



RADIO TEST REPORT

Test Report No. : 10211033H-A-R1

Applicant : Yamaha Motor Co., Ltd.
Type of Equipment : COMMUN. CONT. UNIT COMP.
Model No. : 2KS-85800-00
FCC ID : 2ADBK93JP2KS8580000
Test regulation : FCC Part 15 Subpart C: 2014
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 report is a revised version of 10211033H-A. 10211033H-A is replaced with this report.

Date of test: February 18 to March 3, 2014

Representative test engineer:

Masatoshi Nishiguchi
Engineer
Consumer Technology Division

Approved by:

Motoya Imura
Engineer
Consumer Technology Division



NVLAP LAB CODE: 200572-0

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SECTION 1: Customer information

Company Name : Yamaha Motor Co., Ltd.
Address : 2500 Shingai, Iwata-shi, Shizuoka-ken, 438-8501 Japan
Telephone Number : +81-538-32-2110
Facsimile Number : +81-538-37-9407
Contact Person : Hideki Fujiwara

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

2.1 Identification of E.U.T.

Type of Equipment : COMMUN. CONT. UNIT COMP.
Model No. : 2KS-85800-00
Serial No. : Refer to Section 4, Clause 4.2
Rating : DC 12.0V
Receipt Date of Sample : January 14, 2014
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

General Specification

Clock frequency(ies) in the system : 25MHz
Operating temperature : -10 to +60 deg. C

Radio Specification

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

Radio Type : Transceiver
Frequency of Operation : 2412-2462MHz
Modulation : DSSS, OFDM
Power Supply (inner) : DC 3.3V
Antenna type : Chip Antenna
Antenna Gain : 1.9dBi

[GPS]

Radio Type : GPS Receiver
Frequency of Operation : 1575.42MHz
Modulation : Spread Spectrum modulation
Power Supply (inner) : DC 5.0V
Antenna type : Patch Antenna
Antenna Gain : 3dBic

* This report is applied to WLAN part.

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2014, final revised on August 15, 2014 and effective October 14, 2014

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

* The revision on August 15, 2014 does not affect the test specification applied to the EUT.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.4:2003 7. AC powerline Conducted Emission measurements ----- IC: RSS-Gen 7.2.4	FCC: Section 15.207 ----- IC: RSS-Gen 7.2.4	-	N/A	*1)
6dB Bandwidth	FCC: "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on June 5, 2014)" ----- IC: RSS-Gen 4.6.2	FCC: Section 15.247(a)(2) ----- IC: RSS-210 A8.2(a)	See data.	Complied	Conducted
Maximum Peak Output Power	FCC: "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on June 5, 2014)" ----- IC: RSS-Gen 4.8	FCC: Section 15.247(b)(3) ----- IC: RSS-210 A8.4(4)		Complied	Conducted
Power Density	FCC: "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on June 5, 2014)" ----- IC: -	FCC: Section 15.247 (e) ----- IC: RSS-210 A8.2(b)		Complied	Conducted
Spurious Emission Restricted Band Edges	FCC: "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on June 5, 2014)" ----- IC: RSS-Gen 4.9	FCC: Section15.247(d) ----- IC: RSS-210 A8.5 RSS-Gen 7.2.3	2.1dB 2483.500MHz, AV, Hori.	Complied	Conducted/ Radiated

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

*1) The test is not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line.

* In case any questions arise about test procedure, ANSI C63.4: 2003 is also referred.

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FCC 15.31 (e)

The EUT is a battery-operated device and test was performed with the full-charged battery 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.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	IC: RSS-Gen 4.6.1	IC: RSS-Gen 4.6.1	N/A	-	Conducted

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

3.4 Uncertainty

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

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

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

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

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

Radiated emission test(3m)

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

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	-	8.8 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.

Mode	Remarks*
IEEE 802.11b (11b)	2Mbps, PN9
IEEE 802.11g (11g)	9Mbps, PN9
IEEE 802.11n SISO 20MHz BW (11n-20)	MCS 1, 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 Setting: Same as production model Software: RADITS_11n Version 1.5.0.2 *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.	

*The details of Operating mode(s)

Test Item	Operating Mode	Tested frequency
Spurious Emission (Radiated)	11b Tx	2412MHz
	11g Tx	2437MHz 2462MHz

	11n-20 Tx *1)	2412MHz 2462MHz
Spurious Emission (Conducted)	11g Tx *2)	2412MHz
6dB Bandwidth	11b Tx	2412MHz
Maximum Peak Output Power	11g Tx	2437MHz
Power Density	11n-20 Tx	2462MHz
99% Occupied Bandwidth		

*1) Since 11g had the higher peak output power than 11n-20, band edge test was performed on 11n-20 only.

*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 higher peak output power.

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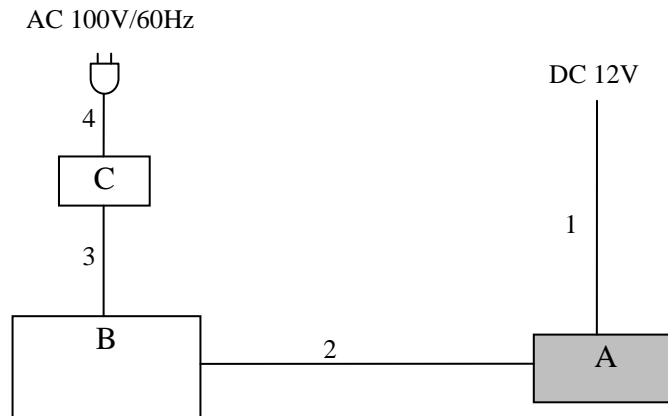
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4.2 Configuration and peripherals



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

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remark
A	COMMUN. CONT. UNIT COMP.	2KS-85800-00	1312010022	Yamaha Motor Co., Ltd.	EUT
B	Laptop PC	FMVNS8BC	R8Z03059	FUJITSU	-
C	AC Adapter	ADP-80NBA	08Z15123A	FUJITSU	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC Cable	1.5	Unshielded	Unshielded	-
2	Signal Cable	0.6	Shielded	Shielded	-
3	DC Cable	1.8	Unshielded	Unshielded	-
4	AC Cable	1.8	Unshielded	Unshielded	-

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SECTION 5: Radiated Spurious Emission

Test Procedure

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

EUT was placed on a urethane platform of nominal size, 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 5 of RSS-Gen 7.2.5(IC) and outside the restricted band of FCC15.205 / Table 3 of RSS-Gen 7.2.2 (IC).

Frequency	Below 1GHz	Above 1GHz		20dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV	PK
IF Bandwidth	BW 120kHz(T/R)	RBW: 1MHz VBW: 3MHz	Average Power Method: Alternative 1 *1) RBW: 1MHz VBW: 3MHz Detector: Power Averaging (RMS) Trace: Free Run Duty factor was added to the results.	RBW: 100kHz VBW: 300kHz (S/A)
Test Distance	3m	3m (below 10GHz), 1m *2) (above 10GHz)		3m (below 10GHz), 1m *2) (above 10GHz)

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

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

The test was made on EUT at the normal use position.

