



# RADIO TEST REPORT

**Test Report No.: 10064467S-F-R1**

**Applicant** : Sony Corporation  
**Type of Equipment** : Wireless Module  
**Model No.** : WS001  
**FCC ID** : AK8WS001  
**Test regulation** : FCC Part15 Subpart E: 2013  
**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 limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
7. This report is a revised version of 10064467S-F. 10064467S-F is replaced with this report.

**Date of test:** September 6 to 16, 2013

**Tested by:** *S. Takano*  
Shinichi Takano  
Engineer of WiSE Japan,  
UL Verification Service

**Approved by :** *T. Imamura*  
Toyokazu Imamura  
Leader of WiSE Japan,  
UL Verification Service



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

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13-EM-F0429



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## **SECTION 1: Customer information**

Company Name : Sony EMCS Corporation  
Address : 8-4 Shiomi Kisarazu-shi, Chiba, 292-0834 Japan  
Telephone Number : +81-438-37-3982  
Facsimile Number : +81-438-37-4705  
Contact Person : Kazuhiko Nagano

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

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

Type of Equipment : Wireless Module  
Model Number : WS001  
Serial Number : Refer to 4.2 in this report.  
Rating : DC3.3V  
Country of Mass-production : Philippines  
Condition of EUT : Production prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Receipt Date of Sample : September 5, 2013  
Modification of EUT : No modification by the test lab.

### **2.2 Product description**

Model: WS001 (referred to as the EUT in this report) is a Wireless Module.

Clock frequency(ies) in the system : 44MHz

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Radio specification:

Equipment type : Transceiver  
Frequency of operation \*1) : 5180-5240MHz, 5736-5814MHz  
Bandwidth : 17MHz  
Channel spacing : 30MHz  
Type of modulation : DSSS, QPSK  
Antenna type : Printed antenna  
Antenna gain : Antenna A:  
5.2GHz band:1.1dBi (max), 5.8GHz band: 0.8dBi (max)  
Antenna B:  
5.2GHz band:0.5dBi (max), 5.8GHz band: 0.1dBi (max)  
Antenna connector type : None  
ITU code : G1D

\*1) Refer to the test report 10064467S-D for FCC 15.247.

Operation temperature range : -10 to +60 deg.C

FCC 15.31 (e)

The module is provided the stable voltage (DC3.3V) from the host device. Therefore, the equipment complies with the requirement.

FCC 15.203

The antenna is not removable from the EUT. Therefore, the equipment complies with the requirement.

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

### **3.1 Test specification**

Test specification : FCC Part 15 Subpart E: 2013, final revised on June 11, 2013 and effective July 11, 2013  
Title : FCC 47CFR Part15 Radio Frequency Device Subpart E Unlicensed National Information Infrastructure Devices  
Section 15.207 Conducted limits  
Section 15.209 Radiated emission limits, general requirements  
Section 15.407 General technical requirements

### **3.2 Procedures & Results**

Item	Test Procedure *1)	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2009 7. AC powerline conducted emission measurements	FCC 15.407 (b)(6) & 15.207	-	N/A	15.6dB Freq.: 0.46220MHz Detection: Quasi-Peak Phase: N Mode: Tx 5240MHz Antenna: B	Complied
26dB & 20dB emission bandwidth	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.407 (a)(1)(2)(3) FCC 15.215 (c)	Conducted	N/A	See data	-
Maximum conducted output power	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.407 (a)(1)(2)(3)	Conducted	N/A		Complied
Peak power spectral density	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.407 (a)(1)(2)(3)	Conducted	N/A		Complied
Peak excursion ratio	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.407 (a)(6)	Conducted	N/A		Complied
Spurious emission & Restricted band edges	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.109, 15.407 (b), 15.205 & 15.209	Radiated	N/A		4.2dB Freq.: 10420.000MHz Polarization: Vertical Detection: Peak Mode: Tx 5210MHz Antenna: B Freq.: 10480.000MHz Polarization: Vertical Detection: Peak Mode: Tx 5210MHz Antenna: B
Dynamic frequency selection	FCC 06-96 APPENDIX	FCC 15.407 (h)	Conducted	N/A *2)	N/A	N/A

\*1) These tests were also referred to KDB 789033 (FCC), "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E".  
\*2) The test is not applicable since the EUT does not operate in the 5.25-5.35 GHz and 5.47-5.725 GHz bands.  
Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422

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### 3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied bandwidth (99%)	ANSI C63.4:2009, RSS-Gen 4.6.1	-	Conducted	-	-

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

\* 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.

Item	Frequency range	No.1 SAC <sup>*1</sup> /SR <sup>*2</sup> (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
<b>Conducted emission (AC Mains) LISN</b>	150kHz-30MHz	3.6 dB	3.6 dB	3.5 dB
<b>Radiated emission (Measurement distance: 3m)</b>	9kHz-30MHz	3.7 dB	3.7 dB	3.6 dB
	30MHz-300MHz	4.8 dB	5.0 dB	4.8 dB
	300MHz-1GHz	5.0 dB	5.0 dB	4.8 dB
	1GHz-15GHz	4.9 dB	4.9 dB	4.9 dB
<b>Radiated emission (Measurement distance: 1m)</b>	15GHz-18GHz	5.7 dB	5.6 dB	5.6 dB
	18GHz-40GHz	5.2 dB	4.3 dB	4.3 dB

\*1: SAC=Semi-Anechoic Chamber

\*2: SR= Shielded Room is applied besides radiated emission

#### Conducted emission test

The data listed in this test report has enough margin, more than the site margin.

#### Radiated emission test

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

#### Antenna port conducted test

Power measurement uncertainty above 1GHz for this test was: (±) 1.5dB

Spurious emission (Conducted) measurement (below 1GHz) uncertainty for this test was: (±) 1.6dB

Spurious emission (Conducted) measurement (1G-3GHz) uncertainty for this test was: (±) 1.4dB

Spurious emission (Conducted) measurement (3G-18GHz) uncertainty for this test was: (±) 2.8dB

Spurious emission (Conducted) measurement (18G-26.5GHz) uncertainty for this test was: (±) 2.5dB

Spurious emission (Conducted) measurement (26.5-50GHz) uncertainty for this test was: (±) 2.7dB

Bandwidth measurement uncertainty for this test was: (±) 5.4%

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### 3.5 Test location

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JAB Accreditation No. : RTL02610

	FCC Registration No.	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
<input checked="" type="checkbox"/> No.1 semi-anechoic chamber	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input checked="" type="checkbox"/> No.2 semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input type="checkbox"/> No.3 semi-anechoic chamber	697847	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
<input type="checkbox"/> No.4 semi-anechoic chamber	-	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
<input type="checkbox"/> No.1 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input checked="" type="checkbox"/> No.2 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.3 shielded room	-	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
<input type="checkbox"/> No.4 shielded room	-	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
<input checked="" type="checkbox"/> No.5 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
<input type="checkbox"/> No.6 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
<input type="checkbox"/> No.7 shielded room	-	-	2.76 x 3.76 x 2.4	2.76 x 3.76	-

### 3.6 Test setup, Test data & Test instruments

Refer to APPENDIX 1 to 3.

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

### 4.1 Operating mode

Test item	Mode	Tested frequency
All items	Transmitting	5180MHz, 5210MHz, 5240MHz

EUT has the power settings by the software as follows;

Test software: GUI\_Demo\_01.05.29\_8192.exe, MCU version SERIAL\_COM\_8179

Power settings: Fixed

Antenna port used:

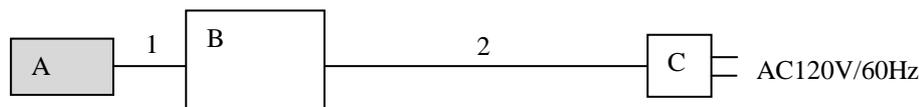
Conducted emission test *1)	- Antenna B
Radiated emission test *1)	- Antenna B
Antenna port conducted tests *2)	- Antenna A

\*1) The worse antenna port was determined based on the test result of pre-check measurement. Refer to Comparison Sheet of Antenna A and B.

\*2) The worse antenna port was determined based on the test result of Maximum Peak Output Power. Refer to Comparison Sheet of Antenna A and B.

**Justification:** The system was configured in typical fashion (as customer would normally use it) for testing.

### 4.2 Configuration and peripherals



\* Test data was taken under worse case conditions.

#### Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Wireless Module	WS001	*1)	Sony Corporation	EUT
B	Jig	-	-	Sony Corporation	-
C	AC Adaptor	ADS6818-0610	7620003234W	Actiontec	-

\*1) Antenna port conducted tests: NR-No.4, 2000158, Other tests: NR-No.2

#### List of cables used

No.	Cable Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Flat	0.09	Unshielded	Unshielded	-
2	DC	1.8	Unshielded	Unshielded	-

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## **SECTION 5: Conducted emission**

### **5.1 Operating environment**

Test place : See test data (APPENDIX 1)  
Temperature : See test data (APPENDIX 1)  
Humidity : See test data (APPENDIX 1)

### **5.2 Test configuration**

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 0.8m above the conducting ground plane. The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals was aligned and was flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from LISN. Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN to the input power source. Photographs of the set up are shown in APPENDIX 3.

