



RADIO TEST REPORT

Test Report No. : 33BE0184-HO-01-A-R2

Applicant : **Panasonic Corporation of North America**
Type of Equipment : **Wireless Speaker System**
Model No. : **SB-NE5**
FCC ID : **ACJ-SB-NE5**
Test regulation : **FCC Part 15 Subpart C: 2012**
***Airplay part**
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 test 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 33BE0184-HO-01-A-R1. 33BE0184-HO-01-A-R1 is replaced with this report.

Date of test: January 9 to 17, 2013

Representative test engineer:

T. Nakagawa

Tomohisa Nakagawa
Engineer of WiSE Japan,
UL Verification Service

Approved by:

Takahiro Hatakeda
Leader of WiSE Japan,
UL Verification Service



NVLAP LAB CODE: 200572-0

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*As for the range of Accreditation in NVLAP, you may refer to the WEB address,
<http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

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13-EM-F0429

CONTENTS	PAGE
SECTION 1: Customer information	4
SECTION 2: Equipment under test (E.U.T.)	4
SECTION 3: Test specification, procedures & results	5
SECTION 4: Operation of E.U.T. during testing	8
SECTION 5: Conducted Emission	10
SECTION 6: Radiated Spurious Emission	11
SECTION 7: Antenna Terminal Conducted Tests	12
APPENDIX 1: Data of EMI test	13
Conducted Emission	13
6dB Bandwidth	15
Maximum Peak Output Power	17
Average Output Power (Reference data)	19
Radiated Spurious Emission	21
Burst rate confirmation	37
Conducted Spurious Emission	38
Power Density	39
99% Occupied Bandwidth	41
APPENDIX 2: Test instruments	42
APPENDIX 3: Photographs of test setup	43
Conducted Emission	43
Radiated Spurious Emission	44

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SECTION 1: Customer information

Company Name : Panasonic Corporation *
Address : 1006 Oaza Kadoma, Kadoma-shi, Osaka 571-8501 Japan
Telephone Number : +81-50-3487-3469
Facsimile Number : +81-6-6906-8800
Contact Person : Kazuo Taniguchi

*Panasonic Corporation is on behalf of the applicant: Panasonic Corporation of North America.

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

2.1 Identification of E.U.T.

Type of Equipment : Wireless Speaker System
Model No. : SB-NE5
Serial No. : Refer to Section 4, Clause 4.2
Rating : AC120V
Receipt Date of Sample : October 16, 2012
Country of Mass-production : Malaysia
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

Radio Specification

[Airplay]

Radio Type : Transceiver
Frequency of Operation : 2412-2462MHz
Modulation : DSSS/OFDM
Power Supply (inner) : DC 3.3V
Antenna type / Antenna Gain : Internal Antenna: 2.65dBi(Antenna1)
External Antenna: 3.65dBi(Antenna2)

[Bluetooth]

Radio Type : Transceiver
Frequency of Operation : 2402-2480MHz
Modulation : FHSS
Power Supply (inner) : DC3.3V
Antenna type : Pattern Antenna
Antenna Gain : 4.85dBi

Variant model: SC-NE3

SB-NE5 has a variant model: SC-NE3.

Difference from SB-NE5 is the non-existence of FM Tuner.

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2012, final revised on December 27, 2012 and effective January 28, 2013

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 December 27, 2012 does not affect the test specification applied to the EUT.

*The EUT complies with FCC Part 15 Subpart B: 2012, final revised on December 27, 2012 and effective January 28, 2013.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.4:2003 7. AC powerline Conducted Emission measurements ----- IC: RSS-Gen 7.2.4	FCC: Section 15.207 ----- IC: RSS-Gen 7.2.4	QP 20.0dB, 1.15542MHz, L AV 22.4dB, 0.76796MHz, N	Complied	-
6dB Bandwidth	FCC: "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on October 4, 2012)" ----- 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 October 4, 2012)" ----- 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 October 4, 2012)" ----- 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 October 4, 2012)" ----- IC: RSS-Gen 4.9	FCC: Section15.247(d) ----- IC: RSS-210 A8.5 RSS-Gen 7.2.3		0.2 dB 2483.500MHz, AV, Vertical	Complied
Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.					

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

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FCC 15.31 (e)

This EUT provides stable voltage (DC3.3V) constantly to RF Module 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.

3.3 Addition to standard

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

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

3.4 Uncertainty

EMI

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

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

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	5.0dB	5.1dB	4.9dB	5.8dB	4.4dB	4.3dB
No.2	4.3dB	5.2dB	5.1dB	5.0dB	5.7dB	4.3dB	4.2dB
No.3	4.6dB	5.0dB	5.1dB	5.0dB	5.7dB	4.5dB	4.2dB
No.4	4.8dB	5.2dB	5.0dB	5.0dB	5.7dB	5.2dB	4.2dB

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

Power meter (+dB)	
Below 1GHz	Above 1GHz
1.0dB	1.0dB

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	
1.0dB	1.1dB	2.7dB	3.2dB	3.3dB	1.5dB

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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	FCC Registration Number	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	313583	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	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	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	134570	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	4.75 x 5.4 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 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

* 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)	11Mbps, PN9
IEEE 802.11g (11g)	36Mbps, PN9
*The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
EUT has the power settings by the software as follows; Power settings: WLAN 11b: 10 WLAN 11g: 3 Software: Juke Box, Ver. 2.2-MR1 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 Antenna	Tested frequency
Conducted Emission	11g Tx	Antenna 1	2437MHz
Spurious Emission (below 1GHz)	*1)	Antenna 2	
Spurious Emission (above 1GHz)	11b Tx	Antenna 1	2412MHz
Maximum Peak Output Power	11g Tx	Antenna 2	2437MHz 2462MHz
6dB Bandwidth	11b Tx	Antenna 2	2412MHz
Power Density	11g Tx		2437MHz
99% Occupied Bandwidth			2462MHz
*1) The mode was tested as a representative, because it had the highest power at antenna terminal test.			

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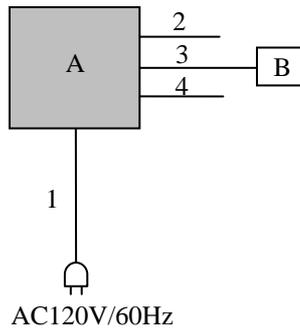
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4.2 Configuration and peripherals



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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Wireless Speaker System	SB-NE5	001	Panasonic	EUT
B	iPod	MC525J/A	-	Apple	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	AC Cable	1.5	Unshielded	Unshielded	-
2	FM Ant Cable	1.2	Unshielded	Unshielded	-
3	Audio Cable	3.0	Shielded	Shielded	-
4	Audio Cable	3.0	Shielded	Shielded	-

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SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 0.8m above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

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

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

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber. The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

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

Detector : QP and 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 "10.0 MAXIMUM UNWANTED EMISSION LEVELS" of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 (Issued on October 4, 2012)".