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

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

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

*1) The measurement was performed with Max Hold since the duty cycle was not 100%.
*2) Section 10.2 Method PKPSD (peak PSD) of "558074 D01 DTS Meas Guidance v03r02 (Issued on June 5, 2014)".
*3) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.
Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.(9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=9.1kHz)

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

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Data of EMI test

6dB Bandwidth

Test place Ise EMC Lab. No.11 Measurement Room
Report No. 10211033H
Date 02/18/2014
Temperature/ Humidity 26 deg. C / 34% RH
Engineer Masatoshi Nishiguchi
Mode Tx

11b

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	11.871	>500
2437	11.366	>500
2462	12.559	>500

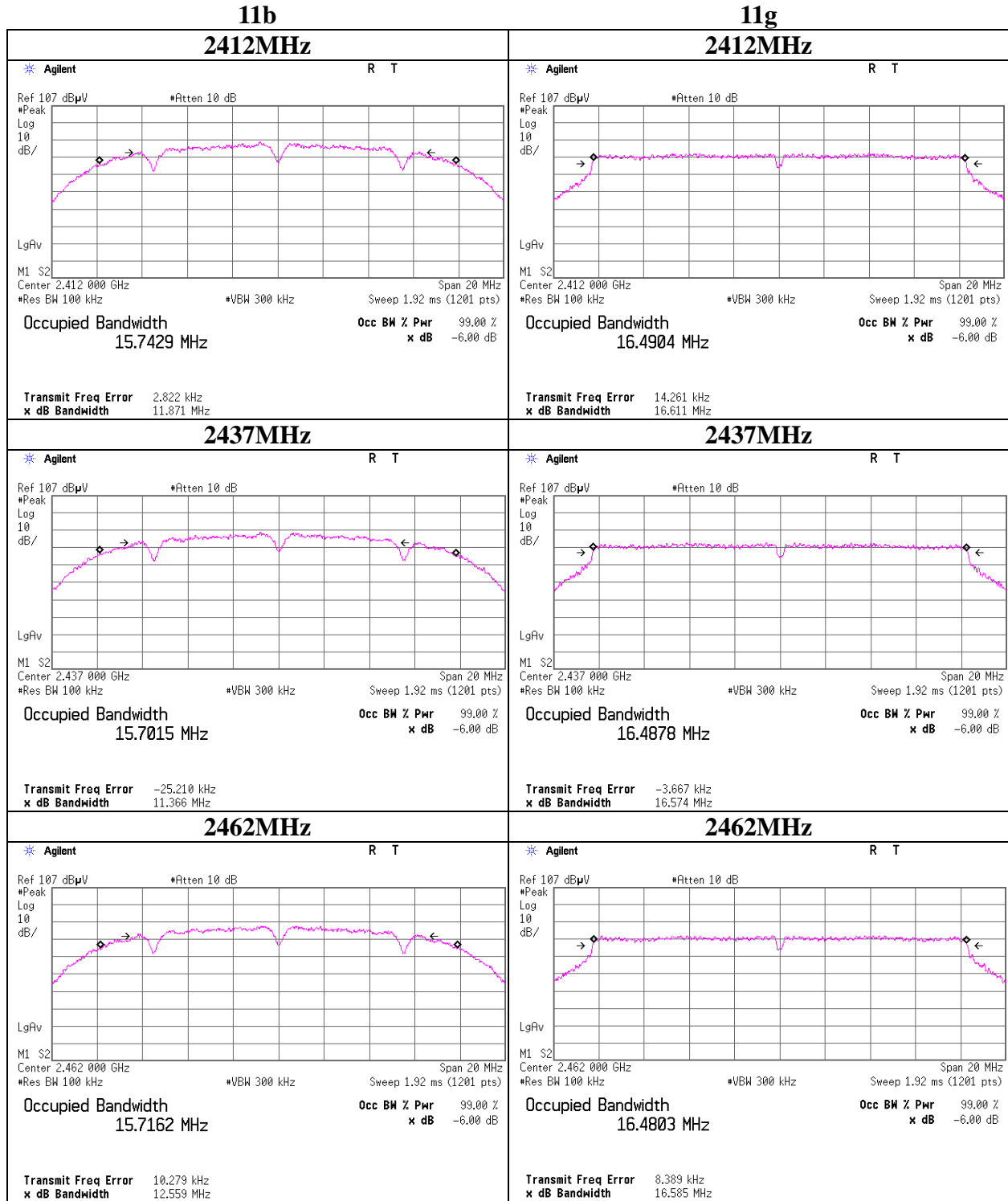
11g

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	16.611	>500
2437	16.574	>500
2462	16.585	>500

11n-20

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	17.767	>500
2437	17.736	>500
2462	17.751	>500

6dB Bandwidth



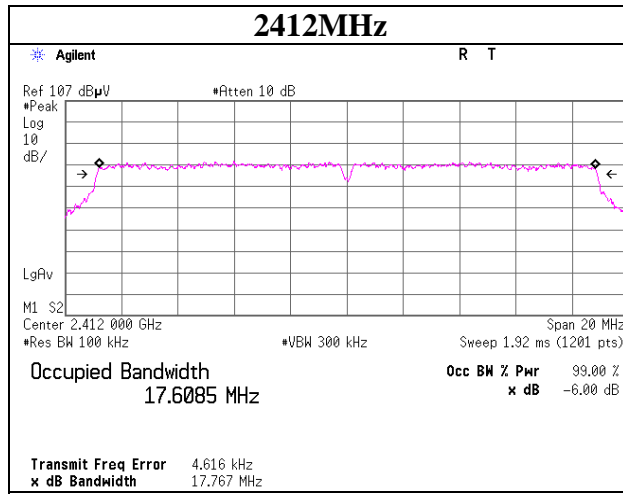
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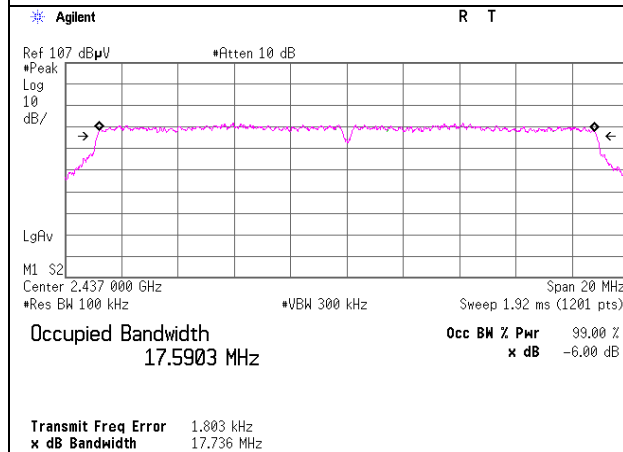
6dB Bandwidth