### **5.3 Test conditions**

Frequency range : 0.15 - 30MHz  
EUT position : Table top

### **5.4 Test procedure**

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT via host device within a Shielded room. The EUT was connected to a Line Impedance Stabilization Network (LISN) via host device. An overview sweep with peak detection has been performed. The measurements had been performed with a quasi-peak detector and if required, a CISPR average detector. The conducted emission measurements were made with the following detection of the test receiver.

Detection Type : Quasi-Peak/ CISPR Average  
IF Bandwidth : 9kHz

### **5.5 Results**

Summary of the test results : Pass  
Refer to APPENDIX 1

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## **SECTION 6: Radiated emission**

### **6.1 Operating environment**

Test place : See test data (APPENDIX 1)  
Temperature : See test data (APPENDIX 1)  
Humidity : See test data (APPENDIX 1)

### **6.2 Test configuration**

EUT was placed on a urethane platform of nominal size, 0.5m by 0.5m, raised 0.8m above the conducting ground plane. Photographs of the set up are shown in APPENDIX 3.

### **6.3 Test conditions**

Frequency range : 30MHz to 40GHz  
EUT position : Table top

### **6.4 Test procedure**

The Radiated Electric Field Strength intensity has been measured on a semi-anechoic chamber with a ground plane and at a distance of 3m (below 15GHz) / 1m (above 15GHz). Measurements were performed with quasi-peak, peak and average detector. The measuring antenna height was varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity. The measurements were performed for both vertical and horizontal antenna polarization. Drawing of the antenna direction is shown in Figure 1.

The radiated emission measurements were made with the following detection.

Frequency	30-1000MHz	1-40GHz	
Detection type	Quasi-Peak	Peak	Average *1)
IF Bandwidth	120kHz	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: *2

\*1) The test method was referred to Section H) 6) d) Method VB (Averaging using reduced video bandwidth) of FCC KDB 789033 D01 "Guidelines for Compliance Testing of unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E"

\*2) When duty cycle > 98 percent, VBW was set at 10Hz.

When duty cycle < 98 percent, VBW (Average) calculation sheet in APPENDIX 1.

Detector and averaging type set for linear voltage averaging.

Below 1GHz

The result also satisfied with the general limits specified in FCC 15.209 (a).

Above 1GHz

Inside of restricted bands (FCC 15.205): Limit in FCC 15.209 (a)

Outside of the restricted bands: Limit 68.2dBuV/m (-27dBm e.i.r.p.\*) in FCC 15.407(b)(1)(2)(3)

Restricted band edge: Limit in FCC 15.209(a)

Since this limit is severer than the limit of the inside of restricted bands.

\*Electric Field Strength to e.i.r.p. conversion

$P [dBm] = E [dBuV/m] - 95.2 [dB]$

$P [dBm] = 10 \times \text{LOG} ( ( \{ 10 ^ ( E [dBuV/m] / 20 ) * 10 ^ (-6) * ( \text{Distance} = 3[m] ) ) ^ 2 \} / 30 ) \times 10 ^ 3 ) (uV/m):$

P is the e.i.r.p. (Watts)

\* Distance Factor for the measurement at 1m:  $20 \times \text{log} ( 3.0m/1.0m ) = 9.5dB$

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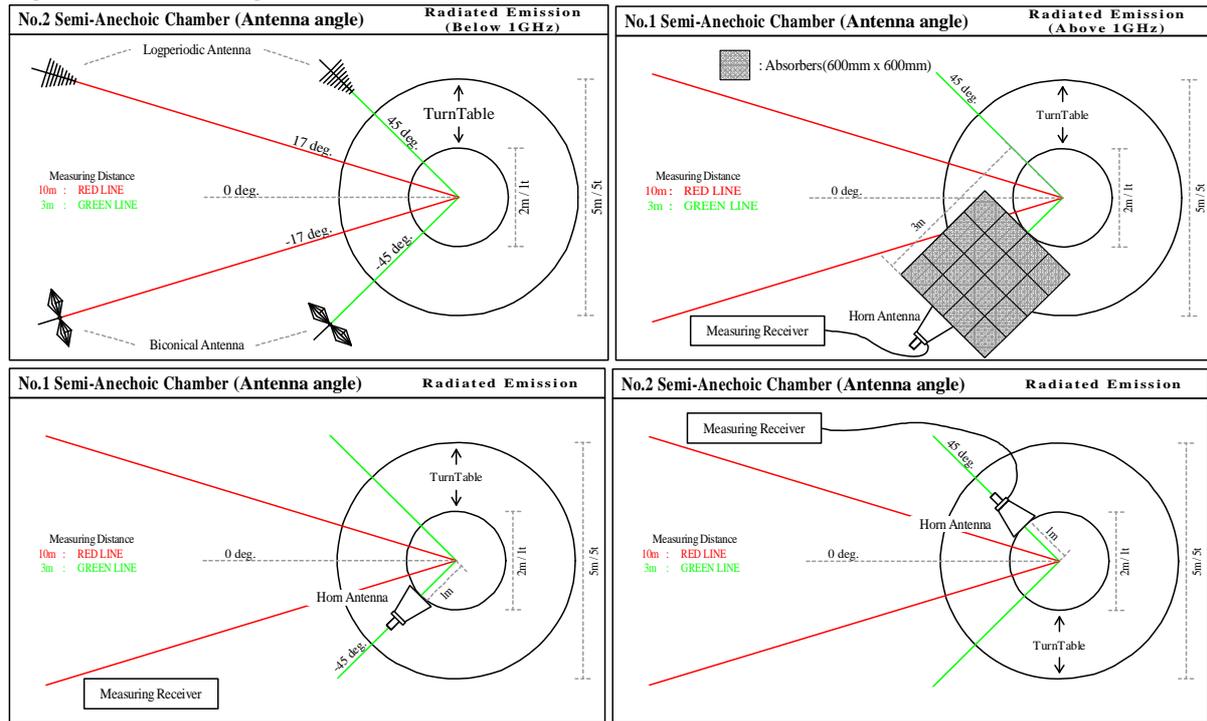
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The carrier levels and noise levels were confirmed at each position of X, Y and Z axes to see the position of maximum noise, and the test was made at the position that has the maximum noise.

**Worst case:**

Antenna polarization	Carrier	Spurious (Below 1GHz)	Spurious (1-15GHz)	Spurious (Above 15GHz)
Horizontal	X	Y	X	X
Vertical	Z	Y	Z	X

**Figure 1. Antenna angle**



**6.5 Band edge**

Band edge level at 5150MHz and 5350MHz are below the limits of FCC 15.209.

**6.6 Results**

Summary of the test results : Pass  
\* No noise was detected other than listed points.

Refer to APPENDIX 1

## **SECTION 7: Antenna terminal conducted tests**

### **Test Procedure**

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

<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 and Test method</b>
26dB bandwidth	Enough width to display	Close to 1% of EBW	Greater than RBW	Auto	Peak	Max Hold	Spectrum Analyzer
99% occupied bandwidth	Enough width to display	Close to 1% of Span	Three times of RBW	Auto	Sample	Max Hold	Spectrum Analyzer
20dB bandwidth	Enough width to display	Close 1% to 5% of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum conducted output power *1)	-	-	50MHz	-	-	-	Power Meter method PM
Peak power spectral density *2)	Enough width to display	1MHz	3MHz	Auto	RMS-Average Power Averaging (100 times)	Clear Write	Spectrum Analyzer method SA-2
Peak excursion ratio	Enough width to display	1MHz	3MHz	Auto	Peak	Max Hold	Spectrum Analyzer method SA-2
					RMS-Average Power Averaging (100 times)	Clear Write	

\*EBW: Emission Bandwidth

\*1) Maximum Conducted Output Power was measured based on Method PM of "Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E".

\*2) PSD was measured based on Method SA-2 of "Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E".