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

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

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

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

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

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

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

Test Antennas are used as below;

Frequency	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 (Peak Power Method: Option 2)	Average Power Method: Alternative 1 RBW: 1MHz VBW: 3MHz Detector: Power Averaging (RMS) Trace: Free Run	RBW: 100kHz VBW: 300kHz (S/A)
Test Distance	3m	3m (below 10GHz), 1m *1) (above 10GHz)		3m (below 10GHz), 1m *1) (above 10GHz)

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

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 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	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	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak/ Average *1)	-	Power Meter (Option 3) (Sensor: 50MHz BW)
Peak Power Density	1.5 times the 6dB bandwidth	30kHz	100kHz	Auto	Peak	Max Hold	Spectrum Analyzer *2)
Conducted Spurious Emission	9kHz to 150kHz	200Hz	620Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	9.1kHz	27kHz				
*1) Reference data							
*2) PSD Option 1 of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 (Issued on October 4, 2012)".							

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

Test data : **APPENDIX**
Test result : **Pass**

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APPENDIX 1: Data of EMI test

Conducted Emission

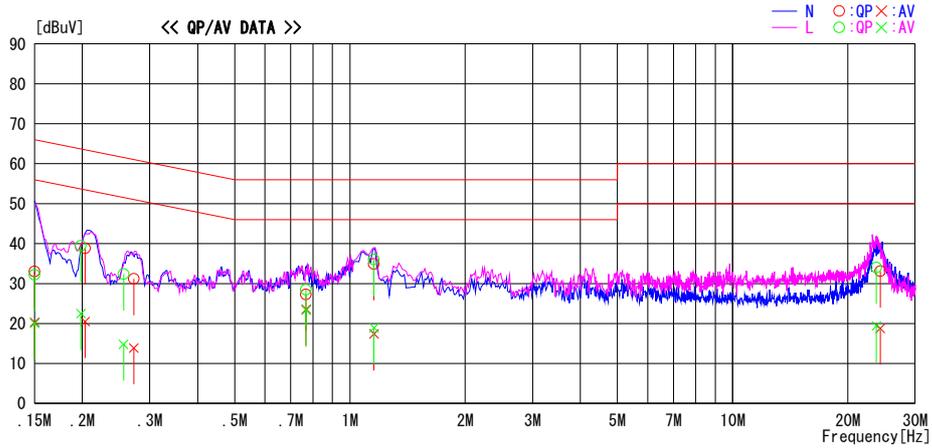
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2013/01/17

Report No. : 33BE0184-H0-01
Temp./Humi. : 19deg. C / 37% RH
Engineer : Tomohisa Nakagawa

Mode / Remarks : 11g Tx 2437MHz Antenna 1

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	19.9	7.2	13.1	33.0	20.3	66.0	56.0	33.0	35.7	N	
0.20316	25.7	7.4	13.1	38.8	20.5	63.5	53.5	24.7	33.0	N	
0.27268	18.0	0.7	13.2	31.2	13.9	61.0	51.0	29.8	37.1	N	
0.76796	14.0	10.3	13.3	27.3	23.6	56.0	46.0	28.7	22.4	N	
1.15481	21.6	4.1	13.3	34.9	17.4	56.0	46.0	21.1	28.6	N	
24.29320	18.2	3.9	14.9	33.1	18.8	60.0	50.0	26.9	31.2	N	
0.15000	19.1	7.0	13.1	32.2	20.1	66.0	56.0	33.8	35.9	L	
0.19818	26.4	9.4	13.1	39.5	22.5	63.7	53.7	24.2	31.2	L	
0.25633	19.2	1.6	13.2	32.4	14.8	61.5	51.5	29.1	36.7	L	
0.76823	15.2	10.0	13.3	28.5	23.3	56.0	46.0	27.5	22.7	L	
1.15542	22.7	5.7	13.3	36.0	19.0	56.0	46.0	20.0	27.0	L	
23.75293	19.1	4.5	14.9	34.0	19.4	60.0	50.0	26.0	30.6	L	

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

Conducted Emission

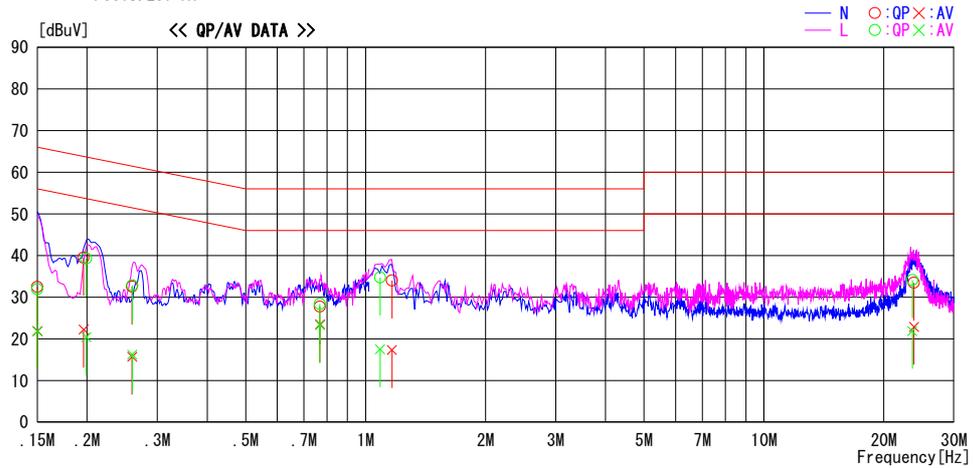
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
 Date : 2013/01/17

Report No. : 33BE0184-HO-01
 Temp./Humi. : 19deg. C / 37% RH
 Engineer : Tomohisa Nakagawa