11n-20

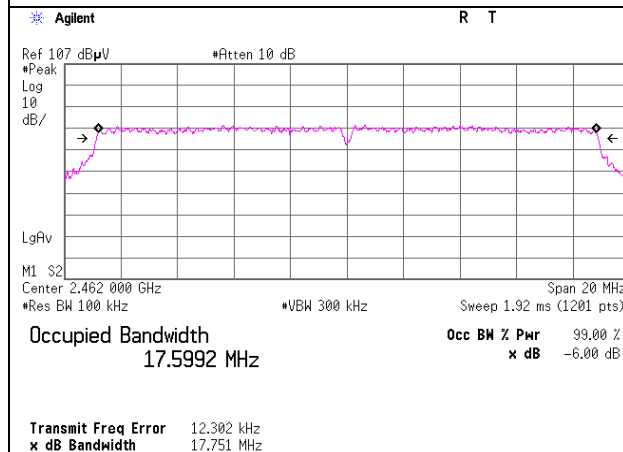
2412MHz



2437MHz



2462MHz



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Maximum Peak Output Power

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10211033H
Date	02/18/2014
Temperature/ Humidity	26 deg. C / 34% RH
Engineer	Masatoshi Nishiguchi
Mode	11b / 11g Tx

11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	-9.13	1.63	10.01	2.51	1.78	30.00	1000	27.49
2437	-9.04	1.66	10.01	2.63	1.83	30.00	1000	27.37
2462	-9.58	1.64	10.01	2.07	1.61	30.00	1000	27.93

11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	-4.26	1.63	10.01	7.38	5.47	30.00	1000	22.62
2437	-4.14	1.66	10.01	7.53	5.66	30.00	1000	22.47
2462	-4.60	1.64	10.01	7.05	5.07	30.00	1000	22.95

Sample Calculation:

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

11b , 2437MHz

Rate [Mbps]	Reading [dBm]	Remark
1	-9.10	
2	-9.04	*
5.5	-9.25	
11	-9.06	

11g , 2437MHz

Rate [Mbps]	Reading [dBm]	Remark
6	-4.62	
9	-4.14	*
12	-4.45	
18	-4.37	
24	-4.34	
36	-4.47	
48	-4.46	
54	-4.27	

*: Worst Rate

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

Maximum Peak Output Power

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10211033H
Date	02/18/2014
Temperature/ Humidity	26 deg. C / 34% RH
Engineer	Masatoshi Nishiguchi
Mode	11n-20 Tx

11n-20

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	-5.45	1.63	10.01	6.19	4.16	30.00	1000	23.81
2437	-5.19	1.66	10.01	6.48	4.44	30.00	1000	23.52
2462	-5.36	1.64	10.01	6.29	4.25	30.00	1000	23.71

Sample Calculation:

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

11n-20 , 2437MHz

Rate [MCS]	Reading [dBm]	Remark
0	-5.27	
1	-5.19	*
2	-5.56	
3	-5.62	
4	-5.41	
5	-5.45	
6	-5.38	
7	-5.43	

*: Worst Rate

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

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Average Output Power

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10211033H
Date	02/18/2014
Temperature/ Humidity	26 deg. C / 34% RH
Engineer	Masatoshi Nishiguchi
Mode	11b / 11g / n-20 Tx

11b 2Mbps

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	-11.52	1.63	10.01	0.12	1.03	30.00	1000	29.88
2437	-11.36	1.66	10.01	0.31	1.07	30.00	1000	29.69
2462	-11.91	1.64	10.01	-0.26	0.94	30.00	1000	30.26

11g 9Mbps

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	-13.74	1.63	10.01	-2.10	0.62	30.00	1000	32.10
2437	-13.43	1.66	10.01	-1.76	0.67	30.00	1000	31.76
2462	-13.93	1.64	10.01	-2.28	0.59	30.00	1000	32.28

11n-20 MCS1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	-14.63	1.63	10.01	-2.99	0.50	30.00	1000	32.99
2437	-14.77	1.66	10.01	-3.10	0.49	30.00	1000	33.10
2462	-14.76	1.64	10.01	-3.11	0.49	30.00	1000	33.11

Sample Calculation:

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

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10211033H
Date : 02/24/2014
Temperature/ Humidity : 24 deg. C /30% RH
Engineer : Keisuke Kawamura
(Above 1GHz)
Mode : 11b Tx 2412MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	54.3	26.8	3.0	34.7	49.4	73.9	24.5	
Hori	4824.000	PK	45.3	30.7	5.4	33.9	47.5	73.9	26.4	
Hori	7236.000	PK	43.4	35.6	6.5	33.8	51.7	73.9	22.2	
Hori	9648.000	PK	44.1	38.2	7.2	34.4	55.1	73.9	18.8	
Hori	2390.000	AV	47.7	26.8	3.0	34.7	42.8	53.9	11.1	
Hori	4824.000	AV	37.4	30.7	5.4	33.9	39.6	53.9	14.3	
Hori	7236.000	AV	34.4	35.6	6.5	33.8	42.7	53.9	11.2	
Hori	9648.000	AV	34.8	38.2	7.2	34.4	45.8	53.9	8.1	
Vert	2390.000	PK	49.9	26.8	3.0	34.7	45.0	73.9	28.9	
Vert	4824.000	PK	49.0	30.7	5.4	33.9	51.2	73.9	22.7	
Vert	7236.000	PK	42.7	35.6	6.5	33.8	51.0	73.9	22.9	
Vert	9648.000	PK	43.6	38.2	7.2	34.4	54.6	73.9	19.3	
Vert	2390.000	AV	42.9	26.8	3.0	34.7	38.0	53.9	15.9	
Vert	4824.000	AV	42.9	30.7	5.4	33.9	45.1	53.9	8.8	
Vert	7236.000	AV	34.1	35.6	6.5	33.8	42.4	53.9	11.5	
Vert	9648.000	AV	35.9	38.2	7.2	34.4	46.9	53.9	7.0	

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

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

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

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	107.1	26.8	3.0	34.7	102.2	-	-	Carrier
Hori	2400.000	PK	58.6	26.8	3.0	34.7	53.7	82.2	28.5	
Hori	2397.033	PK	68.7	26.8	3.0	34.7	63.8	82.2	18.4	
Vert	2412.000	PK	102.9	26.8	3.0	34.7	98.0	-	-	Carrier
Vert	2400.000	PK	53.3	26.8	3.0	34.7	48.4	82.2	33.8	
Vert	2397.033	PK	62.0	26.8	3.0	34.7	57.1	82.2	25.1	