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

Summary of the test results : Pass

Refer to APPENDIX 1

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## **Contents of APPENDIXES**

### **APPENDIX 1: Data of Radio tests**

Conducted emission  
26dB bandwidth  
99% Occupied bandwidth  
20dB bandwidth  
Maximum conducted output power  
Radiated emission  
Peak power density  
Peak excursion ratio

Comparison Sheet of Antenna A and B

### **APPENDIX 2: Test instruments**

Test instruments

### **APPENDIX 3: Photographs of test setup**

Conducted emission  
Radiated emission  
Pre-check of worst position

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# DATA OF CONDUCTED EMISSION TEST

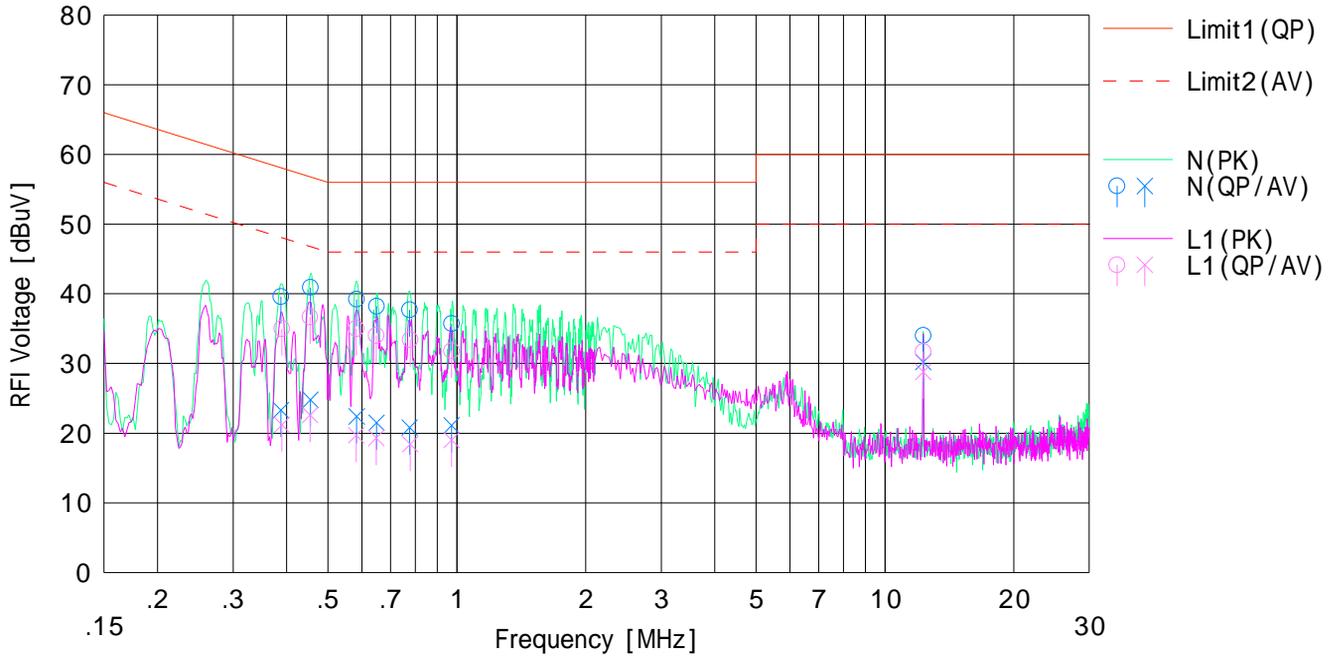
UL Japan, Inc. Shonan EMC Lab. No.2 Shielded Room  
Date : 2013/09/16

Company : SONY Corporation  
Kind of EUT : Wireless module  
Model No. : WS001  
Serial No. : NR-No.2  
Remarks : Ant-B

Mode : Tx 5180MHz, ANT-B  
Order No. : 10064467S  
Power : AC 120V / 60Hz  
Temp./Humi. : 24deg.C / 58%RH

Limit1 : FCC 15C(15.207) QP  
Limit2 : FCC 15C(15.207) AV

Engineer : Wataru Kojima



No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.38830	27.0	10.7	12.6	39.6	23.3	58.0	48.0	18.4	24.7	N	
2	0.45505	28.3	12.2	12.6	40.9	24.8	56.7	46.7	15.8	21.9	N	
3	0.58335	26.6	9.8	12.6	39.2	22.4	56.0	46.0	16.8	23.6	N	
4	0.64900	25.6	8.9	12.6	38.2	21.5	56.0	46.0	17.8	24.5	N	
5	0.77610	25.1	8.2	12.6	37.7	20.8	56.0	46.0	18.3	25.2	N	
6	0.97190	23.1	8.5	12.6	35.7	21.1	56.0	46.0	20.3	24.9	N	
7	12.28995	20.6	16.8	13.4	34.0	30.2	60.0	50.0	26.0	19.8	N	
8	0.39025	22.4	8.6	12.6	35.0	21.2	58.0	48.0	23.0	26.8	L1	
9	0.45380	24.1	10.0	12.6	36.7	22.6	56.8	46.8	20.1	24.2	L1	
10	0.58170	22.4	7.1	12.6	35.0	19.7	56.0	46.0	21.0	26.3	L1	
11	0.64790	21.4	6.7	12.6	34.0	19.3	56.0	46.0	22.0	26.7	L1	
12	0.77787	20.8	5.8	12.6	33.4	18.4	56.0	46.0	22.6	27.6	L1	
13	0.97225	19.2	6.4	12.6	31.8	19.0	56.0	46.0	24.2	27.0	L1	
14	12.28995	18.3	15.4	13.4	31.7	28.8	60.0	50.0	28.3	21.2	L1	

# DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.2 Shielded Room

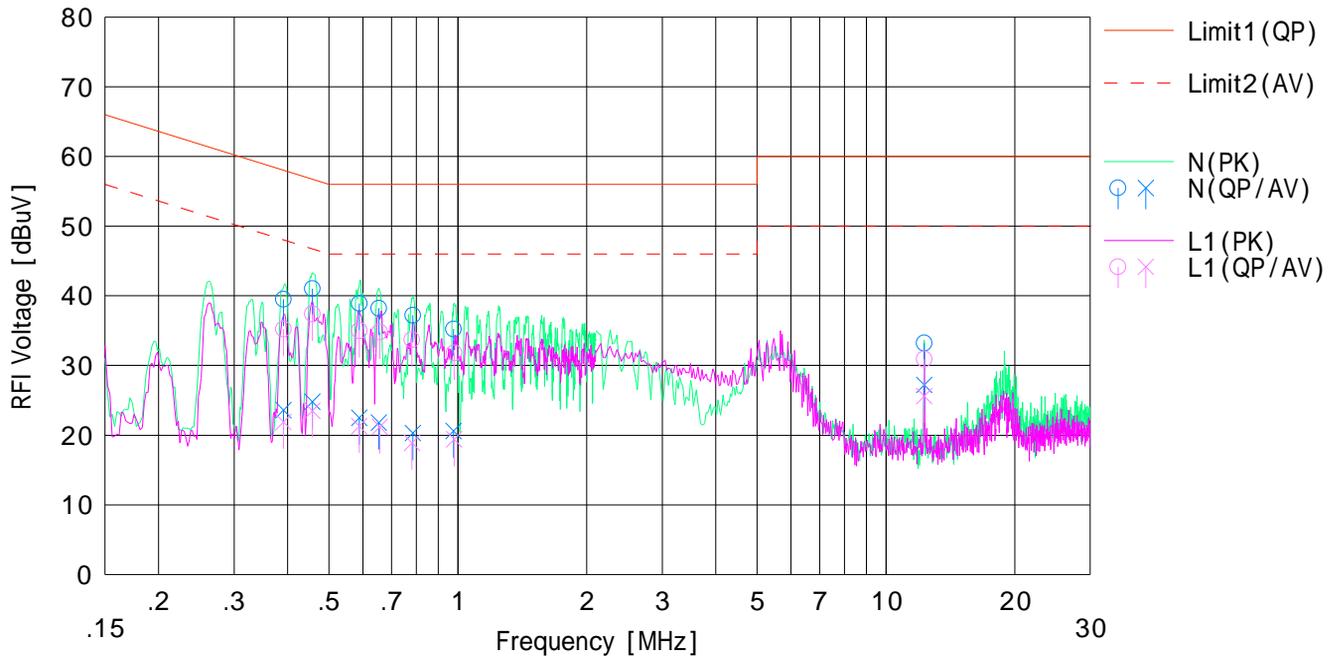
Date : 2013/09/16

Company : SONY Corporation  
 Kind of EUT : Wireless module  
 Model No. : WS001  
 Serial No. : NR-No.2  
 Remarks : Ant-B

Mode : Tx 5210MHz, ANT-B  
 Order No. : 10064467S  
 Power : AC 120V / 60Hz  
 Temp./Humi. : 24deg.C / 58%RH

