



RADIO TEST REPORT

Test Report No. : 10279739H-A-R1

Applicant : KONICA MINOLTA, Inc.
Type of Equipment : AeroDR SYSTEM 2
Model No. : AeroDR_P-51
FCC ID : YR7AERODRP5
Test regulation : FCC Part 15 Subpart C: 2014
Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This report is a revised version of 10279739H-A. 10279739H-A is replaced with this report.

Date of test: July 22 to 29, 2014

Representative test engineer:

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Approved by:

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Manager

Consumer Technology Division



NVLAP LAB CODE: 200572-0

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

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SECTION 1: Customer information

Company Name	:	KONICA MINOLTA, Inc.
Address	:	1, Sakura-machi, Hino-shi, Tokyo, Japan
Telephone Number	:	+81-42-589-8429
Facsimile Number	:	+81-42-589-8053
Contact Person	:	Masayoshi Inoue

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

2.1 Identification of E.U.T.

Type of Equipment	:	AeroDR SYSTEM 2
Model No.	:	AeroDR_P-51
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 15V
Receipt Date of Sample	:	July 21, 2014
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

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2.2 Product Description

General Specification

Clock frequency(ies) in the system : 532MHz

Radio Specification

Radio Type : Transceiver
Method of Frequency Generation : Synthesizer
Power Supply (inner) : DC3.3V

Specification of Wireless LAN (IEEE802.11a/b/g/n-20)

Type of radio	IEEE802.11b	IEEE802.11g	IEEE802.11a	IEEE802.11n (20 M band)
Frequency of operation	2412-2462MHz	2412-2462MHz	5180-5320MHz *1) 5500-5700MHz *1) 5745-5825MHz *1)	2412-2462MHz 5180-5320MHz *1) 5500-5700MHz *1) 5745-5825MHz *1)
Type of modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (64QAM, 16QAM, QPSK, BPSK)	OFDM (64QAM, 16QAM, QPSK, BPSK)	
Channel spacing	5MHz		20MHz	<u>2.4GHz band</u> 5MHz <u>5GHz band</u> 20MHz
Antenna type	PIFA Type			
Antenna Gain	<u>2.4GHz band</u> -Main Antenna: -2.27dBi -Sub Antenna: -1.99dBi <u>5GHz band</u> -Main Antenna: -2.39dBi -Sub Antenna: -1.41dBi			
Antenna Connector type	U.FL Type			

*1) 5180-5320MHz, 5500-5700MHz, and 5745-5825MHz are applied for other test report.(Test Report No.: 10279739H-C-R1)

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2014, final revised on May 1, 2014 and effective June 2, 2014

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

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 13.0dB, 16.22840MHz, L AV 5.8dB, 16.22840MHz, L	Complied	-
6dB Bandwidth	FCC: "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on June 5, 2014)" ----- IC: RSS-Gen 4.6.2	FCC: Section 15.247(a)(2) ----- IC: RSS-210 A8.2(a)	See data.	Complied	Conducted
Maximum Peak Output Power	FCC: "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on June 5, 2014)" ----- IC: RSS-Gen 4.8	FCC: Section 15.247(b)(3) ----- IC: RSS-210 A8.4(4)		Complied	Conducted
Power Density	FCC: "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on June 5, 2014)" ----- IC: -	FCC: Section 15.247 (e) ----- IC: RSS-210 A8.2(b)		Complied	Conducted
Spurious Emission Restricted Band Edges	FCC: "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on June 5, 2014)" ----- IC: RSS-Gen 4.9	FCC: Section15.247(d) ----- IC: RSS-210 A8.5 RSS-Gen 7.2.3	1.8dB 2483.500MHz, AV, Vert.	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 Part 15.31 (e)

This EUT provides stable voltage (DC3.3V) constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

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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	3.5dB
No.3	3.6dB
No.4	3.5dB

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

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

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

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

Conducted Emission test

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

Radiated emission test(3m)

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

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3.5 Test Location

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	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	4.0 x 4.5 x 2.7m	4.0 x 4.5 m	-
No.6 measurement room	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	8.0 x 4.6 x 2.8m	2.4 x 2.4m	-
No.11 measurement room	-	6.2 x 4.7 x 3.0m	4.8 x 4.6m	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Data of EMI, Test instruments, and Test set up

Refer to APPENDIX.

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

4.1 Operating Mode(s)

Test operating mode was determined as follows according to “Section 1 of 6 802.11 a/b/g/n testing - Managing Complex Regulatory Approvals - ” of TCB Council Workshop October 2009.

Mode	Remarks*
IEEE 802.11b (11b)	11Mbps, PN9
IEEE 802.11g (11g)	36Mbps, PN9
IEEE 802.11n SISO 20MHz BW (11n-20) for 2.4GHz band	MCS 5, PN9
*The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
*Power of the EUT was set by the software as follows; Power settings: 10dBm Software: Wireless authentication test tool version 1.0.0.0 *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.	

[2.4GHz band]

*The details of Operating mode(s)

Test Item	Operating Mode	Tested Antenna	Tested frequency
Conducted Emission	11g Tx *1)	Main Sub	2437MHz
Spurious Emission (Radiated)	11b Tx 11g Tx	Main Sub	2412MHz 2437MHz 2462MHz
	11n-20 Tx	Main Sub	2412MHz 2462MHz
6dB Bandwidth Maximum Peak Output Power 99% Occupied Bandwidth	11b Tx 11g Tx 11n-20 Tx	Sub *2)	2412MHz 2437MHz 2462MHz
Power Density	11b Tx 11g Tx 11n-20 Tx	Sub *2)	2412MHz 2437MHz 2462MHz
Spurious Emission (Conducted)	11b Tx	Sub *2)	2462MHz
	11g Tx 11n-20 Tx	Sub *2)	2437MHz

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

*2) The test was performed with the antenna that had higher power as a representative.

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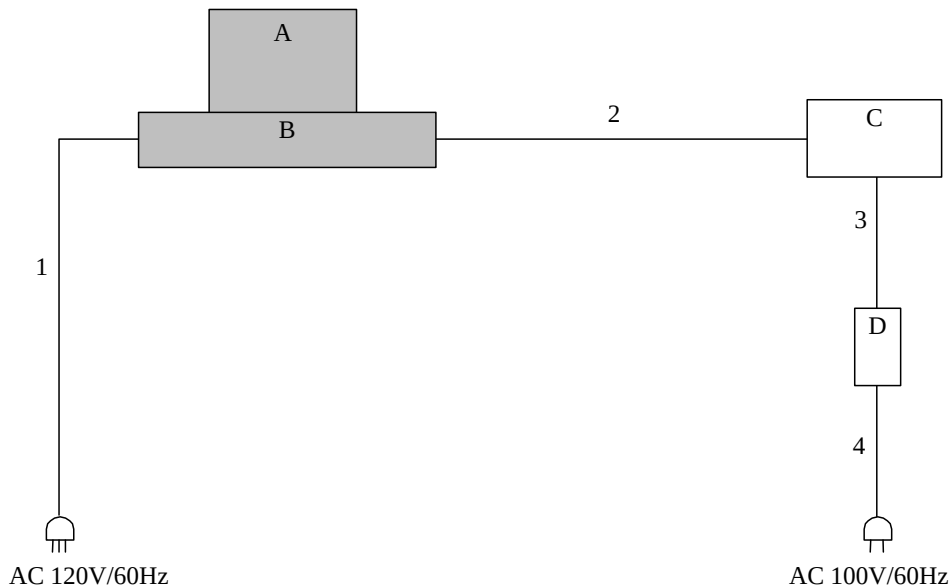
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4.2 Configuration and peripherals



* 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	AeroDR SYSTEM 2	AeroDR_P-51	A6C4-50017 *1) A6C4-S0013 *2)	KONICA MINOLTA, Inc.	EUT
B	AeroDR SYSTEM 2	AeroDR Cradle 2	A5TH-50727	KONICA MINOLTA, Inc.	EUT
C	Laptop PC	FMV-A8260	CP367830	FUJITSU	-
D	AC Adapter	ADP-80NB A	CP410715-01	FUJITSU	-

*1) Used for Antenna Terminal conducted test

*2) Used for Conducted Emission test and Radiated Emission test

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	AC Cable	2.9	Unshielded	Unshielded	-
2	LAN Cable	3.0	Unshielded	Unshielded	-
3	DC Cable	1.8	Unshielded	Unshielded	-
4	AC Cable	1.7	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 CISPR 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 "11.0 Emissions in non-restricted frequency bands" of "558074 D01 DTS Meas Guidance v03r02 (Issued on June 5, 2014)".

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 0.8m above the conducting ground plane.

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

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

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

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

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

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

Test Antennas are used as below;

Frequency	Below 30MHz	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	Loop	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 *1)	PK
IF Bandwidth	BW 120kHz	RBW: 1MHz VBW: 3MHz	Average Power Method: <u>WLAN: 12.2.5.1</u> RBW: 1MHz VBW: 3MHz Detector: Power Averaging (RMS) Trace: Free Run	RBW: 100kHz VBW: 300kHz
Test Distance	3m	3m (below 10GHz), 1m *2) (above 10GHz)		3m (below 10GHz), 1m *2) (above 10GHz)

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

*2) 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 worst case was determined to be the EUT without cradle as this had the worse result than that of the EUT with the cradle at the preliminary test.

