



# RADIO TEST REPORT

Test Report No. : 10832564S-E-R1

**Applicant** : Sony Corporation  
**Type of Equipment** : AV Center  
**Model No.** : XAV-V630BT  
**FCC ID** : AK8XAVV630BT  
**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)
7. This report is a revised version of 10832564S-E. 10832564S-E is replaced with this report.

**Date of test:** June 13 to 21, 2015

**Representative test engineer:**

*H. Shirasawa*

Hikaru Shirasawa  
Engineer  
Consumer Technology Division

**Approved by:**

*T. Imamura*

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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**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  
Facsimile Number : +81-50-3750-6574  
Contact Person : Kazunaga Kinjo

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

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

Type of Equipment : AV Center  
Model No. : XAV-V630BT  
Serial No. : Refer to Clause 4.2  
Rating : DC12V  
Receipt Date of Sample : June 7, 2015  
Country of Mass-production : China  
Condition of EUT : Production prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Modification of EUT : No Modification by the test lab

### **2.2 Product Description**

Model: XAV-V630BT (referred to as the EUT in this report) is a AV Center.

### **General Specification**

Clock frequency(ies) in the system : 37.050 MHz, 27.000 MHz, 8.000 MHz, 26 MHz

### **Radio Specification**

Radio Type : Transceiver  
Frequency of Operation : 2402 MHz - 2480 MHz  
Modulation : FHSS  
Antenna type : WIRE ANTENNA  
Antenna Gain : -0.17 dBi  
Operating Temperature : 0 deg. C - +40 deg. C

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

### **3.1 Test Specification**

Test Specification : FCC Part 15 Subpart C: 2015, final revised on June 12, 2015 and effective July 13, 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 revision on June 12, 2015 does not affect the test specification applied to the EUT.

### **3.2 Procedures and results**

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.4-2009 7. AC powerline conducted emission measurements IC: RSS-Gen 8.8	FCC: Section 15.207 IC: RSS-Gen 8.8		N/A*1)	-
Carrier Frequency Separation	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1) IC: RSS-247 5.1 (2)	See data.	Complied	Conducted
20dB Bandwidth	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1) IC: RSS-247 5.1 (1)		-	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(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 4804.000 MHz, AV, Hori . DH5 2402 MHz	Complied

\*1) The test is not applicable since the EUT has no AC mains.

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

\* In case any questions arise about test procedure, ANSI C63.4: 2009 is also referred.

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

The equipment provides the wireless transmitter with stable power supply (DC3.3V).

Instead of a new battery, DC power supply was used for the test. That does not affect the test result, therefore the EUT complies with the requirement.

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

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

### 3.3 Addition to standard

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

Other than above, no addition, exclusion nor deviation has been made from the standard.

### 3.4 Uncertainty

#### EMI

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor  $k = 2$ .  
Shonan EMC Lab.

Item	Frequency range	Uncertainty (+/-)		
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR
Radiated emission (Measurement distance: 3m)	9kHz - 30MHz	3.7 dB	3.5 dB	3.5 dB
	30MHz - 300MHz	4.9 dB	4.9 dB	4.7 dB
	300MHz - 1GHz	5.0 dB	5.0 dB	4.8 dB
	1GHz - 15GHz	4.9 dB	4.9 dB	4.9 dB
Radiated emission (Measurement distance: 1m)	15GHz - 18GHz	5.7 dB	5.7 dB	5.7 dB
	18GHz - 40GHz	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 1GHz	0.68dB
Spurious emission (Conducted) below 1GHz	1.5dB
Spurious emission (Conducted) 1GHz - 3GHz	1.7dB
Spurious emission (Conducted) 3GHz - 18GHz	2.4dB
Spurious emission (Conducted) 18GHz - 26.5GHz	2.5dB
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

UL Japan, Inc. Shonan EMC Lab.  
1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN  
Telephone: +81 463 50 6400, Facsimile: +81 463 50 6401  
JAB Accreditation No. RTL02610

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

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

Refer to APPENDIX.

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

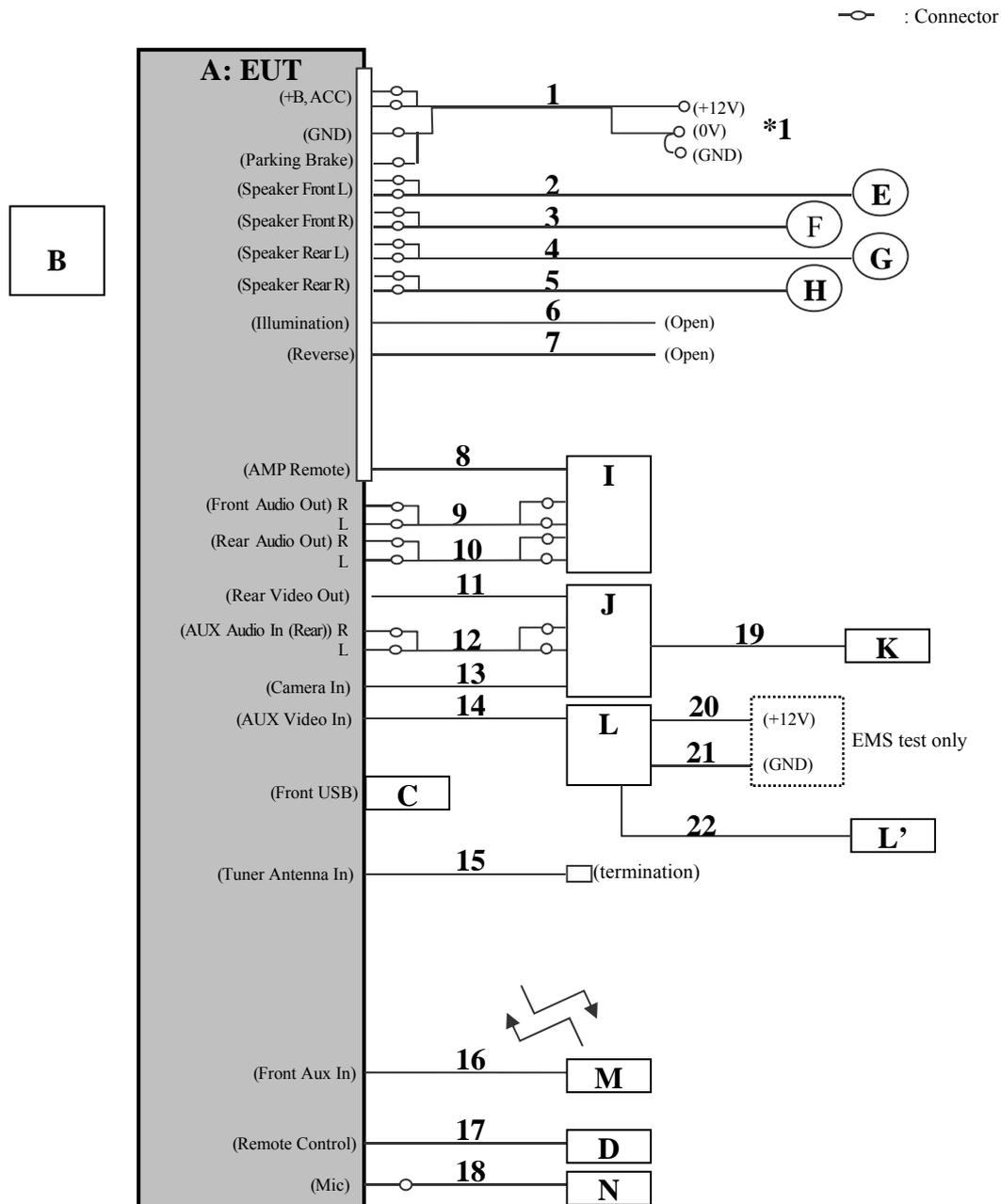
### **4.1 Operating Mode(s)**

Bluetooth (BT): Transmitting (Tx), Payload: PRBS9  
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)  *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.  *EUT has the power settings by the software as follows;  Power settings:   BDR:   Ext.=255,           Int.=41                            EDR:   Ext.=255,           Int.=43  Software:            CSR BlueSuite BlueTest Version 2.2.0.0                            CSR BlueSuite BtCliCtrl Version 2.2.0.0 (Inquiry mode only)  *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	AV Center	XAV-V630BT	*1)	Sony	EUT
B	Remote commander	RM-X170	-	Sony	-
C	USB memory	SDK-USM4GL(B)	-	Sony	-
D	Wired Remote Controller	RM-X4S	-	Sony	-
E	Speaker 1	IS-10	-	Sony	-
F	Speaker 2	IS-10	-	Sony	-
G	Speaker 3	XS-GTF1625R	-	Sony	-
H	Speaker 4	XS-GTF1625R	-	Sony	-
I	Stereo Power Amplifier	XM-1S	-	Sony	-
J	Connection Box	XA-124	3509530	Sony	-
K	MOBILE MONITOR	XVM-F65	350934	Sony	-
L	Camera unit	XA-800C	100114	Sony	-
L'					
M	Walkman	NW-A828	5072265	Sony	-
N	Mic				-

\*1) Antenna port conducted tests: ET00028, Radiated emission tests: ET00029

**List of cables used**

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Power+Parking brake	0.2+3.0	Unshielded	Unshielded	-
2	Speaker (1)	0.15+2.6	Unshielded	Unshielded	-
3	Speaker (2)	0.15+2.6	Unshielded	Unshielded	-
4	Speaker (3)	0.15+2.0	Unshielded	Unshielded	-
5	Speaker (4)	0.15+2.0	Unshielded	Unshielded	-
6	Illumination	0.15+1.5	Unshielded	Unshielded	-
7	Reverse	0.15+1.5	Unshielded	Unshielded	-
8	AMP Remote	0.15+3.0	Unshielded	Unshielded	-
9	RCA (Front Audio Out)	5.2	Shielded	Shielded	-
10	RCA (Rear Audio Out)	5.2	Shielded	Shielded	-
11	RCA (VIDEO Out)	5.0	Shielded	Shielded	-
12	RCA (AUX1 Audio In)	1.2	Shielded	Shielded	-
13	RCA (Camera In)	3.0	Shielded	Shielded	-
14	RCA (AUX Video In)	5.9	Shielded	Shielded	-
15	Tuner Antenna In	3.0	Shielded	Shielded	-
16	Stereo mini(Front AUX)	3.0	Shielded	Shielded	-
17	REMOTE Control	2.0	Shielded	Shielded	-
18	Mic	0.2+3.5	Shielded	Shielded	-
19	Signal	3.0	Shielded	Shielded	-
20	DC Power (+)	1.0	Unshielded	Unshielded	-
21	DC Power (-)	1.0	Unshielded	Unshielded	-
22	Camera	3.0	Shielded	Shielded	-

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

### **Test Procedure**

EUT was placed on a urethane platform of nominal size, 1.0 m by 2.0 m, raised 0.8 m above the conducting ground plane.

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

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	Below 30 MHz	30 MHz to 300 MHz	300 MHz to 1 GHz	Above 1 GHz
Antenna Type	Loop	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 10 GHz),		3 m (below 15 GHz), 1 m*2) (above 10 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 each position of 0 and 45 degrees of EUT to see the position of maximum noise, and the test was made at the position 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 - 26.5 GHz  
**Test data** : APPENDIX  
**Test result** : Pass

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

### **Test Procedure**

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

<b>Test</b>	<b>Span</b>	<b>RBW</b>	<b>VBW</b>	<b>Sweep time</b>	<b>Detector</b>	<b>Trace</b>	<b>Instrument used</b>
20dB Bandwidth	2.5 MHz or 3 MHz	30 kHz	100 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth*1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Sample	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak Average *3)	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	5 MHz or 3MHz	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

