



# RADIO TEST REPORT

Test Report No. : 10400823H-A-R1

**Applicant** : Sony Computer Entertainment Inc.  
**Type of Equipment** : PlayStation® TV  
**Model No.** : VTE-1001  
**FCC ID** : AK8VTE1001S1  
**Test regulation** : FCC Part 15 Subpart C: 2014  
\*WLAN Part  
**Test Result** : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This report is a revised version of 10400823H-A. 10400823H-A is replaced with this report.

**Date of test:** August 4 to 20, 2014

**Representative test engineer:**

*T. Shimada*

Takumi Shimada  
Engineer  
Consumer Technology Division

**Approved by:**

*M. Nishiyama*

Masanori Nishiyama  
Manager  
Consumer Technology Division



NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation. \*As for the range of Accreditation in NVLAP, you may refer to the WEB address, <http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

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## **SECTION 1: Customer information**

Company Name	Sony Computer Entertainment Inc.
Brand Name	SONY
Address	1-7-1 Konan, Minato-ku, Tokyo, 108-0075 Japan
Telephone Number	+81-3-6748-6333
Facsimile Number	+81-3-6748-6383
Contact Person	Kiyoto Sasaki

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

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

Type of Equipment	PlayStation® TV
Model No	VTE-1001
Serial No	Refer to Section 4, Clause 4.2
Country of Manufacture	China
Receipt Date of Sample	August 2, 2014
Condition of EUT	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	No modification by the test lab.

### **2.2 Product Description**

VTE-1001 is PlayStation® TV.

WLAN antenna and Bluetooth antenna transmit simultaneously, but there is no correlation between WLAN antenna and Bluetooth antenna.

### **Product Specification**

Maximum clock frequency in the system	444MHz
Operating Temperature	5-35 deg. C
Power Supply	DC 5.0V
Size	105.0 x 65.0 x 13.6 mm
Weight	Approx. 110g

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## Radio Specification

### WLAN (IEEE802.11b/g/n-20)

Equipment Type	Transceiver
Frequency of Operation	2412-2462MHz
Type of Modulation	DSSS, OFDM
Bandwidth & Channel spacing	20MHz & 5MHz
Method of frequency generation	Synthesizer
Power Supply (inner)	DC 1.8V/DC 3.1V
Antenna Type	Inverted F
Antenna Gain	1.25dBi (Peak)

### Bluetooth (BDR/EDR)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	FHSS (GFSK, $\pi/4$ DQPSK, 8DPSK)
Bandwidth & Channel spacing	1MHz & 1MHz
Method of frequency generation	Synthesizer
Power Supply (inner)	DC 1.8V
Antenna Type	Inverted F
Antenna Gain	-0.88dBi (peak)

\*This test report applies for WLAN.

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

### **3.1 Test Specification**

Test Specification : FCC Part 15 Subpart C: 2014, final revised on May 1, 2014 and effective June 2, 2014

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators  
Section 15.207 Conducted limits  
Section 15.247 Operation within the bands 902-928MHz,  
2400-2483.5MHz, and 5725-5850MHz

\* The EUT complies with FCC Part 15 Subpart B: 2014, final revised on May 1, 2014 and effective June 2, 2014.

### **3.2 Procedures and results**

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.4:2003 7. AC powerline Conducted Emission measurements ----- IC: RSS-Gen 7.2.4	FCC: Section 15.207 ----- IC: RSS-Gen 7.2.4	QP 19.4dB, 0.61926MHz, L AV 16.6dB, 2.26711MHz, N	Complied	-
6dB Bandwidth	FCC: "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on June 5, 2014)" ----- IC: RSS-Gen 4.6.2	FCC: Section 15.247(a)(2) ----- IC: RSS-210 A8.2(a)	See data.	Complied	Conducted
Maximum Peak Output Power	FCC: "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on June 5, 2014)" ----- IC: RSS-Gen 4.8	FCC: Section 15.247(b)(3) ----- IC: RSS-210 A8.4(4)		Complied	Conducted
Power Density	FCC: "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on June 5, 2014)" ----- IC: -	FCC: Section 15.247 (e) ----- IC: RSS-210 A8.2(b)		Complied	Conducted
Spurious Emission Restricted Band Edges	FCC: "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on June 5, 2014)" ----- IC: RSS-Gen 4.9	FCC: Section15.247(d) ----- IC: RSS-210 A8.5 RSS-Gen 7.2.3	3.6dB 370.883MHz, QP, Horizontal	Complied	Conducted/ Radiated

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: 2003 is also referred.

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

This EUT provides stable voltage (DC 1.8V/3.1V) constantly to RF Part regardless of input voltage. Therefore, this EUT complies with the requirement.

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

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

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### 3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	IC: RSS-Gen 4.6.1	IC: RSS-Gen 4.6.1	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.

Test room (semi-anechoic chamber)	Conducted emission (+dB)
	150kHz-30MHz
No.1	3.5dB
No.2	3.5dB
No.3	3.6dB
No.4	3.5dB

Test room (semi-anechoic chamber)	Radiated emission						
	(3m*)(+dB)				(1m*)(+dB)		(0.5m*)(+dB)
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.0dB	5.1dB	5.0dB	5.1dB	6.0dB	4.9dB	4.3dB
No.2	3.9dB	5.2dB	5.0dB	4.9dB	5.9dB	4.7dB	4.2dB
No.3	4.3dB	5.1dB	5.2dB	5.2dB	6.0dB	4.8dB	4.2dB
No.4	4.6dB	5.2dB	5.0dB	5.2dB	6.0dB	5.7dB	4.2dB

\*3m/1m/0.5m = Measurement distance

Power meter (+dB)	
Below 1GHz	Above 1GHz
0.7dB	1.5dB

Antenna terminal conducted emission and Power density (+dB)			Antenna terminal conducted emission (+dB)		Channel power (+dB)
Below 1GHz	1GHz-3GHz	3GHz-18GHz	18GHz-26.5GHz	26.5GHz-40GHz	
1.5dB	1.7dB	2.8dB	2.8dB	2.9dB	2.6dB

#### Conducted Emission test

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

#### Radiated emission test (3m)

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

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### 3.5 Test Location

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	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	4.0 x 4.5 x 2.7m	4.0 x 4.5 m	-
No.6 measurement room	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	8.0 x 4.6 x 2.8m	2.4 x 2.4m	-
No.11 measurement room	-	6.2 x 4.7 x 3.0m	4.8 x 4.6m	-

\* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

### 3.6 Data of EMI, Test instruments, and Test set up

Refer to APPENDIX.

