



RADIO TEST REPORT

Test Report No. : 4786001400H-R2

Applicant : Information Services International-Dentsu, Ltd.
Type of Equipment : Place Sticker
Model No. : WLN-G2-0S-11-1
FCC ID : QXMPS4
Test regulation : FCC Part 15 Subpart C: 2012
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 4786001400H-R1. 4786001400H-R1 is replaced with this report.

Date of test: December 2 to 11, 2012

Representative test engineer:

Katsunori Okai
Engineer of WiSE Japan,
UL Verification Service

Approved by:

Masanori Nishiyama
Manager of WiSE Japan,
UL Verification Service



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

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.....	18
Radiated Spurious Emission	19
Conducted Spurious Emission	23
Power Density	26
99%Occupied Bandwidth	28
APPENDIX 2: Test instruments	29
APPENDIX 3: Photographs of test setup	31
Conducted Emission	31
Radiated Spurious Emission	32
Worst Case Position (Horizontal: Y-axis/ Vertical:Y-axis).....	33

SECTION 1: Customer information

Company Name : Information Services International-Dentsu, Ltd.
Address : 2-17-1 Konan Minato-ku Tokyo 108-0075, Japan
Telephone Number : +81-3-6713-6098
Facsimile Number : +81-3-6713-9903
Contact Person : Kazuhiro Toda

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

2.1 Identification of E.U.T.

Type of Equipment : Place Sticker
Model No. : WLN-G2-0S-11-1
Serial No. : Refer to Section 4, Clause 4.2
Rating : DC3.3V
Receipt Date of Sample : November 27, 2012
Country of Mass-production : Japan
Condition of EUT : Engineering prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT : No Modification by the test lab

2.2 Product Description

General Specification

Clock frequency(ies) in the system : 44MHz

Radio Specification

Radio Type : Transceiver
Frequency of Operation : 2412-2462MHz
Modulation : DSSS
Power Supply (radio part input) : DC1.8V
Antenna type / Antenna gain : Patch Antenna with short cable *1: 4dBic
Patch Antenna with long cable *1: 4dBic

*1: Radiated Emission (carrier frequency) was checked with both antennas, and it was found that there were no difference between the two, so Conducted Emission and Radiated Emission tests in this report were performed only with Patch Antenna with short cable.

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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 August 13, 2012 and effective September 12, 2012

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 C63.4:2003 7. AC powerline Conducted Emission measurements IC: RSS-Gen 7.2.4	FCC: Section 15.207 IC: RSS-Gen 7.2.4	QP 11.7dB, 0.54590MHz, N AV 7.1dB, 0.54590MHz, 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	8.1dB 9648.000MHz, AV, Horizontal	Complied	Conducted/ Radiated

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

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

FCC 15.31 (e)

The RF Module has its own regulator.

The stable voltage (DC1.8V) is constantly provided to the RF Module through the regulator regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203/212 Antenna requirement

The EUT has a unique coupling/antenna connector (UFL). Therefore the equipment complies with the requirement of 15.203.

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3.3 Addition to standard

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

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

3.4 Uncertainty

EMI

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

Test room (semi-anechoic chamber)	Conducted emission (+dB)
	150kHz-30MHz
No.1	3.5dB
No.2	3.6dB
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 test report has enough margin, more than the site margin.

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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.

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

4.1 Operating Mode(s)

Mode	Remarks*
IEEE 802.11b (11b)	11Mbps, PN9
*Transmitting duty was 100% on all tests. *The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
*Power of the EUT was set by the software as follows; Power settings: 0 Software: GS-S2WF-APG Ver. SP-5.5 *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.	

*Details of Operating mode(s)

Test Item	Operating Mode	Tested frequency
Conducted Emission	11b Tx	2412MHz
Spurious Emission		2437MHz
6dB Bandwidth		2462MHz
Maximum Peak Output Power Power Density 99% Occupied Bandwidth		

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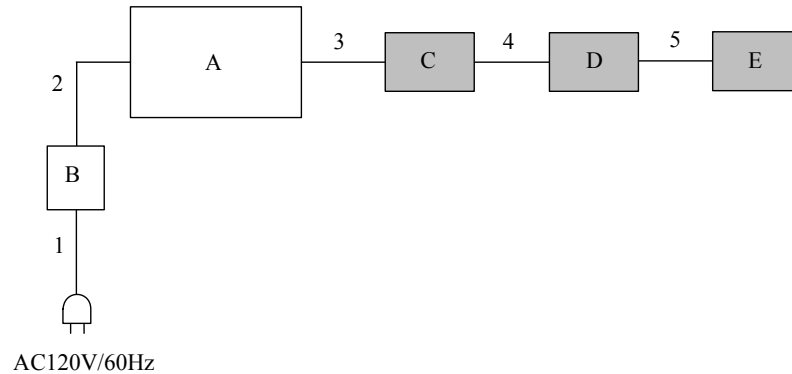
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4.2 Configuration and peripherals



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

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Laptop PC	FMV-C8230	R7305017	FUJITSU	-
B	AC Adaptor	FMV-AC312	CA01007-0930	FUJITSU	-
C	Power Supply Board	014	001	Information Services International-Dentsu, Ltd.	EUT
D	Place Sticker	WLN-G2-0S-11-1	ZA1810100	SATORI ELECTRIC	EUT
E	Antenna	ANT244SR-PP1	A0054	SATORI ELECTRIC	EUT

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	AC Cable	1.8	Unshielded	Unshielded	-
2	DC Cable	1.8	Unshielded	Unshielded	-
3	USB Cable	1.5	Shielded	Shielded	-
4	Signal Cable	0.13	Unshielded	Unshielded	-
5	Antenna Cable	0.3	Unshielded	Unshielded	-

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SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0m 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: Option 1 RBW: 1MHz VBW: 3MHz Detector: Power Averaging (RMS) Trace: Free Run(Duty cycle is $\geq$ 98%) Signal Gating (Duty cycle is < 98%)	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 carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

