



RADIO TEST REPORT

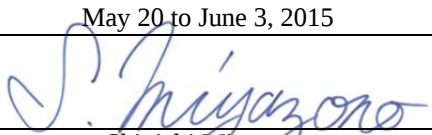
Test Report No. : 10733022H-A

Applicant : **Brother Industries, Ltd.**
Type of Equipment : **Mobile Printer**
Model No. : **PJ-773**
FCC ID : **B3Q8V9313**
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)

Date of test: May 20 to June 3, 2015

Representative test engineer:


Shinichi Miyazono
Engineer
Consumer Technology Division

Approved by:


Takahiro Hatakeda
Leader
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.
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<http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

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13-EM-F0429

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SECTION 1: Customer information

Company Name	:	Brother Industries, Ltd.
Address	:	15-1, Naeshiro-cho, Mizuho-ku, Nagoya, 467-8561, Japan
Telephone Number	:	+81-52-824-2345
Facsimile Number	:	+81-52-821-1068
Contact Person	:	Shintaro Uno

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

2.1 Identification of E.U.T.

Type of Equipment	:	Mobile Printer
Model No.	:	PJ-773
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 15.0 V
Receipt Date of Sample	:	May 20, 2015
Country of Mass-production	:	China
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab

2.2 Product Description

Model: PJ-773 (referred to as the EUT in this report) is a Mobile Printer.

General Specification

Clock frequency(ies) in the system	:	Crystal 20 MHz
------------------------------------	---	----------------

Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	2412 MHz - 2462 MHz
Modulation	:	DSSS / OFDM
Power Supply (radio part input)	:	DC 3.3 V
Antenna type	:	PCB Antenna
Antenna Gain	:	2.12 dBi

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 IC: RSS-Gen 8.8	FCC: Section 15.207 IC: RSS-Gen 8.8	QP 14.2 dB, 1.71220 MHz, L 1.90920 MHz, L AV 4.7 dB, 1.90920 MHz, L	Complied	-
6dB Bandwidth	FCC: KDB 558074 D01 DTS Meas Guidance v03r03 IC: -	FCC: Section 15.247(a)(2) IC: RSS-247 5.2(1)	See data.	Complied	Conducted
Maximum Peak Output Power	FCC: KDB 558074 D01 DTS Meas Guidance v03r03 IC: RSS-Gen 6.12	FCC: Section 15.247(b)(3) IC: RSS-247 5.4(4)		Complied	Conducted
Power Density	FCC: KDB 558074 D01 DTS Meas Guidance v03r03 IC: -	FCC: Section 15.247(e) IC: RSS-247 5.2(2)		Complied	Conducted
Spurious Emission Restricted Band Edges	FCC: KDB 558074 D01 DTS Meas Guidance v03r03 IC: RSS-Gen 6.13	FCC: Section 15.247(d) IC: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	2.8 dB 2390.000 MHz, AV, Vert.	Complied	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *1)

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

*1) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 DTS Meas Guidance v03r03 12.2.7.

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

FCC 15.31 (e)

This EUT provides stable voltage (DC 3.3 V) 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 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 $k = 2$.
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Test site (semi anechoic chamber)	Conducted emission Uncertainty (+/-)			
	No. 1	No. 2	No. 3	No. 4
150 kHz - 30 MHz	3.5 dB	3.5 dB	3.4 dB	3.5 dB

Test site (semi anechoic chamber)	Radiated emission Uncertainty (+/-)						
	Measurement distance: 3 m				1 m		0.5 m
	9 kHz - 30 MHz	30 MHz - 300 MHz	300 MHz - 1 GHz	1 GHz - 10 GHz	10 GHz - 18 GHz	18 GHz - 26.5 GHz	26.5 GHz - 40 GHz
No. 1	4.3 dB	5.5 dB	6.3 dB	5.5 dB	5.8 dB	5.8 dB	4.3 dB
No. 2	4.2 dB	5.4 dB	6.3 dB	5.4 dB	5.7 dB	5.9 dB	5.6 dB
No. 3	4.4 dB	5.4 dB	6.4 dB	5.2 dB	5.5 dB	5.8 dB	5.5 dB
No. 4	4.7 dB	5.6 dB	6.4 dB	5.3 dB	5.7 dB	5.9 dB	5.5 dB

Antenna terminal test Uncertainty (+/-)							
Power meter		Conducted emission and Power density			Conducted emission		Channel power
Below 1 GHz	Above 1 GHz	Below 1 GHz	1 GHz - 3 GHz	3 GHz - 18 GHz	18 GHz - 26.5 GHz	26.5 GHz - 40 GHz	
0.7 dB	1.5 dB	1.5 dB	1.7 dB	2.8 dB	2.8 dB	2.9 dB	2.6 dB

Conducted Emission test

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

Radiated emission test

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

3.5 Test Location

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Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.6 shielded room	-	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	-	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	-	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	-	3.1 x 5.0 x 2.7	N/A	-	-
No.9 measurement room	-	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.11 measurement room	-	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 m 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 Test data, 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.

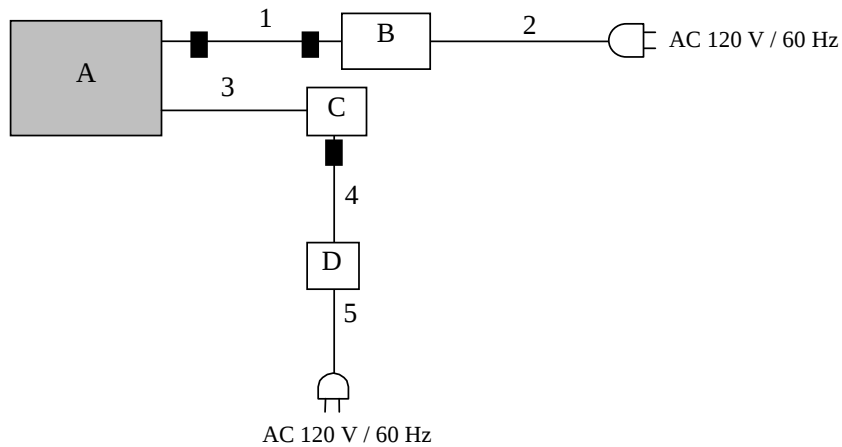
Mode	Remarks*
IEEE 802.11b (11b)	2 Mbps, PN9
IEEE 802.11g (11g)	6 Mbps, PN9
IEEE 802.11n SISO 20 MHz BW (11n-20)	MCS 0, PN9
*The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
*Power of the EUT was set by the software as follows; Power settings: 11b:17.0 [dBm], 11g:13.0 [dBm], 11n:12.0[dBm] Software: Write PTUSB Version2.0.0.1 *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.	

*The details of Operating mode(s)

Test Item	Operating Mode	Tested frequency
Conducted Emission, Spurious Emission (Below 1GHz) *1)	11g Tx	2412 MHz
Spurious Emission (Above 1GHz)	11b Tx	2412 MHz
	11g Tx	2437 MHz
		2462 MHz
	11n-20 Tx	2412 MHz
6dB Bandwidth	11b Tx	2412 MHz
Maximum Peak Output Power	11g Tx	2437 MHz
Power Density	11n-20 Tx	2462 MHz
99% Occupied Bandwidth		

*1) The mode was tested as a representative, because it had the highest power at antenna terminal test.

4.2 Configuration and peripherals



■ : Standard Ferrite Core

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

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Mobile Printer	PJ-773	U64149-B5Z778378	Brother Industries,Ltd.	EUT
B	AC Adapter	PA-AD-600	102172-11	Brother Industries,Ltd.	-
C	Laptop PC	4291-3K0	R9-L23V4	Lenovo	-
D	AC Adapter	92P1156	11S92P1156Z1ZDXN 23PG2M	Lenovo	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	1.5	Unshielded	Unshielded	-
2	AC Cable	1.6	Unshielded	Unshielded	-
3	USB Cable	1.0	Shielded	Shielded	-
4	DC Cable	1.6	Unshielded	Unshielded	-
5	AC Cable	0.9	Unshielded	Unshielded	-

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SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane.

The rear of tabletop was located 40 cm 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 80 cm 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 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane. All unused 50ohm connectors of the LISN (AMN) were resistivity terminated in 50 ohm 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 MHz – 30 MHz
Test data	: APPENDIX
Test result	: Pass

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 v03r03".

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane.

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

The height of the measuring antenna varied between 1 m and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.

The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.

The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Test Antennas are used as below;

Frequency	30 MHz to 300 MHz	300 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

In any 100 kHz bandwidth outside the restricted band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9(IC) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (IC).

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *3)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	Average Power Method: WLAN: 12.2.5.2 RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces Duty factor was added to the results.	RBW: 100 kHz VBW: 300kHz
Test Distance	3m	3 m (below 10 GHz), 1 m *1) (above 10 GHz)		3 m (below 10 GHz), 1 m *1) (above 10 GHz)

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

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

*3) Average Power Measurement was performed based on 6.0 & 12.2.5 of "KDB 558074 D01 DTS Meas Guidance v03r03".

- 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	: 30 M - 26.5 GHz
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.

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

*1) Peak hold was applied as Worst-case measurement.
 *2) Reference data
 *3) Section 10.2 Method PKPSD (peak PSD) of "KDB 558074 D01 DTS Meas Guidance v03r03".
 *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 low enough as shown in the chart.
 (9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 9.1 kHz).