Mode / Remarks : 11g Tx 2437MHz Antenna 2

LIMIT : FCC15.207 QP
 FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	19.4	8.8	13.1	32.5	21.9	66.0	56.0	33.5	34.1	N	
0.19604	26.4	9.1	13.1	39.5	22.2	63.8	53.8	24.3	31.6	N	
0.25945	19.4	2.5	13.2	32.6	15.7	61.4	51.4	28.8	35.7	N	
0.76804	14.4	10.2	13.3	27.7	23.5	56.0	46.0	28.3	22.5	N	
1.16385	20.7	4.0	13.3	34.0	17.3	56.0	46.0	22.0	28.7	N	
23.80996	18.6	8.0	14.9	33.5	22.9	60.0	50.0	26.5	27.1	N	
0.15000	18.8	8.7	13.1	31.9	21.8	66.0	56.0	34.1	34.2	L	
0.19904	26.2	7.3	13.1	39.3	20.4	63.7	53.7	24.4	33.3	L	
0.25966	19.6	3.0	13.2	32.8	16.2	61.4	51.4	28.6	35.2	L	
0.76800	15.1	10.0	13.3	28.4	23.3	56.0	46.0	27.6	22.7	L	
1.08763	21.4	4.2	13.3	34.7	17.5	56.0	46.0	21.3	28.5	L	
23.57237	19.2	7.0	14.9	34.1	21.9	60.0	50.0	25.9	28.1	L	

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

6dB Bandwidth

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 33BE0184-HO-01
Date 01/09/2013
Temperature / Humidity 21 deg. C / 34% RH
Engineer Hironobu Ohnishi
Mode 11b Tx, 11g Tx

11b Antenna 2

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	11.812	>500
2437	11.645	>500
2462	11.918	>500

11g Antenna 2

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	16.484	>500
2437	16.464	>500
2462	16.474	>500

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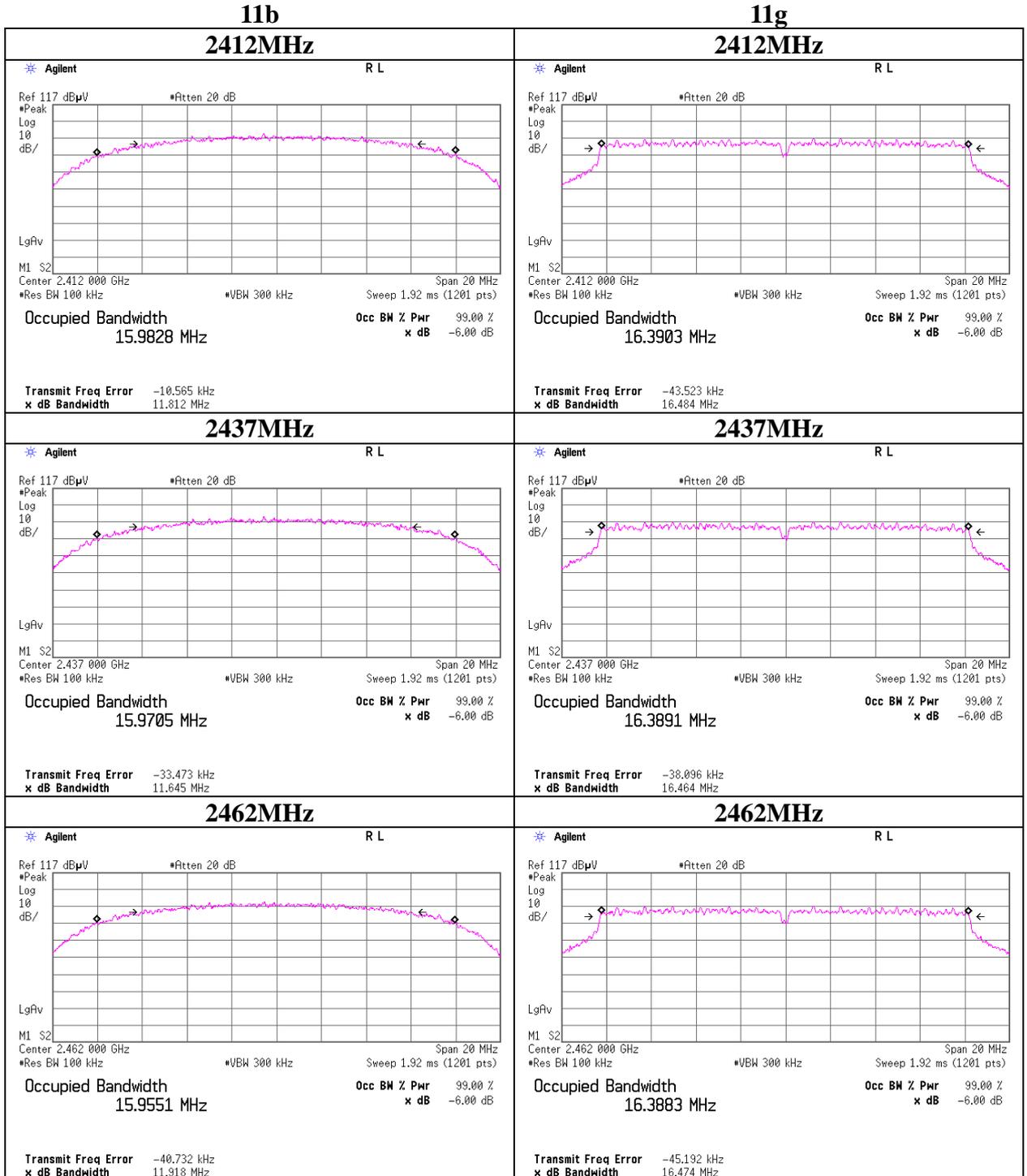
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Facsimile : +81 596 24 8124

6dB Bandwidth

Antenna 2



Maximum Peak Output Power

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	33BE0184-HO-01
Date	01/09/2013
Temperature / Humidity	21 deg. C / 34% RH
Engineer	Hironobu Ohnishi
Mode	11b Tx

Antenna 1 11Mbps

Freq. [MHz]	Reading Peak [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	4.14	1.37	10.03	15.54	35.81	30.00	1000	14.46
2437	4.60	1.37	10.03	16.00	39.81	30.00	1000	14.00
2462	4.82	1.38	10.03	16.23	41.98	30.00	1000	13.77

Antenna 2 11Mbps

Freq. [MHz]	Reading Peak [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	4.60	1.37	10.03	16.00	39.81	30.00	1000	14.00
2437	4.98	1.37	10.03	16.38	43.45	30.00	1000	13.62
2462	5.06	1.38	10.03	16.47	44.36	30.00	1000	13.53

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

Antenna 1, 2437MHz

Rate [Mbps]	Reading Peak [dBm]	Remark
1	4.47	
2	4.59	
5.5	4.41	
11	4.60	*

Antenna 2, 2437MHz

Rate [Mbps]	Reading Peak [dBm]	Remark
1	4.89	
2	4.96	
5.5	4.82	
11	4.98	*

*: Worst Rate

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

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Maximum Peak Output Power

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	33BE0184-HO-01
Date	01/09/2013
Temperature / Humidity	21 deg. C / 34% RH
Engineer	Hironobu Ohnishi
Mode	11g Tx

