RADIO TEST REPORT

Test Report No.: 10430016S-A

(Original report: 32KE0045-SH-04-A)

Applicant	:	**RICOH COMPANY, LTD.**
Type of Equipment	:	**Wireless LAN Module**
Model No.	:	**LBWB1ZZWU6**
FCC ID	:	**BBP-WLALT01**
Test regulation	:	**FCC Part15 Subpart C: 2014**
Test item	:	**Conducted emission** **Radiated Spurious emission**
Test result	:	**Complied**

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3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.

Date of test: September 30 to October 9, 2014

Representative test engineer:

Yasumasa Owaki
Engineer
Consumer Technology Division

Approved by :

Toyokazu Imamura
Leader
Consumer Technology Division

☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
☒ There is no testing item of "Non-accreditation".

RTL02610

UL Japan, Inc.
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
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REVISION HISTORY

Original Test Report No.: 10430016S-A

Revision	Test report No.	Date	Page revised	Contents
-(Original)	10430016S-A	October 28, 2014	-	-

UL Japan, Inc.
Shonan EMC Lab.
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Contents

SECTION 1: Customer information

Company Name	:	RICOH COMPANY, LTD.
Address	:	810, Shimo-imaizumi, Ebina-shi, Kanagawa, 243-0460 Japan
Telephone Number	:	+81-46-249-8490
Facsimile Number	:	+81-3-6673-4366
Contact Person	:	Yoshiaki Nishikawa

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

2.1 Identification of E.U.T.

Type of Equipment	:	Wireless LAN Module
Model Number	:	LBWB1ZZWU6
Serial Number	:	784B879B3786
Rating	:	DC 3.6V
Country of Mass-production	:	China
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample	:	September 29, 2014
Modification of EUT	:	No modification by the test lab.

2.2 Product description

Model: LBWB1ZZWU6 (referred to as the EUT in this report) is a Wireless LAN Module.

Clock frequency(ies) in the system : 37.4MHz

<Radio part>

Equipment type	:	Transceiver	
Frequency of operation *1)	:	2.4GHz:	2412-2462MHz (IEEE 802.11b, 11g, 11n-HT20)
		W52:	5180-5240MHz (IEEE 802.11a, 11n-HT20)
			5190-5230MHz (IEEE 802.11n-HT40)
		W53:	5260-5320MHz (IEEE 802.11a, 11n-HT20)
			5270-5310MHz (IEEE 802.11n-HT40)
		W56:	5500-5700MHz (IEEE 802.11a, 11n-HT20)
			5510-5670MHz (except 5600-5650MHz) (IEEE 802.11n-HT40)
		W58:	5745-5825MHz (IEEE 802.11a, 11n-HT20)
			5755-5795MHz (IEEE 802.11n-HT40)
Bandwidth	:	20MHz	
Channel spacing	:	5MHz (2.4GHz), 20MHz/40MHz (5GHz)	
Type of modulation	:	DSSS (IEEE 802.11b), OFDM (IEEE 802.11a/g/n)	
Antenna type	:	Printed PCB	
Antenna connector type	:	JSC	
Antenna gain	:	2.4GHz: -1.1dBi, W52/53: 2.3dBi, W56: 4.5dBi, W58: 2.7dBi	
ITU code	:	D1D, G1D	
Operation temperature range	:	0 to +80 deg.C.	

*1) Refer to the test reports: 10430016S-B for FCC 15.407.

FCC 15.31 (e) / 212
The host device provides stable voltage (DC3.6V) constantly to the EUT regardless of input voltage. Therefore, the EUT complies with the requirement.

FCC 15.203 / 212
The EUT has a unique coupling/antenna connector. Therefore the equipment complies with the requirement.

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 15.209 Radiated emission limits, general requirements
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 & Results

Item	Test Procedure *1)	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.10:2009	FCC 15.207	-	N/A	13.1dB Freq.: 0.42698MHz Detection: Average Phase: L1 Mode: Tx 2462MHz, IEEE 802.11g	Complied
6dB bandwidth	ANSI C63.10:2009	FCC 15.247 (a)(2)	Conducted	*2)	-	-
Maximum peak output power	ANSI C63.10:2009	FCC 15.247 (b)(3)	Conducted	*2)		-
Out of band emission & Restricted band edges	ANSI C63.10:2009	FCC 15.247 (d) & 15.209	Radiated	N/A	2.7dB Freq.: 48.873MHz Polarization: Vertical Detection: Quasi-Peak Mode: Tx 2462MHz, IEEE 802.11g	Complied
Power density	ANSI C63.10:2009	FCC 15.247 (e)	Conducted	*2)	-	-

Note: UL Japan's EMI Work Procedures No.13-EM-W0420 and 13-EM-W0422.
*1) These tests were also referred to KDB 558074 v03 r02 (FCC), "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247" and KDB 558074 D02 DTS Part 15.247 Old Rule.
*2) Refer to the original test report: 32KE0045-SH-04-A.

3.3 Addition to standard

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.

Item	Frequency range	No.1 SAC[*1]/SR[*2] (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
Conducted emission (AC Mains) LISN	150kHz-30MHz	3.6 dB	3.6 dB	3.5 dB
Radiated emission (Measurement distance: 3m)	9kHz-30MHz	3.7 dB	3.7 dB	3.6 dB
	30MHz-300MHz	4.8 dB	5.0 dB	4.8 dB
	300MHz-1GHz	5.0 dB	5.0 dB	4.8 dB
	1GHz-15GHz	4.9 dB	4.9 dB	4.9 dB
Radiated emission (Measurement distance: 1m)	15GHz-18GHz	5.7 dB	5.6 dB	5.6 dB
	18GHz-40GHz	5.2 dB	4.3 dB	4.3 dB

*1: SAC=Semi-Anechoic Chamber
*2: SR= Shielded Room is applied besides radiated emission

Conducted emission test

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

Radiated emission test

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

3.5 Test location

UL Japan, Inc. Shonan EMC Lab.
1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
Telephone number : +81 463 50 6400
Facsimile number : +81 463 50 6401
JAB Accreditation No. : RTL02610

	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
☐ No.1 semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☐ No.2 semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☒ No.3 semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
☐ No.4 semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
☐ No.1 shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.2 shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☒ No.3 shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
☐ No.4 shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
☐ No.5 shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☐ No.6 shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☐ No.1 measurement room	-	2.55 x 4.1 x 2.5	-	-

3.6 Test setup, Test data & Test instruments

Refer to APPENDIX 1 to 3.

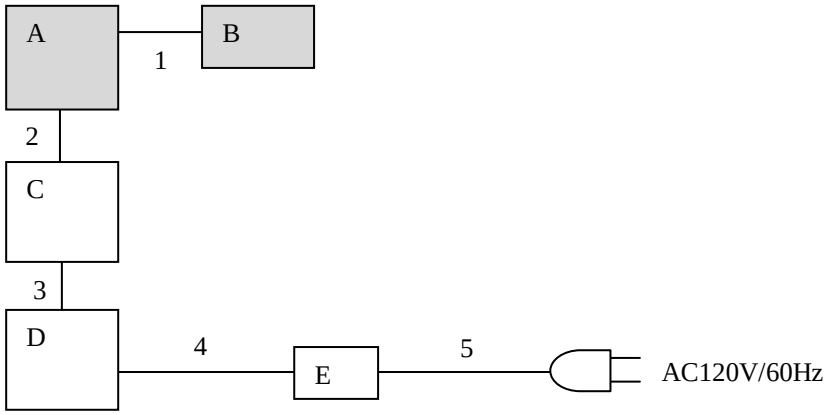
SECTION 4: Operation of E.U.T. during testing

4.1 Operating mode

Test item	Mode	Tested frequency	Power setting *1)	Worst data rate *2)
Conducted emission Radiated emission (below 1GHz) *3)	Transmitting IEEE 802.11g	2462MHz	14dBm	6Mbps, PN9
	Transmitting IEEE 802.11n HT20	5745MHz	13dBm	MCS0, PN9
Radiated emission (above 1GHz)	Transmitting IEEE 802.11b	2412MHz, 2437MHz, 2462MHz	14dBm	1Mbps, PN9
	Transmitting IEEE 802.11g	2412MHz, 2437MHz, 2462MHz	14dBm	6Mbps, PN9
	Transmitting IEEE 802.11n HT20	2412MHz, 2437MHz, 2462MHz	13dBm	MCS0, PN9
	Transmitting IEEE 802.11a	5745MHz, 5785MHz, 5825MHz	13dBm	6Mbps, PN9
	Transmitting IEEE 802.11n HT20	5745MHz, 5785MHz, 5825MHz	13dBm	MCS0, PN9
	Transmitting IEEE 802.11n HT40	5755MHz, 5795MHz	13dBm	MCS0, PN9
*1) Software: Tera Term ver: 4.71, Wl.exe ver:1.0 *2) The worst condition was determined based on the original test report. *3) 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.				

Justification: The system was configured in typical fashion (as customer would normally use it) for testing.

4.2 Configuration and peripherals



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Wireless LAN Module	LBWB1ZZWU6	784B879B3786	RICOH	EUT
B	Antenna	Y0515780	406S0078	RICOH	EUT
C	Network Board	NETWORK: ALT-2	#40	RICOH	-
D	Power Supply Board	EXCHANGE: NW2	WBJ181301	RICOH	-
E	AC Adapter	GFP451DA-1530	13D8-0001806	Li Tone Electronics	-

List of cables used

No.	Cable Name	Length (m)	Shield		Remark
			Cable	Connector	
1	Antenna	0.05	Shielded	Shielded	-
2	Flat	0.10	Unshielded	Unshielded	-
3	Flat	0.05	Unshielded	Unshielded	-
4	DC	1.8	Unshielded	Unshielded	-
5	AC	1.8	Unshielded	Unshielded	-

SECTION 5: Conducted emission

5.1 Operating environment

Test place : See test data (APPENDIX 1)
Temperature : See test data (APPENDIX 1)
Humidity : See test data (APPENDIX 1)

5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 0.8m above the conducting ground plane.
The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.
The rear of tabletop was located 40cm to the vertical conducting plane. The rear of peripheral was aligned and was 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 LISN.
Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN to the input power source. All unused 50ohm connectors of the LISN were resistively terminated in 50ohm when not connected to the measuring equipment.
Photographs of the set up are shown in APPENDIX 3.

