



# RADIO TEST REPORT

**Test Report No. : 10604551H-A-R2**

**Applicant** : silex technology, Inc.  
**Type of Equipment** : PCI Express Half mini card WLAN module  
**Model No.** : SX-PCEAN2  
**FCC ID** : N6C-SXPCEAN2  
**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. 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 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 10604551H-A-R1. 10604551H-A-R1 is replaced with this report.

**Date of test:** February 12 to March 11, 2015

**Representative test engineer:**

  
Kazuya Yoshioka  
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Consumer Technology Division

**Approved by:**

  
Takahiro Hatakeda  
Leader

Consumer Technology Division



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## **SECTION 1: Customer information**

Company Name : silex technology, Inc.  
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Contact Person : Toshiro Kometani

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

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

Type of Equipment : PCI Express Half mini card WLAN module  
Model No. : SX-PCEAN2  
Serial No. : Refer to Clause 4.2  
Rating : DC3.3V  
Receipt Date of Sample : February 12, 2015  
Country of Mass-production : Japan  
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 No: SX-PCEAN2 (referred to as the EUT in this report) is the PCI Express Half mini card WLAN module.

#### **General Specification**

Clock frequency(ies) in the system : 40MHz

#### **Radio Specification**

Radio Type : Transceiver  
Method of Frequency Generation : Synthesizer  
Power Supply (inner) : DC1.2V

#### **Radio Specification**

	IEEE802.11b	IEEE802.11g/n (20 M band)	IEEE802.11a/n (20 M band)	IEEE802.11n (40 M band)
Frequency of operation	2412-2462MHz *1)	2412-2462MHz *1)	5180-5240MHz 5260-5320MHz 5500-5700MHz 5745-5825MHz *1)	2422-2452MHz *1) 5190-5230MHz 5270-5310MHz 5510-5670MHz 5755-5795MHz *1)
Type of modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (64QAM, 16QAM, QPSK, BPSK)	OFDM (64QAM, 16QAM, QPSK, BPSK)	
Channel spacing	5MHz		20MHz	2.4GHz: 5MHz 5GHz: 40MHz
Antenna type	WiFi Dual Band PCB antenna			
Antenna Gain	2.4GHz: 1.8dBi 5GHz: 3.9dBi			
Antenna Connector type	U.FL Alternative connector			

\*1) 2412-2462MHz, 2422-2452MHz, 5745-5825MHz, and 5755-5795MHz are applied for this test report.

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

### **3.1 Test Specification**

Test Specification : FCC Part 15 Subpart C: 2015, final revised on January 21, 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

### **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	FCC: Section 15.207	<b>QP</b> 21.9dB, 4.58560MHz, N	Complied	-
	IC: RSS-Gen 8.8	IC: RSS-Gen 8.8	<b>AV</b> 21.2dB, 2.02330MHz, L		
6dB Bandwidth	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(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 6.12	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)"	FCC: Section15.247(d)	2.0dB 7311.000MHz, AV, Hori.	Complied	Conducted/ Radiated
	IC: RSS-Gen 6.13	IC: RSS-210 A8.5 RSS-Gen 8.9 RSS-Gen 8.10			

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 15.31 (e)**

The RF Module has own regulator.

The RF Module is constantly provided voltage through own regulator regardless of input voltage (DC3.3V).  
Therefore, this EUT complies with the requirement.

#### **FCC Part 15.203/212 Antenna requirement**

The EUT has a unique antenna connector (U.FL on the Module).

Therefore the equipment complies with the requirement of 15.203/212.

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### 3.3 Addition to standard

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

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

### 3.4 Uncertainty

#### 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	3.4dB
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	4.3dB	5.5dB	6.3dB	5.5dB	5.8dB	5.8dB	4.3dB
No.2	4.2dB	5.4dB	6.3dB	5.4dB	5.7dB	5.9dB	5.6dB
No.3	4.4dB	5.4dB	6.4dB	5.2dB	5.5dB	5.8dB	5.5dB
No.4	4.7dB	5.6dB	6.4dB	5.3dB	5.7dB	5.9dB	5.5dB

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

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 (Short GI), PN9
IEEE 802.11g (11g)	12Mbps, PN9
IEEE 802.11n MIMO 20MHz BW (11n-20): 2.4GHz	MCS 9 (Short GI), PN9
IEEE 802.11n MIMO 40MHz BW (11n-40) : 2.4GHz	MCS 9 (Short GI), PN9
IEEE 802.11a (11a)	18Mbps, PN9
IEEE 802.11n MIMO 20MHz BW (11n-20): 5GHz	MCS 8 (Short GI), PN9
IEEE 802.11n MIMO 40MHz BW (11n-40) : 5GHz	MCS 8 (Short GI), PN9
*The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
*The power value of the EUT was set for testing as follows (setting value might be different from product specification value); - Power Setting: Refer to the following table. - Software: Atheros Radio Test Tool (ART2-GUI) Version 2.28.6 *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.	

[Power setting]

<b>Operation</b>	<b>Rate</b>	<b>Frequency</b>	<b>Power Setting [dBm]</b>
11b	11Mbps(Short GI)	2412MHz	13.5
		2437MHz	15.0
		2462MHz	11.5
11g	12Mbps	2412MHz	13.5
		2437MHz	16.5
		2462MHz	11.5
11n MIMO 20Mband	MCS9 (Short GI)	2412MHz	11.5
		2437MHz	16.0
		2462MHz	10.5
11n MIMO 40Mband	MCS9 (Short GI)	2422MHz	5.5
		2437MHz	14.5
		2452MHz	4.5
11a	18Mbps	5745MHz	13.5
		5785MHz	13.5
		5825MHz	13.5
11n MIMO 20Mband	MCS 8 (Short GI)	5745MHz	14.0
		5785MHz	14.0
		5825MHz	13.5
11n MIMO 40Mband	MCS 8 (Short GI)	5755MHz	12.0
		5795MHz	12.0

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<2.4GHz band>

\*The details of Operating mode(s)

Test Item	Operating Mode	Tested Antenna port	Tested frequency
Conducted Emission	11n-20 Tx *1)	0+1	2437MHz *1)
Radiated Spurious Emission (Below 1GHz)	11n-20 Tx *1)	0+1	2437MHz *1)
Radiated Spurious Emission (Above 1GHz)	11b Tx	0	2412MHz
	11n-20 Tx *2)	0+1	2437MHz 2462MHz
	11g Tx *2)	0	2412MHz 2462MHz
	11n-40 Tx	0+1	2422MHz 2437MHz 2452MHz
Conducted Spurious Emission	11n-20 Tx *1)	0+1	2437MHz *1)
6dB Bandwidth, 99% Occupied Bandwidth	11b Tx	0	2412MHz
	11g Tx		2437MHz
	11n-20 Tx	0 *3)	2462MHz
	11n-40 Tx	0 *3)	2422MHz 2437MHz 2452MHz
Maximum Peak Output Power, Average Output Power	11b Tx	0, 1	2412MHz
	11g Tx		2437MHz
	11n-20 Tx	0, 1, 0+1	2462MHz
	11n-40 Tx	0, 1, 0+1	2422MHz 2437MHz 2452MHz
Power Density	11b Tx	0 *3)	2412MHz
	11g Tx		2437MHz
	11n-20 Tx	0, 1, 0+1	2462MHz
	11n-40 Tx	0, 1, 0+1	2422MHz 2437MHz 2452MHz

\*1) The operating mode and tested frequency were tested as a representative, because it had the highest power at antenna terminal test.

\*2) Since 11g and 11n-20 have the same modulation method and no differences in transmitting specification, test was performed on the representative mode that had the highest peak output power.

\*3) After the comparison between Antenna port 0 and Antenna port 1, test was performed with the antenna that had higher power as a representative.

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<5GHz band>

\*The details of Operating mode(s)

Test Item	Operating Mode	Tested Antenna port	Tested frequency
Radiated Spurious Emission (Above 1GHz)	11n-20 Tx *1)	0+1	5745MHz 5785MHz 5825MHz
	11n-40 Tx	0+1	5755MHz 5795MHz
6dB Bandwidth, 99% Occupied Bandwidth	11a Tx	0 *2)	5745MHz 5785MHz
	11n-20 Tx	0 *2)	5825MHz
	11n-40 Tx	0 *2)	5755MHz 5795MHz
Maximum Peak Output Power, Average Output Power	11a Tx	0, 1	5745MHz
	11n-20 Tx	0, 1, 0+1	5785MHz 5825MHz
	11n-40 Tx	0, 1, 0+1	5755MHz 5795MHz
Power Density	11a Tx	0 *2)	5745MHz
	11n-20 Tx	0, 1, 0+1	5785MHz 5825MHz
	11n-40 Tx	0, 1, 0+1	5755MHz 5795MHz

\* Conducted Emission, Radiated Spurious Emission (Below 1GHz), and Conducted Spurious Emission test results were included 2.4GHz test as a representative.

\*1) Since 11a and 11n-20 have the same modulation method and no differences in transmitting specification, test was performed on the representative mode that had the highest peak output power.

\*2) After the comparison between Antenna port 0 and Antenna port 1, test was performed with the antenna that had higher power as a representative.

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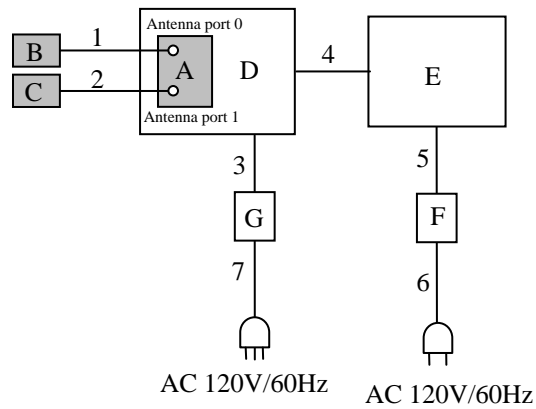
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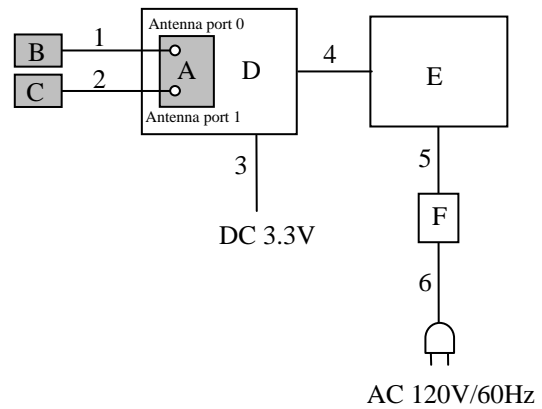
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## 4.2 Configuration and peripherals

### [Conducted emission]



### [Radiated emission / Antenna terminal conducted tests]



\* Cabling and setup(s) were taken into consideration and test data was taken under worst case conditions.

\* The test was performed using a typical evaluation board (Jig board).

### Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	PCI Express Half Mini Card WLAN Module	SX-PCEAN2	001	Silex	EUT
B	Antenna	H2B1PC1A1C	001	Unictron Technologies Corporation	EUT
C	Antenna	H2B1PC1A1C	002	Unictron Technologies Corporation	EUT
D	Jig board	-	-	-	-
E	Laptop PC	HP ProBook 6550 b	CNU1242 MQ0	HP	-
F	AC Adapter	Series PPP009L-E	CT: WBGST0A1R0PJ9u	HP	-
G	Regulated DC Power Supply	PW16-5ADP	171116437	TEXO	-

### List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Antenna Cable	0.15	Shielded	Shielded	-
2	Antenna Cable	0.15	Shielded	Shielded	-
3	DC Cable	2.7	Unshielded	Unshielded	-
4	Mini PCI Cable	0.3	Shielded	Shielded	-
5	DC Cable	1.8	Unshielded	Unshielded	-
6	AC Cable	1.8	Unshielded	Unshielded	-
7	AC Cable	1.8	Unshielded	Unshielded	-

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## **SECTION 5: Conducted Emission**

### **Test Procedure and conditions**

EUT was placed on a wooden table 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 & 558074 D02 DTS Part 15.247 Old Rule (Issued on June 5, 2014)"

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, 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	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	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 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 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>12.2.5.2</u> RBW: 1MHz VBW: 3MHz Detector: Power Averaging (RMS) Trace: 100 traces Duty factor was added to the results.	RBW: 100kHz VBW: 300kHz
Test Distance	3m	3m (below 10GHz), 1m *2) (above 10GHz) 0.5m *3) (above 26.5GHz)		3m (below 10GHz), 1m *2) (above 10GHz) 0.5m *3) (above 26.5GHz)

\*1) Average Power Measurement was performed based on 6.0 & 12.2.5 of "558074 D01 DTS Meas Guidance v03r02 & 558074 D02 DTS Part 15.247 Old Rule (Issued on June 5, 2014)"

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

\*3) Distance Factor:  $20 \times \log(3.0\text{m}/0.5\text{m}) = 15.6\text{dB}$

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- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT (Antenna and Module) 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 (2.4GHz) / 30M-40GHz (5GHz)  
**Test data** : APPENDIX  
**Test result** : Pass

## **SECTION 7: Antenna Terminal Conducted Tests**

### **Test Procedure**

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

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
6dB Bandwidth	20MHz, 40MHz	100kHz	300kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	Enough width to display emission skirts	1 to 5% of OBW	Three times of RBW	Auto	Peak *1)	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak/ Average *2)	-	Power Meter (Sensor: 50MHz BW)
Peak Power Density	1.5 times the 6dB Bandwidth	3kHz	10kHz	Auto	Peak	Max Hold	Spectrum Analyzer *3)
Conducted Spurious Emission *4)	9kHz to 150kHz	200Hz	620Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	9.1kHz	27kHz				

\*1) The measurement was performed with Max Hold since the duty cycle was not 100%.  
\*2) Reference data  
\*3) Section 10.2 Method PKPSD (peak PSD) of "558074 D01 DTS Meas Guidance v03r02 & 558074 D02 DTS Part 15.247 Old Rule (Issued on June 5, 2014)".  
\*4) 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**

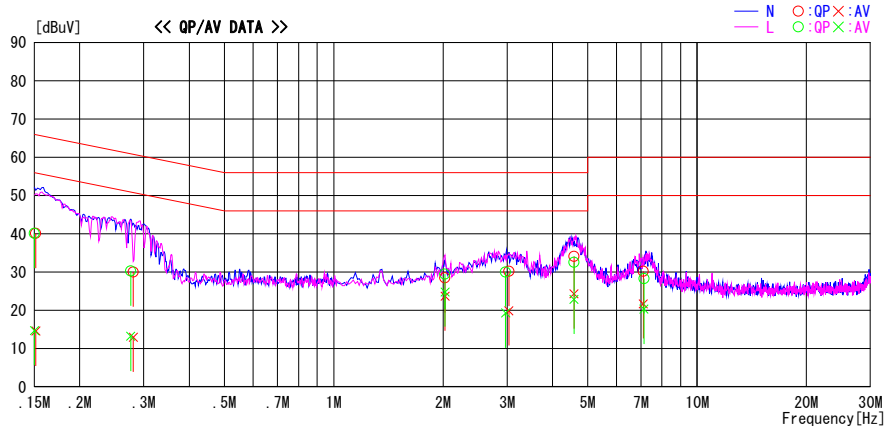
**DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Ise EMC Lab. No.2 Semi Anechoic Chamber  
Date : 2015/03/11

Report No. : 10604551H  
 Temp./Humi. : 22deg. C / 38% RH  
 Engineer : Kazuya Yoshioka

Mode / Remarks : WLAN 11n-20 2437MHz

LIMIT : FCC15.207 QP  
 FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15130	26.9	1.4	13.2	40.1	14.6	65.9	55.9	25.8	41.3	N	
0.28080	16.8	-0.2	13.2	30.0	13.0	60.8	50.8	30.8	37.8	N	
2.02350	15.0	10.2	13.5	28.5	23.7	56.0	46.0	27.5	22.3	N	
3.03360	16.6	6.3	13.6	30.2	19.9	56.0	46.0	25.8	26.1	N	
4.58560	20.4	10.6	13.7	34.1	24.3	56.0	46.0	21.9	21.7	N	
7.11200	16.2	7.7	14.0	30.2	21.7	60.0	50.0	29.8	28.3	N	
0.15000	26.9	1.5	13.2	40.1	14.7	66.0	56.0	25.9	41.3	L	
0.27610	17.1	0.0	13.2	30.3	13.2	60.9	50.9	30.6	37.7	L	
2.02330	16.0	11.3	13.5	29.5	24.8	56.0	46.0	26.5	21.2	L	
2.97194	16.4	5.7	13.6	30.0	19.3	56.0	46.0	26.0	26.7	L	
4.58230	18.9	9.2	13.7	32.6	22.9	56.0	46.0	23.4	23.1	L	
7.14130	14.3	6.3	14.0	28.3	20.3	60.0	50.0	31.7	29.7	L	