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

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

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SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

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

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

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

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

Test data : APPENDIX
Test result : Pass

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APPENDIX 1: Data of EMI test

Conducted Emission

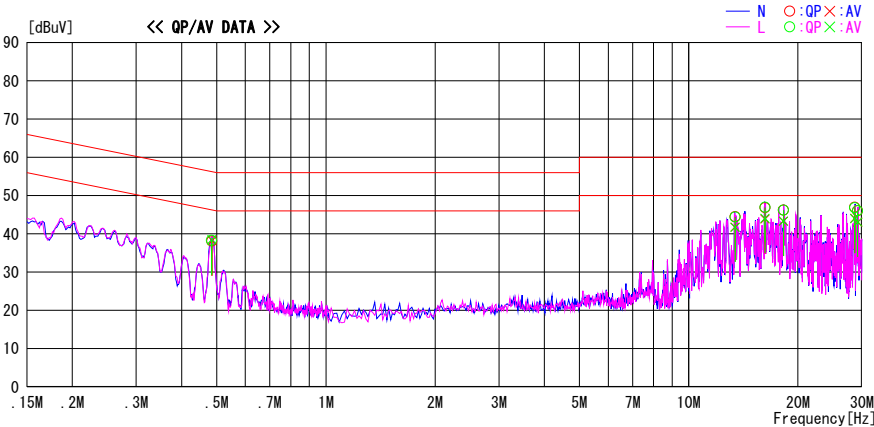
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.2 Semi Anechoic Chamber
Date : 2014/07/29

Report No. : 10279739H
Temp./Humi. : 20deg. C / 53% RH
Engineer : Yuta Moriya

Mode / Remarks : Main Antenna 11g 36Mbps 2437MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.48448	25.1	25.3	13.2	38.3	38.5	56.3	46.3	18.0	7.8	L	
0.48520	24.9	25.0	13.2	38.1	38.2	56.2	46.2	18.1	8.0	N	
13.41896	30.1	27.4	14.4	44.5	41.8	60.0	50.0	15.5	8.2	N	
13.41976	30.0	27.3	14.4	44.4	41.7	60.0	50.0	15.6	8.3	L	
16.22800	32.3	29.5	14.6	46.9	44.1	60.0	50.0	13.1	5.9	L	
16.22868	32.2	29.3	14.6	46.8	43.9	60.0	50.0	13.2	6.1	N	
18.24384	31.5	28.6	14.7	46.2	43.3	60.0	50.0	13.8	6.7	L	
18.24296	31.5	28.6	14.7	46.2	43.3	60.0	50.0	13.8	6.7	N	
28.68568	31.7	28.9	15.2	46.9	44.1	60.0	50.0	13.1	5.9	N	
28.68568	31.6	28.8	15.2	46.8	44.0	60.0	50.0	13.2	6.0	L	
29.23516	30.8	27.9	15.2	46.0	43.1	60.0	50.0	14.0	6.9	L	
29.23540	30.8	27.9	15.2	46.0	43.1	60.0	50.0	14.0	6.9	N	

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

Conducted Emission

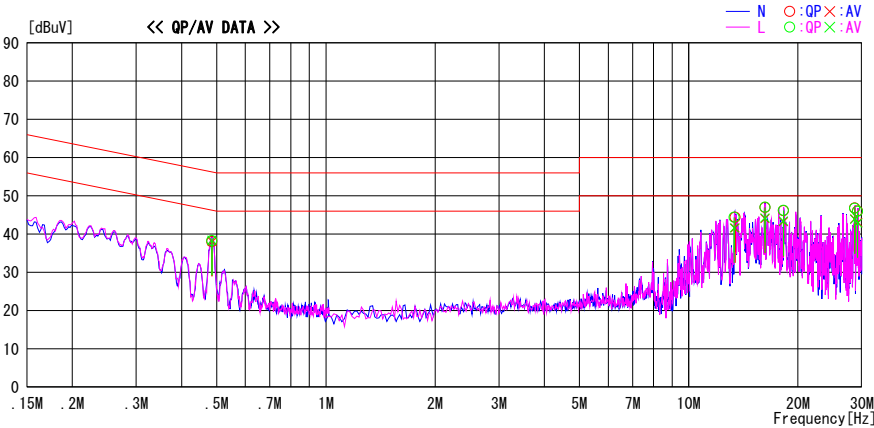
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.2 Semi Anechoic Chamber
Date : 2014/07/29

Report No. : 10279739H
Temp./Humi. : 20deg. C / 53% RH
Engineer : Yuta Moriya

Mode / Remarks : Sub Antenna 11g 36Mbps 2437MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV		QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.48540	24.8	24.9	13.2	38.0	38.1	56.2	46.2	18.2	8.1	N	
13.41996	30.0	27.2	14.4	44.4	41.6	60.0	50.0	15.6	8.4	N	
16.22824	32.3	29.5	14.6	46.9	44.1	60.0	50.0	13.1	5.9	N	
18.24396	31.4	28.5	14.7	46.1	43.2	60.0	50.0	13.9	6.8	N	
28.68596	31.6	28.8	15.2	46.8	44.0	60.0	50.0	13.2	6.0	N	
29.23560	30.8	27.9	15.2	46.0	43.1	60.0	50.0	14.0	6.9	N	
0.48508	25.1	25.2	13.2	38.3	38.4	56.3	46.3	18.0	7.9	L	
13.35840	30.0	27.2	14.4	44.4	41.6	60.0	50.0	15.6	8.4	L	
16.22840	32.4	29.6	14.6	47.0	44.2	60.0	50.0	13.0	5.8	L	
18.24332	31.5	28.7	14.7	46.2	43.4	60.0	50.0	13.8	6.6	L	
28.68544	31.5	28.7	15.2	46.7	43.9	60.0	50.0	13.3	6.1	L	
29.23480	30.7	27.7	15.2	45.9	42.9	60.0	50.0	14.1	7.1	L	

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

6dB Bandwidth

Test place Ise EMC Lab. No.7 Shielded Room
Report No. 10279739H
Date 07/22/2014 07/29/2014
Temperature/ Humidity 21 deg. C / 61% RH 25 deg. C / 67% RH
Engineer Keisuke Kawamura Tomohisa Nakagawa
Mode 11b/11g/11n-20 Tx Sub Antenna

11b

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	10.276	>500
2437	9.884	>500
2462	10.081	>500

11g

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	16.456	>500
2437	16.459	>500
2462	16.444	>500

11n-20

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	17.652	>500
2437	17.692	>500
2462	17.662	>500

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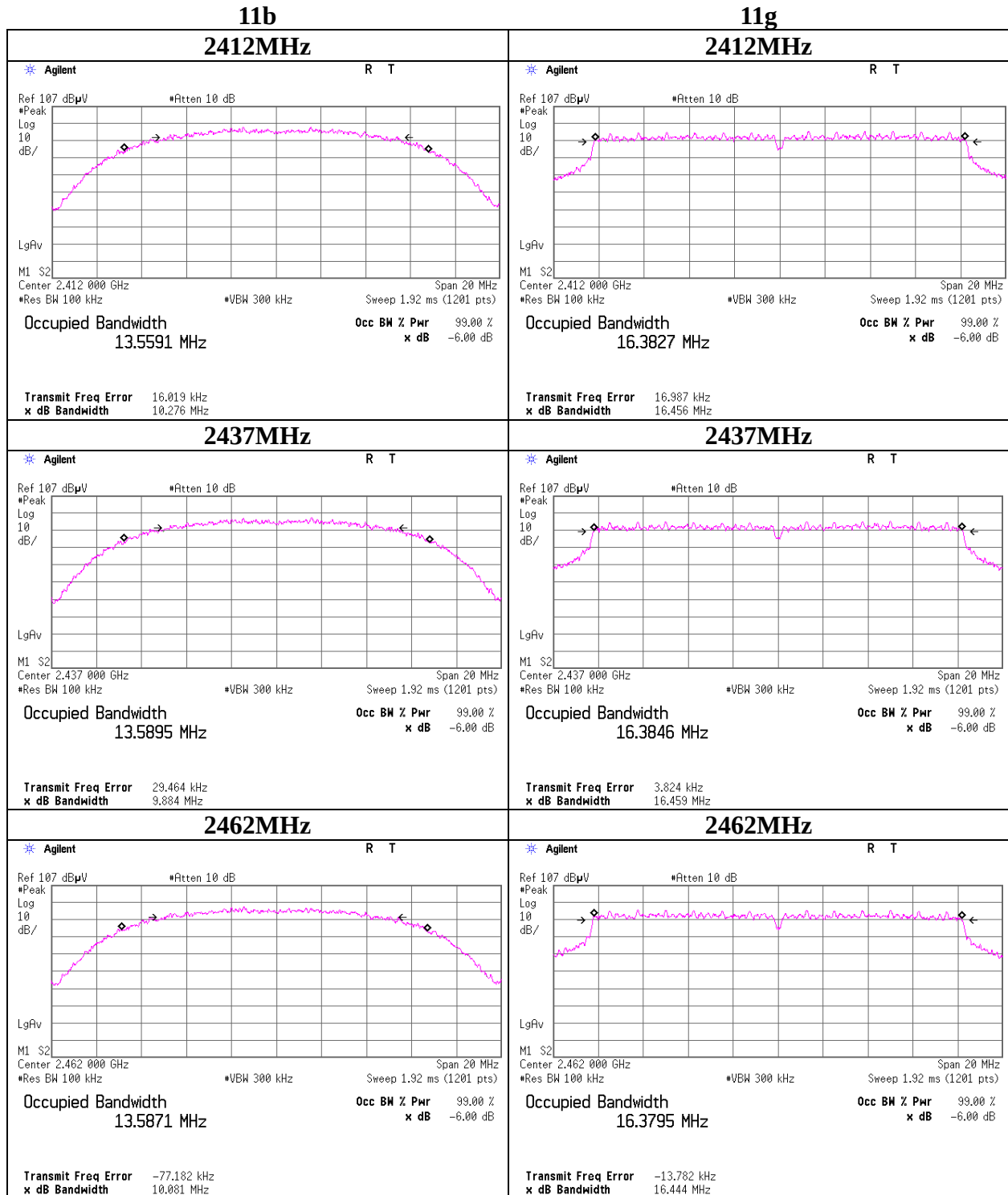
Ise EMC Lab.

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6dB Bandwidth



UL Japan, Inc.

Ise EMC Lab.