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

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

Test operating mode was determined as follows according to “Section 1 of 6 802.11 a/b/g/n testing - Managing Complex Regulatory Approvals - ” of TCB Council Workshop October 2009.

<b>Mode</b>	<b>Remarks*</b>
IEEE 802.11b (11b)	11Mbps, PN9
IEEE 802.11g (11g)	54Mbps, PN9
IEEE 802.11n MIMO 20MHz BW (11n-20)	MCS2, PN9
*Transmitting duty was 100% on all of WLAN tests. *The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
*Power of the EUT was set by the software as follows; Power settings: Same as production model Software: LABTOOL-VTE10-L.L-Ver.1.0.2 *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.	

<b>Test Item</b>	<b>Operating Mode</b>	<b>Tested frequency</b>
Conducted Emission Spurious Emission (Conducted)	11g Tx *1)	2437MHz *1)
6dB Bandwidth, Maximum Peak Output Power, Power Density, 99% Occupied Bandwidth	11b Tx 11g Tx 11n-20 Tx	2412MHz 2437MHz 2462MHz
Spurious Emission (Radiated)	11b Tx 11g Tx	2412MHz 2437MHz 2462MHz
	----- 11n-20 Tx	----- 2412MHz 2462MHz
*1) The test was performed on the mode as a representative, because it had the highest power at antenna terminal test.		

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## 4.2 Configuration and peripherals

**This page has been submitted for a separate exhibit.**

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## **SECTION 5: Conducted Emission**

### **Test Procedure and conditions**

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 0.8m above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and 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 a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

For the tests on EUT with other peripherals (as a whole system)

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. All unused 50ohm connectors of the LISN(AMN) were resistivity terminated in 50ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber.

The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

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

**Detector** : QP and CISPR AV  
**Measurement range** : 0.15-30MHz  
**Test data** : APPENDIX  
**Test result** : Pass

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**SECTION 6: Radiated Spurious Emission**

**Test Procedure**

It was measured based on "11.0 Emissions in non-restricted frequency bands" of "558074 D01 DTS Meas Guidance v03r02 (Issued on June 5, 2014)".

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 0.8m 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 and 4m 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 30MHz	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	Loop	Biconical	Logperiodic	Horn

In any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

**20dBc was applied to the frequency over the limit of FCC 15.209 / Table 5 of RSS-Gen 7.2.5(IC) and outside the restricted band of FCC15.205 / Table 3 of RSS-Gen 7.2.2 (IC).**

Frequency	Below 1GHz	Above 1GHz		20dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *1)	PK
IF Bandwidth	BW 120kHz	RBW: 1MHz VBW: 3MHz	Average Power Method: <u>WLAN: 12.2.5.1</u> RBW: 1MHz VBW: 3MHz Detector: Power Averaging (RMS) Trace: Free Run	RBW: 100kHz VBW: 300kHz
Test Distance	3m	3m (below 10GHz), 1m *2) (above 10GHz)		3m (below 10GHz), 1m *2) (above 10GHz)

\*1) Average Power Measurement was performed based on 6.0 & 12.2.5 of "558074 D01 DTS Meas Guidance v03r02 (Issued on June 5, 2014)"

\*2) Distance Factor:  $20 \times \log(3.0m/1.0m) = 9.5dB$

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

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

**Measurement range : 30M-26.5GHz**  
**Test data : APPENDIX**  
**Test result : Pass**

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## **SECTION 7: 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>
6dB Bandwidth	20MHz	100kHz	300kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	Enough width to display 20dB Bandwidth	1 to 3% of Span	Three times of RBW	Auto	Sample	Clear write	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak/ Average *1)	-	Power Meter (Sensor: 50MHz BW)
Peak Power Density	1.5 times the 6dB Bandwidth	3kHz	10kHz	Auto	Peak	Max Hold	Spectrum Analyzer *2)
Conducted Spurious Emission *3)	9kHz to 150kHz	200Hz	620Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	9.1kHz	27kHz				

\*1) Reference data  
\*2) Section 10.2 Method PKPSD (peak PSD) of "558074 D01 DTS Meas Guidance v03r02 (Issued on June 5, 2014) (Issued on June 5, 2014)".  
\*3) 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. (9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=9.1kHz)

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: Data of EMI test**

**Conducted Emission**

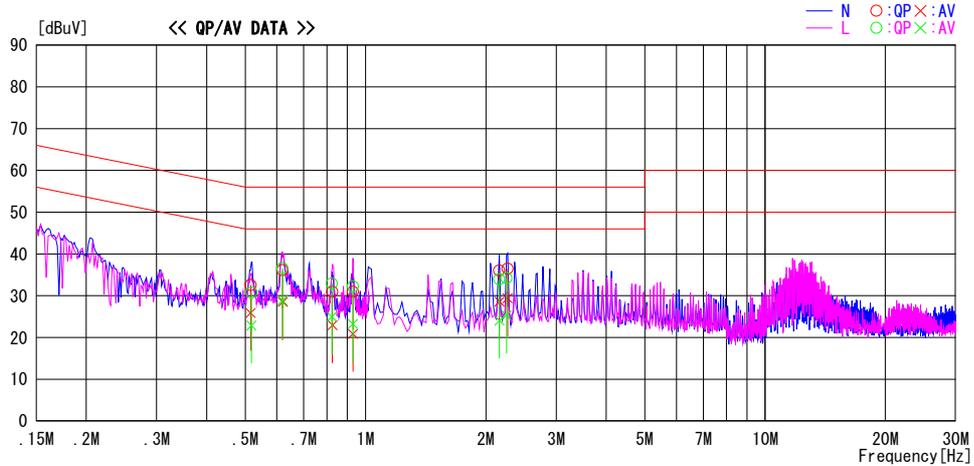
**DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber  
 Date : 2014/08/20

Report No. : 10400823H  
 Temp./Humi. : 24deg. C / 62% RH  
 Engineer : Yuta Moriya