Antenna 1 36Mbps

Freq. [MHz]	Reading Peak [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	11.14	1.37	10.03	22.54	179.47	30.00	1000	7.46
2437	11.24	1.37	10.03	22.64	183.65	30.00	1000	7.36
2462	11.16	1.38	10.03	22.57	180.72	30.00	1000	7.43

Antenna 2 36Mbps

Freq. [MHz]	Reading Peak [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	11.32	1.37	10.03	22.72	187.07	30.00	1000	7.28
2437	11.36	1.37	10.03	22.76	188.80	30.00	1000	7.24
2462	11.22	1.38	10.03	22.63	183.23	30.00	1000	7.37

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

Antenna 1, 2437MHz

Rate [Mbps]	Reading Peak [dBm]	Remark
6	10.91	
9	11.03	
12	10.81	
18	11.07	
24	10.81	
36	11.24	*
48	10.94	
54	10.83	

Antenna 2, 2437MHz

Rate [Mbps]	Reading Peak [dBm]	Remark
6	11.02	
9	11.11	
12	10.94	
18	11.27	
24	10.92	
36	11.36	*
48	11.07	
54	10.85	

*: Worst Rate

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

Average Output Power (Reference data)

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 33BE0184-HO-01
Date 01/09/2013
Temperature / Humidity 21 deg. C / 34% RH
Engineer Hironobu Ohnishi
Mode 11g Tx

Antenna 1 6Mbps

Freq. [MHz]	Reading Average [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
2412	0.33	1.37	10.03	11.73	14.89
2437	0.58	1.37	10.03	11.98	15.78
2462	0.77	1.38	10.03	12.18	16.52

Antenna 2 6Mbps

Freq. [MHz]	Reading Average [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
2412	0.73	1.37	10.03	12.13	16.33
2437	1.00	1.37	10.03	12.40	17.38
2462	1.08	1.38	10.03	12.49	17.74

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

Antenna 1, 2437MHz

Rate [Mbps]	Reading Average [dBm]	Remark
6	0.58	*
9	0.52	
12	0.42	
18	0.30	
24	0.42	
36	0.19	
48	-0.92	
54	-1.23	

Antenna 2, 2437MHz

Rate [Mbps]	Reading Average [dBm]	Remark
6	1.00	*
9	0.93	
12	0.85	
18	0.94	
24	0.85	
36	0.62	
48	-0.39	
54	-1.13	

*: Worst Rate

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

Radiated Spurious Emission

Test place : Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 33BE0184-HO-01
Date : 01/15/2013 1/16/2013
Temperature / Humidity : 15 deg. C / 41% RH 26 deg. C / 33% RH
Engineer : Tomohisa Nakagawa Tomohisa Nakagawa
Mode : (1-10GHz) (Above 10GHz)
 11b Tx 2412MHz Antenna 2

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	2311.852	PK	49.1	27.1	2.2	32.4	-	46.0	73.9	27.9	
Hori	2390.000	PK	69.2	27.4	2.3	32.4	-	66.5	73.9	7.4	
Hori	2483.500	PK	59.5	27.7	2.3	32.3	-	57.2	73.9	16.7	
Hori	4824.000	PK	40.2	31.7	4.8	31.4	-	45.3	73.9	28.6	
Hori	7236.000	PK	42.2	36.3	5.6	32.4	-	51.7	73.9	22.2	
Hori	9648.000	PK	41.2	38.2	6.4	33.0	-	52.8	73.9	21.1	
Hori	2311.852	AV	40.2	27.1	2.2	32.4	0.1	37.2	53.9	16.7	
Hori	2390.000	AV	46.7	27.4	2.3	32.4	0.1	44.1	53.9	9.8	*1)
Hori	2483.500	AV	38.5	27.7	2.3	32.3	0.1	36.3	53.9	17.6	*1)
Hori	4824.000	AV	32.8	31.7	4.8	31.4	0.1	38.0	53.9	15.9	
Hori	7236.000	AV	34.2	36.3	5.6	32.4	0.1	43.8	53.9	10.1	
Hori	9648.000	AV	33.6	38.2	6.4	33.0	0.1	45.3	53.9	8.6	
Vert	2311.830	PK	54.6	27.1	2.2	32.4	-	51.5	73.9	22.4	
Vert	2390.000	PK	72.0	27.4	2.3	32.4	-	69.3	73.9	4.6	
Vert	2483.500	PK	62.3	27.7	2.3	32.3	-	60.0	73.9	13.9	
Vert	4824.000	PK	40.2	31.7	4.8	31.4	-	45.3	73.9	28.6	
Vert	7236.000	PK	41.7	36.3	5.6	32.4	-	51.2	73.9	22.7	
Vert	9648.000	PK	41.6	38.2	6.4	33.0	-	53.2	73.9	20.7	
Vert	2311.830	AV	47.3	27.1	2.2	32.4	0.1	44.3	53.9	9.6	
Vert	2390.000	AV	56.0	27.4	2.3	32.4	0.1	53.4	53.9	0.5	*1)
Vert	2483.500	AV	45.0	27.7	2.3	32.3	0.1	42.8	53.9	11.1	*1)
Vert	4824.000	AV	33.6	31.7	4.8	31.4	0.1	38.8	53.9	15.1	
Vert	7236.000	AV	35.7	36.3	5.6	32.4	0.1	45.3	53.9	8.6	
Vert	9648.000	AV	33.9	38.2	6.4	33.0	0.1	45.6	53.9	8.3	

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

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

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

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

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

*Spurious emissions listed with duty factor value in the above table have the synchronized duty cycle with carrier.