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.2 Semi Anechoic Chamber
 Report No. : 10211033H
 Date : 02/24/2014
 Temperature/ Humidity : 24 deg. C /30% RH
 Engineer : Keisuke Kawamura
 (Above 1GHz)
 Mode : 11b Tx 2437MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4874.000	PK	45.7	30.8	5.4	33.9	48.0	73.9	25.9	
Hori	7311.000	PK	43.4	35.7	6.6	33.8	51.9	73.9	22.0	
Hori	9748.000	PK	44.1	38.4	7.3	34.5	55.3	73.9	18.6	
Hori	4874.000	AV	37.4	30.8	5.4	33.9	39.7	53.9	14.2	
Hori	7311.000	AV	34.4	35.7	6.6	33.8	42.9	53.9	11.0	
Hori	9748.000	AV	34.8	38.4	7.3	34.5	46.0	53.9	7.9	
Vert	4874.000	PK	49.2	30.8	5.4	33.9	51.5	73.9	22.4	
Vert	7311.000	PK	42.7	35.7	6.6	33.8	51.2	73.9	22.7	
Vert	9748.000	PK	44.1	38.4	7.3	34.5	55.3	73.9	18.6	
Vert	4874.000	AV	43.2	30.8	5.4	33.9	45.5	53.9	8.4	
Vert	7311.000	AV	34.1	35.7	6.6	33.8	42.6	53.9	11.3	
Vert	9748.000	AV	35.1	38.4	7.3	34.5	46.3	53.9	7.6	

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

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

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

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10211033H
Date : 02/24/2014
Temperature/ Humidity : 24 deg. C /30% RH
Engineer : Keisuke Kawamura
(Above 1GHz)
Mode : 11b Tx 2462MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	56.7	26.7	3.1	34.7	51.8	73.9	22.1	
Hori	4924.000	PK	46.5	31.0	5.4	33.9	49.0	73.9	24.9	
Hori	7386.000	PK	43.4	35.8	6.6	33.8	52.0	73.9	21.9	
Hori	9848.000	PK	44.1	38.6	7.3	34.5	55.5	73.9	18.4	
Hori	2483.500	AV	51.5	26.7	3.1	34.7	46.6	53.9	7.3	
Hori	4924.000	AV	38.0	31.0	5.4	33.9	40.5	53.9	13.4	
Hori	7386.000	AV	34.4	35.8	6.6	33.8	43.0	53.9	10.9	
Hori	9848.000	AV	34.8	38.6	7.3	34.5	46.2	53.9	7.7	
Vert	2483.500	PK	52.8	26.7	3.1	34.7	47.9	73.9	26.0	
Vert	4924.000	PK	48.9	31.0	5.4	33.9	51.4	73.9	22.5	
Vert	7386.000	PK	42.7	35.8	6.6	33.8	51.3	73.9	22.6	
Vert	9848.000	PK	44.1	38.6	7.3	34.5	55.5	73.9	18.4	
Vert	2483.500	AV	46.7	26.7	3.1	34.7	41.8	53.9	12.1	
Vert	4924.000	AV	43.7	31.0	5.4	33.9	46.2	53.9	7.7	
Vert	7386.000	AV	34.1	35.8	6.6	33.8	42.7	53.9	11.2	
Vert	9848.000	AV	35.1	38.6	7.3	34.5	46.5	53.9	7.4	

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

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

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

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	2462.000	PK	108.7	26.7	3.1	34.7	103.8	-	-	Carrier
Hori	2477.133	PK	70.8	26.7	3.1	34.7	65.9	83.8	17.9	
Vert	2462.000	PK	105.4	26.7	3.1	34.7	100.5	-	-	Carrier
Vert	2477.133	PK	65.5	26.7	3.1	34.7	60.6	83.8	23.2	

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. : 10211033H
Date : 03/03/2014
Temperature/ Humidity : 24 deg. C / 36% RH
Engineer : Masatoshi Nishiguchi
(Above 1GHz)
Mode : 11g Tx 2412MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	61.9	28.3	3.2	32.4	61.0	73.9	12.9	
Hori	4824.000	PK	42.1	32.3	5.4	31.6	48.2	73.9	25.7	
Hori	7236.000	PK	44.1	36.7	6.6	32.7	54.7	73.9	19.2	
Hori	9648.000	PK	42.7	38.8	7.3	33.3	55.5	73.9	18.4	
Hori	2390.000	AV	49.8	28.3	3.2	32.4	48.9	53.9	5.0	
Hori	4824.000	AV	37.0	32.3	5.4	31.6	43.1	53.9	10.8	
Hori	7236.000	AV	39.4	36.7	6.6	32.7	50.0	53.9	3.9	
Hori	9648.000	AV	37.6	38.8	7.3	33.3	50.4	53.9	3.5	
Vert	2390.000	PK	66.2	28.3	3.2	32.4	65.3	73.9	8.6	
Vert	4824.000	PK	44.2	32.3	5.4	31.6	50.3	73.9	23.6	
Vert	7236.000	PK	46.5	36.7	6.6	32.7	57.1	73.9	16.8	
Vert	9648.000	PK	44.8	38.8	7.3	33.3	57.6	73.9	16.3	
Vert	2390.000	AV	48.2	28.3	3.2	32.4	47.3	53.9	6.6	
Vert	4824.000	AV	36.9	32.3	5.4	31.6	43.0	53.9	10.9	
Vert	7236.000	AV	38.9	36.7	6.6	32.7	49.5	53.9	4.4	
Vert	9648.000	AV	37.8	38.8	7.3	33.3	50.6	53.9	3.3	

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

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

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

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	97.4	28.4	3.2	32.4	96.6	-	-	Carrier
Hori	2400.000	PK	66.1	28.4	3.2	32.4	65.3	76.6	11.3	
Vert	2412.000	PK	95.2	28.4	3.2	32.4	94.4	-	-	Carrier
Vert	2400.000	PK	63.2	28.4	3.2	32.4	62.4	74.4	12.0	

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. : 10211033H
Date : 03/03/2014
Temperature/ Humidity : 24 deg. C / 36% RH
Engineer : Masatoshi Nishiguchi
(Below/Above 1GHz)
Mode : 11g Tx 2437MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	45.158	QP	30.3	12.5	7.4	32.2	18.0	40.0	22.0	
Hori	119.997	QP	43.5	13.0	8.3	31.9	32.9	43.5	10.6	
Hori	191.999	QP	43.9	16.4	9.0	31.9	37.4	43.5	6.1	
Hori	215.997	QP	44.1	16.8	9.2	31.9	38.2	43.5	5.3	
Hori	391.255	QP	39.1	17.4	10.5	32.0	35.0	46.0	11.0	
Hori	664.354	QP	29.2	21.5	12.1	32.2	30.6	46.0	15.4	
Hori	4874.000	PK	38.5	32.4	5.4	31.6	44.7	73.9	29.2	
Hori	7311.000	PK	39.5	36.6	6.6	32.7	50.0	73.9	23.9	
Hori	9748.000	PK	36.6	38.6	7.3	33.4	49.1	73.9	24.8	
Hori	4874.000	AV	31.8	32.4	5.4	31.6	38.0	53.9	15.9	
Hori	7311.000	AV	33.3	36.6	6.6	32.7	43.8	53.9	10.1	
Hori	9748.000	AV	32.2	38.6	7.3	33.4	44.7	53.9	9.2	
Vert	45.158	QP	49.1	12.5	7.4	32.2	36.8	40.0	3.2	
Vert	119.997	QP	42.4	13.0	8.3	31.9	31.8	43.5	11.7	
Vert	191.999	QP	43.2	16.4	9.0	31.9	36.7	43.5	6.8	
Vert	215.997	QP	41.4	16.8	9.2	31.9	35.5	43.5	8.0	
Vert	391.255	QP	40.9	17.4	10.5	32.0	36.8	46.0	9.2	
Vert	664.354	QP	34.4	21.5	12.1	32.2	35.8	46.0	10.2	
Vert	4874.000	PK	37.9	32.4	5.4	31.6	44.1	73.9	29.8	
Vert	7311.000	PK	39.3	36.6	6.6	32.7	49.8	73.9	24.1	
Vert	9748.000	PK	38.1	38.6	7.3	33.4	50.6	73.9	23.3	
Vert	4874.000	AV	31.6	32.4	5.4	31.6	37.8	53.9	16.1	
Vert	7311.000	AV	33.0	36.6	6.6	32.7	43.5	53.9	10.4	
Vert	9748.000	AV	32.2	38.6	7.3	33.4	44.7	53.9	9.2	