Mode / Remarks : Tx 11g 2437MHz 54Mbps

LIMIT : FCC15.207 QP  
 FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.51580	19.3	12.6	13.3	32.6	25.9	56.0	46.0	23.4	20.1	N	
0.62010	22.7	15.1	13.4	36.1	28.5	56.0	46.0	19.9	17.5	N	
0.82648	17.5	9.6	13.4	30.9	23.0	56.0	46.0	25.1	23.0	N	
0.92934	17.5	7.5	13.4	30.9	20.9	56.0	46.0	25.1	25.1	N	
2.16146	22.3	14.9	13.7	36.0	28.6	56.0	46.0	20.0	17.4	N	
2.26711	22.8	15.7	13.7	36.5	29.4	56.0	46.0	19.5	16.6	N	
0.51788	17.4	9.6	13.3	30.7	22.9	56.0	46.0	25.3	23.1	L	
0.61926	23.2	15.5	13.4	36.6	28.9	56.0	46.0	19.4	17.1	L	
0.82300	19.5	11.6	13.4	32.9	25.0	56.0	46.0	23.1	21.0	L	
0.92934	18.8	9.8	13.4	32.2	23.2	56.0	46.0	23.8	22.8	L	
2.16131	20.2	10.4	13.7	33.9	24.1	56.0	46.0	22.1	21.9	L	
2.25234	20.5	11.6	13.7	34.2	25.3	56.0	46.0	21.8	20.7	L	

CHART : WITH FACTOR, Peak hold data. CALCULATION : RESULT[dBuV] = READING[dBuV] + C.F[dB] (LISN + CABLE + ATTEN.)  
 Except for the above table : adequate margin data below the limits.

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### 6dB Bandwidth

Test place Ise EMC Lab. No.11 Measurement Room  
Report No. 10400823H  
Date 08/07/2014  
Temperature/ Humidity 25 deg. C / 51% RH  
Engineer Shinya Watanabe  
Mode Tx 11b / 11g / 11n-20

11b

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	10.022	>500
2437	10.026	>500
2462	10.030	>500

11g

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	16.540	>500
2437	16.560	>500
2462	16.546	>500

11n-20

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	17.809	>500
2437	17.822	>500
2462	17.816	>500

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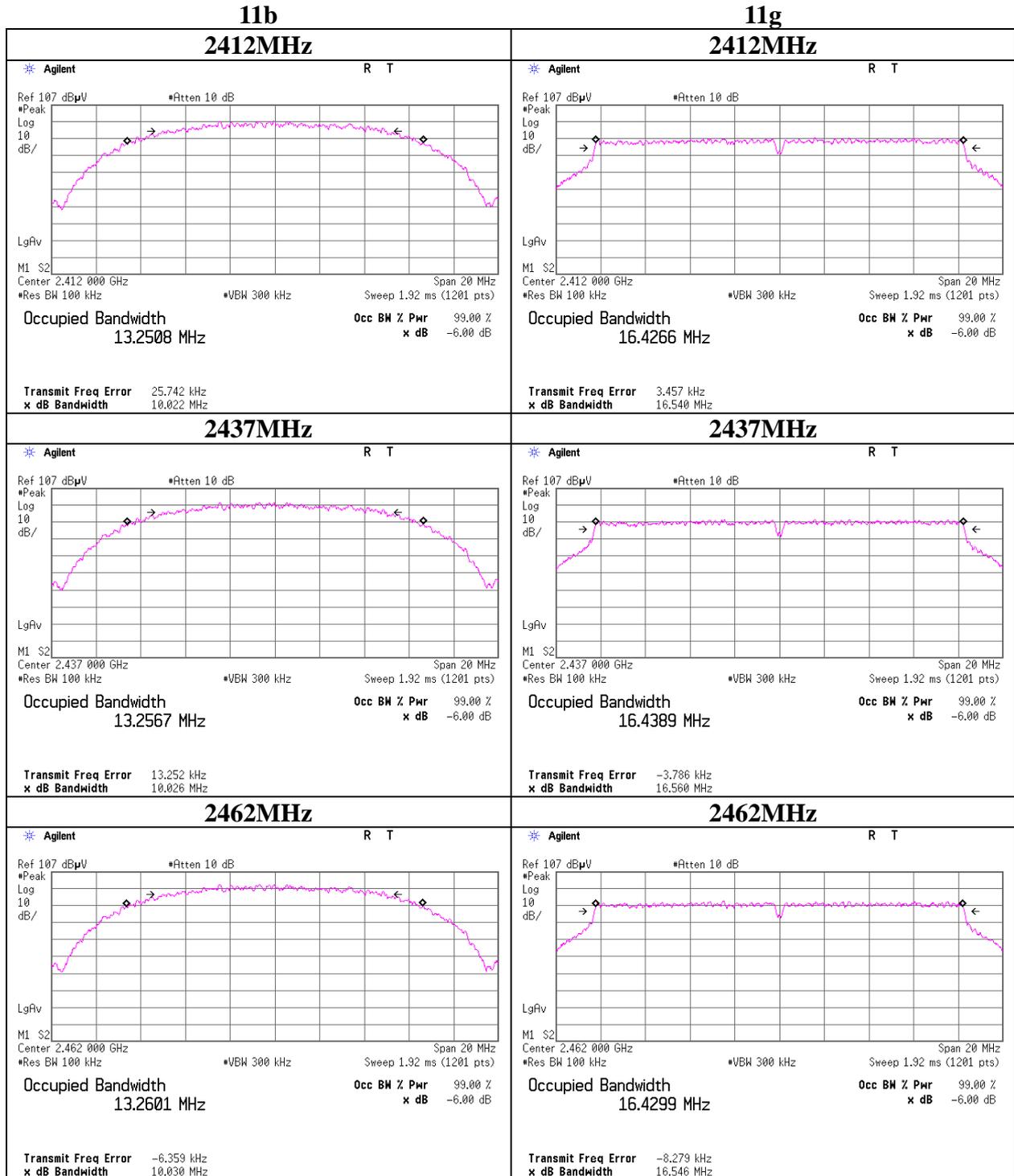
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**6dB Bandwidth**



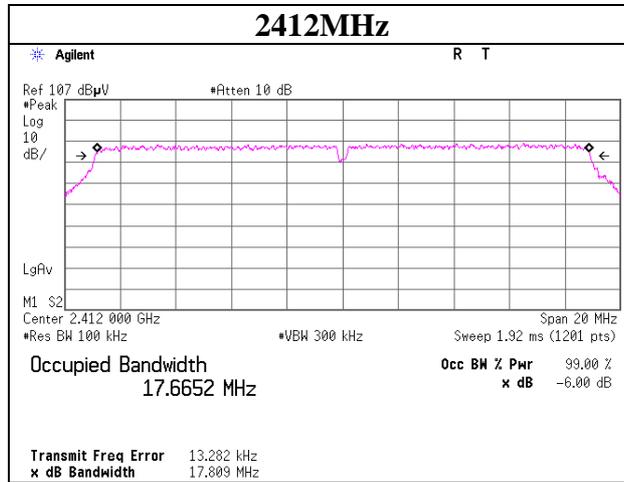
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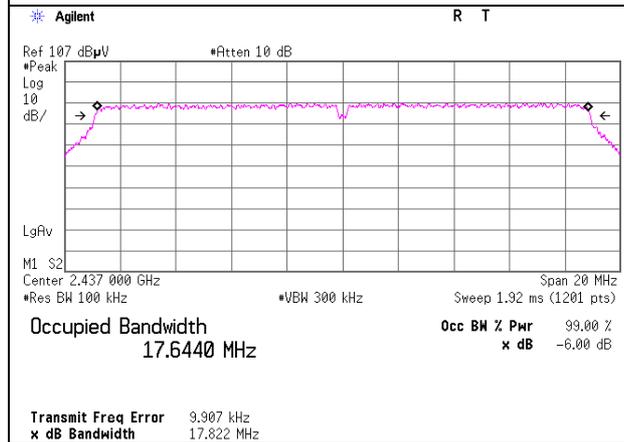
## 6dB Bandwidth