*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	102.8	27.5	2.3	32.4	100.2	-	-	Carrier
Hori	2400.000	PK	62.6	27.4	2.3	32.4	59.9	80.2	20.3	
Vert	2412.000	PK	104.6	27.5	2.3	32.4	102.0	-	-	Carrier
Vert	2400.000	PK	64.9	27.4	2.3	32.4	62.2	82.0	19.8	

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

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Radiated Spurious Emission

Test place : Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 33BE0184-HO-01
Date : 01/15/2013 1/16/2013
Temperature / Humidity : 15 deg. C / 41% RH 26 deg. C / 33% RH
Engineer : Tomohisa Nakagawa Tomohisa Nakagawa
Mode : (1-10GHz) (Above 10GHz)
 11b Tx 2462MHz Antenna 2

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	54.9	27.4	2.3	32.4	-	52.2	73.9	21.7	
Hori	2483.500	PK	66.0	27.7	2.3	32.3	-	63.7	73.9	10.2	
Hori	4924.000	PK	40.0	32.1	4.7	31.4	-	45.4	73.9	28.5	
Hori	7386.000	PK	42.9	36.6	5.6	32.5	-	52.6	73.9	21.3	
Hori	9848.000	PK	41.3	38.5	6.4	33.1	-	53.1	73.9	20.8	
Hori	2390.000	AV	34.2	27.4	2.3	32.4	0.1	31.6	53.9	22.3	*1)
Hori	2483.500	AV	43.8	27.7	2.3	32.3	-	41.5	53.9	12.4	
Hori	4924.000	AV	32.0	32.1	4.7	31.4	0.1	37.5	53.9	16.4	
Hori	7386.000	AV	34.1	36.6	5.6	32.5	0.1	43.9	53.9	10.0	
Hori	9848.000	AV	33.4	38.5	6.4	33.1	0.1	45.3	53.9	8.6	
Vert	2390.000	PK	62.4	27.4	2.3	32.4	-	59.7	73.9	14.2	
Vert	2483.500	PK	72.8	27.7	2.3	32.3	-	70.5	73.9	3.4	
Vert	4924.000	PK	40.2	32.1	4.7	31.4	-	45.6	73.9	28.3	
Vert	7386.000	PK	42.9	36.6	5.6	32.5	-	52.6	73.9	21.3	
Vert	9848.000	PK	41.4	38.5	6.4	33.1	-	53.2	73.9	20.7	
Vert	2390.000	AV	44.7	27.4	2.3	32.4	0.1	42.1	53.9	11.8	*1)
Vert	2483.500	AV	56.0	27.7	2.3	32.3	-	53.7	53.9	0.2	
Vert	4924.000	AV	32.2	32.1	4.7	31.4	0.1	37.7	53.9	16.2	
Vert	7386.000	AV	34.0	36.6	5.6	32.5	0.1	43.8	53.9	10.1	
Vert	9848.000	AV	33.2	38.5	6.4	33.1	0.1	45.1	53.9	8.8	

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

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

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

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

*Spurious emissions listed with duty factor value in the above table have the synchronized duty cycle with carrier.

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

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Head Office EMC Lab.

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Radiated Spurious Emission

Test place : Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 33BE0184-HO-01
Date : 01/15/2013
Temperature / Humidity : 15 deg. C / 44% RH
Engineer : Takumi Shimada
(1-10GHz)
Mode : 11g Tx 2412MHz Antenna 1

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	27.5	2.3	32.4	95.0	-	-	Carrier
Hori	2400.000	PK	57.2	27.4	2.3	32.4	54.5	75.0	20.5	
Hori	2530.740	PK	54.0	27.9	2.3	32.3	51.9	75.0	23.1	
Vert	2412.000	PK	95.3	27.5	2.3	32.4	92.7	-	-	Carrier
Vert	2400.000	PK	49.5	27.4	2.3	32.4	46.8	72.7	25.9	
Vert	2525.730	PK	51.6	27.8	2.3	32.3	49.4	72.7	23.3	

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

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Radiated Spurious Emission

Test place : Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 33BE0184-HO-01
Date : 01/15/2013
Temperature / Humidity : 15 deg. C / 44% RH
Engineer : Takumi Shimada
(1-10GHz)
Mode : 11g Tx 2462MHz Antenna 1

Marker-Delta Method Data Sheet (RBW:30kHz)

FREQ [MHz]	Field strength of band-edge*		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATT [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
	HOR [dBuV]	VER					HOR	VER		HOR	VER
PK DETECT											
2483.5	61.2	54.9	27.7	32.3	2.3	0.0	58.9	52.6	73.9	15.0	21.3
AV DETECT											
2483.5	54.4	43.7	27.7	32.3	2.3	0.0	52.1	41.4	53.9	1.8	12.5

*Field Strength of band-edge
Spectrum Analyzer Reading

		Polarity	Hor [dBuV]			Ver [dBuV]			
			Detector	PK	AV(RMS)	PK	PK	AV(RMS)	PK
				RBW	VBW	3MHz	3MHz	100kHz	3MHz
Step 1)	Fundamental(2462MHz)	1MHz	105.9	99.1	-	99.7	88.5	-	
Step 2)	Fundamental(2462MHz)	30kHz	-	-	94.1	-	-	88.4	
	Band-edge(2483.5MHz)	30kHz	-	-	49.4	-	-	43.6	
	Amplitude delta *1	-	-	-	44.7	-	-	44.8	
Step 3)	Field strength of band-edge *2	-	61.2	54.4	-	54.9	43.7	-	

*1 Amplitude delta = Fundamental(RBW:30kHz) - Band-edge(RBW:30kHz)
*2 Field strength of band-edge = Fundamental(RBW:1MHz) - Amplitude delta

Radiated Spurious Emission

Test place : Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 33BE0184-HO-01
Date : 01/15/2013
Temperature / Humidity : 15 deg. C / 41% RH
Engineer : Tomohisa Nakagawa
(1-10GHz)
Mode : 11g Tx 2412MHz Antenna 2

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	94.5	27.5	2.3	32.4	91.9	-	-	Carrier
Hori	2525.737	PK	54.6	27.8	2.3	32.3	52.4	71.9	19.5	
Hori	2400.000	PK	52.5	27.4	2.3	32.4	49.8	71.9	22.1	
Vert	2412.000	PK	98.3	27.5	2.3	32.4	95.7	-	-	Carrier
Vert	2525.737	PK	58.9	27.8	2.3	32.3	56.7	75.7	19.0	
Vert	2400.000	PK	55.5	27.4	2.3	32.4	52.8	75.7	22.9	

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

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Radiated Spurious Emission

Test place : Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 33BE0184-HO-01
Date : 01/15/2013 1/16/2013
Temperature / Humidity : 15 deg. C / 41% RH 26 deg. C / 33% RH
Engineer : Tomohisa Nakagawa Tomohisa Nakagawa
Mode : (1-10GHz) (Below 1GHz and above 10GHz)
11g Tx 2437MHz Antenna 2