Limit1 : FCC 15C(15.207) QP  
 Limit2 : FCC 15C(15.207) AV

Engineer : Wataru Kojima



No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.39145	26.9	11.0	12.6	39.5	23.6	58.0	48.0	18.5	24.4	N	
2	0.45735	28.4	12.2	12.6	41.0	24.8	56.7	46.7	15.7	21.9	N	
3	0.58860	26.3	9.9	12.6	38.9	22.5	56.0	46.0	17.1	23.5	N	
4	0.65390	25.6	9.2	12.6	38.2	21.8	56.0	46.0	17.8	24.2	N	
5	0.78470	24.6	7.7	12.6	37.2	20.3	56.0	46.0	18.8	25.7	N	
6	0.97776	22.6	8.0	12.6	35.2	20.6	56.0	46.0	20.8	25.4	N	
7	12.28996	19.8	13.8	13.4	33.2	27.2	60.0	50.0	26.8	22.8	N	
8	0.39150	22.6	9.3	12.6	35.2	21.9	58.0	48.0	22.8	26.1	L1	
9	0.45700	24.8	10.9	12.6	37.4	23.5	56.7	46.7	19.3	23.2	L1	
10	0.58920	22.4	8.7	12.6	35.0	21.3	56.0	46.0	21.0	24.7	L1	
11	0.65730	22.2	8.6	12.6	34.8	21.2	56.0	46.0	21.2	24.8	L1	
12	0.78120	21.1	6.3	12.6	33.7	18.9	56.0	46.0	22.3	27.1	L1	
13	0.98040	19.2	6.8	12.6	31.8	19.4	56.0	46.0	24.2	26.6	L1	
14	12.28996	17.5	12.2	13.4	30.9	25.6	60.0	50.0	29.1	24.4	L1	

# DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.2 Shielded Room

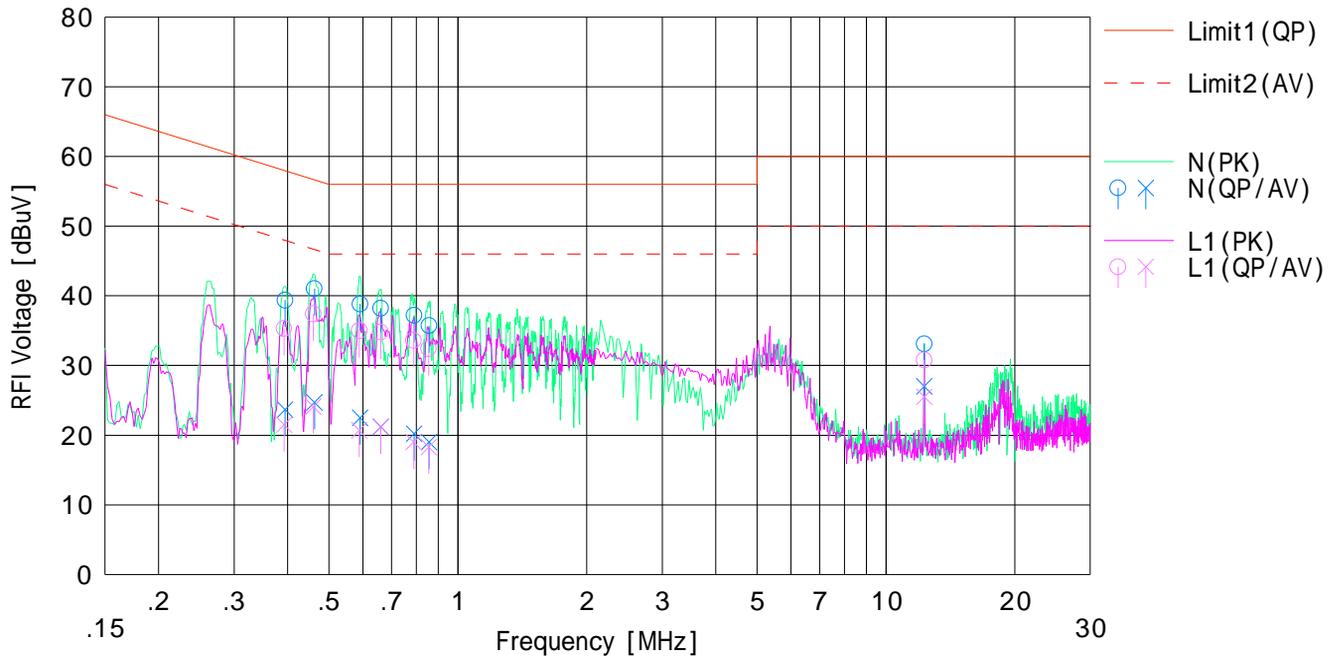
Date : 2013/09/16

Company : SONY Corporation  
 Kind of EUT : Wireless module  
 Model No. : WS001  
 Serial No. : NR-No.2  
 Remarks : Ant-B

Mode : Tx 5240MHz, ANT-B  
 Order No. : 10064467S  
 Power : AC 120V / 60Hz  
 Temp./Humi. : 24deg.C / 58%RH

Limit1 : FCC 15C(15.207) QP  
 Limit2 : FCC 15C(15.207) AV

Engineer : Wataru Kojima

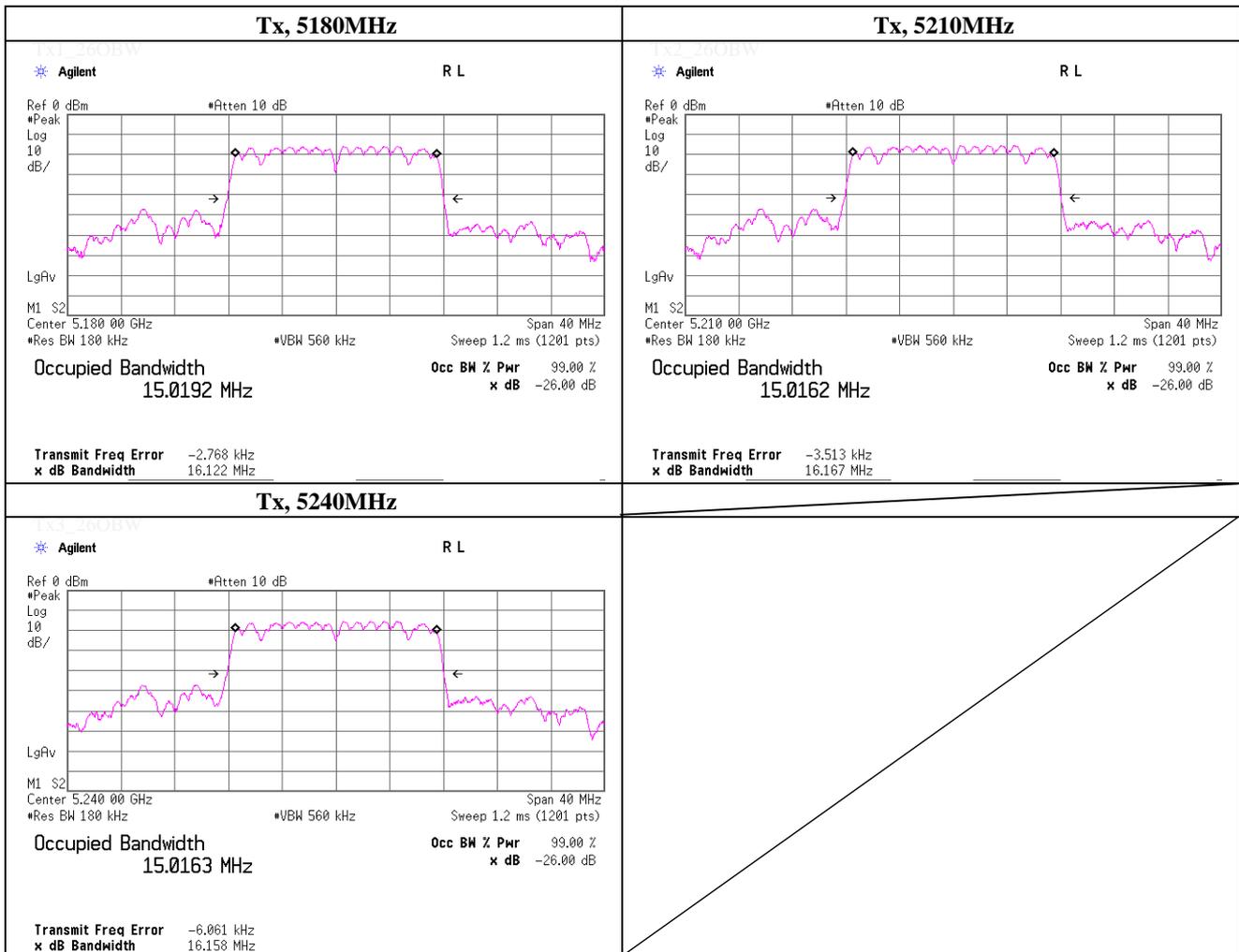


No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.39480	26.8	11.1	12.6	39.4	23.7	57.9	47.9	18.5	24.2	N	
2	0.46220	28.4	12.1	12.6	41.0	24.7	56.6	46.6	15.6	21.9	N	
3	0.59085	26.2	9.9	12.6	38.8	22.5	56.0	46.0	17.2	23.5	N	
4	0.66030	25.6	8.6	12.6	38.2	21.2	56.0	46.0	17.8	24.8	N	
5	0.79065	24.6	7.6	12.6	37.2	20.2	56.0	46.0	18.8	25.8	N	
6	0.85650	23.1	6.4	12.6	35.7	19.0	56.0	46.0	20.3	27.0	N	
7	12.28940	19.7	13.6	13.4	33.1	27.0	60.0	50.0	26.9	23.0	N	
8	0.39240	22.7	8.9	12.6	35.3	21.5	58.0	48.0	22.7	26.5	L1	
9	0.45965	24.8	11.5	12.6	37.4	24.1	56.6	46.6	19.2	22.5	L1	
10	0.58930	22.4	8.1	12.6	35.0	20.7	56.0	46.0	21.0	25.3	L1	
11	0.65995	22.2	8.6	12.6	34.8	21.2	56.0	46.0	21.2	24.8	L1	
12	0.78810	21.0	6.4	12.6	33.6	19.0	56.0	46.0	22.4	27.0	L1	
13	0.85410	19.8	5.7	12.6	32.4	18.3	56.0	46.0	23.6	27.7	L1	
14	12.28940	17.4	12.1	13.4	30.8	25.5	60.0	50.0	29.2	24.5	L1	