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



## 6dB Bandwidth

Test place Ise EMC Lab. No.6 Measurement Room  
Report No. 10604551H  
Date 02/12/2015  
Temperature/ Humidity 20deg. C / 32% RH  
Engineer Tomoki Matsui  
Mode Tx 11b / 11g / 11n-20 / 11n-40

11b

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	10.659	>500
2437	10.261	>500
2462	9.667	>500

11g

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	16.555	>500
2437	16.545	>500
2462	16.529	>500

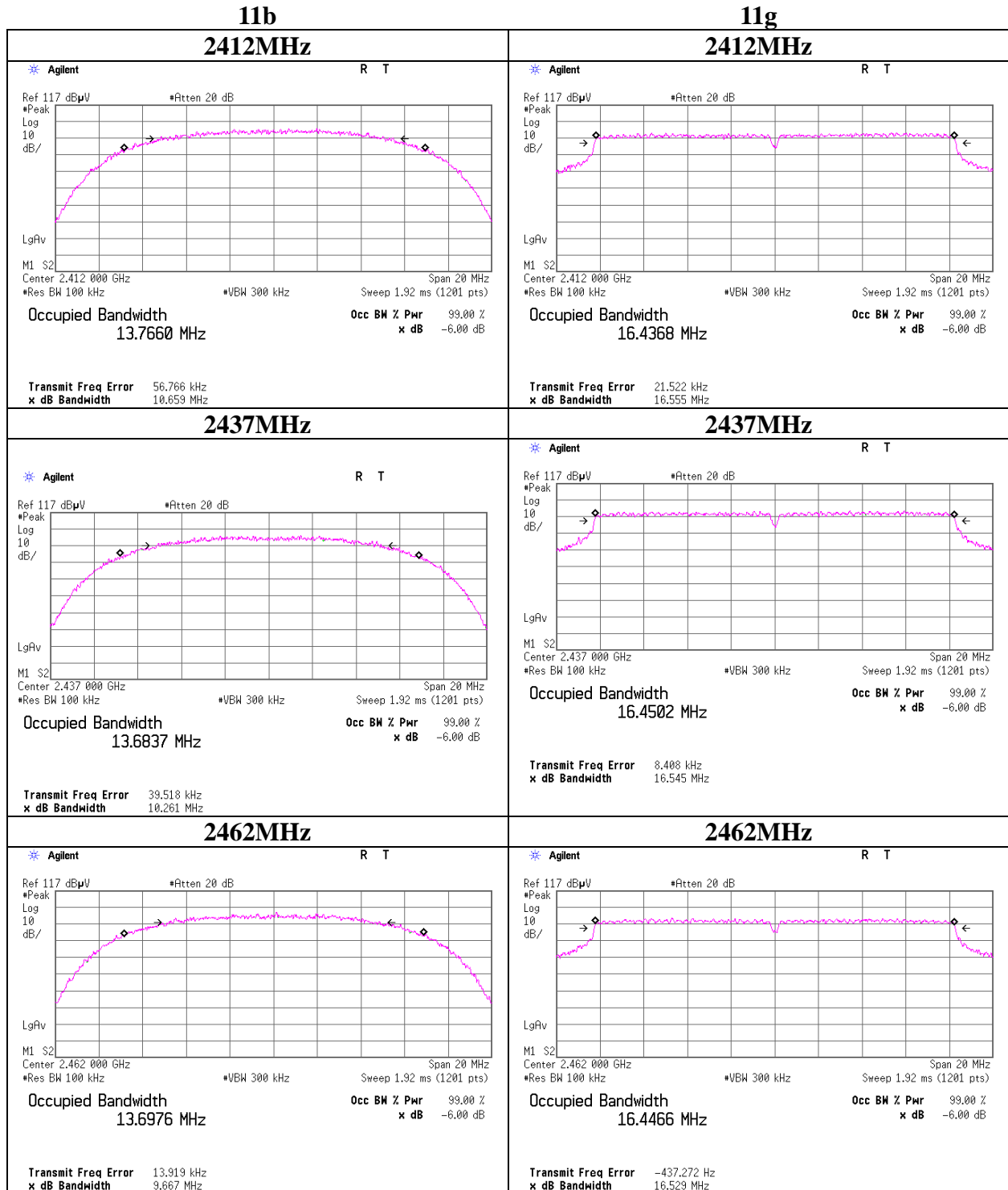
11n-20

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	17.809	>500
2437	17.790	>500
2462	17.822	>500

11n-40

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2422	36.567	>500
2437	36.615	>500
2452	36.601	>500

### 6dB Bandwidth



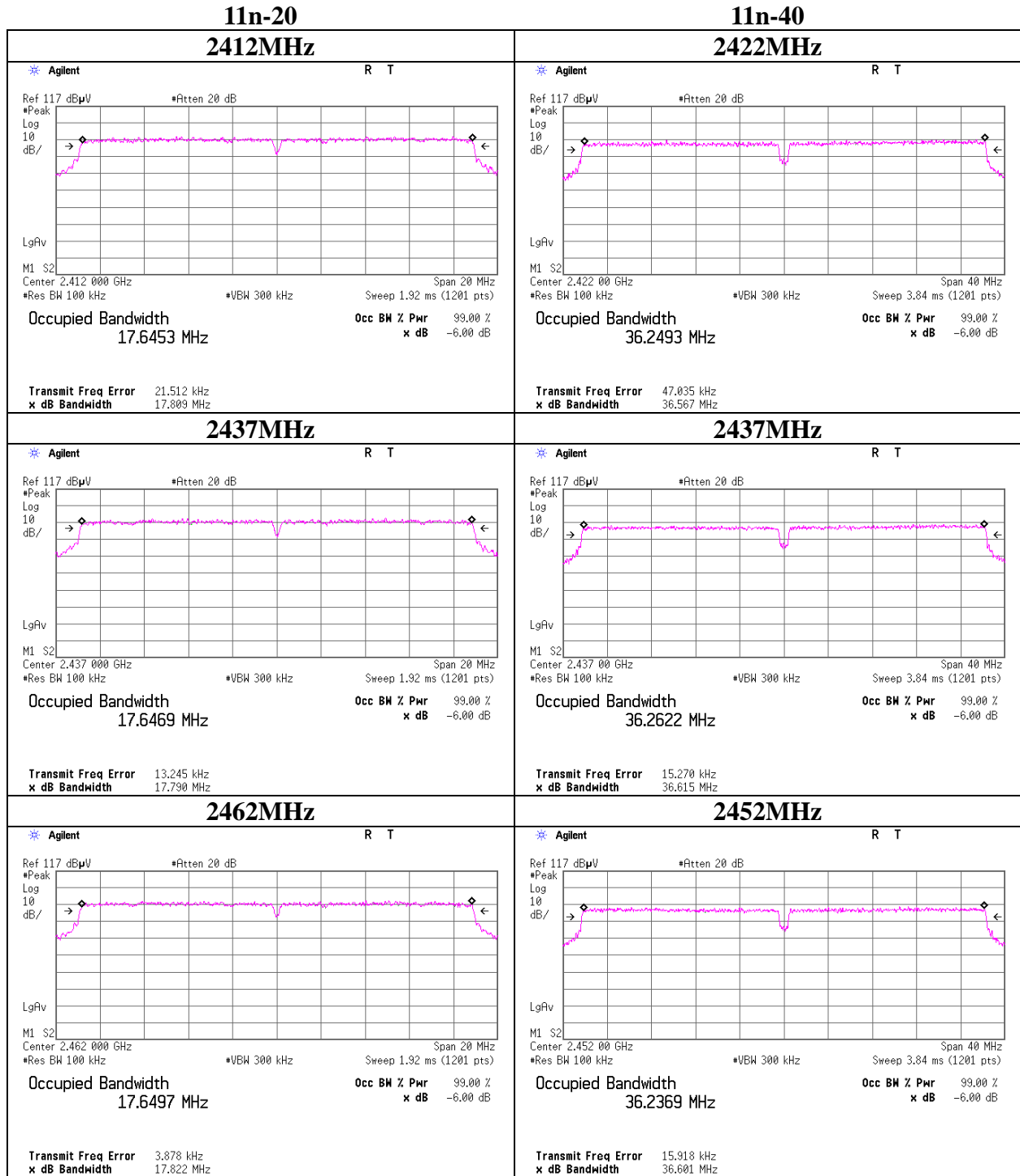
**UL Japan, Inc.**  
**Ise EMC Lab.**

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### 6dB Bandwidth



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## 6dB Bandwidth

Test place Ise EMC Lab. No.11 Measurement Room  
Report No. 10604551H  
Date 03/10/2015  
Temperature/ Humidity 23deg. C / 30% RH  
Engineer Shinichi Miyazono  
Mode Tx 11a / 11n-20 / 11n-40

### 11a

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
5745	16.365	>500
5785	16.366	>500
5825	16.394	>500

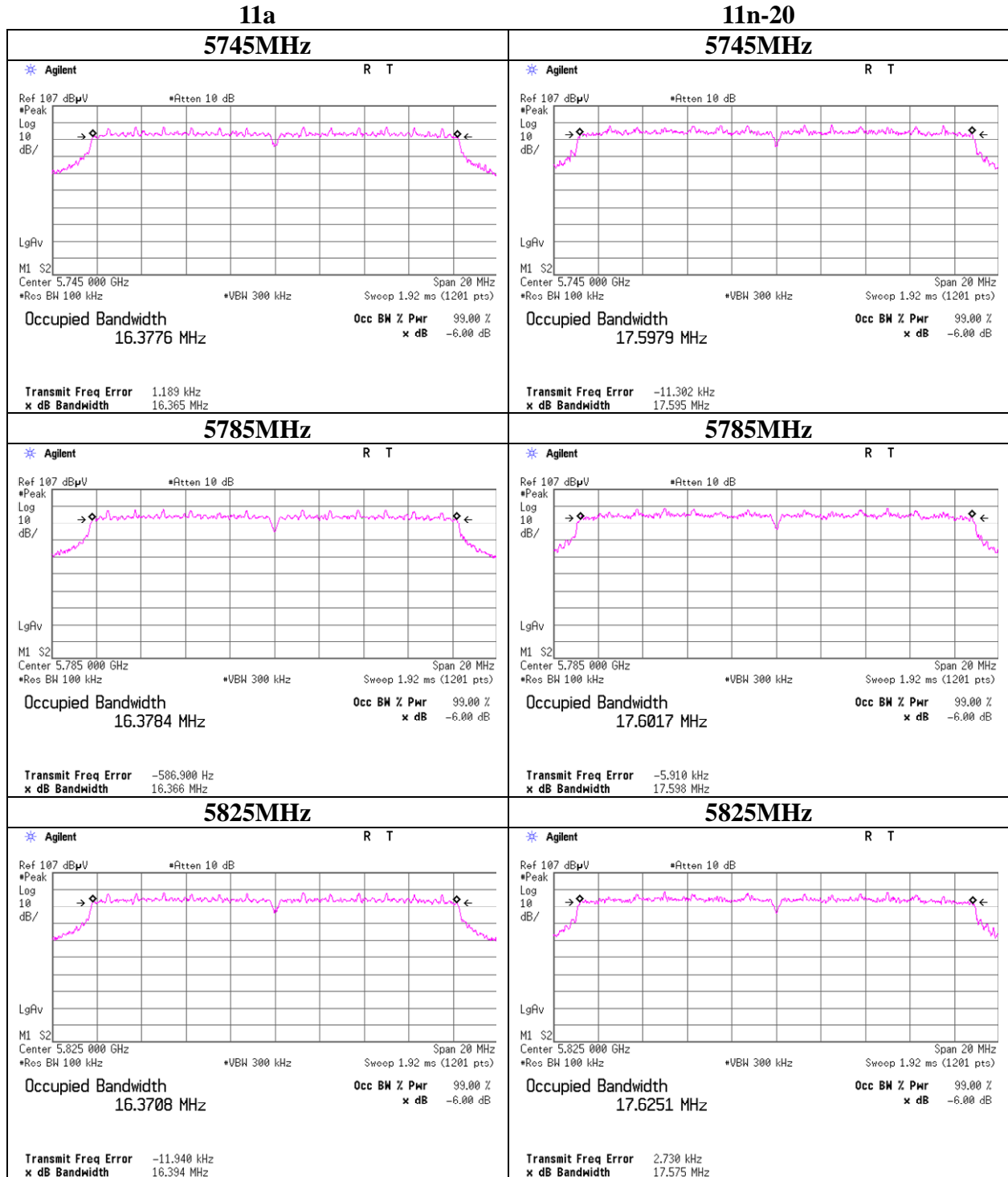
### 11n-20

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
5745	17.595	>500
5785	17.598	>500
5825	17.575	>500

### 11n-40

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
5755	35.892	>500
5795	35.991	>500

## 6dB Bandwidth



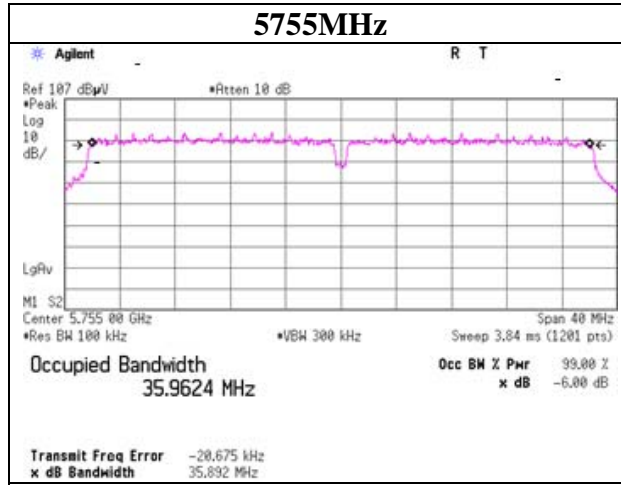
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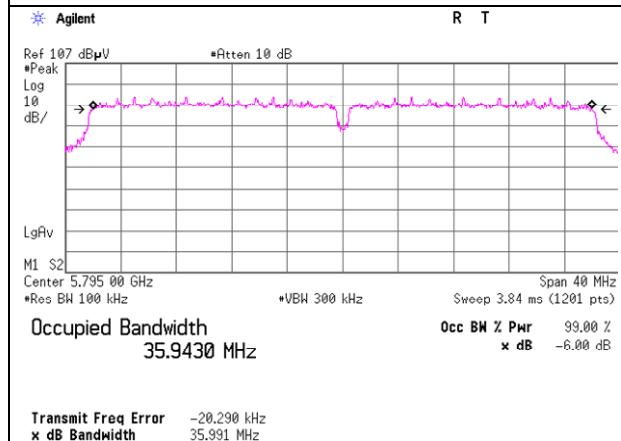
**6dB Bandwidth**

**11n-40**

**5755MHz**



**5795MHz**



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### Maximum Peak Output Power

Test place	Ise EMC Lab. No.6 and No.11 Measurement Room	
Report No.	10604551H	
Date	02/12/2015	03/10/2015
Temperature/ Humidity	20deg. C / 32% RH	23deg. C / 30% RH
Engineer	Tomoki Matsui	Shinichi Miyazono
Mode	Tx 11b 11Mbps(Short GI)	

Antenna port 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	4.98	0.77	10.06	15.81	38.11	30.00	1000	14.19
2437	7.21	0.77	10.00	17.98	62.81	30.00	1000	12.02
2462	3.00	0.77	10.06	13.83	24.15	30.00	1000	16.17

Antenna port1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	4.66	0.77	10.06	15.49	35.40	30.00	1000	14.51
2437	6.09	0.79	10.07	16.95	49.55	30.00	1000	13.05
2462	2.66	0.77	10.06	13.49	22.34	30.00	1000	16.51

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

Antenna port 0, 2437MHz

Rate [Mbps]	Reading [dBm]	Remark
1(Long)	7.15	
2(Long)	6.90	
2(Short)	6.87	
5.5(Long)	6.77	
5.5(Short)	6.70	
11(Long)	6.79	
11(Short)	7.21	*

Antenna port 1, 2437MHz

Rate [Mbps]	Reading [dBm]	Remark
1(Long)	5.99	
2(Long)	6.00	
2(Short)	5.98	
5.5(Long)	5.92	
5.5(Short)	5.90	
11(Long)	6.04	
11(Short)	6.09	*

\*: Worst Rate

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

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## Maximum Peak Output Power

Test place	Ise EMC Lab. No.6 and No.11 Measurement Room	
Report No.	10604551H	
Date	02/12/2015	03/10/2015
Temperature/ Humidity	20deg. C / 32% RH	23deg. C / 30% RH
Engineer	Tomoki Matsui	Shinichi Miyazono
Mode	Tx 11g 12Mbps	

Antenna port 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	12.67	0.77	10.06	23.50	223.87	30.00	1000	6.50
2437	14.18	0.77	10.00	24.95	312.61	30.00	1000	5.05
2462	11.10	0.77	10.06	21.93	155.96	30.00	1000	8.07