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

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

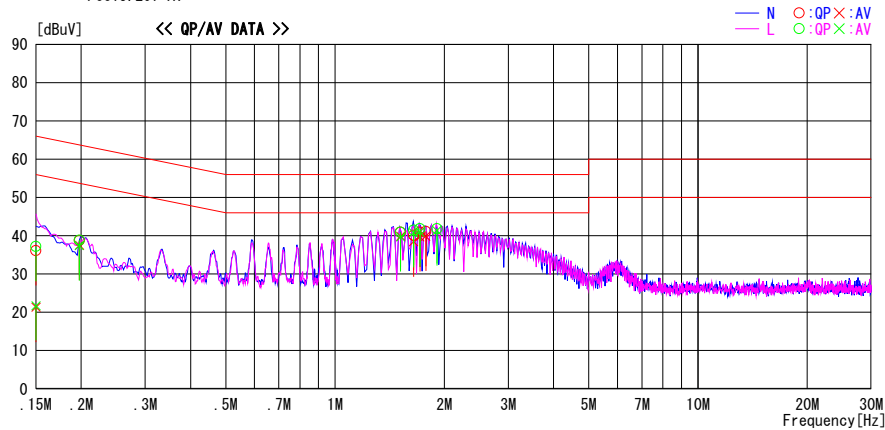
UL Japan, Inc. Ise EMC Lab. No.2 Semi Anechoic Chamber
Date : 2015/06/03

Report No. : 10733022H

Temp./Humi. : 24deg. C / 64% RH
Engineer : Shinichi Miyazono

Mode / Remarks : Tx 11g 6Mbps 2412MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]	
0.15000	22.9	8.1	13.2	36.1	21.3	66.0	56.0	29.9	34.7	N
0.19770	25.5	24.3	13.2	38.7	37.5	63.7	53.7	25.0	16.2	N
1.51530	27.5	26.5	13.4	40.9	39.9	56.0	46.0	15.1	6.1	N
1.64710	26.7	25.0	13.4	40.1	38.4	56.0	46.0	15.9	7.6	N
1.71270	27.5	26.3	13.4	40.9	39.7	56.0	46.0	15.1	6.3	N
1.77860	27.7	26.5	13.4	41.1	39.9	56.0	46.0	14.9	6.1	N
0.15000	24.0	8.5	13.2	37.2	21.7	66.0	56.0	28.8	34.3	L
0.19740	25.6	24.2	13.2	38.8	37.4	63.7	53.7	24.9	16.3	L
1.51502	27.5	26.3	13.4	40.9	39.7	56.0	46.0	15.1	6.3	L
1.64650	28.1	27.4	13.4	41.5	40.8	56.0	46.0	14.5	5.2	L
1.71220	28.4	27.6	13.4	41.8	41.0	56.0	46.0	14.2	5.0	L
1.90920	28.4	27.9	13.4	41.8	41.3	56.0	46.0	14.2	4.7	L

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

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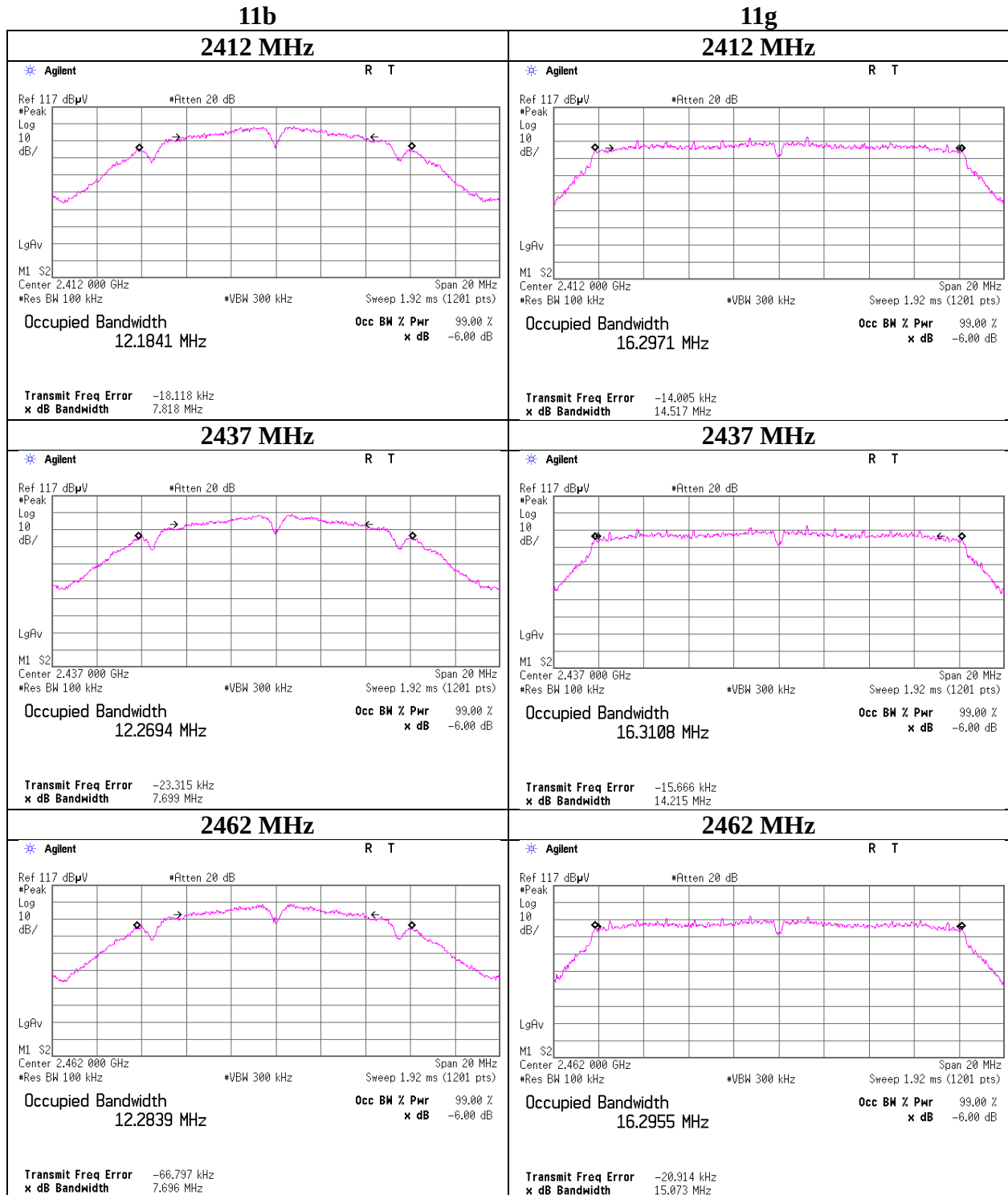
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6dB Bandwidth

Test place Ise EMC Lab. No.7 Shielded Room
Report No. 10733022H
Date June 1, 2015
Temperature / Humidity 24 deg. C / 58 % RH
Engineer Takumi Shimada
Mode Tx

Mode	Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
11b	2412	7.818	> 500
	2437	7.699	> 500
	2462	7.696	> 500
11g	2412	14.517	> 500
	2437	14.215	> 500
	2462	15.073	> 500
11n-20	2412	15.097	> 500
	2437	15.046	> 500
	2462	15.856	> 500

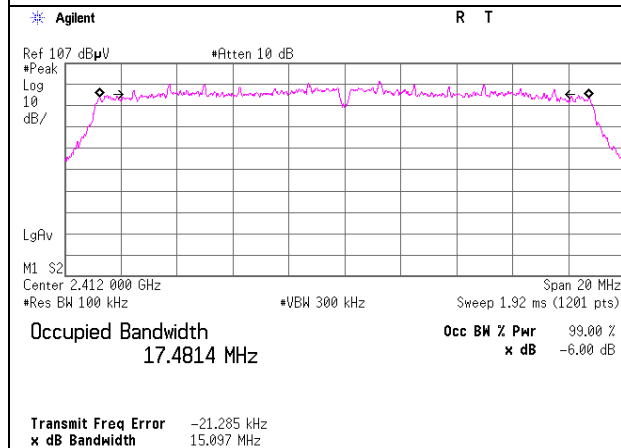
6dB Bandwidth



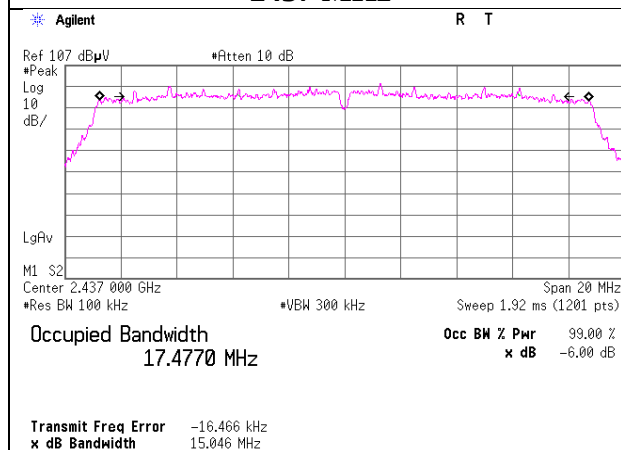
6dB Bandwidth

11n-20

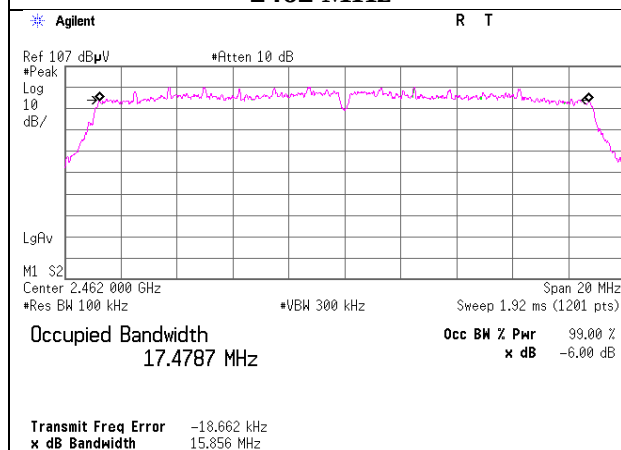
2412 MHz



2437 MHz



2462 MHz



Maximum Peak Output Power

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	10733022H
Date	May 20, 2015
Temperature / Humidity	23 deg. C / 58 % RH
Engineer	Tomohisa Nakagawa
Mode	Tx 11b/g

