 1 GHz - 15 GHz : 20log(3.8 m / 3.0 m) = 2.1 dB

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

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Date : August 23, 2015  
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Engineer : Kenichi Adachi  
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. : 10910945S-E  
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Temperature / Humidity : 23 deg. C / 56 % RH      27 deg. C / 56 % RH  
Engineer : Kenichi Adachi      Shinichi Takano  
            (1 GHz-18 GHz)      (30 MHz-1 GHz, 18 GHz-25 GHz)  
Mode : Tx, Hopping Off, 3DH5 2402 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	60.000	QP	36.7	7.7	6.7	32.1	0.0	19.0	40.0	21.0	360	237	
Hori.	63.157	QP	42.5	7.3	6.7	32.1	0.0	24.4	40.0	15.6	358	72	
Hori.	96.000	QP	42.2	9.3	7.6	32.1	0.0	27.0	43.5	16.5	280	99	
Hori.	108.000	QP	36.6	11.2	7.4	32.1	0.0	23.1	43.5	20.4	287	354	
Hori.	144.000	QP	26.4	14.5	7.8	32.1	0.0	16.6	43.5	26.9	232	205	
Hori.	384.000	QP	36.2	16.1	9.1	31.9	0.0	29.5	46.0	16.5	100	181	
Hori.	2390.000	PK	45.5	27.2	13.7	41.0	2.1	47.5	73.9	26.4	147	357	
Hori.	4804.000	PK	45.6	32.0	5.7	39.6	2.1	45.8	73.9	28.1	132	181	
Hori.	7206.000	PK	45.8	36.2	7.1	40.1	2.1	51.1	73.9	22.8	100	0	
Hori.	9608.000	PK	44.0	38.4	8.2	39.6	2.1	53.1	73.9	20.8	100	0	
Hori.	12010.000	PK	45.4	40.8	9.3	39.3	2.1	58.3	73.9	15.6	100	0	
Hori.	2390.000	AV	33.7	27.2	13.7	41.0	2.1	35.7	53.9	18.2	147	357	
Hori.	4804.000	AV	34.1	32.0	5.7	39.6	2.1	34.3	53.9	19.6	132	181	
Hori.	7206.000	AV	33.7	36.2	7.1	40.1	2.1	39.0	53.9	14.9	100	0	
Hori.	9608.000	AV	32.4	38.4	8.2	39.6	2.1	41.5	53.9	12.4	100	0	
Hori.	12010.000	AV	33.0	40.8	9.3	39.3	2.1	45.9	53.9	8.0	100	0	
Vert.	48.000	QP	31.8	11.4	6.9	32.1	0.0	18.0	40.0	22.0	100	118	
Vert.	63.220	QP	37.1	7.3	6.7	32.1	0.0	19.0	40.0	21.0	100	280	
Vert.	96.000	QP	39.0	9.3	7.6	32.1	0.0	23.8	43.5	19.7	100	48	
Vert.	108.000	QP	33.5	11.2	7.4	32.1	0.0	20.0	43.5	23.5	100	234	
Vert.	384.000	QP	33.5	16.1	9.1	31.9	0.0	26.8	46.0	19.2	100	208	
Vert.	2390.000	PK	45.5	27.2	13.7	41.0	2.1	47.5	73.9	26.4	100	2	
Vert.	4804.000	PK	45.7	32.0	5.7	39.6	2.1	45.9	73.9	28.0	100	296	
Vert.	7206.000	PK	45.9	36.2	7.1	40.1	2.1	51.2	73.9	22.7	100	0	
Vert.	9608.000	PK	43.9	38.4	8.2	39.6	2.1	53.0	73.9	20.9	100	0	
Vert.	12010.000	PK	45.3	40.8	9.3	39.3	2.1	58.2	73.9	15.7	100	0	
Vert.	2390.000	AV	33.8	27.2	13.7	41.0	2.1	35.8	53.9	18.1	100	2	
Vert.	4804.000	AV	34.4	32.0	5.7	39.6	2.1	34.6	53.9	19.3	100	296	
Vert.	7206.000	AV	33.8	36.2	7.1	40.1	2.1	39.1	53.9	14.8	100	0	
Vert.	9608.000	AV	32.3	38.4	8.2	39.6	2.1	41.4	53.9	12.5	100	0	
Vert.	12010.000	AV	32.9	40.8	9.3	39.3	2.1	45.8	53.9	8.1	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor  
Distance factor : 1 GHz - 15 GHz : 20log(3.8 m / 3.0 m) = 2.1 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	80.6	27.2	13.7	41.0	2.1	82.6	-	-	Carrier
Hori.	2400.000	PK	38.2	27.2	13.7	41.0	2.1	40.2	62.6	22.4	
Vert.	2402.000	PK	85.2	27.2	13.7	41.0	2.1	87.2	-	-	Carrier
Vert.	2400.000	PK	38.4	27.2	13.7	41.0	2.1	40.4	67.2	26.8	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor  
Distance factor : 1 GHz - 15 GHz : 20log(3.8 m / 3.0 m) = 2.1 dB