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

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

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

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No. : 10211033H
Date : 03/03/2014
Temperature/ Humidity : 24 deg. C / 36% RH
Engineer : Masatoshi Nishiguchi
(Above 1GHz)
Mode : 11g Tx 2462MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	60.3	28.7	3.3	32.4	59.9	73.9	14.0	
Hori	4924.000	PK	41.0	32.6	5.5	31.6	47.5	73.9	26.4	
Hori	7386.000	PK	40.9	36.5	6.6	32.8	51.2	73.9	22.7	
Hori	9848.000	PK	41.3	38.4	7.4	33.4	53.7	73.9	20.2	
Hori	2483.500	AV	52.2	28.7	3.3	32.4	51.8	53.9	2.1	
Hori	4924.000	AV	31.8	32.6	5.5	31.6	38.3	53.9	15.6	
Hori	7386.000	AV	32.9	36.5	6.6	32.8	43.2	53.9	10.7	
Hori	9848.000	AV	32.2	38.4	7.4	33.4	44.6	53.9	9.3	
Vert	2483.500	PK	60.4	28.7	3.3	32.4	60.0	73.9	13.9	
Vert	4924.000	PK	39.0	32.6	5.5	31.6	45.5	73.9	28.4	
Vert	7386.000	PK	42.0	36.5	6.6	32.8	52.3	73.9	21.6	
Vert	9848.000	PK	41.1	38.4	7.4	33.4	53.5	73.9	20.4	
Vert	2483.500	AV	51.8	28.7	3.3	32.4	51.4	53.9	2.5	
Vert	4924.000	AV	31.7	32.6	5.5	31.6	38.2	53.9	15.7	
Vert	7386.000	AV	32.9	36.5	6.6	32.8	43.2	53.9	10.7	
Vert	9848.000	AV	33.0	38.4	7.4	33.4	45.4	53.9	8.5	

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

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

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

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No. : 10211033H
Date : 03/03/2014
Temperature/ Humidity : 24 deg. C / 36% RH
Engineer : Masatoshi Nishiguchi
(Above 1GHz)
Mode : 11n-20 Tx 2412MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	61.5	28.3	3.2	32.4	60.6	73.9	13.3	
Hori	2390.000	AV	50.6	28.3	3.2	32.4	49.7	53.9	4.2	
Vert	2390.000	PK	58.0	28.3	3.2	32.4	57.1	73.9	16.8	
Vert	2390.000	AV	48.0	28.3	3.2	32.4	47.1	53.9	6.8	

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

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

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

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	97.6	28.4	3.2	32.4	96.8	-	-	Carrier
Hori	2400.000	PK	65.5	28.4	3.2	32.4	64.7	76.8	12.1	
Vert	2412.000	PK	94.3	28.4	3.2	32.4	93.5	-	-	Carrier
Vert	2400.000	PK	63.0	28.4	3.2	32.4	62.2	73.5	11.3	

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. : 10211033H
 Date : 03/03/2014
 Temperature/ Humidity : 24 deg. C / 36% RH
 Engineer : Masatoshi Nishiguchi
 (Above 1GHz)
 Mode : 11n-20 Tx 2462MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	62.0	28.7	3.3	32.4	61.6	73.9	12.3	
Hori	2483.500	AV	51.0	28.7	3.3	32.4	50.6	53.9	3.3	
Vert	2483.500	PK	59.4	28.7	3.3	32.4	59.0	73.9	14.9	
Vert	2483.500	AV	50.1	28.7	3.3	32.4	49.7	53.9	4.2	

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

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

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

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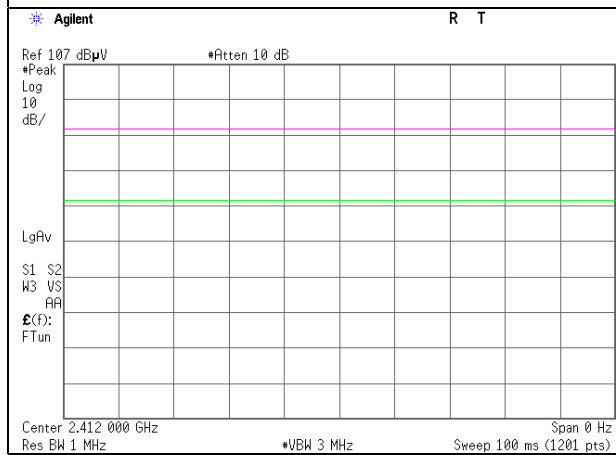
Facsimile : +81 596 24 8124

Burst rate confirmation

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10211033H
Date	02/18/2014
Temperature/ Humidity	26 deg. C / 34% RH
Engineer	Masatoshi Nishiguchi
Mode	Tx

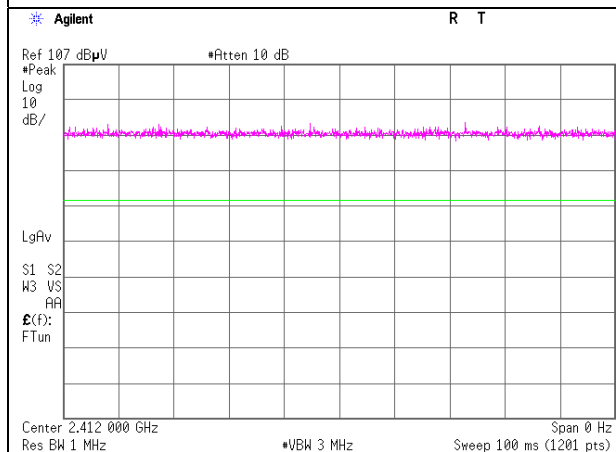
11b 2Mbps

Tx on / (Tx on + Tx off) =	1.000
Tx on / (Tx on + Tx off) * 100 =	100.0 %
Duty factor = 10 * log (100 / 100) =	0.00 dB