11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	9.57	1.05	10.02	20.64	115.87	30.00	1000	9.36
2437	9.57	1.06	10.02	20.65	116.13	30.00	1000	9.35
2462	9.40	1.07	10.02	20.49	111.91	30.00	1000	9.51

11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	13.02	1.05	10.02	24.09	256.43	30.00	1000	5.91
2437	12.92	1.06	10.02	24.00	251.15	30.00	1000	6.00
2462	13.00	1.07	10.02	24.09	256.38	30.00	1000	5.91

Sample Calculation:

Result = Reading + Cable Loss + Attenuator Loss

2437MHz

Rate [Mbps]	Reading [dBm]	Remark
1	9.36	
2	9.57	*
5.5	9.48	
11	9.45	

2437MHz

Rate [Mbps]	Reading [dBm]	Remark
6	12.92	*
9	12.89	
12	12.77	
18	12.77	
24	12.76	
36	12.78	
48	12.61	
54	12.60	

*: Worst Rate

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

Maximum Peak Output Power

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	10733022H
Date	May 20, 2015
Temperature / Humidity	23 deg. C / 58 % RH
Engineer	Tomohisa Nakagawa
Mode	Tx 11n-20

11n-20

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	12.08	1.05	10.02	23.15	206.53	30.00	1000	6.85
2437	11.94	1.06	10.02	23.02	200.42	30.00	1000	6.98
2462	12.15	1.07	10.02	23.24	210.80	30.00	1000	6.76

Sample Calculation:

Result = Reading + Cable Loss + Attenuator Loss

11n-20 2437MHz

Rate	Reading	Remark
MCS	[dBm]	
0	11.94	*
1	11.65	
2	11.66	
3	11.67	
4	11.38	
5	10.75	
6	10.99	
7	11.20	

*: Worst Rate

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

Average Output Power (Reference data for SAR testing)

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 10733022H
Date : May 20, 2015
Temperature / Humidity : 23 deg. C / 58 % RH
Engineer : Tomohisa Nakagawa
Mode : Tx 11b/g

11b Gated Power 1Mbps								
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Frame power)		Duty factor [dB]	Result (Burst power)	
				[dBm]	[mW]		[dBm]	[mW]
2412	6.27	1.05	10.02	17.34	54.20	0.00	17.34	54.20
2437	6.44	1.06	10.02	17.52	56.48	0.00	17.52	56.48
2462	6.53	1.07	10.02	17.62	57.79	0.00	17.62	57.79

11b Timed Power 1Mbps								
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Frame power)		Duty factor [dB]	Result (Burst power)	
				[dBm]	[mW]		[dBm]	[mW]
2412	5.67	1.05	10.02	16.74	47.20	0.00	16.74	47.20
2437	5.68	1.06	10.02	16.76	47.42	0.00	16.76	47.42
2462	5.74	1.07	10.02	16.83	48.18	0.00	16.83	48.18

11g Gated Power 6Mbps								
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Frame power)		Duty factor [dB]	Result (Burst power)	
				[dBm]	[mW]		[dBm]	[mW]
2412	2.42	1.05	10.02	13.49	22.33	0.00	13.49	22.33
2437	2.48	1.06	10.02	13.56	22.70	0.00	13.56	22.70
2462	2.50	1.07	10.02	13.59	22.85	0.00	13.59	22.85

11g Timed Power 6Mbps								
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Frame power)		Duty factor [dB]	Result (Burst power)	
				[dBm]	[mW]		[dBm]	[mW]
2412	0.16	1.05	10.02	11.23	13.27	0.00	11.23	13.27
2437	0.28	1.06	10.02	11.36	13.68	0.00	11.36	13.68
2462	0.21	1.07	10.02	11.30	13.49	0.00	11.30	13.49

Sample Calculation:
Result = Reading + Cable Loss + Attenuator Loss

Average Output Power
(Reference data for SAR testing)

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 10733022H
Date : May 20, 2015
Temperature / Humidity : 23 deg. C / 58 % RH
Engineer : Tomohisa Nakagawa
Mode : Tx 11n-20

11n-20 **Gated Power** MCS0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Frame power)		Duty factor [dB]	Result (Burst power)	
				[dBm]	[mW]		[dBm]	[mW]
2412	1.19	1.05	10.02	12.26	16.83	0.00	12.26	16.83
2437	1.42	1.06	10.02	12.50	17.78	0.00	12.50	17.78
2462	1.28	1.07	10.02	12.37	17.25	0.00	12.37	17.25

11n-20 **Timed Power** MCS0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Frame power)		Duty factor [dB]	Result (Burst power)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-1.27	1.05	10.02	9.80	9.55	0.00	9.80	9.55
2437	-1.20	1.06	10.02	9.88	9.73	0.00	9.88	9.73
2462	-1.13	1.07	10.02	9.96	9.91	0.00	9.96	9.91

Sample Calculation:

Result = Reading + Cable Loss + Attenuator Loss

Average Output Power (Reference data for SAR testing)

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	10733022H
Date	May 20, 2015
Temperature / Humidity	23 deg. C / 58 % RH
Engineer	Tomohisa Nakagawa
Mode	Tx

2437 MHz

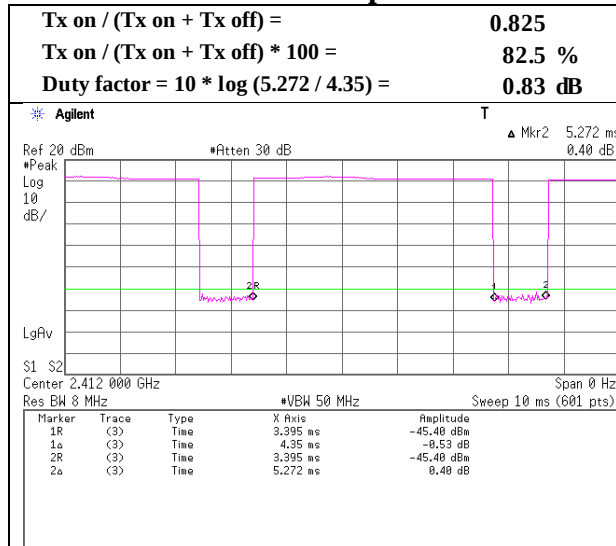
Mode	Rate Mbps	Reading Gated power [dBm]	Remarks Gated power	Reading Timed Power [dBm]	Remarks Timed Power
11b	1	6.44	*	5.68	*
	2	6.40		5.46	
	5.5	6.38		4.33	
	11	6.33		3.00	
11g	6	2.48	*	0.28	*
	9	2.43		-1.36	
	12	2.38		-1.29	
	18	2.42		-2.29	
	24	2.41		-3.19	
	36	2.44		-4.41	
	48	2.43		-5.40	
	54	2.43		-5.35	
11n-20	0	1.42	*	-1.20	*
	1	1.41		-2.64	
	2	1.22		-3.37	
	3	1.19		-4.46	
	4	1.20		-5.40	
	5	1.26		-6.42	
	6	1.22		-6.72	
	7	1.19		-7.02	

* Worst rate

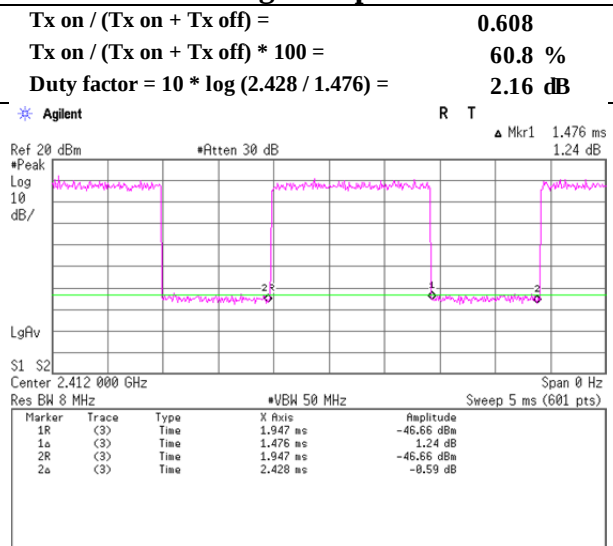
Burst rate confirmation

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 10733022H
Date : June 1, 2015
Temperature / Humidity : 24 deg. C / 58 % RH
Engineer : Takumi Shimada
Mode : Tx