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	118.994	QP	36.4	12.9	8.4	32.3	-	25.4	43.5	18.1	
Hori	654.782	QP	38.9	19.9	12.3	32.0	-	39.1	46.0	6.9	
Hori	699.940	QP	39.3	20.3	12.5	32.0	-	40.1	46.0	5.9	
Hori	745.100	QP	37.8	21.0	12.8	31.7	-	39.9	46.0	6.1	
Hori	790.263	QP	36.8	21.7	13.0	31.5	-	40.0	46.0	6.0	
Hori	835.418	QP	35.1	21.9	13.2	31.3	-	38.9	46.0	7.1	
Hori	2321.292	PK	56.8	27.2	2.2	32.4	-	53.8	73.9	20.1	
Hori	2378.173	PK	59.7	27.4	2.3	32.4	-	57.0	73.9	16.9	
Hori	2495.479	PK	56.8	27.7	2.3	32.3	-	54.5	73.9	19.4	
Hori	4874.000	PK	39.7	31.9	4.7	31.4	-	44.9	73.9	29.0	
Hori	7311.000	PK	41.8	36.5	5.6	32.5	-	51.4	73.9	22.5	
Hori	9748.000	PK	41.5	38.3	6.4	33.0	-	53.2	73.9	20.7	
Hori	2321.292	AV	47.0	27.2	2.2	32.4	0.6	44.6	53.9	9.3	
Hori	2378.173	AV	49.4	27.4	2.3	32.4	0.6	47.3	53.9	6.6	
Hori	2495.479	AV	47.1	27.7	2.3	32.3	0.6	45.4	53.9	8.5	
Hori	4874.000	AV	32.6	31.9	4.7	31.4	0.6	38.4	53.9	15.5	
Hori	7311.000	AV	35.0	36.5	5.6	32.5	0.6	45.2	53.9	8.7	
Hori	9748.000	AV	31.9	38.3	6.4	33.0	0.6	44.2	53.9	9.7	
Vert	101.603	QP	45.1	10.3	8.2	32.3	-	31.3	43.5	12.2	
Vert	222.235	QP	35.0	17.0	9.4	32.2	-	29.2	46.0	16.8	
Vert	519.314	QP	33.8	18.3	11.5	32.0	-	31.6	46.0	14.4	
Vert	609.634	QP	34.5	19.4	12.1	32.0	-	34.0	46.0	12.0	
Vert	745.104	QP	32.8	21.0	12.8	31.7	-	34.9	46.0	11.1	
Vert	880.504	QP	33.1	22.1	13.5	31.1	-	37.6	46.0	8.4	
Vert	2321.292	PK	57.9	27.2	2.2	32.4	-	54.9	73.9	19.0	
Vert	2378.173	PK	62.9	27.4	2.3	32.4	-	60.2	73.9	13.7	
Vert	2495.479	PK	63.4	27.7	2.3	32.3	-	61.1	73.9	12.8	
Vert	4874.000	PK	41.5	31.9	4.7	31.4	-	46.7	73.9	27.2	
Vert	7311.000	PK	41.6	36.5	5.6	32.5	-	51.2	73.9	22.7	
Vert	9748.000	PK	41.1	38.3	6.4	33.0	-	52.8	73.9	21.1	
Vert	2321.292	AV	48.5	27.2	2.2	32.4	0.6	46.1	53.9	7.8	
Vert	2378.173	AV	53.5	27.4	2.3	32.4	0.6	51.4	53.9	2.5	
Vert	2495.479	AV	53.9	27.7	2.3	32.3	0.6	52.2	53.9	1.7	
Vert	4874.000	AV	32.6	31.9	4.7	31.4	0.6	38.4	53.9	15.5	
Vert	7311.000	AV	35.0	36.5	5.6	32.5	0.6	45.2	53.9	8.7	
Vert	9748.000	AV	32.4	38.3	6.4	33.0	0.6	44.7	53.9	9.2	

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

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

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

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

*Spurious emissions listed with duty factor value in the above table have the synchronized duty cycle with carrier.

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	2437.000	PK	94.6	27.6	2.3	32.4	92.1	-	-	Carrier
Hori	2551.979	PK	49.5	27.9	2.4	32.3	47.5	72.1	24.6	
Vert	2437.000	PK	98.1	27.6	2.3	32.4	95.6	-	-	Carrier
Vert	2551.979	PK	55.8	27.9	2.4	32.3	53.8	75.6	21.8	

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

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Radiated Spurious Emission

Test place : Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 33BE0184-HO-01
Date : 01/15/2013
Temperature / Humidity : 15 deg. C / 41% RH
Engineer : Tomohisa Nakagawa
(1-10GHz)
Mode : 11g Tx 2462MHz Antenna 2

Marker-Delta Method Data Sheet (RBW:30kHz)

FREQ [MHz]	Field strength of band-edge*		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATT [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
	HOR [dBuV]	VER [dBuV]					HOR [dB]	VER [dB]			
PK DETECT											
2483.5	57.6	60.0	27.7	32.3	2.3	0.0	55.3	57.7	73.9	18.6	16.2
AV DETECT											
2483.5	50.8	53.2	27.7	32.3	2.3	0.0	48.5	50.9	53.9	5.4	3.0

*Field Strength of band-edge
Spectrum Analyzer Reading

		Polarity	Hor [dBuV]			Ver [dBuV]			
			Detector	PK	AV	PK	PK	AV	PK
				RBW	VBW	3MHz	10Hz	100kHz	3MHz
Step 1)	Fundamental(2462MHz)	1MHz	101.7	94.9	-	103.9	97.1	-	
Step 2)	Fundamental(2462MHz)	30kHz	-	-	89.1	-	-	91.7	
	Band-edge(2483.5MHz)	30kHz	-	-	45.0	-	-	47.8	
	Amplitude delta *1	-	-	-	44.1	-	-	43.9	
Step 3)	Field strength of band-edge *2	-	57.6	50.8	-	60.0	53.2	-	

*1 Amplitude delta = Fundamental(RBW:30kHz) - Band-edge(RBW:30kHz)
*2 Field strength of band-edge = Fundamental(RBW:1MHz) - Amplitude delta

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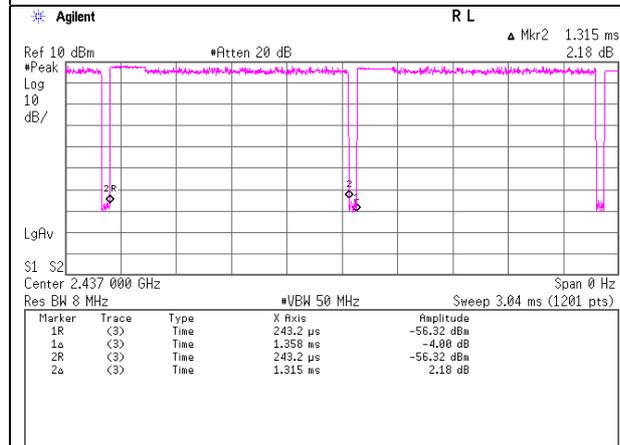
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Burst rate confirmation