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**Shonan EMC Lab.**

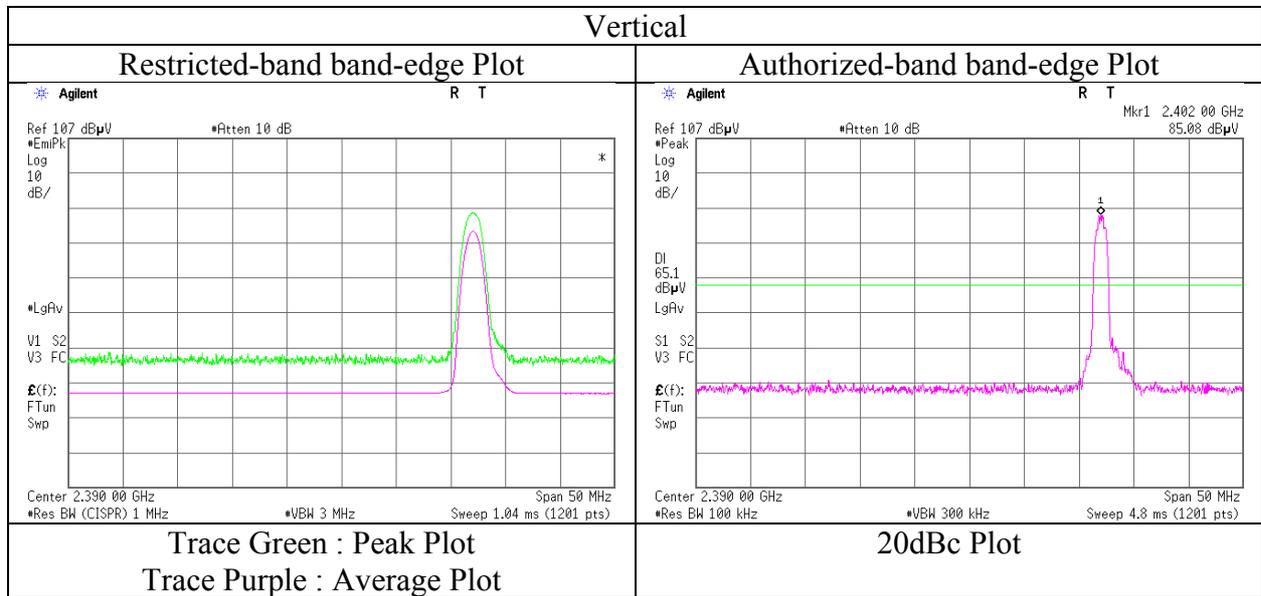
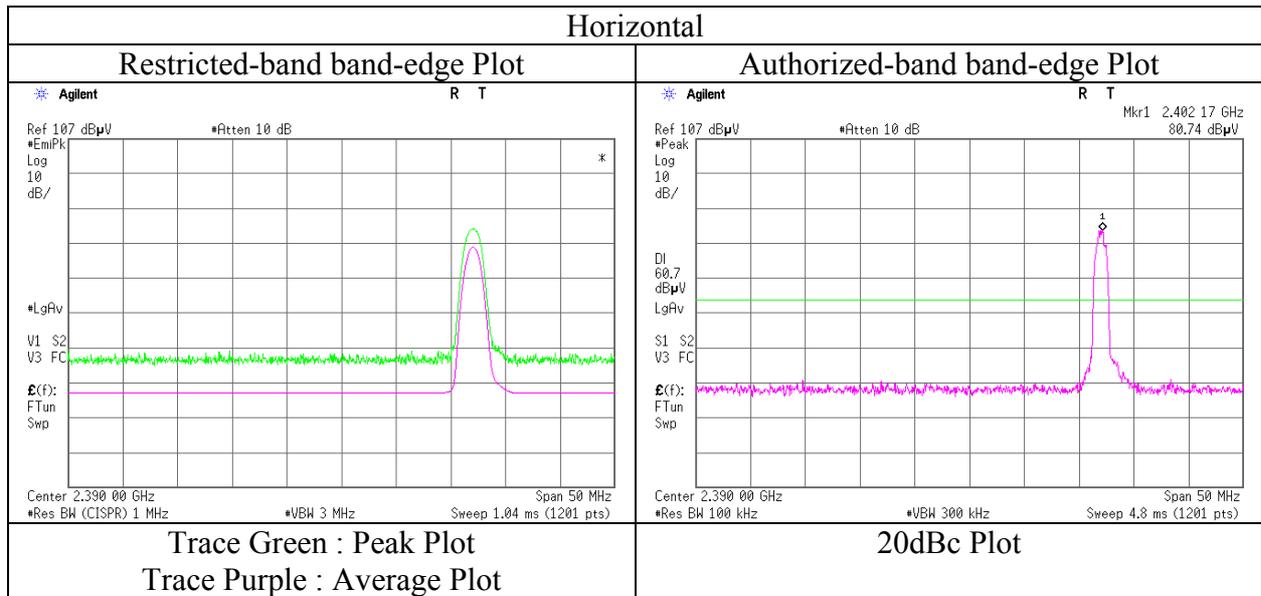
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## Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10910945S-E
Date	August 23, 2015
Temperature / Humidity	23 deg. C / 56 % RH
Engineer	Kenichi Adachi
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. : 10910945S-E  
Date : August 23, 2015      August 24, 2015  
Temperature / Humidity : 23 deg. C / 56 % RH      27 deg. C / 56 % RH  
Engineer : Kenichi Adachi      Shinichi Takano  
            (1 GHz-18 GHz)      (30 MHz-1 GHz, 18 GHz-25 GHz)  
Mode : Tx, Hopping Off, 3DH5 2441 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	60.000	QP	37.5	7.7	6.7	32.1	0.0	19.8	40.0	20.2	378	225	
Hori.	62.786	QP	42.8	7.3	6.7	32.1	0.0	24.7	40.0	15.3	373	58	
Hori.	96.000	QP	41.9	9.3	7.6	32.1	0.0	26.7	43.5	16.8	336	92	
Hori.	108.000	QP	36.3	11.2	7.4	32.1	0.0	22.8	43.5	20.7	287	351	
Hori.	120.000	QP	36.9	12.9	7.4	32.1	0.0	25.1	43.5	18.4	275	337	
Hori.	384.003	QP	35.4	16.1	9.1	31.9	0.0	28.7	46.0	17.3	100	200	
Hori.	4882.000	PK	45.8	32.2	5.8	39.5	2.1	46.4	73.9	27.5	131	179	
Hori.	7323.000	PK	44.3	36.3	7.2	40.2	2.1	49.7	73.9	24.2	100	0	
Hori.	9764.000	PK	43.6	38.3	8.2	39.5	2.1	52.7	73.9	21.2	100	0	
Hori.	12205.000	PK	43.8	40.7	9.4	39.4	2.1	56.6	73.9	17.3	100	0	
Hori.	4882.000	AV	34.5	32.2	5.8	39.5	2.1	35.1	53.9	18.8	131	179	
Hori.	7323.000	AV	33.0	36.3	7.2	40.2	2.1	38.4	53.9	15.5	100	0	
Hori.	9764.000	AV	32.1	38.3	8.2	39.5	2.1	41.2	53.9	12.7	100	0	
Hori.	12205.000	AV	32.7	40.7	9.4	39.4	2.1	45.5	53.9	8.4	100	0	
Vert.	48.000	QP	31.7	11.4	6.9	32.1	0.0	17.9	40.0	22.1	100	109	
Vert.	60.000	QP	32.6	7.7	6.7	32.1	0.0	14.9	40.0	25.1	100	259	
Vert.	62.804	QP	39.0	7.3	6.7	32.1	0.0	20.9	40.0	19.1	100	269	
Vert.	108.000	QP	33.5	11.2	7.4	32.1	0.0	20.0	43.5	23.5	100	231	
Vert.	384.003	QP	33.7	16.1	9.1	31.9	0.0	27.0	46.0	19.0	100	214	
Vert.	4882.000	PK	46.9	32.2	5.8	39.5	2.1	47.5	73.9	26.4	100	298	
Vert.	7323.000	PK	44.4	36.3	7.2	40.2	2.1	49.8	73.9	24.1	100	0	
Vert.	9764.000	PK	43.5	38.3	8.2	39.5	2.1	52.6	73.9	21.3	100	0	
Vert.	12205.000	PK	43.7	40.7	9.4	39.4	2.1	56.5	73.9	17.4	100	0	
Vert.	4882.000	AV	35.3	32.2	5.8	39.5	2.1	35.9	53.9	18.0	100	298	
Vert.	7323.000	AV	33.1	36.3	7.2	40.2	2.1	38.5	53.9	15.4	100	0	
Vert.	9764.000	AV	32.0	38.3	8.2	39.5	2.1	41.1	53.9	12.8	100	0	
Vert.	12205.000	AV	32.6	40.7	9.4	39.4	2.1	45.4	53.9	8.5	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor  
Distance factor : 1 GHz - 15 GHz : 20log(3.8 m / 3.0 m) = 2.1 dB

## Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. : 10910945S-E  
Date : August 23, 2015      August 24, 2015  
Temperature / Humidity : 23 deg. C / 56 % RH      27 deg. C / 56 % RH  
Engineer : Kenichi Adachi      Shinichi Takano  
            (1 GHz-18 GHz)      (30 MHz-1 GHz, 18 GHz-25 GHz)  
Mode : Tx, Hopping Off, 3DH5 2480 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	60.000	QP	36.9	7.7	6.7	32.1	0.0	19.2	40.0	20.8	362	227	
Hori.	62.955	QP	40.4	7.3	6.7	32.1	0.0	22.3	40.0	17.7	356	74	
Hori.	96.000	QP	42.3	9.3	7.6	32.1	0.0	27.1	43.5	16.4	258	99	
Hori.	108.000	QP	36.4	11.2	7.4	32.1	0.0	22.9	43.5	20.6	289	346	
Hori.	120.000	QP	36.6	12.9	7.4	32.1	0.0	24.8	43.5	18.7	274	328	
Hori.	384.000	QP	34.6	16.1	9.1	31.9	0.0	27.9	46.0	18.1	100	191	
Hori.	2483.500	PK	46.5	27.3	13.7	41.0	2.1	48.6	73.9	25.3	149	354	
Hori.	4960.000	PK	46.1	32.4	5.8	39.4	2.1	47.0	73.9	26.9	133	183	
Hori.	7440.000	PK	44.8	36.3	7.2	40.4	2.1	50.0	73.9	23.9	100	0	
Hori.	9920.000	PK	43.8	38.3	8.2	39.4	2.1	53.0	73.9	20.9	100	0	
Hori.	12400.000	PK	45.3	40.6	9.6	39.6	2.1	58.0	73.9	15.9	100	0	
Hori.	2483.500	AV	33.7	27.3	13.7	41.0	2.1	35.8	53.9	18.1	149	354	
Hori.	4960.000	AV	34.6	32.4	5.8	39.4	2.1	35.5	53.9	18.4	133	183	
Hori.	7440.000	AV	33.7	36.3	7.2	40.4	2.1	38.9	53.9	15.0	100	0	
Hori.	9920.000	AV	31.8	38.3	8.2	39.4	2.1	41.0	53.9	12.9	100	0	
Hori.	12400.000	AV	32.9	40.6	9.6	39.6	2.1	45.6	53.9	8.3	100	0	
Vert.	48.000	QP	31.5	11.4	6.9	32.1	0.0	17.7	40.0	22.3	100	125	
Vert.	62.877	QP	38.1	7.3	6.7	32.1	0.0	20.0	40.0	20.0	100	290	
Vert.	96.000	QP	38.8	9.3	7.6	32.1	0.0	23.6	43.5	19.9	120	39	
Vert.	108.000	QP	33.6	11.2	7.4	32.1	0.0	20.1	43.5	23.4	100	233	
Vert.	384.000	QP	33.7	16.1	9.1	31.9	0.0	27.0	46.0	19.0	107	227	
Vert.	2483.500	PK	46.5	27.3	13.7	41.0	2.1	48.6	73.9	25.3	100	2	
Vert.	4960.000	PK	46.5	32.4	5.8	39.4	2.1	47.4	73.9	26.5	100	297	
Vert.	7440.000	PK	44.9	36.3	7.2	40.4	2.1	50.1	73.9	23.8	100	0	
Vert.	9920.000	PK	43.9	38.3	8.2	39.4	2.1	53.1	73.9	20.8	100	0	
Vert.	12400.000	PK	45.2	40.6	9.6	39.6	2.1	57.9	73.9	16.0	100	0	
Vert.	2483.500	AV	33.9	27.3	13.7	41.0	2.1	36.0	53.9	17.9	100	2	
Vert.	4960.000	AV	34.7	32.4	5.8	39.4	2.1	35.6	53.9	18.3	100	297	
Vert.	7440.000	AV	33.8	36.3	7.2	40.4	2.1	39.0	53.9	14.9	100	0	
Vert.	9920.000	AV	31.9	38.3	8.2	39.4	2.1	41.1	53.9	12.8	100	0	
Vert.	12400.000	AV	32.8	40.6	9.6	39.6	2.1	45.5	53.9	8.4	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor  
Distance factor : 1 GHz - 15 GHz : 20log(3.8 m / 3.0 m) = 2.1 dB

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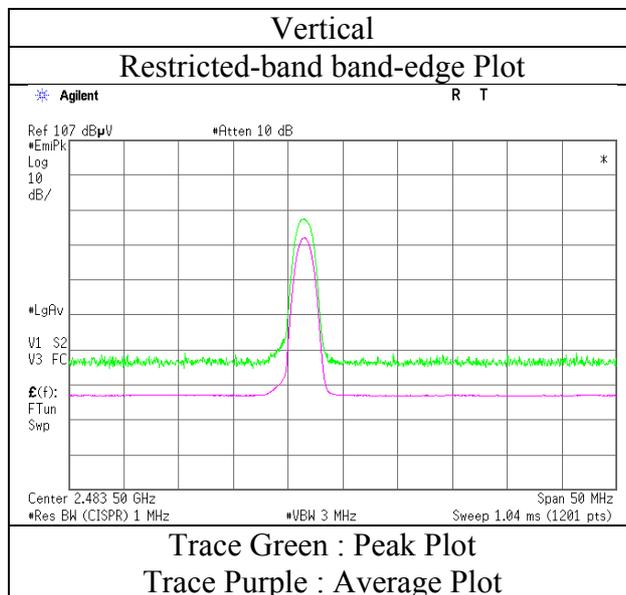
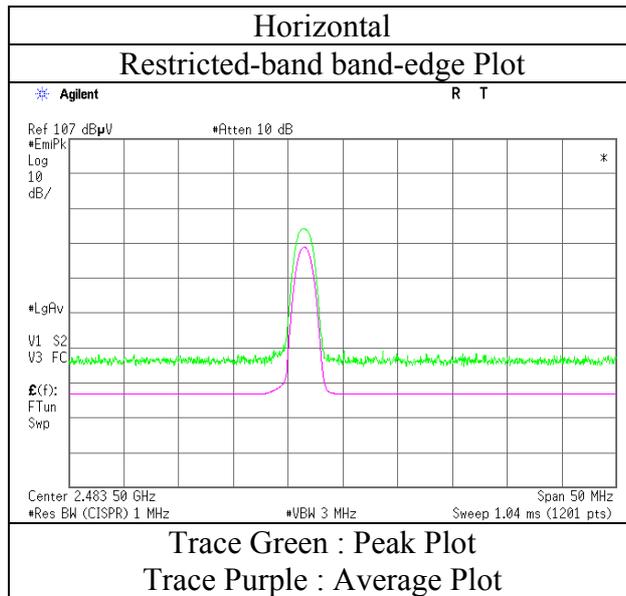
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**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

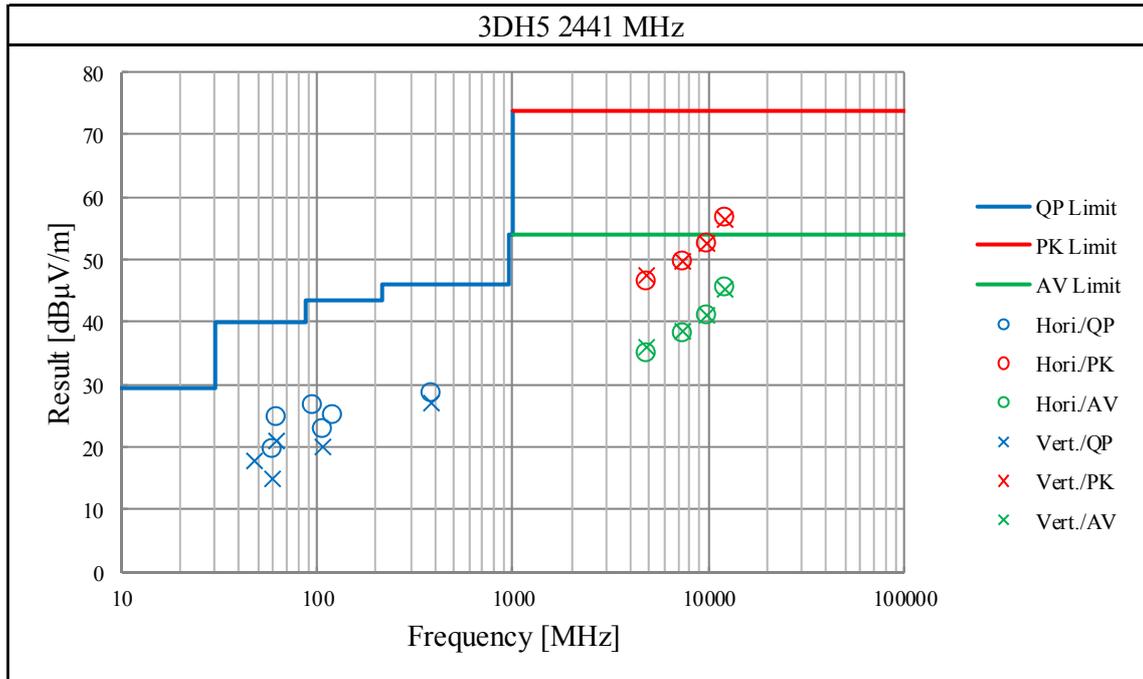
Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. : 10910945S-E  
Date : August 23, 2015  
Temperature / Humidity : 23 deg. C / 56 % RH  
Engineer : Kenichi Adachi  
Mode : Tx, Hopping Off, 3DH5 2480 MHz