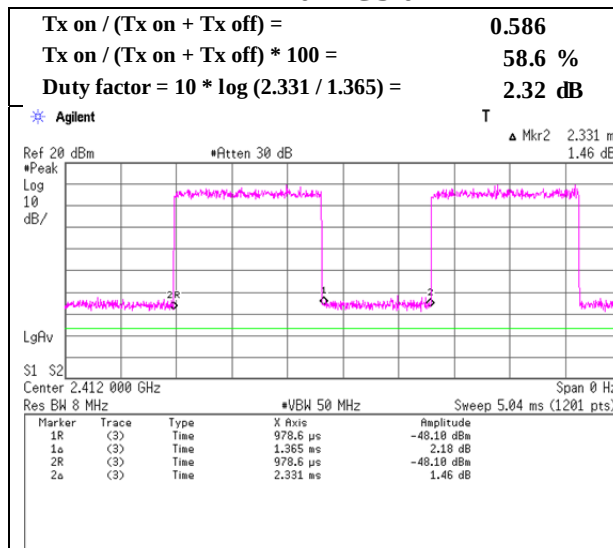
11b 2 Mbps



11g 6 Mbps



11n-20 MCS 0



Radiated Spurious Emission

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10733022H
Date : June 2, 2015 Day June 2, 2015 Night
Temperature / Humidity : 22 deg. C / 55 % RH 24 deg. C / 54 % RH
Engineer : Keisuke Kawamura Shinichi Miyazono
(1-10GHz) (10-26.5GHz)
Mode : Tx 11b 2412 MHz

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	42.3	29.3	3.5	35.0	-	40.1	73.9	33.8	
Hori	4824.000	PK	43.6	32.7	5.7	34.2	-	47.8	73.9	26.1	Floor Noise
Hori	7236.000	PK	43.0	36.8	7.2	34.1	-	52.9	73.9	21.0	Floor Noise
Hori	9648.000	PK	42.8	38.9	7.8	34.7	-	54.8	73.9	19.1	Floor Noise
Hori	2390.000	AV	35.3	29.3	3.5	35.0	0.8	33.9	53.9	20.0	*1)
Hori	4824.000	AV	34.3	32.7	5.7	34.2	-	38.5	53.9	15.4	Floor Noise
Hori	7236.000	AV	34.2	36.8	7.2	34.1	-	44.1	53.9	9.8	Floor Noise
Hori	9648.000	AV	34.6	38.9	7.8	34.7	-	46.6	53.9	7.3	Floor Noise
Vert	1720.152	PK	60.0	27.8	3.0	35.3	-	55.5	73.9	18.4	
Vert	2390.000	PK	48.3	29.3	3.5	35.0	-	46.1	73.9	27.8	
Vert	4824.000	PK	42.4	32.7	5.7	34.2	-	46.6	73.9	27.3	Floor Noise
Vert	7236.000	PK	42.6	36.8	7.2	34.1	-	52.5	73.9	21.4	Floor Noise
Vert	9648.000	PK	43.3	38.9	7.8	34.7	-	55.3	73.9	18.6	Floor Noise
Vert	1720.152	AV	41.8	27.8	3.0	35.3	-	37.3	53.9	16.6	
Vert	2390.000	AV	38.6	29.3	3.5	35.0	0.8	37.2	53.9	16.7	*1)
Vert	4824.000	AV	34.2	32.7	5.7	34.2	-	38.4	53.9	15.5	Floor Noise
Vert	7236.000	AV	34.3	36.8	7.2	34.1	-	44.2	53.9	9.7	Floor Noise
Vert	9648.000	AV	34.7	38.9	7.8	34.7	-	46.7	53.9	7.2	Floor Noise

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

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

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

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

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

*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	98.5	29.3	3.5	34.9	96.4	-	-	Carrier
Hori	2400.000	PK	43.4	29.3	3.5	35.0	41.2	76.4	35.2	
Vert	2412.000	PK	101.7	29.3	3.5	34.9	99.6	-	-	Carrier
Vert	2400.000	PK	52.2	29.3	3.5	35.0	50.0	79.6	29.6	

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

Radiated Spurious Emission

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	10733022H	
Date	June 2, 2015 Day	June 2, 2015 Night
Temperature / Humidity	22 deg. C / 55 % RH	24 deg. C / 54 % RH
Engineer	Keisuke Kawamura (1-10GHz)	Shinichi Miyazono (10-26.5GHz)
Mode	Tx 11b 2437 MHz	

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	43.0	32.8	5.8	34.2	-	47.4	73.9	26.5	Floor Noise
Hori	7311.000	PK	42.9	36.8	7.1	34.1	-	52.7	73.9	21.2	Floor Noise
Hori	9748.000	PK	43.1	39.0	7.8	34.7	-	55.2	73.9	18.7	Floor Noise
Hori	4874.000	AV	34.2	32.8	5.8	34.2	-	38.6	53.9	15.3	Floor Noise
Hori	7311.000	AV	34.1	36.8	7.1	34.1	-	43.9	53.9	10.0	Floor Noise
Hori	9748.000	AV	34.6	39.0	7.8	34.7	-	46.7	53.9	7.2	Floor Noise
Vert	4874.000	PK	43.0	32.8	5.8	34.2	-	47.4	73.9	26.5	Floor Noise
Vert	7311.000	PK	42.4	36.8	7.1	34.1	-	52.2	73.9	21.7	Floor Noise
Vert	9748.000	PK	42.7	39.0	7.8	34.7	-	54.8	73.9	19.1	Floor Noise
Vert	4874.000	AV	34.4	32.8	5.8	34.2	-	38.8	53.9	15.1	Floor Noise
Vert	7311.000	AV	34.5	36.8	7.1	34.1	-	44.3	53.9	9.6	Floor Noise
Vert	9748.000	AV	34.6	39.0	7.8	34.7	-	46.7	53.9	7.2	Floor Noise

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

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

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

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

Radiated Spurious Emission

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10733022H
Date : June 2, 2015 Day June 2, 2015 Night
Temperature / Humidity : 22 deg. C / 55 % RH 24 deg. C / 54 % RH
Engineer : Keisuke Kawamura Shinichi Miyazono
(1-10GHz) (10-26.5GHz)
Mode : Tx 11b 2462 MHz

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	44.7	29.3	3.5	34.9	-	42.6	73.9	31.3	
Hori	4924.000	PK	42.8	32.9	5.8	34.2	-	47.3	73.9	26.6	Floor Noise
Hori	7386.000	PK	43.0	36.8	7.1	34.2	-	52.7	73.9	21.2	Floor Noise
Hori	9848.000	PK	44.2	39.0	7.8	34.7	-	56.3	73.9	17.6	Floor Noise
Hori	2483.500	AV	39.2	29.3	3.5	34.9	0.8	37.9	53.9	16.0	*1)
Hori	4924.000	AV	33.6	32.9	5.8	34.2	-	38.1	53.9	15.8	Floor Noise
Hori	7386.000	AV	34.1	36.8	7.1	34.2	-	43.8	53.9	10.1	Floor Noise
Hori	9848.000	AV	34.8	39.0	7.8	34.7	-	46.9	53.9	7.0	Floor Noise
Vert	1672.162	PK	63.5	27.5	2.9	35.4	-	58.5	73.9	15.4	
Vert	2483.500	PK	52.6	29.3	3.5	34.9	-	50.5	73.9	23.4	
Vert	4924.000	PK	42.7	32.9	5.8	34.2	-	47.2	73.9	26.7	Floor Noise
Vert	7386.000	PK	42.6	36.8	7.1	34.2	-	52.3	73.9	21.6	Floor Noise
Vert	9848.000	PK	43.7	39.0	7.8	34.7	-	55.8	73.9	18.1	Floor Noise
Vert	1672.162	AV	42.6	27.5	2.9	35.4	-	37.6	53.9	16.3	
Vert	2483.500	AV	44.4	29.3	3.5	34.9	0.8	43.1	53.9	10.8	*1)
Vert	4924.000	AV	34.0	32.9	5.8	34.2	-	38.5	53.9	15.4	Floor Noise
Vert	7386.000	AV	34.2	36.8	7.1	34.2	-	43.9	53.9	10.0	Floor Noise
Vert	9848.000	AV	34.7	39.0	7.8	34.7	-	46.8	53.9	7.1	Floor Noise

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

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

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

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

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

*1) Not out of Band emission (Leakage power)

Radiated Spurious Emission

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber		
Report No.	10733022H		
Date	June 2, 2015 Day	June 2, 2015 Night	June 3, 2015 Night
Temperature / Humidity	22 deg. C / 55 % RH	24 deg. C / 54 % RH	24 deg. C / 64 % RH
Engineer	Keisuke Kawamura (1-10GHz)	Shinichi Miyazono (10-26.5GHz)	Shinichi Miyazono (Below 1GHz)
Mode	Tx 11g 2412 MHz		