### -26dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	September 6, 2013	
Temperature / Humidity	24deg.C , 52%RH	
Engineer	Shinichi Takano	
Mode	Tx, PN9, worst antenna port A	

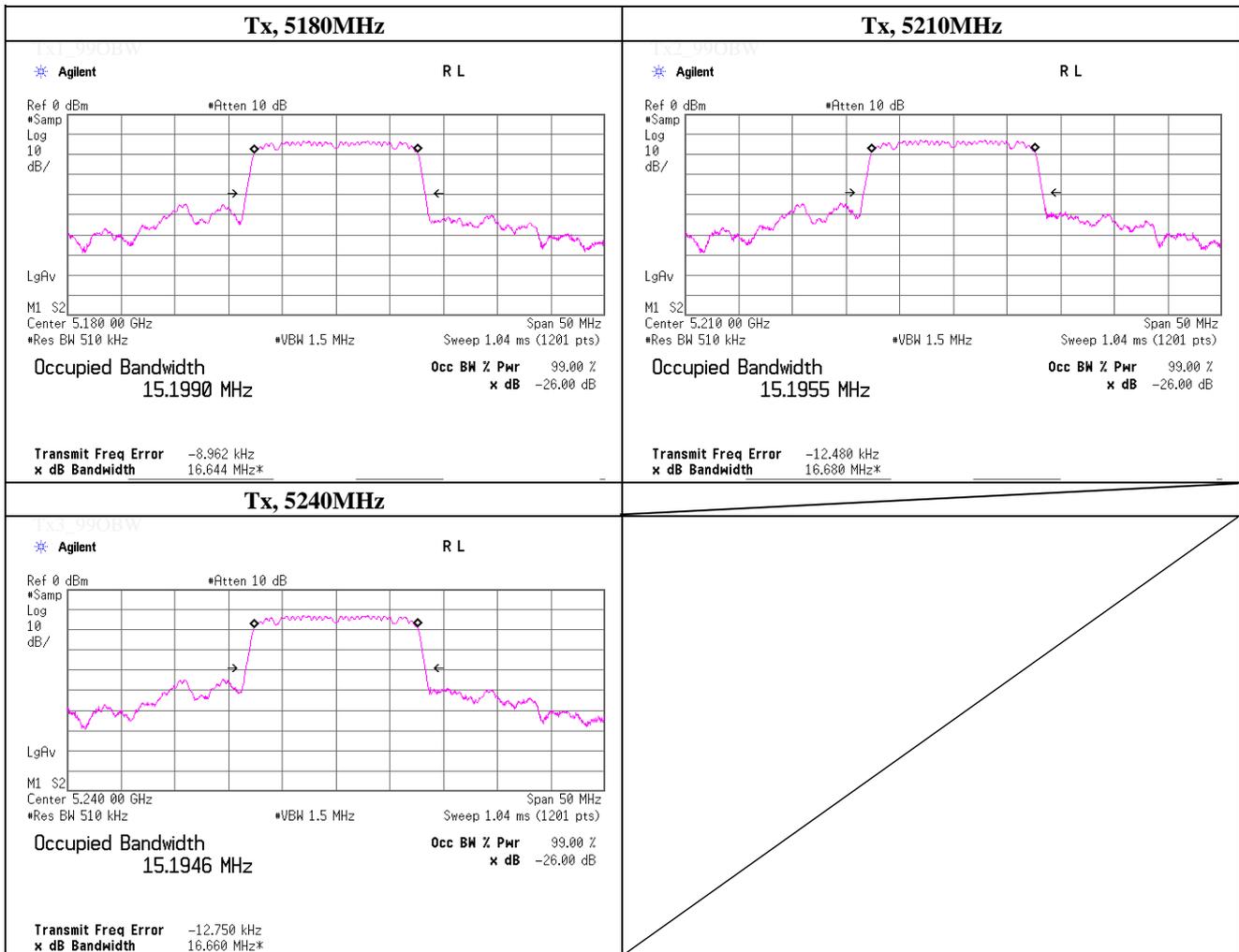
Freq. [MHz]	-26dB Bandwidth [MHz]
5180.0000	16.122
5210.0000	16.167
5240.0000	16.158



### 99% Occupied Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	September 6, 2013	
Temperature / Humidity	24deg.C , 52%RH	
Engineer	Shinichi Takano	
Mode	Tx, PN9, worst antenna port A	

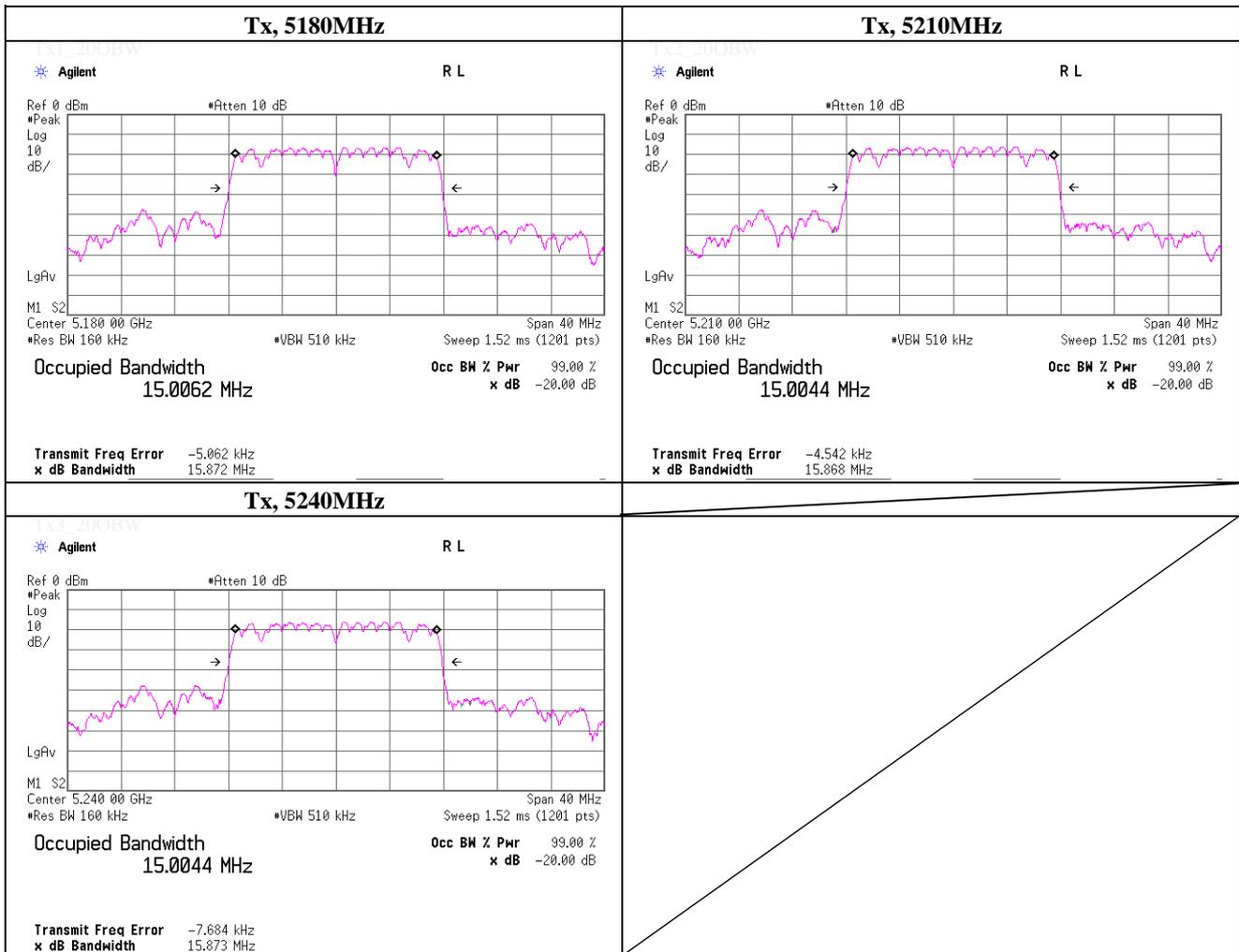
Freq. [MHz]	99% Occupied Bandwidth [MHz]
5180.0000	15.199
5210.0000	15.196
5240.0000	15.195