Antenna port 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	12.43	0.77	10.06	23.26	211.84	30.00	1000	6.74
2437	14.08	0.79	10.07	24.94	311.89	30.00	1000	5.06
2462	10.60	0.77	10.06	21.43	139.00	30.00	1000	8.57

Sample Calculation:

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

Antenna port 0, 2437MHz

Rate [Mbps]	Reading [dBm]	Remark
6	13.97	
9	14.05	
12	14.18	*
18	14.14	
24	13.94	
36	14.00	
48	13.56	
54	13.08	

Antenna port 1, 2437MHz

Rate [Mbps]	Reading [dBm]	Remark
6	13.83	
9	13.92	
12	14.08	*
18	14.07	
24	13.87	
36	13.93	
48	13.28	
54	13.06	

\*: Worst Rate

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

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### Maximum Peak Output Power

Test place	Ise EMC Lab. No.6 and No.11 Measurement Room	
Report No.	10604551H	
Date	02/12/2015	03/10/2015
Temperature/ Humidity	20deg. C / 32% RH	23deg. C / 30% RH
Engineer	Tomoki Matsui	Shinichi Miyazono
Mode	Tx 11n-20 MCS9 (Short GI)	

Antenna port 0 + 1

Freq. [MHz]	Antenna port 0 Result [mW]	Antenna port 1 Result [mW]	Result Antenna port 0 + 1		Limit		Margin [dB]
			[dBm]	[mW]	[dBm]	[mW]	
2412	163.31	141.25	24.84	304.56	30.00	1000	5.16
2437	299.92	283.79	27.66	583.71	30.00	1000	2.34
2462	146.55	118.58	24.23	265.13	30.00	1000	5.77

Sample Calculation:

Result = Antenna port 0 + 1

Antenna port 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	11.30	0.77	10.06	22.13	163.31	30.00	1000	7.87
2437	14.00	0.77	10.00	24.77	299.92	30.00	1000	5.23
2462	10.83	0.77	10.06	21.66	146.55	30.00	1000	8.34

Antenna port 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	10.67	0.77	10.06	21.50	141.25	30.00	1000	8.50
2437	13.67	0.79	10.07	24.53	283.79	30.00	1000	5.47
2462	9.91	0.77	10.06	20.74	118.58	30.00	1000	9.26

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

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### Maximum Peak Output Power

Test place : Ise EMC Lab. No.6 Measurement Room  
Report No. : 10604551H  
Date : 02/12/2015  
Temperature/ Humidity : 20deg. C / 32% RH  
Engineer : Tomoki Matsui  
Mode : Tx 11n-20

2437MHz

MCS Number	Reading		Reading		Result		Remark
	Antenna port 0		Antenna port 1		Antenna port 0 + 1		
	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	
0	13.87	24.38	13.72	23.55	-	-	
1	13.91	24.60	13.76	23.77	-	-	
2	14.08	25.59	13.81	24.04	-	-	*SISO
3	14.02	25.23	13.53	22.54	-	-	
4	13.95	24.83	13.80	23.99	-	-	
5	13.64	23.12	13.40	21.88	-	-	
6	13.33	21.53	13.11	20.46	-	-	
7	12.84	19.23	12.68	18.54	-	-	
8	13.82	24.10	13.79	23.93	16.82	48.03	
9	14.00	25.12	13.67	23.28	16.85	48.40	*MIMO
10	13.64	23.12	13.60	22.91	16.63	46.03	
11	13.77	23.82	13.64	23.12	16.72	46.94	
12	13.78	23.88	13.71	23.50	16.76	47.37	
13	13.38	21.78	13.14	20.61	16.27	42.38	
14	13.07	20.28	12.76	18.88	15.93	39.16	
15	12.25	16.79	12.11	16.26	15.19	33.04	

\* Worst MCS

2437MHz

MCS Number	Reading Antenna port 0 [dBm]	Reading Antenna port 1 [dBm]	Result Antenna port 0+1 [dBm]	GI	Remark
2	14.08	13.81	-	Long	
2	14.09	13.94	-	Short	*
9	14.00	13.67	16.85	Long	
9	14.01	13.70	16.87	Short	*

\* Worst GI

### Maximum Peak Output Power

Test place	Ise EMC Lab. No.6 and No.11 Measurement Room		
Report No.	10604551H		
Date	02/12/2015	03/10/2015	
Temperature/ Humidity	20deg. C / 32% RH	23deg. C / 30% RH	
Engineer	Tomoki Matsui	Shinichi Miyazono	
Mode	Tx 11n-40 MCS9 (Short GI)		

**Antenna port 0 + 1**

Freq. [MHz]	Antenna port 0 Result [mW]	Antenna port 1 Result [mW]	Result Antenna port 0 + 1		Limit		Margin [dB]
			[dBm]	[mW]	[dBm]	[mW]	
			2422	44.67	40.18	19.29	
2437	287.08	267.30	27.44	554.38	30.00	1000	2.56
2452	30.41	26.61	17.56	57.02	30.00	1000	12.44

Sample Calculation:

Result = Antenna port 0 + 1

**Antenna port 0**

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
				2422	5.67	0.77	10.06	
2437	13.81	0.77	10.00	24.58	287.08	30.00	1000	5.42
2452	4.00	0.77	10.06	14.83	30.41	30.00	1000	15.17

**Antenna port 1**

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
				2422	5.21	0.77	10.06	
2437	13.41	0.79	10.07	24.27	267.30	30.00	1000	5.73
2452	3.42	0.77	10.06	14.25	26.61	30.00	1000	15.75

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

### Maximum Peak Output Power

Test place : Ise EMC Lab. No.6 Measurement Room  
Report No. : 10604551H  
Date : 02/12/2015  
Temperature/ Humidity : 20deg. C / 32% RH  
Engineer : Tomoki Matsui  
Mode : Tx 11n-40

2437MHz

MCS Number	Reading		Reading		Result		Remark
	Antenna port 0		Antenna port 1		Antenna port 0 + 1		
	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	
0	13.94	24.77	13.50	22.39	-	-	
1	14.00	25.12	13.77	23.82	-	-	*SISO
2	13.83	24.15	13.65	23.17	-	-	
3	13.73	23.60	13.63	23.07	-	-	
4	13.60	22.91	13.35	21.63	-	-	
5	13.74	23.66	13.40	21.88	-	-	
6	13.81	24.04	13.39	21.83	-	-	
7	13.24	21.09	12.95	19.72	-	-	
8	13.58	22.80	13.54	22.59	16.57	45.40	
9	13.81	24.04	13.41	21.93	16.62	45.97	*MIMO
10	13.52	22.49	13.26	21.18	16.40	43.67	
11	13.49	22.34	13.36	21.68	16.44	44.01	
12	13.46	22.18	13.21	20.94	16.35	43.12	
13	13.49	22.34	13.26	21.18	16.39	43.52	
14	13.49	22.34	13.25	21.13	16.38	43.47	
15	13.21	20.94	13.21	20.94	16.22	41.88	

\* Worst MCS

2437MHz

MCS Number	Reading Antenna port 0 [dBm]	Reading Antenna port 1 [dBm]	Result Antenna port 0+1 [dBm]	GI	Remark
1	13.80	13.64	-	Long	
1	14.00	13.77	-	Short	*
9	13.58	13.30	16.45	Long	
9	13.81	13.41	16.62	Short	*

\* Worst GI

## Maximum Peak Output Power

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10604551H
Date	02/12/2015
Temperature/ Humidity	20deg. C / 32% RH
Engineer	Tomoki Matsui
Mode	Tx 11a 18Mbps

Antenna port 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
5745	11.19	1.31	10.04	22.54	179.47	30.00	1000	7.46
5785	11.26	1.31	10.04	22.61	182.39	30.00	1000	7.39
5825	10.93	1.32	10.04	22.29	169.43	30.00	1000	7.71

Antenna port 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
5745	11.00	1.50	10.09	22.59	181.55	30.00	1000	7.41
5785	10.93	1.52	10.09	22.54	179.47	30.00	1000	7.46
5825	10.75	1.53	10.09	22.37	172.58	30.00	1000	7.63

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

Antenna port 0, 5785MHz

Rate [Mbps]	Reading [dBm]	Remark
6	10.71	
9	10.86	
12	11.13	
18	11.26	*
24	10.93	
36	10.66	
48	10.82	
54	10.02	

Antenna port 1, 5785MHz

Rate [Mbps]	Reading [dBm]	Remark
6	10.51	
9	10.64	
12	10.91	
18	10.93	*
24	10.82	
36	10.48	
48	10.60	
54	9.66	

\*: Worst Rate

### Maximum Peak Output Power

Test place	Ise EMC Lab. No.6 and No.11 Measurement Room	
Report No.	10604551H	
Date	02/12/2015	03/10/2015
Temperature/ Humidity	20deg. C / 32% RH	23deg. C / 30% RH
Engineer	Tomoki Matsui	Shinichi Miyazono
Mode	Tx 11n-20 MCS8 (Short GI)	

Antenna port 0 + 1

Freq. [MHz]	Antenna port 0 Result [mW]	Antenna port 1 Result [mW]	Result Antenna port 0 + 1		Limit		Margin [dB]
			[dBm]	[mW]	[dBm]	[mW]	
			5745	183.65	183.65	25.65	
5785	188.80	184.08	25.72	372.88	30.00	1000	4.28
5825	161.44	152.05	24.96	313.49	30.00	1000	5.04

Sample Calculation:

Result = Antenna port 0 + 1

Antenna port 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
5745	11.29	1.31	10.04	22.64	183.65	30.00	1000	7.36
5785	11.41	1.31	10.04	22.76	188.80	30.00	1000	7.24
5825	10.66	1.32	10.10	22.08	161.44	30.00	1000	7.92

Antenna port 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
5745	11.05	1.50	10.09	22.64	183.65	30.00	1000	7.36
5785	11.04	1.52	10.09	22.65	184.08	30.00	1000	7.35
5825	10.40	1.32	10.10	21.82	152.05	30.00	1000	8.18

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

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### Maximum Peak Output Power

Test place : Ise EMC Lab. No.6 Measurement Room  
Report No. : 10604551H  
Date : 02/12/2015  
Temperature/ Humidity : 20deg. C / 32% RH  
Engineer : Tomoki Matsui  
Mode : Tx 11n-20

5785MHz

MCS Number	Reading		Reading		Result		Remark
	Antenna port 0		Antenna port 1		Antenna port 0 + 1		
	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	
0	11.31	13.52	11.02	12.65	-	-	
1	11.18	13.12	10.88	12.25	-	-	
2	11.25	13.34	11.10	12.88	-	-	
3	11.39	13.77	11.11	12.91	-	-	
4	11.41	13.84	11.30	13.49	-	-	*SISO
5	10.82	12.08	10.70	11.75	-	-	
6	10.22	10.52	10.01	10.02	-	-	
7	7.56	5.70	7.26	5.32	-	-	
8	11.41	13.84	11.04	12.71	14.24	26.54	*MIMO
9	11.28	13.43	10.87	12.22	14.09	25.65	
10	11.30	13.49	10.84	12.13	14.09	25.62	
11	11.21	13.21	10.97	12.50	14.10	25.72	
12	11.12	12.94	10.90	12.30	14.02	25.24	
13	10.68	11.69	10.24	10.57	13.48	22.26	
14	10.12	10.28	9.84	9.64	12.99	19.92	
15	7.50	5.62	6.22	4.19	9.92	9.81	

\* Worst MCS

5785MHz

MCS Number	Reading Antenna port 0 [dBm]	Reading Antenna port 1 [dBm]	Result Antenna port 0+1 [dBm]	GI	Remark
4	11.32	11.05	-	Long	
4	11.41	11.30	-	Short	*
8	11.25	10.96	14.12	Long	
8	11.41	11.04	14.24	Short	*

\* Worst GI

## Maximum Peak Output Power

Test place : Ise EMC Lab. No.6 Measurement Room  
Report No. : 10604551H  
Date : 02/12/2015  
Temperature/ Humidity : 20deg. C / 32% RH  
Engineer : Tomoki Matsui  
Mode : Tx 11n-40 MCS8 (Short GI)

### Antenna port 0 + 1

Freq. [MHz]	Antenna port 0 Result [mW]	Antenna port 1 Result [mW]	Result Antenna port 0 + 1		Limit		Margin [dB]
			[dBm]	[mW]	[dBm]	[mW]	
5755	141.25	145.55	24.58	286.80	30.00	1000	5.42
5795	149.62	148.94	24.75	298.56	30.00	1000	5.25

Sample Calculation:

Result = Antenna 0 + 1

### Antenna port 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
5755	10.15	1.31	10.04	21.50	141.25	30.00	1000	8.50
5795	10.40	1.31	10.04	21.75	149.62	30.00	1000	8.25

### Antenna port 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
5755	10.04	1.50	10.09	21.63	145.55	30.00	1000	8.37
5795	10.12	1.52	10.09	21.73	148.94	30.00	1000	8.27

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

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### Maximum Peak Output Power

Test place : Ise EMC Lab. No.6 Measurement Room  
Report No. : 10604551H  
Date : 02/12/2015  
Temperature/ Humidity : 20deg. C / 32% RH  
Engineer : Tomoki Matsui  
Mode : Tx 11n-40

5755MHz

MCS Number	Reading		Reading		Result		Remark
	Antenna port 0		Antenna port 1		Antenna port 0 + 1		
	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	
0	9.85	9.66	9.92	9.82	-	-	
1	10.34	10.81	10.30	10.72	-	-	
2	10.40	10.96	10.37	10.89	-	-	*SISO
3	10.27	10.64	10.10	10.23	-	-	
4	9.76	9.46	9.94	9.86	-	-	
5	9.76	9.46	9.81	9.57	-	-	
6	9.35	8.61	9.33	8.57	-	-	
7	7.71	5.90	7.40	5.50	-	-	
8	10.15	10.35	10.04	10.09	13.11	20.44	*MIMO
9	9.94	9.86	9.71	9.35	12.84	19.22	
10	9.85	9.66	10.07	10.16	12.97	19.82	
11	9.75	9.44	9.45	8.81	12.61	18.25	
12	9.84	9.64	9.47	8.85	12.67	18.49	
13	9.93	9.84	9.43	8.77	12.70	18.61	
14	9.15	8.22	8.49	7.06	11.84	15.29	
15	7.21	5.26	7.16	5.20	10.20	10.46	

\* Worst MCS

5755MHz

MCS Number	Reading Antenna port 0 [dBm]	Reading Antenna port 1 [dBm]	Result Antenna port 0+1 [dBm]	GI	Remark
2	10.09	9.62	-	Long	
2	10.40	10.37	-	Short	*
8	9.85	9.78	12.83	Long	
8	10.15	10.04	13.11	Short	*

\* Worst GI

### Maximum Average Output Power (Reference data for RF Exposure)

Test place Ise EMC Lab. No.6 and No.11 Measurement Room  
Report No. 10604551H  
Date 02/12/2015 03/10/2015  
Temperature/ Humidity 20deg. C / 32% RH 23deg. C / 30% RH  
Engineer Tomoki Matsui Shinichi Miyazono  
Mode Tx 11b 11Mbps(Short GI)

[AV]

Antenna port 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.)		Result (e.i.r.p)	
					[dBm]	[mW]	[dBm]	[mW]
2412	1.97	0.77	10.06	1.80	12.80	19.05	14.60	28.84
2437	3.95	0.77	10.00	1.80	14.72	29.65	16.52	44.87
2462	0.22	0.77	10.06	1.80	11.05	12.74	12.85	19.28

Antenna port 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.)		Result (e.i.r.p)	
					[dBm]	[mW]	[dBm]	[mW]
2412	1.91	0.77	10.06	1.80	12.74	18.79	14.54	28.44
2437	3.20	0.79	10.07	1.80	14.06	25.47	15.86	38.55
2462	-0.11	0.77	10.06	1.80	10.72	11.80	12.52	17.86

Sample Calculation:

Result(Cond.) = Reading + Cable Loss + Atten.Loss

Result(e.i.r.p.) = Reading + Cable Loss + Atten.Loss + Antenna Gain

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**Maximum Average Output Power (Reference data for RF Exposure)**

Test place Ise EMC Lab. No.6 and No.11 Measurement Room  
Report No. 10604551H  
Date 02/12/2015 03/10/2015  
Temperature/ Humidity 20deg. C / 32% RH 23deg. C / 30% RH  
Engineer Tomoki Matsui Shinichi Miyazono  
Mode Tx 11g 12Mbps

[AV]

Antenna port 0

Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.)		Result (e.i.r.p)	
					[dBm]	[mW]	[dBm]	[mW]
2412	2.65	0.77	10.06	1.80	13.48	22.28	15.28	33.73
2437	5.64	0.77	10.00	1.80	16.41	43.75	18.21	66.22
2462	0.42	0.77	10.06	1.80	11.25	13.34	13.05	20.18