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	71.995	QP	44.7	6.3	7.2	28.4	-	29.8	40.0	10.2	
Hori	120.005	QP	36.0	12.7	7.6	28.2	-	28.1	43.5	15.4	
Hori	167.998	QP	41.8	15.8	8.0	28.0	-	37.6	43.5	5.9	
Hori	399.998	QP	30.7	17.6	9.4	28.3	-	29.4	46.0	16.6	
Hori	767.988	QP	26.9	21.5	10.9	27.8	-	31.5	46.0	14.5	
Hori	863.980	QP	29.0	22.3	11.2	27.4	-	35.1	46.0	10.9	
Hori	2390.000	PK	54.0	29.3	3.5	35.0	-	51.8	73.9	22.1	
Hori	4824.000	PK	43.5	32.7	5.7	34.2	-	47.7	73.9	26.2	Floor Noise
Hori	7236.000	PK	43.1	36.8	7.2	34.1	-	53.0	73.9	20.9	Floor Noise
Hori	9648.000	PK	43.2	38.9	7.8	34.7	-	55.2	73.9	18.7	Floor Noise
Hori	2390.000	AV	36.9	29.3	3.5	35.0	2.2	36.9	53.9	17.0	
Hori	4824.000	AV	34.0	32.7	5.7	34.2	-	38.2	53.9	15.8	Floor Noise
Hori	7236.000	AV	34.3	36.8	7.2	34.1	-	44.2	53.9	9.7	Floor Noise
Hori	9648.000	AV	34.7	38.9	7.8	34.7	-	46.7	53.9	7.2	Floor Noise
Vert	72.000	QP	40.5	6.3	7.2	28.4	-	25.6	40.0	14.4	
Vert	74.122	QP	39.7	6.4	7.2	28.4	-	24.9	40.0	15.1	
Vert	120.006	QP	42.6	12.7	7.6	28.2	-	34.7	43.5	8.8	
Vert	167.996	QP	37.5	15.8	8.0	28.0	-	33.3	43.5	10.2	
Vert	311.999	QP	34.8	14.9	8.9	27.5	-	31.1	46.0	14.9	
Vert	863.970	QP	28.1	22.3	11.2	27.4	-	34.2	46.0	11.8	
Vert	1719.495	PK	54.0	27.8	3.0	35.3	-	49.5	73.9	24.4	
Vert	2390.000	PK	65.6	29.3	3.5	35.0	-	63.4	73.9	10.5	
Vert	4824.000	PK	42.6	32.7	5.7	34.2	-	46.8	73.9	27.1	Floor Noise
Vert	7236.000	PK	44.1	36.8	7.2	34.1	-	54.0	73.9	19.9	Floor Noise
Vert	9648.000	PK	43.0	38.9	7.8	34.7	-	55.0	73.9	18.9	Floor Noise
Vert	1719.495	AV	38.0	27.8	3.0	35.3	-	33.5	53.9	20.4	
Vert	2390.000	AV	40.7	29.3	3.5	35.0	2.2	40.7	53.9	13.2	
Vert	4824.000	AV	33.9	32.7	5.7	34.2	-	38.1	53.9	15.8	Floor Noise
Vert	7236.000	AV	34.1	36.8	7.2	34.1	-	44.0	53.9	9.9	Floor Noise
Vert	9648.000	AV	34.7	38.9	7.8	34.7	-	46.7	53.9	7.2	Floor Noise

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

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

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

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

*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	87.9	29.3	3.5	34.9	85.8	-	-	Carrier
Hori	2400.000	PK	41.0	29.3	3.5	35.0	38.8	65.8	27.0	
Vert	2412.000	PK	95.1	29.3	3.5	34.9	93.0	-	-	Carrier
Vert	2400.000	PK	53.7	29.3	3.5	35.0	51.5	73.0	21.5	

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

Radiated Spurious Emission

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	10733022H	
Date	June 2, 2015 Day	June 2, 2015 Night
Temperature / Humidity	22 deg. C / 55 % RH	24 deg. C / 54 % RH
Engineer	Keisuke Kawamura (1-10GHz)	Shinichi Miyazono (10-26.5GHz)
Mode	Tx 11g 2437 MHz	

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	42.6	32.8	5.8	34.2	-	47.0	73.9	26.9	Floor Noise
Hori	7311.000	PK	43.3	36.8	7.1	34.1	-	53.1	73.9	20.8	Floor Noise
Hori	9748.000	PK	43.1	39.0	7.8	34.7	-	55.2	73.9	18.7	Floor Noise
Hori	4874.000	AV	34.2	32.8	5.8	34.2	-	38.6	53.9	15.3	Floor Noise
Hori	7311.000	AV	33.9	36.8	7.1	34.1	-	43.7	53.9	10.2	Floor Noise
Hori	9748.000	AV	34.5	39.0	7.8	34.7	-	46.6	53.9	7.3	Floor Noise
Vert	1719.750	PK	62.2	27.8	3.0	35.3	-	57.7	73.9	16.2	
Vert	4874.000	PK	42.3	32.8	5.8	34.2	-	46.7	73.9	27.2	Floor Noise
Vert	7311.000	PK	43.4	36.8	7.1	34.1	-	53.2	73.9	20.7	Floor Noise
Vert	9748.000	PK	43.3	39.0	7.8	34.7	-	55.4	73.9	18.5	Floor Noise
Vert	1719.750	AV	44.0	27.8	3.0	35.3	-	39.5	53.9	14.4	
Vert	4874.000	AV	34.1	32.8	5.8	34.2	-	38.5	53.9	15.4	Floor Noise
Vert	7311.000	AV	33.8	36.8	7.1	34.1	-	43.6	53.9	10.3	Floor Noise
Vert	9748.000	AV	34.4	39.0	7.8	34.7	-	46.5	53.9	7.4	Floor Noise

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

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

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

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

Radiated Spurious Emission

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10733022H
Date : June 2, 2015 Day June 2, 2015 Night
Temperature / Humidity : 22 deg. C / 55 % RH 24 deg. C / 54 % RH
Engineer : Keisuke Kawamura Shinichi Miyazono
(1-10GHz) (10-26.5GHz)
Mode : Tx 11g 2462 MHz

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	57.2	29.3	3.5	34.9	-	55.1	73.9	18.8	
Hori	4924.000	PK	42.1	32.9	5.8	34.2	-	46.6	73.9	27.3	Floor Noise
Hori	7386.000	PK	41.9	36.8	7.1	34.2	-	51.6	73.9	22.3	Floor Noise
Hori	9848.000	PK	44.0	39.0	7.8	34.7	-	56.1	73.9	17.8	Floor Noise
Hori	2483.500	AV	42.8	29.3	3.5	34.9	2.2	42.9	53.9	11.0	*1)
Hori	4924.000	AV	33.9	32.9	5.8	34.2	-	38.4	53.9	15.5	Floor Noise
Hori	7386.000	AV	33.7	36.8	7.1	34.2	-	43.4	53.9	10.5	Floor Noise
Hori	9848.000	AV	34.4	39.0	7.8	34.7	-	46.5	53.9	7.4	Floor Noise
Vert	1672.162	PK	61.9	27.5	2.9	35.4	-	56.9	73.9	17.0	
Vert	2483.500	PK	61.6	29.3	3.5	34.9	-	59.5	73.9	14.4	
Vert	4924.000	PK	42.3	32.9	5.8	34.2	-	46.8	73.9	27.1	Floor Noise
Vert	7386.000	PK	42.2	36.8	7.1	34.2	-	51.9	73.9	22.0	Floor Noise
Vert	9848.000	PK	43.3	39.0	7.8	34.7	-	55.4	73.9	18.5	Floor Noise
Vert	1672.162	AV	42.3	27.5	2.9	35.4	-	37.3	53.9	16.6	
Vert	2483.500	AV	45.4	29.3	3.5	34.9	2.2	45.5	53.9	8.4	*1)
Vert	4924.000	AV	33.6	32.9	5.8	34.2	-	38.1	53.9	15.8	Floor Noise
Vert	7386.000	AV	33.9	36.8	7.1	34.2	-	43.6	53.9	10.3	Floor Noise
Vert	9848.000	AV	34.4	39.0	7.8	34.7	-	46.5	53.9	7.4	Floor Noise

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

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

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

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

*1) Not out of Band emission (Leakage power)

Radiated Spurious Emission

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10733022H
Date : June 2, 2015 Night
Temperature / Humidity : 24 deg. C / 54 % RH
Engineer : Shinichi Miyazono
(Bandedge)
Mode : Tx 11n-20 2412 MHz

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	60.6	29.3	3.5	35.0	2.3	60.7	73.9	13.2	
Hori	2390.000	AV	43.1	29.3	3.5	35.0	2.3	43.2	53.9	10.7	
Vert	2390.000	PK	65.2	29.3	3.5	35.0	2.3	65.3	73.9	8.6	
Vert	2390.000	AV	51.0	29.3	3.5	35.0	2.3	51.1	53.9	2.8	

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

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	87.6	29.3	3.5	34.9	85.5	-	-	Carrier
Hori	2400.000	PK	50.7	29.3	3.5	35.0	48.5	65.5	17.0	
Vert	2412.000	PK	94.4	29.3	3.5	34.9	92.3	-	-	Carrier
Vert	2400.000	PK	54.4	29.3	3.5	35.0	52.2	72.3	20.1	

