RADIO TEST REPORT

Test Report No.: 10229869S-B

Applicant	:	**Anritsu Corporation**
Type of Equipment	:	**Network Master Pro**
Model No.	:	**MT1000A**
FCC ID	:	**OCS-MT1000A**
Test regulation	:	**FCC Part15 Subpart C: 2014**
Test result	:	**Complied**

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3. This sample tested is in compliance with the limits of the above regulation.
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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: February 27 to April 16, 2014

Tested by:

Tatsuya Arai
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

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REVISION HISTORY

Original Test Report No.: 10229869S-B

Revision	Test report No.	Date	Page revised	Contents
-(Original)	10229869S-B	April 25, 2014	-	-
1	10229869S-B	June 19, 2014	4	P4: Correction of 2.2

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SECTION 1: Customer information

Company Name	:	Anritsu Corporation
Address	:	5-1-1 Onna, Atsugi-shi, Kanagawa, 243-8555 Japan
Telephone Number	:	+81-46-296-6669
Facsimile Number	:	+81-46-225-8380
Contact Person	:	Yasuyuki Oishi

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

2.1 Identification of E.U.T.

Type of Equipment	:	Network Master Pro
Model Number	:	MT1000A
Serial Number	:	708230036
Rating	:	Mains adapter: Input: AC 100 - 240V 50/60Hz, Output: DC18V 3.62A Battery: DC 10.8V
Country of Mass-production	:	Denmark
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample	:	February 24, 2014
Modification of EUT	:	No modification by the test lab.

2.2 Product description

Model: MT1000A (referred to as the EUT in this report) is Network Master Pro.

Clock frequency(ies) in the system : 20 MHz, 200 MHz, 625 MHz

<Bluetooth part>

Equipment type	:	Transceiver
Frequency of operation	:	2402-2480MHz
Bandwidth & channel spacing	:	79MHz & 1MHz
Type of modulation	:	GFSK, π/4DQPSK, 8DPSK
Antenna type	:	Dipole
Antenna gain	:	3.0dBi
Antenna connector type	:	IPEX MHF Connector (U.FL compatible)
Operation temperature range	:	0 to +50 deg.C.

<Wireless LAN part>

Equipment type	:	Transceiver
Frequency of operation	:	2412-2462MHz
Bandwidth & channel spacing	:	20MHz & 5MHz
Type of modulation	:	CCK,OFDM
Antenna type	:	Dipole
Antenna gain	:	3.0dBi
Antenna connector type	:	IPEX MHF Connector (U.FL compatible)
Operation temperature range	:	0 to +50 deg.C.

* For Bluetooth part, refer to the test report: 10229869S-A.

FCC 15.31 (e)
The stable voltage (DC3.3V and DC1.8V) is provided constantly to RF part via regulator. Therefore, the EUT complies with the requirement.

FCC 15.203
It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore the EUT 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 March 6, 2014 and effective April 7, 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 March 6, 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	14.3dB Freq.: 0.15000 MHz Detection: Quasi-Peak Phase: N Mode: Tx 2412MHz, IEEE 802.11g	Complied
6dB bandwidth	ANSI C63.10:2009	FCC 15.247 (a)(2)	Conducted	N/A	* See data	Complied
Maximum peak output power	ANSI C63.10:2009	FCC 15.247 (b)(3)	Conducted	N/A		Complied
Out of band emission & Restricted band edges	ANSI C63.10:2009	FCC 15.109, 15.247 (d) & 15.209	Conducted / Radiated	N/A	3.7dB Freq.: 892.158 MHz Polarization: Vertical Detection: Quasi-Peak Mode: Tx 2412MHz, IEEE 802.11g	Complied
Power density	ANSI C63.10:2009	FCC 15.247 (e)	Conducted	N/A	* See data	Complied
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 r01 (FCC), "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".						

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.10:2009, RSS-Gen 4.6.1	-	Conducted	-	-
Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422					

* 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 the site margin.