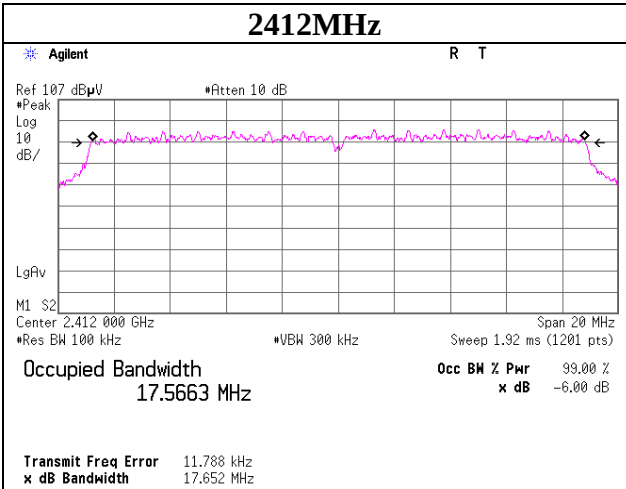
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

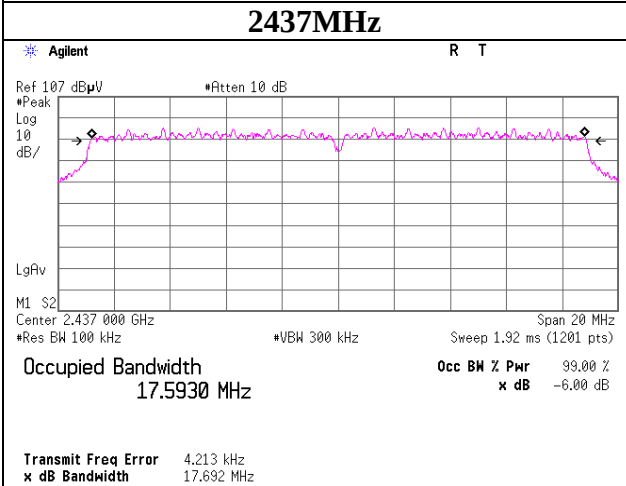
Facsimile : +81 596 24 8124

6dB Bandwidth

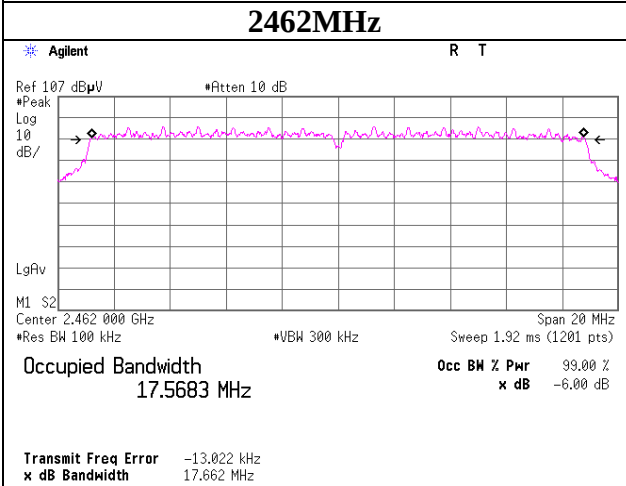
11n-20
2412MHz



2437MHz



2462MHz



Maximum Peak Output Power

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 10279739H
Date : 07/22/2014
Temperature/ Humidity : 21 deg. C / 61% RH
Engineer : Keisuke Kawamura
Mode : 11b Tx 11Mbps

Antenna Main

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	1.14	2.00	9.90	13.04	20.14	30.00	1000	16.96
2437	1.15	2.00	9.90	13.05	20.18	30.00	1000	16.95
2462	1.27	2.00	9.90	13.17	20.75	30.00	1000	16.83

Antenna Sub

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	1.15	2.00	9.90	13.05	20.18	30.00	1000	16.95
2437	1.30	2.00	9.90	13.20	20.89	30.00	1000	16.80
2462	1.42	2.00	9.90	13.32	21.48	30.00	1000	16.68

Sample Calculation:

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

Antenna Main, 2412MHz

Rate [Mbps]	Reading [dBm]	Remark
1	0.99	
2	1.05	
5.5	0.99	
11	1.14	

Antenna Sub, 2412MHz

Rate [Mbps]	Reading [dBm]	Remark
1	1.02	
2	1.05	
5.5	1.12	
11	1.15	*

*: Worst Rate

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

Maximum Peak Output Power

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 10279739H
Date : 07/22/2014
Temperature/ Humidity : 21 deg. C / 61% RH
Engineer : Keisuke Kawamura
Mode : 11g Tx 36Mbps

Antenna Main

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	7.18	2.00	9.90	19.08	80.91	30.00	1000	10.92
2437	7.38	2.00	9.90	19.28	84.72	30.00	1000	10.72
2462	6.50	2.00	9.90	18.40	69.18	30.00	1000	11.60

Antenna Sub

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	7.25	2.00	9.90	19.15	82.22	30.00	1000	10.85
2437	7.40	2.00	9.90	19.30	85.11	30.00	1000	10.70
2462	6.70	2.00	9.90	18.60	72.44	30.00	1000	11.40

Sample Calculation:

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

Antenna Main, 2412MHz

Rate [Mbps]	Reading [dBm]	Remark
6	6.44	
9	6.36	
12	6.46	
18	6.80	
24	6.66	
36	7.18	
48	7.16	
54	7.14	

Antenna Sub, 2412MHz

Rate [Mbps]	Reading [dBm]	Remark
6	6.47	
9	6.53	
12	6.59	
18	6.89	
24	6.69	
36	7.25	*
48	7.23	
54	7.20	

*: Worst Rate

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

Maximum Peak Output Power

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 10279739H
Date : 07/22/2014
Temperature/ Humidity : 21 deg. C / 61% RH
Engineer : Keisuke Kawamura
Mode : 11n-20 Tx MCS5

Antenna Main

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	7.04	2.00	9.90	18.94	78.34	30.00	1000	11.06
2437	7.26	2.00	9.90	19.16	82.41	30.00	1000	10.84
2462	6.49	2.00	9.90	18.39	69.02	30.00	1000	11.61

Antenna Sub

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	7.09	2.00	9.90	18.99	79.25	30.00	1000	11.01
2437	7.32	2.00	9.90	19.22	83.56	30.00	1000	10.78
2462	6.55	2.00	9.90	18.45	69.98	30.00	1000	11.55

Sample Calculation:

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

Antenna Main, 2412MHz

MCS Number	Reading [dBm]	Remark
MCS0	6.44	
MCS1	6.53	
MCS2	6.40	
MCS3	6.48	
MCS4	6.37	
MCS5	7.04	
MCS6	7.01	
MCS7	7.03	

Antenna Sub, 2412MHz

Rate [Mbps]	Reading [dBm]	Remark
MCS0	6.65	
MCS1	6.68	
MCS2	6.78	
MCS3	6.74	
MCS4	6.49	
MCS5	7.09	*
MCS6	7.05	
MCS7	7.04	

*: Worst Rate

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

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Radiated Spurious Emission

Test place Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. 10279739H
Date 07/24/2014 07/27/2014
Temperature/ Humidity 25 deg. C / 61% RH 24 deg. C / 57% RH
Engineer Yuta Moriya Yuta Moriya
(1-10GHz) (Above10GHz)
Mode 11b Tx 2412MHz Main Antenna

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	48.4	27.0	3.0	34.7	-	43.7	73.9	30.2	
Hori	4824.000	PK	43.1	31.9	5.3	33.9	-	46.4	73.9	27.5	Fllor Noise
Hori	7236.000	PK	42.1	35.7	6.6	33.8	-	50.6	73.9	23.3	Fllor Noise
Hori	9648.000	PK	42.2	38.1	7.0	34.4	-	52.9	73.9	21.0	Fllor Noise
Hori	2390.000	AV	37.4	27.0	3.0	34.7	0.1	32.8	53.9	21.1	*1)
Hori	4824.000	AV	35.4	31.9	5.3	33.9	-	38.7	53.9	15.2	Fllor Noise
Hori	7236.000	AV	35.3	35.7	6.6	33.8	-	43.8	53.9	10.1	Fllor Noise
Hori	9648.000	AV	35.7	38.1	7.0	34.4	-	46.4	53.9	7.5	Fllor Noise
Vert	2390.000	PK	48.5	27.0	3.0	34.7	-	43.8	73.9	30.1	
Vert	4824.000	PK	42.7	31.9	5.3	33.9	-	46.0	73.9	27.9	Fllor Noise
Vert	7236.000	PK	43.1	35.7	6.6	33.8	-	51.6	73.9	22.3	Fllor Noise
Vert	9648.000	PK	43.1	38.1	7.0	34.4	-	53.8	73.9	20.1	Fllor Noise
Vert	2390.000	AV	36.9	27.0	3.0	34.7	0.1	32.3	53.9	21.6	*1)
Vert	4824.000	AV	35.2	31.9	5.3	33.9	-	38.5	53.9	15.4	Fllor Noise
Vert	7236.000	AV	34.4	35.7	6.6	33.8	-	42.9	53.9	11.0	Fllor Noise
Vert	9648.000	AV	35.2	38.1	7.0	34.4	-	45.9	53.9	8.0	Fllor Noise

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

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

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

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

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	98.4	27.0	3.0	34.7	93.7	-	-	Carrier
Hori	2400.000	PK	48.7	27.0	3.0	34.7	44.0	73.7	29.7	
Vert	2412.000	PK	98.1	27.0	3.0	34.7	93.4	-	-	Carrier
Vert	2400.000	PK	47.0	27.0	3.0	34.7	42.3	73.4	31.1	

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

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10279739H
Date : 07/24/2014 07/27/2014
Temperature/ Humidity : 25 deg. C / 61% RH 24 deg. C / 57% RH
Engineer : Yuta Moriya Yuta Moriya
(1-10GHz) (Above10GHz)
Mode : 11b Tx 2437MHz Main Antenna

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4874.000	PK	44.1	32.0	5.3	33.9	47.5	73.9	26.4	Floor Noise
Hori	7311.000	PK	42.1	35.8	6.7	33.8	50.8	73.9	23.1	Floor Noise
Hori	9748.000	PK	41.7	38.3	7.1	34.5	52.6	73.9	21.3	Floor Noise
Hori	4874.000	AV	35.3	32.0	5.3	33.9	38.7	53.9	15.2	Floor Noise
Hori	7311.000	AV	35.0	35.8	6.7	33.8	43.7	53.9	10.2	Floor Noise
Hori	9748.000	AV	36.2	38.3	7.1	34.5	47.1	53.9	6.8	Floor Noise
Vert	4874.000	PK	43.2	32.0	5.3	33.9	46.6	73.9	27.3	Floor Noise
Vert	7311.000	PK	42.1	35.8	6.7	33.8	50.8	73.9	23.1	Floor Noise
Vert	9748.000	PK	42.3	38.3	7.1	34.5	53.2	73.9	20.7	Floor Noise
Vert	4874.000	AV	34.7	32.0	5.3	33.9	38.1	53.9	15.8	Floor Noise
Vert	7311.000	AV	34.9	35.8	6.7	33.8	43.6	53.9	10.3	Floor Noise
Vert	9748.000	AV	34.5	38.3	7.1	34.5	45.4	53.9	8.5	Floor Noise

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

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

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

UL Japan, Inc.

Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10279739H
Date : 07/24/2014 07/27/2014
Temperature/ Humidity : 25 deg. C / 61% RH 24 deg. C / 57% RH
Engineer : Yuta Moriya Yuta Moriya
(1-10GHz) (Above10GHz)
Mode : 11b Tx 2462MHz Main Antenna

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	45.5	26.9	3.1	34.7	-	40.8	73.9	33.1	
Hori	4924.000	PK	44.1	32.1	5.3	33.9	-	47.6	73.9	26.3	Floor Noise
Hori	7386.000	PK	42.1	35.8	6.6	33.8	-	50.7	73.9	23.2	Floor Noise
Hori	9848.000	PK	41.6	38.5	7.1	34.5	-	52.7	73.9	21.2	Floor Noise
Hori	2483.500	AV	38.2	26.9	3.1	34.7	0.1	33.6	53.9	20.3	*1)
Hori	4924.000	AV	35.1	32.1	5.3	33.9	-	38.6	53.9	15.3	Floor Noise
Hori	7386.000	AV	35.0	35.8	6.6	33.8	-	43.6	53.9	10.3	Floor Noise
Hori	9848.000	AV	36.3	38.5	7.1	34.5	-	47.4	53.9	6.5	Floor Noise
Vert	2483.500	PK	45.8	26.9	3.1	34.7	-	41.1	73.9	32.8	
Vert	4924.000	PK	43.3	32.1	5.3	33.9	-	46.8	73.9	27.1	Floor Noise
Vert	7386.000	PK	42.2	35.8	6.6	33.8	-	50.8	73.9	23.1	Floor Noise
Vert	9848.000	PK	42.1	38.5	7.1	34.5	-	53.2	73.9	20.7	Floor Noise
Vert	2483.500	AV	36.9	26.9	3.1	34.7	0.1	32.3	53.9	21.6	*1)
Vert	4924.000	AV	34.6	32.1	5.3	33.9	-	38.1	53.9	15.8	Floor Noise
Vert	7386.000	AV	35.0	35.8	6.6	33.8	-	43.6	53.9	10.3	Floor Noise
Vert	9848.000	AV	34.3	38.5	7.1	34.5	-	45.4	53.9	8.5	Floor Noise

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

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

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

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

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10279739H
Date : 07/24/2014 07/27/2014
Temperature/ Humidity : 25 deg. C / 61% RH 24 deg. C / 57% RH
Engineer : Yuta Moriya Yuta Moriya
(1-10GHz) (Above10GHz)
Mode : 11g Tx 2412MHz Main Antenna

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	66.6	27.0	3.0	34.7	-	61.9	73.9	12.0	
Hori	4824.000	PK	43.1	31.9	5.3	33.9	-	46.4	73.9	27.5	Floor Noise
Hori	7236.000	PK	42.1	35.7	6.6	33.8	-	50.6	73.9	23.3	Floor Noise
Hori	9648.000	PK	42.2	38.1	7.0	34.4	-	52.9	73.9	21.0	Floor Noise
Hori	2390.000	AV	52.8	27.0	3.0	34.7	0.4	48.5	53.9	5.4	*1)
Hori	4824.000	AV	35.4	31.9	5.3	33.9	-	38.7	53.9	15.2	Floor Noise
Hori	7236.000	AV	35.3	35.7	6.6	33.8	-	43.8	53.9	10.1	Floor Noise
Hori	9648.000	AV	35.7	38.1	7.0	34.4	-	46.4	53.9	7.5	Floor Noise
Vert	2390.000	PK	64.7	27.0	3.0	34.7	-	60.0	73.9	13.9	
Vert	4824.000	PK	42.7	31.9	5.3	33.9	-	46.0	73.9	27.9	Floor Noise
Vert	7236.000	PK	43.1	35.7	6.6	33.8	-	51.6	73.9	22.3	Floor Noise
Vert	9648.000	PK	43.1	38.1	7.0	34.4	-	53.8	73.9	20.1	Floor Noise
Vert	2390.000	AV	51.6	27.0	3.0	34.7	0.4	47.3	53.9	6.6	*1)
Vert	4824.000	AV	35.2	31.9	5.3	33.9	-	38.5	53.9	15.4	Floor Noise
Vert	7236.000	AV	34.4	35.7	6.6	33.8	-	42.9	53.9	11.0	Floor Noise
Vert	9648.000	AV	35.2	38.1	7.0	34.4	-	45.9	53.9	8.0	Floor Noise

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

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

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

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

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	97.8	27.0	3.0	34.7	93.1	-	-	Carrier
Hori	2400.000	PK	64.8	27.0	3.0	34.7	60.1	73.1	13.0	
Vert	2412.000	PK	95.0	27.0	3.0	34.7	90.3	-	-	Carrier
Vert	2400.000	PK	62.3	27.0	3.0	34.7	57.6	70.3	12.7	

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

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Radiated Spurious Emission

Test place Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. 10279739H
Date 07/24/2014 07/27/2014 07/28/2014
Temperature/ Humidity 25 deg. C / 61% RH 24 deg. C / 57% RH 22 deg. C / 59% RH
Engineer Yuta Moriya Yuta Moriya Takumi Shimada
(1-10GHz) (Above10GHz) (Below10GHz)
Mode 11g Tx 2437MHz Main Antenna

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	177.330	QP	32.3	16.0	8.0	28.0	28.3	43.5	15.2	
Hori	416.000	QP	31.7	17.4	9.2	28.4	29.9	46.0	16.1	
Hori	544.000	QP	32.2	18.8	9.6	28.8	31.8	46.0	14.2	
Hori	576.339	QP	37.5	19.2	9.8	28.8	37.7	46.0	8.3	
Hori	768.000	QP	35.8	21.3	10.7	28.3	39.5	46.0	6.5	
Hori	800.000	QP	33.0	21.8	10.8	28.2	37.4	46.0	8.6	
Hori	4874.000	PK	44.1	32.0	5.3	33.9	47.5	73.9	26.4	Floor Noise
Hori	7311.000	PK	42.1	35.8	6.7	33.8	50.8	73.9	23.1	Floor Noise
Hori	9748.000	PK	41.7	38.3	7.1	34.5	52.6	73.9	21.3	Floor Noise
Hori	4874.000	AV	35.3	32.0	5.3	33.9	38.7	53.9	15.2	Floor Noise
Hori	7311.000	AV	35.0	35.8	6.7	33.8	43.7	53.9	10.3	Floor Noise
Hori	9748.000	AV	36.2	38.3	7.1	34.5	47.1	53.9	6.8	Floor Noise
Vert	177.330	QP	34.7	16.0	8.0	28.0	30.7	43.5	12.8	
Vert	416.000	QP	36.9	17.4	9.2	28.4	35.1	46.0	10.9	
Vert	544.000	QP	38.1	18.8	9.6	28.8	37.7	46.0	8.3	
Vert	576.000	QP	32.0	19.2	9.8	28.8	32.2	46.0	13.8	
Vert	768.000	QP	33.3	21.3	10.7	28.3	37.0	46.0	9.0	
Vert	800.000	QP	31.7	21.8	10.8	28.2	36.1	46.0	9.9	
Vert	4874.000	PK	43.2	32.0	5.3	33.9	46.6	73.9	27.3	Floor Noise
Vert	7311.000	PK	42.1	35.8	6.7	33.8	50.8	73.9	23.1	Floor Noise
Vert	9748.000	PK	42.3	38.3	7.1	34.5	53.2	73.9	20.7	Floor Noise
Vert	4874.000	AV	34.7	32.0	5.3	33.9	38.1	53.9	15.8	Floor Noise
Vert	7311.000	AV	34.9	35.8	6.7	33.8	43.6	53.9	10.3	Floor Noise
Vert	9748.000	AV	34.5	38.3	7.1	34.5	45.4	53.9	8.5	Floor Noise

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

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

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

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Facsimile : +81 596 24 8124

Radiated Spurious Emission

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10279739H
Date : 07/24/2014 07/27/2014
Temperature/ Humidity : 25 deg. C / 61% RH 24 deg. C / 57% RH
Engineer : Yuta Moriya Yuta Moriya
(1-10GHz) (Above10GHz)
Mode : 11g Tx 2462MHz Main Antenna

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	68.9	26.9	3.1	34.7	-	64.2	73.9	9.7	
Hori	4924.000	PK	44.1	32.1	5.3	33.9	-	47.6	73.9	26.3	Floor Noise
Hori	7386.000	PK	42.1	35.8	6.6	33.8	-	50.7	73.9	23.2	Floor Noise
Hori	9848.000	PK	41.6	38.5	7.1	34.5	-	52.7	73.9	21.2	Floor Noise
Hori	2483.500	AV	56.1	26.9	3.1	34.7	0.4	51.8	53.9	2.1	*1)
Hori	4924.000	AV	35.1	32.1	5.3	33.9	-	38.6	53.9	15.3	Floor Noise
Hori	7386.000	AV	35.0	35.8	6.6	33.8	-	43.6	53.9	10.3	Floor Noise
Hori	9848.000	AV	36.3	38.5	7.1	34.5	-	47.4	53.9	6.5	Floor Noise
Vert	2483.500	PK	68.3	26.9	3.1	34.7	-	63.6	73.9	10.3	
Vert	4924.000	PK	43.3	32.1	5.3	33.9	-	46.8	73.9	27.1	Floor Noise
Vert	7386.000	PK	42.2	35.8	6.6	33.8	-	50.8	73.9	23.1	Floor Noise
Vert	9848.000	PK	42.1	38.5	7.1	34.5	-	53.2	73.9	20.7	Floor Noise
Vert	2483.500	AV	56.4	26.9	3.1	34.7	0.4	52.1	53.9	1.8	*1)
Vert	4924.000	AV	34.6	32.1	5.3	33.9	-	38.1	53.9	15.8	Floor Noise
Vert	7386.000	AV	35.0	35.8	6.6	33.8	-	43.6	53.9	10.3	Floor Noise
Vert	9848.000	AV	34.3	38.5	7.1	34.5	-	45.4	53.9	8.5	Floor Noise

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

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

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

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

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10279739H
Date : 07/24/2014
Temperature/ Humidity : 25 deg. C / 61% RH
Engineer : Yuta Moriya
(1-10GHz)
Mode : 11n-20 Tx 2412MHz Main Antenna

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	68.2	27.0	3.0	34.7	-	63.5	73.9	10.4	
Hori	2390.000	AV	52.6	27.0	3.0	34.7	0.5	48.4	53.9	5.5	*1)
Vert	2390.000	PK	64.4	27.0	3.0	34.7	-	59.7	73.9	14.2	
Vert	2390.000	AV	49.7	27.0	3.0	34.7	0.5	45.5	53.9	8.4	*1)

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

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

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

NS: No signal detect

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

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	97.6	27.0	3.0	34.7	92.9	-	-	Carrier
Hori	2400.000	PK	64.8	27.0	3.0	34.7	60.1	72.9	12.8	
Vert	2412.000	PK	93.7	27.0	3.0	34.7	89.0	-	-	Carrier
Vert	2400.000	PK	60.8	27.0	3.0	34.7	56.1	69.0	12.9	

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

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10279739H
Date : 07/24/2014
Temperature/ Humidity : 25 deg. C / 61% RH
Engineer : Yuta Moriya
(1-10GHz)
Mode : 11n-20 Tx 2462MHz Main Antenna