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

Radiated Spurious Emission

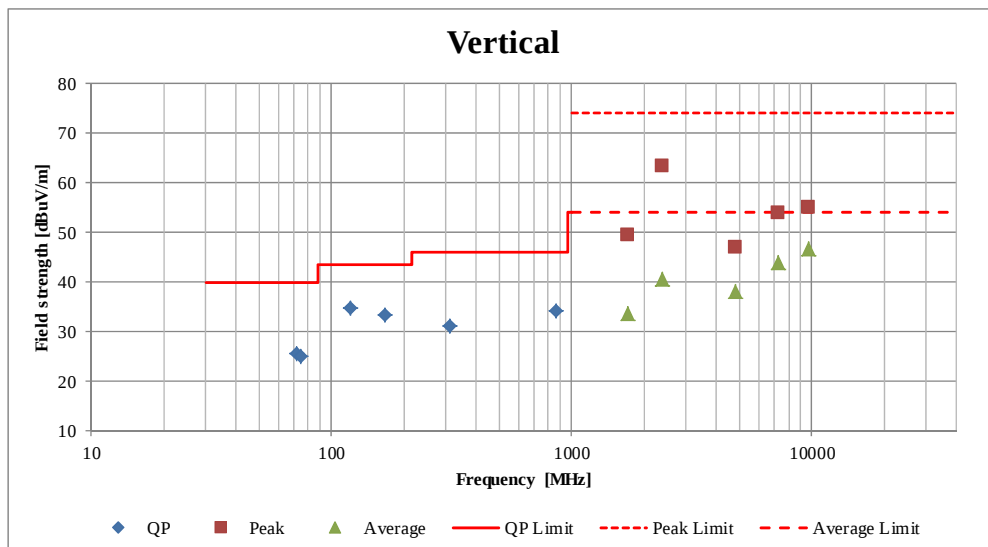
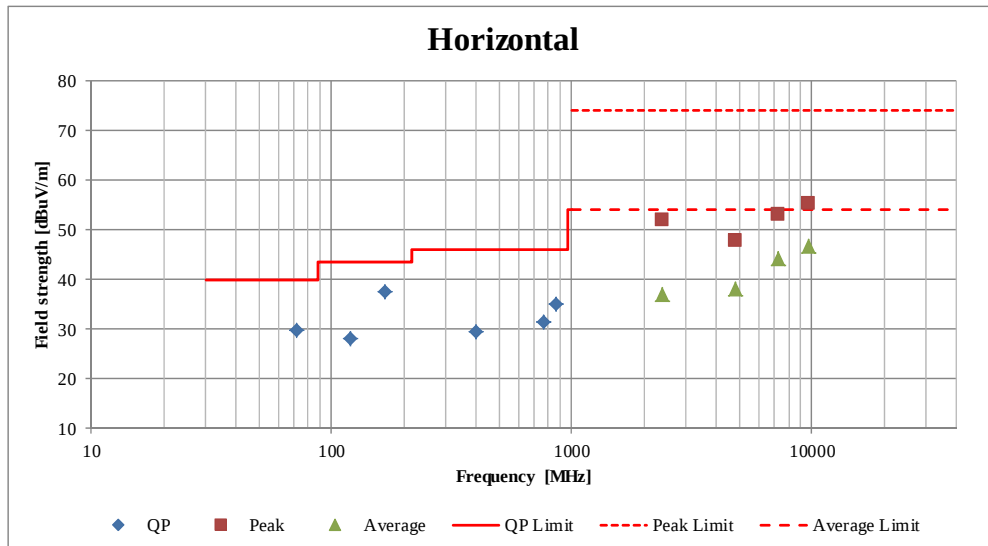
Test place Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. 10733022H
Date June 2, 2015 Night
Temperature / Humidity 24 deg. C / 54 % RH
Engineer Shinichi Miyazono
 (Bandedge)
Mode Tx 11n-20 2462 MHz

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	59.5	29.3	3.5	34.9	2.3	59.7	73.9	14.2	
Hori	2483.500	AV	43.9	29.3	3.5	34.9	2.3	44.1	53.9	9.8	
Vert	2483.500	PK	63.1	29.3	3.5	34.9	2.3	63.3	73.9	10.6	
Vert	2483.500	AV	45.9	29.3	3.5	34.9	2.3	46.1	53.9	7.8	

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

Radiated Spurious Emission (Plot data, Worst case)

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	10733022H	
Date	June 2, 2015 Day	June 3, 2015 Night
Temperature / Humidity	22 deg. C / 55 % RH	24 deg. C / 64 % RH
Engineer	Keisuke Kawamura (1-10GHz)	Shinichi Miyazono (Below 1GHz)
Mode	Tx 11g 2412 MHz	

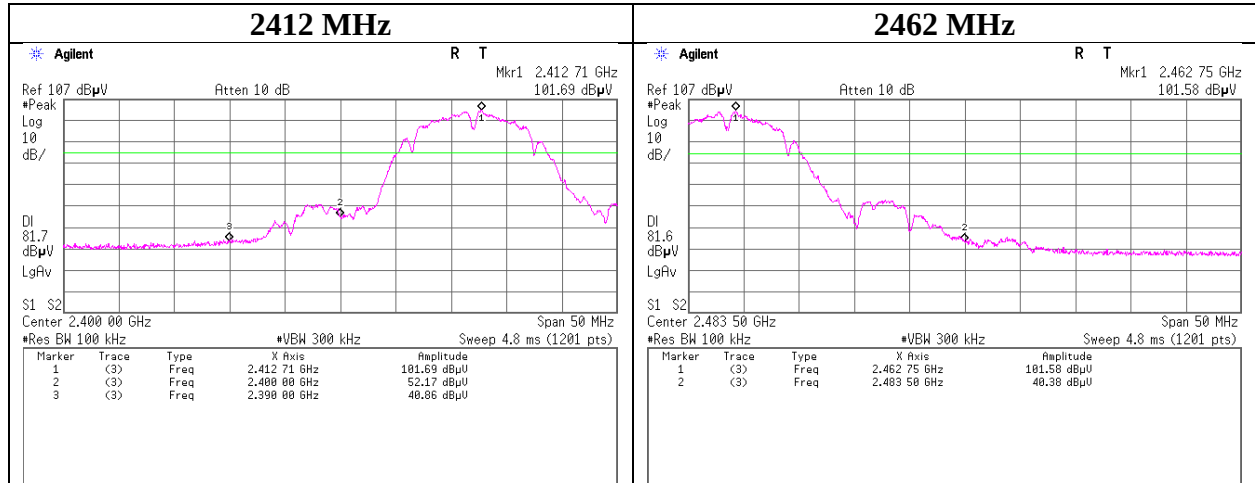


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

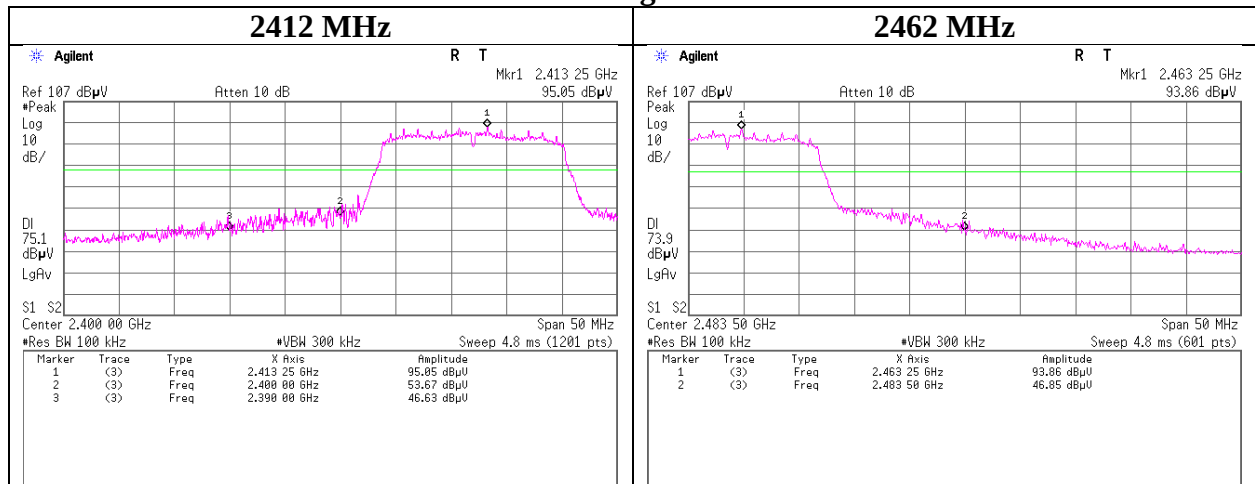
Band Edge confirmation

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	10706993H
Date	June 2, 2015 Night
Temperature/ Humidity	24 deg. C / 54 % RH
Engineer	Shinichi Miyazono
Mode	Tx 11b/g

11b



11g

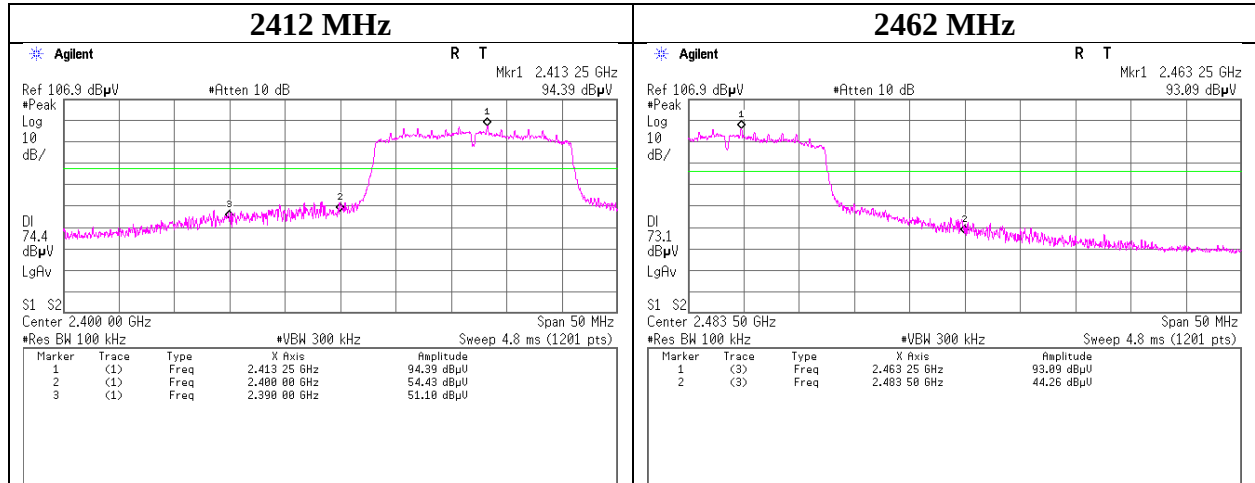


* Final result of band edge was measured as radiated spurious emission. Refer to Radiated Spurious Emission's pages.

Band Edge confirmation

Test place Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. 10733022H
Date June 2, 2015
Temperature/ Humidity 24 deg. C / 54 % RH
Engineer Shinichi Miyazono
Mode Tx 11n-20

11n-20



* Final result of band edge was measured as radiated spurious emission. Refer to Radiated Spurious Emission's pages.