5.3 Test conditions

Frequency range : 0.15 - 30MHz
EUT position : Table top

5.4 Test procedure

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT within a Shielded room.
The EUT was connected to a Line Impedance Stabilization Network (LISN).
An overview sweep with peak detection has been performed.
The measurements had been performed with a quasi-peak detector and if required, a CISPR average detector.
The conducted emission measurements were made with the following detection of the test receiver.

Detection Type : Quasi-Peak/ CISPR Average
IF Bandwidth : 9kHz

5.5 Results

Summary of the test results : Pass
Refer to APPENDIX 1

SECTION 6: Radiated emission

6.1 Operating environment

Test place : See test data (APPENDIX 1)
Temperature : See test data (APPENDIX 1)
Humidity : See test data (APPENDIX 1)

6.2 Test configuration

EUT was placed on a polystyrene platform of nominal size, 0.5m by 0.5m, raised 0.8m above the conducting ground plane. Photographs of the set up are shown in APPENDIX 3.

6.3 Test conditions

Frequency range : 30MHz to 40GHz
EUT position : Table top

6.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on a semi-anechoic chamber with a ground plane and at a distance of 3m (below 15GHz) / 1m (above 15GHz) (Refer to Figure 1). Measurements were performed with quasi-peak, peak and average detector. The measuring antenna height was varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity. The measurements were performed for both vertical and horizontal antenna polarization.
The radiated emission measurements were made with the following detection.

Frequency	30-1000MHz	1-40GHz		20dBc
Detection type	Quasi-Peak	Peak	Average *1)	Peak
IF Bandwidth	120kHz	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 3MHz Detector: Linear Voltage Averaging	RBW: 100kHz VBW: 300kHz

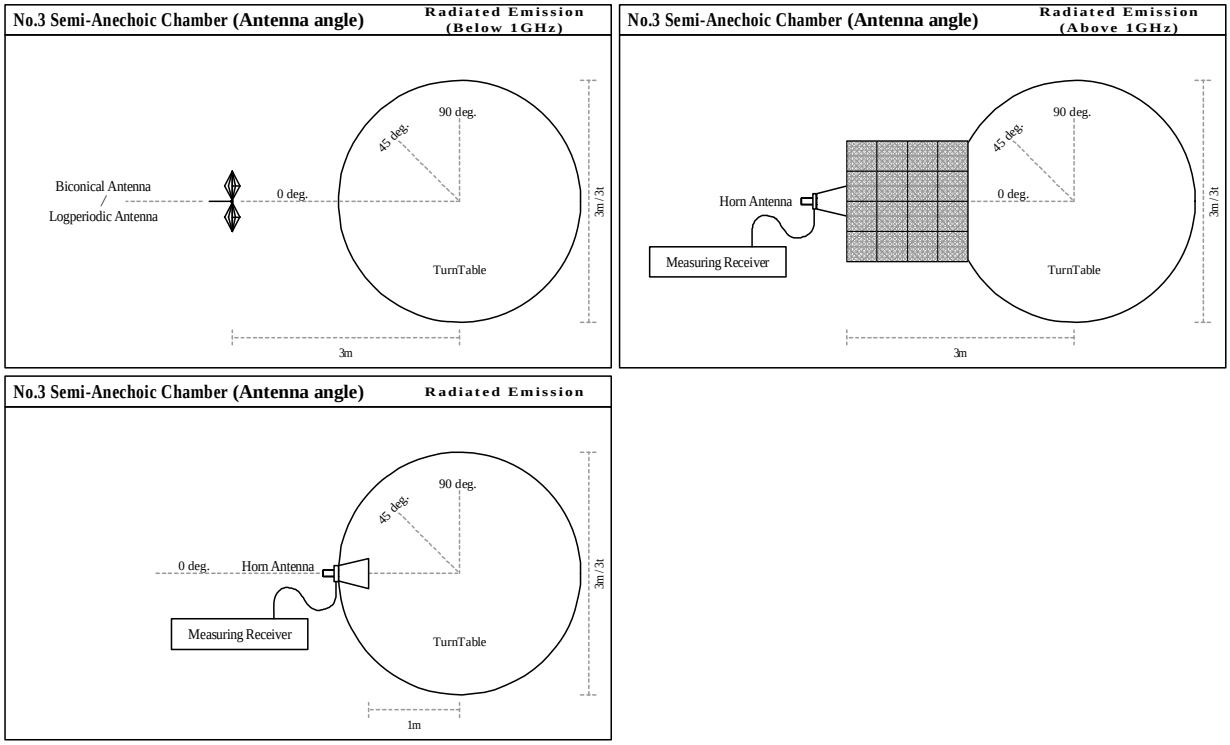
*1) Average Power Measurement was measured based on 12.2.5 of KDB 558074 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247" .

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.

	Antenna polarization	Carrier (Band edge)	Spurious			
			Below 1GHz	1-15GHz	15-18GHz	18-40GHz
Module	Horizontal	Y	X	Z	Z	X
Antenna		Y	X	Y	Y	X
Module	Vertical	Z	X	X	X	X
Antenna		Z	X	X	X	X

* The definition of each position is shown in a 'Pre-check of the worst position' in APPENDIX 3.

Figure 1. Antenna angle



6.5 Band edge

Band edge level at 2390MHz and 2483.5MHz is below the limits of FCC 15.209 and band edge level at 2400MHz, 5725MHz and 5850MHz is below the 20dBc. Refer to the data.

6.6 Results

Summary of the test results : Pass

* No noise was detected above the 5th order harmonics (2.4GHz bands).
* No noise was detected above the 3rd order harmonics (5GHz bands).

Refer to APPENDIX 1

Contents of APPENDIXES

APPENDIX 1: Data of Radio tests

Conducted emission
Radiated emission

APPENDIX 2: Test instruments

Test instruments

APPENDIX 3: Photographs of test setup

Conducted emission
Radiated emission
Pre-check of the worst position

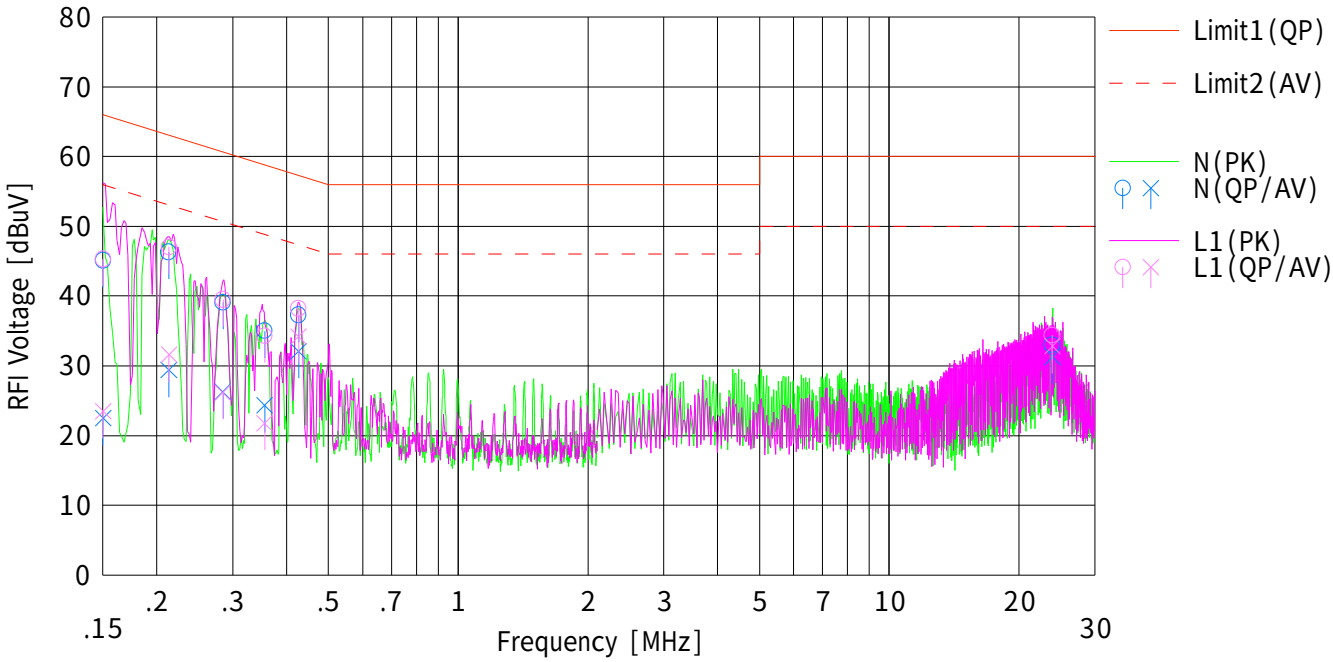
DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2014/10/03

Company	: RICOH COMPANY,LTD.	Mode	: Tx 11g 2462MHz
Kind of EUT	: Wireless Module	Report No.	: 10430016S
Model No.	: LBWB1ZZWU6, Y0515780	Power	: AC 120V / 60Hz
Serial No.	: 784B879B3786, 406S0078	Temp./Humi.	: 24deg.C. / 56%RH
Remarks	: -		