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	67.2	26.9	3.1	34.7	-	62.5	73.9	11.4	
Hori	2483.500	AV	54.4	26.9	3.1	34.7	0.5	50.2	53.9	3.7	*1)
Vert	2483.500	PK	69.1	26.9	3.1	34.7	-	64.4	73.9	9.5	
Vert	2483.500	AV	55.0	26.9	3.1	34.7	0.5	50.8	53.9	3.1	*1)

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

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

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

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

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10279739H
Date : 07/22/2014 07/27/2014
Temperature/ Humidity : 25 deg. C / 60% RH 24 deg. C / 57% RH
Engineer : Yuta Moriya Yuta Moriya
(1-10GHz) (Above10GHz)
Mode : 11b Tx 2412MHz Sub Antenna

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	46.2	27.0	3.0	34.7	-	41.5	73.9	32.4	
Hori	4824.000	PK	43.1	31.9	5.3	33.9	-	46.4	73.9	27.5	Floor Noise
Hori	7236.000	PK	42.1	35.7	6.6	33.8	-	50.6	73.9	23.3	Floor Noise
Hori	9648.000	PK	42.2	38.1	7.0	34.4	-	52.9	73.9	21.0	Floor Noise
Hori	2390.000	AV	37.9	27.0	3.0	34.7	0.1	33.3	53.9	20.6	*1)
Hori	4824.000	AV	35.4	31.9	5.3	33.9	-	38.7	53.9	15.2	Floor Noise
Hori	7236.000	AV	35.3	35.7	6.6	33.8	-	43.8	53.9	10.1	Floor Noise
Hori	9648.000	AV	35.7	38.1	7.0	34.4	-	46.4	53.9	7.5	Floor Noise
Vert	2390.000	PK	45.6	27.0	3.0	34.7	-	40.9	73.9	33.0	
Vert	4824.000	PK	42.7	31.9	5.3	33.9	-	46.0	73.9	27.9	Floor Noise
Vert	7236.000	PK	43.1	35.7	6.6	33.8	-	51.6	73.9	22.3	Floor Noise
Vert	9648.000	PK	43.1	38.1	7.0	34.4	-	53.8	73.9	20.1	Floor Noise
Vert	2390.000	AV	37.2	27.0	3.0	34.7	0.1	32.6	53.9	21.3	*1)
Vert	4824.000	AV	35.2	31.9	5.3	33.9	-	38.5	53.9	15.4	Floor Noise
Vert	7236.000	AV	34.4	35.7	6.6	33.8	-	42.9	53.9	11.0	Floor Noise
Vert	9648.000	AV	35.2	38.1	7.0	34.4	-	45.9	53.9	8.0	Floor Noise

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

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

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

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	96.3	27.0	3.0	34.7	91.6	-	-	Carrier
Hori	2400.000	PK	44.8	27.0	3.0	34.7	40.1	71.6	31.5	
Vert	2412.000	PK	94.1	27.0	3.0	34.7	89.4	-	-	Carrier
Vert	2400.000	PK	43.3	27.0	3.0	34.7	38.6	69.4	30.8	

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

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Radiated Spurious Emission

Test place Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. 10279739H
Date 07/22/2014 07/27/2014
Temperature/ Humidity 25 deg. C / 60% RH 24 deg. C / 57% RH
Engineer Yuta Moriya Yuta Moriya
(1-10GHz) (Above10GHz)
Mode 11b Tx 2437MHz Sub Antenna

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4874.000	PK	44.1	32.0	5.3	33.9	47.5	73.9	26.4	Floor Noise
Hori	7311.000	PK	42.1	35.8	6.7	33.8	50.8	73.9	23.1	Floor Noise
Hori	9748.000	PK	41.7	38.3	7.1	34.5	52.6	73.9	21.3	Floor Noise
Hori	4874.000	AV	35.3	32.0	5.3	33.9	38.7	53.9	15.2	Floor Noise
Hori	7311.000	AV	35.0	35.8	6.7	33.8	43.7	53.9	10.2	Floor Noise
Hori	9748.000	AV	36.2	38.3	7.1	34.5	47.1	53.9	6.8	Floor Noise
Vert	4874.000	PK	43.2	32.0	5.3	33.9	46.6	73.9	27.3	Floor Noise
Vert	7311.000	PK	42.1	35.8	6.7	33.8	50.8	73.9	23.1	Floor Noise
Vert	9748.000	PK	42.3	38.3	7.1	34.5	53.2	73.9	20.7	Floor Noise
Vert	4874.000	AV	34.7	32.0	5.3	33.9	38.1	53.9	15.8	Floor Noise
Vert	7311.000	AV	34.9	35.8	6.7	33.8	43.6	53.9	10.3	Floor Noise
Vert	9748.000	AV	34.5	38.3	7.1	34.5	45.4	53.9	8.5	Floor Noise

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

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

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

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10279739H
Date : 07/22/2014 07/27/2014
Temperature/ Humidity : 25 deg. C / 60% RH 24 deg. C / 57% RH
Engineer : Yuta Moriya Yuta Moriya
(1-10GHz) (Above10GHz)
Mode : 11b Tx 2462MHz Sub Antenna

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	47.1	26.9	3.1	34.7	-	42.4	73.9	31.5	
Hori	4924.000	PK	44.1	32.1	5.3	33.9	-	47.6	73.9	26.3	Floor Noise
Hori	7386.000	PK	42.1	35.8	6.6	33.8	-	50.7	73.9	23.2	Floor Noise
Hori	9848.000	PK	41.6	38.5	7.1	34.5	-	52.7	73.9	21.2	Floor Noise
Hori	2483.500	AV	38.7	26.9	3.1	34.7	0.1	34.1	53.9	19.8	*1)
Hori	4924.000	AV	35.1	32.1	5.3	33.9	-	38.6	53.9	15.3	Floor Noise
Hori	7386.000	AV	35.0	35.8	6.6	33.8	-	43.6	53.9	10.3	Floor Noise
Hori	9848.000	AV	36.3	38.5	7.1	34.5	-	47.4	53.9	6.5	Floor Noise
Vert	2483.500	PK	45.6	26.9	3.1	34.7	-	40.9	73.9	33.0	
Vert	4924.000	PK	43.3	32.1	5.3	33.9	-	46.8	73.9	27.1	Floor Noise
Vert	7386.000	PK	42.2	35.8	6.6	33.8	-	50.8	73.9	23.1	Floor Noise
Vert	9848.000	PK	42.1	38.5	7.1	34.5	-	53.2	73.9	20.7	Floor Noise
Vert	2483.500	AV	37.2	26.9	3.1	34.7	0.1	32.6	53.9	21.3	*1)
Vert	4924.000	AV	34.6	32.1	5.3	33.9	-	38.1	53.9	15.8	Floor Noise
Vert	7386.000	AV	35.0	35.8	6.6	33.8	-	43.6	53.9	10.3	Floor Noise
Vert	9848.000	AV	34.3	38.5	7.1	34.5	-	45.4	53.9	8.5	Floor Noise

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

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

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

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

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10279739H
Date : 07/22/2014 07/27/2014
Temperature/ Humidity : 25 deg. C / 60% RH 24 deg. C / 57% RH
Engineer : Yuta Moriya Yuta Moriya
(1-10GHz) (Above10GHz)
Mode : 11g Tx 2412MHz Sub Antenna

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	61.0	27.0	3.0	34.7	-	56.3	73.9	17.6	
Hori	4824.000	PK	43.1	31.9	5.3	33.9	-	46.4	73.9	27.5	Floor Noise
Hori	7236.000	PK	42.1	35.7	6.6	33.8	-	50.6	73.9	23.3	Floor Noise
Hori	9648.000	PK	42.2	38.1	7.0	34.4	-	52.9	73.9	21.0	Floor Noise
Hori	2390.000	AV	47.5	27.0	3.0	34.7	0.4	43.2	53.9	10.7	*1)
Hori	4824.000	AV	35.4	31.9	5.3	33.9	-	38.7	53.9	15.2	Floor Noise
Hori	7236.000	AV	35.3	35.7	6.6	33.8	-	43.8	53.9	10.1	Floor Noise
Hori	9648.000	AV	35.7	38.1	7.0	34.4	-	46.4	53.9	7.5	Floor Noise
Vert	2390.000	PK	59.8	27.0	3.0	34.7	-	55.1	73.9	18.8	
Vert	4824.000	PK	42.7	31.9	5.3	33.9	-	46.0	73.9	27.9	Floor Noise
Vert	7236.000	PK	43.1	35.7	6.6	33.8	-	51.6	73.9	22.3	Floor Noise
Vert	9648.000	PK	43.1	38.1	7.0	34.4	-	53.8	73.9	20.1	Floor Noise
Vert	2390.000	AV	46.3	27.0	3.0	34.7	0.4	42.0	53.9	11.9	*1)
Vert	4824.000	AV	35.2	31.9	5.3	33.9	-	38.5	53.9	15.4	Floor Noise
Vert	7236.000	AV	34.4	35.7	6.6	33.8	-	42.9	53.9	11.0	Floor Noise
Vert	9648.000	AV	35.2	38.1	7.0	34.4	-	45.9	53.9	8.0	Floor Noise

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

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

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

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

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	93.7	27.0	3.0	34.7	89.0	-	-	Carrier
Hori	2400.000	PK	61.4	27.0	3.0	34.7	56.7	69.0	12.3	
Vert	2412.000	PK	93.0	27.0	3.0	34.7	88.3	-	-	Carrier
Vert	2400.000	PK	60.2	27.0	3.0	34.7	55.5	68.3	12.8	

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

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10279739H
Date : 07/22/2014 07/27/2014
Temperature/ Humidity : 25 deg. C / 60% RH 24 deg. C / 57% RH
Engineer : Yuta Moriya Yuta Moriya
(1-10GHz) (Above10GHz)
Mode : 11g Tx 2462MHz Sub Antenna

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	65.7	26.9	3.1	34.7	-	61.0	73.9	12.9	
Hori	4924.000	PK	44.1	32.1	5.3	33.9	-	47.6	73.9	26.3	Floor Noise
Hori	7386.000	PK	42.1	35.8	6.6	33.8	-	50.7	73.9	23.2	Floor Noise
Hori	9848.000	PK	41.6	38.5	7.1	34.5	-	52.7	73.9	21.2	Floor Noise
Hori	2483.500	AV	52.2	26.9	3.1	34.7	0.4	47.9	53.9	6.0	*1)
Hori	4924.000	AV	35.1	32.1	5.3	33.9	-	38.6	53.9	15.3	Floor Noise
Hori	7386.000	AV	35.0	35.8	6.6	33.8	-	43.6	53.9	10.3	Floor Noise
Hori	9848.000	AV	36.3	38.5	7.1	34.5	-	47.4	53.9	6.5	Floor Noise
Vert	2483.500	PK	65.3	26.9	3.1	34.7	-	60.6	73.9	13.3	
Vert	4924.000	PK	43.3	32.1	5.3	33.9	-	46.8	73.9	27.1	Floor Noise
Vert	7386.000	PK	42.2	35.8	6.6	33.8	-	50.8	73.9	23.1	Floor Noise
Vert	9848.000	PK	42.1	38.5	7.1	34.5	-	53.2	73.9	20.7	Floor Noise
Vert	2483.500	AV	51.5	26.9	3.1	34.7	0.4	47.2	53.9	6.7	*1)
Vert	4924.000	AV	34.6	32.1	5.3	33.9	-	38.1	53.9	15.8	Floor Noise
Vert	7386.000	AV	35.0	35.8	6.6	33.8	-	43.6	53.9	10.3	Floor Noise
Vert	9848.000	AV	34.3	38.5	7.1	34.5	-	45.4	53.9	8.5	Floor Noise

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

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

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

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

UL Japan, Inc.