\* 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.	10910945S-E	
Date	August 23, 2015	August 24, 2015
Temperature / Humidity	23 deg. C / 56 % RH	27 deg. C / 56 % RH
Engineer	Kenichi Adachi	Shinichi Takano
	(1 GHz-18 GHz)	(30 MHz-1 GHz, 18 GHz-25 GHz)
Mode	Tx, Hopping Off, 3DH5 2441 MHz	

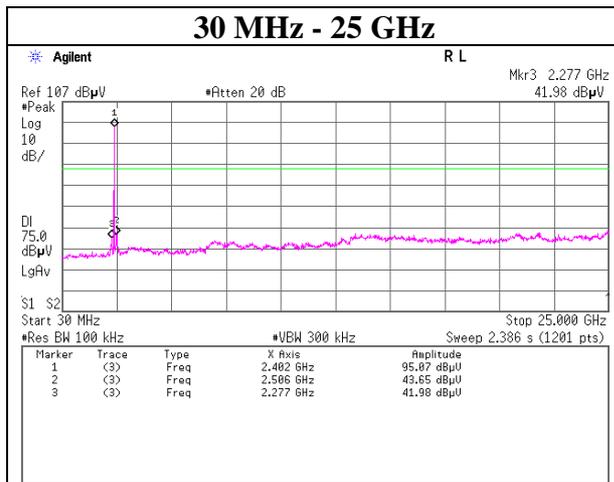
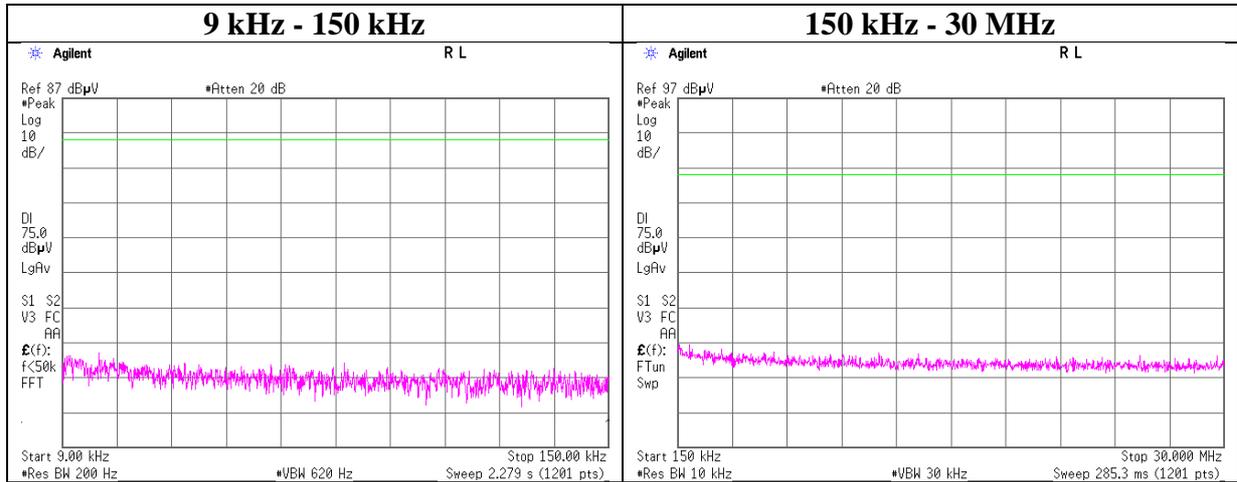


\*These plots data contains sufficient number to show the trend of characteristic features for EUT.

## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.1 Measurement Room
Report No.	10910945S-E
Date	August 19, 2015
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Shinichi Takano
Mode	Tx, Hopping Off, DH5

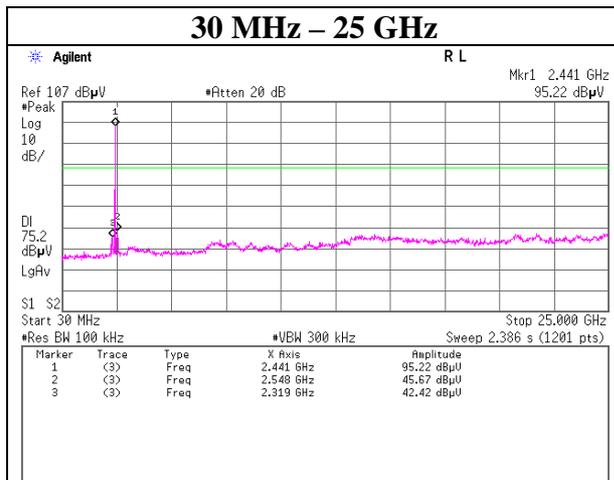
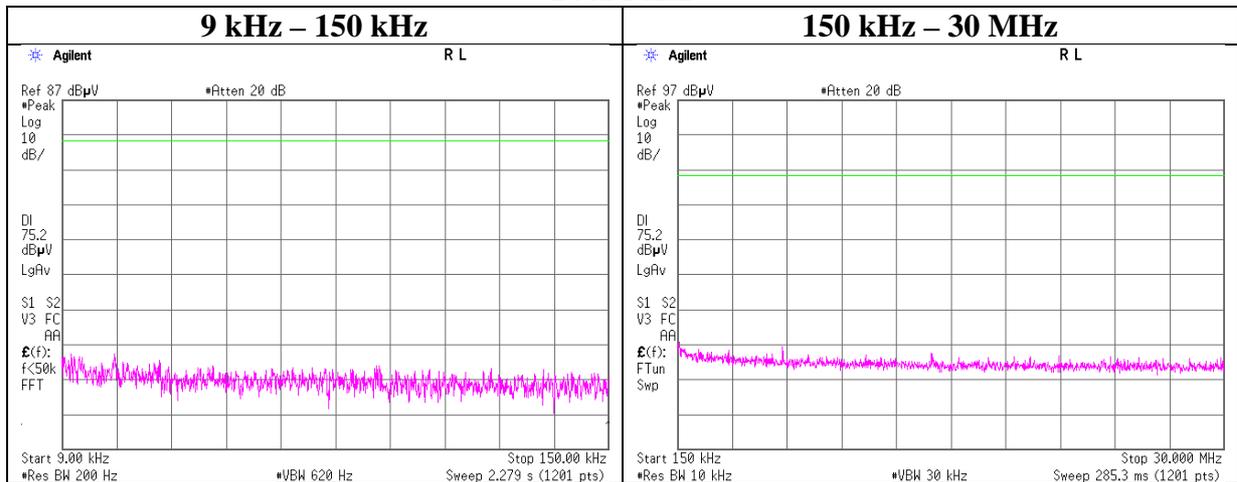
### 2402 MHz



## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.1 Measurement Room
Report No.	10910945S-E
Date	August 19, 2015
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Shinichi Takano
Mode	Tx, Hopping Off, DH5