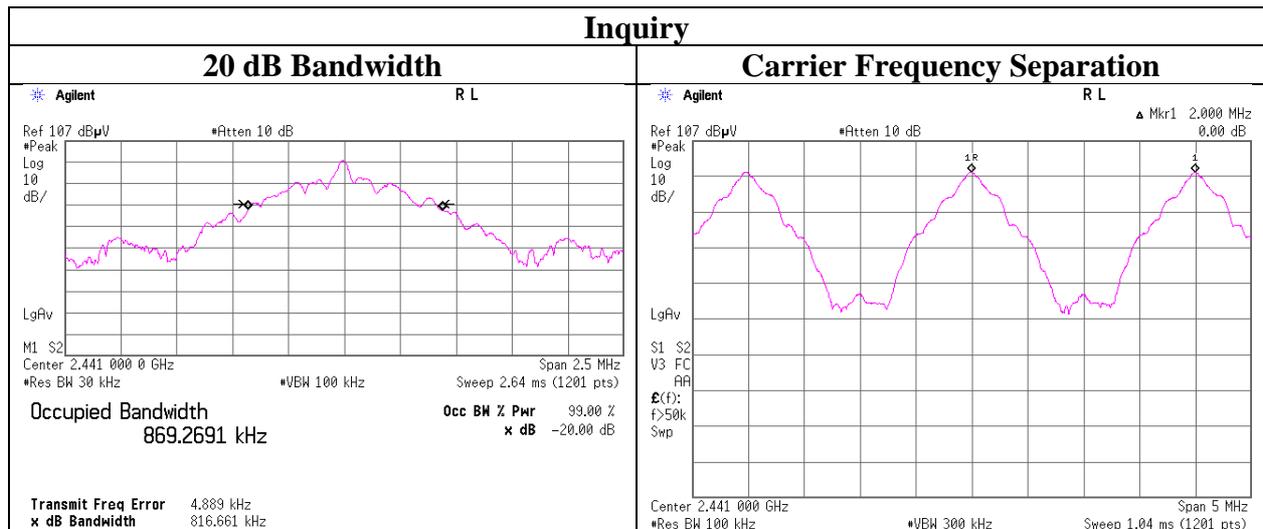
**APPENDIX 1: Test data**

**20dB Bandwidth and Carrier Frequency Separation**

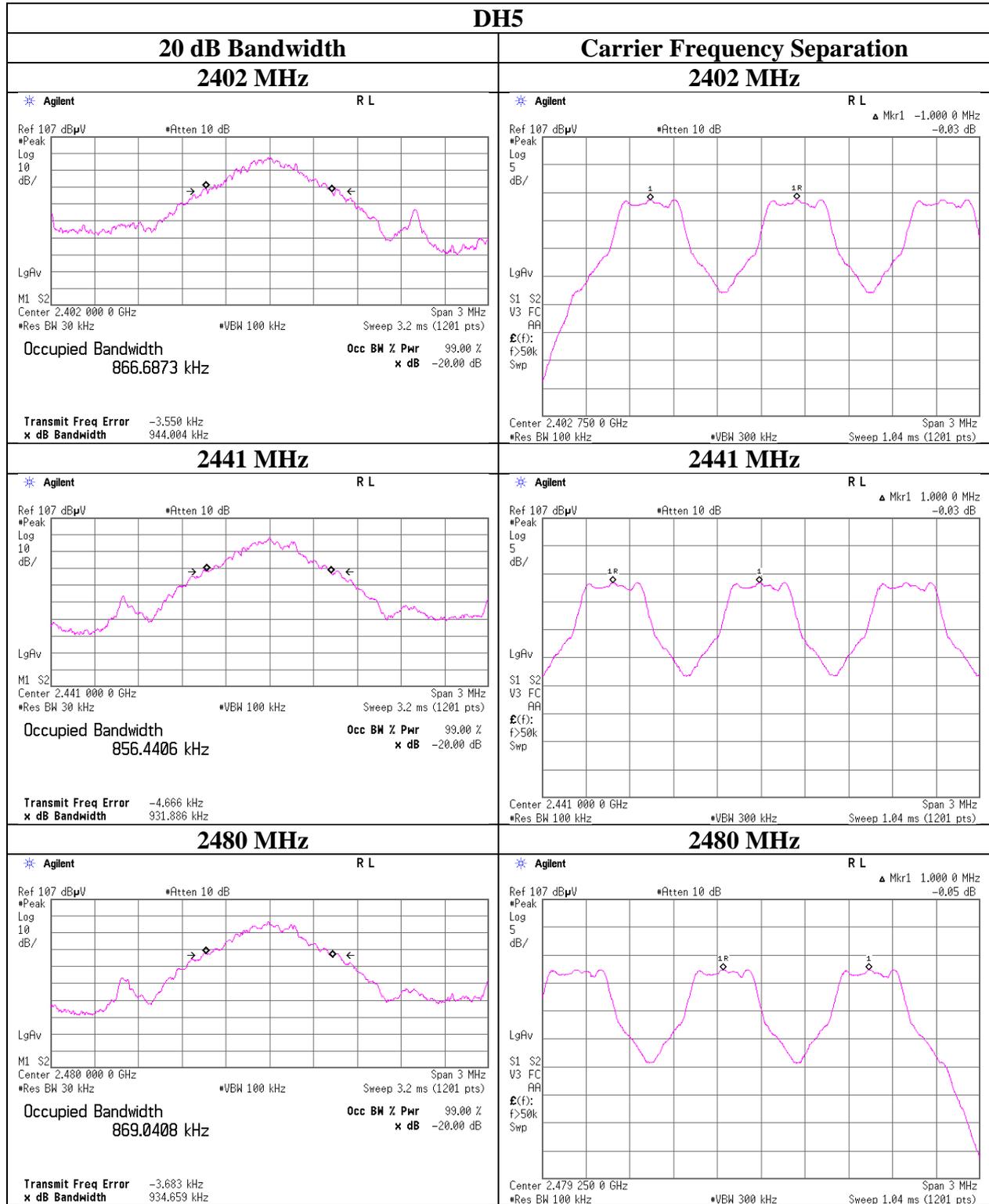
Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10832564S-E-R1
Date	June 13, 2015
Temperature / Humidity	26 deg. C / 58 % RH
Engineer	Hikaru Shirasawa
Mode	Tx Hopping On

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.944	1.000	$\geq 0.629$
DH5	2441.0	0.932	1.000	$\geq 0.621$
DH5	2480.0	0.935	1.000	$\geq 0.623$
3DH5	2402.0	1.290	1.000	$\geq 0.860$
3DH5	2441.0	1.304	1.000	$\geq 0.870$
3DH5	2480.0	1.263	1.000	$\geq 0.842$
Inquiry	2441.0	0.817	2.000	$\geq 0.544$

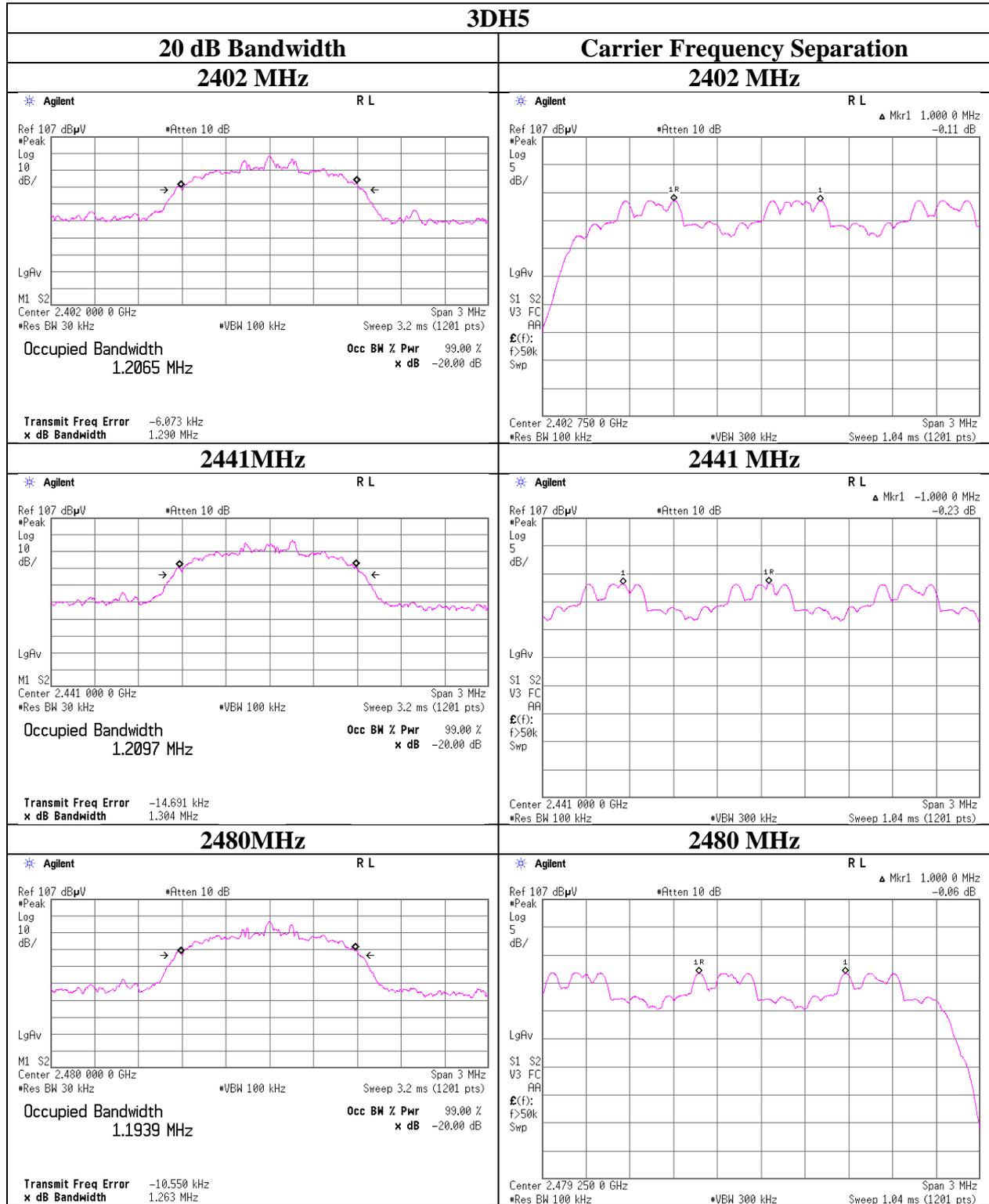
Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).  
 No limit applies to 20dB Bandwidth.



## 20dB Bandwidth and Carrier Frequency Separation



## 20dB Bandwidth and Carrier Frequency Separation

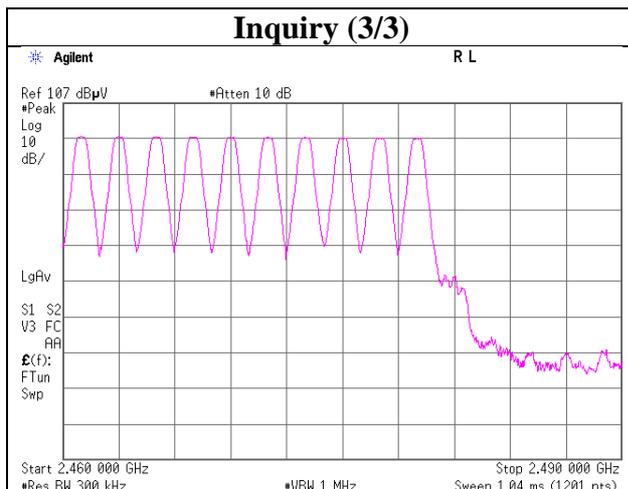
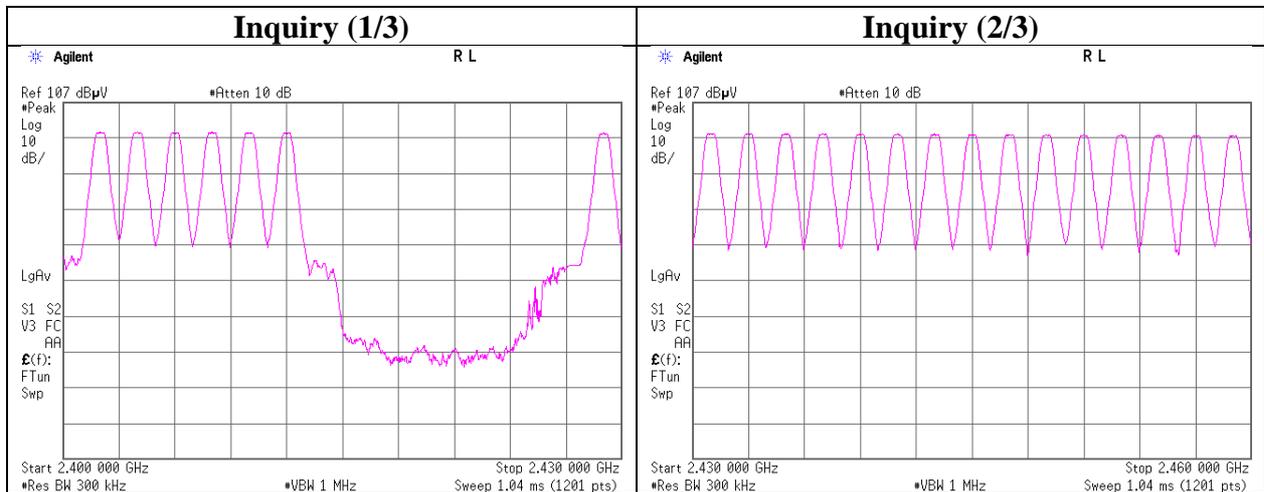