Ise EMC Lab.

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10279739H
Date : 07/22/2014
Temperature/ Humidity : 25 deg. C / 60% RH
Engineer : Yuta Moriya
(1-10GHz)
Mode : 11n-20 Tx 2412MHz Sub Antenna

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	61.3	27.0	3.0	34.7	-	56.6	73.9	17.3	
Hori	2390.000	AV	49.4	27.0	3.0	34.7	0.5	45.2	53.9	8.7	*1)
Vert	2390.000	PK	59.8	27.0	3.0	34.7	-	55.1	73.9	18.8	
Vert	2390.000	AV	48.2	27.0	3.0	34.7	0.5	44.0	53.9	9.9	*1)

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

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

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

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

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	93.7	27.0	3.0	34.7	89.0	-	-	Carrier
Hori	2400.000	PK	61.9	27.0	3.0	34.7	57.2	69.0	11.8	
Vert	2412.000	PK	92.9	27.0	3.0	34.7	88.2	-	-	Carrier
Vert	2400.000	PK	60.5	27.0	3.0	34.7	55.8	68.2	12.4	

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

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10279739H
Date : 07/22/2014
Temperature/ Humidity : 25 deg. C / 60% RH
Engineer : Yuta Moriya
(1-10GHz)
Mode : 11n-20 Tx 2462MHz Sub Antenna

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	67.8	26.9	3.1	34.7	-	63.1	73.9	10.8	
Hori	2483.500	AV	54.8	26.9	3.1	34.7	0.5	50.6	53.9	3.3	*1)
Vert	2483.500	PK	67.1	26.9	3.1	34.7	-	62.4	73.9	11.5	
Vert	2483.500	AV	52.9	26.9	3.1	34.7	0.5	48.7	53.9	5.2	*1)

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

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

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

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

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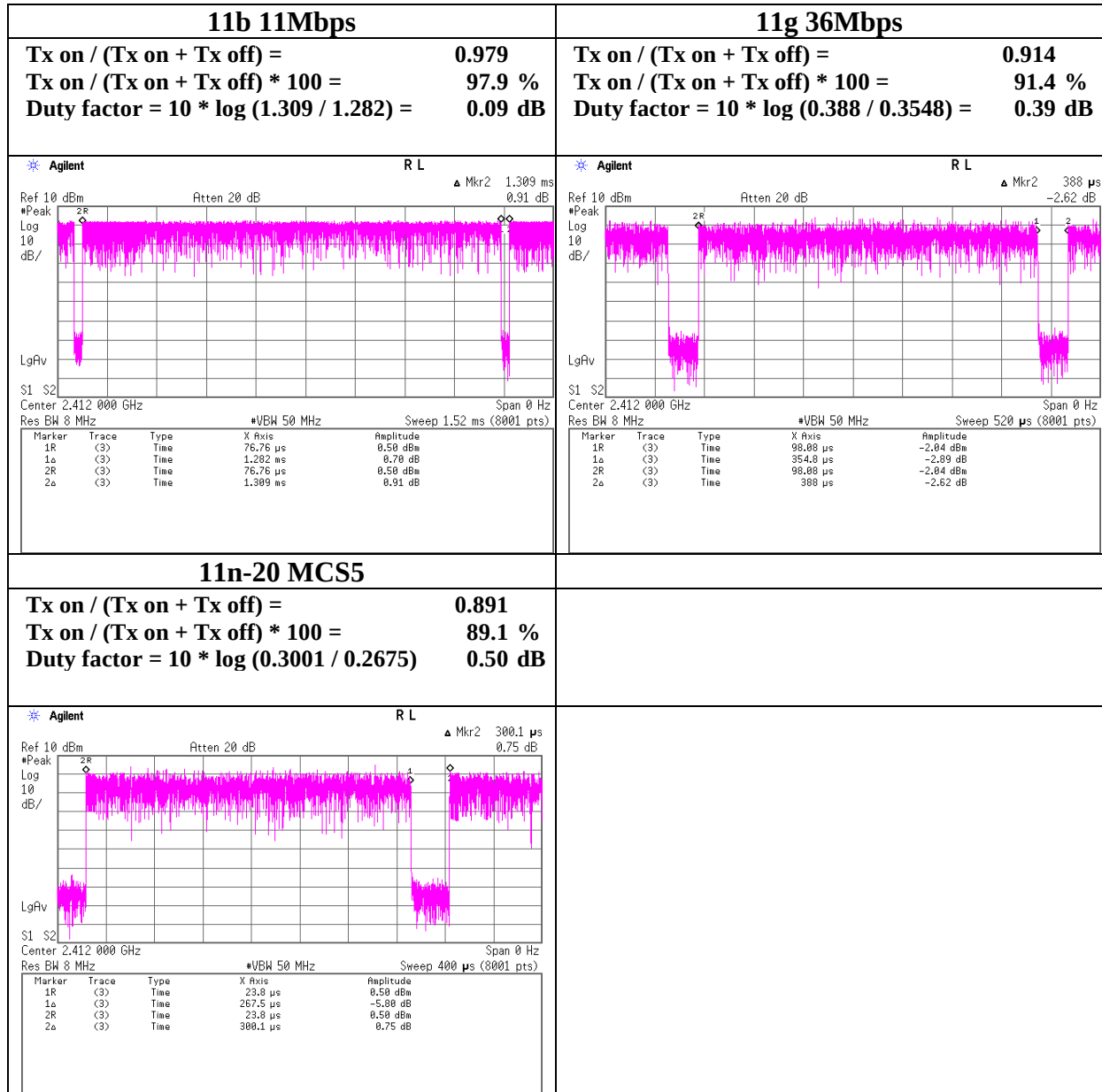
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Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Burst rate confirmation

Test place Ise EMC Lab. No.7 Shielded Room
Report No. 10279739H
Date 07/22/2014
Temperature/ Humidity 21 deg. C / 61% RH
Engineer Keisuke Kawamura



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Ise EMC Lab.

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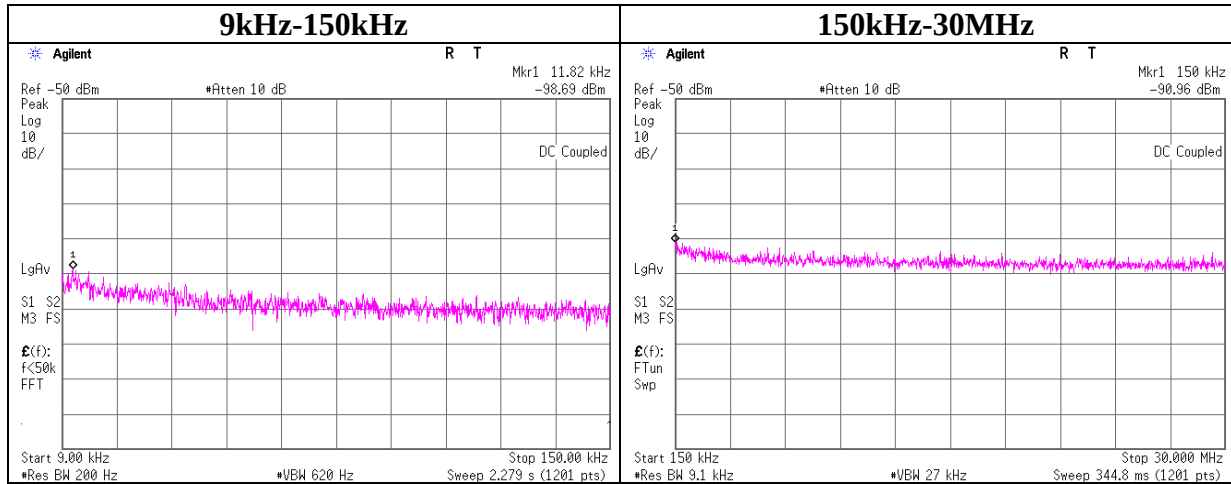
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 10279739H
Date : 07/22/2014
Temperature/ Humidity : 21 deg. C / 61% RH
Engineer : Keisuke Kawamura
Mode : 11b Tx 2462MHz

11b Tx 2462MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator [dB]	Antenna Gain [dBi]	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]
11.82	-98.7	0.01	10.0	2.0	-86.7	300.0	6.0	-25.4	46.1
150	-91.0	0.01	10.0	2.0	-79.0	300.0	6.0	-17.7	24.0