### 2441 MHz



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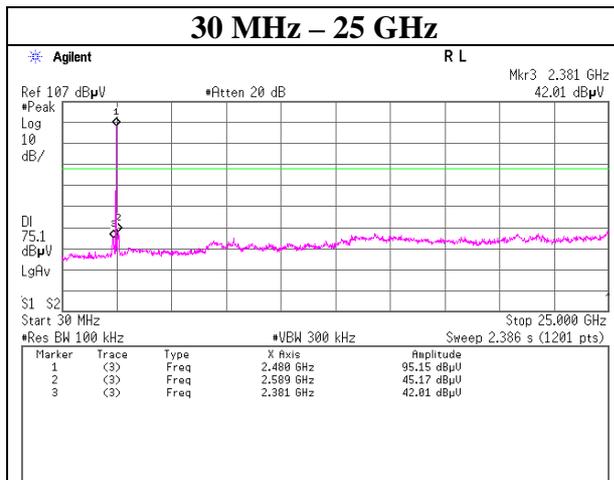
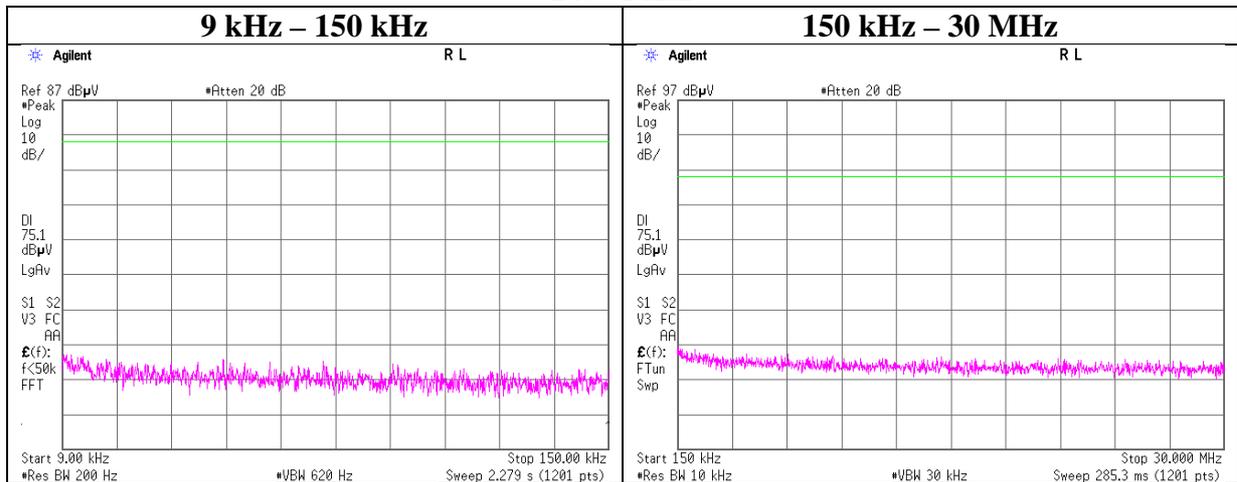
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## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.1 Measurement Room
Report No.	10910945S-E
Date	August 19, 2015
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Shinichi Takano
Mode	Tx, Hopping Off, DH5

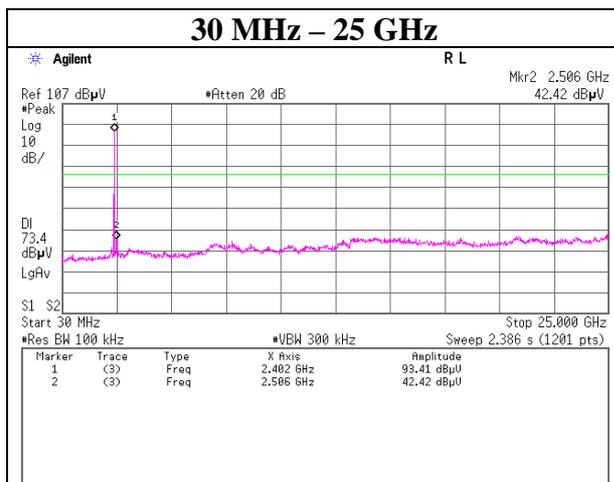
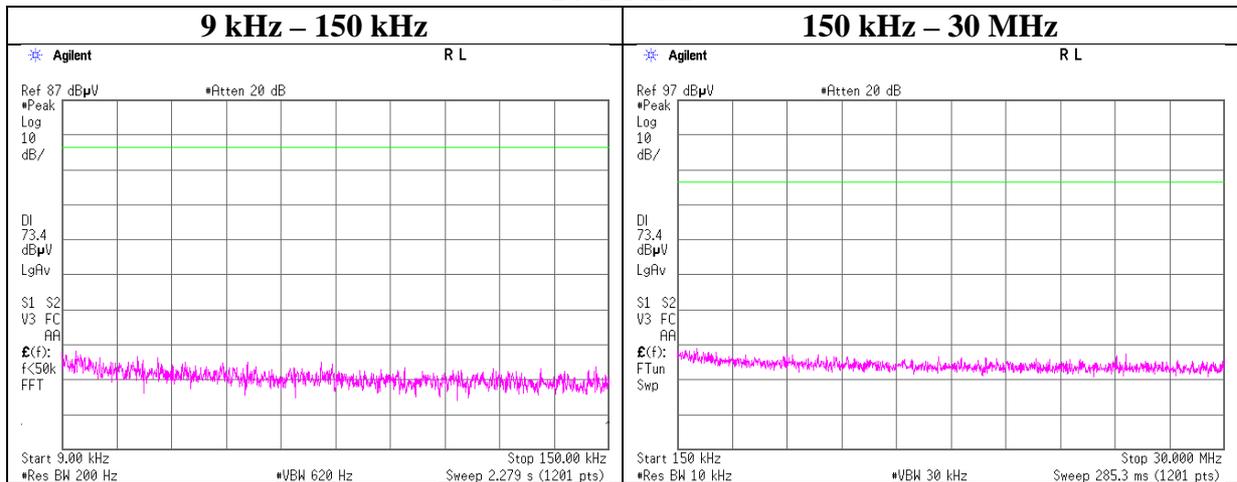
### 2480 MHz



## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.1 Measurement Room
Report No.	10910945S-E
Date	August 19, 2015
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Shinichi Takano
Mode	Tx, Hopping Off, 3DH5

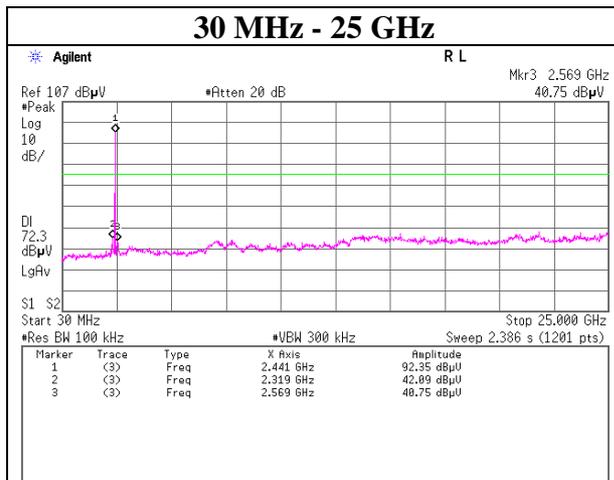
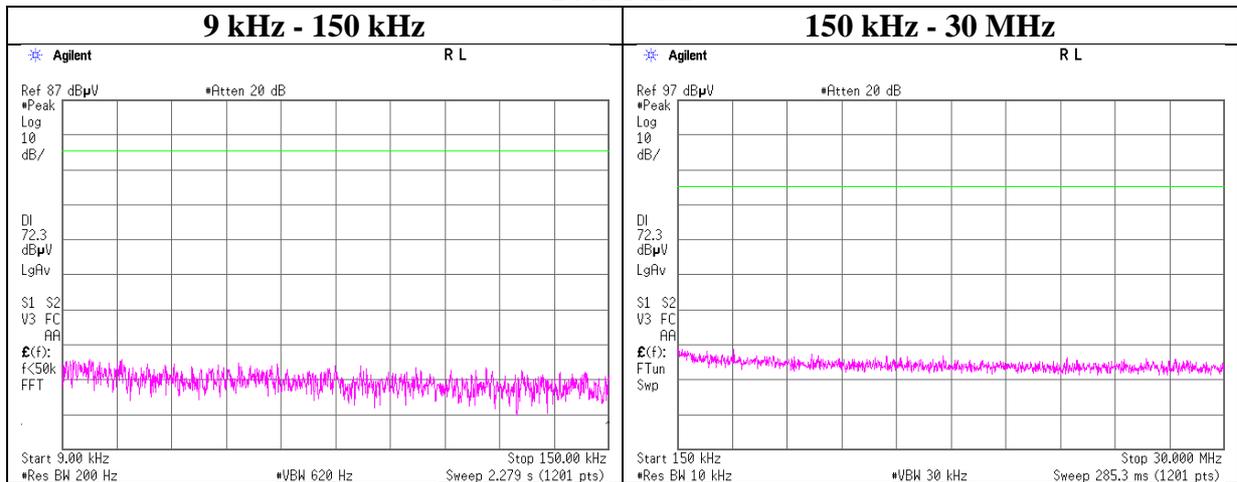
### 2402 MHz



## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.1 Measurement Room
Report No.	10910945S-E
Date	August 19, 2015
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Shinichi Takano
Mode	Tx, Hopping Off, 3DH5

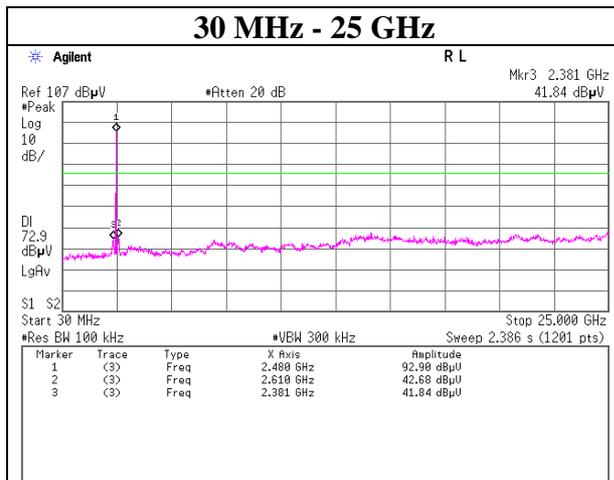
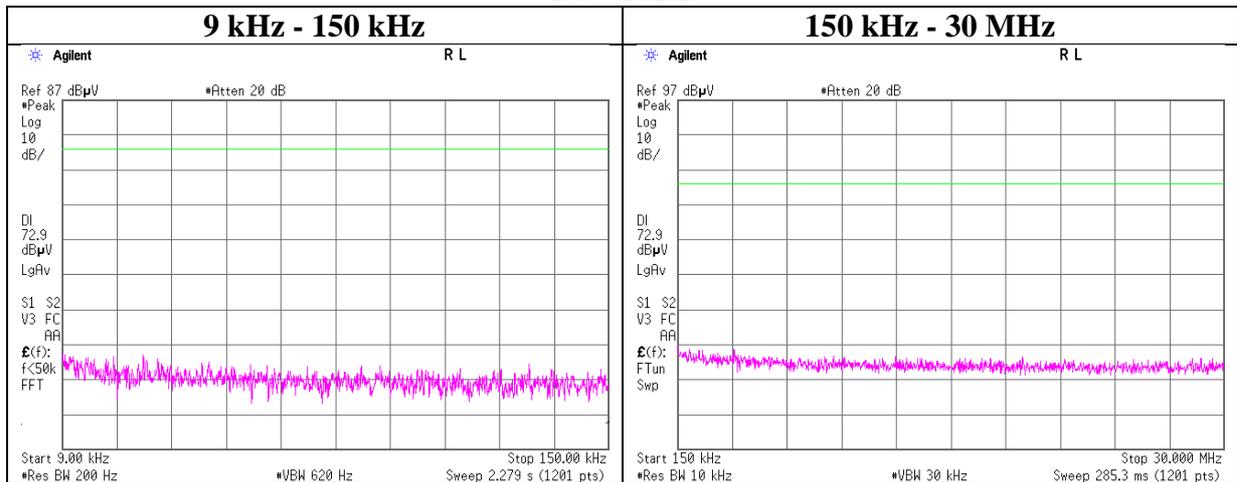
### 2441 MHz



## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.1 Measurement Room
Report No.	10910945S-E
Date	August 19, 2015
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Shinichi Takano
Mode	Tx, Hopping Off, 3DH5

### 2480 MHz



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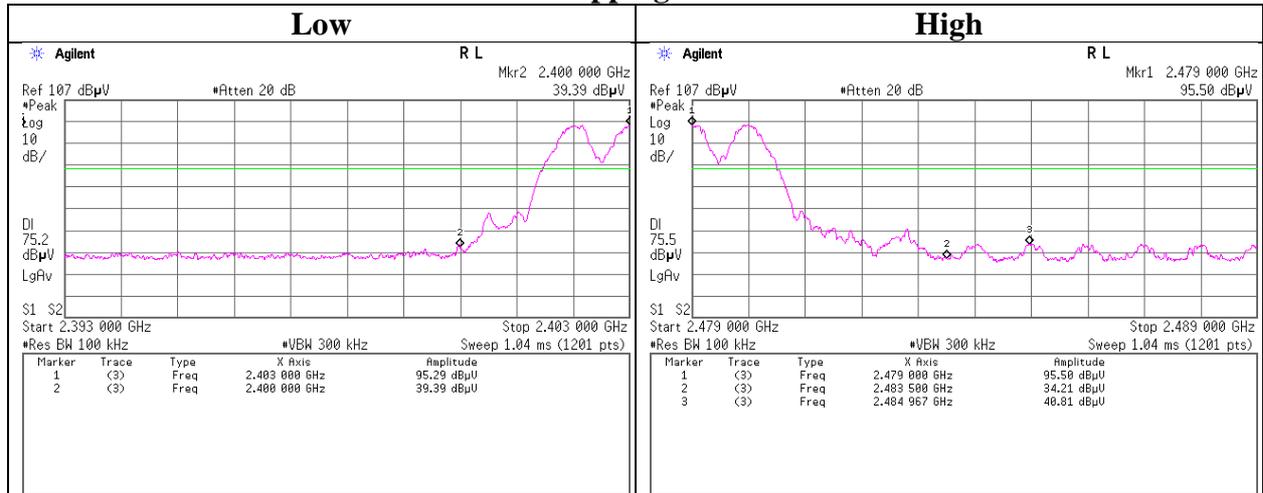
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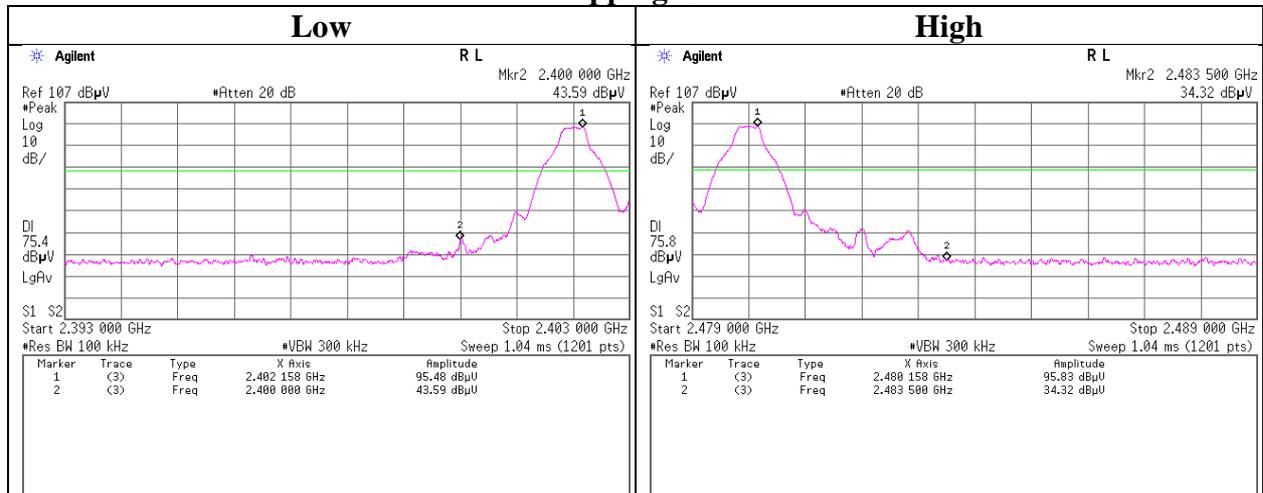
## Conducted Emission Band Edge compliance