**11n-20**

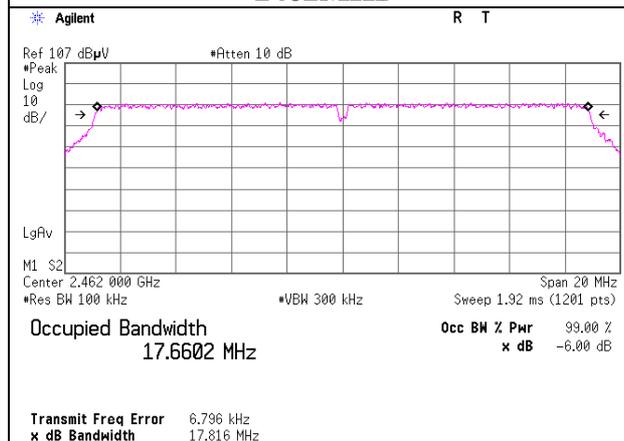
**2412MHz**



**2437MHz**



**2462MHz**



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**Ise EMC Lab.**

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## Maximum Peak Output Power

Test place : Ise EMC Lab. No.11 Measurement Room  
Report No. : 10400823H  
Date : 08/05/2014  
Temperature/ Humidity : 25 deg. C / 45% RH  
Engineer : Tsubasa Takayama  
Mode : Tx 11b / 11g / 11n-20

### 11b 11Mbps

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	3.03	0.50	10.04	13.57	22.75	30.00	1000	16.43
2437	3.17	0.50	10.04	13.71	23.50	30.00	1000	16.29
2462	3.11	0.50	10.04	13.65	23.17	30.00	1000	16.35

### 11g 54Mbps

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	10.47	0.50	10.04	21.01	126.18	30.00	1000	8.99
2437	11.11	0.50	10.04	21.65	146.22	30.00	1000	8.35
2462	10.64	0.50	10.04	21.18	131.22	30.00	1000	8.82

### 11n-20 MCS2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	10.83	0.50	10.04	21.37	137.09	30.00	1000	8.63
2437	10.85	0.50	10.04	21.39	137.72	30.00	1000	8.61
2462	11.04	0.50	10.04	21.58	143.88	30.00	1000	8.42

Sample Calculation:

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

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**Maximum Peak Output Power**  
(Worst Rate Check)

Test place Ise EMC Lab. No.11 Shielded Room Chamber  
Report No. 10400823H  
Date 2014/08/04  
Temperature/ Humidity 23 deg. C / 53% RH  
Engineer Takumi Shimada  
Mode Tx 11b / 11g / 11n-20

11b,2437MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
1	2.60	
2	2.63	
5.5	2.01	
11	2.68	*

\*: Worst Rate

All comparizon were carried out on same frequency and measurement factors.

11g,2437MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
6	9.70	
9	9.90	
12	10.35	
18	10.17	
24	9.70	
36	10.26	
48	9.68	
54	10.78	*

\*: Worst Rate

All comparizon were carried out on same frequency and measurement factors.

11n-20,2437MHz

MCS	Reading	Remark
Number	[dBm]	
0	10.16	
1	10.29	
2	10.35	*
3	10.33	
4	10.32	
5	10.17	
6	10.20	
7	10.13	

\*: Worst Rate

All comparizon were carried out on same frequency and measurement factors.

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**Average Output Power**  
 (For reporting purpose only)

Test place : Ise EMC Lab. No.11 Measurement Room  
 Report No. : 10400823H  
 Date : 08/05/2014  
 Temperature/ Humidity : 25 deg. C / 45% RH  
 Engineer : Tsubasa Takayama  
 Mode : Tx 11b / 11g / 11n-20

**11b 11Mbps**

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	0.34	0.50	10.04	10.88	12.25	30.00	1000	19.12
2437	0.54	0.50	10.04	11.08	12.82	30.00	1000	18.92
2462	0.39	0.50	10.04	10.93	12.39	30.00	1000	19.07

**11g 54Mbps**

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	0.06	0.50	10.04	10.60	11.48	30.00	1000	19.40
2437	0.31	0.50	10.04	10.85	12.16	30.00	1000	19.15
2462	0.27	0.50	10.04	10.81	12.05	30.00	1000	19.19

**11n-20 MCS2**

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	0.00	0.50	10.04	10.54	11.32	30.00	1000	19.46
2437	0.34	0.50	10.04	10.88	12.25	30.00	1000	19.12
2462	0.26	0.50	10.04	10.80	12.02	30.00	1000	19.20

Sample Calculation:

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

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## Radiated Spurious Emission

Test place Ise EMC Lab. No.2 Semi Anechoic Chamber  
Report No. 10400823H  
Date 08/14/2014 08/15/2014  
Temperature/ Humidity 21 deg. C / 59% RH 22 deg. C / 56% RH  
Engineer Takumi Shimada Takumi Shimada  
(1-10GHz) (Above 10GHz)  
Mode Tx 11b 2412MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	49.0	27.0	3.0	34.7	44.3	73.9	29.6	
Hori	4828.000	PK	43.0	31.9	5.3	33.9	46.3	73.9	27.6	
Hori	7236.000	PK	42.0	35.7	6.6	33.8	50.5	73.9	23.4	
Hori	9648.000	PK	42.1	38.1	7.0	34.4	52.8	73.9	21.1	
Hori	2390.000	AV	40.7	27.0	3.0	34.7	36.0	53.9	17.9	
Hori	4828.000	AV	35.3	31.9	5.3	33.9	38.6	53.9	15.3	
Hori	7236.000	AV	35.2	35.7	6.6	33.8	43.7	53.9	10.2	
Hori	9648.000	AV	35.4	38.1	7.0	34.4	46.1	53.9	7.8	
Vert	2390.000	PK	47.1	27.0	3.0	34.7	42.4	73.9	31.5	
Vert	4828.000	PK	42.8	31.9	5.3	33.9	46.1	73.9	27.8	
Vert	7236.000	PK	43.2	35.7	6.6	33.8	51.7	73.9	22.2	
Vert	9648.000	PK	42.6	38.1	7.0	34.4	53.3	73.9	20.6	
Vert	2390.000	AV	38.3	27.0	3.0	34.7	33.6	53.9	20.3	
Vert	4828.000	AV	35.2	31.9	5.3	33.9	38.5	53.9	15.4	
Vert	7236.000	AV	34.5	35.7	6.6	33.8	43.0	53.9	10.9	
Vert	9648.000	AV	35.2	38.1	7.0	34.4	45.9	53.9	8.0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