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

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

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SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

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

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
6dB Bandwidth	20MHz, 3MHz	100kHz 30kHz	300kHz 100kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	Enough width to display 20dB Bandwidth	1 to 3% of Span	Three times of RBW	Auto	Sample, Peak	Clear Write 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	3kHz	10kHz	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

APPENDIX 1: Data of EMI test

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

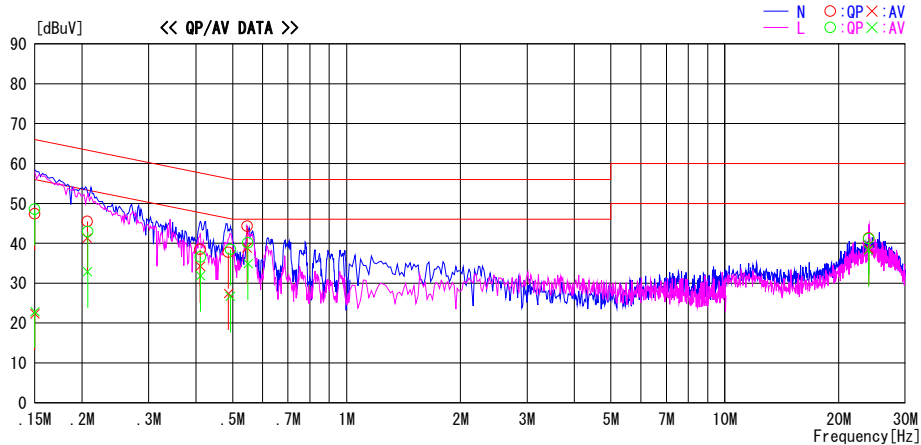
UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2012/12/11

Report No. : 4786001400H

Temp./Humi. : 21deg. C / 35% RH
Engineer : Hiroshi Kukita

Mode / Remarks : 11b Tx Mch

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	34.1	9.0	13.3	47.4	22.3	66.0	56.0	18.6	33.7	N
0.20628	32.3	28.1	13.2	45.5	41.3	63.4	53.4	17.9	12.1	N
0.41021	25.2	20.9	13.3	38.5	34.2	57.6	47.6	19.1	13.4	N
0.48740	24.4	14.1	13.3	37.7	27.4	56.2	46.2	18.5	18.8	N
0.54590	31.0	25.6	13.3	44.3	38.9	56.0	46.0	11.7	7.1	N
24.00000	25.6	22.9	15.7	41.3	38.6	60.0	50.0	18.7	11.4	N
0.15000	35.3	9.6	13.3	48.6	22.9	66.0	56.0	17.4	33.1	L
0.20686	29.7	19.7	13.2	42.9	32.9	63.3	53.3	20.4	20.4	L
0.41128	23.3	18.6	13.3	36.6	31.9	57.6	47.6	21.0	15.7	L
0.49324	25.2	13.4	13.3	38.5	26.7	56.1	46.1	17.6	19.4	L
0.54934	26.8	21.6	13.3	40.1	34.9	56.0	46.0	15.9	11.1	L
23.99900	25.5	22.5	15.7	41.2	38.2	60.0	50.0	18.8	11.8	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.

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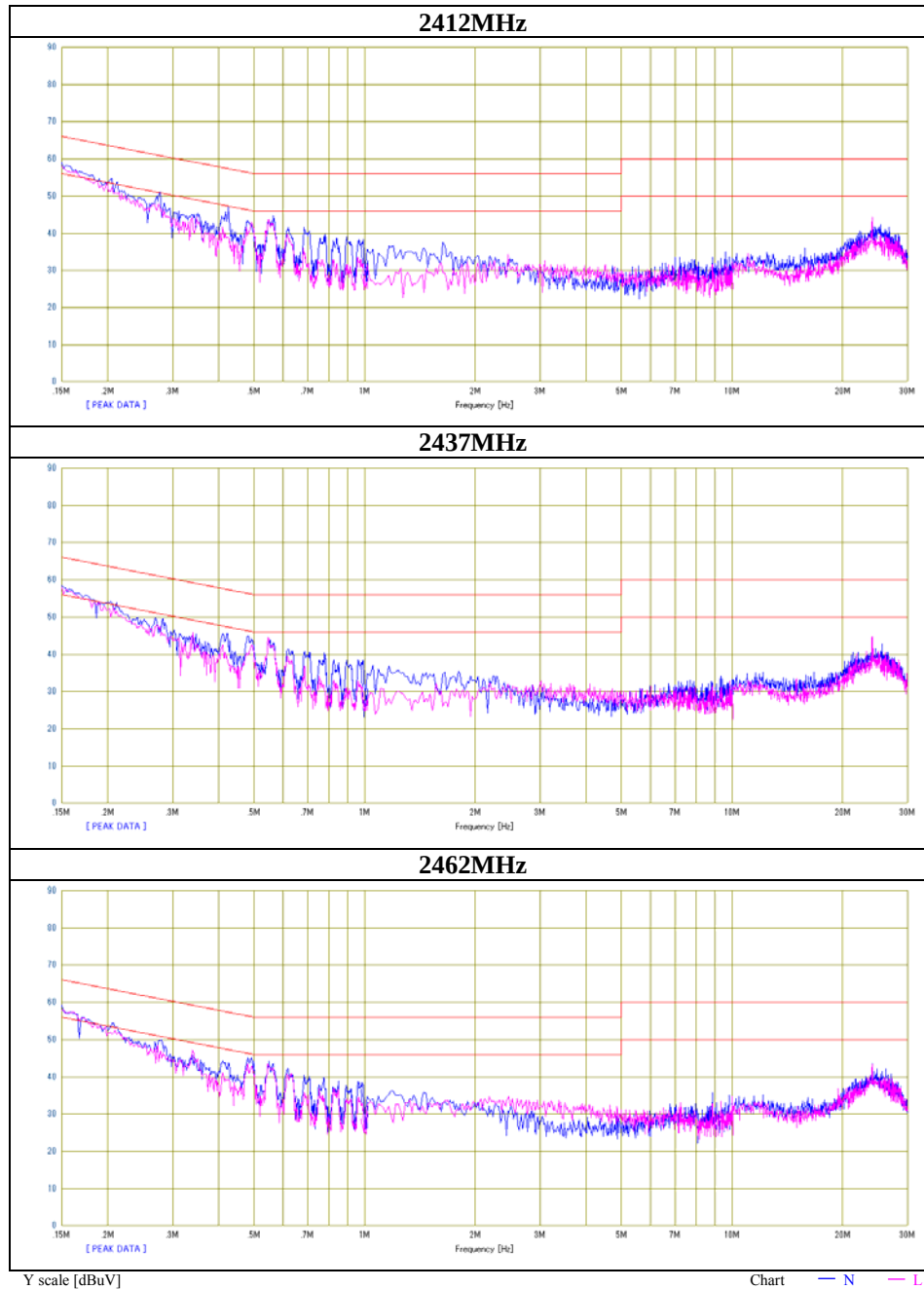
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Conducted Emission