## Number of Hopping Frequency

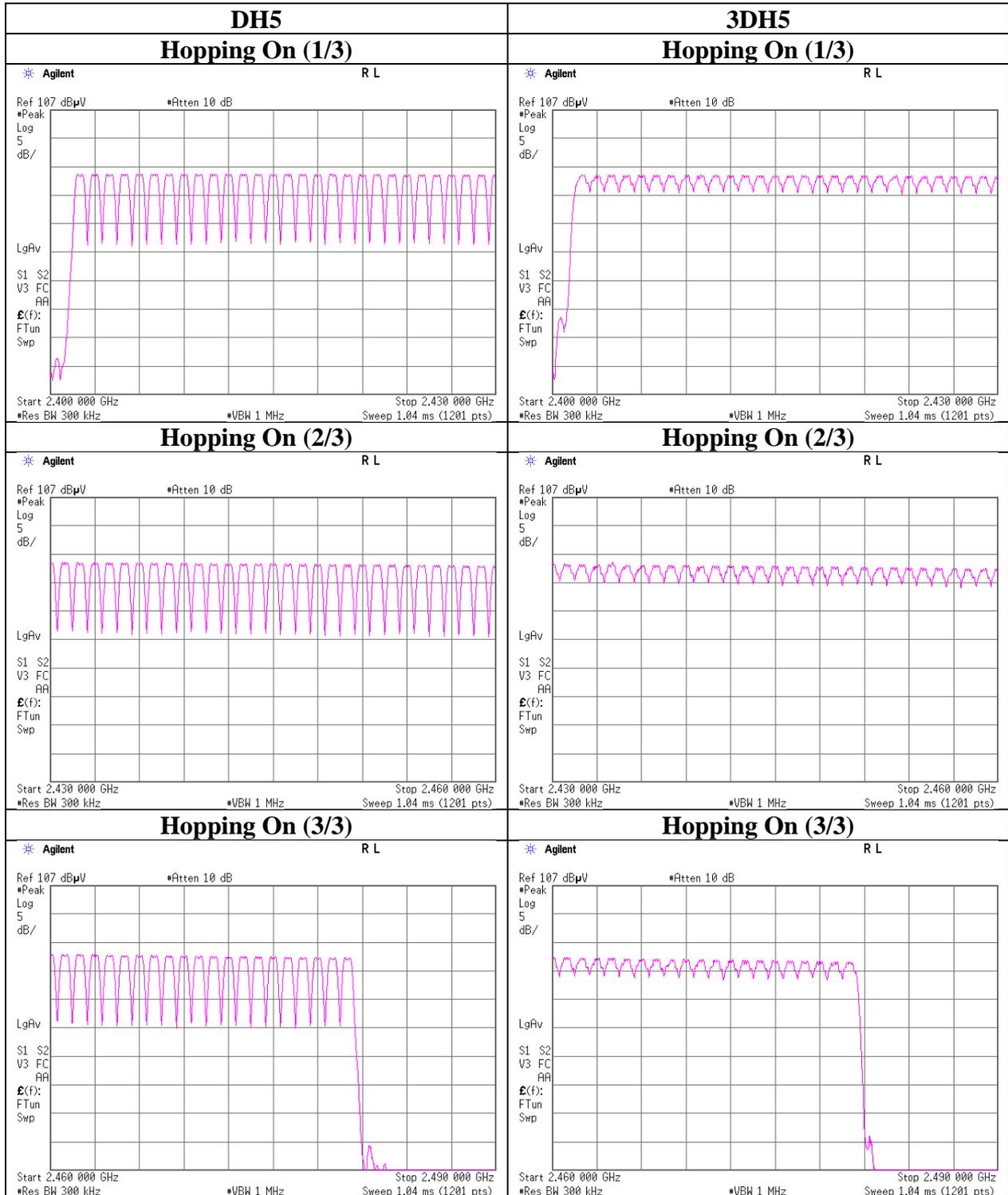
Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10832564S-E-R1
Date	June 13, 2015
Temperature / Humidity	26 deg. C / 58 % RH
Engineer	Hikaru Shirasawa
Mode	Tx Hopping On

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

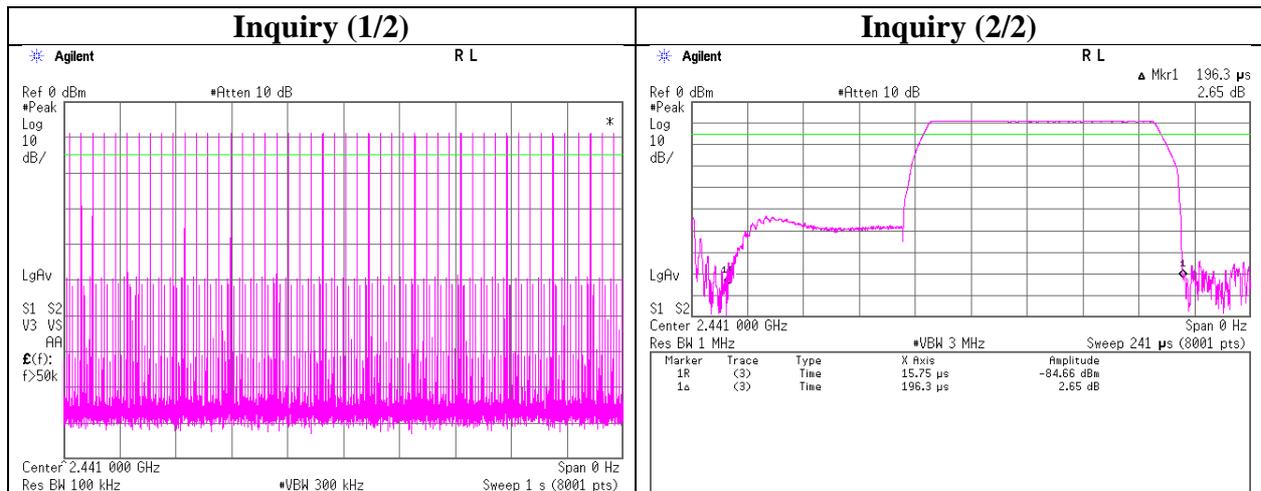
Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10832564S-E-R1
Date	June 13, 2015
Temperature / Humidity	26 deg. C / 58 % RH
Engineer	Hikaru Shirasawa
Mode	Tx Hopping On

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	0.512	165	400
DH3	26.0 times / 5 sec. x 31.6 sec. = 165 times	1.769	292	400
DH5	17.0 times / 5 sec. x 31.6 sec. = 108 times	3.018	326	400
3DH1	51.0 times / 5 sec. x 31.6 sec. = 323 times	0.526	170	400
3DH3	26.0 times / 5 sec. x 31.6 sec. = 165 times	1.779	293	400
3DH5	17.0 times / 5 sec. x 31.6 sec. = 108 times	3.029	327	400
Inquiry	100.0 times / 1 sec. x 12.8 sec. = 1280 times	0.196	251	400

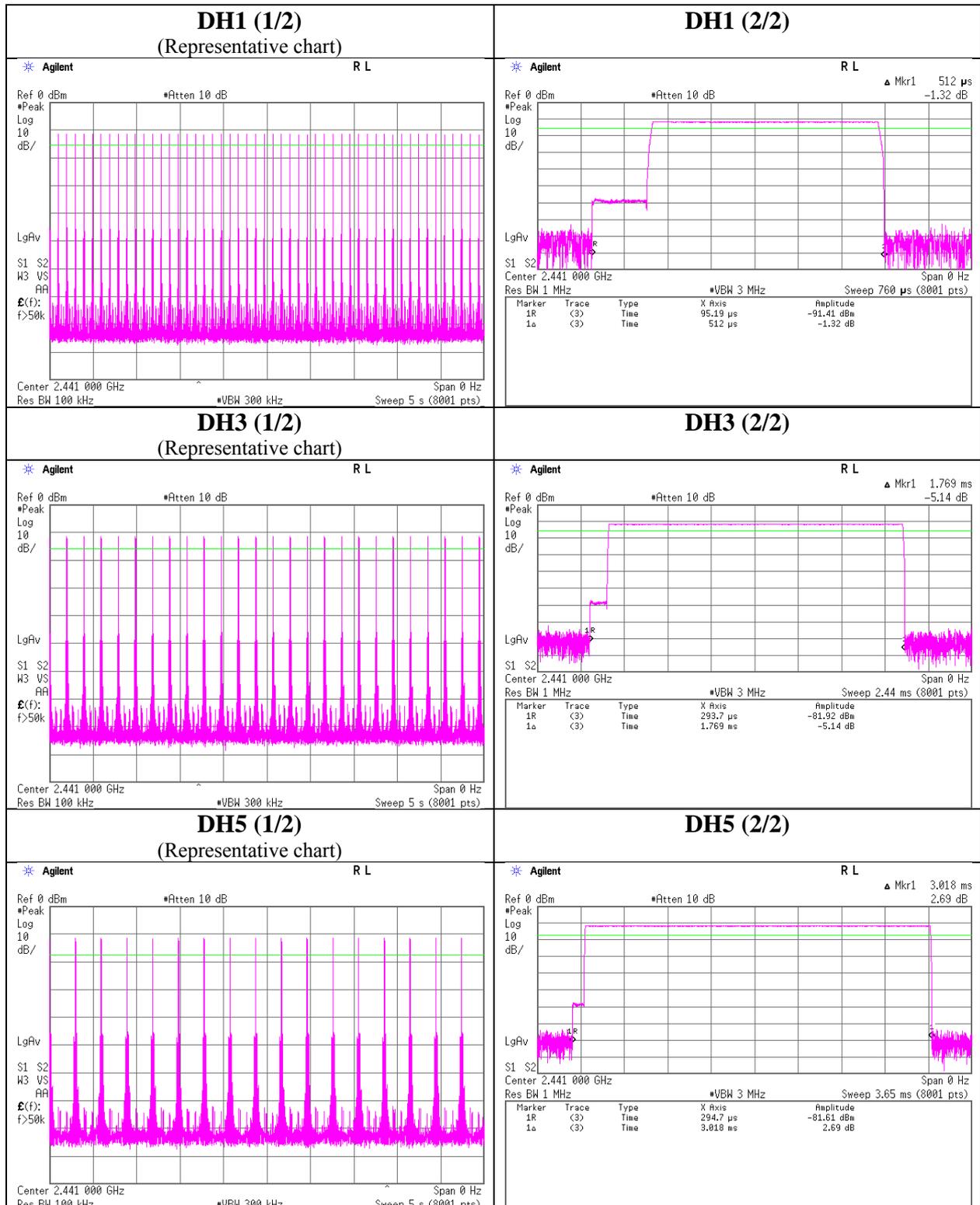
Sample Calculation

Result = Number of transmission x Length of transmission

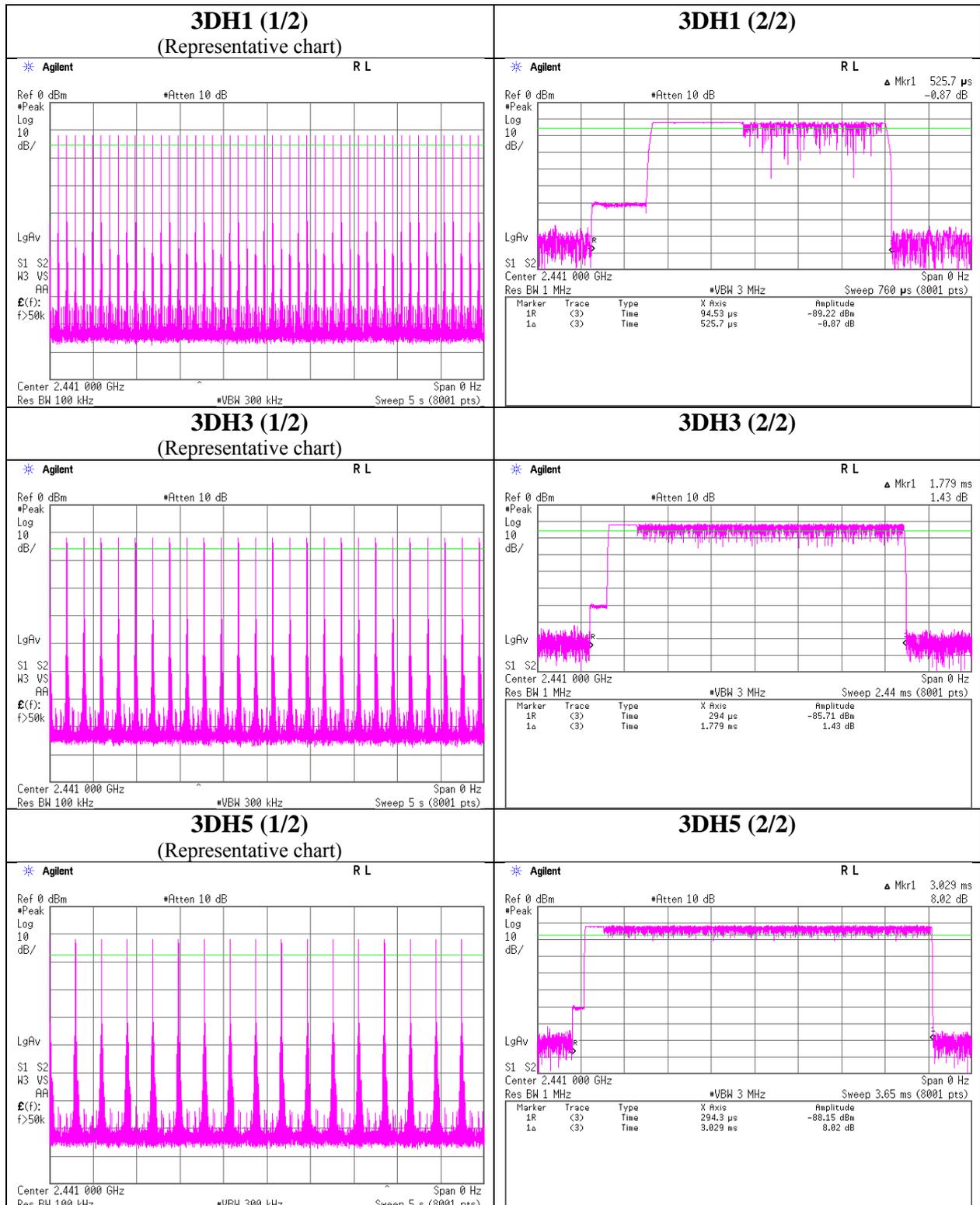
This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in  $N \times 0.4s$ , where  $N$  is the number of channels being used in the hopping sequence ( $20 \leq N \leq 79$ ), is always less than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



### Dwell time



### Dwell time



## Maximum Peak Output Power

Test place Shonan EMC Lab. No.5 Shielded Room  
Report No. 10832564S-E-R1  
Date June 13, 2015  
Temperature / Humidity 26 deg. C / 58 % RH  
Engineer Hikaru Shirasawa  
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	-10.71	1.78	9.63	0.70	1.17	20.96	125	20.26
DH5	2441.0	-11.09	1.79	9.63	0.33	1.08	20.96	125	20.63
DH5	2480.0	-12.10	1.80	9.63	-0.67	0.86	20.96	125	21.63
2DH5	2402.0	-10.07	1.78	9.63	1.34	1.36	20.96	125	19.62
2DH5	2441.0	-10.73	1.79	9.63	0.69	1.17	20.96	125	20.27
2DH5	2480.0	-11.90	1.80	9.63	-0.47	0.90	20.96	125	21.43
3DH5	2402.0	-9.88	1.78	9.63	1.53	1.42	20.96	125	19.43
3DH5	2441.0	-10.68	1.79	9.63	0.74	1.19	20.96	125	20.22
3DH5	2480.0	-11.82	1.80	9.63	-0.39	0.91	20.96	125	21.35

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.