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

Distance factor: 10GHz-26.5GHz  $20\log(3.0m/1.0m) = 9.5dB$

NS:No signal detect

### 20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	101.6	27.0	3.0	34.7	96.9	-	-	Carrier
Hori	2400.000	PK	47.3	27.0	3.0	34.7	42.6	76.9	34.3	
Vert	2412.000	PK	100.8	27.0	3.0	34.7	96.1	-	-	Carrier
Vert	2400.000	PK	46.9	27.0	3.0	34.7	42.2	76.1	33.9	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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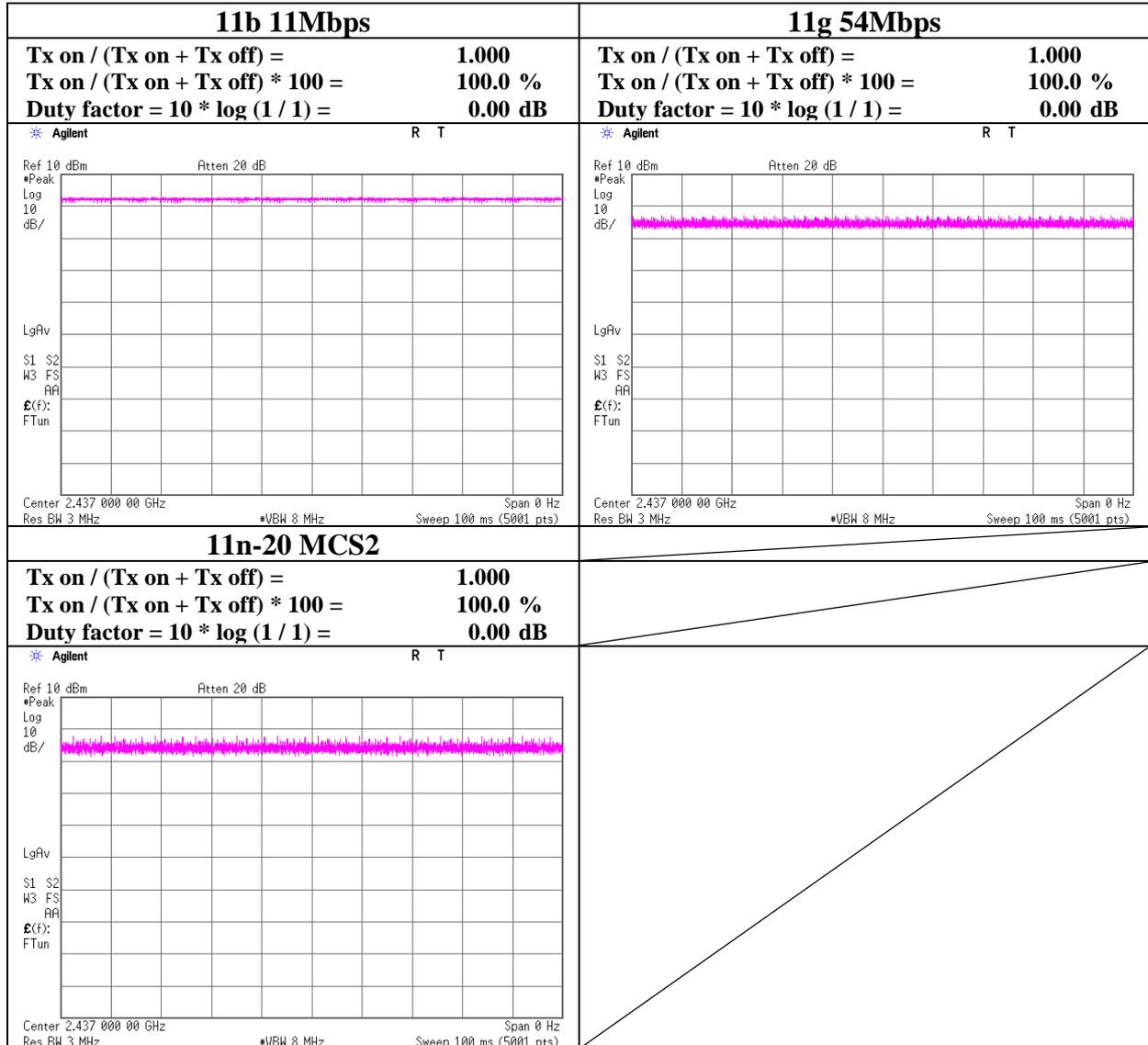






### Burst rate confirmation

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10400823H
Date	08/07/2014
Temperature/ Humidity	25 deg. C / 51% RH
Engineer	Shinya Watanabe
Mode	Tx 11b / 11g / 11n-20