11g 9Mbps

Tx on / (Tx on + Tx off) =	1.000
Tx on / (Tx on + Tx off) * 100 =	100.0 %
Duty factor = 10 * log (100 / 100) =	0.00 dB



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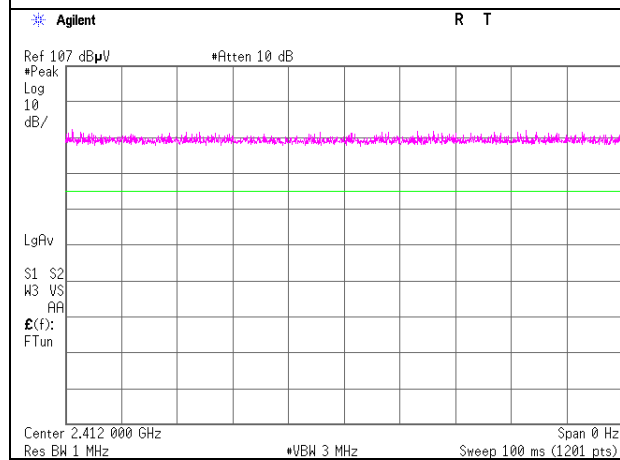
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Burst rate confirmation

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10211033H
Date	02/18/2014
Temperature/ Humidity	26 deg. C / 34% RH
Engineer	Masatoshi Nishiguchi
Mode	Tx

11n-20 MCS1

Tx on / (Tx on + Tx off) =	1.000
Tx on / (Tx on + Tx off) * 100 =	100.0 %
Duty factor = 10 * log (100 / 100) =	0.00 dB



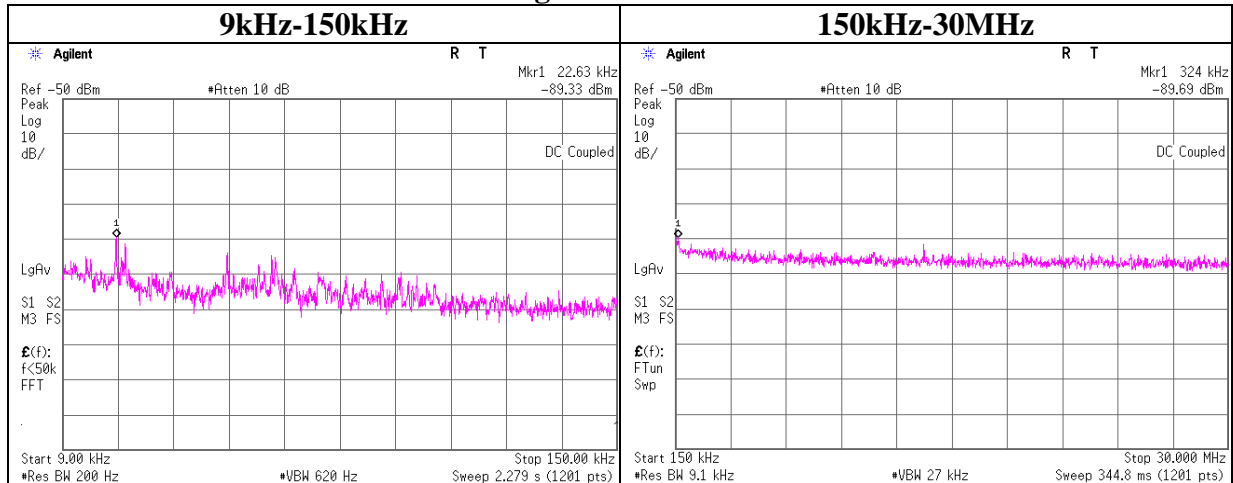
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Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10211033H
Date	02/18/2014
Temperature/ Humidity	26 deg. C / 34% RH
Engineer	Masatoshi Nishiguchi
Mode	Tx

11g Tx 2437MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator [dB]	Antenna Gain [dBi]	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]
22.63	-89.33	0.44	9.9	1.9	-77.1	300.0	6.0	-15.9	40.5
324.00	-89.69	0.81	9.9	1.9	-77.1	300.0	6.0	-15.8	37.4

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

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Power Density

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 10211033H
Date : 02/18/2014
Temperature/ Humidity : 26 deg. C / 34% RH
Engineer : Masatoshi Nishiguchi
Mode : 11b / 11g Tx

11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-35.19	1.63	10.01	-23.55	8.00	31.55
2437.00	-35.18	1.66	10.01	-23.51	8.00	31.51
2462.00	-35.93	1.64	10.01	-24.28	8.00	32.28

11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-39.12	1.63	10.01	-27.48	8.00	35.48
2437.00	-37.57	1.66	10.01	-25.90	8.00	33.90
2462.00	-39.37	1.64	10.01	-27.72	8.00	35.72

Sample Calculation:

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

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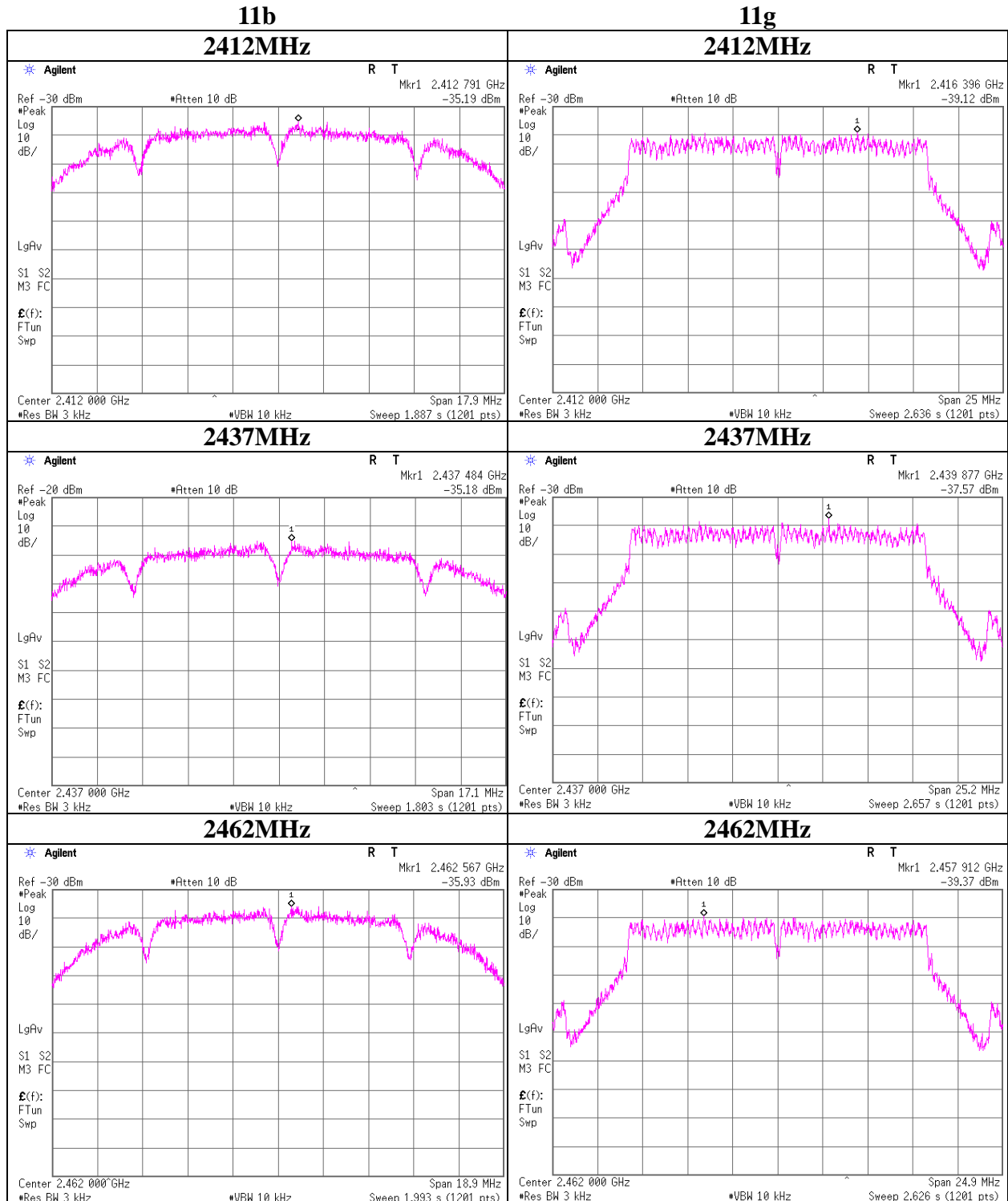
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Power Density