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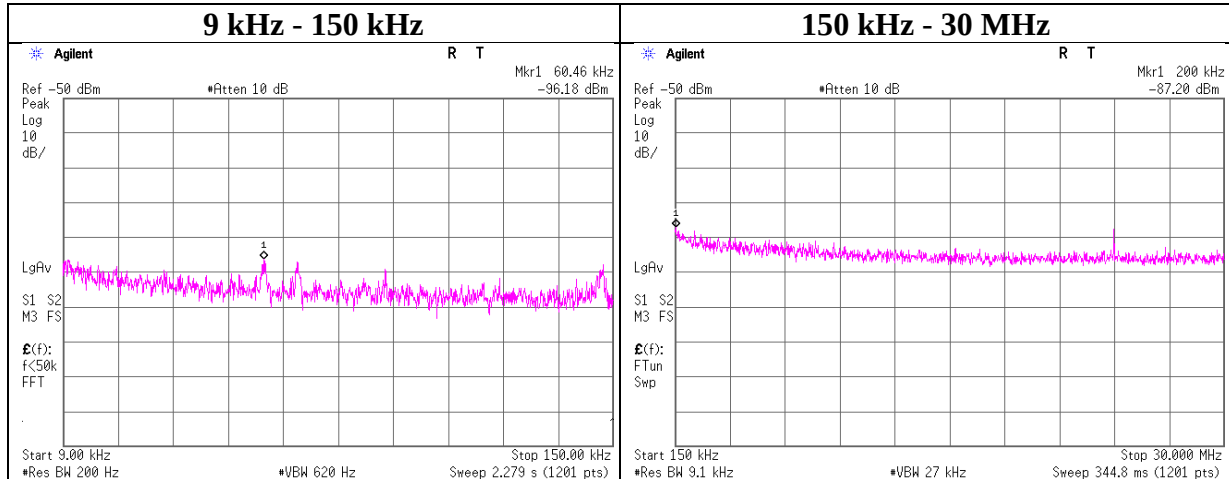
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Conducted Spurious Emission

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 10733022H
Date : June 1, 2015
Temperature / Humidity : 24 deg. C / 58 % RH
Engineer : Takumi Shimada
Mode : Tx 11g 2412 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [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
60.46	-96.18	0.12	9.98	2.12	1	-84.0	300	6.0	-22.7	31.9	54.6	
200.00	-87.20	0.12	9.98	2.12	1	-75.0	300	6.0	-13.7	21.5	35.2	

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

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

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Power Density

Test place Ise EMC Lab. No.7 Shielded Room
Report No. 10733022H
Date June 1, 2015
Temperature / Humidity 24 deg. C / 58 % RH
Engineer Takumi Shimada
Mode Tx

11b

Freq.	Reading	Cable Loss	Atten. Loss	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-14.96	1.05	10.02	-3.89	8.00	11.89
2437.00	-15.87	1.06	10.02	-4.79	8.00	12.79
2462.00	-14.85	1.07	10.02	-3.76	8.00	11.76

11g

Freq.	Reading	Cable Loss	Atten. Loss	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-21.78	1.05	10.02	-10.71	8.00	18.71
2437.00	-22.06	1.06	10.02	-10.98	8.00	18.98
2462.00	-21.91	1.07	10.02	-10.82	8.00	18.82

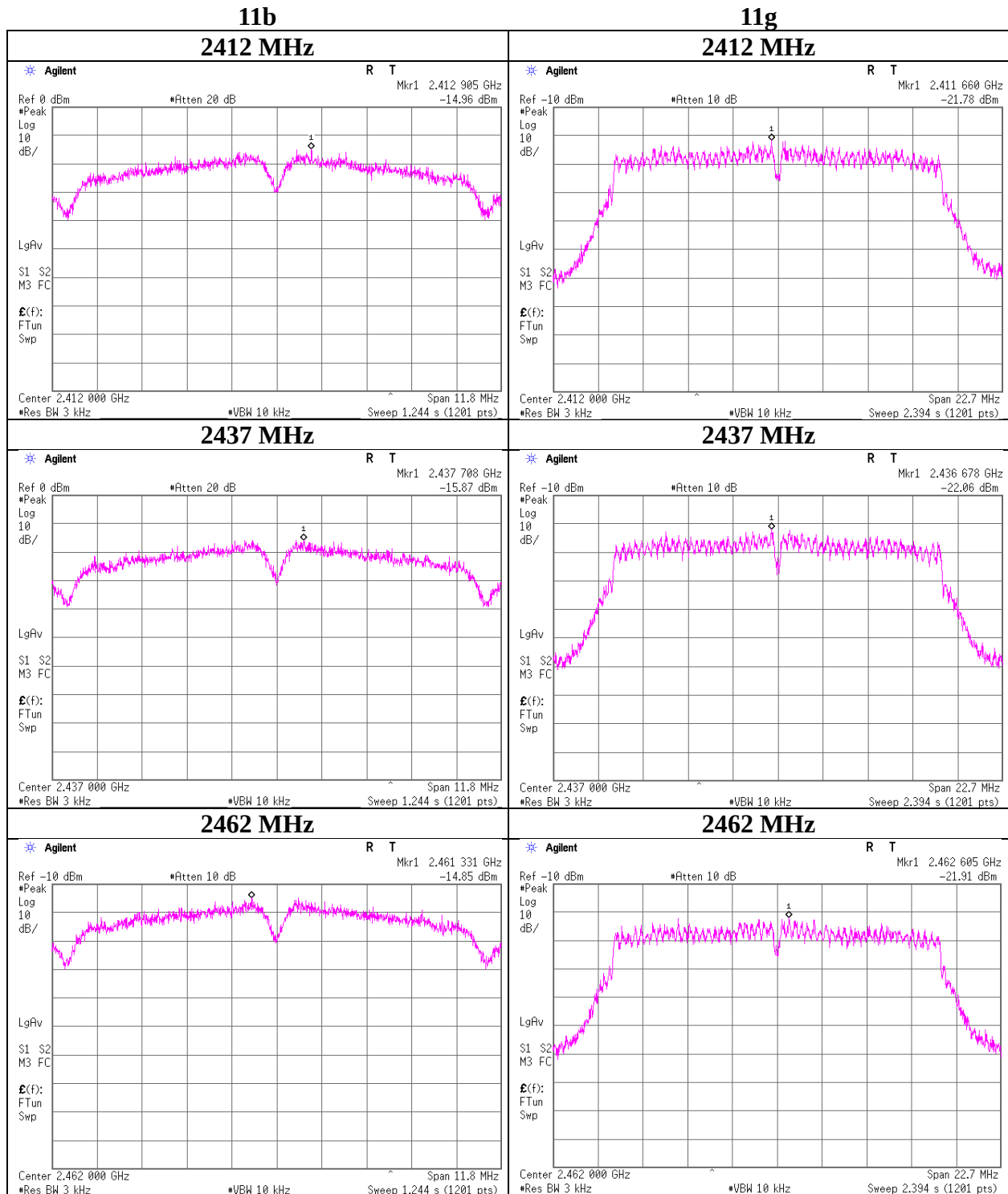
11n-20

Freq.	Reading	Cable Loss	Atten. Loss	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-23.64	1.05	10.02	-12.57	8.00	20.57
2437.00	-23.48	1.06	10.02	-12.40	8.00	20.40
2462.00	-23.72	1.07	10.02	-12.63	8.00	20.63

Sample Calculation:

Result = Reading + Cable Loss + Attenuator Loss

Power Density



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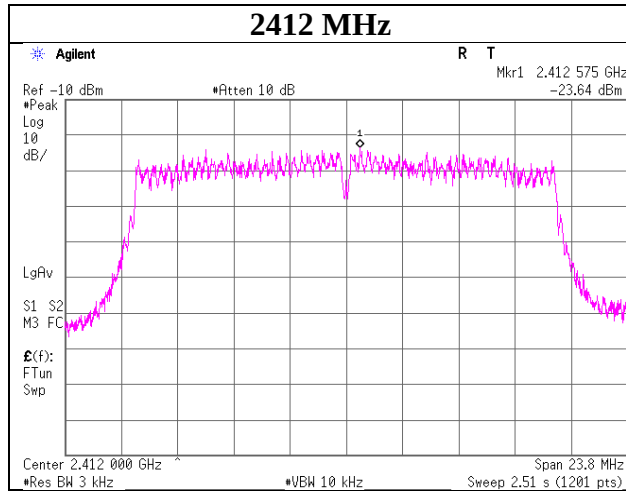
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Facsimile : +81 596 24 8124