Antenna port 1

Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.)		Result (e.i.r.p)	
					[dBm]	[mW]	[dBm]	[mW]
2412	2.35	0.77	10.06	1.80	13.18	20.80	14.98	31.48
2437	5.05	0.79	10.07	1.80	15.91	38.99	17.71	59.02
2462	-0.17	0.77	10.06	1.80	10.66	11.64	12.46	17.62

Sample Calculation:

Result(Cond.) = Reading + Cable Loss + Atten.Loss

Result(e.i.r.p.) = Reading + Cable Loss + Atten.Loss + Antenna Gain

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**Maximum Average Output Power (Reference data for RF Exposure)**

Test place	Ise EMC Lab. No.6 and No.11 Measurement Room	
Report No.	10604551H	
Date	02/12/2015	03/10/2015
Temperature/ Humidity	20deg. C / 32% RH	23deg. C / 30% RH
Engineer	Tomoki Matsui	Shinichi Miyazono
Mode	Tx 11n-20 MCS9 (Short GI)	

[AV]

**Antenna port 0+1**

Freq. [MHz]	Antenna Port 0 Result		Antenna Port 1 Result		Result Antenna Port 0+1 (Cond.)		Result Antenna Port 0+1 (e.i.r.p.)	
	(Cond.) [mW]	(e.i.r.p.) [mW]	(Cond.) [mW]	(e.i.r.p.) [mW]	[dBm]	[mW]	[dBm]	[mW]
	2412.0	13.34	20.18	12.39	18.75	14.10	25.72	15.90
2437.0	36.73	55.59	33.81	51.17	18.48	70.53	20.28	106.76
2462.0	9.93	15.03	9.31	14.09	12.84	19.24	14.64	29.12

**Antenna port 0**

Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.)		Result (e.i.r.p.)	
					[dBm]	[mW]	[dBm]	[mW]
2412.0	0.42	0.77	10.06	1.80	11.25	13.34	13.05	20.18
2437.0	4.88	0.77	10.00	1.80	15.65	36.73	17.45	55.59
2462.0	-0.86	0.77	10.06	1.80	9.97	9.93	11.77	15.03

**Antenna port 1**

Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.)		Result (e.i.r.p.)	
					[dBm]	[mW]	[dBm]	[mW]
2412.0	0.10	0.77	10.06	1.80	10.93	12.39	12.73	18.75
2437.0	4.43	0.79	10.07	1.80	15.29	33.81	17.09	51.17
2462.0	-1.14	0.77	10.06	1.80	9.69	9.31	11.49	14.09

Sample Calculation:

Result(Cond.) = Reading + Cable Loss + Atten.Loss

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**Maximum Average Output Power (Reference data for RF Exposure)**

Test place	Ise EMC Lab. No.6 and No.11 Measurement Room	
Report No.	10604551H	
Date	02/12/2015	03/10/2015
Temperature/ Humidity	20deg. C / 32% RH	23deg. C / 30% RH
Engineer	Tomoki Matsui	Shinichi Miyazono
Mode	Tx 11n-40 MCS9 (Short GI)	

[AV]

**Antenna port 0+1**

Freq. [MHz]	Antenna Port 0 Result		Antenna Port 1 Result		Result Antenna Port 0+1 (Cond.)		Result Antenna Port 0+1 (e.i.r.p.)	
	(Cond.) [mW]	(e.i.r.p.) [mW]	(Cond.) [mW]	(e.i.r.p.) [mW]	[dBm]	[mW]	[dBm]	[mW]
	2422.0	3.47	5.25	3.23	4.89	8.26	6.70	10.06
2437.0	28.77	43.55	25.06	37.93	17.31	53.84	19.11	81.48
2452.0	2.26	3.43	2.07	3.14	6.37	4.34	8.17	6.57

**Antenna port 0**

Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.)		Result (e.i.r.p.)	
					[dBm]	[mW]	[dBm]	[mW]
2422.0	-5.43	0.77	10.06	1.80	5.40	3.47	7.20	5.25
2437.0	3.82	0.77	10.00	1.80	14.59	28.77	16.39	43.55
2452.0	-7.28	0.77	10.06	1.80	3.55	2.26	5.35	3.43

**Antenna port 1**

Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.)		Result (e.i.r.p.)	
					[dBm]	[mW]	[dBm]	[mW]
2422.0	-5.74	0.77	10.06	1.80	5.09	3.23	6.89	4.89
2437.0	3.13	0.79	10.07	1.80	13.99	25.06	15.79	37.93
2452.0	-7.66	0.77	10.06	1.80	3.17	2.07	4.97	3.14

Sample Calculation:

$$\text{Result(Cond.)} = \text{Reading} + \text{Cable Loss} + \text{Atten.Loss}$$

**Maximum Average Output Power (Reference data for RF Exposure)**

Test place : Ise EMC Lab. No.6 Measurement Room  
Report No. : 10604551H  
Date : 02/12/2015  
Temperature/ Humidity : 20deg. C / 32% RH  
Engineer : Tomoki Matsui  
Mode : Tx 11a 18Mbps

[AV]

Antenna port 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.)		Result (e.i.r.p)	
					[dBm]	[mW]	[dBm]	[mW]
5745	0.68	1.31	10.04	3.90	12.03	15.96	15.93	39.17
5785	1.09	1.31	10.04	3.90	12.44	17.54	16.34	43.05
5825	0.95	1.32	10.04	3.90	12.31	17.02	16.21	41.78

Antenna port 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.)		Result (e.i.r.p)	
					[dBm]	[mW]	[dBm]	[mW]
5745	0.31	1.50	10.09	3.90	11.90	15.49	15.80	38.02
5785	0.13	1.52	10.09	3.90	11.74	14.93	15.64	36.64
5825	-0.65	1.53	10.09	3.90	10.97	12.50	14.87	30.69

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

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**Maximum Average Output Power (Reference data for RF Exposure)**

Test place : Ise EMC Lab. No.6 and No.11 Measurement Room  
 Report No. : 10604551H  
 Date : 02/12/2015 03/10/2015  
 Temperature/ Humidity : 20deg. C / 32% RH 23deg. C / 30% RH  
 Engineer : Tomoki Matsui Shinichi Miyazono  
 Mode : Tx 11n-20 MCS8 (Short GI)

[AV]

**Antenna port 0+1**

Freq. [MHz]	Antenna Port 0 Result		Antenna Port 1 Result		Result Antenna Port 0+1 (Cond.)		Result Antenna Port 0+1 (e.i.r.p.)	
	(Cond.) [mW]	(e.i.r.p.) [mW]	(Cond.) [mW]	(e.i.r.p.) [mW]	[dBm]	[mW]	[dBm]	[mW]
	5745.0	20.46	50.23	19.45	47.75	16.01	39.92	19.91
5785.0	20.51	50.35	16.83	41.30	15.72	37.34	19.62	91.65
5825.0	15.81	38.82	12.39	30.41	14.50	28.20	18.40	69.22

**Antenna port 0**

Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.)		Result (e.i.r.p.)	
					[dBm]	[mW]	[dBm]	[mW]
5745.0	1.76	1.31	10.04	3.90	13.11	20.46	17.01	50.23
5785.0	1.77	1.31	10.04	3.90	13.12	20.51	17.02	50.35
5825.0	0.57	1.32	10.10	3.90	11.99	15.81	15.89	38.82

**Antenna port 1**

Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.)		Result (e.i.r.p.)	
					[dBm]	[mW]	[dBm]	[mW]
5745.0	1.30	1.50	10.09	3.90	12.89	19.45	16.79	47.75
5785.0	0.65	1.52	10.09	3.90	12.26	16.83	16.16	41.30
5825.0	-0.49	1.32	10.10	3.90	10.93	12.39	14.83	30.41

Result(Cond.) = Reading + Cable Loss + Atten.Loss

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**Maximum Average Output Power (Reference data for RF Exposure)**

Test place : Ise EMC Lab. No.6 Measurement Room  
Report No. : 10604551H  
Date : 02/12/2015  
Temperature/ Humidity : 20deg. C / 32% RH  
Engineer : Tomoki Matsui  
Mode : Tx 11n-40 MCS8 (Short GI)

[AV]

**Antenna port 0+1**

Freq. [MHz]	Antenna Port 0 Result		Antenna Port 1 Result		Result Antenna Port 0+1 (Cond.)		Result Antenna Port 0+1 (e.i.r.p.)	
	(Cond.) [mW]	(e.i.r.p.) [mW]	(Cond.) [mW]	(e.i.r.p.) [mW]	[dBm]	[mW]	[dBm]	[mW]
	5755.0	10.89	26.73	9.89	24.27	13.18	20.77	17.08
5795.0	11.43	28.05	9.14	22.44	13.13	20.57	17.03	50.49

**Antenna port 0**

Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.)		Result (e.i.r.p.)	
					[dBm]	[mW]	[dBm]	[mW]
5755.0	-0.98	1.31	10.04	3.90	10.37	10.89	14.27	26.73
5795.0	-0.77	1.31	10.04	3.90	10.58	11.43	14.48	28.05

**Antenna port 1**

Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.)		Result (e.i.r.p.)	
					[dBm]	[mW]	[dBm]	[mW]
5755.0	-1.64	1.50	10.09	3.90	9.95	9.89	13.85	24.27
5795.0	-2.00	1.52	10.09	3.90	9.61	9.14	13.51	22.44

Result(Cond.) = Reading + Cable Loss + Atten.Loss

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## Radiated Spurious Emission

Test place : Ise EMC Lab. No.4 Semi Anechoic Chamber  
Report No. : 10604551H  
Date : 03/04/2015  
Temperature/ Humidity : 25deg. C / 30% RH  
Engineer : Kenshi Shimomura  
(1-10GHz)  
Mode : 11g Tx 2412MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	67.0	27.4	2.5	32.8	-	64.1	73.9	9.8	
Hori	2390.000	AV	53.5	27.4	2.5	32.8	0.3	50.9	53.9	3.0	*1)
Vert	2390.000	PK	63.1	27.4	2.5	32.8	-	60.2	73.9	13.7	
Vert	2390.000	AV	48.7	27.4	2.5	32.8	0.3	46.1	53.9	7.8	*1)

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

\*1) Not Out of Band emission(Leakage Power)

### 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	102.5	27.4	2.5	32.8	99.6	-	-	Carrier
Hori	2400.000	PK	69.9	27.4	2.5	32.8	67.0	79.6	12.6	
Vert	2412.000	PK	99.9	27.4	2.5	32.8	97.0	-	-	Carrier
Vert	2400.000	PK	66.4	27.4	2.5	32.8	63.5	77.0	13.5	

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

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## Radiated Spurious Emission

Test place : Ise EMC Lab. No.4 Semi Anechoic Chamber  
 Report No. : 10604551H  
 Date : 03/04/2015  
 Temperature/ Humidity : 25deg. C / 30% RH  
 Engineer : Kenshi Shimomura  
 (1-10GHz)  
 Mode : 11g Tx 2462MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	66.2	27.6	2.6	32.7	-	63.7	73.9	10.2	
Hori	2483.500	AV	51.7	27.6	2.6	32.7	0.3	49.5	53.9	4.4	*1)
Vert	2483.500	PK	67.0	27.6	2.6	32.7	-	64.5	73.9	9.4	
Vert	2483.500	AV	53.2	27.6	2.6	32.7	0.3	51.0	53.9	2.9	*1)

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

\*1) Not Out of Band emission(Leakage Power)

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## Radiated Spurious Emission

Test place Ise EMC Lab. No.2 Semi Anechoic Chamber  
Report No. 10604551H  
Date 03/04/2015 03/09/2015  
Temperature/ Humidity 25deg. C / 30% RH 23deg. C / 41% RH  
Engineer Kenshi Shimomura Kazuya Yoshioka  
(1-10GHz) (1-26.5GHz)  
Mode 11n-40 Tx 2437MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4874.000	PK	53.6	32.8	5.9	34.2	-	58.1	73.9	15.8	
Hori	7311.000	PK	47.9	36.8	7.1	34.1	-	57.7	73.9	16.2	
Hori	9748.000	PK	42.3	39.0	8.1	34.7	-	54.7	73.9	19.2	Floor Noise
Hori	4874.000	AV	42.3	32.8	5.9	34.2	0.8	47.6	53.9	6.3	
Hori	7311.000	AV	38.8	36.8	7.1	34.1	0.8	49.4	53.9	4.5	
Hori	9748.000	AV	34.5	39.0	8.1	34.7	-	46.9	53.9	7.0	Floor Noise
Vert	4874.000	PK	51.8	32.8	5.9	34.2	-	56.3	73.9	17.6	
Vert	7311.000	PK	45.2	36.8	7.1	34.1	-	55.0	73.9	18.9	
Vert	9748.000	PK	42.0	39.0	8.1	34.7	-	54.4	73.9	19.5	Floor Noise
Vert	4874.000	AV	41.2	32.8	5.9	34.2	0.8	46.5	53.9	7.4	
Vert	7311.000	AV	37.6	36.8	7.1	34.1	0.8	48.2	53.9	5.7	
Vert	9748.000	AV	34.5	39.0	8.1	34.7	-	46.9	53.9	7.0	Floor Noise

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

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB  
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

## Radiated Spurious Emission

Test place                      Ise EMC Lab. No.2 and No.4 Semi Anechoic Chamber  
Report No.                      10604551H  
Date                              03/04/2015                      03/09/2015  
Temperature/ Humidity      25deg. C / 30% RH            23deg. C / 41% RH  
Engineer                        Kenshi Shimomura              Kazuya Yoshioka  
                                      (1-10GHz)                        (1-26.5GHz)  
Mode                              11n-40 Tx 2452MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	64.6	27.6	2.6	32.7	-	62.1	73.9	11.8	
Hori	4904.000	PK	47.1	32.9	5.9	34.2	-	51.7	73.9	22.2	
Hori	7356.000	PK	42.3	36.8	7.1	34.1	-	52.1	73.9	21.8	
Hori	9808.000	PK	42.1	39.0	8.1	34.7	-	54.5	73.9	19.4	Floor Noise
Hori	2483.500	AV	53.2	27.6	2.6	32.7	0.8	51.5	53.9	2.4	*1)
Hori	4904.000	AV	37.4	32.9	5.9	34.2	0.8	42.8	53.9	11.1	
Hori	7356.000	AV	34.0	36.8	7.1	34.1	0.8	44.6	53.9	9.3	
Hori	9808.000	AV	34.7	39.0	8.1	34.7	-	47.1	53.9	6.8	Floor Noise
Vert	2483.500	PK	64.4	27.6	2.6	32.7	-	61.9	73.9	12.0	
Vert	4904.000	PK	44.3	32.9	5.9	34.2	-	48.9	73.9	25.0	
Vert	7356.000	PK	42.0	36.8	7.1	34.1	-	51.8	73.9	22.1	
Vert	9808.000	PK	42.3	39.0	8.1	34.7	-	54.7	73.9	19.2	Floor Noise
Vert	2483.500	AV	53.0	27.6	2.6	32.7	0.8	51.3	53.9	2.6	*1)
Vert	4904.000	AV	37.0	32.9	5.9	34.2	0.8	42.4	53.9	11.5	
Vert	7356.000	AV	34.0	36.8	7.1	34.1	0.8	44.6	53.9	9.3	
Vert	9808.000	AV	34.7	39.0	8.1	34.7	-	47.1	53.9	6.8	Floor Noise

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

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

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

                                  26.5GHz-40GHz    20log(3.0m/0.5m)=15.6dB

\*1) Not Out of Band emission(Leakage Power)

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## Radiated Spurious Emission

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	10604551H		
Date	03/06/2015	03/07/2015	03/08/2015
Temperature/ Humidity	23deg. C / 35% RH	23deg. C / 44% RH	22deg. C / 39% RH
Engineer	Koji Yamamoto	Kazuya Yoshioka	Takumi Shimada
	(1-10GHz)	(10-15GHz)	(15-40GHz)
Mode	11n-20 Tx 5745MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5440.009	PK	53.5	31.7	3.8	31.8	-	57.2	73.9	16.7	
Hori	11490.000	PK	52.9	39.6	-1.7	33.6	-	57.2	73.9	16.7	
Hori	17235.000	PK	45.3	37.2	-2.4	32.2	-	47.9	73.9	26.0	Floor noise
Hori	22980.000	PK	45.5	37.9	-1.0	31.6	-	50.8	73.9	23.1	Floor noise
Hori	5440.009	AV	45.1	31.7	3.8	31.8	-	48.8	53.9	5.1	
Hori	11490.000	AV	44.9	39.6	-1.7	33.6	0.3	49.5	53.9	4.4	
Hori	17235.000	AV	36.1	37.2	-2.4	32.2	-	38.7	53.9	15.2	Floor noise
Hori	22980.000	AV	37.1	37.9	-1.0	31.6	-	42.4	53.9	11.5	Floor noise
Vert	5440.009	PK	52.8	31.7	3.8	31.8	-	56.5	73.9	17.4	
Vert	11490.000	PK	53.4	39.6	-1.7	33.6	-	57.7	73.9	16.2	
Vert	17235.000	PK	46.4	37.2	-2.4	32.2	-	49.0	73.9	24.9	Floor noise
Vert	22980.000	PK	45.8	37.9	-1.0	31.6	-	51.1	73.9	22.8	Floor noise
Vert	5440.009	AV	44.5	31.7	3.8	31.8	-	48.2	53.9	5.7	
Vert	11490.000	AV	43.1	39.6	-1.7	33.6	0.3	47.7	53.9	6.2	
Vert	17235.000	AV	36.0	37.2	-2.4	32.2	-	38.6	53.9	15.3	Floor noise
Vert	22980.000	AV	36.6	37.9	-1.0	31.6	-	41.9	53.9	12.0	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier) + Duty factor  
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor:   10GHz-26.5GHz   20log(3.0m/1.0m)= 9.5dB  
                          26.5GHz-40GHz   20log(3.0m/0.5m)=15.6dB