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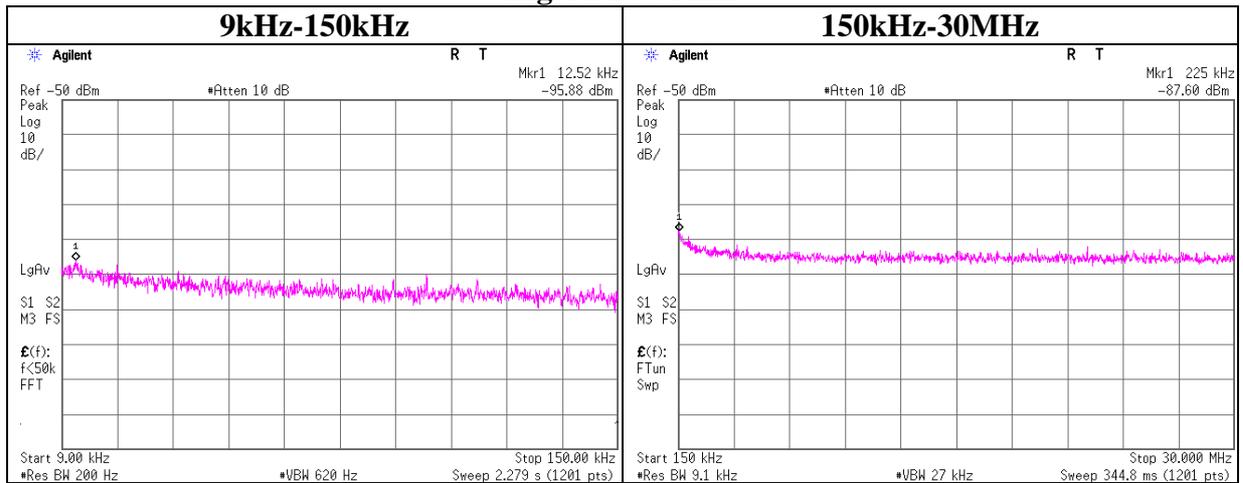
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### Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10400823H
Date	08/07/2014
Temperature/ Humidity	25 deg. C / 51% RH
Engineer	Shinya Watanabe
Mode	Tx 11g

#### 11g Tx 2437MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator [dB]	Antenna Gain [dBi]	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]
12.52	-95.9	0.50	10.1	1.3	-84.1	300.0	6.0	-22.8	45.6
225	-87.6	0.50	10.1	1.3	-75.8	300.0	6.0	-14.5	20.5

$E = \text{EIRP} - 20\log(D) + \text{Ground bounce} + 104.8 \text{ [dBuV/m]}$   
 $\text{EIRP} = \text{Reading} + \text{Cable Loss} + \text{Attenuator} + \text{Antenna Gain}$

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### Power Density

Test place Ise EMC Lab. No.11 Measurement Room  
Report No. 10400823H  
Date 08/07/2014  
Temperature/ Humidity 25 deg. C / 51% RH  
Engineer Shinya Watanabe  
Mode Tx 11b / 11g / 11n-20

#### 11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-24.66	0.50	10.08	-14.08	8.00	22.08
2437.00	-23.26	0.50	10.08	-12.68	8.00	20.68
2462.00	-22.32	0.50	10.08	-11.74	8.00	19.74

#### 11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-32.68	0.50	10.08	-22.10	8.00	30.10
2437.00	-31.36	0.50	10.08	-20.78	8.00	28.78
2462.00	-30.36	0.50	10.08	-19.78	8.00	27.78

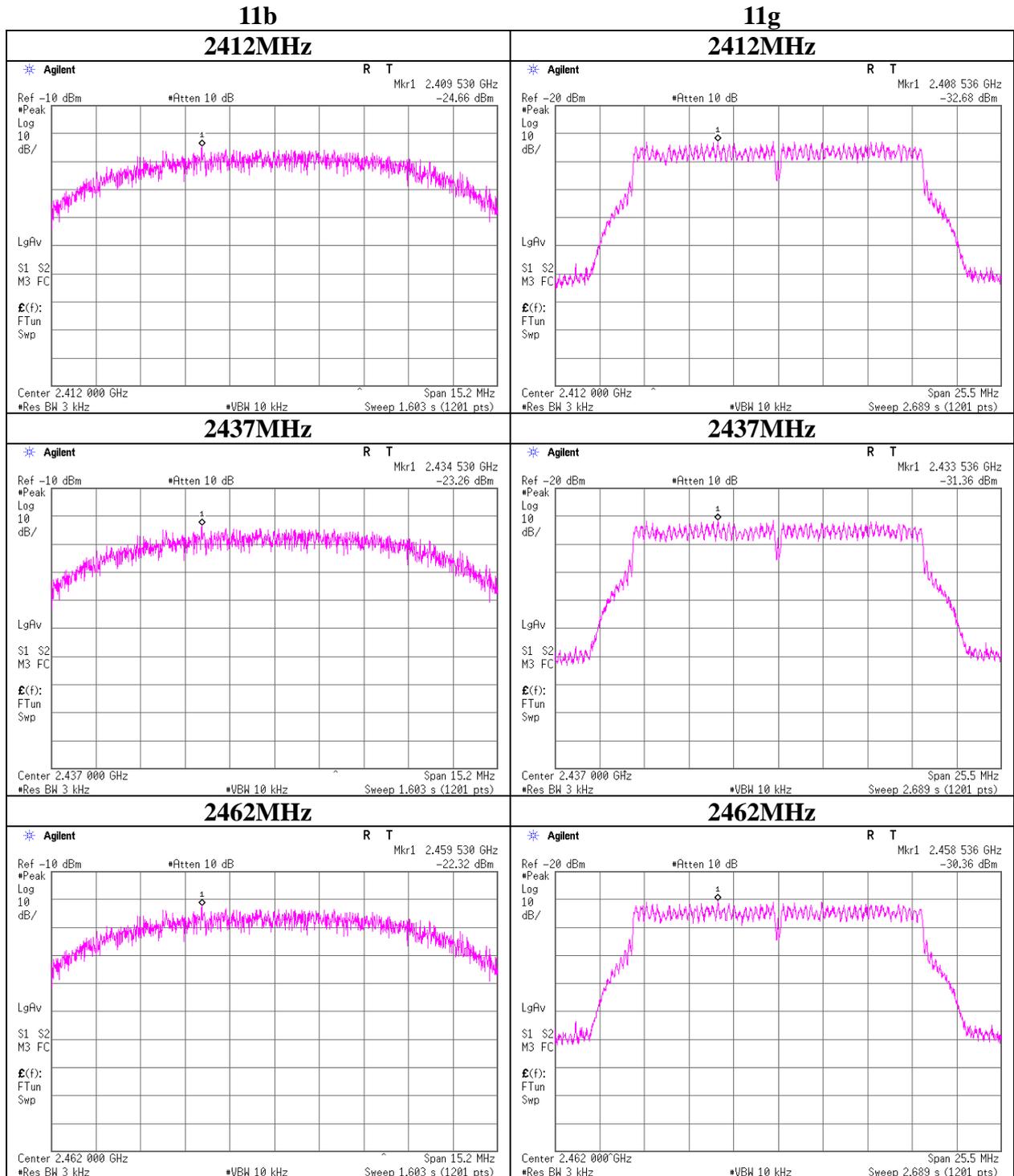
#### 11n-20

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-31.98	0.50	10.08	-21.40	8.00	29.40
2437.00	-31.61	0.50	10.08	-21.03	8.00	29.03
2462.00	-30.35	0.50	10.08	-19.77	8.00	27.77