Limit1 : FCC 15C(15.207) QP
Limit2 : FCC 15C(15.207) AV

Engineer : Yasumasa Owaki



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	32.6	10.0	12.5	45.1	22.5	66.0	56.0	20.9	33.5	N	
2	0.21320	33.8	16.9	12.5	46.3	29.4	63.0	53.0	16.7	23.6	N	
3	0.28484	26.6	13.8	12.5	39.1	26.3	60.6	50.6	21.5	24.3	N	
4	0.35590	22.5	11.8	12.5	35.0	24.3	58.8	48.8	23.8	24.5	N	
5	0.42696	24.8	19.6	12.5	37.3	32.1	57.3	47.3	20.0	15.2	N	
6	23.90164	19.5	17.8	13.5	33.0	31.3	60.0	50.0	27.0	18.7	N	
7	0.15000	32.8	11.0	12.5	45.3	23.5	66.0	56.0	20.7	32.5	L1	
8	0.21351	34.5	19.1	12.5	47.0	31.6	63.0	53.0	16.0	21.4	L1	
9	0.28494	27.0	13.7	12.5	39.5	26.2	60.6	50.6	21.1	24.4	L1	
10	0.35580	21.8	9.3	12.5	34.3	21.8	58.8	48.8	24.5	27.0	L1	
11	0.42698	25.7	21.7	12.5	38.2	34.2	57.3	47.3	19.1	13.1	L1	
12	23.90232	20.9	19.3	13.5	34.4	32.8	60.0	50.0	25.6	17.2	L1	

Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(LISN+Cable+ATT)[dB]
LISN:SLS-05

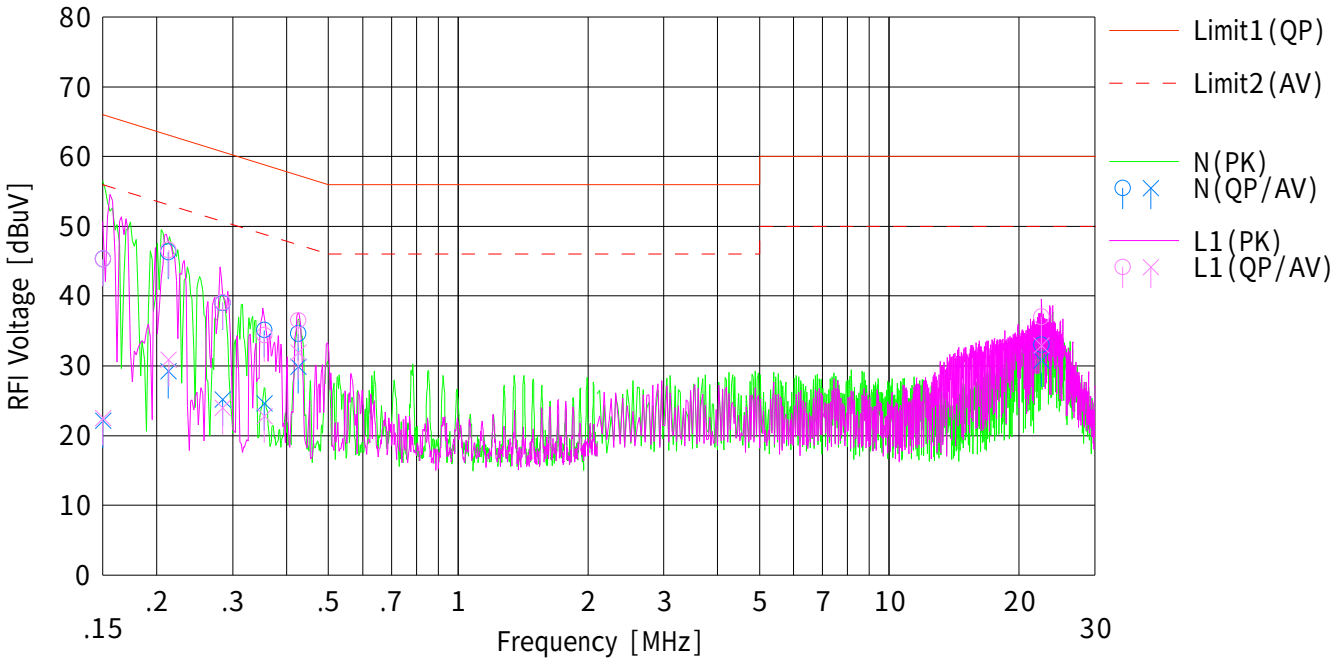
DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2014/10/03

Company	: RICOH COMPANY,LTD.	Mode	: Tx 11n-20HT 5745MHz
Kind of EUT	: Wireless Module	Report No.	: 10430016S
Model No.	: LBWB1ZZWU6, Y0515780	Power	: AC 120V / 60Hz
Serial No.	: 784B879B3786, 406S0078	Temp./Humi.	: 24deg.C. / 56%RH
Remarks	: -		

Limit1 : FCC 15C(15.207) QP
Limit2 : FCC 15C(15.207) AV

Engineer : Yasumasa Owaki



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	32.8	9.6	12.5	45.3	22.1	66.0	56.0	20.7	33.9	N	
2	0.21285	33.8	16.7	12.5	46.3	29.2	63.0	53.0	16.7	23.8	N	
3	0.28440	26.5	12.7	12.5	39.0	25.2	60.6	50.6	21.6	25.4	N	
4	0.35504	22.6	12.1	12.5	35.1	24.6	58.8	48.8	23.7	24.2	N	
5	0.42634	22.1	17.4	12.5	34.6	29.9	57.3	47.3	22.7	17.4	N	
6	22.58263	19.5	17.3	13.5	33.0	30.8	60.0	50.0	27.0	19.2	N	
7	0.15000	32.8	10.0	12.5	45.3	22.5	66.0	56.0	20.7	33.5	L1	
8	0.21302	34.1	18.4	12.5	46.6	30.9	63.0	53.0	16.4	22.1	L1	
9	0.28470	26.6	11.5	12.5	39.1	24.0	60.6	50.6	21.5	26.6	L1	
10	0.35548	21.9	10.3	12.5	34.4	22.8	58.8	48.8	24.4	26.0	L1	
11	0.42612	24.0	19.4	12.5	36.5	31.9	57.3	47.3	20.8	15.4	L1	
12	22.57243	23.5	19.4	13.5	37.0	32.9	60.0	50.0	23.0	17.1	L1	

Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(LISN+Cable+ATT)[dB]
LISN:SLS-05

Radiated Emission

Test place	No.3 Semi Anechoic Chamber		
Date	September 30, 2014	October 1, 2014	October 2, 2014
Temperature / Humidity	23 deg.C, 50 %RH	23 deg.C, 58 %RH	21 deg.C, 57 %RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Yasumasa Owaki
Mode	Tx, 2412 MHz		
	Tx, IEEE802.11b		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	1138.480	PK	55.5	24.0	12.3	40.8	51.0	73.9	22.9	144	170	
Hori.	1237.482	PK	55.1	24.2	12.4	40.9	50.8	73.9	23.1	148	297	
Hori.	2390.000	PK	50.4	26.4	13.6	41.1	49.3	73.9	24.6	100	40	
Hori.	3617.990	PK	51.1	28.4	5.5	40.9	44.1	73.9	29.8	100	119	
Hori.	4824.000	PK	49.1	30.7	6.0	39.8	46.0	73.9	27.9	100	36	
Hori.	7236.000	PK	46.7	36.7	7.1	40.2	50.3	73.9	23.6	100	0	
Hori.	12060.000	PK	47.5	39.5	9.3	39.6	56.7	73.9	17.2	100	0	
Hori.	1138.480	AV	53.0	24.0	12.3	40.8	48.5	53.9	5.4	144	170	
Hori.	1237.482	AV	52.8	24.2	12.4	40.9	48.5	53.9	5.4	148	297	
Hori.	2390.000	AV	41.3	26.4	13.6	41.1	40.2	53.9	13.7	100	40	
Hori.	3617.990	AV	45.8	28.4	5.5	40.9	38.8	53.9	15.1	100	119	
Hori.	4824.000	AV	43.9	30.7	6.0	39.8	40.8	53.9	13.1	100	36	
Hori.	7236.000	AV	37.1	36.7	7.1	40.2	40.7	53.9	13.2	100	0	
Hori.	12060.000	AV	38.2	39.5	9.3	39.6	47.4	53.9	6.5	100	0	
Vert.	1237.475	PK	55.3	24.2	12.4	40.9	51.0	73.9	22.9	100	326	
Vert.	1336.460	PK	51.6	24.5	12.5	40.9	47.7	73.9	26.2	100	338	
Vert.	2390.000	PK	48.8	26.4	13.6	41.1	47.7	73.9	26.2	100	303	
Vert.	4824.000	PK	48.9	30.7	6.0	39.8	45.8	73.9	28.1	100	332	
Vert.	7236.000	PK	46.1	36.7	7.1	40.2	49.7	73.9	24.2	100	0	
Vert.	12060.000	PK	47.3	39.5	9.3	39.6	56.5	73.9	17.4	100	0	
Vert.	1237.475	AV	52.6	24.2	12.4	40.9	48.3	53.9	5.6	100	326	
Vert.	1336.460	AV	47.3	24.5	12.5	40.9	43.4	53.9	10.5	100	338	
Vert.	2390.000	AV	39.7	26.4	13.6	41.1	38.6	53.9	15.3	100	303	
Vert.	4824.000	AV	43.8	30.7	6.0	39.8	40.7	53.9	13.2	100	332	
Vert.	7236.000	AV	36.9	36.7	7.1	40.2	40.5	53.9	13.4	100	0	
Vert.	12060.000	AV	38.2	39.5	9.3	39.6	47.4	53.9	6.5	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