### 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	5745.000	PK	96.6	32.1	3.9	31.8	100.8	-	-	Carrier
Hori	5725.000	PK	48.0	32.1	3.9	31.8	52.2	80.8	28.6	
Vert	5745.000	PK	98.9	32.1	3.9	31.8	103.1	-	-	Carrier
Vert	5725.000	PK	49.2	32.1	3.9	31.8	53.4	83.1	29.7	

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

## Radiated Spurious Emission

Test place Ise EMC Lab. No.3 Semi Anechoic Chamber  
Report No. 10604551H  
Date 03/06/2015 03/07/2015 03/08/2015  
Temperature/ Humidity 23deg. C / 35% RH 23deg. C / 44% RH 22deg. C / 39% RH  
Engineer Koji Yamamoto Kazuya Yoshioka Takumi Shimada  
(1-10GHz) (10-15GHz) (15-40GHz)  
Mode 11n-20 Tx 5785MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5440.009	PK	54.9	31.7	3.8	31.8	-	58.6	73.9	15.3	
Hori	11570.000	PK	52.6	39.6	-1.5	33.6	-	57.1	73.9	16.8	
Hori	17355.000	PK	45.8	37.1	-2.4	32.2	-	48.3	73.9	25.6	Floor noise
Hori	23140.000	PK	45.8	37.9	-1.0	31.5	-	51.2	73.9	22.7	Floor noise
Hori	5440.009	AV	46.2	31.7	3.8	31.8	-	49.9	53.9	4.0	
Hori	11570.000	AV	44.1	39.6	-1.5	33.6	0.3	48.9	53.9	5.0	
Hori	17355.000	AV	35.7	37.1	-2.4	32.2	-	38.2	53.9	15.7	Floor noise
Hori	23140.000	AV	37.1	37.9	-1.0	31.5	-	42.5	73.9	31.4	Floor noise
Vert	5440.009	PK	55.7	31.7	3.8	31.8	-	59.4	73.9	14.5	
Vert	11570.000	PK	54.7	39.6	-1.5	33.6	-	59.2	73.9	14.7	
Vert	17355.000	PK	45.1	37.1	-2.4	32.2	-	47.6	73.9	26.3	Floor noise
Vert	23140.000	PK	45.6	37.9	-1.0	31.5	-	51.0	73.9	22.9	Floor noise
Vert	5440.009	AV	47.3	31.7	3.8	31.8	-	51.0	53.9	2.9	
Vert	11570.000	AV	45.2	39.6	-1.5	33.6	0.3	50.0	53.9	3.9	
Vert	17355.000	AV	36.0	37.1	-2.4	32.2	-	38.5	53.9	15.4	Floor noise
Vert	23140.000	AV	37.5	37.9	-1.0	31.5	-	42.9	53.9	11.0	Floor noise

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

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB  
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

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## Radiated Spurious Emission

Test place Ise EMC Lab. No.3 Semi Anechoic Chamber  
Report No. 10604551H  
Date 03/06/2015 03/07/2015 03/08/2015  
Temperature/ Humidity 20deg. C / 40% RH 23deg. C / 44% RH 22deg. C / 39% RH  
Engineer Kenshi Shimomura Kazuya Yoshioka Takumi Shimada  
(1-10GHz) (10-15GHz) (15-40GHz)  
Mode 11n-40 Tx 5755MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5440.000	PK	51.1	31.7	3.8	31.8	-	54.8	73.9	19.1	
Hori	11510.000	PK	49.0	39.6	-1.6	33.6	-	53.4	73.9	20.5	
Hori	17265.000	PK	45.2	37.2	-2.4	32.2	-	47.8	73.9	26.1	Floor noise
Hori	23020.000	PK	46.1	37.9	-1.0	31.6	-	51.4	73.9	22.5	Floor noise
Hori	5440.000	AV	43.5	31.7	3.8	31.8	-	47.6	53.9	6.3	
Hori	11510.000	AV	39.5	39.6	-1.6	33.6	0.4	44.3	53.9	9.6	
Hori	17265.000	AV	36.1	37.2	-2.4	32.2	-	38.7	53.9	15.2	Floor noise
Hori	23020.000	AV	36.7	37.9	-1.0	31.6	-	42.0	53.9	11.9	Floor noise
Vert	5440.000	PK	53.5	31.7	3.8	31.8	-	57.2	73.9	16.7	
Vert	11510.000	PK	48.5	39.6	-1.6	33.6	-	52.9	73.9	21.0	
Vert	17265.000	PK	45.6	37.2	-2.4	32.2	-	48.2	73.9	25.7	Floor noise
Vert	23020.000	PK	44.9	37.9	-1.0	31.6	-	50.2	73.9	23.7	Floor noise
Vert	5440.000	AV	46.1	31.7	3.8	31.8	-	50.2	53.9	3.7	
Vert	11510.000	AV	38.3	39.6	-1.6	33.6	0.4	43.1	53.9	10.8	
Vert	17265.000	AV	36.1	37.2	-2.4	32.2	-	38.7	53.9	15.2	Floor noise
Vert	23020.000	AV	36.7	37.9	-1.0	31.6	-	42.0	53.9	11.9	Floor noise

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

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB  
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

### 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	5755.000	PK	92.6	32.1	3.9	31.8	96.8	-	-	Carrier
Hori	5725.000	PK	50.3	32.1	3.9	31.8	54.5	76.8	22.3	
Vert	5755.000	PK	92.4	32.1	3.9	31.8	96.6	-	-	Carrier
Vert	5725.000	PK	48.8	32.1	3.9	31.8	53.0	76.6	23.6	

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

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**Radiated Spurious Emission**

Test place Ise EMC Lab. No.3 Semi Anechoic Chamber  
 Report No. 10604551H  
 Date 03/06/2015 03/07/2015 03/08/2015  
 Temperature/ Humidity 20deg. C / 40% RH 23deg. C / 44% RH 22deg. C / 39% RH  
 Engineer Kenshi Shimomura Kazuya Yoshioka Takumi Shimada  
 (1-10GHz) (10-15GHz) (15-40GHz)  
 Mode 11n-40 Tx 5795MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5440.000	PK	52.9	31.7	3.8	31.8	-	56.6	73.9	17.3	
Hori	11590.000	PK	50.9	39.6	-1.5	33.5	-	55.5	73.9	18.4	
Hori	17385.000	PK	44.4	37.1	-2.4	32.2	-	46.9	73.9	27.0	Floor noise
Hori	23180.000	PK	45.8	37.9	-1.0	31.5	-	51.2	73.9	22.7	Floor noise
Hori	5440.000	AV	43.8	31.7	3.8	31.8	-	47.5	53.9	6.4	
Hori	11590.000	AV	40.8	39.6	-1.5	33.5	0.4	45.8	53.9	8.1	
Hori	17385.000	AV	35.6	37.1	-2.4	32.2	-	38.1	53.9	15.8	Floor noise
Hori	23180.000	AV	37.4	37.9	-1.0	31.5	-	42.8	53.9	11.1	Floor noise
Vert	5440.000	PK	55.5	31.7	3.8	31.8	-	59.2	73.9	14.7	
Vert	11590.000	PK	50.2	39.6	-1.5	33.5	-	54.8	73.9	19.1	
Vert	17385.000	PK	44.2	37.1	-2.4	32.2	-	46.7	73.9	27.2	Floor noise
Vert	23180.000	PK	47.5	37.9	-1.0	31.5	-	52.9	73.9	21.0	Floor noise
Vert	5440.000	AV	47.0	31.7	3.8	31.8	-	50.7	53.9	3.2	
Vert	11590.000	AV	40.7	39.6	-1.5	33.5	0.4	45.7	53.9	8.2	
Vert	17385.000	AV	35.5	37.1	-2.4	32.2	-	38.0	53.9	15.9	Floor noise
Vert	23180.000	AV	37.5	37.9	-1.0	31.5	-	42.9	53.9	11.0	Floor noise

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

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB  
 26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

**20dBc Data Sheet**

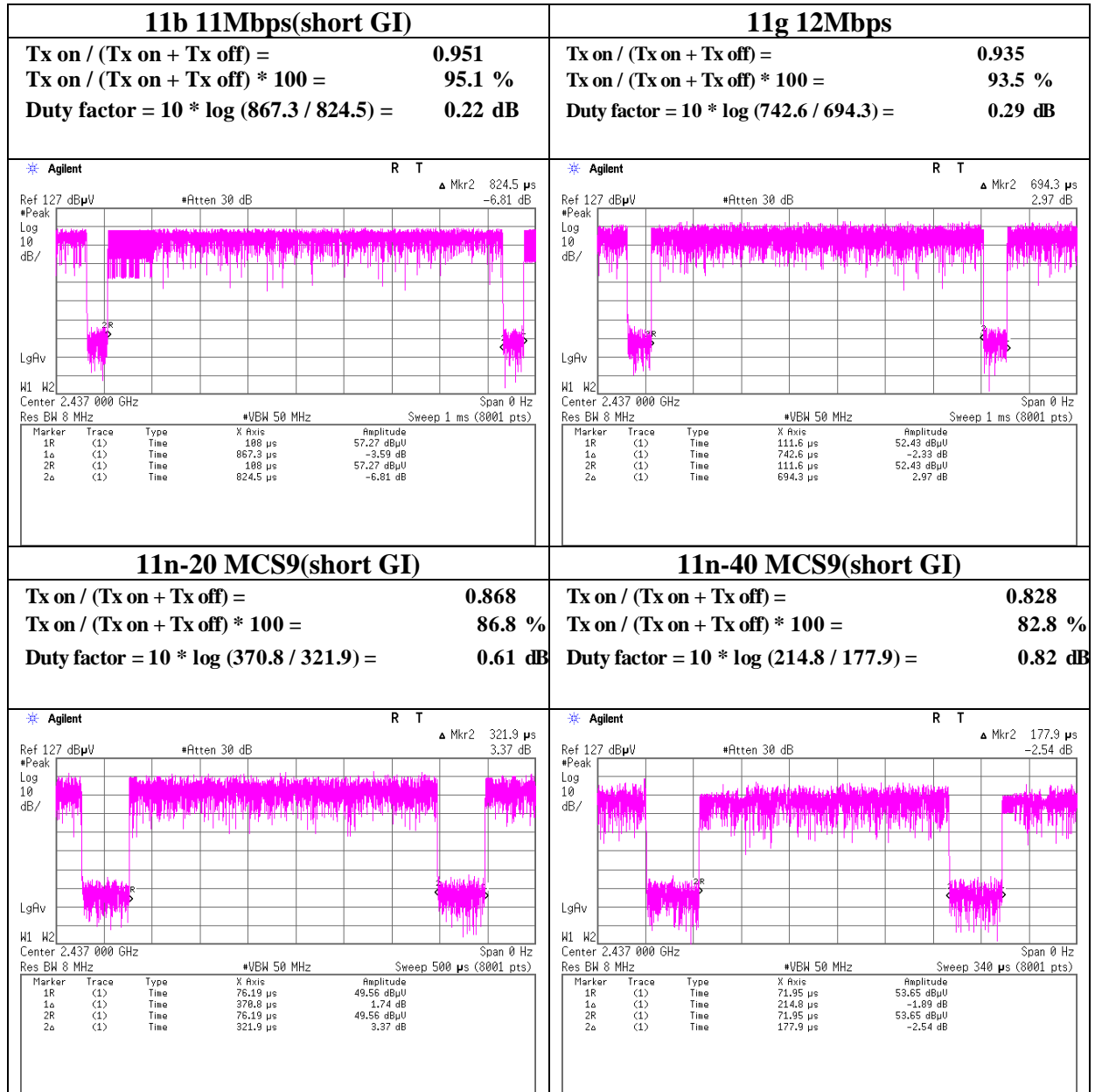
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5795.000	PK	91.2	32.2	3.9	31.8	95.5	-	-	Carrier
Hori	5850.000	PK	36.4	32.2	4.0	31.8	40.8	75.5	34.7	
Vert	5795.000	PK	93.2	32.2	3.9	31.8	97.5	-	-	Carrier
Vert	5850.000	PK	40.0	32.2	4.0	31.8	44.4	77.5	33.1	

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



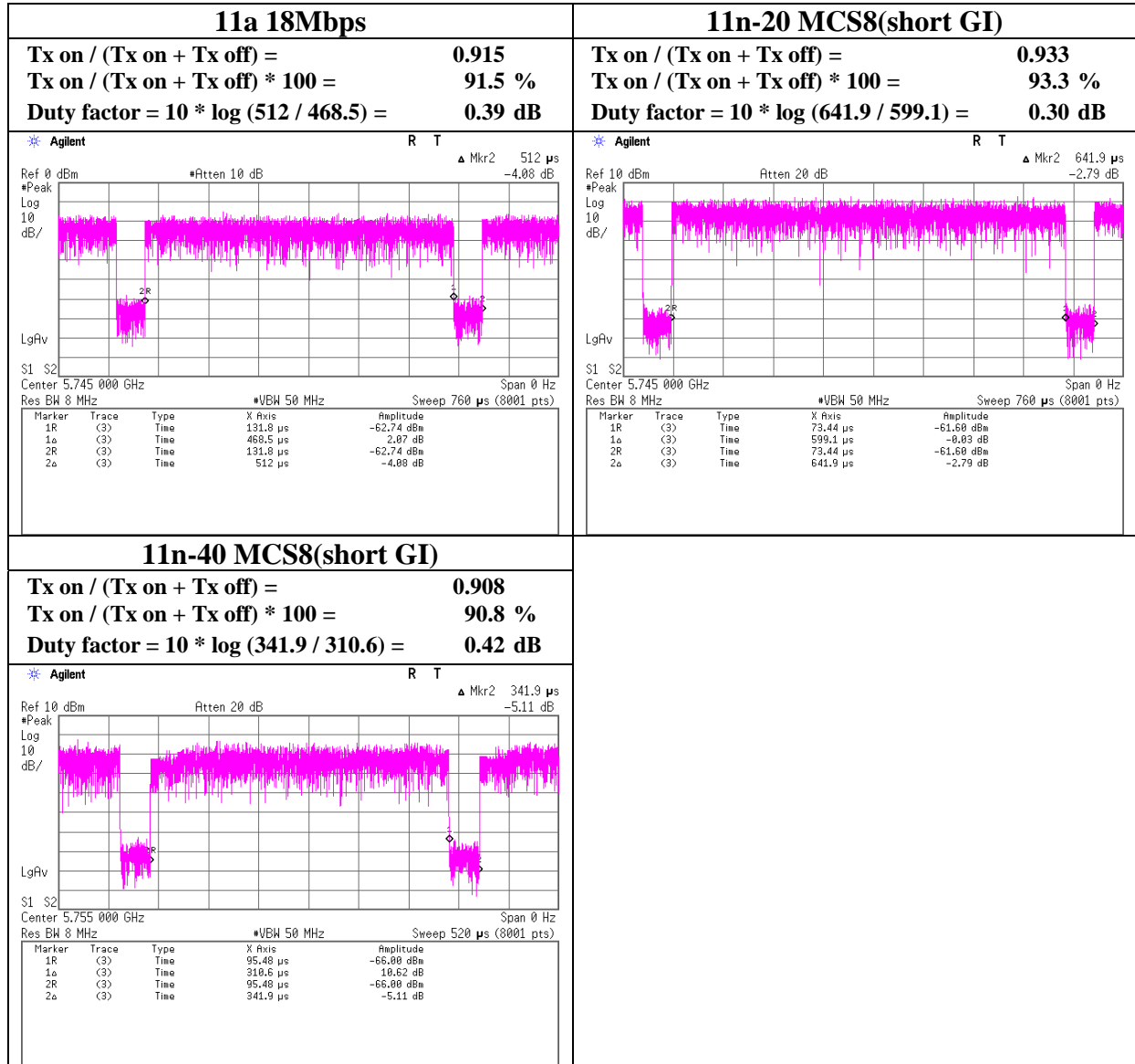
### Burst rate confirmation

Test place : Ise EMC Lab. No.6 Measurement Room  
 Report No. : 10604551H  
 Date : 02/13/2015  
 Temperature/ Humidity : 23deg. C / 43% RH  
 Engineer : Shinya Watanabe  
 Mode : 11b / 11g / 11n-20 / 11n-40 Tx