## -20dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	September 6, 2013	
Temperature / Humidity	24deg.C , 52%RH	
Engineer	Shinichi Takano	
Mode	Tx, PN9, worst antenna port A	

Freq. [MHz]	-20dB Bandwidth [MHz]
5180.0000	15.872
5210.0000	15.868
5240.0000	15.873





## Burst rate confirmation

Tx, PN9, worst antenna port A



**UL Japan, Inc.**

**Shonan EMC Lab.**

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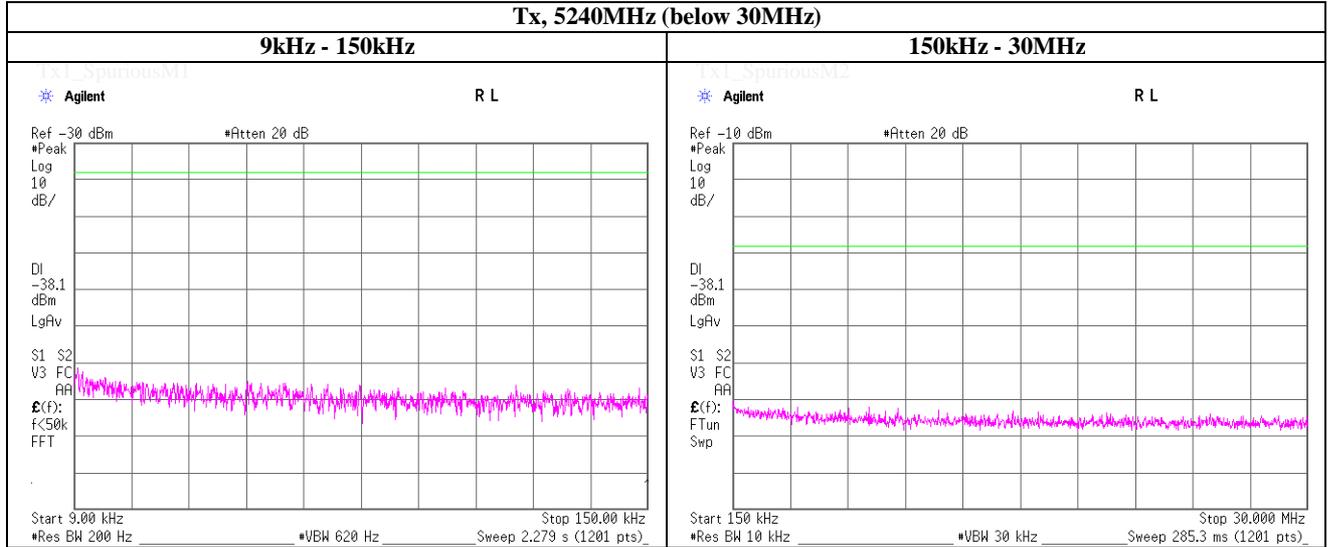
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

### Spurious emission (Conducted)

Tx, PN9, worst antenna port A

Tx, 5240MHz (below 30MHz)



FREQ	Regulation	Cable Loss	Atten. Loss	Antenna Gain	Limit line
[MHz]	[dBm]	[dB]	[dB]	[dBi]	[dBm]
30.00	-27.00	0.15	9.84	1.10	-38.09

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## Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab. No.1 and No.2 Semi Anechoic Chamber		
Date	September 12, 2013	September 15, 2013	September 16, 2013
Temperature / Humidity	23 deg.C , 63 %RH	23 deg.C , 62%RH	23 deg.C , 61 %RH
Engineer	Wataru Kojima	Wataru Kojima	Wataru Kojima
Mode	Tx, 5180 MHz		
	Tx, PN9, worst antenna port B		

### (below 1GHz and above 1GHz Inside of the restricted band)

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	86.027	QP	40.8	7.7	8.2	31.9	24.8	40.0	15.2	300	209	
Hori.	675.939	QP	26.0	20.2	9.2	31.6	23.8	46.0	22.2	159	290	
Hori.	5150.000	PK	46.3	33.3	16.2	41.3	54.5	73.9	19.4	131	103	
Hori.	15540.000	PK	47.6	39.2	1.6	40.2	48.2	73.9	25.7	100	140	
Hori.	5150.000	AV	36.8	33.3	16.2	41.3	45.0	53.9	8.9	131	103	
Hori.	15540.000	AV	34.5	39.2	1.6	40.2	35.1	53.9	18.8	100	140	
Vert.	36.752	QP	33.1	16.0	7.0	31.9	24.2	40.0	15.8	100	107	
Vert.	61.448	QP	44.4	8.1	7.1	31.9	27.7	40.0	12.3	100	59	
Vert.	86.027	QP	48.8	7.7	8.2	31.9	32.8	40.0	7.2	100	72	
Vert.	110.609	QP	37.8	12.2	8.1	31.8	26.3	43.5	17.2	100	157	
Vert.	626.777	QP	28.6	19.5	9.0	31.6	25.5	46.0	20.5	100	358	
Vert.	5150.000	PK	48.6	33.3	16.2	41.3	56.8	73.9	17.1	100	75	
Vert.	15540.000	PK	47.7	39.2	1.6	40.2	48.3	73.9	25.6	100	328	
Vert.	5150.000	AV	36.3	33.3	16.2	41.3	44.5	53.9	9.4	100	75	
Vert.	15540.000	AV	37.8	39.2	1.6	40.2	38.4	53.9	15.5	100	328	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

\*The 10th harmonic was not seen so the result was its base noise level.

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

### (Calculation) (above 1GHz Outside of the restricted band)

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Result (EIRP) [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	6905.946	PK	52.3	36.7	7.9	41.4	55.5	-39.73	-27.00	12.7	132	99	
Hori.	10360.000	PK	54.5	40.0	9.1	40.7	62.9	-32.33	-27.00	5.3	133	350	
Vert.	6906.720	PK	49.7	36.7	7.9	41.4	52.9	-42.33	-27.00	15.3	100	337	
Vert.	10360.000	PK	54.8	40.0	9.1	40.7	63.2	-32.03	-27.00	5.0	140	117	

Result[dBuV/m] = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

Result(EIRP[dBm])=10\*LOG (({ 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) \* 10 ^ (-6) \* Distance:3[m] ) ^ 2 } / 30) \*10^3)

\*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

\*The 10th harmonic was not seen so the result was its base noise level.

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

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## Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab. No.1 and No.2 Semi Anechoic Chamber		
Date	September 12, 2013	September 15, 2013	September 16, 2013
Temperature / Humidity	23 deg.C , 63 %RH	23 deg.C , 62%RH	23 deg.C , 61 %RH
Engineer	Wataru Kojima	Wataru Kojima	Wataru Kojima
Mode	Tx, 5210 MHz		
	Tx, PN9, worst antenna port B		

### (below 1GHz and above 1GHz Inside of the restricted band)

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	86.028	QP	41.8	7.7	8.2	31.9	25.8	40.0	14.2	208	188	
Hori.	184.348	QP	33.1	16.9	9.2	31.8	27.4	43.5	16.1	177	200	
Hori.	675.934	QP	25.9	20.2	9.2	31.6	23.7	46.0	22.3	161	305	
Hori.	15630.000	PK	45.4	38.9	1.7	40.2	45.8	73.9	28.1	100	0	
Hori.	15630.000	AV	33.4	38.9	1.7	40.2	33.8	53.9	20.1	100	0	
Vert.	36.873	QP	33.0	16.0	7.0	31.9	24.1	40.0	15.9	100	343	
Vert.	61.448	QP	44.4	8.1	7.1	31.9	27.7	40.0	12.3	100	22	
Vert.	86.028	QP	48.8	7.7	8.2	31.9	32.8	40.0	7.2	100	120	
Vert.	626.955	QP	28.4	19.5	9.0	31.6	25.3	46.0	20.7	100	358	
Vert.	15630.000	PK	45.8	38.9	1.7	40.2	46.2	73.9	27.7	100	334	
Vert.	15630.000	AV	36.5	38.9	1.7	40.2	36.9	53.9	17.0	100	334	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

\*The 10th harmonic was not seen so the result was its base noise level.

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

### (Calculation) (above 1GHz Outside of the restricted band)

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Result (EIRP) [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	6946.626	PK	50.8	36.8	7.9	41.4	54.1	-41.13	-27.00	14.1	148	354	
Hori.	10420.000	PK	55.0	40.2	9.3	40.7	63.8	-31.43	-27.00	4.4	141	14	
Vert.	6946.626	PK	51.1	36.8	7.9	41.4	54.4	-40.83	-27.00	13.8	100	351	
Vert.	10420.000	PK	55.2	40.2	9.3	40.7	64.0	-31.23	-27.00	4.2	122	134	

Result[dBuV/m] = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

Result(EIRP[dBm])=10\*LOG (({ 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) \* 10 ^ (-6) \* Distance:3[m] ) ^ 2 } / 30) \*10^3)

\*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

\*The 10th harmonic was not seen so the result was its base noise level.