Test place	Shonan EMC Lab. No.1 Measurement Room
Report No.	10910945S-E
Date	August 19, 2015
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Shinichi Takano
Mode	Tx DH5

### Hopping On



### Hopping Off



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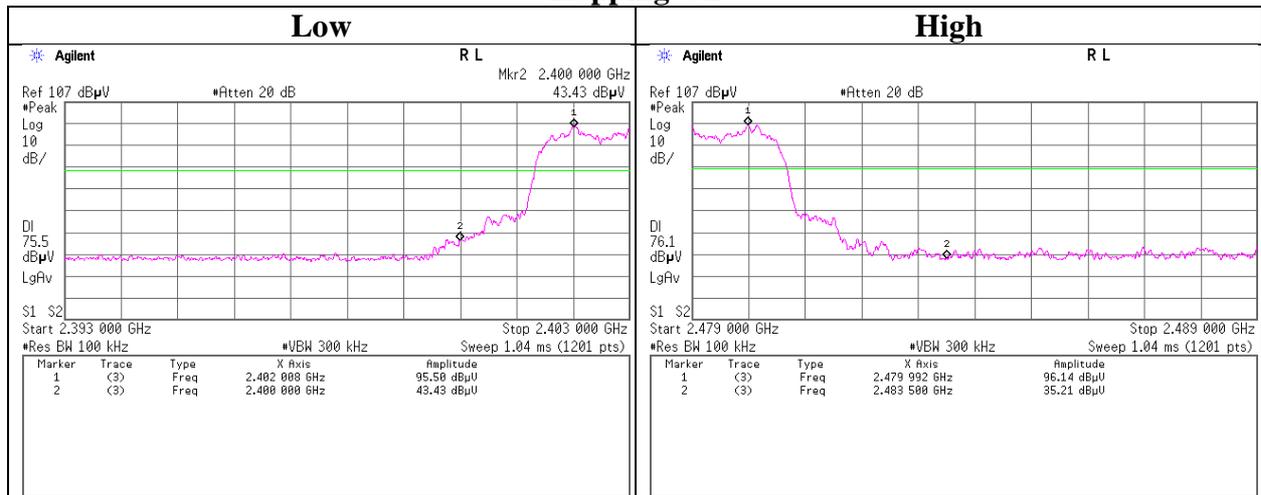
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

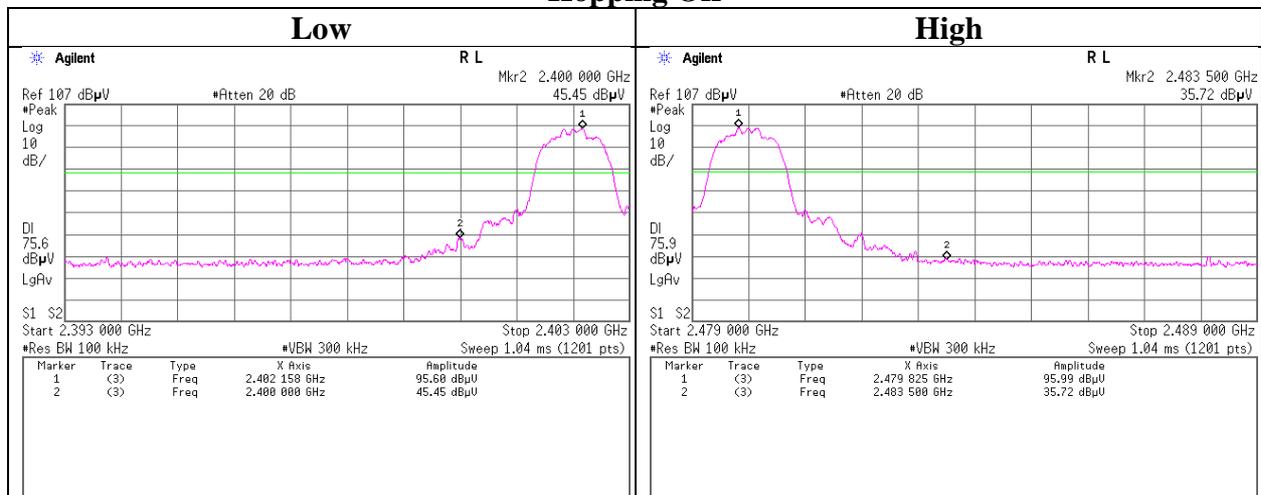
## Conducted Emission Band Edge compliance

Test place	Shonan EMC Lab. No.1 Measurement Room
Report No.	10910945S-E
Date	August 19, 2015
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Shinichi Takano
Mode	Tx 3DH5

### Hopping On



### Hopping Off



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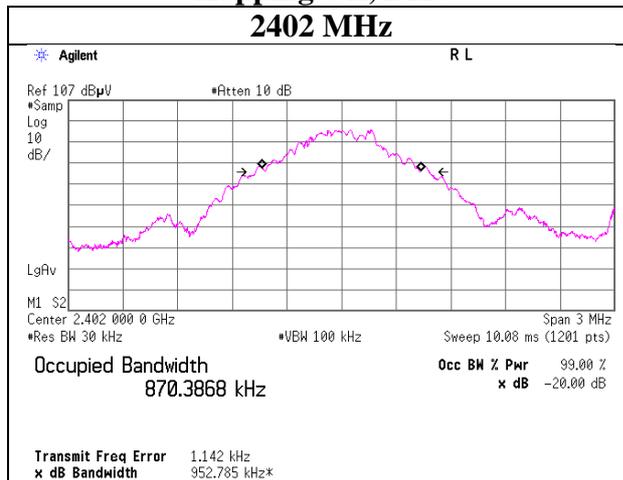
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

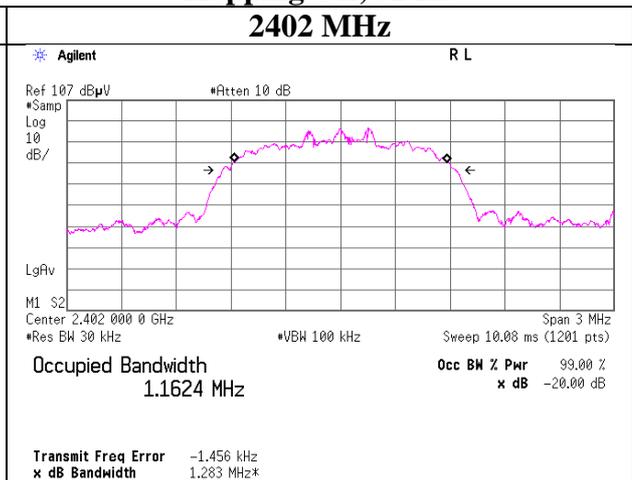
## 99% Occupied Bandwidth

Test place	Shonan EMC Lab. No.1 Measurement Room
Report No.	10910945S-E
Date	August 19, 2015
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Shinichi Takano
Mode	Tx Hopping Off