Sample Calculation:

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

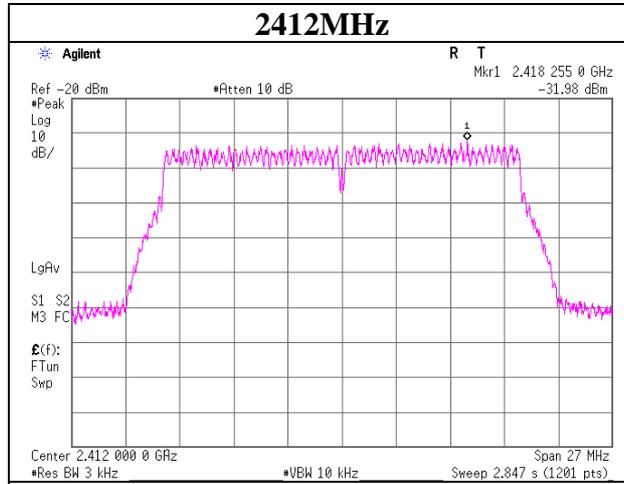
**Power Density**



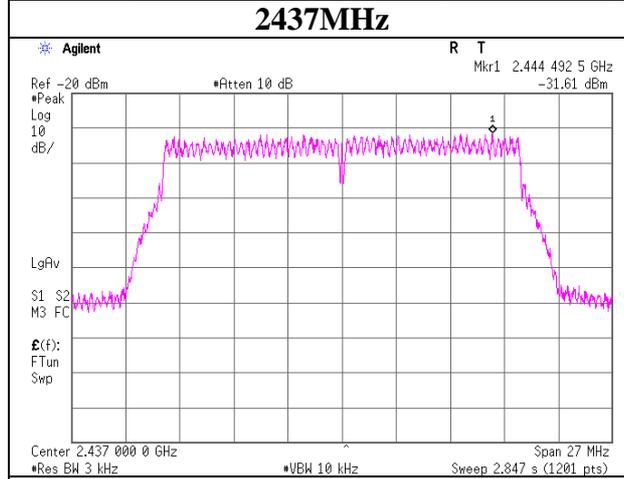
## Power Density

11n-20

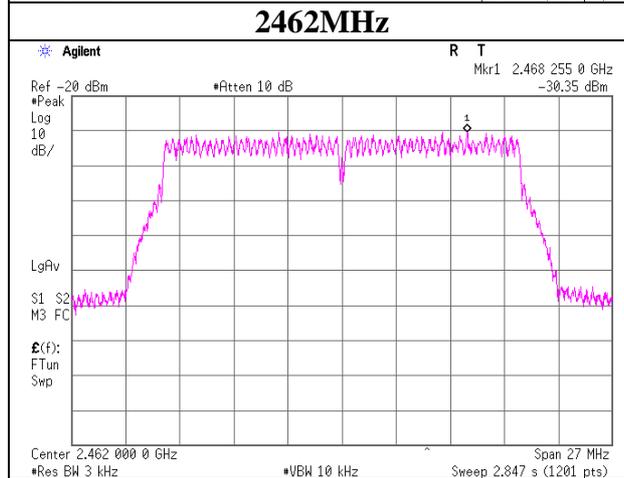
2412MHz



2437MHz



2462MHz



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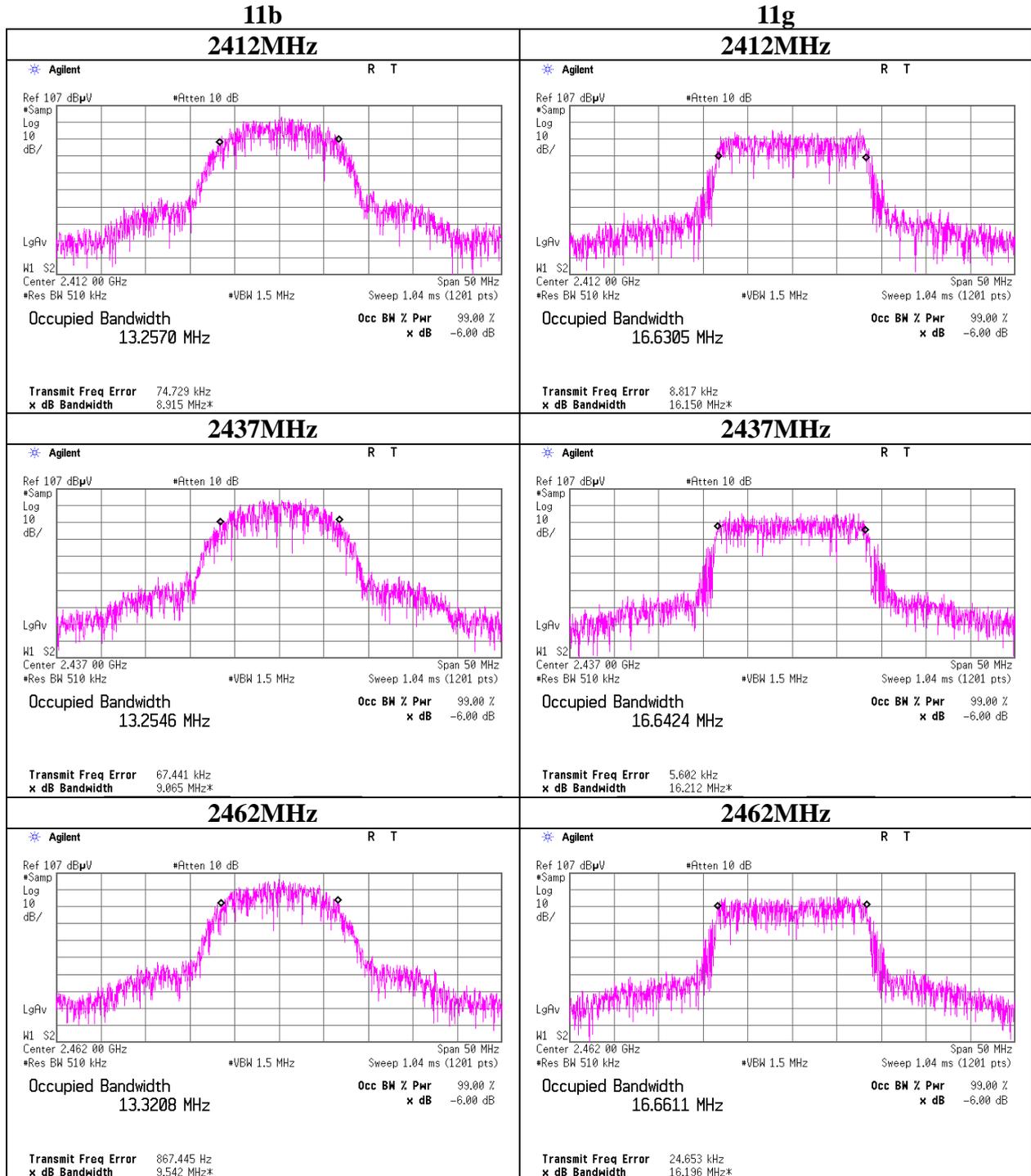
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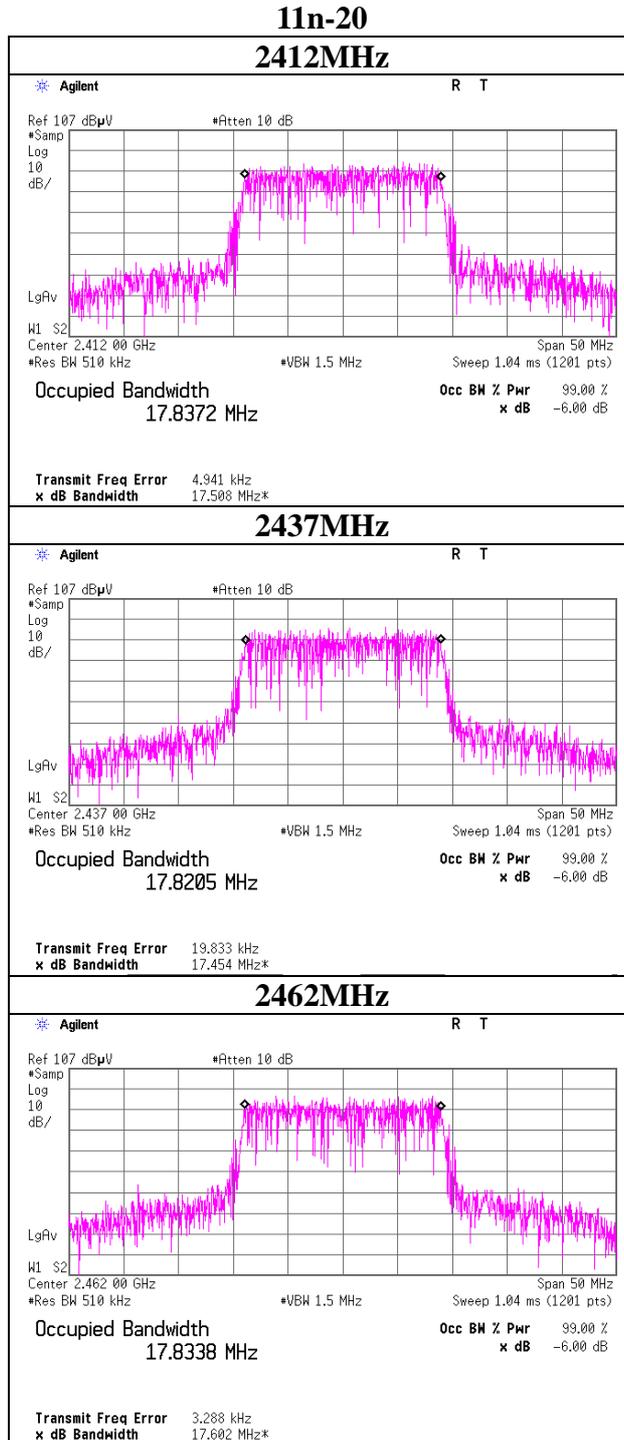
### 99% Occupied Bandwidth

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10400823H
Date	08/07/2014
Temperature/ Humidity	25 deg. C / 51% RH
Engineer	Shinya Watanabe
Mode	Tx 11b / 11g



## 99% Occupied Bandwidth

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10400823H
Date	08/07/2014
Temperature/ Humidity	25 deg. C / 51% RH
Engineer	Shinya Watanabe
Mode	Tx 11n-20



## APPENDIX 2: Test instruments

### EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
KSA-07	Spectrum Analyzer	Agilent	N9320A	CN0163000434	AT	Pre Check
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2013/10/21 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2013/10/21 * 12
MCC-66	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28636/2	AT	2014/04/09 * 12
MAT-56	Attenuator(10dB)	Suhner	6810.19.A	-	AT	2014/01/15 * 12
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2013/12/17 * 12
MAT-58	Attenuator(10dB)	Suhner	6810.19.A	-	AT	2014/01/15 * 12
MSA-13	Spectrum Analyzer	Agilent	E4440A	MY46185823	AT	2014/06/06 * 12
MPSU-13	Power Supply	NF	ES1000S		AT	Pre Check
MCC-137	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37954/2	AT	2013/10/18 * 12
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	AT	2013/11/25 * 12