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

Test place : Shonan EMC Lab. No.5 Shielded Room  
Report No. : 10832564S-E-R1  
Date : June 13, 2015  
Temperature / Humidity : 26 deg. C / 58 % RH  
Engineer : Hikaru Shirasawa  
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	-12.34	1.78	9.63	-0.93	0.81	0.94	0.01	1.00
DH5	2441.0	-12.63	1.79	9.63	-1.21	0.76	0.94	-0.27	0.94
DH5	2480.0	-13.74	1.80	9.63	-2.31	0.59	0.94	-1.37	0.73
2DH5	2402.0	-13.43	1.78	9.63	-2.02	0.63	0.92	-1.10	0.78
2DH5	2441.0	-13.87	1.79	9.63	-2.45	0.57	0.92	-1.53	0.70
2DH5	2480.0	-15.07	1.80	9.63	-3.64	0.43	0.92	-2.72	0.53
3DH5	2402.0	-13.42	1.78	9.63	-2.01	0.63	0.92	-1.09	0.78
3DH5	2441.0	-13.85	1.79	9.63	-2.43	0.57	0.92	-1.51	0.71
3DH5	2480.0	-15.26	1.80	9.63	-3.83	0.41	0.92	-2.91	0.51

Sample Calculation:

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

Result (Burst power) = Frame power + Duty factor

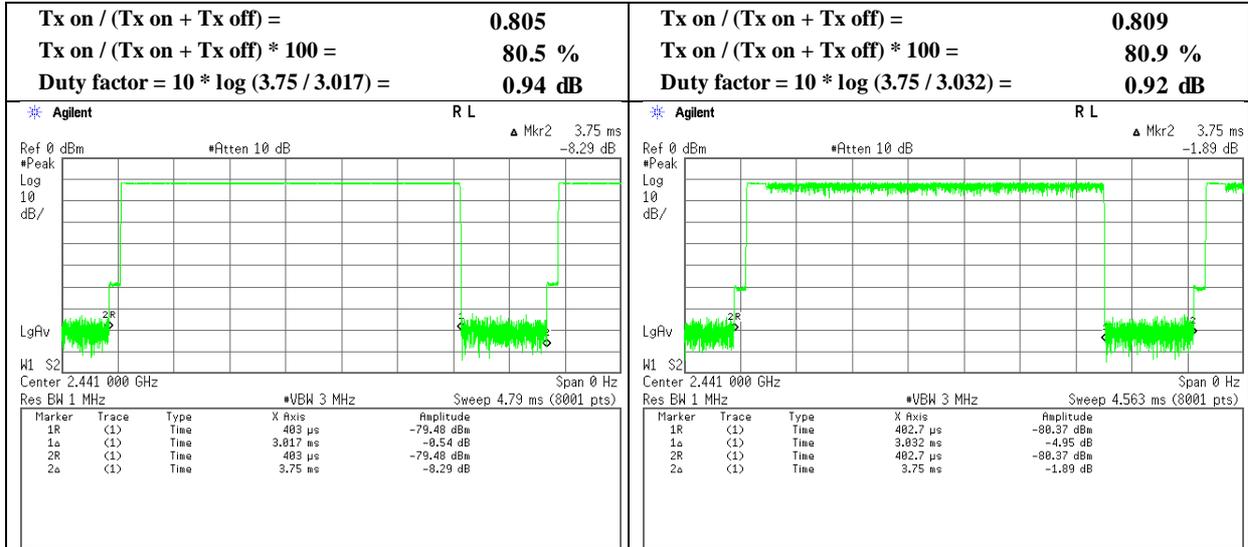
\*The equipment and cables were not used for factor 0 dB of the data sheets.

### Duty Factor Calculation Chart

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10832564S-E-R1
Date	June 13, 2015
Temperature / Humidity	26 deg. C / 58 % RH
Engineer	Hikaru Shiasawa
Mode	Tx Hopping Off

#### DH5

#### 3DH5



## Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. : 10832564S-E-R1  
Date : June 20, 2015      June 21, 2015  
Temperature / Humidity : 24 deg. C / 63 % RH      23 deg. C / 57 % RH  
Engineer : Yosuke Ishikawa      Yosuke Ishikawa  
            (18-26.5 GHz)      (1-18 GHz)  
            30-1000 MHz)  
Mode : Tx 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.	108.008	QP	37.2	11.2	7.5	32.1	0.0	23.8	43.5	19.7	184	99	
Hori.	508.634	QP	31.2	17.9	9.5	31.9	0.0	26.7	46.0	19.3	100	281	
Hori.	589.760	QP	33.6	19.1	9.8	31.9	0.0	30.6	46.0	15.4	100	10	
Hori.	691.971	QP	33.6	20.4	10.2	31.8	0.0	32.4	46.0	13.6	100	12	
Hori.	2390.000	PK	44.5	26.4	13.7	41.0	1.6	45.2	73.9	28.7	230	310	
Hori.	4804.000	PK	55.5	30.6	5.8	39.6	1.6	53.9	73.9	20.0	108	200	
Hori.	7206.000	PK	44.3	36.6	7.2	40.1	1.6	49.6	73.9	24.3	100	0	
Hori.	9608.000	PK	45.2	38.5	8.2	39.6	1.6	53.9	73.9	20.0	100	0	
Hori.	2390.000	AV	33.1	26.4	13.7	41.0	1.6	33.8	53.9	20.1	230	310	
Hori.	4804.000	AV	49.9	30.6	5.8	39.6	1.6	48.3	53.9	5.6	108	200	
Hori.	7206.000	AV	33.3	36.6	7.2	40.1	1.6	38.6	53.9	15.3	100	0	
Hori.	9608.000	AV	33.7	38.5	8.2	39.6	1.6	42.4	53.9	11.5	100	0	
Vert.	108.002	QP	33.7	11.2	7.5	32.1	0.0	20.3	43.5	23.2	100	249	
Vert.	147.297	QP	35.4	14.6	7.8	32.1	0.0	25.7	43.5	17.8	100	255	
Vert.	595.395	QP	32.0	19.2	9.9	31.9	0.0	29.2	46.0	16.8	100	286	
Vert.	691.868	QP	37.5	20.4	10.2	31.8	0.0	36.3	46.0	9.7	100	5	
Vert.	2390.000	PK	45.6	26.4	13.7	41.0	1.6	46.3	73.9	27.6	177	57	
Vert.	4804.000	PK	53.6	30.6	5.8	39.6	1.6	52.0	73.9	21.9	101	65	
Vert.	7206.000	PK	44.8	36.6	7.2	40.1	1.6	50.1	73.9	23.8	100	0	
Vert.	9608.000	PK	44.7	38.5	8.2	39.6	1.6	53.4	73.9	20.5	100	0	
Vert.	2390.000	AV	33.1	26.4	13.7	41.0	1.6	33.8	53.9	20.1	177	57	
Vert.	4804.000	AV	47.5	30.6	5.8	39.6	1.6	45.9	53.9	8.0	101	65	
Vert.	7206.000	AV	33.4	36.6	7.2	40.1	1.6	38.7	53.9	15.2	100	0	
Vert.	9608.000	AV	33.5	38.5	8.2	39.6	1.6	42.2	53.9	11.7	100	0	

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

Distance factor : 1 GHz - 15 GHz :  $20\log(3.6\text{ m} / 3.0\text{ m}) = 1.6\text{ dB}$

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

### 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	90.7	26.4	13.7	41.0	1.6	91.4	-	-	Carrier
Hori.	2400.000	PK	42.2	26.4	13.7	41.0	1.6	42.9	71.4	28.5	
Vert.	2402.000	PK	83.9	26.4	13.7	41.0	1.6	84.6	-	-	Carrier
Vert.	2400.000	PK	37.6	26.4	13.7	41.0	1.6	38.3	64.6	26.3	

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

Distance factor : 1 GHz - 15 GHz :  $20\log(3.6\text{ m} / 3.0\text{ m}) = 1.6\text{ dB}$

15 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. : 10832564S-E-R1  
Date : June 20, 2015      June 21, 2015  
Temperature / Humidity : 24 deg. C / 63 % RH      23 deg. C / 57 % RH  
Engineer : Yosuke Ishikawa      Yosuke Ishikawa  
            (18-26.5 GHz      (1-18 GHz)  
            30-1000 MHz)  
Mode : Tx 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.	107.998	QP	37.9	11.2	7.5	32.1	0.0	24.5	43.5	19.0	165	100	
Hori.	218.913	QP	35.1	16.6	8.2	32.0	0.0	27.9	46.0	18.1	154	300	
Hori.	261.395	QP	35.7	17.5	8.4	32.0	0.0	29.6	46.0	16.4	130	145	
Hori.	489.367	QP	30.9	17.6	9.5	31.9	0.0	26.1	46.0	19.9	100	163	
Hori.	590.612	QP	32.9	19.1	9.8	31.9	0.0	29.9	46.0	16.1	187	296	
Hori.	624.364	QP	36.3	19.5	10.0	31.9	0.0	33.9	46.0	12.1	131	329	
Hori.	1627.311	PK	47.1	25.1	13.0	40.8	1.6	46.0	73.9	27.9	100	183	
Hori.	4882.000	PK	54.5	30.9	5.8	39.5	1.6	53.3	73.9	20.6	100	203	
Hori.	7323.000	PK	44.4	36.8	7.2	40.2	1.6	49.8	73.9	24.1	100	0	
Hori.	9764.000	PK	44.7	38.6	8.3	39.5	1.6	53.7	73.9	20.2	100	0	
Hori.	1627.311	AV	37.4	25.1	13.0	40.8	1.6	36.3	53.9	17.6	100	183	
Hori.	4882.000	AV	49.0	30.9	5.8	39.5	1.6	47.8	53.9	6.1	100	203	
Hori.	7323.000	AV	33.0	36.8	7.2	40.2	1.6	38.4	53.9	15.5	100	0	
Hori.	9764.000	AV	32.9	38.6	8.3	39.5	1.6	41.9	53.9	12.0	100	0	
Vert.	147.264	QP	36.1	14.6	7.8	32.1	0.0	26.4	43.5	17.1	100	247	
Vert.	261.324	QP	34.1	17.5	8.4	32.0	0.0	28.0	46.0	18.0	100	360	
Vert.	597.441	QP	32.9	19.2	9.9	31.9	0.0	30.1	46.0	15.9	100	282	
Vert.	658.111	QP	38.2	20.0	10.1	31.9	0.0	36.4	46.0	9.6	144	351	
Vert.	1627.311	PK	47.3	25.1	13.0	40.8	1.6	46.2	73.9	27.7	100	195	
Vert.	4882.000	PK	54.2	30.9	5.8	39.5	1.6	53.0	73.9	20.9	108	227	
Vert.	7323.000	PK	44.1	36.8	7.2	40.2	1.6	49.5	73.9	24.4	100	0	
Vert.	9764.000	PK	44.6	38.6	8.3	39.5	1.6	53.6	73.9	20.3	100	0	
Vert.	1627.311	AV	38.9	25.1	13.0	40.8	1.6	37.8	53.9	16.1	100	195	
Vert.	4882.000	AV	48.8	30.9	5.8	39.5	1.6	47.6	53.9	6.3	108	227	
Vert.	7323.000	AV	33.1	36.8	7.2	40.2	1.6	38.5	53.9	15.4	100	0	
Vert.	9764.000	AV	32.9	38.6	8.3	39.5	1.6	41.9	53.9	12.0	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(3.6 m / 3.0 m) = 1.6 dB