20dBc Data Sheet **(RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	100.9	26.4	13.6	41.1	99.8	-	-	
Hori.	2400.000	PK	55.3	26.4	13.6	41.1	54.2	79.8	25.6	
Hori.	9648.000	PK	47.9	38.5	8.3	40.1	54.6	79.8	25.2	
Vert.	2412.000	PK	99.6	26.4	13.6	41.1	98.5	-	-	
Vert.	2400.000	PK	53.2	26.4	13.6	41.1	52.1	78.5	26.4	
Vert.	9648.000	PK	46.5	38.5	8.3	40.1	53.2	78.5	25.3	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber		
Date	September 30, 2014	October 1, 2014	October 2, 2014
Temperature / Humidity	23 deg.C, 50 %RH	23 deg.C, 58 %RH	21 deg.C, 57 %RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Yasumasa Owaki
Mode	Tx, 2437 MHz		
	Tx, IEEE802.11b		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	1138.480	PK	55.6	24.0	12.3	40.8	51.1	73.9	22.8	145	169	
Hori.	1237.482	PK	55.0	24.2	12.4	40.9	50.7	73.9	23.2	147	294	
Hori.	3655.496	PK	51.3	28.5	5.5	40.9	44.4	73.9	29.5	100	144	
Hori.	4874.000	PK	51.4	30.9	6.0	39.7	48.6	73.9	25.3	113	52	
Hori.	7311.000	PK	51.9	36.8	7.1	40.3	55.5	73.9	18.4	126	111	
Hori.	12185.000	PK	46.6	39.4	9.4	39.8	55.6	73.9	18.3	100	0	
Hori.	1138.480	AV	53.3	24.0	12.3	40.8	48.8	53.9	5.1	145	169	
Hori.	1237.482	AV	52.5	24.2	12.4	40.9	48.2	53.9	5.7	147	294	
Hori.	3655.496	AV	47.0	28.5	5.5	40.9	40.1	53.9	13.8	100	144	
Hori.	4874.000	AV	47.2	30.9	6.0	39.7	44.4	53.9	9.5	113	52	
Hori.	7311.000	AV	46.5	36.8	7.1	40.3	50.1	53.9	**3.8**	126	111	
Hori.	12185.000	AV	37.0	39.4	9.4	39.8	46.0	53.9	7.9	100	0	
Vert.	1237.475	PK	54.7	24.2	12.4	40.9	50.4	73.9	23.5	100	330	
Vert.	1336.483	PK	52.0	24.5	12.5	40.9	48.1	73.9	25.8	100	341	
Vert.	4874.000	PK	50.3	30.9	6.0	39.7	47.5	73.9	26.4	106	206	
Vert.	7311.000	PK	46.2	36.8	7.1	40.3	49.8	73.9	24.1	100	0	
Vert.	12185.000	PK	45.8	39.4	9.4	39.8	54.8	73.9	19.1	100	0	
Vert.	1237.475	AV	52.4	24.2	12.4	40.9	48.1	53.9	5.8	100	330	
Vert.	1336.483	AV	47.3	24.5	12.5	40.9	43.4	53.9	10.5	100	341	
Vert.	4874.000	AV	45.8	30.9	6.0	39.7	43.0	53.9	10.9	106	206	
Vert.	7311.000	AV	37.5	36.8	7.1	40.3	41.1	53.9	12.8	100	0	
Vert.	12185.000	AV	36.9	39.4	9.4	39.8	45.9	53.9	8.0	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

20dBc Data Sheet **(RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2437.000	PK	101.9	26.5	13.6	41.1	100.9	-	-	
Hori.	9748.000	PK	49.8	38.6	8.1	40.0	56.5	80.9	24.4	
Vert.	2437.000	PK	99.9	26.5	13.6	41.1	98.9	-	-	
Vert.	9748.000	PK	48.0	38.6	8.1	40.0	54.7	78.9	24.2	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber		
Date	September 30, 2014	October 1, 2014	October 2, 2014
Temperature / Humidity	23 deg.C, 50 %RH	23 deg.C, 58 %RH	21 deg.C, 57 %RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Yasumasa Owaki
Mode	Tx, 2462 MHz		
	Tx, IEEE802.11b		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	1138.484	PK	55.7	24.0	12.3	40.8	51.2	73.9	22.7	144	171	
Hori.	1237.480	PK	55.5	24.2	12.4	40.9	51.2	73.9	22.7	146	297	
Hori.	2483.500	PK	50.2	26.6	13.6	41.1	49.3	73.9	24.6	100	36	
Hori.	3692.976	PK	52.3	28.5	5.5	40.8	45.5	73.9	28.4	100	140	
Hori.	4924.000	PK	48.6	31.1	5.9	39.6	46.0	73.9	27.9	100	43	
Hori.	7386.000	PK	49.2	36.9	7.2	40.4	52.9	73.9	21.0	143	119	
Hori.	12310.000	PK	44.3	39.3	9.4	39.9	53.1	73.9	20.8	100	0	
Hori.	1138.484	AV	53.2	24.0	12.3	40.8	48.7	53.9	**5.2**	144	171	
Hori.	1237.480	AV	52.5	24.2	12.4	40.9	48.2	53.9	5.7	146	297	
Hori.	2483.500	AV	41.1	26.6	13.6	41.1	40.2	53.9	13.7	100	36	
Hori.	3692.976	AV	48.3	28.5	5.5	40.8	41.5	53.9	12.4	100	140	
Hori.	4924.000	AV	43.3	31.1	5.9	39.6	40.7	53.9	13.2	100	43	
Hori.	7386.000	AV	43.5	36.9	7.2	40.4	47.2	53.9	6.7	143	119	
Hori.	12310.000	AV	35.9	39.3	9.4	39.9	44.7	53.9	9.2	100	0	
Vert.	1237.475	PK	55.2	24.2	12.4	40.9	50.9	73.9	23.0	100	321	
Vert.	1336.484	PK	51.2	24.5	12.5	40.9	47.3	73.9	26.6	100	340	
Vert.	2483.500	PK	49.1	26.6	13.6	41.1	48.2	73.9	25.7	100	302	
Vert.	4924.000	PK	48.9	31.1	5.9	39.6	46.3	73.9	27.6	100	337	
Vert.	7386.000	PK	46.4	36.9	7.2	40.4	50.1	73.9	23.8	100	0	
Vert.	12310.000	PK	44.3	39.3	9.4	39.9	53.1	73.9	20.8	100	0	
Vert.	1237.475	AV	52.6	24.2	12.4	40.9	48.3	53.9	5.6	100	321	
Vert.	1336.484	AV	47.3	24.5	12.5	40.9	43.4	53.9	10.5	100	340	
Vert.	2483.500	AV	39.5	26.6	13.6	41.1	38.6	53.9	15.3	100	302	
Vert.	4924.000	AV	44.1	31.1	5.9	39.6	41.5	53.9	12.4	100	337	
Vert.	7386.000	AV	37.5	36.9	7.2	40.4	41.2	53.9	12.7	100	0	
Vert.	12310.000	AV	35.9	39.3	9.4	39.9	44.7	53.9	9.2	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

20dBc Data Sheet **(RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2462.000	PK	101.5	26.5	13.6	41.1	100.5	-	-	
Hori.	9848.000	PK	43.0	38.6	8.1	39.9	49.8	80.5	30.7	
Vert.	2462.000	PK	99.5	26.5	13.6	41.1	98.5	-	-	
Vert.	9848.000	PK	43.5	38.6	8.1	39.9	50.3	78.5	28.2	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber		
Date	September 30, 2014	October 1, 2014	October 2, 2014
Temperature / Humidity	23 deg.C, 50 %RH	23 deg.C, 58 %RH	21 deg.C, 57 %RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Yasumasa Owaki
Mode	Tx, 2412 MHz		
	Tx, IEEE802.11g		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	1138.486	PK	55.3	24.0	12.3	40.8	50.8	73.9	23.1	143	175	
Hori.	1237.482	PK	55.0	24.2	12.4	40.9	50.7	73.9	23.2	146	293	
Hori.	2390.000	PK	61.6	26.4	13.6	41.1	60.5	73.9	13.4	100	43	
Hori.	3617.982	PK	50.5	28.4	5.5	40.9	43.5	73.9	30.4	100	119	
Hori.	4824.000	PK	47.4	30.7	6.0	39.8	44.3	73.9	29.6	100	34	
Hori.	7236.000	PK	46.3	36.7	7.1	40.2	49.9	73.9	24.0	100	0	
Hori.	12060.000	PK	47.6	39.5	9.3	39.6	56.8	73.9	17.1	100	0	
Hori.	1138.486	AV	53.0	24.0	12.3	40.8	48.5	53.9	**5.4**	143	175	
Hori.	1237.482	AV	52.4	24.2	12.4	40.9	48.1	53.9	5.8	146	293	
Hori.	2390.000	AV	46.7	26.4	13.6	41.1	45.6	53.9	8.3	100	43	
Hori.	3617.982	AV	45.8	28.4	5.5	40.9	38.8	53.9	15.1	100	119	
Hori.	4824.000	AV	39.8	30.7	6.0	39.8	36.7	53.9	17.2	100	34	
Hori.	7236.000	AV	36.9	36.7	7.1	40.2	40.5	53.9	13.4	100	0	
Hori.	12060.000	AV	38.3	39.5	9.3	39.6	47.5	53.9	6.4	100	0	
Vert.	1237.475	PK	55.2	24.2	12.4	40.9	50.9	73.9	23.0	100	320	
Vert.	1336.482	PK	51.5	24.5	12.5	40.9	47.6	73.9	26.3	100	341	
Vert.	2390.000	PK	60.9	26.4	13.6	41.1	59.8	73.9	14.1	100	308	
Vert.	4824.000	PK	48.1	30.7	6.0	39.8	45.0	73.9	28.9	100	341	
Vert.	7236.000	PK	46.2	36.7	7.1	40.2	49.8	73.9	24.1	100	0	
Vert.	12060.000	PK	47.3	39.5	9.3	39.6	56.5	73.9	17.4	100	0	
Vert.	1237.475	AV	51.7	24.2	12.4	40.9	47.4	53.9	6.5	100	320	
Vert.	1336.482	AV	47.1	24.5	12.5	40.9	43.2	53.9	10.7	100	341	
Vert.	2390.000	AV	44.6	26.4	13.6	41.1	43.5	53.9	10.4	100	308	
Vert.	4824.000	AV	38.8	30.7	6.0	39.8	35.7	53.9	18.2	100	341	
Vert.	7236.000	AV	37.0	36.7	7.1	40.2	40.6	53.9	13.3	100	0	
Vert.	12060.000	AV	38.2	39.5	9.3	39.6	47.4	53.9	6.5	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