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

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## Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab. No.1 and No.2 Semi Anechoic Chamber		
Date	September 12, 2013	September 15, 2013	September 16, 2013
Temperature / Humidity	23 deg.C , 63 %RH	23 deg.C , 62%RH	23 deg.C , 61 %RH
Engineer	Wataru Kojima	Wataru Kojima	Wataru Kojima
Mode	Tx, 5240 MHz		
	Tx, PN9, worst antenna port B		

### (below 1GHz and above 1GHz Inside of the restricted band)

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	86.027	QP	41.8	7.7	8.2	31.9	25.8	40.0	14.2	204	189	
Hori.	184.346	QP	33.1	16.9	9.2	31.8	27.4	43.5	16.1	200	193	
Hori.	675.936	QP	26.0	20.2	9.2	31.6	23.8	46.0	22.2	159	286	
Hori.	5350.000	PK	46.2	33.4	16.4	41.1	54.9	73.9	19.0	134	214	
Hori.	15720.000	PK	45.4	38.6	1.6	40.3	45.3	73.9	28.6	100	0	
Hori.	5350.000	AV	35.7	33.4	16.4	41.1	44.4	53.9	9.5	134	214	
Hori.	15720.000	AV	34.2	38.6	1.6	40.3	34.1	53.9	19.8	100	0	
Vert.	36.871	QP	33.2	16.0	7.0	31.9	24.3	40.0	15.7	100	43	
Vert.	61.448	QP	44.4	8.1	7.1	31.9	27.7	40.0	12.3	100	160	
Vert.	86.027	QP	48.8	7.7	8.2	31.9	32.8	40.0	7.2	100	152	
Vert.	602.195	QP	29.3	19.1	8.9	31.6	25.7	46.0	20.3	100	26	
Vert.	5350.000	PK	45.7	33.4	16.4	41.1	54.4	73.9	19.5	100	224	
Vert.	15720.000	PK	45.3	38.6	1.6	40.3	45.2	73.9	28.7	100	345	
Vert.	5350.000	AV	36.8	33.4	16.4	41.1	45.5	53.9	8.4	100	224	
Vert.	15720.000	AV	34.0	38.6	1.6	40.3	33.9	53.9	20.0	100	345	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

\*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

\*The 10th harmonic was not seen so the result was its base noise level.

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

### (Calculation) (above 1GHz Outside of the restricted band)

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Result (EIRP) [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	6986.212	PK	49.7	36.9	7.9	41.4	53.1	-42.13	-27.00	15.1	145	54	
Hori.	10480.000	PK	54.2	40.4	9.3	40.7	63.2	-32.03	-27.00	5.0	123	150	
Vert.	6986.692	PK	49.5	36.9	7.9	41.4	52.9	-42.33	-27.00	15.3	100	0	
Vert.	10480.000	PK	55.0	40.4	9.3	40.7	64.0	-31.23	-27.00	4.2	139	121	

Result[dBuV/m] = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

Result(EIRP[dBm])=10\*LOG (({ 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) \* 10 ^ (-6) \* Distance:3[m] ) ^ 2 } / 30) \*10^3)

\*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

\*The 10th harmonic was not seen so the result was its base noise level.

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

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### Peak Power Spectral Density

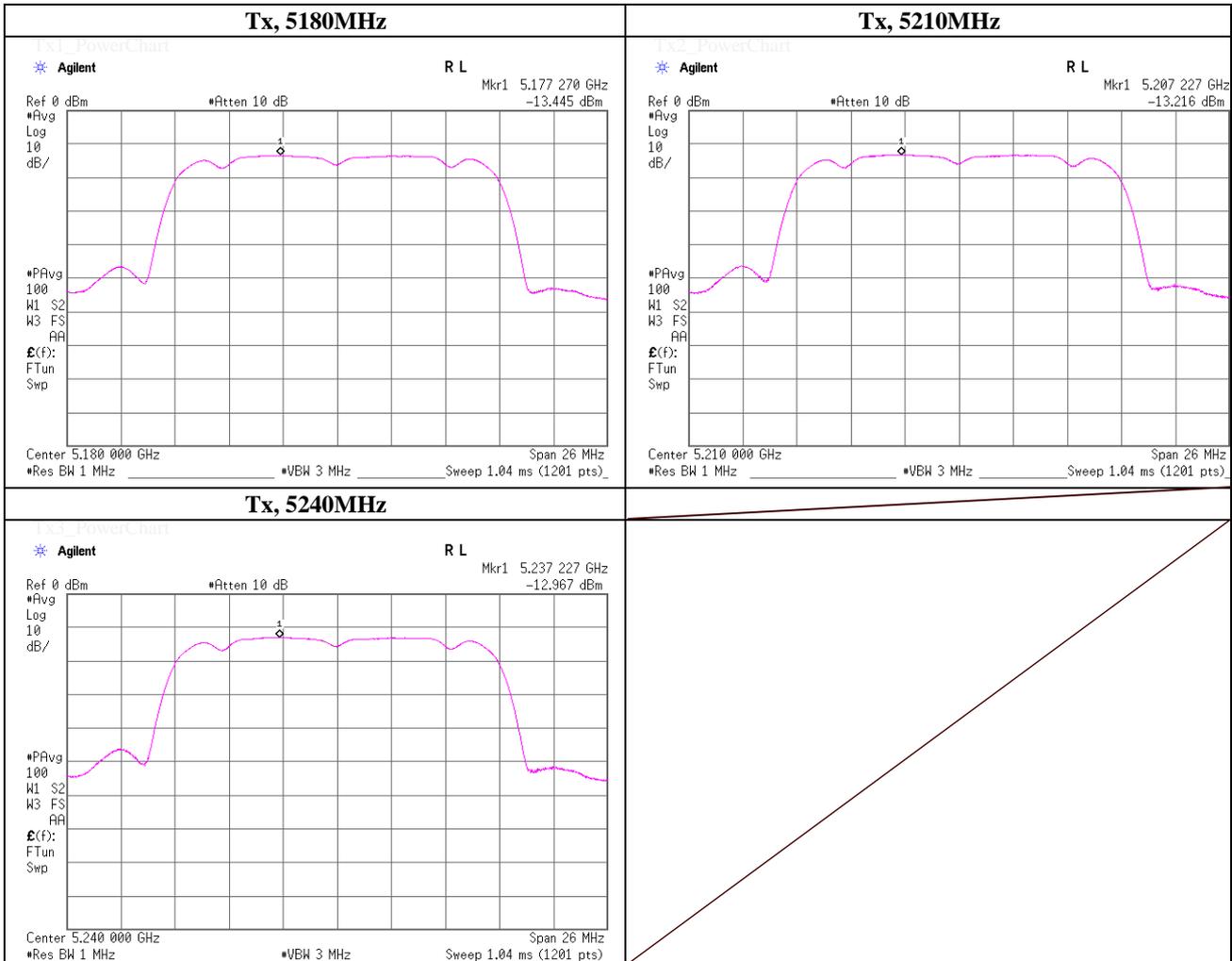
(Method: SA-2)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	September 6, 2013	
Temperature / Humidity	24deg.C , 52%RH	
Engineer	Shinichi Takano	
Mode	Tx, PN9, worst antenna port A	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm/MHz]	Cable Loss [dB]	Atten. Loss [dB]	Duty factor [dB]		Result [dBm/MHz]	Limit [dBm]	Margin [dB]
5180.0000	5177.27	-13.45	2.19	9.84	0.00		-1.42	4.00	5.42
5210.0000	5207.23	-13.22	2.20	9.84	0.00		-1.18	4.00	5.18
5240.0000	5237.23	-12.97	2.29	9.84	0.00		-0.84	4.00	4.84