### Burst rate confirmation

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10604551H
Date	03/07/2015
Temperature/ Humidity	23deg. C / 44% RH
Engineer	Kazuya Yoshioka
Mode	11a / 11n-20 / 11n-40 Tx



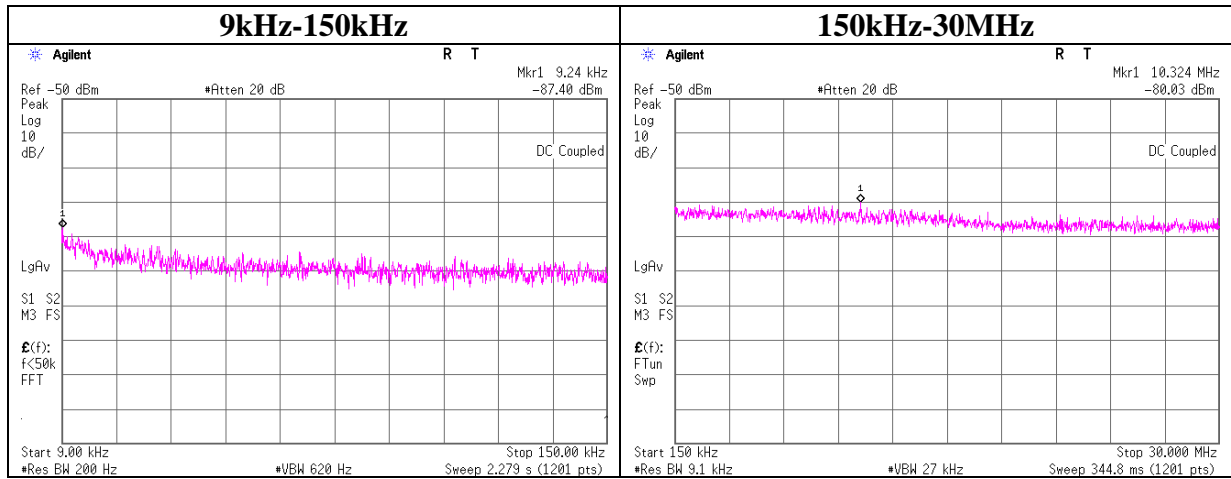
**UL Japan, Inc.**  
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## Conducted Spurious Emission

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10604551H
Date	02/13/2015
Temperature/ Humidity	23deg. C / 43% RH
Engineer	Shinya Watanabe
Mode	11n-20 2437MHz

### 11n-20 Tx 2437MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
9.24	-87.4	0.00	9.8	2.0	2	-72.6	300	6.0	-11.3	48.2	59.5	
10324.00	-80.0	0.02	9.8	2.0	2	-65.2	30	6.0	16.1	29.5	13.5	

$E = \text{EIRP} - 20\log(D) + \text{Ground bounce} + 104.8 [\text{dBuV/m}]$

$\text{EIRP} = \text{Reading} + \text{Cable Loss} + \text{Attenuator} + \text{Antenna Gain} + 10 * \log(N)$

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### Power Density

Test place Ise EMC Lab. No.6 and No.11 Measurement Room  
Report No. 10604551H  
Date 02/13/2015 03/10/2015  
Temperature/ Humidity 23deg. C / 43% RH 23deg. C / 30% RH  
Engineer Shinya Watanabe Shinichi Miyazono  
Mode 11b Tx / 11g Tx

11b Antenna port 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-22.35	2.05	10.06	-10.24	8.00	18.24
2437.00	-16.77	0.77	10.00	-6.00	8.00	14.00
2462.00	-24.65	2.07	10.06	-12.52	8.00	20.52

11g Antenna port 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-22.99	2.05	10.06	-10.88	8.00	18.88
2437.00	-18.54	0.77	10.00	-7.77	8.00	15.77
2462.00	-24.45	2.07	10.06	-12.32	8.00	20.32

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

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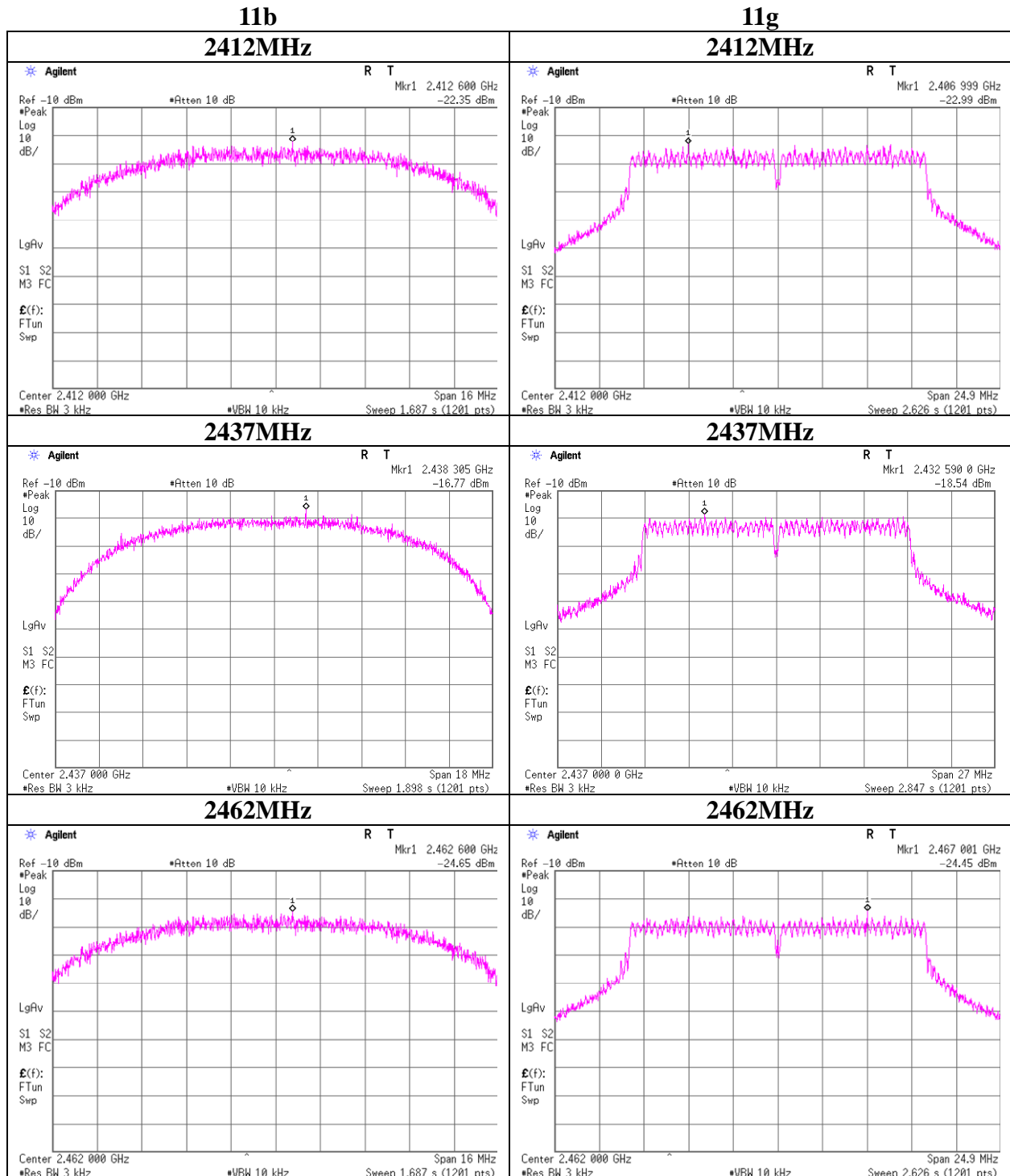
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**Power Density**



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## Power Density

Test place	Ise EMC Lab. No.6 and No.11 Measurement Room	
Report No.	10604551H	
Date	02/13/2015	03/10/2015
Temperature/ Humidity	23deg. C / 43% RH	23deg. C / 30% RH
Engineer	Shinya Watanabe	Shinichi Miyazono
Mode	11n-20 Tx	

### Antenna port 0 + 1

Freq. [MHz]	Antenna 0 Result [mW]	Antenna 1 Result [mW]	Result Antenna 0+1		Limit [dBm]	Margin [dB]
			[dBm]	[mW]		
2412.00	0.03	0.04	-11.62	0.07	8.00	19.62
2437.00	0.09	0.08	-7.75	0.17	8.00	15.75
2462.00	0.03	0.02	-12.74	0.05	8.00	20.74

Sample Calculation:

Result = Antenna 0 + 1

### Antenna port 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit [dBm]	Margin [dB]
				[dBm]	[mW]		
2412.00	-27.11	2.05	10.06	-15.00	0.03	8.00	23.00
2437.00	-21.17	0.77	10.00	-10.40	0.09	8.00	18.40
2462.00	-27.51	2.07	10.06	-15.38	0.03	8.00	23.38

### Antenna port 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit [dBm]	Margin [dB]
				[dBm]	[mW]		
2412.00	-26.40	2.05	10.06	-14.29	0.04	8.00	22.29
2437.00	-21.92	0.77	10.00	-11.15	0.08	8.00	19.15
2462.00	-28.28	2.07	10.06	-16.15	0.02	8.00	24.15

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

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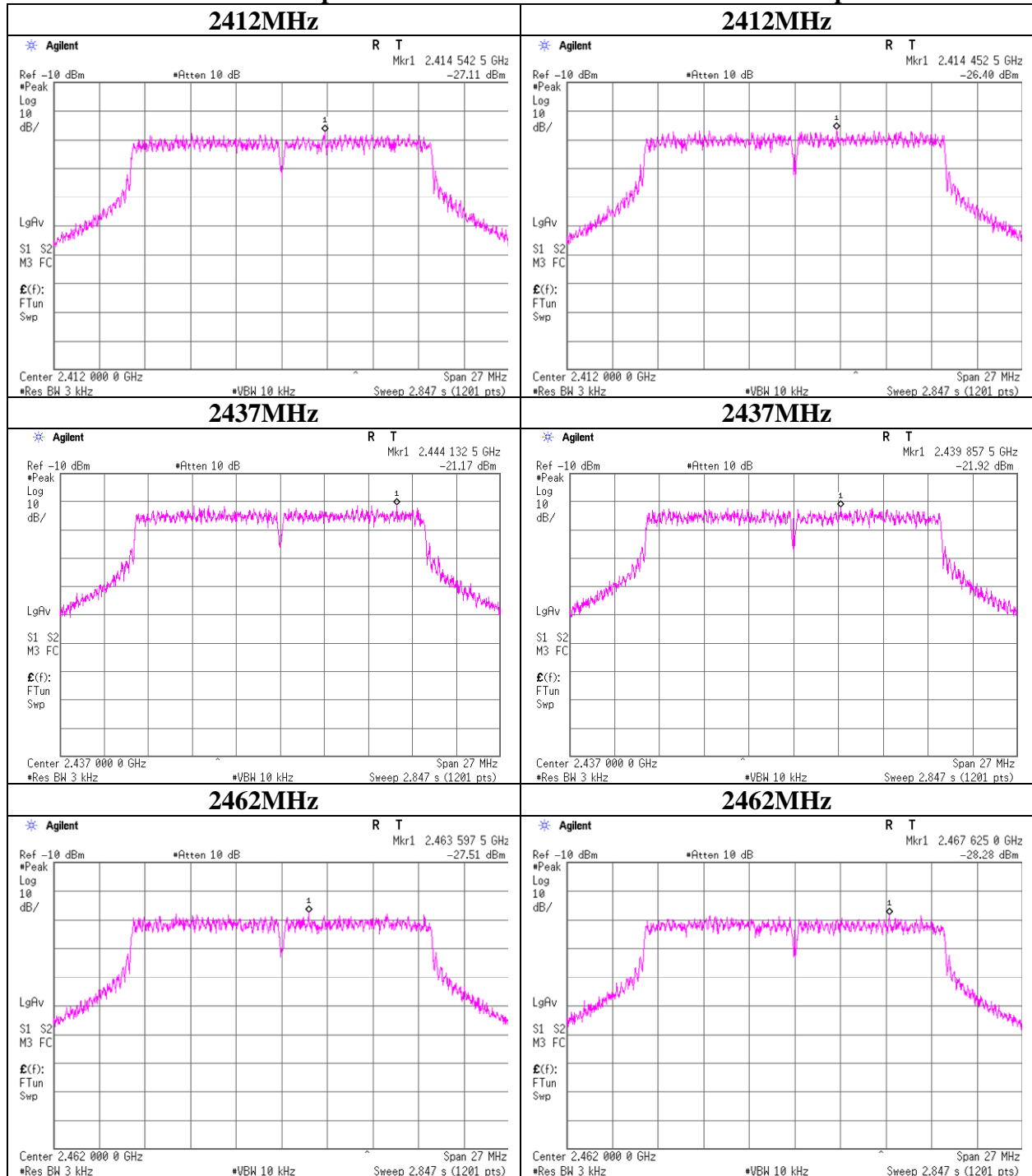
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**Power Density**

**11n-20 Antenna port 0**

**11n-20 Antenna port 1**



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## Power Density

Test place	Ise EMC Lab. No.6 and No.11 Measurement Room	
Report No.	10604551H	
Date	02/13/2015	03/10/2015
Temperature/ Humidity	23deg. C / 43% RH	23deg. C / 30% RH
Engineer	Shinya Watanabe	Shinichi Miyazono
Mode	11n-40 Tx	

### Antenna port 0 + 1

Freq. [MHz]	Antenna port 0 Result [mW]	Antenna port1 Result [mW]	Result		Limit [dBm]	Margin [dB]
			Antenna port 0+1			
			[dBm]	[mW]		
2422.00	0.01	0.00	-18.74	0.01	8.00	26.74
2437.00	0.04	0.03	-11.55	0.07	8.00	19.55
2452.00	0.00	0.00	-20.67	0.01	8.00	28.67

Sample Calculation:

Result = Antenna 0 + 1

### Antenna port 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit [dBm]	Margin [dB]
				[dBm]	[mW]		
2422.00	-32.77	2.06	10.06	-20.65	0.01	8.00	28.65
2437.00	-24.94	0.77	10.00	-14.17	0.04	8.00	22.17
2452.00	-35.96	2.07	10.06	-23.83	0.00	8.00	31.83

### Antenna port 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit [dBm]	Margin [dB]
				[dBm]	[mW]		
2422.00	-35.34	2.06	10.06	-23.22	0.00	8.00	31.22
2437.00	-25.76	0.77	10.00	-14.99	0.03	8.00	22.99
2452.00	-35.67	2.07	10.06	-23.54	0.00	8.00	31.54

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

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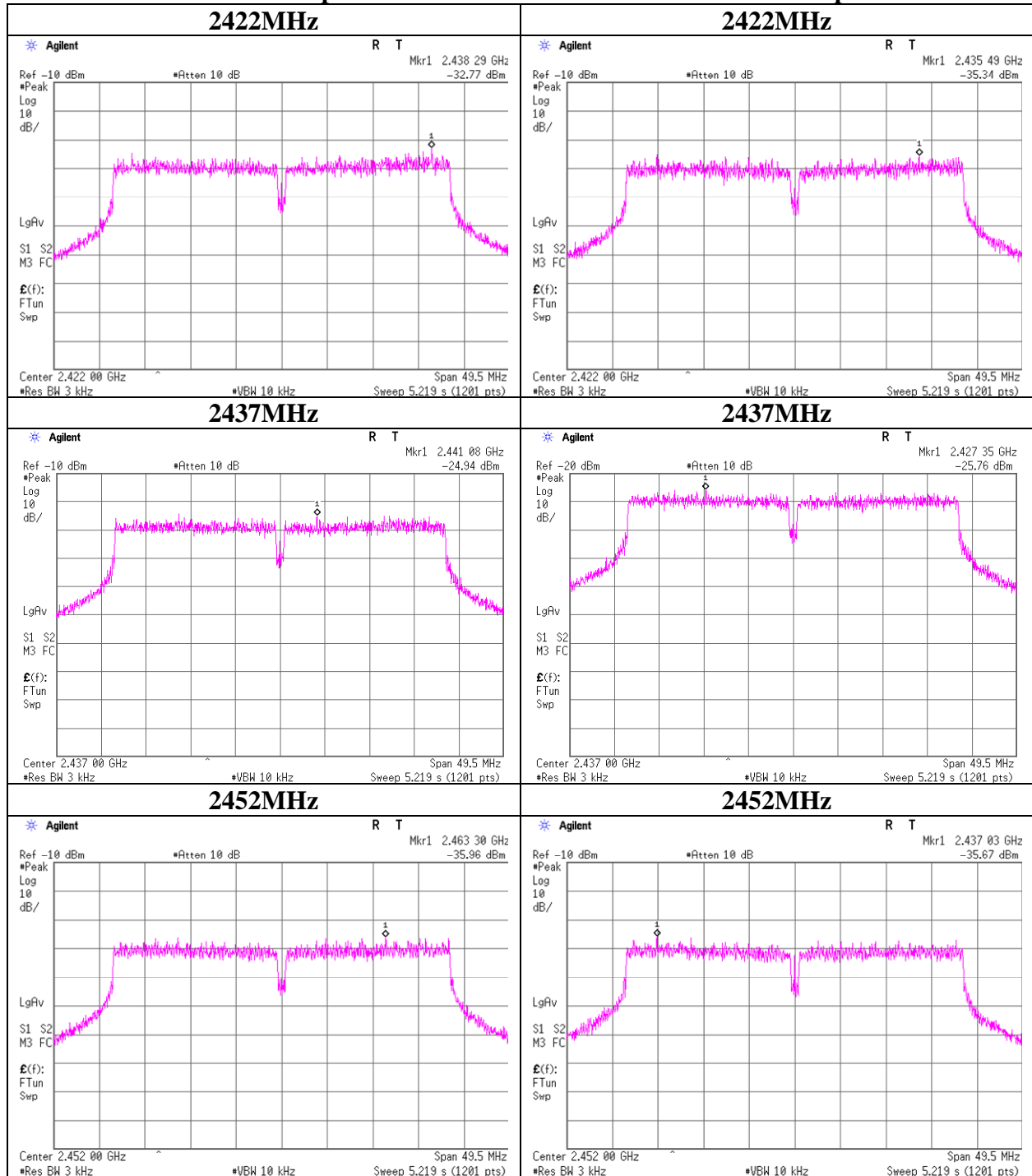
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**Power Density**