20dBc Data Sheet **(RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	98.5	26.4	13.6	41.1	97.4	-	-	
Hori.	2400.000	PK	60.1	26.4	13.6	41.1	59.0	77.4	18.4	
Hori.	9648.000	PK	44.3	38.5	8.3	40.1	51.0	77.4	26.4	
Vert.	2412.000	PK	98.3	26.4	13.6	41.1	97.2	-	-	
Vert.	2400.000	PK	58.1	26.4	13.6	41.1	57.0	77.2	20.2	
Vert.	9648.000	PK	42.6	38.5	8.3	40.1	49.3	77.2	27.9	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber		
Date	September 30, 2014	October 1, 2014	October 2, 2014
Temperature / Humidity	23 deg.C, 50 %RH	23 deg.C, 58 %RH	21 deg.C, 57 %RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Yasumasa Owaki
Mode	Tx, 2437 MHz		
	Tx, IEEE802.11g		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	1138.486	PK	55.7	24.0	12.3	40.8	51.2	73.9	22.7	145	170	
Hori.	1237.482	PK	55.2	24.2	12.4	40.9	50.9	73.9	23.0	148	295	
Hori.	3655.486	PK	50.9	28.5	5.5	40.9	44.0	73.9	29.9	100	119	
Hori.	4874.000	PK	48.0	30.9	6.0	39.7	45.2	73.9	28.7	100	29	
Hori.	7311.000	PK	53.6	36.8	7.1	40.3	57.2	73.9	16.7	126	110	
Hori.	12185.000	PK	45.7	39.4	9.4	39.8	54.7	73.9	19.2	100	0	
Hori.	1138.486	AV	53.2	24.0	12.3	40.8	48.7	53.9	**5.2**	145	170	
Hori.	1237.482	AV	52.6	24.2	12.4	40.9	48.3	53.9	5.6	148	295	
Hori.	3655.486	AV	46.5	28.5	5.5	40.9	39.6	53.9	14.3	100	119	
Hori.	4874.000	AV	39.6	30.9	6.0	39.7	36.8	53.9	17.1	100	29	
Hori.	7311.000	AV	43.5	36.8	7.1	40.3	47.1	53.9	6.8	126	110	
Hori.	12185.000	AV	37.0	39.4	9.4	39.8	46.0	53.9	7.9	100	0	
Vert.	1237.475	PK	55.0	24.2	12.4	40.9	50.7	73.9	23.2	100	328	
Vert.	1336.480	PK	52.1	24.5	12.5	40.9	48.2	73.9	25.7	100	340	
Vert.	4874.000	PK	49.1	30.9	6.0	39.7	46.3	73.9	27.6	107	206	
Vert.	7311.000	PK	47.1	36.8	7.1	40.3	50.7	73.9	23.2	100	0	
Vert.	12185.000	PK	45.9	39.4	9.4	39.8	54.9	73.9	19.0	100	0	
Vert.	1237.475	AV	52.0	24.2	12.4	40.9	47.7	53.9	6.2	100	328	
Vert.	1336.480	AV	47.2	24.5	12.5	40.9	43.3	53.9	10.6	100	340	
Vert.	4874.000	AV	39.0	30.9	6.0	39.7	36.2	53.9	17.7	107	206	
Vert.	7311.000	AV	37.1	36.8	7.1	40.3	40.7	53.9	13.2	100	0	
Vert.	12185.000	AV	36.9	39.4	9.4	39.8	45.9	53.9	8.0	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

20dBc Data Sheet **(RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2437.000	PK	99.7	26.5	13.6	41.1	98.7	-	-	
Hori.	9748.000	PK	44.7	38.6	8.1	40.0	51.4	78.7	27.3	
Vert.	2437.000	PK	98.4	26.5	13.6	41.1	97.4	-	-	
Vert.	9748.000	PK	43.2	38.6	8.1	40.0	49.9	77.4	27.5	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber			
Date	September 30, 2014	October 1, 2014	October 2, 2014	October 9, 2014
Temperature / Humidity	23 deg.C, 50 %RH	23 deg.C, 58 %RH	21 deg.C, 57 %RH	26 deg.C, 54 %RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Yasumasa Owaki	Akio Hayashi
Mode	Tx, 2462 MHz			
	Tx, IEEE802.11g			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	420.741	QP	47.6	16.4	7.1	31.9	39.2	46.0	6.8	100	304	
Hori.	428.742	QP	38.4	16.5	7.1	31.9	30.1	46.0	15.9	100	5	
Hori.	519.738	QP	48.0	17.5	7.6	32.0	41.1	46.0	4.9	219	299	
Hori.	1138.482	PK	55.7	24.0	12.3	40.8	51.2	73.9	22.7	145	177	
Hori.	1237.480	PK	54.9	24.2	12.4	40.9	50.6	73.9	23.3	145	295	
Hori.	2483.500	PK	65.6	26.6	13.6	41.1	64.7	73.9	9.2	100	36	
Hori.	3692.982	PK	52.0	28.5	5.5	40.8	45.2	73.9	28.7	100	141	
Hori.	4924.000	PK	47.8	31.1	5.9	39.6	45.2	73.9	28.7	100	44	
Hori.	7386.000	PK	52.1	36.9	7.2	40.4	55.8	73.9	18.1	142	118	
Hori.	12310.000	PK	44.6	39.3	9.4	39.9	53.4	73.9	20.5	100	0	
Hori.	1138.482	AV	53.3	24.0	12.3	40.8	48.8	53.9	5.1	145	177	
Hori.	1237.480	AV	52.4	24.2	12.4	40.9	48.1	53.9	5.8	145	295	
Hori.	2483.500	AV	51.4	26.6	13.6	41.1	50.5	53.9	3.4	100	36	
Hori.	3692.982	AV	47.8	28.5	5.5	40.8	41.0	53.9	12.9	100	141	
Hori.	4924.000	AV	38.6	31.1	5.9	39.6	36.0	53.9	17.9	100	44	
Hori.	7386.000	AV	42.0	36.9	7.2	40.4	45.7	53.9	8.2	142	118	
Hori.	12310.000	AV	35.6	39.3	9.4	39.9	44.4	53.9	9.5	100	0	
Vert.	48.873	QP	50.4	11.3	7.4	31.8	37.3	40.0	**2.7**	100	172	
Vert.	69.074	QP	54.5	6.7	7.7	31.8	37.1	40.0	2.9	100	243	
Vert.	80.867	QP	50.7	6.5	7.8	31.8	33.2	40.0	6.8	100	207	
Vert.	156.354	QP	43.7	15.1	8.7	31.8	35.7	43.5	7.8	100	199	
Vert.	214.371	QP	42.8	16.7	9.2	31.8	36.9	43.5	6.6	100	122	
Vert.	371.241	QP	49.2	15.5	6.8	31.8	39.7	46.0	6.3	142	94	
Vert.	420.740	QP	51.6	16.4	7.1	31.9	43.2	46.0	2.8	142	61	
Vert.	428.742	QP	50.1	16.5	7.1	31.9	41.8	46.0	4.2	135	97	
Vert.	1237.475	PK	54.9	24.2	12.4	40.9	50.6	73.9	23.3	100	325	
Vert.	1336.480	PK	52.0	24.5	12.5	40.9	48.1	73.9	25.8	100	340	
Vert.	2483.500	PK	62.7	26.6	13.6	41.1	61.8	73.9	12.1	100	299	
Vert.	4924.000	PK	48.3	31.1	5.9	39.6	45.7	73.9	28.2	100	338	
Vert.	7386.000	PK	46.7	36.9	7.2	40.4	50.4	73.9	23.5	100	0	
Vert.	12310.000	PK	44.3	39.3	9.4	39.9	53.1	73.9	20.8	100	0	
Vert.	1237.475	AV	52.2	24.2	12.4	40.9	47.9	53.9	6.0	100	325	
Vert.	1336.480	AV	47.3	24.5	12.5	40.9	43.4	53.9	10.5	100	340	
Vert.	2483.500	AV	46.4	26.6	13.6	41.1	45.5	53.9	8.4	100	299	
Vert.	4924.000	AV	38.3	31.1	5.9	39.6	35.7	53.9	18.2	100	338	
Vert.	7386.000	AV	36.8	36.9	7.2	40.4	40.5	53.9	13.4	100	0	
Vert.	12310.000	AV	35.3	39.3	9.4	39.9	44.1	53.9	9.8	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