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten.Loss + Duty factor



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## Peak Excursion Ratio

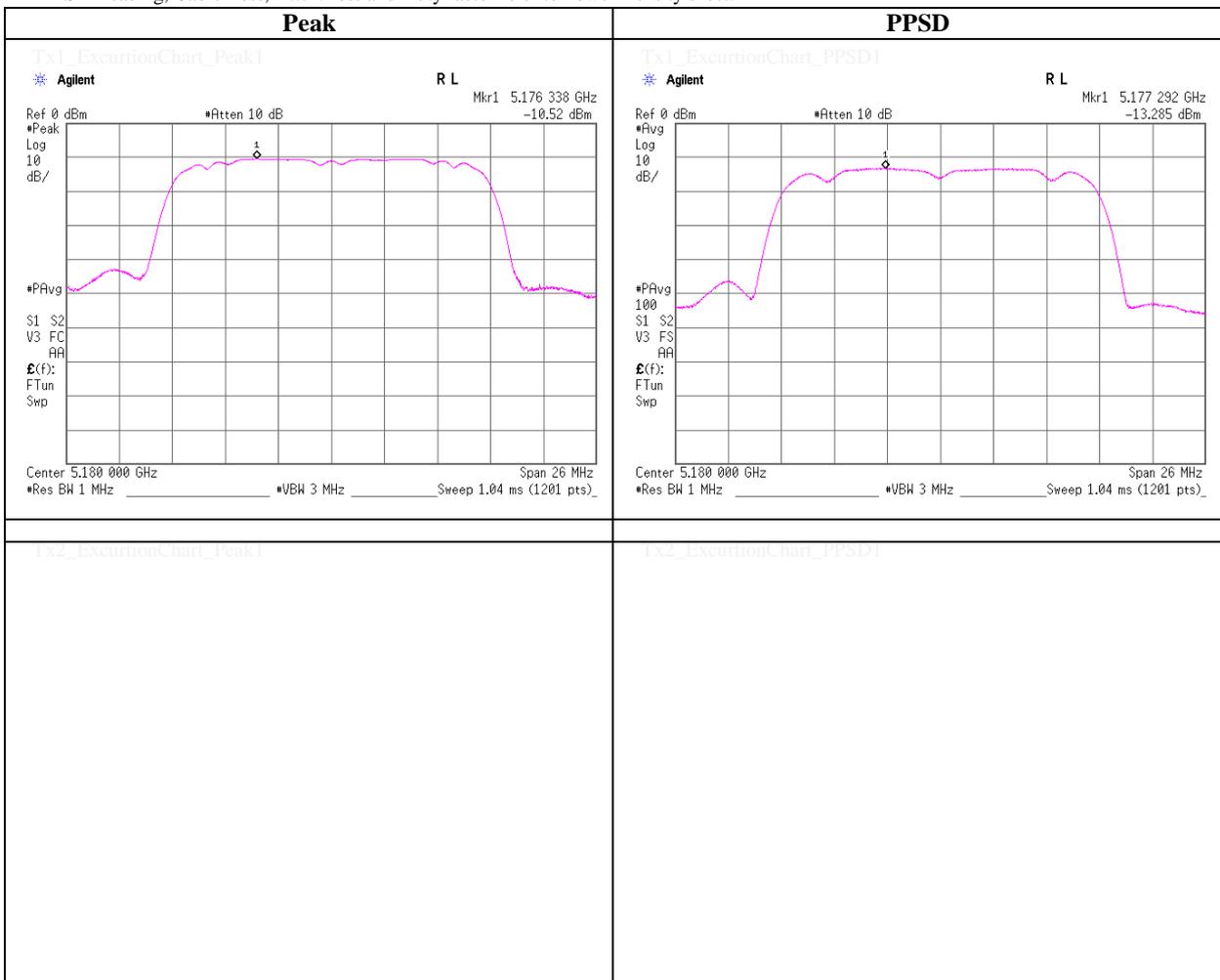
Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	September 6, 2013	
Temperature / Humidity	24deg.C , 52%RH	
Engineer	Shinichi Takano	
Mode	Tx, , PN9, worst antenna port A	

Ch. Freq. [MHz]	Mode	Peak Reading [dBm]	PPSD Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty factor [dB]	Peak Result [dBm]	PPSD Result [dBm]	Peak Power Excursion [dB]	Limit [dB]	Margin [dB]
5180	-	-10.52	-13.29	2.19	9.84	0.00	1.51	-1.26	2.77	=<13.0	10.23

\*Peak Power Excursion = Peak Result - PPSD Result

\*Peak Result = Peak Reading + Cable Loss + Atten. Loss, PPSD Result = PPSD Reading + Cable Loss + Atten. Loss + Duty factor

\*PPSD Reading, Cable Loss, Atten.Loss and Duty factor refer to Power Density sheet.



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## Comparison Sheet of Antenna A and B

Test place                   UL Japan, Inc. Shonan EMC Lab.       No.5 Shielded Room and No.1 Anechoic Chamber  
 Date                         September 6 and 12, 2013  
 Engineer                  Shinichi Takano, Wataru Kojima  
 Mode                        Tx

### Maximum Peak Conducted Output Power (Conducted)

Freq. [MHz]	Antenna A Result		Antenna B Result	
	[dBm]	[mW]	[dBm]	[mW]
5210.0	9.65	9.23	9.51	8.93

### Radiated Emission

Tx. Freq. [MHz]	Freq [MHz]	Antenna A Result				Antenna B Result			
		Peak		Average		Peak		Average	
		Hor	Ver	Hor	Ver	Hor	Ver	Hor	Ver
		[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]
5210.0	5210.00	98.50	98.40	-	-	98.60	98.70	-	-
	10420.00	60.10	60.00	-	-	63.80	64.00	-	-

### Conducted Emission

Tx. Freq. [MHz]	Freq [MHz]	Antenna A Result		Antenna B Result		
		QP	AV	Freq [MHz]	QP	AV
		[dBuV/m]	[dBuV/m]		[dBuV/m]	[dBuV/m]
5210.0	0.45735	40.80	24.70	0.45735	41.00	24.80

Comparison data of Antenna A and B was obtained with Transmitting 5210MHz mode, because the spurious emission level was highest at the mode.

Other than the above list, no difference was observed in the emission level between Antenna A and B.

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## APPENDIX 2

### Test Instruments

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	AT	2013/01/08 * 12
SCC-G30	Coaxial Cable	Junkosha	MWX241-02000KM SKMS	SEP-20-12-00 4	AT	2012/09/26 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2012/11/15 * 12
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2013/04/09 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2013/04/09 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2013/03/07 * 12
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2013/07/03 * 12
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2013/03/19 * 12
SCC-G01	Coaxial Cable	Suhner	SUCOFLEX 104A	46497/4A	RE	2013/04/09 * 12
SCC-G21	Coaxial Cable	Suhner	SUCOFLEX 104	296169/4	RE	2013/05/22 * 12
SHA-01	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	RE	2013/08/12 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2013/02/27 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE	2012/10/04 * 12
SJM-08	Measure	PROMART	SEN1935	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFLMF)	-	RE	-
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2012/12/18 * 12
SFL-03	Highpass Filter	MICRO-TRONICS	HPM50112	028	RE	2012/12/18 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2013/03/14 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2013/03/19 * 12
SCC-G15	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2		2013/03/16 * 12
SHA-06	Horn Antenna	ETS LINDGREN	3160-10	LM3459	RE	2013/03/14 * 12
SAF-10	Pre Amplifier	TOYO Corporation	HAP26-40W	00000010	RE	2013/03/19 * 12
SCC-G16	Coaxial Cable	Suhner	SUCOFLEX 102	32704/2		2013/03/16 * 12
SAF-02	Pre Amplifier	SONOMA	310N	290212	RE	2013/02/12 * 12
SAT6-02	Attenuator	JFW	50HF-006N	-	RE	2013/02/12 * 12
KAT3-11	Attenuator	JFW IND. INC.	50HF-003N	-	RE	2013/08/19 * 12
SBA-02	Biconical Antenna	Schwarzbeck	BBA9106	91032665	RE	2012/11/18 * 12
SCC-B1/B3/B5/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2013/04/03 * 12
SCC-B2/B4/B6/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2013/04/03 * 12
SLA-02	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0893	RE	2012/11/18 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2013/02/27 * 12
STR-02	Test Receiver	Rohde & Schwarz	ESCI	100575	RE	2012/09/03 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2013/07/06 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2013/03/28 * 12

The expiration date of the calibration is the end of the expired month .  
As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards .

Test Item :

- CE: Conducted emission ,
- RE: Radiated emission ,
- AT: Antenna terminal conducted test

## APPENDIX

### Test Instruments

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SCC-B12/B13/ SRSE-02	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/N S4906	-/0901-270( RF Selector)	CE	2013/04/03 * 12
SLS-04	LISN	Rohde & Schwarz	ENV216	100514	CE	2013/02/25 * 12
SAT3-06	Attenuator	JFW	50HF-003N	-	CE	2013/02/12 * 12
SOS-04	Humidity Indicator	A&D	AD-5681	4061512	CE	2013/03/07 * 12
STR-02	Test Receiver	Rohde & Schwarz	ESCI	100575	CE	2012/09/03 * 12
SJM-02	Measure	KOMELON	KMC-36	-	CE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFI,MF)	-	CE	-

The expiration date of the calibration is the end of the expired month .  
As for some calibrations performed after the tested dates , those test equipment have been  
controlled by means of an unbroken chains of calibrations .  
All equipment is calibrated with valid calibrations . Each measurement data is traceable to the  
national or international standards .

Test Item :

- CE: Conducted emission ,
- RE: Radiated emission ,
- AT: Antenna terminal conducted test