Test place	Head Office EMC Lab. No.1 Semi Anechoic Chamber
Report No.	4786001400H
Date	12/10/2012
Temperature/ Humidity	21deg. C / 35% RH
Engineer	Hiroshi Kukita
Mode	Tx 11b



6dB Bandwidth

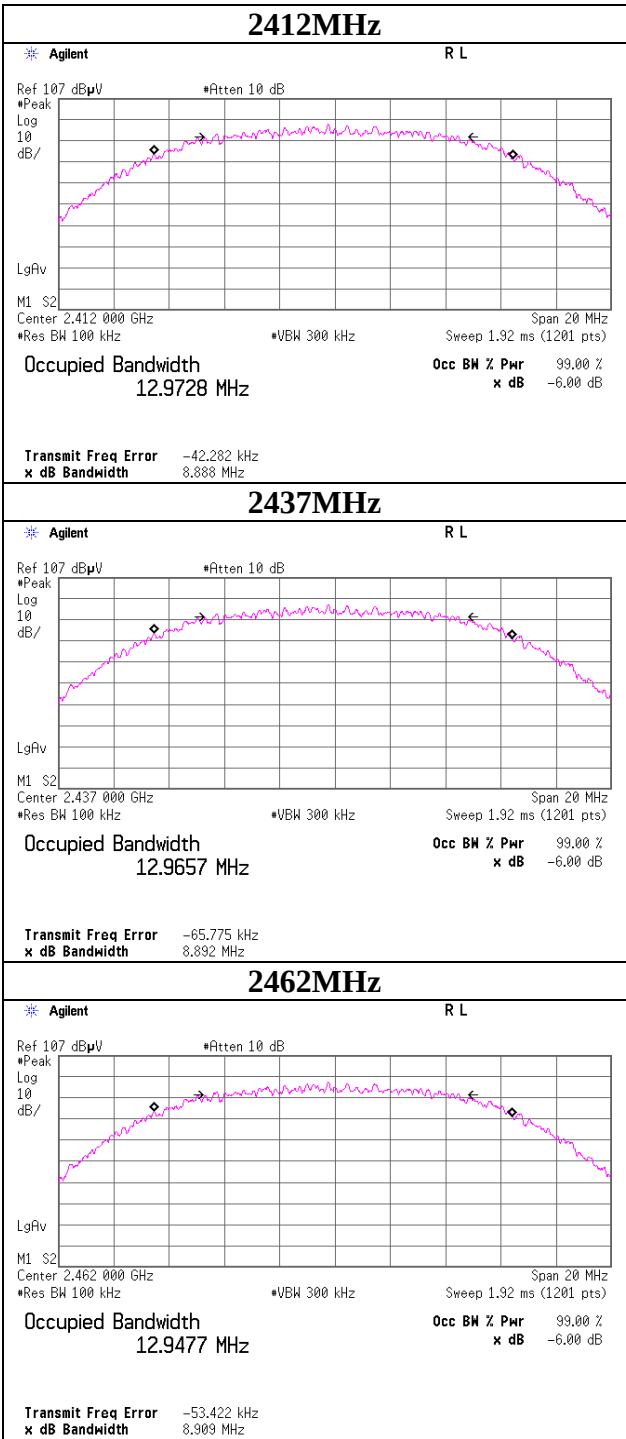
Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 4786001400H
Date 12/02/2012
Temperature/ Humidity 23 deg. C / 40% RH
Engineer Katsunori Okai
Mode 11b Tx

11b

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	8.888	>500
2437	8.892	>500
2462	8.909	>500

6dB Bandwidth

11b



Maximum Peak Output Power

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 4786001400H
Date 12/02/2012
Temperature/ Humidity 23 deg. C / 40% RH
Engineer Katsunori Okai
Mode 11b Tx

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	-0.63	2.03	10.00	11.40	13.80	30.00	1000	18.60
2437	-1.06	2.03	10.00	10.97	12.50	30.00	1000	19.03
2462	-1.15	2.05	10.00	10.90	12.30	30.00	1000	19.10

Sample Calculation:

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

2412MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
1	-0.76	
2	-0.73	
5.5	-1.10	
11	-0.63	*

*: Worst Rate

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

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Average Output Power

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 4786001400H
Date 12/02/2012
Temperature/ Humidity 23 deg. C / 40% RH
Engineer Katsunori Okai
Mode 11b Tx

[AV]

11b **11Mbps**

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	-3.33	2.03	10.00	8.70	7.41	30.00	1000	21.30
2437	-3.78	2.03	10.00	8.25	6.68	30.00	1000	21.75
2462	-3.97	2.05	10.00	8.08	6.43	30.00	1000	21.92

Sample Calculation:

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

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Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 4786001400H
Date 12/05/2012
Temperature/ Humidity 23 deg. C / 34% RH
Engineer Motoya Imura
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	48.000	QP	37.2	11.4	7.4	32.0	24.0	40.0	16.0	
Hori	144.001	QP	41.2	14.7	8.6	32.3	32.2	43.5	11.3	
Hori	168.002	QP	41.0	15.7	8.9	32.2	33.4	43.5	10.1	
Hori	192.002	QP	39.1	16.5	9.1	32.2	32.5	43.5	11.0	
Hori	360.000	QP	33.7	16.3	10.4	32.1	28.3	46.0	17.7	
Hori	432.000	QP	33.3	17.6	10.9	32.0	29.8	46.0	16.2	
Hori	2323.000	PK	45.0	27.2	2.2	32.4	42.0	73.9	31.9	
Hori	2390.000	PK	46.6	27.4	2.3	32.4	43.9	73.9	30.0	
Hori	2396.870	PK	48.2	27.4	2.3	32.4	45.5	-	-	See 20dBc Data Sheet
Hori	2400.000	PK	46.7	27.4	2.3	32.4	44.0	-	-	See 20dBc Data Sheet
Hori	2587.000	PK	43.0	28.0	2.4	32.3	41.1	73.9	32.8	
Hori	4824.000	PK	44.1	31.7	4.1	31.4	48.5	73.9	25.4	
Hori	7236.000	PK	42.5	36.3	4.7	32.4	51.1	73.9	22.8	
Hori	9648.000	PK	44.3	38.2	4.7	33.0	54.2	73.9	19.7	
Hori	2323.000	AV	34.0	27.2	2.2	32.4	31.0	53.9	22.9	
Hori	2390.000	AV	36.5	27.4	2.3	32.4	33.8	53.9	20.1	
Hori	2587.000	AV	32.2	28.0	2.4	32.3	30.3	53.9	23.6	
Hori	4824.000	AV	35.1	31.7	4.1	31.4	39.5	53.9	14.4	
Hori	7236.000	AV	33.1	36.3	4.7	32.4	41.7	53.9	12.2	
Hori	9648.000	AV	35.2	38.2	5.4	33.0	45.8	53.9	8.1	
Vert	48.000	QP	42.0	11.4	7.4	32.2	28.6	40.0	11.4	
Vert	144.001	QP	41.9	14.7	8.6	32.3	32.9	43.5	10.6	
Vert	168.002	QP	36.4	15.7	8.9	32.2	28.8	43.5	14.7	
Vert	192.003	QP	37.4	16.5	9.1	32.2	30.8	43.5	12.7	
Vert	360.000	QP	32.0	16.3	10.4	32.1	26.6	46.0	19.4	
Vert	432.000	QP	32.0	17.6	10.9	32.0	28.5	46.0	17.5	
Vert	2323.000	PK	45.0	27.2	2.2	32.4	42.0	73.9	31.9	
Vert	2390.000	PK	46.7	27.4	2.3	32.4	44.0	73.9	29.9	
Vert	2396.870	PK	47.0	27.4	2.3	32.4	44.3	-	-	See 20dBc Data Sheet
Vert	2400.000	PK	45.8	27.4	2.3	32.4	43.1	-	-	See 20dBc Data Sheet
Vert	2587.000	PK	32.2	28.0	2.4	32.3	30.3	73.9	43.6	
Vert	4824.000	PK	44.1	31.7	4.1	31.4	48.5	73.9	25.4	
Vert	7236.000	PK	42.5	36.3	4.7	32.4	51.1	73.9	22.8	
Vert	9648.000	PK	44.1	38.2	5.4	33.0	54.7	73.9	19.2	
Vert	2323.000	AV	34.0	27.2	2.2	32.4	31.0	53.9	22.9	
Vert	2390.000	AV	37.2	27.4	2.3	32.4	34.5	53.9	19.4	
Vert	2587.000	AV	43.0	28.0	2.4	32.3	41.1	53.9	12.8	
Vert	4824.000	AV	35.5	31.7	4.1	31.4	39.9	53.9	14.0	
Vert	7236.000	AV	33.1	36.3	4.7	32.4	41.7	53.9	12.2	
Vert	9648.000	AV	34.8	38.2	5.4	33.0	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).

*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

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	99.6	27.5	2.3	32.4	97.0	-	-	Carrier
Hori	2396.870	PK	48.2	27.4	2.3	32.4	45.5	77.0	31.5	
Hori	2400.000	PK	46.7	27.4	2.3	32.4	44.0	77.0	33.0	
Vert	2412.000	PK	98.3	27.5	2.3	32.4	95.7	-	-	Carrier
Vert	2396.870	PK	47.0	27.4	2.3	32.4	44.3	75.7	31.4	
Vert	2400.000	PK	45.8	27.4	2.3	32.4	43.1	75.7	32.6	