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

## Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. : 10832564S-E-R1  
Date : June 20, 2015      June 21, 2015  
Temperature / Humidity : 24 deg. C / 63 % RH      23 deg. C / 57 % RH  
Engineer : Yosuke Ishikawa      Yosuke Ishikawa  
            (18-26.5 GHz      (1-18 GHz)  
            30-1000 MHz)  
Mode : Tx 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.	108.008	QP	37.5	11.2	7.5	32.1	0.0	24.1	43.5	19.4	149	99	
Hori.	222.608	QP	34.6	16.6	8.2	32.0	0.0	27.4	46.0	18.6	146	309	
Hori.	265.021	QP	34.9	17.7	8.5	32.0	0.0	29.1	46.0	16.9	137	143	
Hori.	479.993	QP	37.1	17.5	9.4	31.9	0.0	32.1	46.0	13.9	100	212	
Hori.	624.366	QP	36.0	19.5	10.0	31.9	0.0	33.6	46.0	12.4	187	337	
Hori.	2483.500	PK	47.6	26.6	13.7	41.0	1.6	48.5	73.9	25.4	223	304	
Hori.	4960.000	PK	52.8	31.2	5.9	39.4	1.6	52.1	73.9	21.8	105	216	
Hori.	7440.000	PK	44.2	37.0	7.2	40.4	1.6	49.6	73.9	24.3	100	0	
Hori.	9920.000	PK	43.1	38.6	8.2	39.4	1.6	52.1	73.9	21.8	100	0	
Hori.	2483.500	AV	34.9	26.6	13.7	41.0	1.6	35.8	53.9	18.1	223	304	
Hori.	4960.000	AV	46.9	31.2	5.9	39.4	1.6	46.2	53.9	7.7	105	216	
Hori.	7440.000	AV	32.6	37.0	7.2	40.4	1.6	38.0	53.9	15.9	100	0	
Hori.	9920.000	AV	31.7	38.6	8.2	39.4	1.6	40.7	53.9	13.2	100	0	
Vert.	147.077	QP	36.3	14.6	7.8	32.1	0.0	26.6	43.5	16.9	100	247	
Vert.	262.318	QP	34.3	17.5	8.4	32.0	0.0	28.2	46.0	17.8	100	326	
Vert.	601.697	QP	33.2	19.3	9.9	31.9	0.0	30.5	46.0	15.5	100	288	
Vert.	762.783	QP	28.5	20.8	10.6	31.6	0.0	28.3	46.0	17.7	100	18	
Vert.	850.200	QP	25.2	21.8	10.9	31.2	0.0	26.7	46.0	19.3	100	360	
Vert.	2483.500	PK	46.6	26.6	13.7	41.0	1.6	47.5	73.9	26.4	215	56	
Vert.	4960.000	PK	52.1	31.2	5.9	39.4	1.6	51.4	73.9	22.5	124	151	
Vert.	7440.000	PK	44.9	37.0	7.2	40.4	1.6	50.3	73.9	23.6	100	0	
Vert.	9920.000	PK	43.2	38.6	8.2	39.4	1.6	52.2	73.9	21.7	100	0	
Vert.	2483.500	AV	34.2	26.6	13.7	41.0	1.6	35.1	53.9	18.8	215	56	
Vert.	4960.000	AV	45.7	31.2	5.9	39.4	1.6	45.0	53.9	8.9	124	151	
Vert.	7440.000	AV	32.8	37.0	7.2	40.4	1.6	38.2	53.9	15.7	100	0	
Vert.	9920.000	AV	31.7	38.6	8.2	39.4	1.6	40.7	53.9	13.2	100	0	

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

Distance factor : 1 GHz - 15 GHz :  $20\log(3.6\text{ m} / 3.0\text{ m}) = 1.6\text{ dB}$

15 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. : 10832564S-E-R1  
Date : June 20, 2015      June 21, 2015  
Temperature / Humidity : 24 deg. C / 63 % RH      23 deg. C / 57 % RH  
Engineer : Yosuke Ishikawa      Yosuke Ishikawa  
            (18-26.5 GHz      (1-18 GHz)  
            30-1000 MHz)  
Mode : Tx 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.	108.004	QP	37.1	11.2	7.5	32.1	0.0	23.7	43.5	19.8	142	95	
Hori.	221.117	QP	34.2	16.6	8.2	32.0	0.0	27.0	46.0	19.0	159	299	
Hori.	262.151	QP	35.0	17.5	8.4	32.0	0.0	28.9	46.0	17.1	129	154	
Hori.	323.999	QP	38.3	14.6	8.8	31.9	0.0	29.8	46.0	16.2	100	294	
Hori.	523.121	QP	34.4	18.1	9.6	31.9	0.0	30.2	46.0	15.8	100	178	
Hori.	624.363	QP	36.0	19.5	10.0	31.9	0.0	33.6	46.0	12.4	185	340	
Hori.	691.864	QP	31.6	20.4	10.2	31.8	0.0	30.4	46.0	15.6	100	142	
Hori.	2390.000	PK	45.4	26.4	13.7	41.0	1.6	46.1	73.9	27.8	230	311	
Hori.	4804.000	PK	52.2	30.6	5.8	39.6	1.6	50.6	73.9	23.3	109	200	
Hori.	7206.000	PK	44.9	36.6	7.2	40.1	1.6	50.2	73.9	23.7	100	0	
Hori.	9608.000	PK	45.4	38.5	8.2	39.6	1.6	54.1	73.9	19.8	100	0	
Hori.	2390.000	AV	33.8	26.4	13.7	41.0	1.6	34.5	53.9	19.4	230	311	
Hori.	4804.000	AV	43.2	30.6	5.8	39.6	1.6	41.6	53.9	12.3	109	200	
Hori.	7206.000	AV	33.6	36.6	7.2	40.1	1.6	38.9	53.9	15.0	100	0	
Hori.	9608.000	AV	33.8	38.5	8.2	39.6	1.6	42.5	53.9	11.4	100	0	
Vert.	147.022	QP	36.7	14.6	7.8	32.1	0.0	27.0	43.5	16.5	100	265	
Vert.	262.239	QP	34.2	17.5	8.4	32.0	0.0	28.1	46.0	17.9	100	353	
Vert.	602.414	QP	32.8	19.3	9.9	31.9	0.0	30.1	46.0	15.9	100	285	
Vert.	766.947	QP	26.6	20.8	10.6	31.6	0.0	26.4	46.0	19.6	100	359	
Vert.	850.953	QP	25.2	21.8	10.9	31.2	0.0	26.7	46.0	19.3	100	360	
Vert.	2390.000	PK	45.2	26.4	13.7	41.0	1.6	45.9	73.9	28.0	213	67	
Vert.	4804.000	PK	50.7	30.6	5.8	39.6	1.6	49.1	73.9	24.8	100	66	
Vert.	7206.000	PK	44.7	36.6	7.2	40.1	1.6	50.0	73.9	23.9	100	0	
Vert.	9608.000	PK	45.5	38.5	8.2	39.6	1.6	54.2	73.9	19.7	100	0	
Vert.	2390.000	AV	33.8	26.4	13.7	41.0	1.6	34.5	53.9	19.4	213	67	
Vert.	4804.000	AV	40.5	30.6	5.8	39.6	1.6	38.9	53.9	15.0	100	66	
Vert.	7206.000	AV	33.6	36.6	7.2	40.1	1.6	38.9	53.9	15.0	100	0	
Vert.	9608.000	AV	33.7	38.5	8.2	39.6	1.6	42.4	53.9	11.5	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(3.6 m / 3.0 m) = 1.6 dB

15 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	90.8	26.4	13.7	41.0	1.6	91.5	-	-	Carrier
Hori.	2400.000	PK	44.7	26.4	13.7	41.0	1.6	45.4	71.5	26.1	
Vert.	2402.000	PK	83.4	26.4	13.7	41.0	1.6	84.1	-	-	Carrier
Vert.	2400.000	PK	39.6	26.4	13.7	41.0	1.6	40.3	64.1	23.8	

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

Distance factor : 1 GHz - 15 GHz : 20log(3.6 m / 3.0 m) = 1.6 dB

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

## Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber  
Report No. : 10832564S-E-R1  
Date : June 20, 2015      June 21, 2015  
Temperature / Humidity : 24 deg. C / 63 % RH      23 deg. C / 57 % RH  
Engineer : Yosuke Ishikawa      Yosuke Ishikawa  
            (18-26.5 GHz      (1-18 GHz)  
            30-1000 MHz)  
Mode : Tx 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.	107.993	QP	37.2	11.2	7.5	32.1	0.0	23.8	43.5	19.7	149	113	
Hori.	217.608	QP	36.2	16.5	8.2	32.0	0.0	28.9	46.0	17.1	162	302	
Hori.	264.085	QP	34.7	17.6	8.4	32.0	0.0	28.7	46.0	17.3	131	138	
Hori.	479.994	QP	36.6	17.5	9.4	31.9	0.0	31.6	46.0	14.4	100	214	
Hori.	628.289	QP	28.1	19.6	10.0	31.9	0.0	25.8	46.0	20.2	100	342	
Hori.	4882.000	PK	50.9	30.9	5.8	39.5	1.6	49.7	73.9	24.2	106	200	
Hori.	7323.000	PK	43.9	36.8	7.2	40.2	1.6	49.3	73.9	24.6	100	0	
Hori.	9764.000	PK	44.1	38.6	8.3	39.5	1.6	53.1	73.9	20.8	100	0	
Hori.	4882.000	AV	41.1	30.9	5.8	39.5	1.6	39.9	53.9	14.0	106	200	
Hori.	7323.000	AV	32.7	36.8	7.2	40.2	1.6	38.1	53.9	15.8	100	0	
Hori.	9764.000	AV	32.4	38.6	8.3	39.5	1.6	41.4	53.9	12.5	100	0	
Vert.	147.257	QP	36.4	14.6	7.8	32.1	0.0	26.7	43.5	16.8	100	251	
Vert.	262.680	QP	34.3	17.6	8.4	32.0	0.0	28.3	46.0	17.7	100	353	
Vert.	595.335	QP	32.3	19.2	9.9	31.9	0.0	29.5	46.0	16.5	100	279	
Vert.	850.950	QP	25.1	21.8	10.9	31.2	0.0	26.6	46.0	19.4	100	360	
Vert.	4882.000	PK	49.6	30.9	5.8	39.5	1.6	48.4	73.9	25.5	147	307	
Vert.	7323.000	PK	44.5	36.8	7.2	40.2	1.6	49.9	73.9	24.0	100	0	
Vert.	9764.000	PK	44.3	38.6	8.3	39.5	1.6	53.3	73.9	20.6	100	0	
Vert.	4882.000	AV	40.3	30.9	5.8	39.5	1.6	39.1	53.9	14.8	147	307	
Vert.	7323.000	AV	32.8	36.8	7.2	40.2	1.6	38.2	53.9	15.7	100	0	
Vert.	9764.000	AV	32.3	38.6	8.3	39.5	1.6	41.3	53.9	12.6	100	0	

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

Distance factor : 1 GHz - 15 GHz :  $20\log(3.6\text{ m} / 3.0\text{ m}) = 1.6\text{ dB}$

15 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. : 10832564S-E-R1  
Date : June 20, 2015      June 21, 2015  
Temperature / Humidity : 24 deg. C / 63 % RH      23 deg. C / 57 % RH  
Engineer : Yosuke Ishikawa      Yosuke Ishikawa  
            (18-26.5 GHz      (1-18 GHz)  
            30-1000 MHz)  
Mode : Tx 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.	107.995	QP	37.2	11.2	7.5	32.1	0.0	23.8	43.5	19.7	151	94	
Hori.	222.626	QP	34.7	16.6	8.2	32.0	0.0	27.5	46.0	18.5	156	308	
Hori.	265.003	QP	34.6	17.7	8.5	32.0	0.0	28.8	46.0	17.2	137	139	
Hori.	479.997	QP	36.5	17.5	9.4	31.9	0.0	31.5	46.0	14.5	100	213	
Hori.	590.611	QP	33.2	19.1	9.8	31.9	0.0	30.2	46.0	15.8	100	209	
Hori.	624.357	QP	34.2	19.5	10.0	31.9	0.0	31.8	46.0	14.2	100	340	
Hori.	2483.500	PK	51.3	26.6	13.7	41.0	1.6	52.2	73.9	21.7	223	316	
Hori.	4960.000	PK	48.7	31.2	5.9	39.4	1.6	48.0	73.9	25.9	100	220	
Hori.	7440.000	PK	44.6	37.0	7.2	40.4	1.6	50.0	73.9	23.9	100	0	
Hori.	9920.000	PK	43.5	38.6	8.2	39.4	1.6	52.5	73.9	21.4	100	0	
Hori.	2483.500	AV	38.2	26.6	13.7	41.0	1.6	39.1	53.9	14.8	223	316	
Hori.	4960.000	AV	37.9	31.2	5.9	39.4	1.6	37.2	53.9	16.7	100	220	
Hori.	7440.000	AV	32.7	37.0	7.2	40.4	1.6	38.1	53.9	15.8	100	0	
Hori.	9920.000	AV	31.9	38.6	8.2	39.4	1.6	40.9	53.9	13.0	100	0	
Vert.	147.044	QP	32.3	14.6	7.8	32.1	0.0	22.6	43.5	20.9	100	167	
Vert.	254.392	QP	30.4	17.2	8.4	32.0	0.0	24.0	46.0	22.0	100	156	
Vert.	606.585	QP	31.3	19.3	9.9	31.9	0.0	28.6	46.0	17.4	100	278	
Vert.	848.100	QP	25.3	21.7	10.8	31.3	0.0	26.5	46.0	19.5	100	360	
Vert.	2483.500	PK	47.1	26.6	13.7	41.0	1.6	48.0	73.9	25.9	249	72	
Vert.	4960.000	PK	47.7	31.2	5.9	39.4	1.6	47.0	73.9	26.9	100	238	
Vert.	7440.000	PK	45.0	37.0	7.2	40.4	1.6	50.4	73.9	23.5	100	0	
Vert.	9920.000	PK	43.7	38.6	8.2	39.4	1.6	52.7	73.9	21.2	100	0	
Vert.	2483.500	AV	35.0	26.6	13.7	41.0	1.6	35.9	53.9	18.0	249	72	
Vert.	4960.000	AV	37.3	31.2	5.9	39.4	1.6	36.6	53.9	17.3	100	238	
Vert.	7440.000	AV	32.9	37.0	7.2	40.4	1.6	38.3	53.9	15.6	100	0	
Vert.	9920.000	AV	31.9	38.6	8.2	39.4	1.6	40.9	53.9	13.0	100	0	