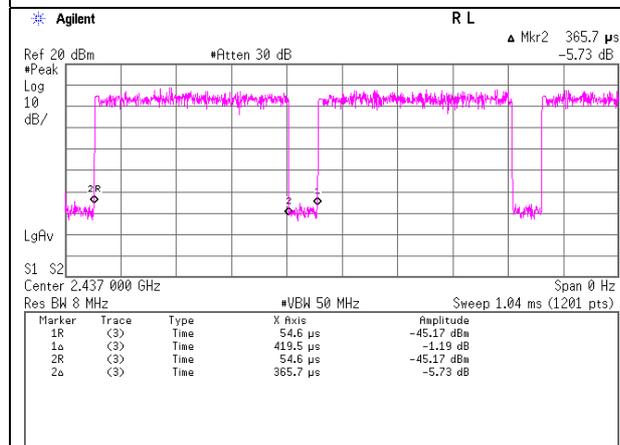
11b 11Mbps

Tx on / (Tx on + Tx off) = 0.968
Tx on / (Tx on + Tx off) * 100 = 96.8 %
Duty factor = 10 * log (1.358 / 1.315) = 0.14 dB



11g 36Mbps

Tx on / (Tx on + Tx off) = 0.872
Tx on / (Tx on + Tx off) * 100 = 87.2 %
Duty factor = 10 * log (419.5 / 365.7) = 0.60 dB



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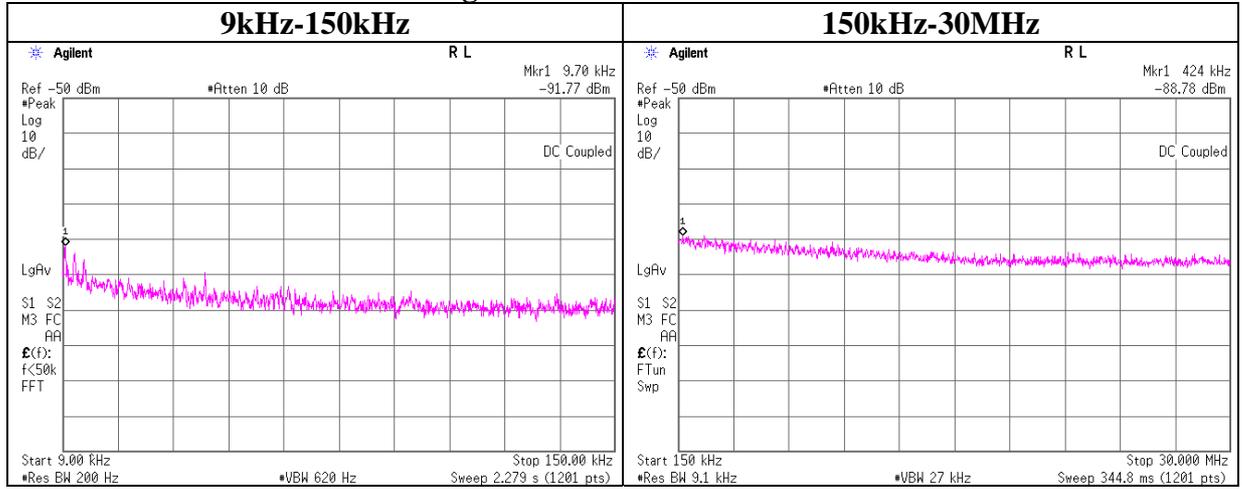
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Conducted Spurious Emission

11g Tx 2437MHz Antenna 2



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]
9.70	-91.8	0.01	10.0	3.7	-78.1	300.0	6.0	-16.9	47.9
424	-88.8	0.01	10.0	3.7	-75.1	300.0	6.0	-13.9	15.1

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

$\text{EIRP} = \text{Reading} + \text{Cable Loss} + \text{Attenuator} + \text{Antenna Gain}$