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. : 4786001400H
Date : 12/05/2012
Temperature/ Humidity : 23 deg. C / 34% RH
Engineer : Motoya Imura
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	48.000	QP	37.2	11.4	7.4	32.2	23.8	40.0	16.2	
Hori	144.001	QP	41.3	14.7	8.6	32.3	32.3	43.5	11.2	
Hori	168.002	QP	40.9	15.7	8.9	32.2	33.3	43.5	10.2	
Hori	192.002	QP	39.2	16.5	9.1	32.2	32.6	43.5	10.9	
Hori	336.000	QP	33.8	15.6	10.2	32.1	27.5	46.0	18.5	
Hori	432.000	QP	34.0	17.6	10.9	32.0	30.5	46.0	15.5	
Hori	2350.000	PK	43.2	27.3	2.3	32.4	40.4	73.9	33.5	
Hori	2570.000	PK	44.0	28.0	2.4	32.3	42.1	73.9	31.8	
Hori	4874.000	PK	42.3	31.9	4.0	31.4	46.8	73.9	27.1	
Hori	7311.000	PK	41.8	36.5	4.7	32.5	50.5	73.9	23.4	
Hori	9748.000	PK	42.8	38.3	5.4	33.0	53.5	73.9	20.4	
Hori	2350.000	AV	33.2	27.3	2.3	32.4	30.4	53.9	23.5	
Hori	2570.000	AV	32.3	28.0	2.4	32.3	30.4	53.9	23.5	
Hori	4874.000	AV	33.7	31.9	4.0	31.4	38.2	53.9	15.7	
Hori	7311.000	AV	33.0	36.5	4.7	32.5	41.7	53.9	12.2	
Hori	9748.000	AV	34.9	38.3	5.4	33.0	45.6	53.9	8.3	
Vert	48.002	QP	41.8	11.4	7.4	32.2	28.4	40.0	11.6	
Vert	144.002	QP	42.0	14.7	8.6	32.3	33.0	43.5	10.5	
Vert	168.002	QP	36.9	15.7	8.9	32.2	29.3	43.5	14.2	
Vert	192.003	QP	37.2	16.5	9.1	32.2	30.6	43.5	12.9	
Vert	336.000	QP	33.0	15.6	10.2	32.1	26.7	46.0	19.3	
Vert	432.000	QP	32.1	17.6	10.9	32.0	28.6	46.0	17.4	
Vert	2350.000	PK	43.2	27.3	2.3	32.4	40.4	73.9	33.5	
Vert	2570.000	PK	44.1	28.0	2.4	32.3	42.2	73.9	31.7	
Vert	4874.000	PK	42.2	31.9	4.0	31.4	46.7	73.9	27.2	
Vert	7311.000	PK	41.8	36.5	4.7	32.5	50.5	73.9	23.4	
Vert	9748.000	PK	42.7	38.3	5.4	33.0	53.4	73.9	20.5	
Vert	2350.000	AV	33.2	27.3	2.3	32.4	30.4	53.9	23.5	
Vert	2570.000	AV	32.3	28.0	2.4	32.3	30.4	53.9	23.5	
Vert	4874.000	AV	33.7	31.9	4.0	31.4	38.2	53.9	15.7	
Vert	7311.000	AV	33.0	36.5	4.7	32.5	41.7	53.9	12.2	
Vert	9748.000	AV	34.8	38.3	5.4	33.0	45.5	53.9	8.4	

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).

*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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 4786001400H
Date 12/05/2012
Temperature/ Humidity 23 deg. C / 34% RH
Engineer Motoya Imura

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	48.000	QP	37.2	11.4	7.4	32.2	23.8	40.0	16.2	
Hori	144.002	QP	41.3	14.7	8.6	32.3	32.3	43.5	11.2	
Hori	167.998	QP	40.7	15.7	8.9	32.2	33.1	43.5	10.4	
Hori	192.002	QP	38.8	16.5	9.1	32.2	32.2	43.5	11.3	
Hori	360.080	QP	33.2	16.3	10.4	32.1	27.8	46.0	18.2	
Hori	432.000	QP	33.7	17.6	10.9	32.0	30.2	46.0	15.8	
Hori	2373.000	PK	43.8	27.3	2.3	32.4	41.0	73.9	32.9	
Hori	2483.500	PK	45.2	27.7	2.3	32.3	42.9	73.9	31.0	
Hori	2506.000	PK	46.2	27.8	2.3	32.3	44.0	73.9	29.9	
Hori	4924.000	PK	42.2	32.1	4.0	31.4	46.9	73.9	27.0	
Hori	7386.000	PK	41.8	36.6	4.7	32.5	50.6	73.9	23.3	
Hori	9848.000	PK	42.2	38.5	5.4	33.1	53.0	73.9	20.9	
Hori	2373.000	AV	35.2	27.3	2.3	32.4	32.4	53.9	21.5	
Hori	2483.500	AV	34.5	27.7	2.3	32.3	32.2	53.9	21.7	
Hori	2506.000	AV	38.4	27.8	2.3	32.3	36.2	53.9	17.7	
Hori	4924.000	AV	33.5	32.1	4.0	31.4	38.2	53.9	15.7	
Hori	7386.000	AV	32.4	36.6	4.7	32.5	41.2	53.9	12.7	
Hori	9848.000	AV	33.0	38.5	5.4	33.1	43.8	53.9	10.1	
Vert	48.002	QP	41.8	11.4	7.4	32.2	28.4	40.0	11.6	
Vert	144.001	QP	42.2	14.7	8.6	32.3	33.2	43.5	10.3	
Vert	168.000	QP	36.8	15.7	8.9	32.2	29.2	43.5	14.3	
Vert	191.998	QP	37.1	16.5	9.1	32.2	30.5	43.5	13.0	
Vert	360.080	QP	32.1	16.3	10.4	32.1	26.7	46.0	19.3	
Vert	432.000	QP	31.7	17.6	10.9	32.0	28.2	46.0	17.8	
Vert	2373.000	PK	43.0	27.3	2.3	32.4	40.2	73.9	33.7	
Vert	2483.500	PK	47.5	27.7	2.3	32.3	45.2	73.9	28.7	
Vert	2506.000	PK	47.0	27.8	2.3	32.3	44.8	73.9	29.1	
Vert	4924.000	PK	42.0	32.1	4.0	31.4	46.7	73.9	27.2	
Vert	7386.000	PK	41.8	36.6	4.7	32.5	50.6	73.9	23.3	
Vert	9848.000	PK	42.0	38.5	5.4	33.1	52.8	73.9	21.1	
Vert	2373.000	AV	34.4	27.3	2.3	32.4	31.6	53.9	22.3	
Vert	2483.500	AV	35.7	27.7	2.3	32.3	33.4	53.9	20.5	
Vert	2506.000	AV	39.0	27.8	2.3	32.3	36.8	53.9	17.1	
Vert	4924.000	AV	33.2	32.1	4.0	31.4	37.9	53.9	16.0	
Vert	7386.000	AV	32.4	36.6	4.7	32.5	41.2	53.9	12.7	
Vert	9848.000	AV	32.8	38.5	5.4	33.1	43.6	53.9	10.3	

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).