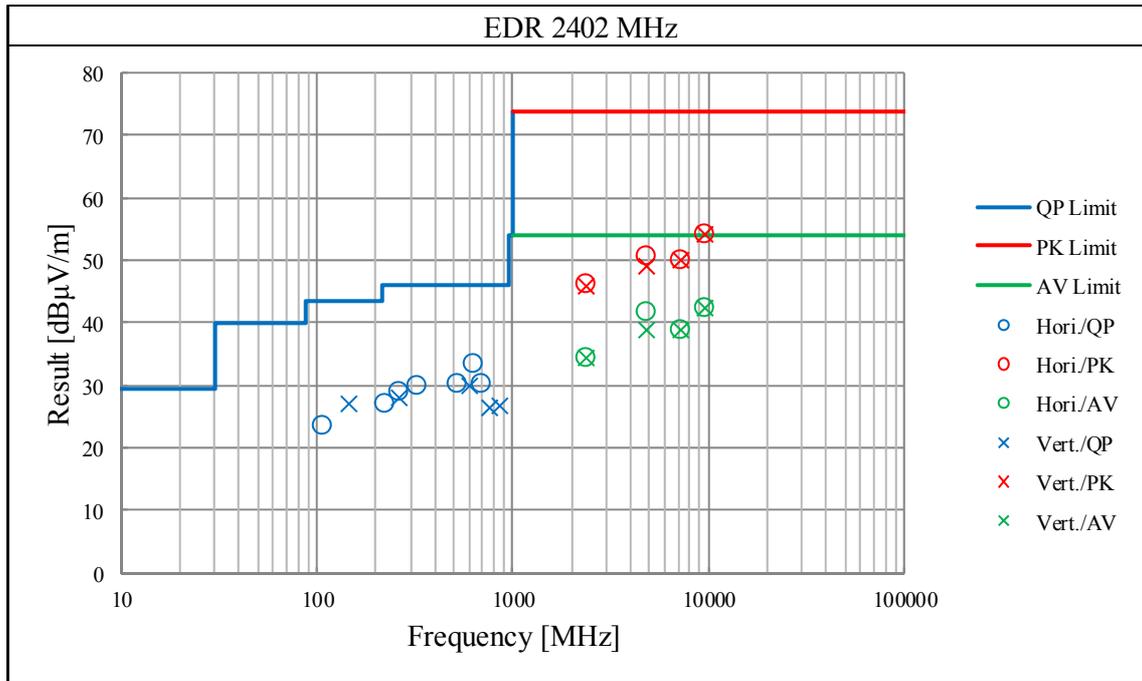
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 15 GHz :  $20\log(3.6\text{ m} / 3.0\text{ m}) = 1.6\text{ dB}$

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

### Radiated Spurious Emission (Worst mode plot)

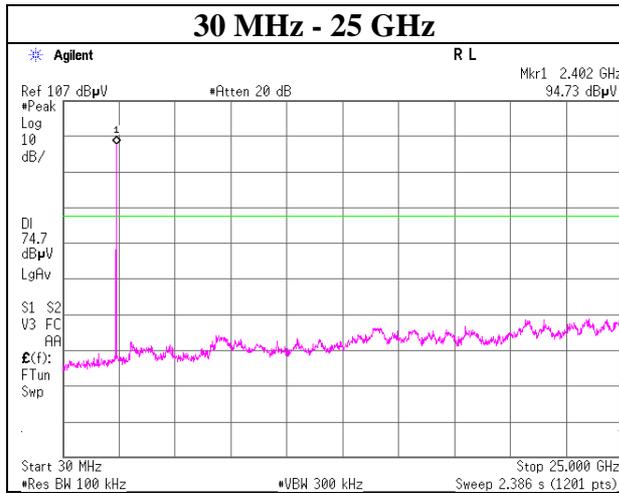
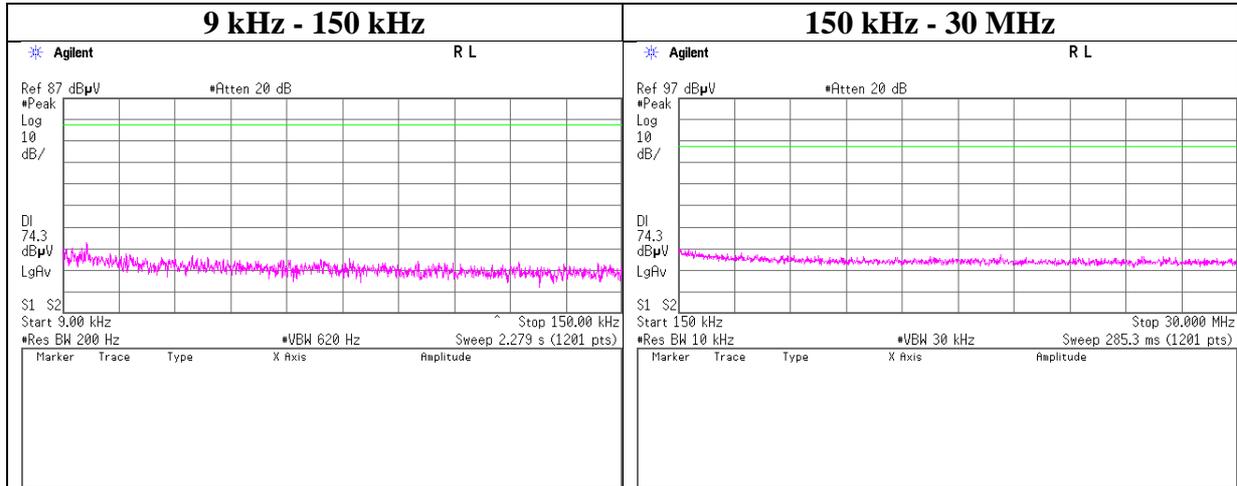
Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	10832564S-E-R1	
Date	June 20, 2015	June 21, 2015
Temperature / Humidity	24 deg. C / 63 % RH	23 deg. C / 57 % RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa
	(18-26.5 GHz	(1-18 GHz)
	30-1000 MHz)	
Mode	Tx 3DH5 2402 MHz	



## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10832564S-E-R1
Date	June 13, 2015
Temperature / Humidity	26 deg. C / 58 % RH
Engineer	Hikaru Shirasawa
Mode	Tx DH5

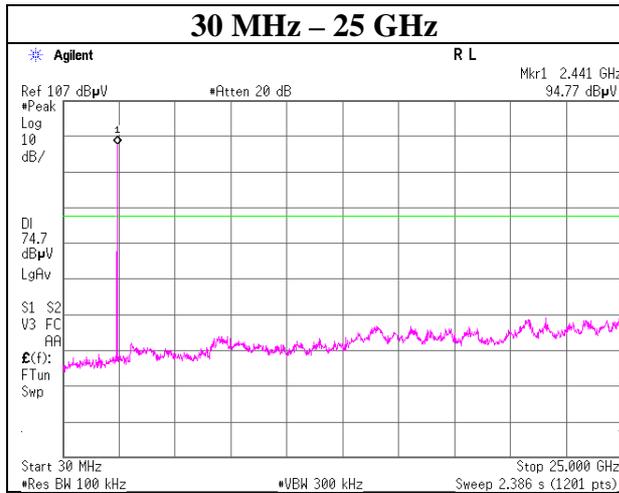
### 2402 MHz



## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10832564S-E-R1
Date	June 13, 2015
Temperature / Humidity	26 deg. C / 58 % RH
Engineer	Hikaru Shirasawa
Mode	Tx DH5

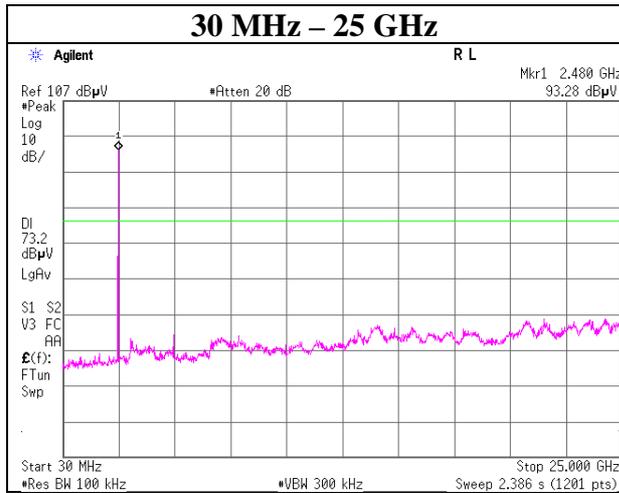
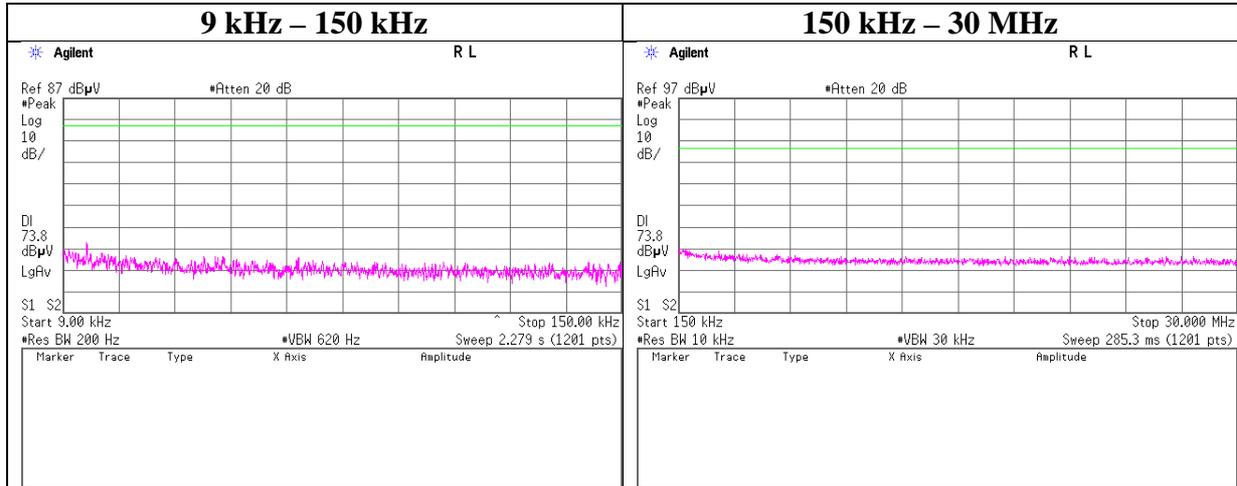
### 2441 MHz



## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10832564S-E-R1
Date	June 13, 2015
Temperature / Humidity	26 deg. C / 58 % RH
Engineer	Hikara Shirasawa
Mode	Tx DH5

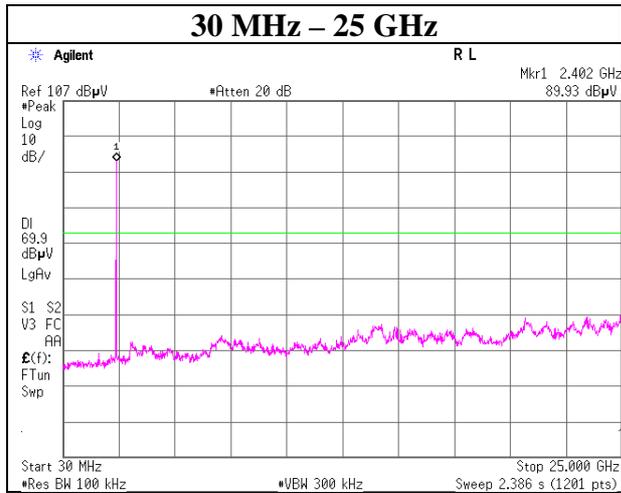
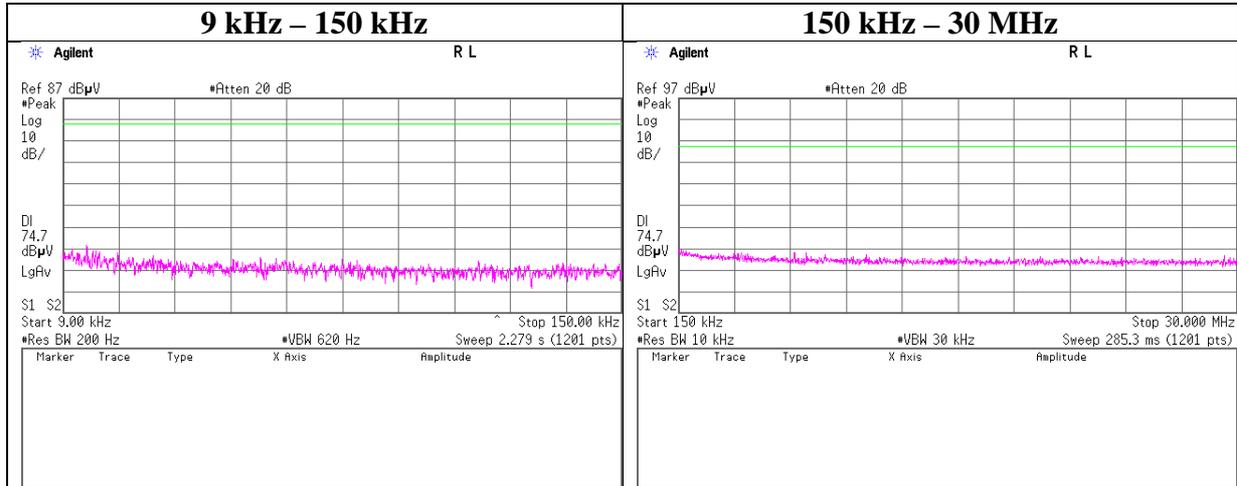
### 2480 MHz



## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10832564S-E-R1
Date	June 13, 2015
Temperature / Humidity	26 deg. C / 58 % RH
Engineer	Hikaru Shirasawa
Mode	Tx 3DH5

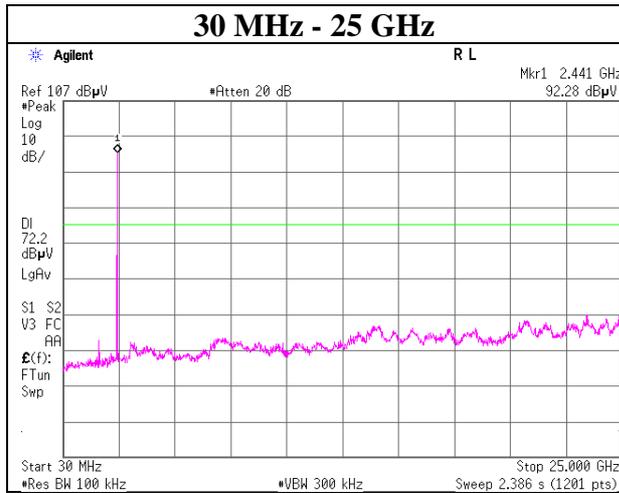
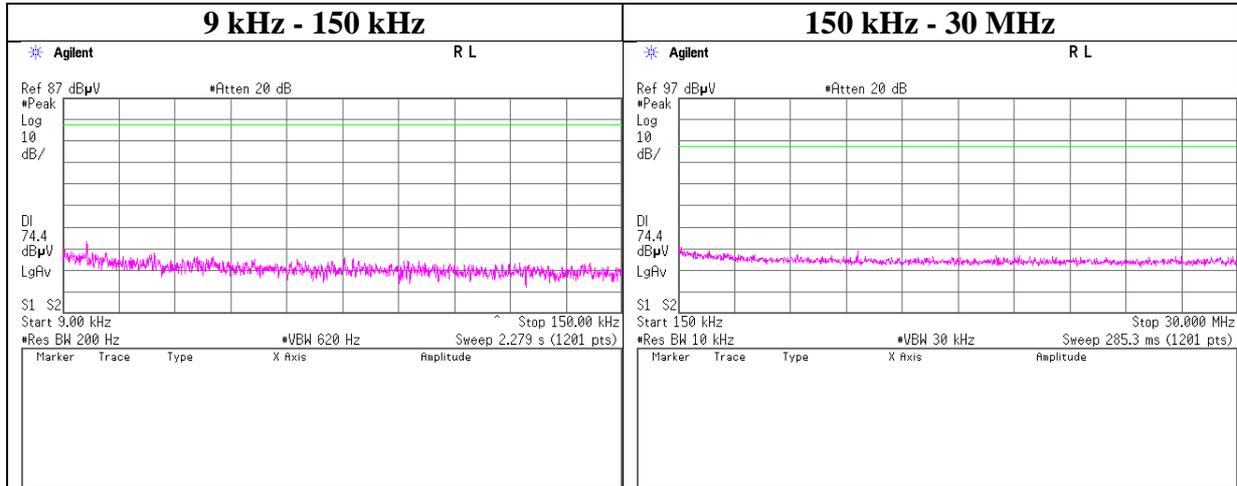
### 2402 MHz



## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10832564S-E-R1
Date	June 13, 2015
Temperature / Humidity	26 deg. C / 58 % RH
Engineer	Hikaru Shirasawa
Mode	Tx 3DH5

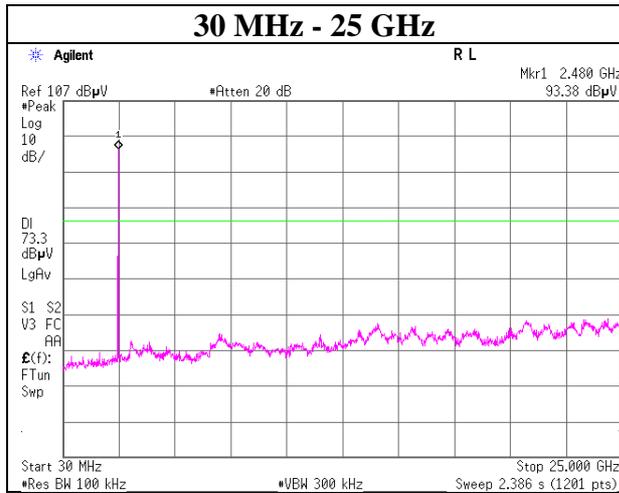
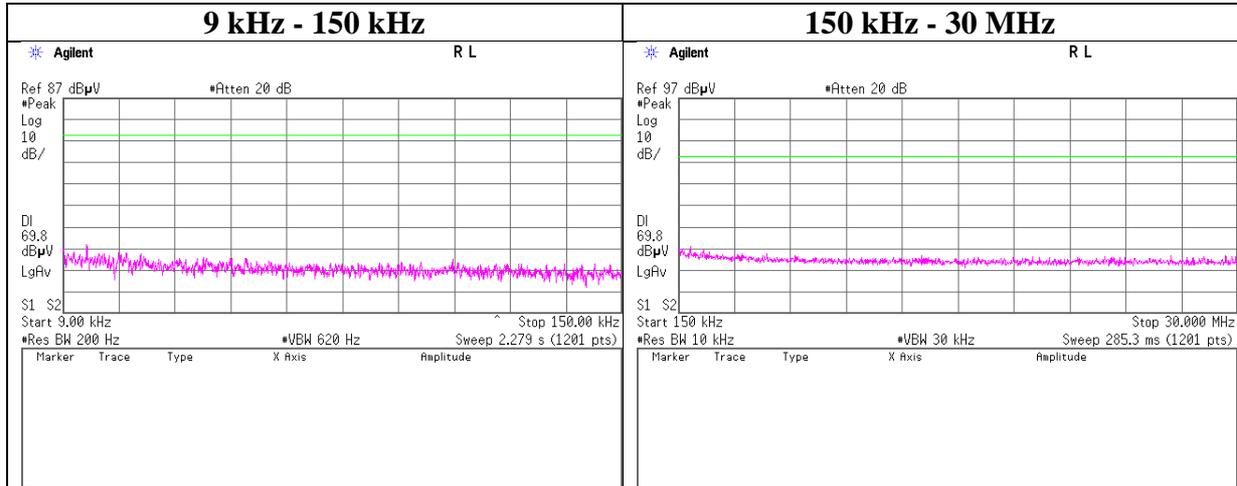
### 2441 MHz



## Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10832564S-E-R1
Date	June 13, 2015
Temperature / Humidity	26 deg. C / 58 % RH
Engineer	Hikaru Shirasawa
Mode	Tx 3DH5

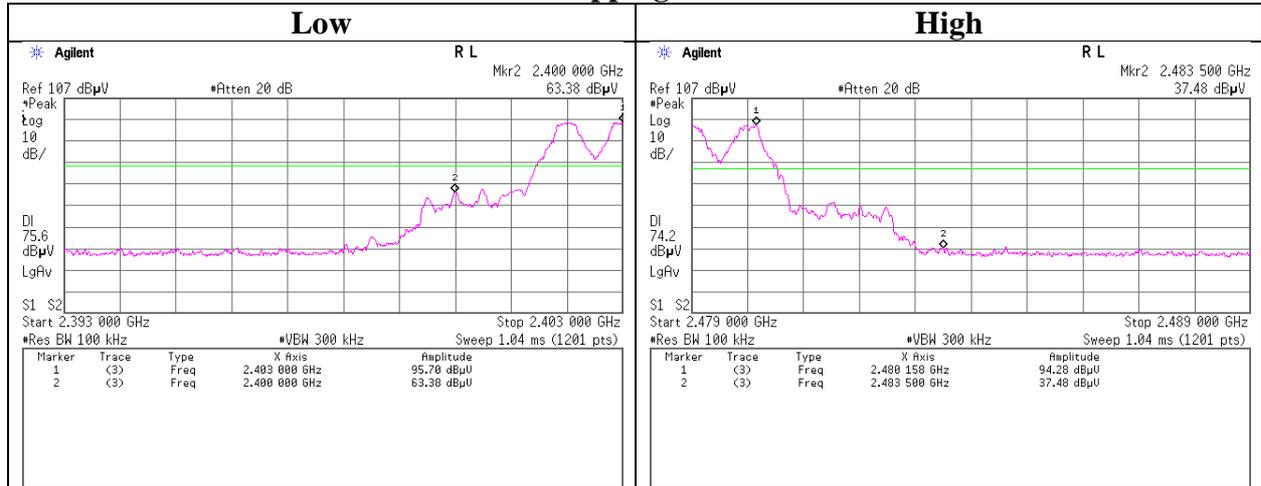
### 2480 MHz



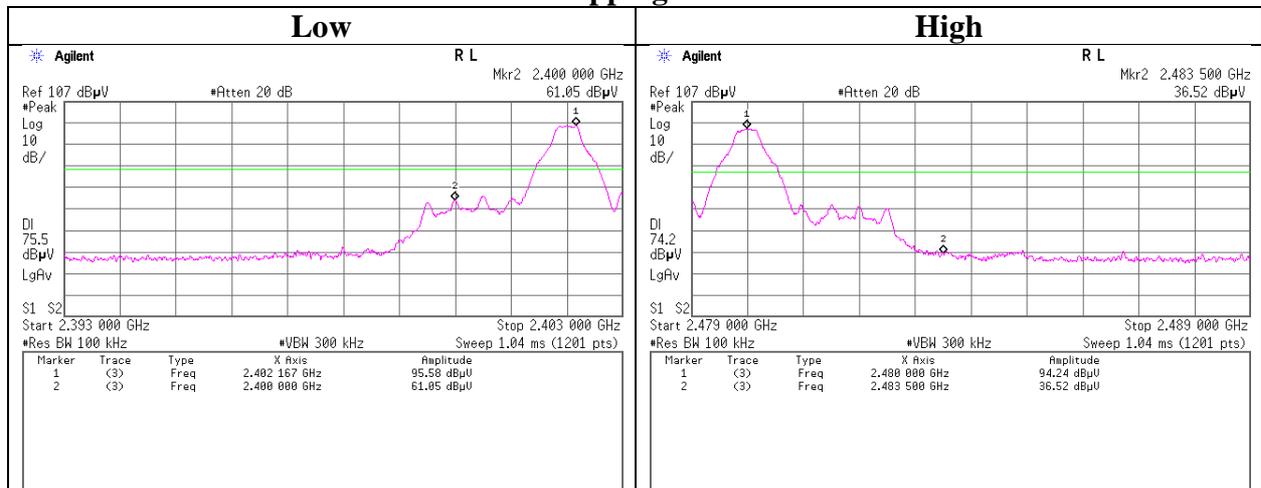
## Conducted Emission Band Edge compliance

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10832564S-E-R1
Date	June 13, 2015
Temperature / Humidity	26 deg. C / 58 % RH
Engineer	Hikaru Shirasawa
Mode	Tx DH5