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

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

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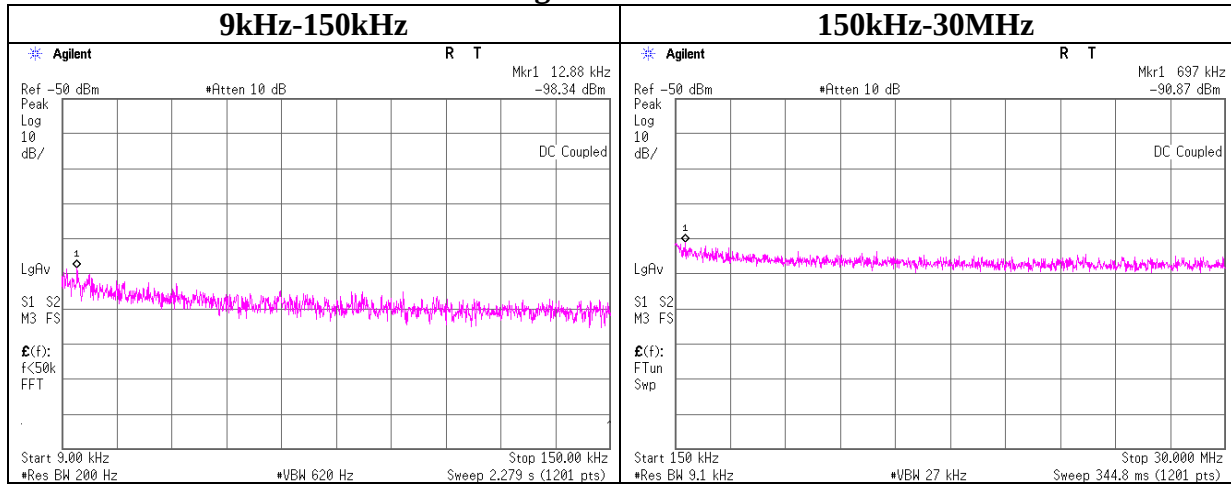
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 10279739H
Date : 07/22/2014
Temperature/ Humidity : 21 deg. C / 61% RH
Engineer : Keisuke Kawamura
Mode : 11g Tx 2437MHz 36Mbps Sub Antenna

11g Tx 2437MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator [dB]	Antenna Gain [dBi]	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]
12.88	-91.8	0.01	10.0	2.0	-79.8	300.0	6.0	-18.5	45.4
697	-88.8	0.01	10.0	2.0	-76.8	30.0	6.0	4.5	10.7

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

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

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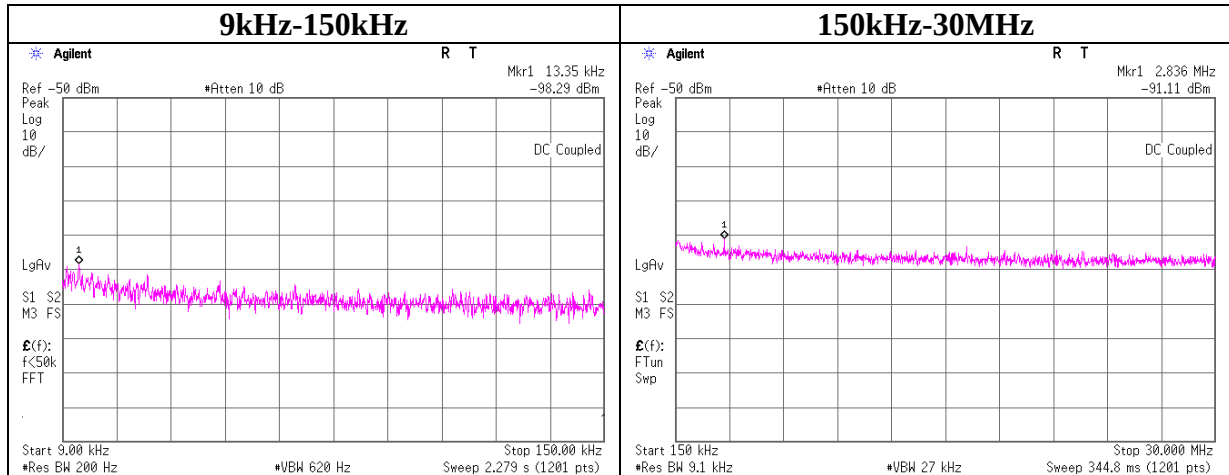
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 10279739H
Date : 07/22/2014
Temperature/ Humidity : 21 deg. C / 61% RH
Engineer : Keisuke Kawamura
Mode : 11n-20 Tx 2437MHz MCS5 Sub Antenna

11n-20 Tx 2437MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator [dB]	Antenna Gain [dBi]	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]
13.35	-98.3	0.01	10.0	2.0	-86.3	300.0	6.0	-25.0	45.0
2836	-91.1	0.01	10.0	2.0	-79.1	30.0	6.0	2.2	29.5

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

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

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Power Density

Test place Ise EMC Lab. No.7 Shielded Room
Report No. 10279739H
Date 07/22/2014
Temperature/ Humidity 21 deg. C / 61% RH
Engineer Keisuke Kawamura
Mode 11b/11g Tx Sub Antenna

11b Antenna Sub

Freq.	Reading	Cable Loss	Atten.	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-27.16	2.53	10.00	-14.63	8.00	22.63
2437.00	-27.68	2.54	10.00	-15.14	8.00	23.14
2462.00	-27.83	2.55	10.00	-15.28	8.00	23.28

11g Antenna Sub

Freq.	Reading	Cable Loss	Atten.	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-28.94	2.53	10.00	-16.41	8.00	24.41
2437.00	-28.78	2.54	10.00	-16.24	8.00	24.24
2462.00	-28.51	2.55	10.00	-15.96	8.00	23.96

Sample Calculation:

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

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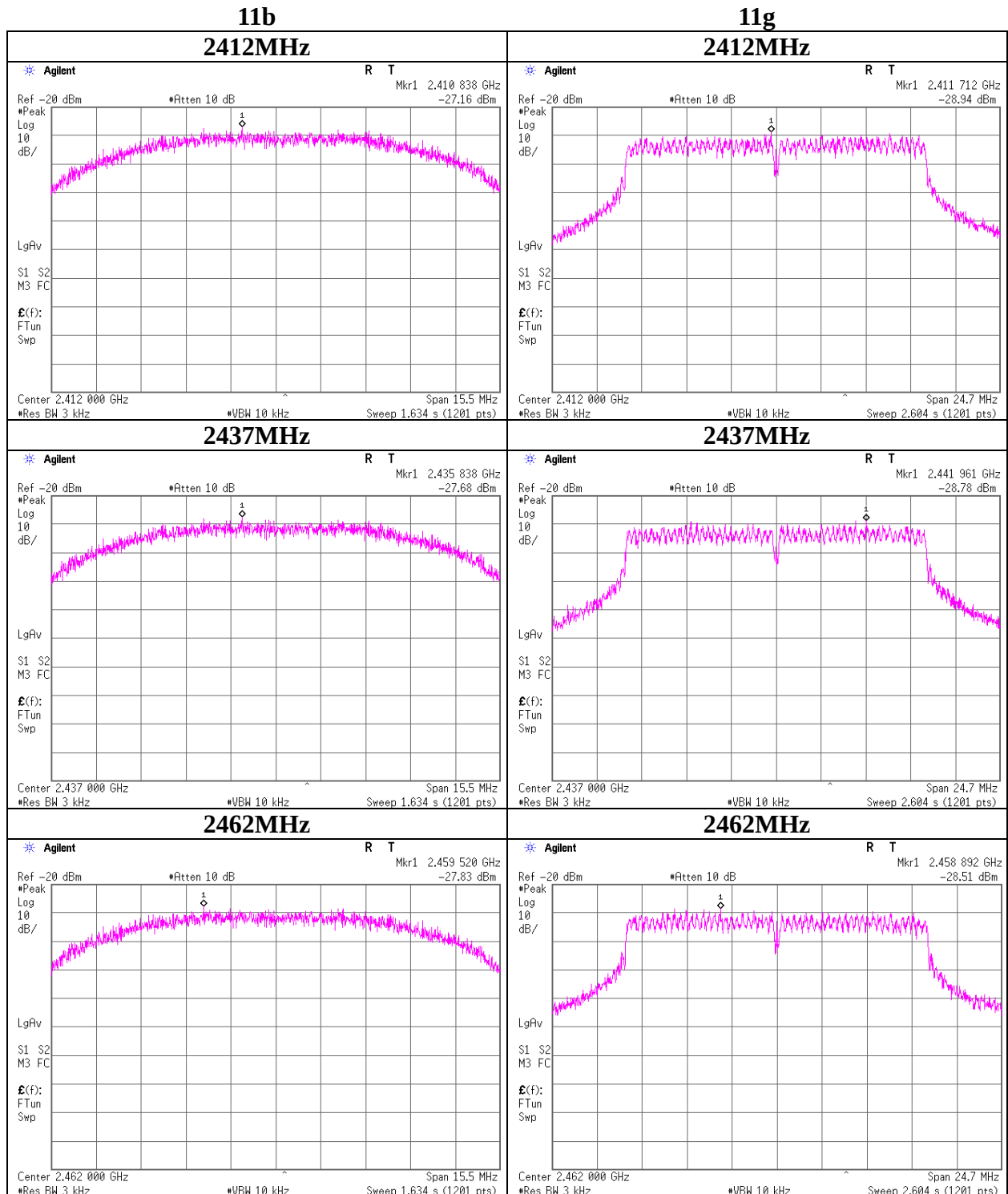
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Power Density



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Facsimile : +81 596 24 8124

Power Density

Test place Ise EMC Lab. No.7 Shielded Room
Report No. 10279739H
Date 07/22/2014
Temperature/ Humidity 21 deg. C / 61% RH
Engineer Keisuke Kawamura
Mode 11n-20 Tx Sub Antenna

11n-20 Antenna Sub

Freq.	Reading	Cable Loss	Atten.	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2412.00	-29.13	2.53	10.00	-16.60	0.02	8.00	24.60
2437.00	-28.85	2.54	10.00	-16.31	0.02	8.00	24.31
2462.00	-28.09	2.55	10.00	-15.54	0.03	8.00	23.54

Sample Calculation:

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

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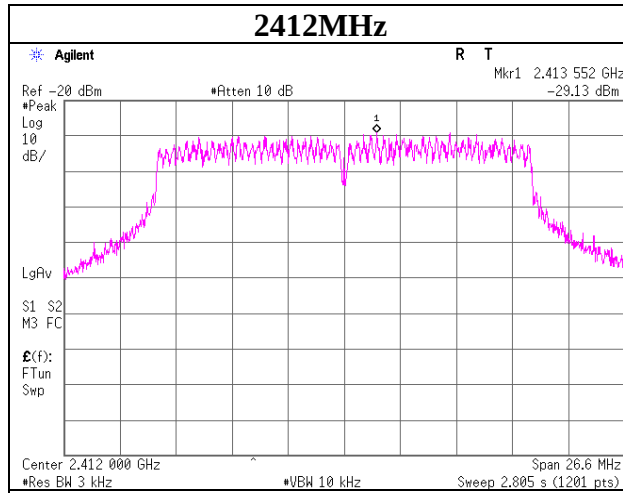
Telephone : +81 596 24 8999