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

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

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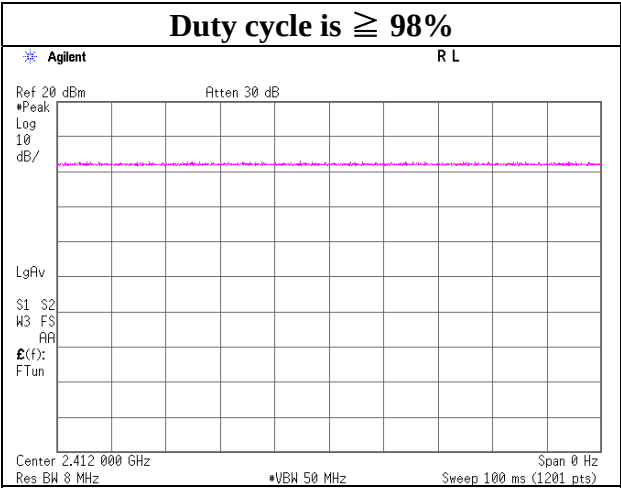
Head Office EMC Lab.

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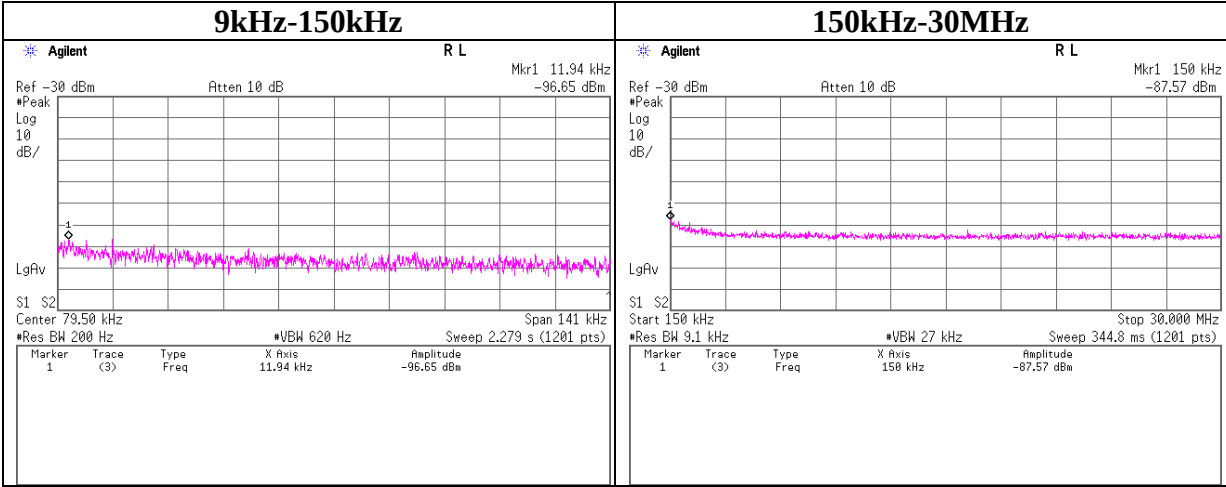
Facsimile : +81 596 24 8124

Burst rate confirmation



Conducted Spurious Emission

11b Tx 2412MHz

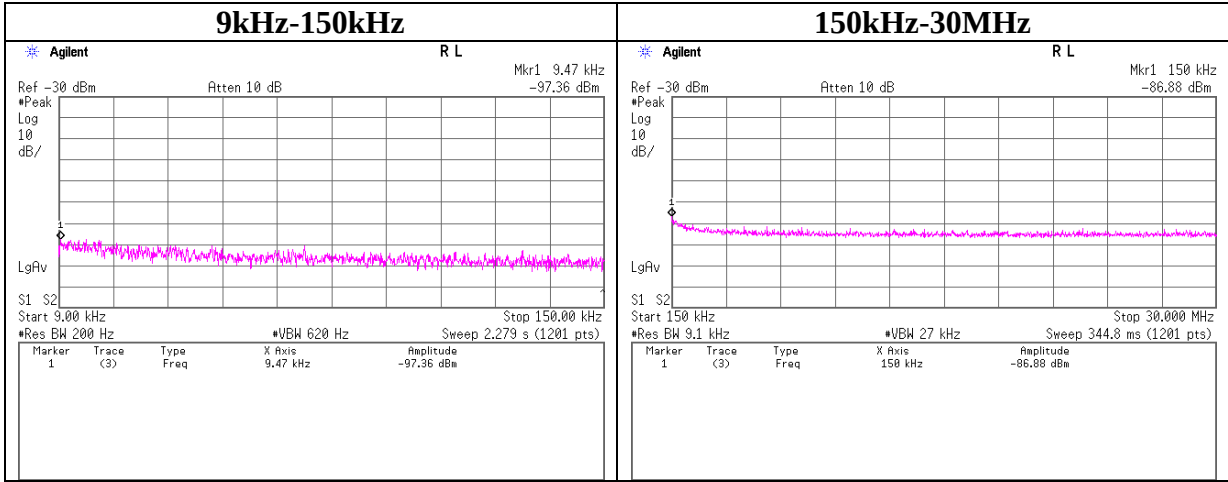


Frequency	Reading	Cable Loss	Attenuator	Antenna Gain	EIRP	Distance	Ground bounce	E (field strength)	Limit	Remark
[kHz]	[dBm]	[dB]	[dB]	[dB]	[dBm]	[m]	[dB]	[dBuV/m]	[dBuV/m]	
11.940	-96.7	0.02	9.9	4.0	-82.8	300.0	6.0	-21.5	46.1	
150.000	-87.6	0.01	9.8	4.0	-73.7	300.0	6.0	-12.5	24.1	

E=EIRP-20log(D)+Ground bounce +104.8[dBuV/m]