### Hopping On



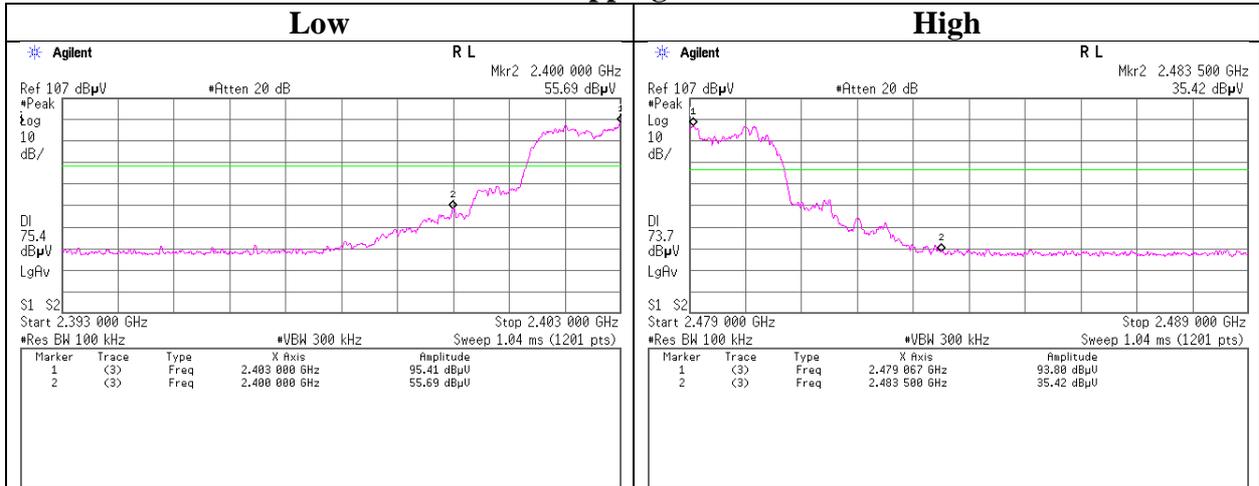
### Hopping Off



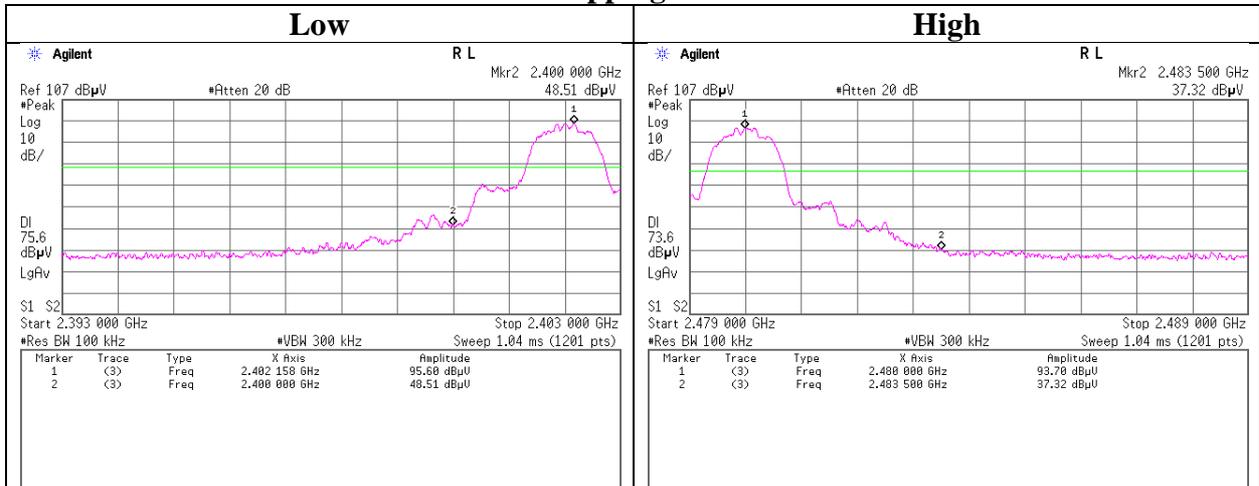
## Conducted Emission Band Edge compliance

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10832564S-E-R1
Date	June 13, 2015
Temperature / Humidity	26 deg. C / 58 % RH
Engineer	Hikaru Shirasawa
Mode	Tx 3DH5

### Hopping On



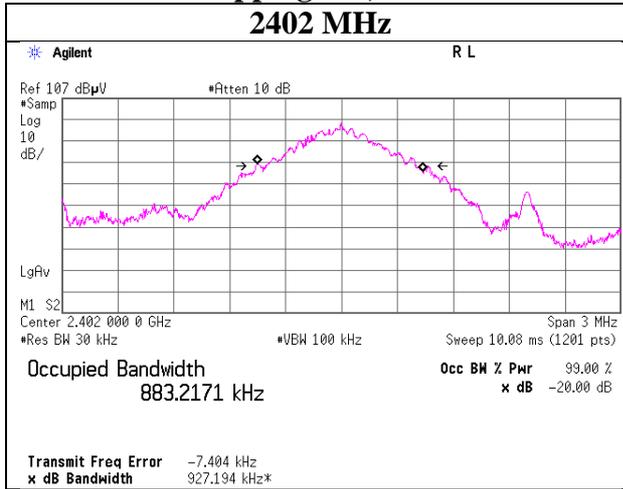
### Hopping Off



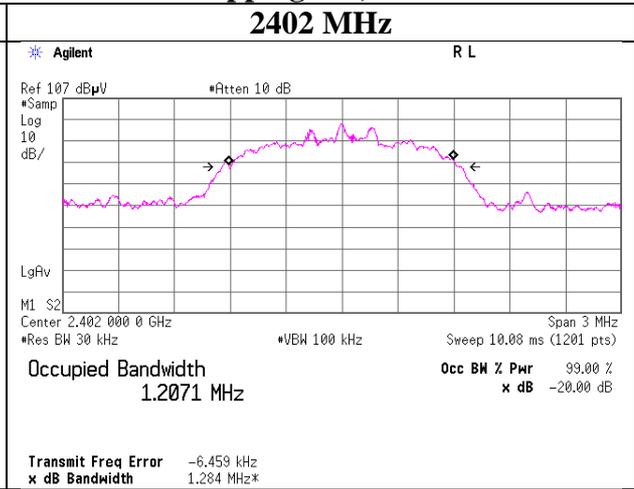
## 99%Occupied Bandwidth

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10832564S-E-R1
Date	June 13, 2015
Temperature / Humidity	26 deg. C / 58 % RH
Engineer	Hikaru Shirasawa
Mode	Tx Hopping Off

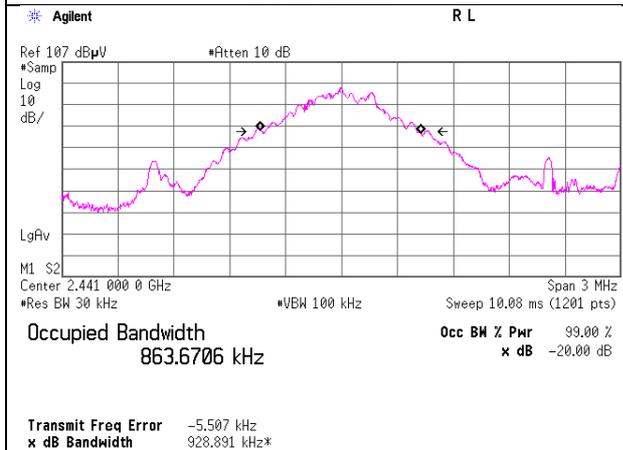
### Hopping Off, DH5 2402 MHz



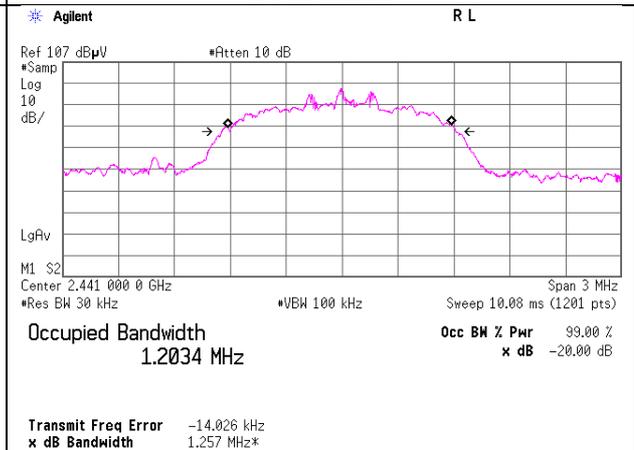
### Hopping Off, 3DH5 2402 MHz

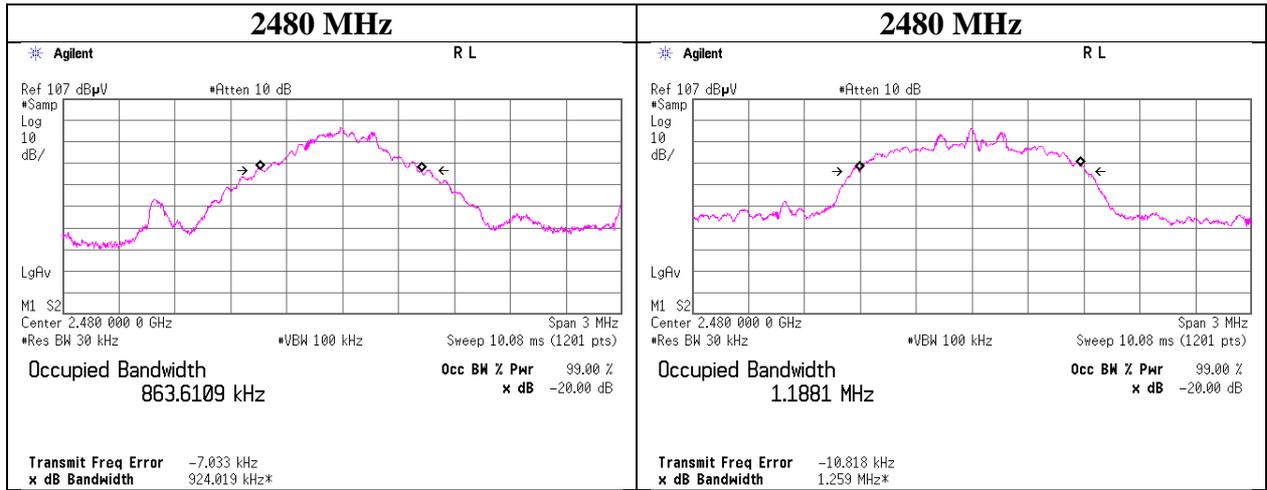


### 2441 MHz



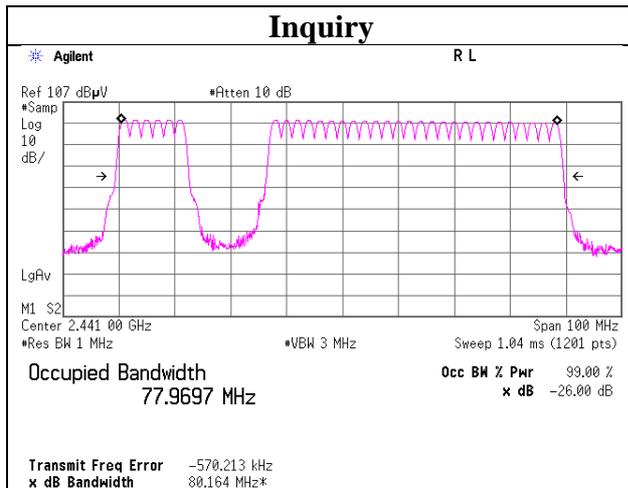
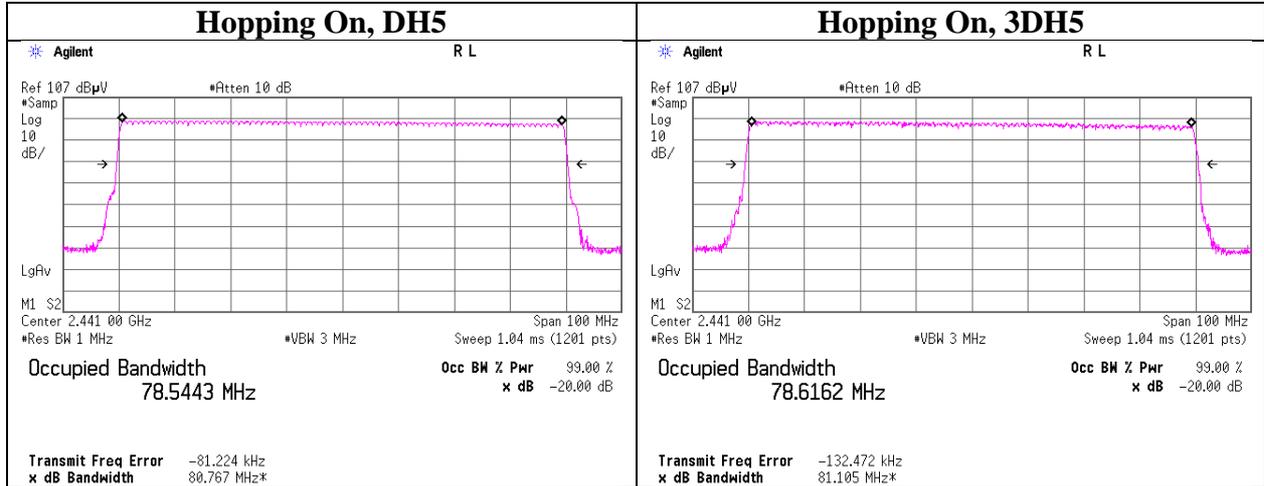
### 2441 MHz





## 99% Occupied Bandwidth

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10832564S-E-R1
Date	June 13, 2015
Temperature / Humidity	26 deg. C / 58 % RH
Engineer	Hikaru Shirasawa
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-03	Spectrum Analyzer	Agilent	E4448A	MY4825015 2	AT	2015/02/24 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2014/11/21 * 12
SCC-G13	Coaxial Cable	Suhner	SUCOFLEX 102	31599/2	AT	2015/03/11 * 12
SPM-07	Power Meter	Agilent	8990B	MY5100272	AT	2015/04/02 * 12
SPSS-04	Power sensor	Agilent	N1923A	MY5326009	AT	2015/04/02 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2014/12/24 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2014/07/14 * 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/ 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
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	-
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY4825010 6	RE	2015/03/26 * 12
SCC-G15	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	RE	2015/03/11 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2015/03/23 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2015/03/17 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2015/05/27 * 12
SCC-G04	Coaxial Cable	Junkosha	J12J102207-00	JUN-12-14- 018	RE	2015/06/08 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2015/05/19 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2014/08/12 * 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
SAEC-03(SVS WR)	Semi-Anechoic Chamber	TDK	SAEC-03(SVS WR)	3	RE	2015/03/11 * 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.**

**RE: Radiated Emission test**

**AT: Antenna Terminal Conducted test**

**UL Japan, Inc.**

**Shonan EMC Lab.**

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13-EM-F0429