Power Density

Test place Ise EMC Lab. No.11 Measurement Room
Report No. 10211033H
Date 02/18/2014
Temperature/ Humidity 26 deg. C / 34% RH
Engineer Masatoshi Nishiguchi
Mode 11n-20 Tx

11n-20

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-40.98	0.95	10.01	-30.02	8.00	38.02
2437.00	-39.64	0.94	10.01	-28.69	8.00	36.69
2462.00	-39.95	0.96	10.01	-28.98	8.00	36.98

Sample Calculation:

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

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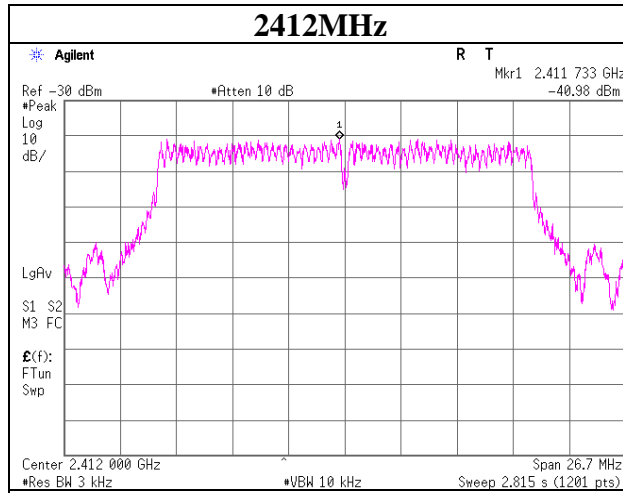
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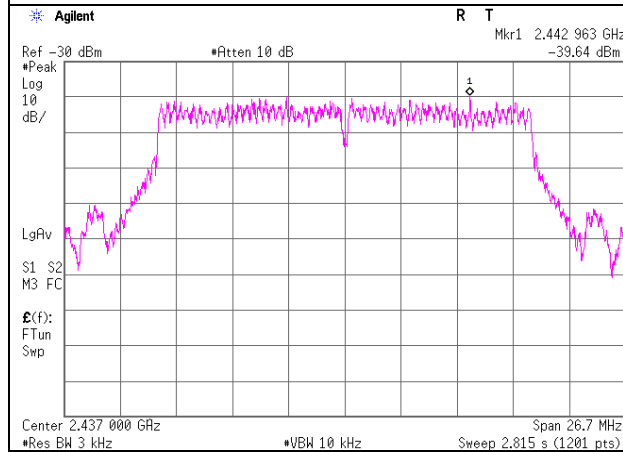
Power Density