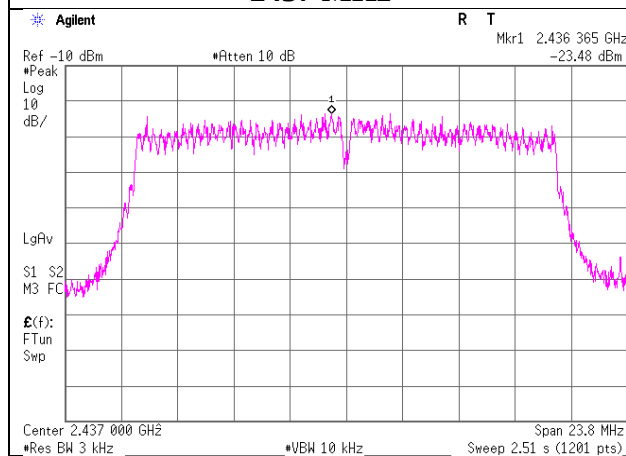
Power Density

11n-20

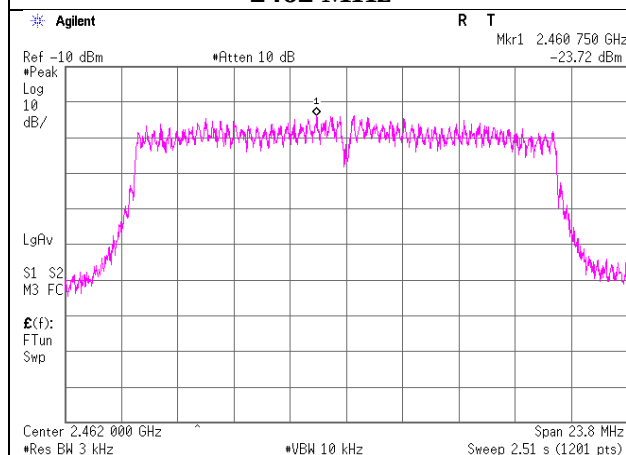
2412 MHz



2437 MHz



2462 MHz



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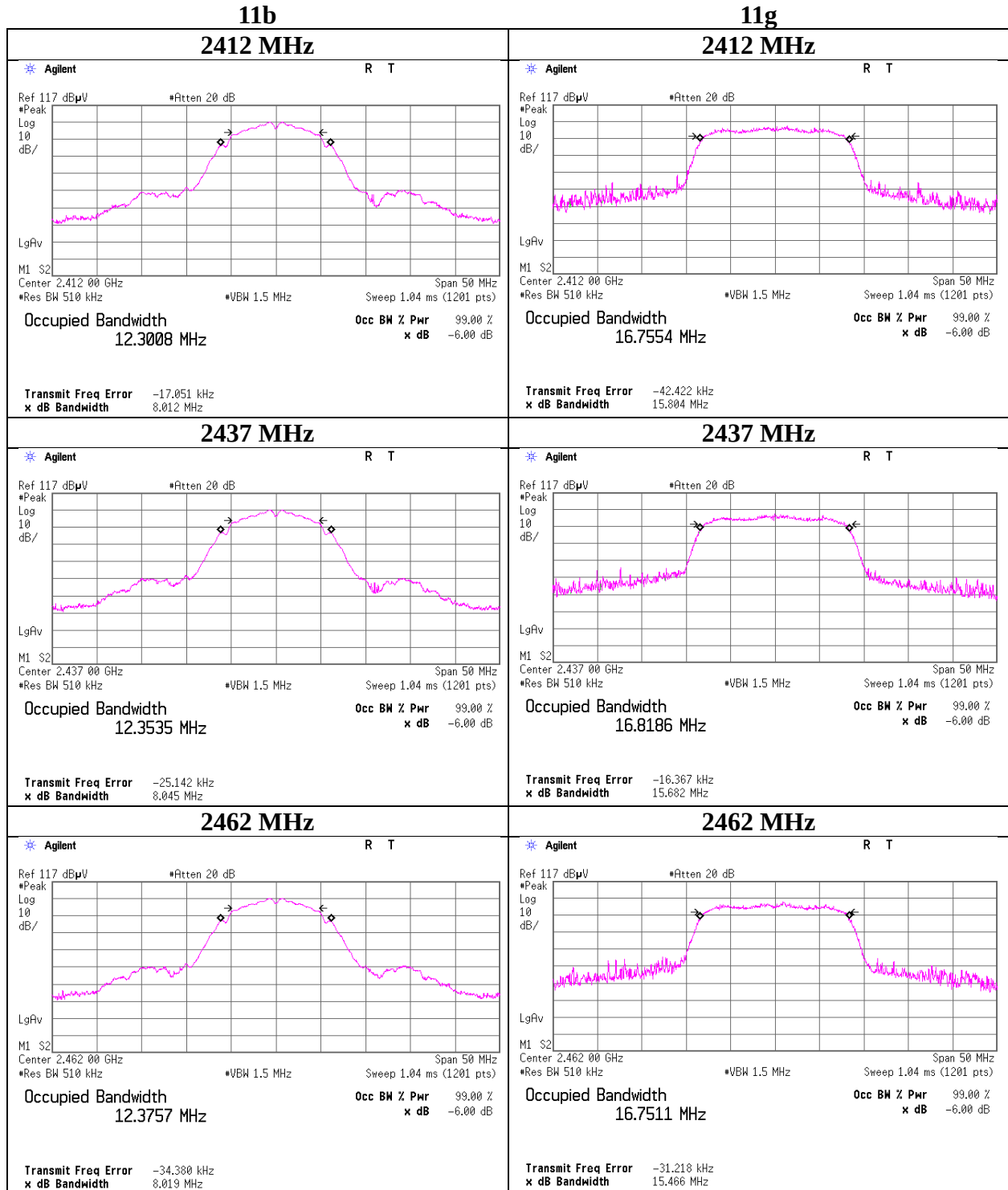
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99% Occupied Bandwidth

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	10733022H
Date	June 1, 2015
Temperature / Humidity	24 deg. C / 58 % RH
Engineer	Takumi Shimada
Mode	Tx 11b/g



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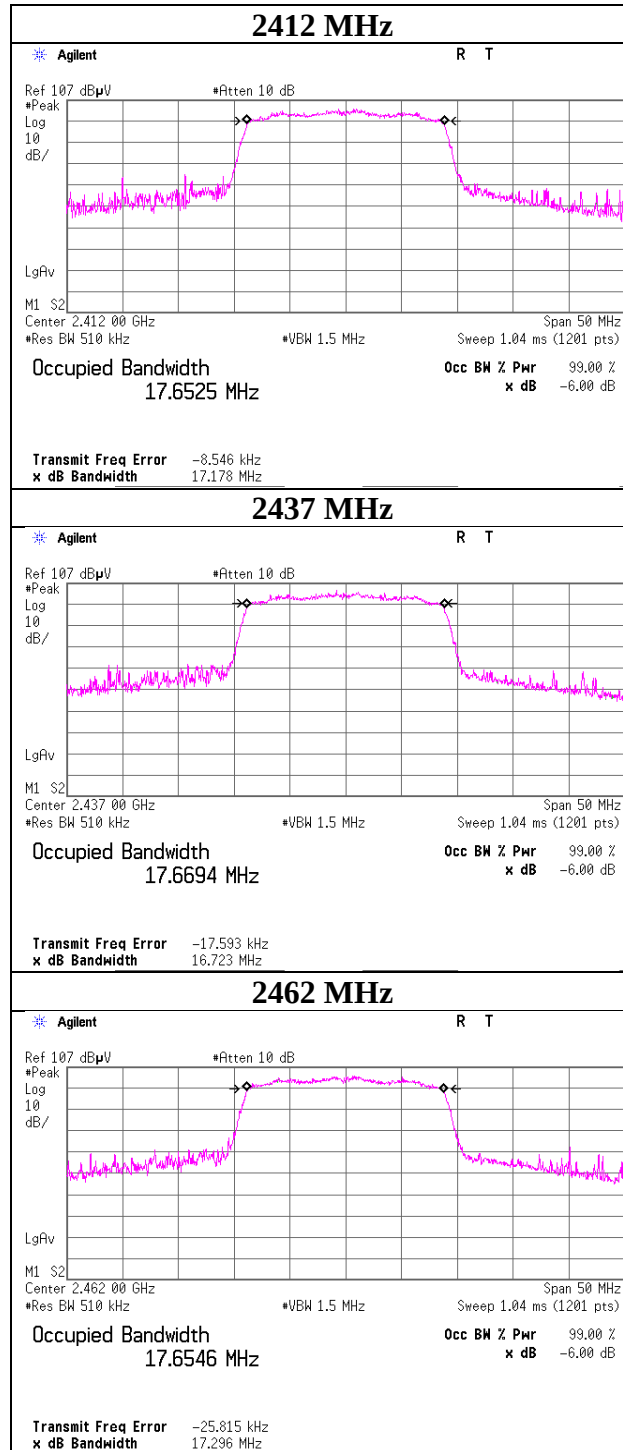
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

99% Occupied Bandwidth

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	10733022H
Date	June 1, 2015
Temperature / Humidity	24 deg. C / 58 % RH
Engineer	Takumi Shimada
Mode	Tx 11n-20

11n-20



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APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	AT	2014/10/16 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	AT	2014/10/15 * 12
MCC-45	Microwave Cable	Murata	MXGS83RK3000	-	AT	2014/07/31 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2015/03/18 * 12
MOS-34	Thermo-Hygrometer	Custom	CTH-201	3401	AT	2015/01/13 * 12
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	AT	2014/11/12 * 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	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
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-02	Horn Antenna 18-26.5GHz	EMCO	3160-09	1265	RE	2015/02/05 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2014/09/22 * 12
MSA-16	Spectrum Analyzer	Agilent	E4440A	MY46186390	RE/CE	2015/02/16 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2014/06/03 * 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
MLS-23	LISN(AMN)	Schwarzbeck	NSLK8127	8127-729	CE(EUT)	2014/07/10 * 12
MLS-24	LISN(AMN)	Schwarzbeck	NSLK8127	8127-730	CE(AE)	2014/07/10 * 12
MTA-28	Terminator	TME	CT-01	-	CE	2014/11/26 * 12
MCC-13	Coaxial Cable	Fujikura	3D-2W(12m)/5D-2 W(5m)/5D-2W(0.8 m)/5D-2W(1m)	-	CE	2015/02/06 * 12
MAT-65	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2015/01/29 * 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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