Conducted Spurious Emission

11b Tx 2437MHz

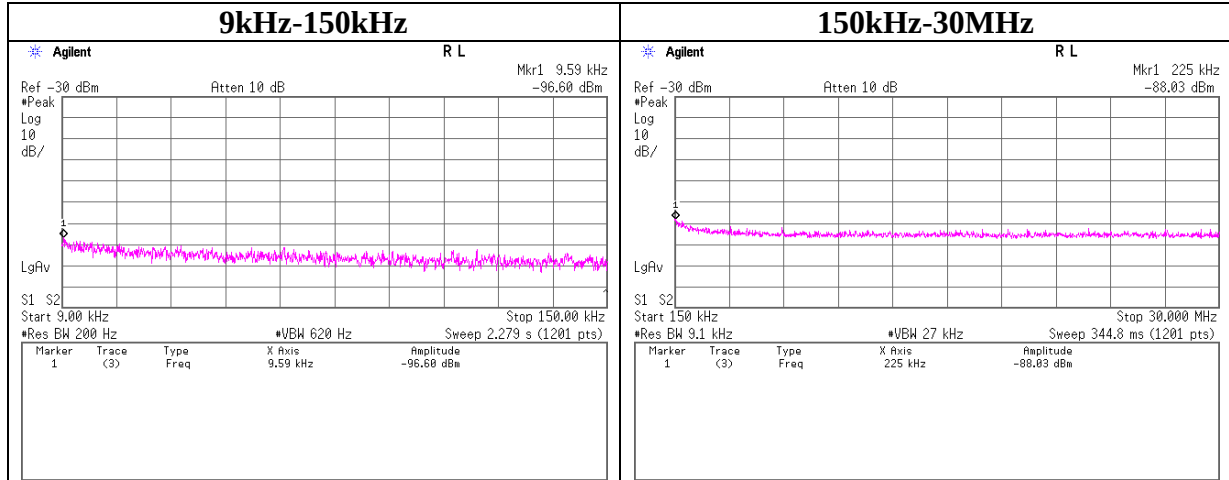


Frequency	Reading	Cable Loss	Attenuator	Antenna Gain	EIRP	Distance	Ground bounce	E (field strength)	Limit	Margin	Remark
[kHz]	[dBm]	[dB]	[dB]	[dB]	[dBm]	[m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
9.470	-97.4	0.01	9.9	4.0	-83.5	300.0	6.0	-22.2	48.1	70.3	
150.000	-86.7	0.01	9.8	4.0	-72.9	300.0	6.0	-11.6	24.1	35.7	

E=EIRP-20log(D)+Ground bounce +104.8[dBuV/m]

Conducted Spurious Emission

11b Tx 2462MHz



Frequency	Reading	Cable Loss	Attenuator	Antenna Gain	EIRP	Distance	Ground bounce	E (field strength)	Limit	Margin	Remark
[kHz]	[dBm]	[dB]	[dB]	[dB]	[dBm]	[m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
9.590	-96.6	0.02	9.9	4.0	-82.7	300.0	6.0	-21.5	48.0	69.4	
225.000	-88.0	0.01	9.8	4.0	-74.2	300.0	6.0	-12.9	20.6	33.5	

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

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Power Density

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 4786001400H
Date 12/02/2012
Temperature/ Humidity 23 deg. C / 40% RH
Engineer Katsunori Okai
Mode 11b Tx

11b

Freq.	Reading	Cable Loss	Atten.	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-26.84	2.03	10.00	-14.81	8.00	22.81
2437.00	-27.63	2.03	10.00	-15.60	8.00	23.60
2462.00	-27.76	2.05	10.00	-15.71	8.00	23.71

Sample Calculation:

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

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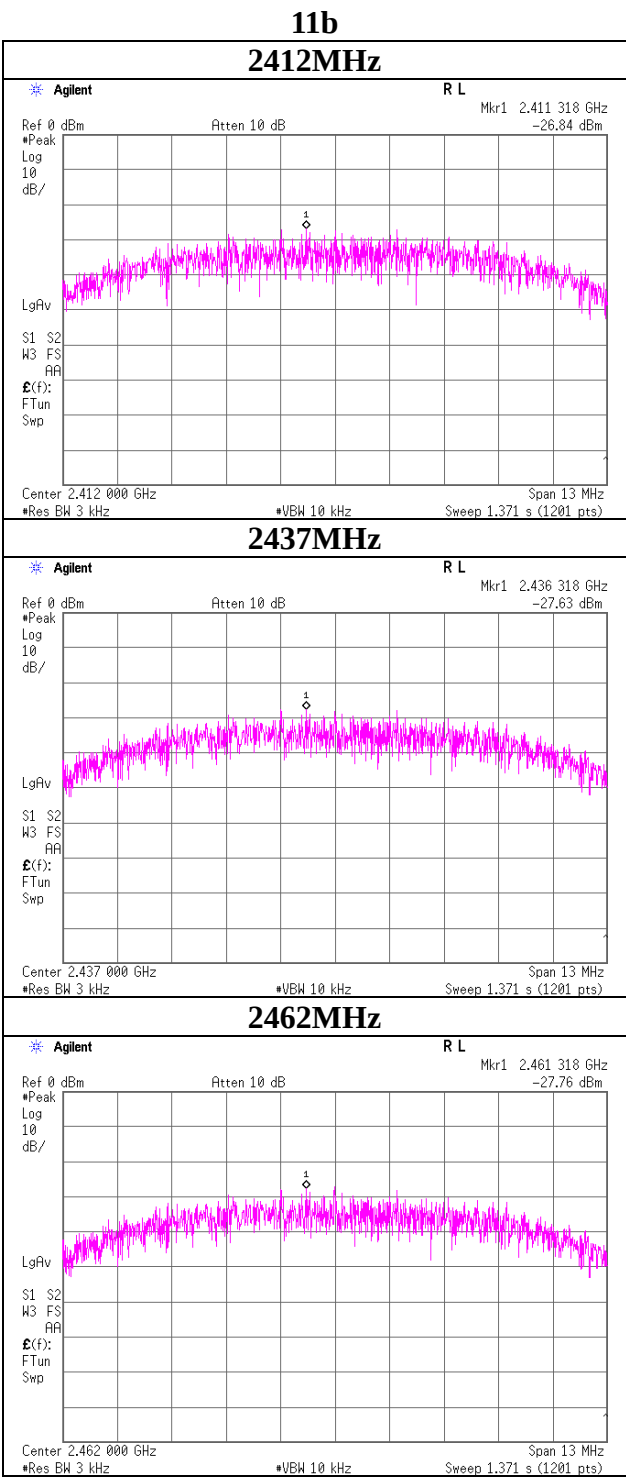
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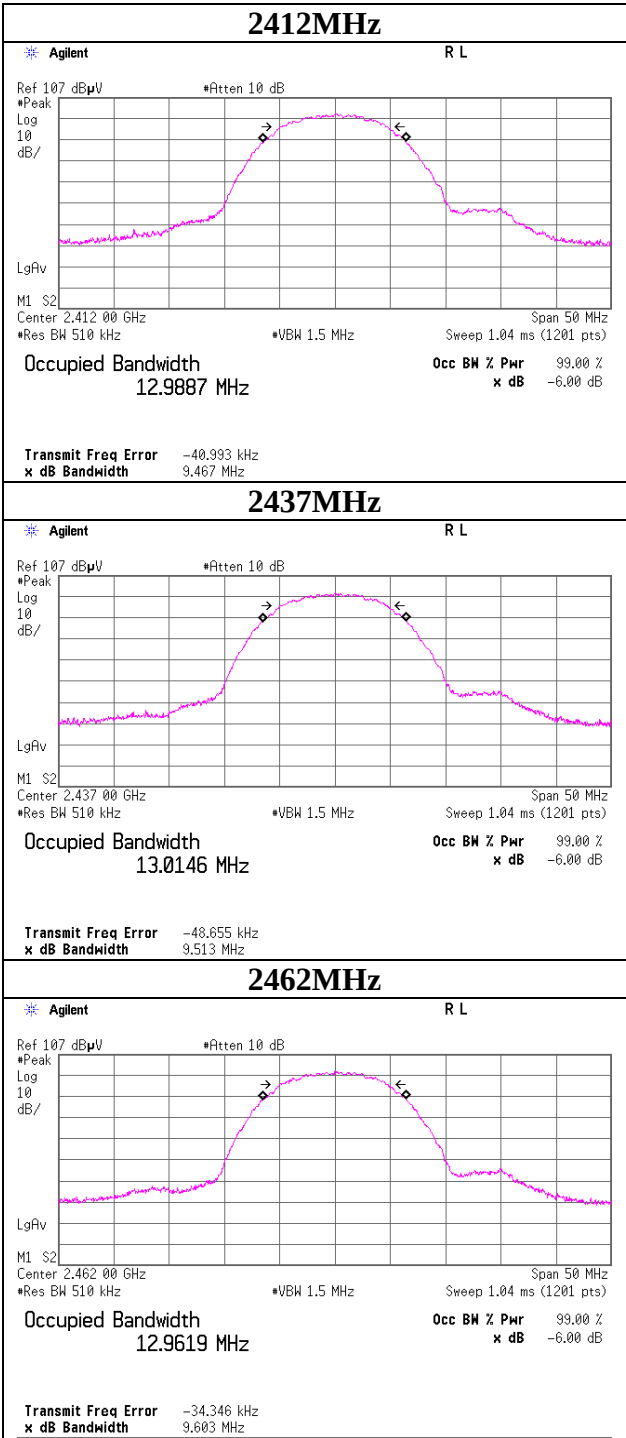
Facsimile : +81 596 24 8124

Power Density



99%Occupied Bandwidth

11b



APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2011/12/09 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	AT	2012/11/20 * 12
MPM-12	Power Meter	Anritsu	ML2495A	0825002	AT	2012/06/01 * 12
MPSE-17	Power sensor	Anritsu	MA2411B	0738285	AT	2012/06/01 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2012/03/27 * 12
MCC-138	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37953/2	AT	2012/10/17 * 12
MCC-103	Microwave Cable	Hirose Electric	U.FL-2LP-066J1-A(200)	-	AT	2012/06/27 * 12
MTA-38	Terminator	OMC	BL01-6118-00(50Ω SMA)	-	AT	Pre Check
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2012/06/29 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2012/02/06 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2012/02/22 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2012/01/25 * 12
MHA-02	Horn Antenna 18-26.5GHz	EMCO	3160-09	1265	RE	2012/02/22 * 12
MCC-132	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336161/4(1m) / 340639(5m)	RE	2012/09/05 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2012/02/24 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE	2012/02/06 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	RE	2012/11/21 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2012/08/23 * 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
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2012/05/25 * 12
MCC-133	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336164/4(1m) / 340640(5m)	RE	2012/09/05 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2012/03/29 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2012/05/21 * 12
MAEC-01	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	CE	2012/08/01 * 12
MOS-27	Thermo-Hygrometer	CUSTOM	CTH-201	A08Q26	CE	2012/02/08 * 12
MJM-01	Measure	KDS	ES19-55	-	CE	-
MTR-09	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	CE	2012/06/14 * 12
MLS-02	LISN(AMN)	Schwarzbeck	NSLK8127	8127383	CE(EUT)	2012/07/17 * 12
MCC-03	Coaxial Cable	Fujikura/Suhner/TSJ	5D-2W(20m)/3D-2W(7.5m)/RG400u(1.5m)/RFM-E421(Switcher)	-/01068(Switcher)	CE	2012/01/22 * 12
MAT-64	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2012/01/28 * 12
MAT-10	Attenuator(10dB)	Weinschel Corp	2	BL1173	AT	2012/11/06 * 12
MCC-64	Coaxial Cable	UL Japan	-	-	AT	2012/03/22 * 12

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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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