MAT-20	Attenuator(10dB)(above 1GHz)	HIROSE ELECTRIC CO.,LTD.	AT-110	-	AT	2014/01/29 * 12
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2014/06/25 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2014/02/20 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2014/02/21 * 12
MCC-166	Microwave Cable	Junkosha	MWX221	1303S120(1m) / 1311S167(5m)	RE	2013/11/27 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2014/01/21 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2013/09/01 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE	2014/02/20 * 12
MHA-02	Horn Antenna 18-26.5GHz	EMCO	3160-09	1265	RE	2014/02/21 * 12
MAEC-01	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	CE	2013/08/01 * 12
MOS-27	Thermo-Hygrometer	CUSTOM	CTH-201	A08Q26	CE	2014/02/20 * 12
MJM-21	Measure	KOMELON	KMC-36	-	CE	-
MTR-09	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	CE	2014/06/06 * 12
MLS-25	LISN(AMN)	Schwarzbeck	NSLK8127	8127-731	CE(EUT)	2014/07/09 * 12
MLS-26	LISN(AMN)	Schwarzbeck	NSLK8127	8127-732	CE(AE)	2014/07/09 * 12
MTA-30	Terminator	TME	CT-01	-	CE	2014/01/20 * 12
MCC-03	Coaxial Cable	Fujikura/Suhner/TSJ	5D-2W(20m)/3D-2W(7.5m)/RG400u(1.5m)/RFM-E421(Switcher)	-/01068 (Switcher)	CE	2013/09/12 * 12
MAT-64	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2014/01/29 * 12

**The expiration date of the calibration is the end of the expired month.**

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

**As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.**

**Test Item: CE: Conducted Emission test**

**RE: Radiated Emission test**

**AT: Antenna Terminal Conducted test**

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