20dBc Data Sheet **(RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2462.000	PK	99.2	26.5	13.6	41.1	98.2	-	-	
Hori.	9848.000	PK	43.1	38.6	8.1	39.9	49.9	78.2	28.3	
Vert.	2462.000	PK	97.5	26.5	13.6	41.1	96.5	-	-	
Vert.	9848.000	PK	41.4	38.6	8.1	39.9	48.2	76.5	28.3	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber		
Date	September 30, 2014	October 1, 2014	October 2, 2014
Temperature / Humidity	23 deg.C, 50 %RH	23 deg.C, 58 %RH	21 deg.C, 57 %RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Yasumasa Owaki
Mode	Tx, 2412 MHz		
	Tx, IEEE802.11n HT20		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	1138.488	PK	55.5	24.0	12.3	40.8	51.0	73.9	22.9	143	170	
Hori.	1237.484	PK	55.5	24.2	12.4	40.9	51.2	73.9	22.7	144	296	
Hori.	2390.000	PK	61.1	26.4	13.6	41.1	60.0	73.9	13.9	100	38	
Hori.	3617.996	PK	50.8	28.4	5.5	40.9	43.8	73.9	30.1	100	118	
Hori.	4824.000	PK	48.3	30.7	6.0	39.8	45.2	73.9	28.7	100	29	
Hori.	7236.000	PK	45.7	36.7	7.1	40.2	49.3	73.9	24.6	100	0	
Hori.	12060.000	PK	46.8	39.5	9.3	39.6	56.0	73.9	17.9	100	0	
Hori.	1138.488	AV	53.0	24.0	12.3	40.8	48.5	53.9	**5.4**	143	170	
Hori.	1237.484	AV	52.7	24.2	12.4	40.9	48.4	53.9	5.5	144	296	
Hori.	2390.000	AV	46.4	26.4	13.6	41.1	45.3	53.9	8.6	100	38	
Hori.	3617.996	AV	45.5	28.4	5.5	40.9	38.5	53.9	15.4	100	118	
Hori.	4824.000	AV	40.0	30.7	6.0	39.8	36.9	53.9	17.0	100	29	
Hori.	7236.000	AV	37.1	36.7	7.1	40.2	40.7	53.9	13.2	100	0	
Hori.	12060.000	AV	37.8	39.5	9.3	39.6	47.0	53.9	6.9	100	0	
Vert.	1237.475	PK	54.8	24.2	12.4	40.9	50.5	73.9	23.4	100	321	
Vert.	1336.481	PK	51.9	24.5	12.5	40.9	48.0	73.9	25.9	100	339	
Vert.	2390.000	PK	57.7	26.4	13.6	41.1	56.6	73.9	17.3	100	306	
Vert.	4824.000	PK	46.9	30.7	6.0	39.8	43.8	73.9	30.1	100	334	
Vert.	7236.000	PK	45.9	36.7	7.1	40.2	49.5	73.9	24.4	100	0	
Vert.	12060.000	PK	47.1	39.5	9.3	39.6	56.3	73.9	17.6	100	0	
Vert.	1237.475	AV	52.0	24.2	12.4	40.9	47.7	53.9	6.2	100	321	
Vert.	1336.481	AV	47.3	24.5	12.5	40.9	43.4	53.9	10.5	100	339	
Vert.	2390.000	AV	43.9	26.4	13.6	41.1	42.8	53.9	11.1	100	306	
Vert.	4824.000	AV	37.9	30.7	6.0	39.8	34.8	53.9	19.1	100	334	
Vert.	7236.000	AV	36.9	36.7	7.1	40.2	40.5	53.9	13.4	100	0	
Vert.	12060.000	AV	37.9	39.5	9.3	39.6	47.1	53.9	6.8	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

20dBc Data Sheet **(RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	97.5	26.4	13.6	41.1	96.4	-	-	
Hori.	2400.000	PK	57.4	26.4	13.6	41.1	56.3	76.4	20.1	
Hori.	9648.000	PK	43.4	38.5	8.3	40.1	50.1	76.4	26.3	
Vert.	2412.000	PK	97.1	26.4	13.6	41.1	96.0	-	-	
Vert.	2400.000	PK	56.1	26.4	13.6	41.1	55.0	76.0	21.0	
Vert.	9648.000	PK	42.5	38.5	8.3	40.1	49.2	76.0	26.8	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber		
Date	September 30, 2014	October 1, 2014	October 2, 2014
Temperature / Humidity	23 deg.C, 50 %RH	23 deg.C, 58 %RH	21 deg.C, 57 %RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Yasumasa Owaki
Mode	Tx, 2437 MHz		
	Tx, IEEE802.11n HT20		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	1138.490	PK	55.4	24.0	12.3	40.8	50.9	73.9	23.0	142	173	
Hori.	1237.484	PK	55.4	24.2	12.4	40.9	51.1	73.9	22.8	149	296	
Hori.	3655.492	PK	51.3	28.5	5.5	40.9	44.4	73.9	29.5	100	121	
Hori.	4874.000	PK	47.3	30.9	6.0	39.7	44.5	73.9	29.4	100	26	
Hori.	7311.000	PK	51.6	36.8	7.1	40.3	55.2	73.9	18.7	125	110	
Hori.	12185.000	PK	46.4	39.4	9.4	39.8	55.4	73.9	18.5	100	0	
Hori.	1138.490	AV	53.0	24.0	12.3	40.8	48.5	53.9	**5.4**	142	173	
Hori.	1237.484	AV	52.6	24.2	12.4	40.9	48.3	53.9	5.6	149	296	
Hori.	3655.492	AV	46.8	28.5	5.5	40.9	39.9	53.9	14.0	100	121	
Hori.	4874.000	AV	39.2	30.9	6.0	39.7	36.4	53.9	17.5	100	26	
Hori.	7311.000	AV	42.0	36.8	7.1	40.3	45.6	53.9	8.3	125	110	
Hori.	12185.000	AV	37.0	39.4	9.4	39.8	46.0	53.9	7.9	100	0	
Vert.	1237.475	PK	55.0	24.2	12.4	40.9	50.7	73.9	23.2	100	328	
Vert.	1336.480	PK	52.0	24.5	12.5	40.9	48.1	73.9	25.8	100	340	
Vert.	4874.000	PK	48.2	30.9	6.0	39.7	45.4	73.9	28.5	109	205	
Vert.	7311.000	PK	46.0	36.8	7.1	40.3	49.6	73.9	24.3	100	0	
Vert.	12185.000	PK	45.4	39.4	9.4	39.8	54.4	73.9	19.5	100	0	
Vert.	1237.475	AV	52.3	24.2	12.4	40.9	48.0	53.9	5.9	100	328	
Vert.	1336.480	AV	47.3	24.5	12.5	40.9	43.4	53.9	10.5	100	340	
Vert.	4874.000	AV	38.0	30.9	6.0	39.7	35.2	53.9	18.7	109	205	
Vert.	7311.000	AV	37.0	36.8	7.1	40.3	40.6	53.9	13.3	100	0	
Vert.	12185.000	AV	36.2	39.4	9.4	39.8	45.2	53.9	8.7	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

20dBc Data Sheet **(RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2437.000	PK	99.2	26.5	13.6	41.1	98.2	-	-	
Hori.	9748.000	PK	44.5	38.6	8.1	40.0	51.2	78.2	27.0	
Vert.	2437.000	PK	97.3	26.5	13.6	41.1	96.3	-	-	
Vert.	9748.000	PK	41.1	38.6	8.1	40.0	47.8	76.3	28.5	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber		
Date	September 30, 2014	October 1, 2014	October 2, 2014
Temperature / Humidity	23 deg.C, 50 %RH	23 deg.C, 58 %RH	21 deg.C, 57 %RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Yasumasa Owaki
Mode	Tx, 2462 MHz		
	Tx, IEEE802.11n HT20		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	1138.486	PK	55.5	24.0	12.3	40.8	51.0	73.9	22.9	142	169	
Hori.	1237.482	PK	55.3	24.2	12.4	40.9	51.0	73.9	22.9	143	295	
Hori.	2483.500	PK	64.5	26.6	13.6	41.1	63.6	73.9	10.3	100	42	
Hori.	3692.980	PK	52.2	28.5	5.5	40.8	45.4	73.9	28.5	100	141	
Hori.	4924.000	PK	47.1	31.1	5.9	39.6	44.5	73.9	29.4	100	46	
Hori.	7386.000	PK	50.0	36.9	7.2	40.4	53.7	73.9	20.2	144	119	
Hori.	12310.000	PK	44.4	39.3	9.4	39.9	53.2	73.9	20.7	100	0	
Hori.	1138.486	AV	52.9	24.0	12.3	40.8	48.4	53.9	**5.5**	142	169	
Hori.	1237.482	AV	52.7	24.2	12.4	40.9	48.4	53.9	**5.5**	143	295	
Hori.	2483.500	AV	47.7	26.6	13.6	41.1	46.8	53.9	7.1	100	42	
Hori.	3692.980	AV	48.0	28.5	5.5	40.8	41.2	53.9	12.7	100	141	
Hori.	4924.000	AV	38.8	31.1	5.9	39.6	36.2	53.9	17.7	100	46	
Hori.	7386.000	AV	39.8	36.9	7.2	40.4	43.5	53.9	10.4	144	119	
Hori.	12310.000	AV	35.5	39.3	9.4	39.9	44.3	53.9	9.6	100	0	
Vert.	1237.475	PK	54.9	24.2	12.4	40.9	50.6	73.9	23.3	100	322	
Vert.	1336.481	PK	51.8	24.5	12.5	40.9	47.9	73.9	26.0	100	338	
Vert.	2483.500	PK	62.1	26.6	13.6	41.1	61.2	73.9	12.7	100	302	
Vert.	4924.000	PK	46.5	31.1	5.9	39.6	43.9	73.9	30.0	100	334	
Vert.	7386.000	PK	45.4	36.9	7.2	40.4	49.1	73.9	24.8	100	0	
Vert.	12310.000	PK	45.0	39.3	9.4	39.9	53.8	73.9	20.1	100	0	
Vert.	1237.475	AV	52.5	24.2	12.4	40.9	48.2	53.9	5.7	100	322	
Vert.	1336.481	AV	47.2	24.5	12.5	40.9	43.3	53.9	10.6	100	338	
Vert.	2483.500	AV	45.9	26.6	13.6	41.1	45.0	53.9	8.9	100	302	
Vert.	4924.000	AV	37.7	31.1	5.9	39.6	35.1	53.9	18.8	100	334	
Vert.	7386.000	AV	36.0	36.9	7.2	40.4	39.7	53.9	14.2	100	0	
Vert.	12310.000	AV	35.3	39.3	9.4	39.9	44.1	53.9	9.8	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