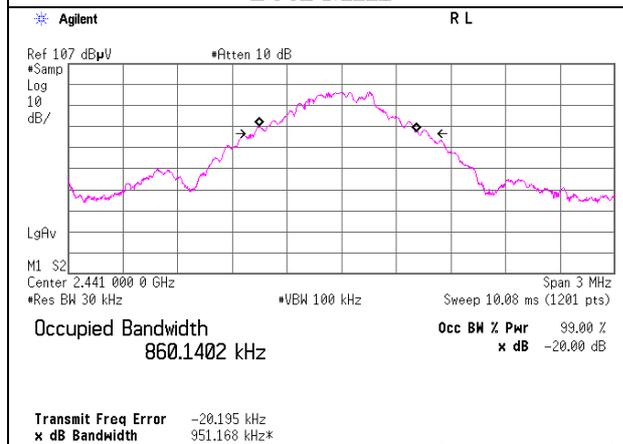
### Hopping Off, DH5



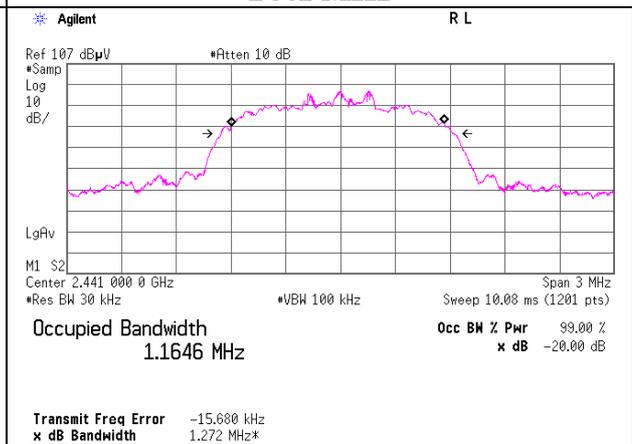
### Hopping Off, 3DH5



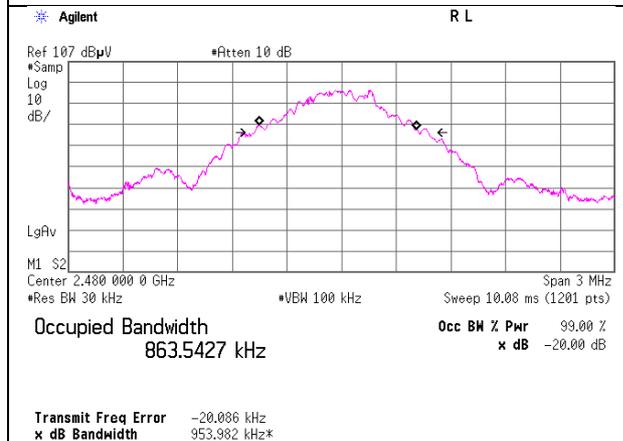
### 2441 MHz



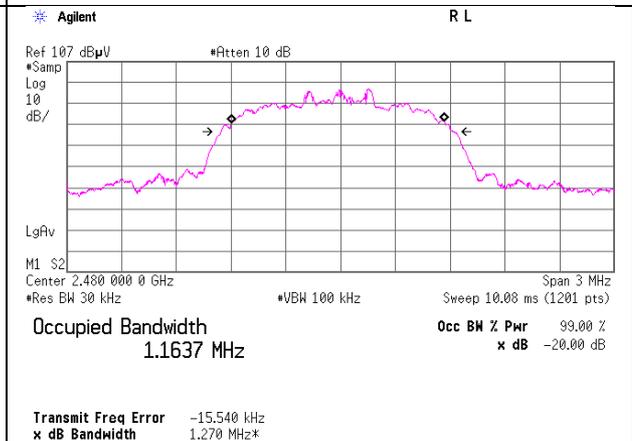
### 2441 MHz



### 2480 MHz



### 2480 MHz



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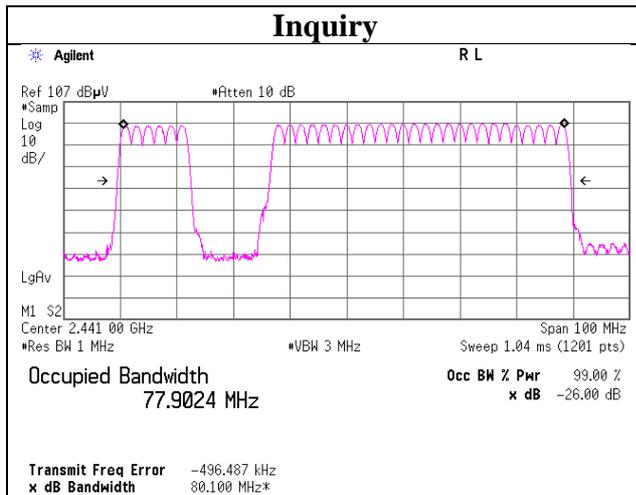
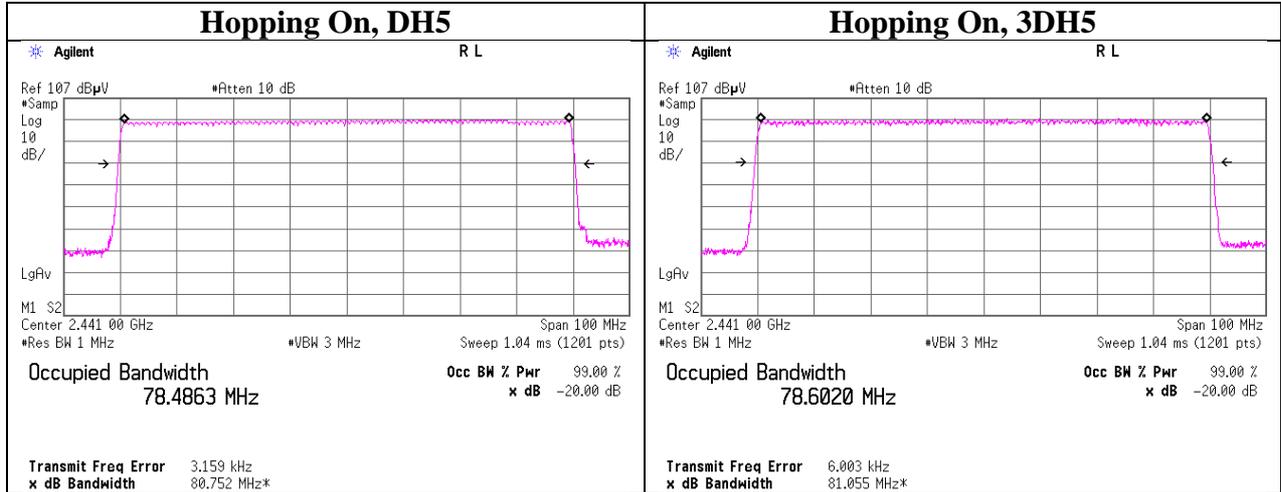
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## 99% Occupied Bandwidth

Test place	Shonan EMC Lab. No.1 Measurement Room
Report No.	10910945S-E
Date	August 19, 2015
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Shinichi Takano
Mode	Tx Hopping On



## **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>
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	AT	2015/03/26 * 12
SCC-G12	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	AT	2015/03/11 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2014/11/21 * 12
STS-05	Digital Hitester	Hioki	3805-50	080997828	AT	2014/11/11 * 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
SOS-13	Humidity Indicator	Custom	CTH-202	Q.C.17	AT	2015/04/28 * 12
SAEC-03(SVSW R)	Semi-Anechoic Chamber	TDK	SAEC-03(SVSW R)	3	RE	2015/03/11 * 12
KHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	230	RE	2015/05/18 * 12
SCC-G04	Coaxial Cable	Junkosha	J12J102207-00	JUN-12-14-0 18	RE	2015/06/08 * 12
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2014/11/21 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2014/11/21 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2015/05/27 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2015/05/19 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	RE	2015/03/23 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE ,CE,RFI,MF)	-	RE	-
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2014/10/30 * 12
SJM-15	Measure	ASKUL	-	-	RE	-
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
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2014/11/11 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA )	3	RE	2015/07/16 * 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	2014/08/27 * 12
SCC-C1/C2/C3/C 4/C5/C10/SRSE- 03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner /Suhner/Suhner/Suhner/T OYO	8D2W/12DSFA /141PE/141PE/ 141PE/141PE/ NS4906	-/0901-271(R F 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 tests**

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