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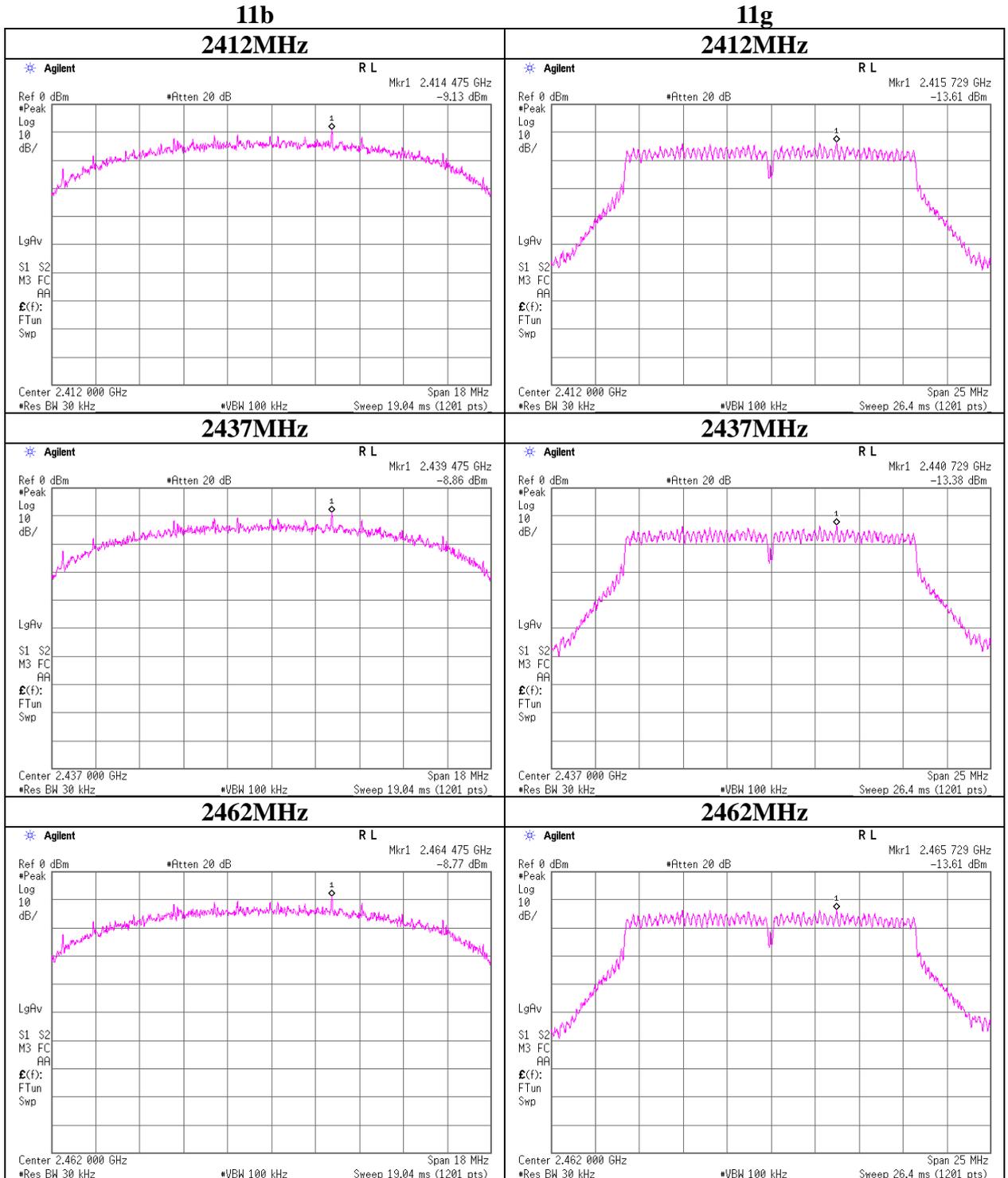
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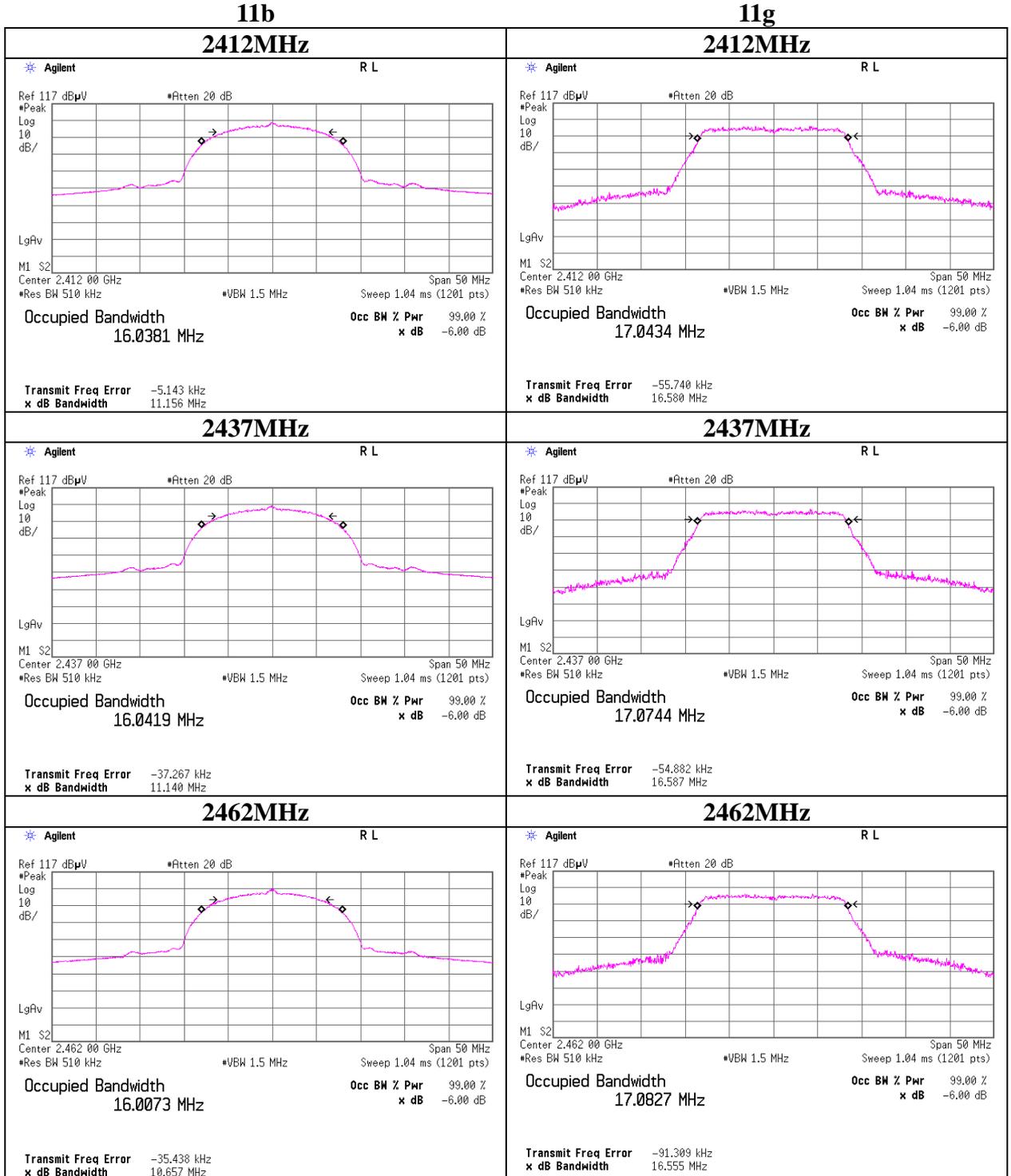
Power Density

Antenna 2



99% Occupied Bandwidth

Antenna 2



APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	AT	2012/02/06 * 12
MCC-137	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37954/2	AT	2012/10/19 * 12
MAT-25	Attenuator(10dB) (above1GHz)	Agilent	8493C	71642	AT	2012/06/27 * 12
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2012/10/08 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2012/10/08 * 12
MRENT-95	Spectrum Analyzer	Agilent	E4440A	MY46185823	AT	2012/06/19 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2012/05/25 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2012/03/29 * 12
MCC-133	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336164/4(1m) / 340640(5m)	RE	2012/09/05 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE/CE	2012/02/03 * 12
MHF-19	High Pass Filter 3.5-18.0GHz	TOKIMEC	TF323DCA	602	RE	2012/09/12 * 12
MCC-76	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278967/4	RE	2012/12/24 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2012/02/24 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE/CE	2012/02/06 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2012/05/21 * 12
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	CE	2012/11/21 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE/CE	2012/08/23 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE	2013/01/07 * 12
MCC-112	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/ SFM141(3m)/ suciform141- PE(1m)/ 421-010(1.5m)/ RFM-E321 (Switcher)	-/00640	CE	2012/07/12 * 12
MAT-65	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2013/01/09 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2012/10/08 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2012/10/08 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2012/07/12 * 12
MAT-09	Attenuator(6dB)	Weinschel Corp	2	BK7973	RE	2012/11/06 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2012/03/16 * 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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