20dBc Data Sheet **(RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2462.000	PK	99.3	26.5	13.6	41.1	98.3	-	-	
Hori.	9848.000	PK	42.8	38.6	8.1	39.9	49.6	78.3	28.7	
Vert.	2462.000	PK	96.4	26.5	13.6	41.1	95.4	-	-	
Vert.	9848.000	PK	40.5	38.6	8.1	39.9	47.3	75.4	28.1	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.1 and 3 Semi Anechoic Chamber			
Date	October 2, 2014	October 3, 2014	October 7, 2014	October 9, 2014
Temperature / Humidity	21 deg.C, 57 %RH	26 deg.C, 56 %RH	26 deg.C, 54 %RH	25 deg.C, 55 %RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Wataru Kojima	Wataru Kojima
Mode	Tx, 5745 MHz			
	Tx, IEEE802.11a			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	7660.000	PK	50.1	37.2	6.8	40.6	53.5	73.9	20.4	102	339	
Hori.	11490.000	PK	48.1	39.9	8.4	39.2	57.2	73.9	16.7	100	143	
Hori.	17235.000	PK	54.5	42.2	1.1	39.6	58.2	73.9	15.7	100	58	
Hori.	7660.000	AV	41.9	37.2	6.8	40.6	45.3	53.9	8.6	102	339	
Hori.	11490.000	AV	34.5	39.9	8.4	39.2	43.6	53.9	10.3	100	143	
Hori.	17235.000	AV	38.2	42.2	1.1	39.6	41.9	53.9	12.0	100	58	
Vert.	7660.000	PK	49.7	37.2	6.8	40.6	53.1	73.9	20.8	100	59	
Vert.	11490.000	PK	53.1	39.9	8.4	39.2	62.2	73.9	11.7	134	163	
Vert.	17235.000	PK	50.8	42.2	1.1	39.6	54.5	73.9	19.4	100	0	
Vert.	7660.000	AV	41.1	37.2	6.8	40.6	44.5	53.9	9.4	100	59	
Vert.	11490.000	AV	39.9	39.9	8.4	39.2	49.0	53.9	4.9	134	163	
Vert.	17235.000	AV	34.1	42.2	1.1	39.6	37.8	53.9	16.1	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

20dBc Data Sheet **(RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	5745.000	PK	89.2	32.2	15.6	38.9	98.1	-	-	
Hori.	5725.000	PK	45.4	32.2	15.6	38.9	54.3	78.1	23.8	
Vert.	5745.000	PK	85.4	32.2	15.6	38.9	94.3	-	-	
Vert.	5725.000	PK	41.7	32.2	15.6	38.9	50.6	74.3	23.7	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.1 and 3 Semi Anechoic Chamber			
Date	October 2, 2014	October 3, 2014	October 7, 2014	October 9, 2014
Temperature / Humidity	21 deg.C, 57 %RH	26 deg.C, 56 %RH	26 deg.C, 54 %RH	25 deg.C, 55 %RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Wataru Kojima	Wataru Kojima
Mode	Tx, 5785 MHz			
	Tx, IEEE802.11a			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	7713.333	PK	50.7	37.2	6.8	40.6	54.1	73.9	19.8	104	336	
Hori.	11570.000	PK	47.6	39.8	8.4	39.3	56.5	73.9	17.4	100	142	
Hori.	17355.000	PK	54.8	43.0	1.2	39.5	59.5	73.9	14.4	100	111	
Hori.	7713.333	AV	42.1	37.2	6.8	40.6	45.5	53.9	8.4	104	336	
Hori.	11570.000	AV	34.2	39.8	8.4	39.3	43.1	53.9	10.8	100	142	
Hori.	17355.000	AV	40.0	43.0	1.2	39.5	44.7	53.9	9.2	100	111	
Vert.	7713.333	PK	50.9	37.2	6.8	40.6	54.3	73.9	19.6	100	65	
Vert.	11570.000	PK	51.6	39.8	8.4	39.3	60.5	73.9	13.4	125	160	
Vert.	17355.000	PK	49.9	43.0	1.2	39.5	54.6	73.9	19.3	100	227	
Vert.	7713.333	AV	41.7	37.2	6.8	40.6	45.1	53.9	8.8	100	65	
Vert.	11570.000	AV	38.6	39.8	8.4	39.3	47.5	53.9	6.4	125	160	
Vert.	17355.000	AV	33.8	43.0	1.2	39.5	38.5	53.9	15.4	100	227	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.1 and 3 Semi Anechoic Chamber			
Date	October 2, 2014	October 3, 2014	October 7, 2014	October 9, 2014
Temperature / Humidity	21 deg.C, 57 %RH	26 deg.C, 56 %RH	26 deg.C, 54 %RH	25 deg.C, 55 %RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Wataru Kojima	Wataru Kojima
Mode	Tx, 5825 MHz			
	Tx, IEEE802.11a			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	7766.667	PK	50.6	37.3	6.9	40.7	54.1	73.9	19.8	100	339	
Hori.	11650.000	PK	48.0	39.7	8.4	39.3	56.8	73.9	17.1	100	140	
Hori.	17475.000	PK	55.2	43.8	1.2	39.4	60.8	73.9	13.1	100	56	
Hori.	7766.667	AV	41.4	37.3	6.9	40.7	44.9	53.9	9.0	100	339	
Hori.	11650.000	AV	33.9	39.7	8.4	39.3	42.7	53.9	11.2	100	140	
Hori.	17475.000	AV	40.2	43.8	1.2	39.4	45.8	53.9	8.1	100	56	
Vert.	7766.667	PK	50.8	37.3	6.9	40.7	54.3	73.9	19.6	100	83	
Vert.	11650.000	PK	50.3	39.7	8.4	39.3	59.1	73.9	14.8	128	158	
Vert.	17475.000	PK	48.5	43.8	1.2	39.4	54.1	73.9	19.8	100	76	
Vert.	7766.667	AV	41.1	37.3	6.9	40.7	44.6	53.9	9.3	100	83	
Vert.	11650.000	AV	37.3	39.7	8.4	39.3	46.1	53.9	7.8	128	158	
Vert.	17475.000	AV	34.5	43.8	1.2	39.4	40.1	53.9	13.8	100	76	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

20dBc Data Sheet **(RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	5825.000	PK	86.9	32.4	15.5	38.9	95.9	-	-	
Hori.	5850.000	PK	39.3	32.4	15.6	38.9	48.4	75.9	27.5	
Vert.	5825.000	PK	84.0	32.4	15.5	38.9	93.0	-	-	
Vert.	5850.000	PK	39.9	32.4	15.6	38.9	49.0	73.0	24.0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.1 and 3 Semi Anechoic Chamber			
Date	October 2, 2014	October 3, 2014	October 5, 2014	October 9, 2014
Temperature / Humidity	21 deg.C, 57 %RH	26 deg.C, 56 %RH	26 deg.C, 54 %RH	25 deg.C, 55 %RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Kenichi Adachi	Wataru Kojima
Mode	Tx, 5745 MHz			
	Tx, IEEE802.11n HT20			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	371.243	QP	50.3	15.5	6.8	31.8	40.8	46.0	5.2	100	352	
Hori.	420.738	QP	46.7	16.4	7.1	31.9	38.3	46.0	7.7	100	305	
Hori.	428.742	QP	37.3	16.5	7.1	31.9	29.0	46.0	17.0	100	119	
Hori.	519.738	QP	47.4	17.5	7.6	32.0	40.5	46.0	5.5	225	280	
Hori.	569.237	QP	46.6	18.2	7.9	32.0	40.7	46.0	5.3	197	312	
Hori.	7659.965	PK	48.6	37.2	6.8	40.6	52.0	73.9	21.9	100	308	
Hori.	11490.000	PK	49.8	39.9	8.4	39.2	58.9	73.9	15.0	100	149	
Hori.	17235.000	PK	54.1	42.2	1.1	39.6	57.8	73.9	16.1	100	105	
Hori.	7659.965	AV	40.4	37.2	6.8	40.6	43.8	53.9	10.1	100	308	
Hori.	11490.000	AV	36.4	39.9	8.4	39.2	45.5	53.9	8.4	100	149	
Hori.	17235.000	AV	38.0	42.2	1.1	39.6	41.7	53.9	12.2	100	105	
Vert.	47.177	QP	47.4	11.9	7.4	31.8	34.9	40.0	5.1	100	153	
Vert.	66.057	QP	52.6	7.1	7.7	31.8	35.6	40.0	**4.4**	100	160	
Vert.	83.240	QP	48.0	7.0	7.9	31.8	31.1	40.0	8.9	100	194	
Vert.	146.247	QP	41.7	14.8	8.6	31.8	33.3	43.5	10.2	100	193	
Vert.	371.243	QP	51.1	15.5	6.8	31.8	41.6	46.0	**4.4**	145	151	
Vert.	420.741	QP	44.7	16.4	7.1	31.9	36.3	46.0	9.7	124	150	
Vert.	428.742	QP	48.0	16.5	7.1	31.9	39.7	46.0	6.3	133	131	
Vert.	569.237	QP	39.0	18.2	7.9	32.0	33.1	46.0	12.9	212	215	
Vert.	7659.965	PK	49.9	37.2	6.8	40.6	53.3	73.9	20.6	100	153	
Vert.	11490.000	PK	51.6	39.9	8.4	39.2	60.7	73.9	13.2	100	167	
Vert.	17235.000	PK	49.1	42.2	1.1	39.6	52.8	73.9	21.1	100	130	
Vert.	7659.965	AV	42.9	37.2	6.8	40.6	46.3	53.9	7.6	100	153	
Vert.	11490.000	AV	38.8	39.9	8.4	39.2	47.9	53.9	6.0	100	167	
Vert.	17235.000	AV	34.9	42.2	1.1	39.6	38.6	53.9	15.3	100	130	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