11n-20

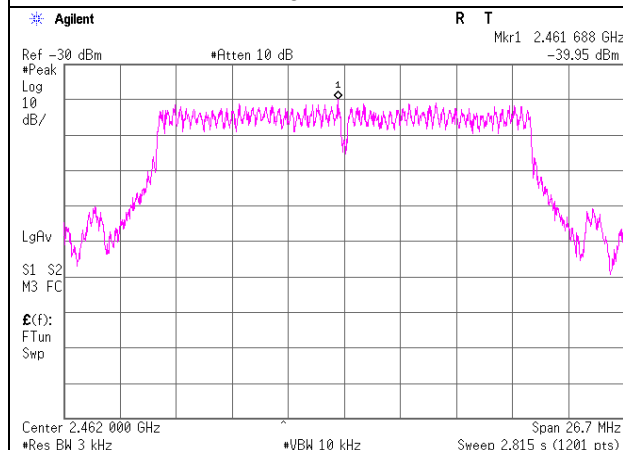
2412MHz



2437MHz



2462MHz



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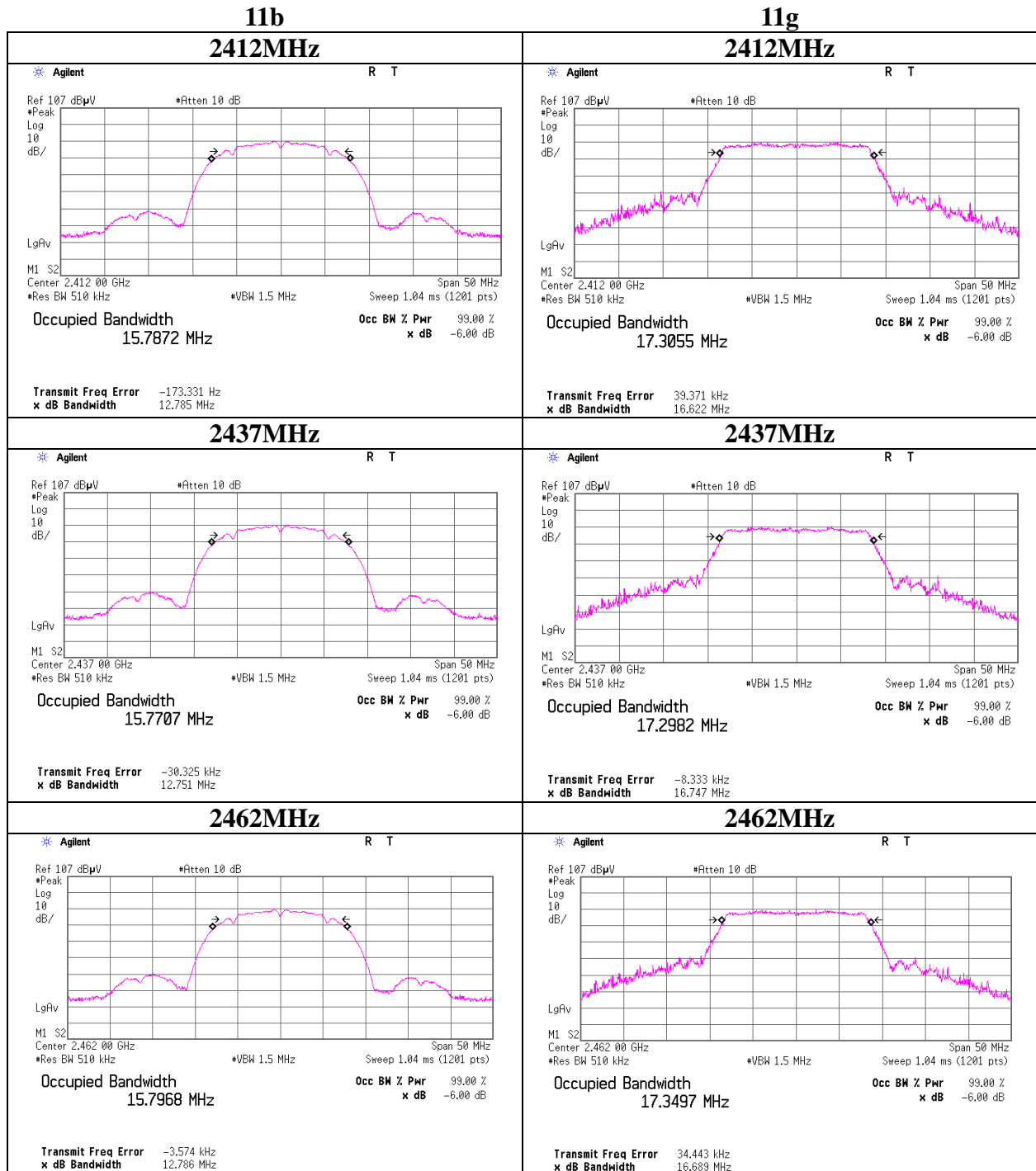
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99% Occupied Bandwidth

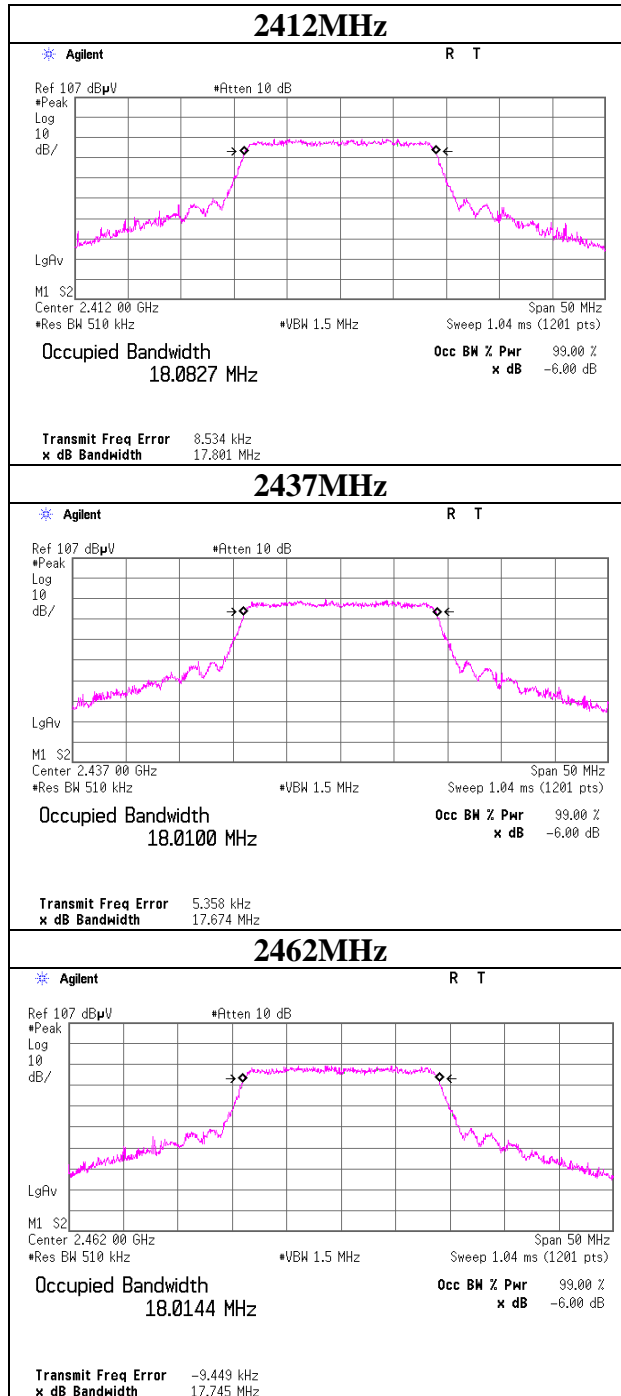
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10211033H
Date	02/18/2014
Temperature/ Humidity	26 deg. C / 34% RH
Engineer	Masatoshi Nishiguchi
Mode	11b / 11g Tx



99% Occupied Bandwidth

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10211033H
Date	02/18/2014
Temperature/ Humidity	26 deg. C / 34% RH
Engineer	Masatoshi Nishiguchi
Mode	11n-20 Tx

11n-20



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APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MRENT-114	Spectrum Analyzer	Agilent	E4440A	MY46187105	AT/RE	2013/11/11 * 12
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2013/10/21 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2013/10/21 * 12
MCC-66	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28636/2	AT	2013/04/17 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2013/03/21 * 12
MCC-64	Coaxial Cable	UL Japan	-	-	AT	2013/03/22 * 12
MAT-10	Attenuator(10dB)	Weinschel Corp	2	BL1173	AT	2013/11/26 * 12
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2013/12/17 * 12
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2013/06/30 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2014/02/20 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-13	Spectrum Analyzer	Agilent	E4440A	MY46185823	RE	2013/06/14 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2014/02/21 * 12
MCC-166	Microwave Cable	Junkosha	MWX221	1303S120(1m) / 1311S167(5m)	RE	2013/11/27 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2014/01/21 * 12
MHF-26	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	002	RE	2013/09/01 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2014/02/28 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	1501	RE	2014/02/20 * 12
MJM-09	Measure	KDS	E19-55	-	RE	-
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	100084	RE	2013/11/12 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2013/11/24 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2013/11/24 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2013/06/18 * 12
MAT-68	Attenuator	Anritsu	MP721B	6200961025	RE	2013/11/26 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2013/03/12 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2013/08/12 * 12
MCC-141	Microwave Cable	Junkosha	MWX221	1305S002R(1m) / 1204S062(5m)	RE	2013/05/28 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE	2013/03/19 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2013/06/30 * 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: RE: Radiated Emission

AT: Antenna Terminal Conducted test

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