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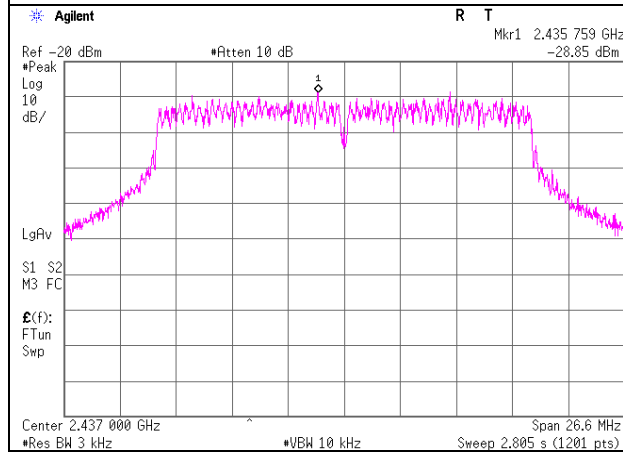
Power Density

11n-20

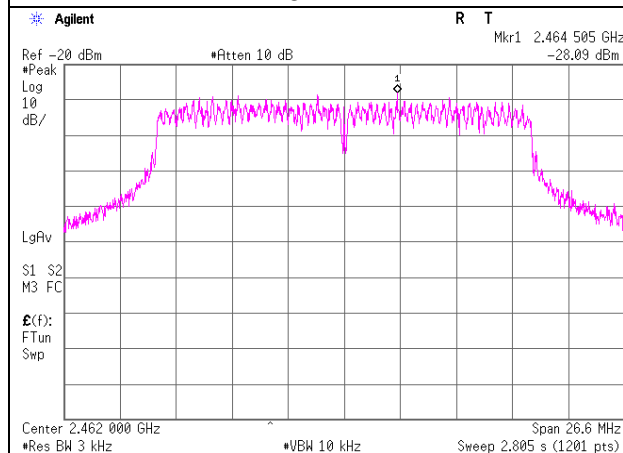
2412MHz



2437MHz



2462MHz



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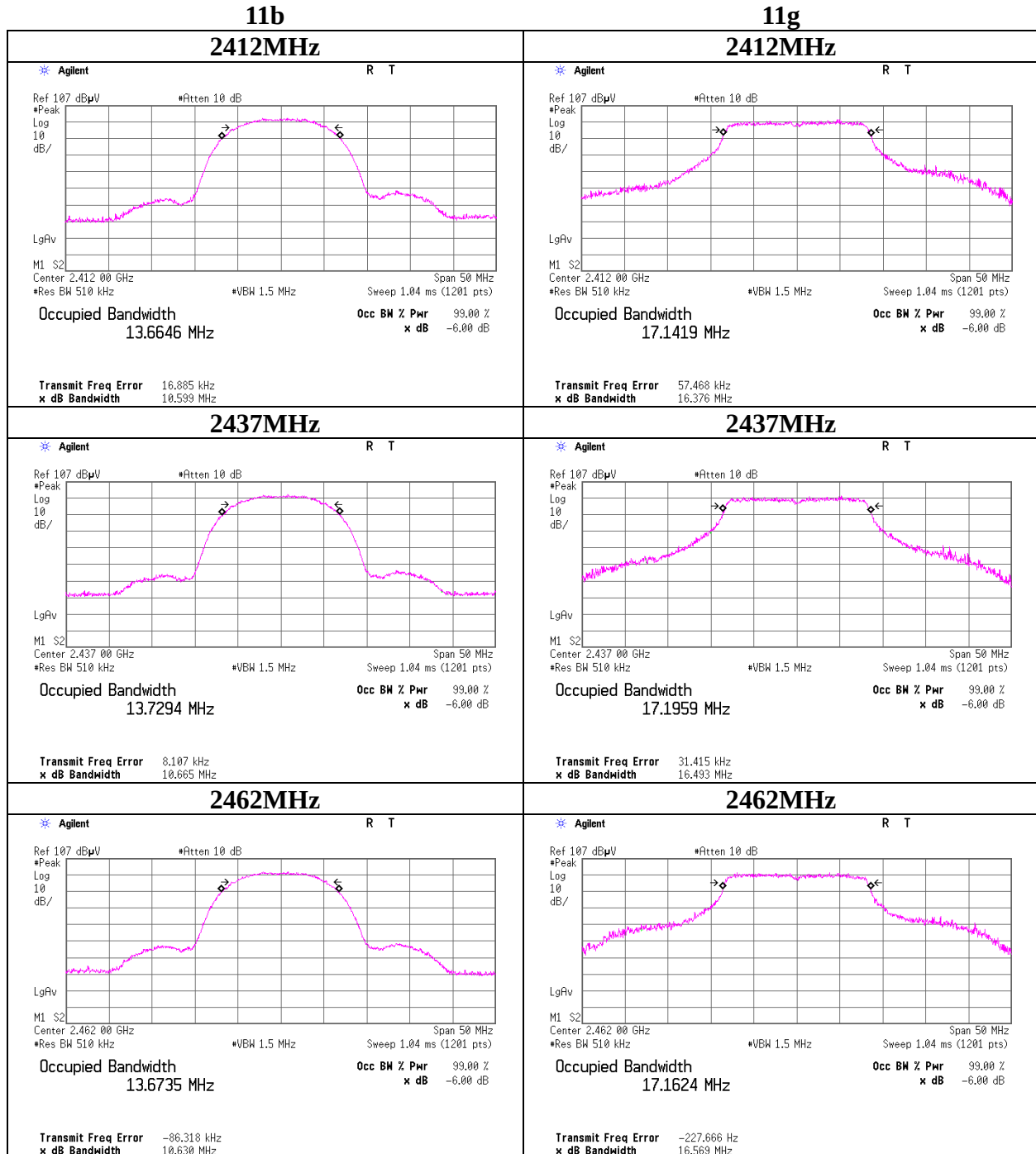
Telephone : +81 596 24 8999

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99%Occupied Bandwidth

Test place
Report No.
Date
Temperature/ Humidity
Engineer
Mode

Ise EMC Lab. No.7 Shielded Room
10279739H
07/22/2014
21 deg. C / 61% RH
Keisuke Kawamura
11b/11g Tx Sub Antenna

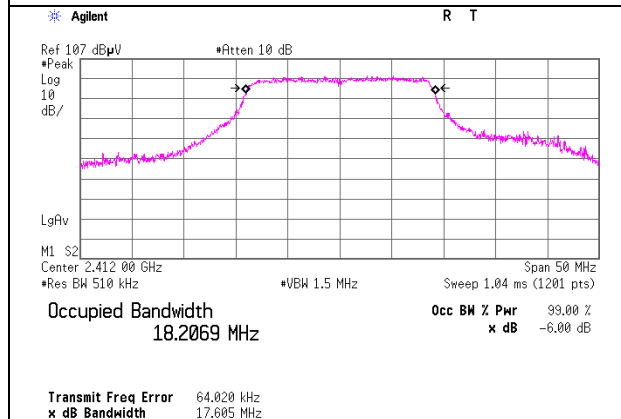


99% Occupied Bandwidth

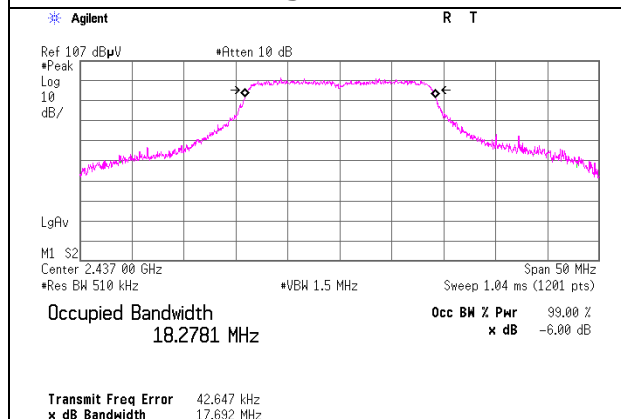
Test place Ise EMC Lab. No.7 Shielded Room
Report No. 10279739H
Date 07/22/2014
Temperature/ Humidity 21 deg. C / 61% RH
Engineer Keisuke Kawamura
Mode 11n-20 Tx Sub Antenna

11n-20

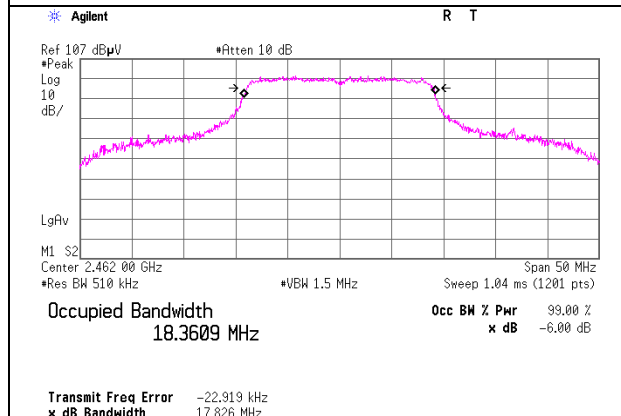
2412MHz



2437MHz



2462MHz



APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MRENT-115	Spectrum Analyzer	Agilent	E4440A	MY46186390	AT	2014/02/28 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2014/03/13 * 12
MCC-67	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28635/2	AT	2014/04/14 * 12
MOS-34	Thermo-Hygrometer	Custom	CTH-201	3401	AT	2014/02/20 * 12
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	AT	2013/10/15 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	AT	2013/10/15 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MRENT-116	Spectrum Analyzer	Agilent	E4440A	MY46187620	RE	2014/03/05 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2014/02/21 * 12
MCC-166	Microwave Cable	Junkosha	MWX221	1303S120(1m) / 1311S167(5m)	RE	2013/11/27 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2014/01/21 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2013/09/01 * 12
MHF-26	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	002	RE	2013/09/01 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE/CE	2014/02/20 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE/CE	2014/06/03 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2013/10/13 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2013/10/13 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2014/02/20 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2013/11/26 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2013/09/12 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	1401	AT	2014/02/20 * 12
MLS-23	LISN(AMN)	Schwarzbeck	NSLK8127	8127-729	CE(EUT)	2014/07/10 * 12
MLS-24	LISN(AMN)	Schwarzbeck	NSLK8127	8127-730	CE(AE)	2014/07/10 * 12
MTA-30	Terminator	TME	CT-01	-	CE	2014/01/20 * 12
MCC-13	Coaxial Cable	Fujikura	3D-2W(12m)/5D-2W(5m)/5D-2W(0.8m)/5D-2W(1m)	-	CE	2014/02/20 * 12
MAT-65	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2014/01/29 * 12

The expiration date of the calibration is the end of the expired month.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

Test Item: CE: Conducted Emission
RE: Radiated Emission
AT: Antenna Terminal Conducted test

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