20dBc Data Sheet **(RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	5745.000	PK	88.0	32.2	15.5	38.9	96.8	-	-	
Hori.	5725.000	PK	46.0	32.2	15.5	38.9	54.8	76.8	22.0	
Vert.	5745.000	PK	85.4	32.2	15.5	38.9	94.2	-	-	
Vert.	5725.000	PK	42.8	32.2	15.5	38.9	51.6	74.2	22.6	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.1 and 3 Semi Anechoic Chamber			
Date	October 2, 2014	October 3, 2014	October 5, 2014	October 9, 2014
Temperature / Humidity	21 deg.C, 57 %RH	26 deg.C, 56 %RH	26 deg.C, 54 %RH	25 deg.C, 55 %RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Kenichi Adachi	Wataru Kojima
Mode	Tx, 5785 MHz			
	Tx, IEEE802.11n HT20			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	7713.296	PK	48.0	37.2	6.8	40.6	51.4	73.9	22.5	100	298	
Hori.	11570.000	PK	49.1	39.8	8.4	39.3	58.0	73.9	15.9	100	152	
Hori.	17355.000	PK	54.3	43.0	1.2	39.5	59.0	73.9	14.9	100	104	
Hori.	7713.296	AV	40.7	37.2	6.8	40.6	44.1	53.9	9.8	100	298	
Hori.	11570.000	AV	36.0	39.8	8.4	39.3	44.9	53.9	9.0	100	152	
Hori.	17355.000	AV	39.4	43.0	1.2	39.5	44.1	53.9	9.8	100	104	
Vert.	7713.296	PK	49.2	37.2	6.8	40.6	52.6	73.9	21.3	100	151	
Vert.	11570.000	PK	50.9	39.8	8.4	39.3	59.8	73.9	14.1	100	137	
Vert.	17355.000	PK	48.6	43.0	1.2	39.5	53.3	73.9	20.6	100	134	
Vert.	7713.296	AV	42.1	37.2	6.8	40.6	45.5	53.9	8.4	100	151	
Vert.	11570.000	AV	38.3	39.8	8.4	39.3	47.2	53.9	6.7	100	137	
Vert.	17355.000	AV	34.6	43.0	1.2	39.5	39.3	53.9	14.6	100	134	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.1 and 3 Semi Anechoic Chamber			
Date	October 2, 2014	October 3, 2014	October 5, 2014	October 9, 2014
Temperature / Humidity	21 deg.C, 57 %RH	26 deg.C, 56 %RH	26 deg.C, 54 %RH	25 deg.C, 55 %RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Kenichi Adachi	Wataru Kojima
Mode	Tx, 5825 MHz			
	Tx, IEEE802.11n HT20			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	7766.633	PK	47.9	37.3	6.9	40.7	51.4	73.9	22.5	100	305	
Hori.	11650.000	PK	48.1	39.7	8.4	39.3	56.9	73.9	17.0	100	152	
Hori.	17475.000	PK	54.5	43.8	1.2	39.4	60.1	73.9	13.8	100	60	
Hori.	7766.633	AV	40.5	37.3	6.9	40.7	44.0	53.9	9.9	100	305	
Hori.	11650.000	AV	35.7	39.7	8.4	39.3	44.5	53.9	9.4	100	152	
Hori.	17475.000	AV	39.6	43.8	1.2	39.4	45.2	53.9	8.7	100	60	
Vert.	7766.633	PK	49.0	37.3	6.9	40.7	52.5	73.9	21.4	100	154	
Vert.	11650.000	PK	49.9	39.7	8.4	39.3	58.7	73.9	15.2	100	143	
Vert.	17475.000	PK	48.5	43.8	1.2	39.4	54.1	73.9	19.8	100	114	
Vert.	7766.633	AV	42.0	37.3	6.9	40.7	45.5	53.9	8.4	100	154	
Vert.	11650.000	AV	37.5	39.7	8.4	39.3	46.3	53.9	7.6	100	143	
Vert.	17475.000	AV	34.0	43.8	1.2	39.4	39.6	53.9	14.3	100	114	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

20dBc Data Sheet **(RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	5825.000	PK	89.4	32.4	15.5	38.9	98.4	-	-	
Hori.	5850.000	PK	41.7	32.4	15.6	38.9	50.8	78.4	27.6	
Vert.	5825.000	PK	83.6	32.4	15.5	38.9	92.6	-	-	
Vert.	5850.000	PK	37.3	32.4	15.6	38.9	46.4	72.6	26.2	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.1 and 3 Semi Anechoic Chamber			
Date	October 2, 2014	October 3, 2014	October 7, 2014	October 9, 2014
Temperature / Humidity	21 deg.C, 57 %RH	26 deg.C, 56 %RH	26 deg.C, 54 %RH	25 deg.C, 55 %RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Wataru Kojima	Wataru Kojima
Mode	Tx, 5755 MHz			
	Tx, IEEE802.11 n HT40			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	7673.333	PK	50.8	37.2	6.8	40.6	54.2	73.9	19.7	104	335	
Hori.	11510.000	PK	46.9	39.9	8.4	39.2	56.0	73.9	17.9	100	138	
Hori.	17265.000	PK	51.7	42.4	1.1	39.6	55.6	73.9	18.3	100	56	
Hori.	7673.333	AV	43.7	37.2	6.8	40.6	47.1	53.9	6.8	104	335	
Hori.	11510.000	AV	35.3	39.9	8.4	39.2	44.4	53.9	9.5	100	138	
Hori.	17265.000	AV	38.4	42.4	1.1	39.6	42.3	53.9	11.6	100	56	
Vert.	7673.333	PK	50.2	37.2	6.8	40.6	53.6	73.9	20.3	100	76	
Vert.	11510.000	PK	50.6	39.9	8.4	39.2	59.7	73.9	14.2	129	163	
Vert.	17265.000	PK	47.4	42.4	1.1	39.6	51.3	73.9	22.6	100	160	
Vert.	7673.333	AV	42.8	37.2	6.8	40.6	46.2	53.9	7.7	100	76	
Vert.	11510.000	AV	39.5	39.9	8.4	39.2	48.6	53.9	5.3	129	163	
Vert.	17265.000	AV	34.7	42.4	1.1	39.6	38.6	53.9	15.3	100	160	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

20dBc Data Sheet **(RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	5755.000	PK	85.1	32.2	15.5	38.9	93.9	-	-	
Hori.	5725.000	PK	47.3	32.2	15.6	38.9	56.2	73.9	17.7	
Vert.	5755.000	PK	83.3	32.2	15.5	38.9	92.1	-	-	
Vert.	5725.000	PK	45.7	32.2	15.6	38.9	54.6	72.1	17.5	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.1 and 3 Semi Anechoic Chamber			
Date	October 2, 2014	October 3, 2014	October 7, 2014	October 9, 2014
Temperature / Humidity	21 deg.C, 57 %RH	26 deg.C, 56 %RH	26 deg.C, 54 %RH	25 deg.C, 55 %RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Wataru Kojima	Wataru Kojima
Mode	Tx, 5795 MHz			
	Tx, IEEE802.11n HT40			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	7726.667	PK	51.1	37.2	6.8	40.6	54.5	73.9	19.4	100	336	
Hori.	11590.000	PK	46.1	39.8	8.4	39.3	55.0	73.9	18.9	100	143	
Hori.	17385.000	PK	51.6	43.2	1.2	39.5	56.5	73.9	17.4	100	113	
Hori.	7726.667	AV	44.0	37.2	6.8	40.6	47.4	53.9	6.5	100	336	
Hori.	11590.000	AV	34.8	39.8	8.4	39.3	43.7	53.9	10.2	100	143	
Hori.	17385.000	AV	38.5	43.2	1.2	39.5	43.4	73.9	10.5	100	113	
Vert.	7726.667	PK	51.4	37.2	6.8	40.6	54.8	73.9	19.1	100	82	
Vert.	11590.000	PK	50.6	39.8	8.4	39.3	59.5	73.9	14.4	135	162	
Vert.	17385.000	PK	48.2	43.2	1.2	39.5	53.1	73.9	20.8	100	194	
Vert.	7726.667	AV	44.5	37.2	6.8	40.6	47.9	53.9	6.0	100	82	
Vert.	11590.000	AV	38.8	39.8	8.4	39.3	47.7	53.9	6.2	135	162	
Vert.	17385.000	AV	35.4	43.2	1.2	39.5	40.3	73.9	13.6	100	194	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

20dBc Data Sheet **(RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	5795.000	PK	85.5	32.3	15.5	38.9	94.4	-	-	
Hori.	5850.000	PK	37.7	32.4	15.6	38.9	46.8	74.4	27.6	
Vert.	5795.000	PK	81.4	32.3	15.5	38.9	90.3	-	-	
Vert.	5850.000	PK	37.6	32.4	15.6	38.9	46.7	70.3	23.6	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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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)
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2014/07/14 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2014/05/23 * 12
SCC-G04	Coaxial Cable	Junkosha	J12J102207-00	JUN-12-14-018	RE	2014/06/24 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2014/05/15 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2014/08/12 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2014/02/21 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2014/03/17 * 12
SJM-15	Measure	ASKUL	-	-	RE/CE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFI,MF)	-	RE/CE	-
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2013/11/22 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2013/11/22 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2014/03/15 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2014/03/14 * 12
SCC-G15	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	RE	2014/03/13 * 12
SCC-C9/C10/ SRSE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/N S4906	-/0901-271(RF Selector)	CE	2014/04/25 * 12
SLS-05	LISN	Rohde & Schwarz	ENV216	100516	CE	2014/02/26 * 12
SAT3-07	Attenuator	JFW	50HF-003N	-	CE	2014/09/02 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2014/03/07 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	CE	2014/03/04 * 12
SAF-01	Pre Amplifier	SONOMA	310N	290211	RE	2014/02/17 * 12
KAT6-04	Attenuator	INMET	18N-6dB	-	RE	2013/12/26 * 12
KAT3-09	Attenuator	JFW IND. INC.	50HF-003N	-	RE	2014/08/27 * 12
SBA-01	Biconical Antenna	Schwarzbeck	BBA9106	91032664	RE	2013/10/13 * 12
SCC-A1/A3/A5 /A7/A8/A13/S RSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhne r/Suhner/Suhner/Suhn er/TOYO	8D2W/12DSFA/14 1PE/141PE/141PE /141PE/NS4906	-/0901-269(RF Selector)	RE	2014/04/25 * 12
SCC-A2/A4/A6 /A7/A8/A13/S RSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhne r/Suhner/Suhner/Suhn er/TOYO	8D2W/12DSFA/14 1PE/141PE/141PE /141PE/NS4906	-/0901-269(RF Selector)	RE	2014/04/25 * 12
SLA-01	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0888	RE	2013/10/26 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2014/02/21 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE	2013/11/20 * 12
SJM-13	Measure	ASKUL	-	-	RE	-
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2014/07/09 * 12

The expiration date of the calibration is the end of the expired month .
As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards .
Test Item :
CE: Conducted emission ,
RE: Radiated emission ,