**11n-40 Antenna port 0**

**11n-40 Antenna port 1**



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## Power Density

Test place : Ise EMC Lab. No.11 Measurement Room  
Report No. : 10604551H  
Date : 03/10/2015  
Temperature/ Humidity : 23deg. C / 30% RH  
Engineer : Shinichi Miyazono  
Mode : 11a Tx

11a Antenna port 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
5745.00	-26.75	3.33	10.10	-13.32	8.00	21.32
5785.00	-25.49	3.34	10.10	-12.05	8.00	20.05
5825.00	-25.90	3.36	10.10	-12.44	8.00	20.44

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

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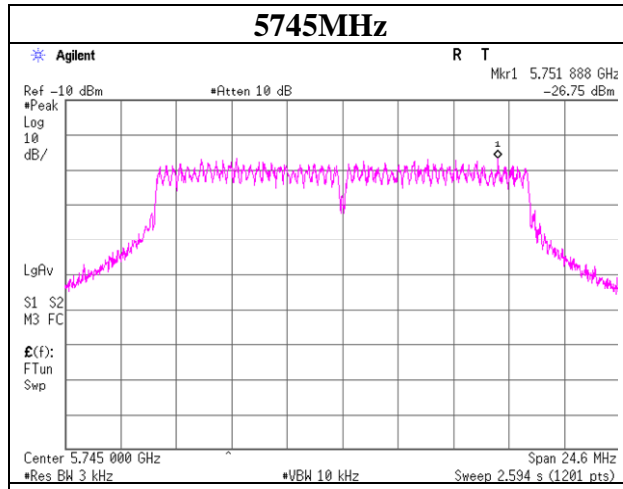
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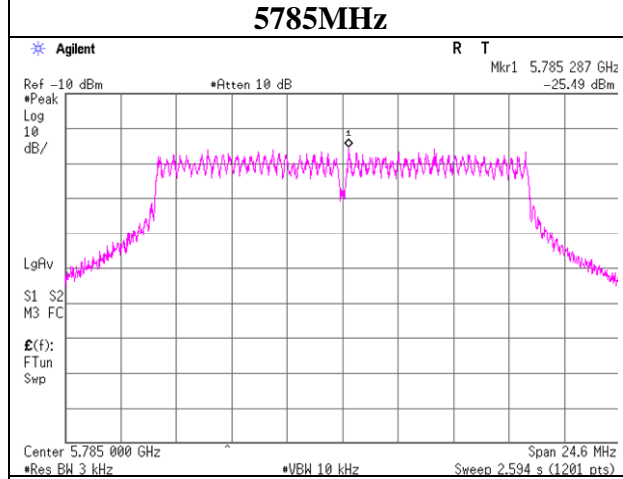
## Power Density

11a

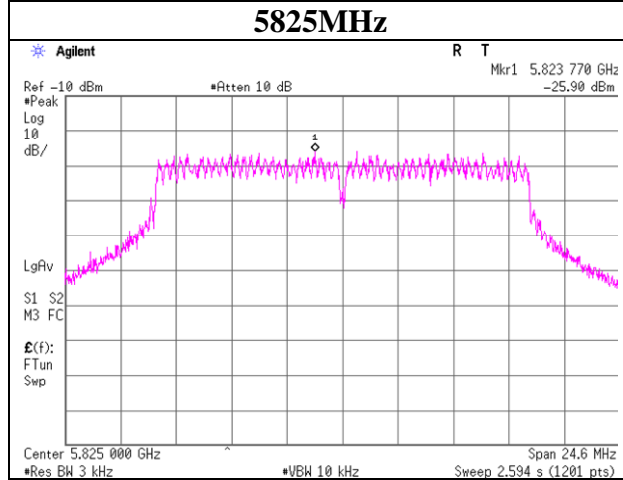
5745MHz



5785MHz



5825MHz



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## Power Density

Test place : Ise EMC Lab. No.11 Measurement Room  
Report No. : 10604551H  
Date : 03/10/2015  
Temperature/ Humidity : 23deg. C / 30% RH  
Engineer : Shinichi Miyazono  
Mode : 11n-20 Tx

### Antenna port 0 + 1

Freq. [MHz]	Antenna port 0 Result [mW]	Antenna port 1 Result [mW]	Result		Limit [dBm]	Margin [dB]
			Antenna port 0+1 [dBm]	[mW]		
5745.00	0.06	0.05	-9.70	0.11	8.00	17.70
5785.00	0.06	0.04	-10.13	0.10	8.00	18.13
5825.00	0.05	0.03	-10.63	0.09	8.00	18.63

Sample Calculation:

Result = Antenna 0 + 1

### Antenna port 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit [dBm]	Margin [dB]
				[dBm]	[mW]		
5745.00	-25.58	3.33	10.10	-12.15	0.06	8.00	20.15
5785.00	-26.03	3.34	10.10	-12.59	0.06	8.00	20.59
5825.00	-26.30	3.36	10.10	-12.84	0.05	8.00	20.84

### Antenna port 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit [dBm]	Margin [dB]
				[dBm]	[mW]		
5745.00	-26.79	3.33	10.10	-13.36	0.05	8.00	21.36
5785.00	-27.20	3.34	10.10	-13.76	0.04	8.00	21.76
5825.00	-28.08	3.36	10.10	-14.62	0.03	8.00	22.62

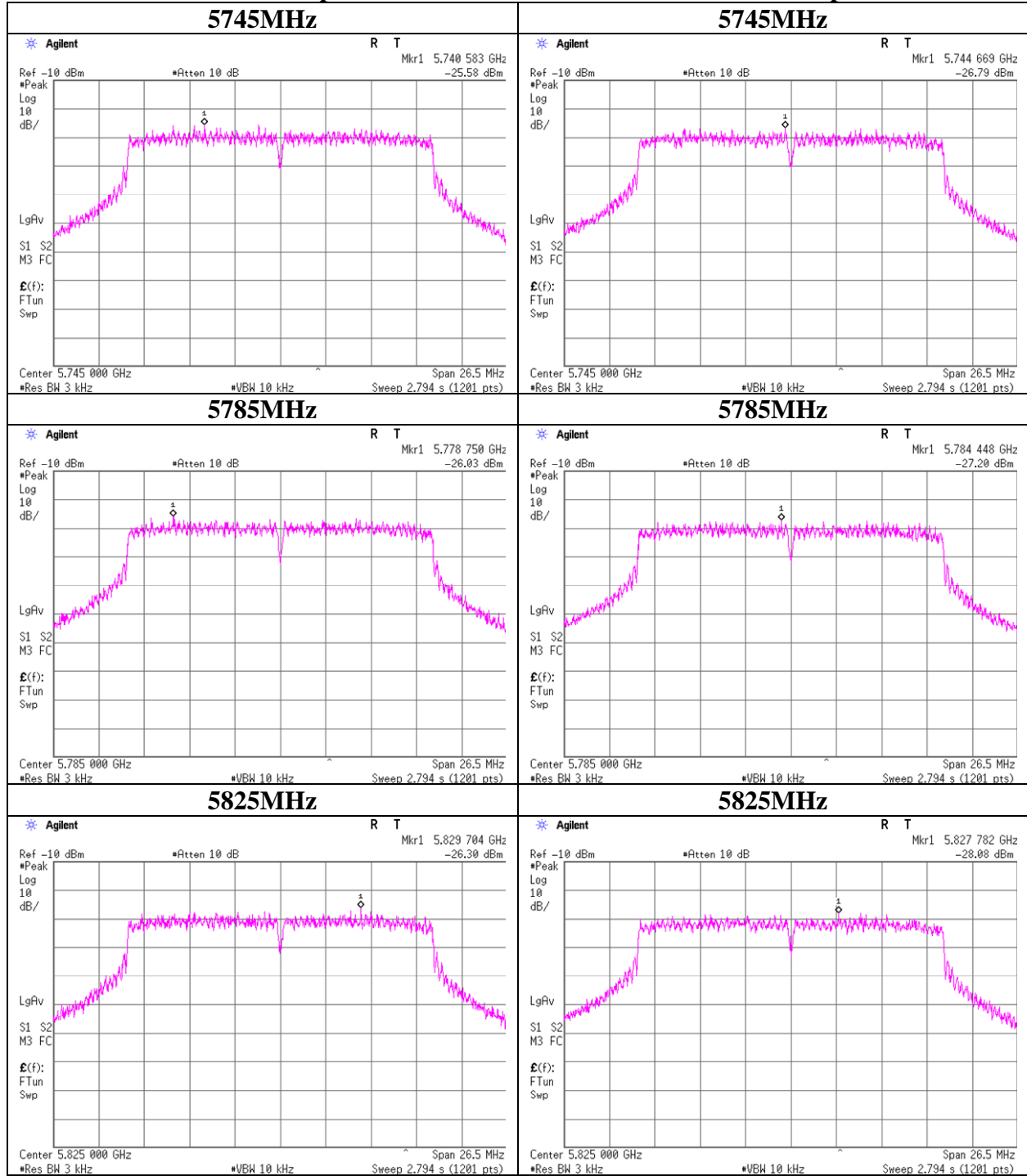
Sample Calculation:

Result = Reading + Cable Loss + Attenuator

**Power Density**

**11n-20 Antenna port 0**

**11n-20 Antenna port 1**



## Power Density

Test place : Ise EMC Lab. No.11 Measurement Room  
Report No. : 10604551H  
Date : 03/10/2015  
Temperature/ Humidity : 23deg. C / 30% RH  
Engineer : Shinichi Miyazono  
Mode : 11n-40 Tx

### Antenna port 0 + 1

Freq. [MHz]	Antenna port 0 Result [mW]	Antenna port 1 Result [mW]	Result		Limit [dBm]	Margin [dB]
			Antenna port 0+1 [dBm]	[mW]		
5755.00	0.01	0.01	-15.49	0.03	8.00	23.49
5795.00	0.02	0.02	-14.41	0.04	8.00	22.41

Sample Calculation:

Result = Antenna 0 + 1

### Antenna port 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit [dBm]	Margin [dB]
				[dBm]	[mW]		
5755.00	-31.68	3.33	10.10	-18.25	0.01	8.00	26.25
5795.00	-30.79	3.34	10.10	-17.35	0.02	8.00	25.35

### Antenna port 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit [dBm]	Margin [dB]
				[dBm]	[mW]		
5755.00	-32.19	3.33	10.10	-18.76	0.01	8.00	26.76
5795.00	-30.93	3.34	10.10	-17.49	0.02	8.00	25.49

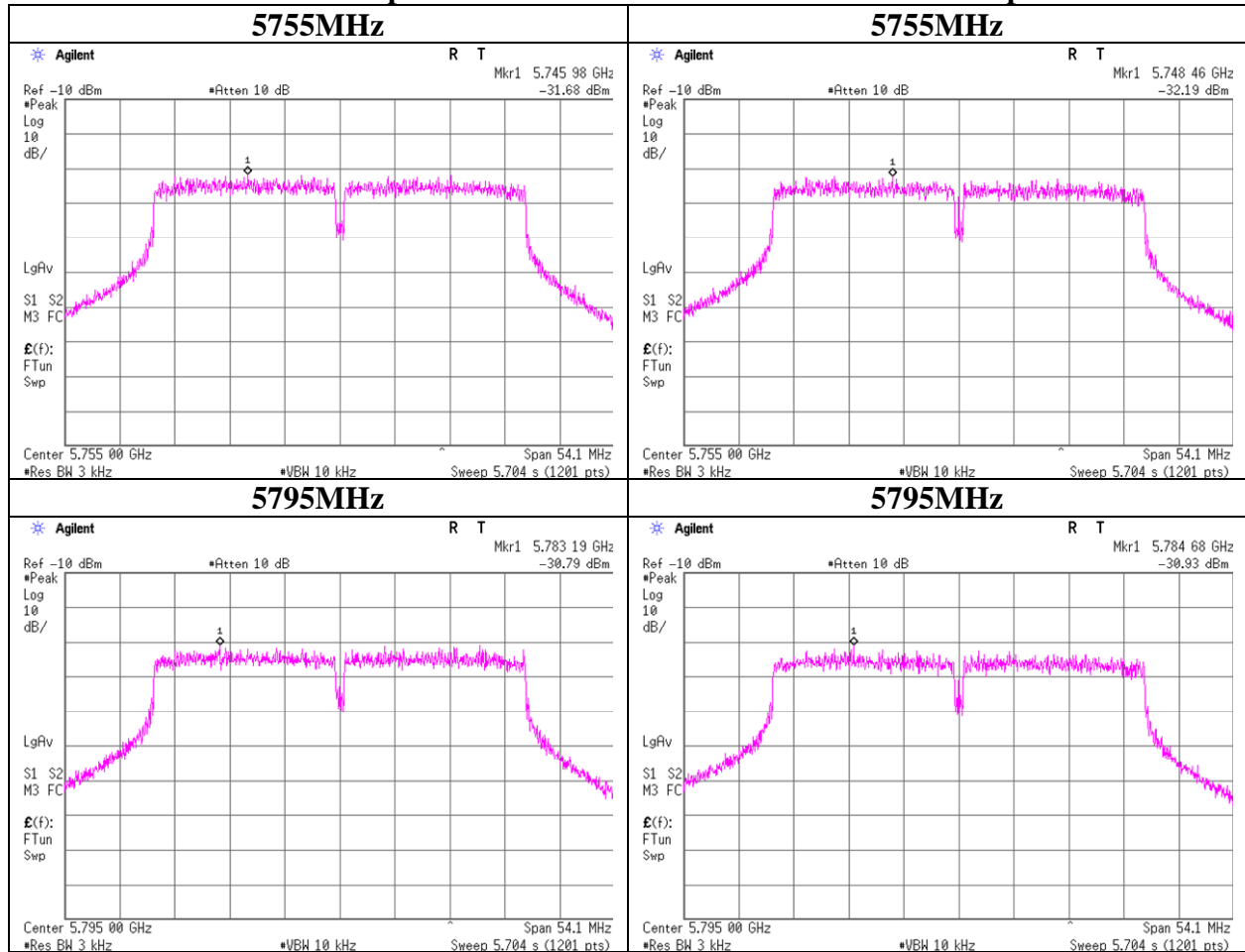
Sample Calculation:

Result = Reading + Cable Loss + Attenuator

**Power Density**

**11n-40 Antenna port 0**

**11n-40 Antenna port 1**



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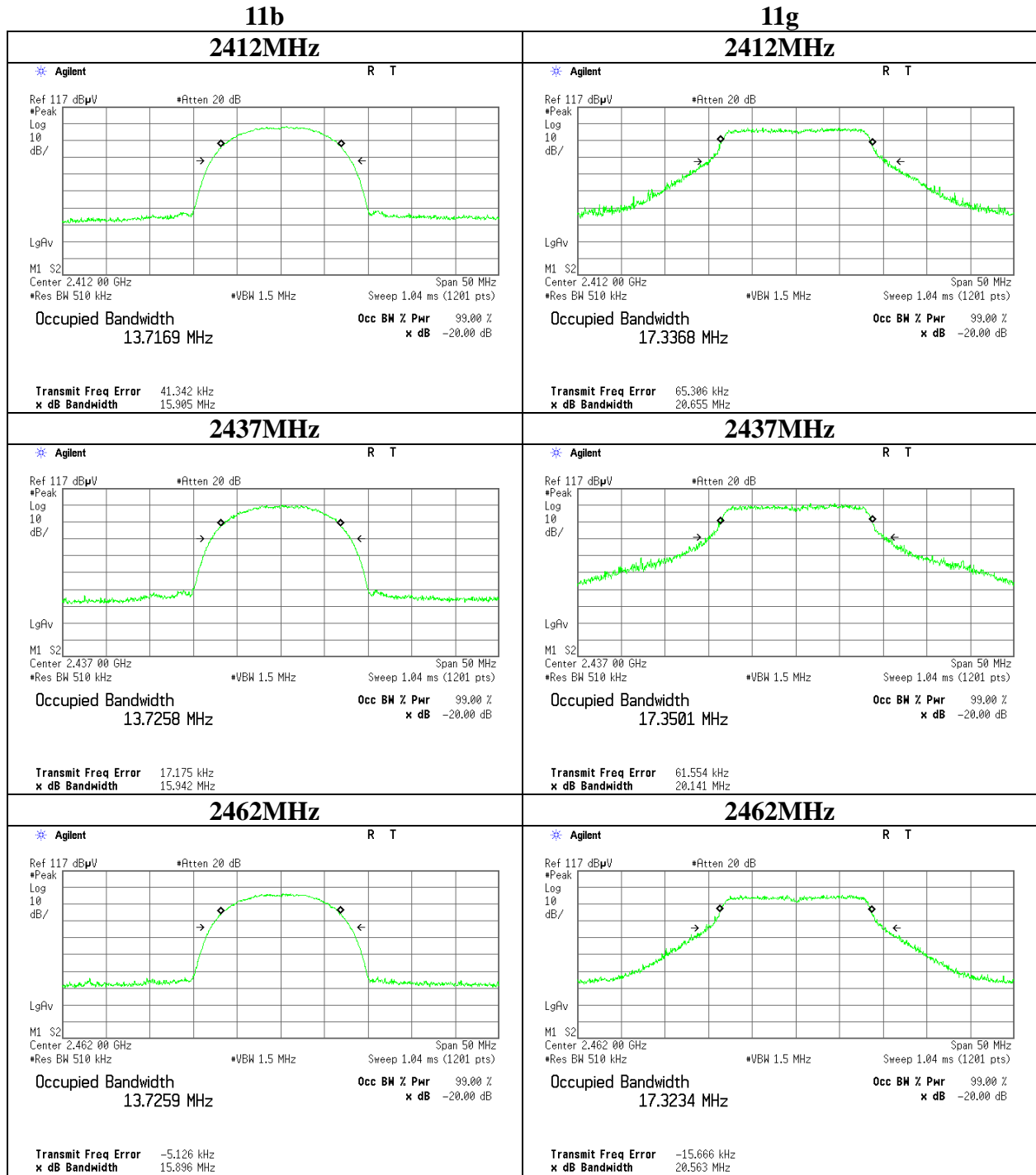
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### 99% Occupied Bandwidth

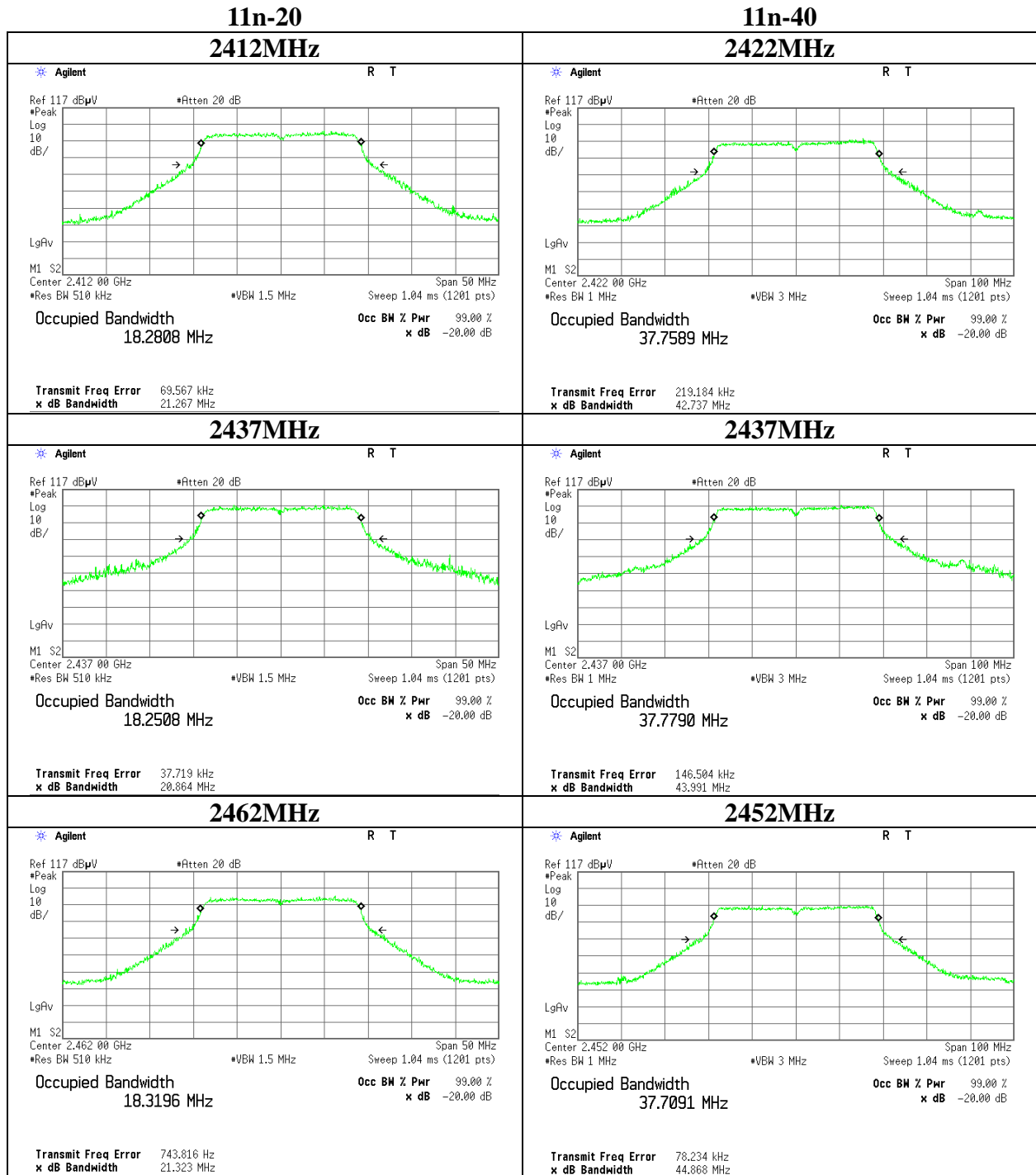
Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10604551H
Date	03/10/2015
Temperature/ Humidity	23deg. C / 30% RH
Engineer	Shinichi Miyazono
Mode	11b Tx / 11g Tx





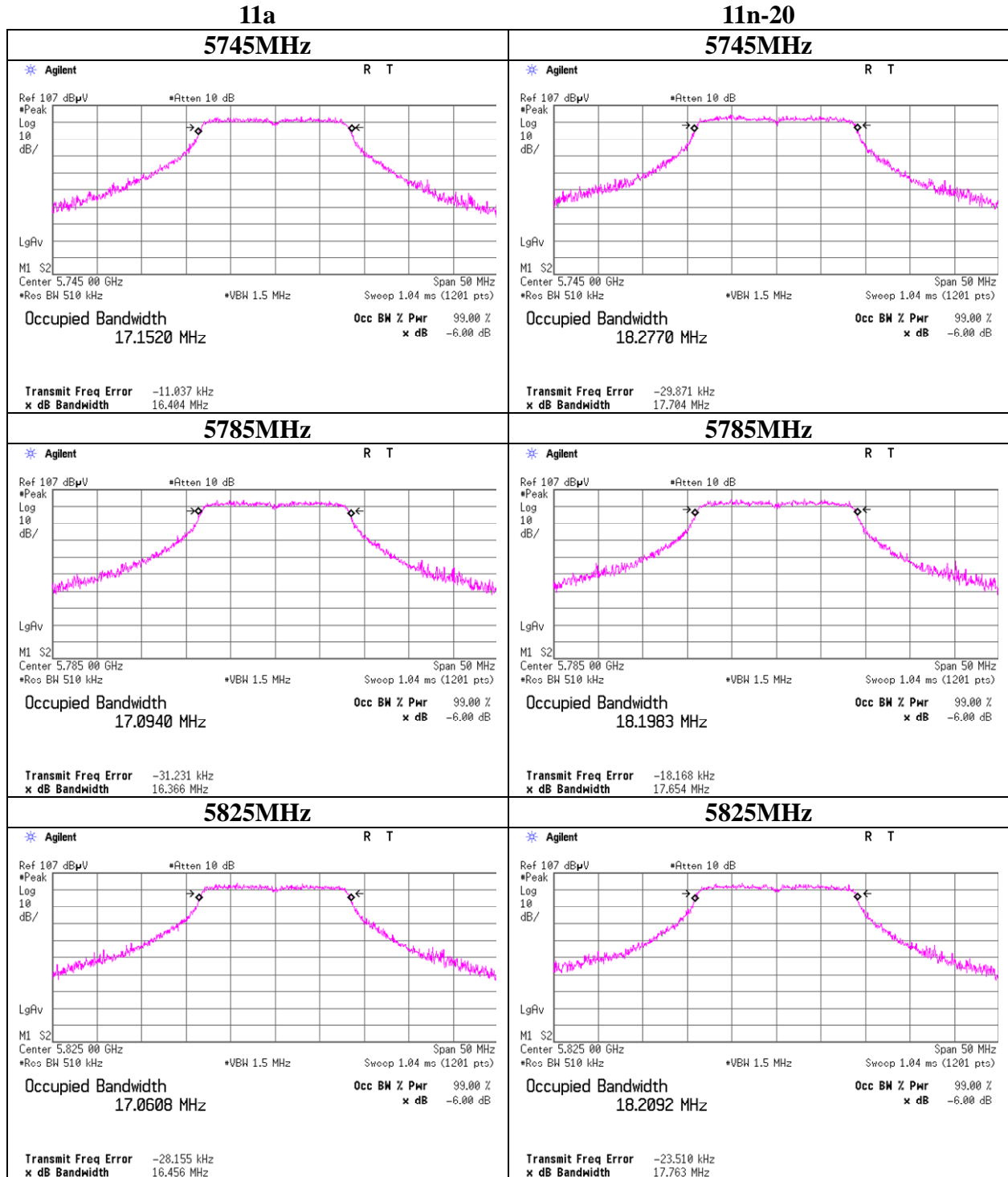
### 99% Occupied Bandwidth

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10604551H
Date	03/10/2015
Temperature/ Humidity	23deg. C / 30% RH
Engineer	Shinichi Miyazono
Mode	11n-20 Tx / 11n-40 Tx



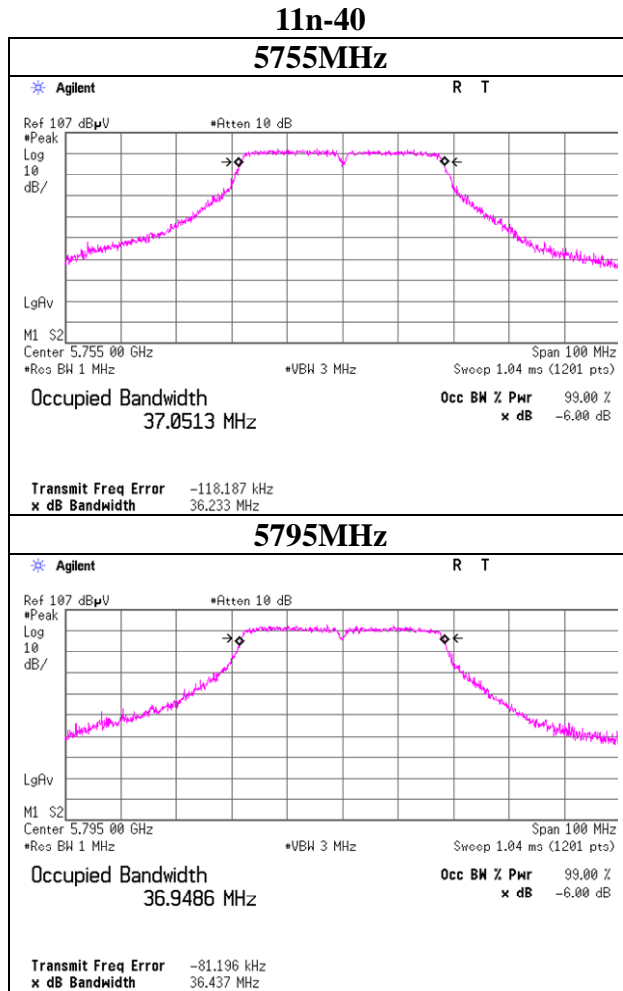
### 99% Occupied Bandwidth

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10604551H
Date	03/10/2015
Temperature/ Humidity	23deg. C / 30% RH
Engineer	Shinichi Miyazono
Mode	11a Tx / 11n-20 Tx



## 99% Occupied Bandwidth

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10604551H
Date	03/10/2015
Temperature/ Humidity	23deg. C / 30% RH
Engineer	Shinichi Miyazono
Mode	11n-40 Tx



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## APPENDIX 2: Test instruments

### EMI test equipment (1/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MSA-13	Spectrum Analyzer	Agilent	E4440A	MY46185823	AT	2014/06/06 * 12
MPM-16	Power Meter	Agilent	8990B	MY51000271	AT	2014/04/04 * 12
MPSE-22	Power sensor	Agilent	N1923A	MY54070003	AT	2014/04/04 * 12
MPSE-23	Power sensor	Agilent	N1923A	MY54070004	AT	2014/04/04 * 12
MCC-36	Microwave Cable	Hirose Electric	U.FL-2LP-066-A-(200)	-	AT	2014/09/12 * 12
MCC-37	Microwave Cable	Hirose Electric	U.FL-2LP-066-A-(200)	-	AT	2014/09/25 * 12
MTW-02	Torque wrench	HUBER+SUHNER	74 Z-0-0-21	98190	AT	2015/01/16 * 36
MOS-14	Thermo-Hygrometer	Custom	CTH-201	1401	AT	2015/01/13 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2014/03/13 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2015/02/26 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	1501	RE	2015/01/13 * 12
MJM-23	Measure	ASKUL	-	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE	2015/02/26 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2014/08/12 * 12
MCC-141	Microwave Cable	Junkosha	MWX221	1305S002R(1m) / 1405S146(5m)	RE	2014/06/11 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE	2014/03/11 * 12
MHF-26	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	002	RE	2014/09/24 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2015/02/19 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE	2015/01/13 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE	2014/04/08 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2014/05/26 * 12
MCC-167	Microwave Cable	Junkosha	MWX221	1404S374(1m) / 1405S074(5m)	RE	2014/05/26 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2014/03/24 * 12
MCC-79	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278923/4	RE	2014/12/15 * 12
MHF-22	High Pass Filter 7-20GHz	TOKIMEC	TF37NCCB	602	RE	2015/01/27 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2014/05/26 * 12
MHA-29	Horn Antenna 26.5-40GHz	ETS LINDGREN	3160-10	00152399	RE	2014/09/02 * 12
MPA-22	Pre Amplifier	MITEQ, Inc	AMF-6F-2600400-33-8P / AMF-4F-2600400-33-8P	1871355 / 1871328	RE	2014/09/11 * 12
MCC-54	Microwave Cable	Suhner	SUCOFLEX101	2873(1m) / 2876(5m)	RE	2015/03/09 * 12
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE/CE	2014/06/25 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE/CE	2015/01/13 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE/CE	-
MSA-14	Spectrum Analyzer	Agilent	E4440A	MY48250080	RE/CE	2014/10/17 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2015/02/05 * 12
MCC-166	Microwave Cable	Junkosha	MWX221	1303S120(1m) / 1311S167(5m)	RE	2014/09/24 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2015/01/28 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2014/06/11 * 12

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**EMI test equipment (2/2)**

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
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
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	CE/RE	2014/06/03 * 12
MTA-28	Terminator	TME	CT-01	-	CE	2014/11/26 * 12
MCC-13	Coaxial Cable	Fujikura	3D-2W(12m)/5D- 2W(5m)/5D- 2W(0.8m)/5D- 2W(1m)	-	CE	2015/02/06 * 12
MAT-65	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2015/01/29 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2014/10/18 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2014/10/18 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2015/02/06 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2014/11/11 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2014/09/26 * 12
MAT-10	Attenuator(10dB)	Weinschel Corp	2	BL1173	AT	2014/11/19*12
MCC-38	Coaxial Cable	UL Japan	-	-	AT	014/12/02*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**  
**RE: Radiated Emission**  
**AT: Antenna Terminal Conducted test**

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