Radiated emission test

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

Antenna port conducted test

Power measurement uncertainty above 1GHz for this test was: (±) 1.5dB
Spurious emission (Conducted) measurement (below 1GHz) uncertainty for this test was: (±) 1.7dB
Spurious emission (Conducted) measurement (1G-3GHz) uncertainty for this test was: (±) 2.3dB
Spurious emission (Conducted) measurement (3G-18GHz) uncertainty for this test was: (±) 3.0dB
Spurious emission (Conducted) measurement (18G-26.5GHz) uncertainty for this test was: (±) 2.9dB
Bandwidth measurement uncertainty for this test was: (±) 5.4%

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

	FCC Registration No.	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	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☐ No.2 semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☒ No.3 semi-anechoic chamber	697847	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

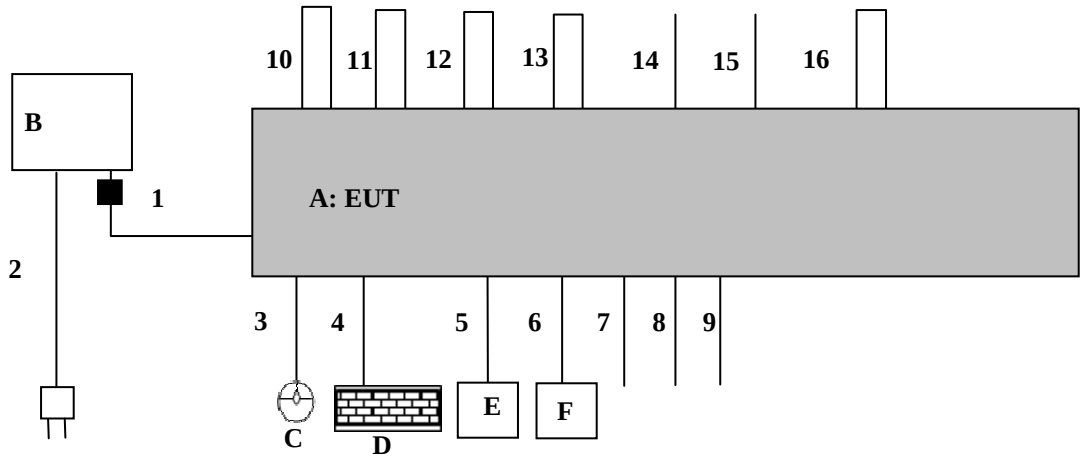
Test item	Mode	Tested frequency	Worst data mode *1)
Conducted emission Radiated emission (below 1GHz) *2)	Transmitting IEEE 802.11g	2412MHz	PN9, 9Mbps
Radiated emission (above 1GHz)	Transmitting IEEE 802.11b	2412MHz, 2437MHz, 2462MHz	PN9, 2Mbps
	Transmitting IEEE 802.11g	2412MHz, 2437MHz, 2462MHz	PN9, 9Mbps
	Transmitting IEEE 802.11n (HT20)	2412MHz, 2437MHz, 2462MHz	PN9, MCS0
Other items	Transmitting IEEE 802.11b	2412MHz, 2437MHz, 2462MHz	PN9, 2Mbps
	Transmitting IEEE 802.11g	2412MHz, 2437MHz, 2462MHz	PN9, 9Mbps
	Transmitting IEEE 802.11n (HT20)	2412MHz, 2437MHz, 2462MHz	PN9, MCS0
*1) The worst condition was determined based on the test result of Maximum Peak Output Power. *2) 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.			

Software : Tera Term version 4.80
Power setting : 12500

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

4.2 Configuration and peripherals

■ : Standard ferrite core



AC 120V/ 60Hz

* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Network Master Pro	MT1000A	708230036	Anritu	EUT
B	AC Adaptor	ATS065-A180	132800002	TECH	-
C	Mouse	M-UAE96	-	HP	-
D	Keyboard	BSKBU02	A01213	BUFFALO	-
E	Head Set	HL-108	-	DELTACO	-
F	GPS Receiver	CAN 310	19S093144	GARMIN	-

List of cables used

No.	Item	Length (m)	Shield	Remarks
1	DC	1.5	Unshielded	-
2	AC	2.0	Unshielded	-
3	Mouse	1.8	Unshielded	-
4	Keyboard	1.4	Unshielded	-
5	Head Set	1.8	Unshielded	-
6	GPS Receiver	5.0	Shielded	-
7	USB	2.0	Shielded	-
8	Coaxial	3.0	Shielded	-
9	Ethernet	1.65	Unshielded	Cat.5
10	Bantam	1.9	Unshielded	-
11	Coaxial	2.1	Shielded	-
12	Bantam	1.9	Unshielded	-
13	Coaxial	2.1	Shielded	-
14	Balanced	2.0	Unshielded	-
15	Balanced	2.0	Unshielded	-
16	Ethernet	2.1	Unshielded	Cat.5e

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 platform of nominal size, 1.0m 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 EUT, including its peripherals was aligned and flushed with rear of tabletop. I/O cables that were connected to the peripherals were bundled in center. They were folded back and for the forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane.

Photographs of the set up are shown in APPENDIX 3.

6.3 Test conditions

Frequency range : 30MHz to 25GHz
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.

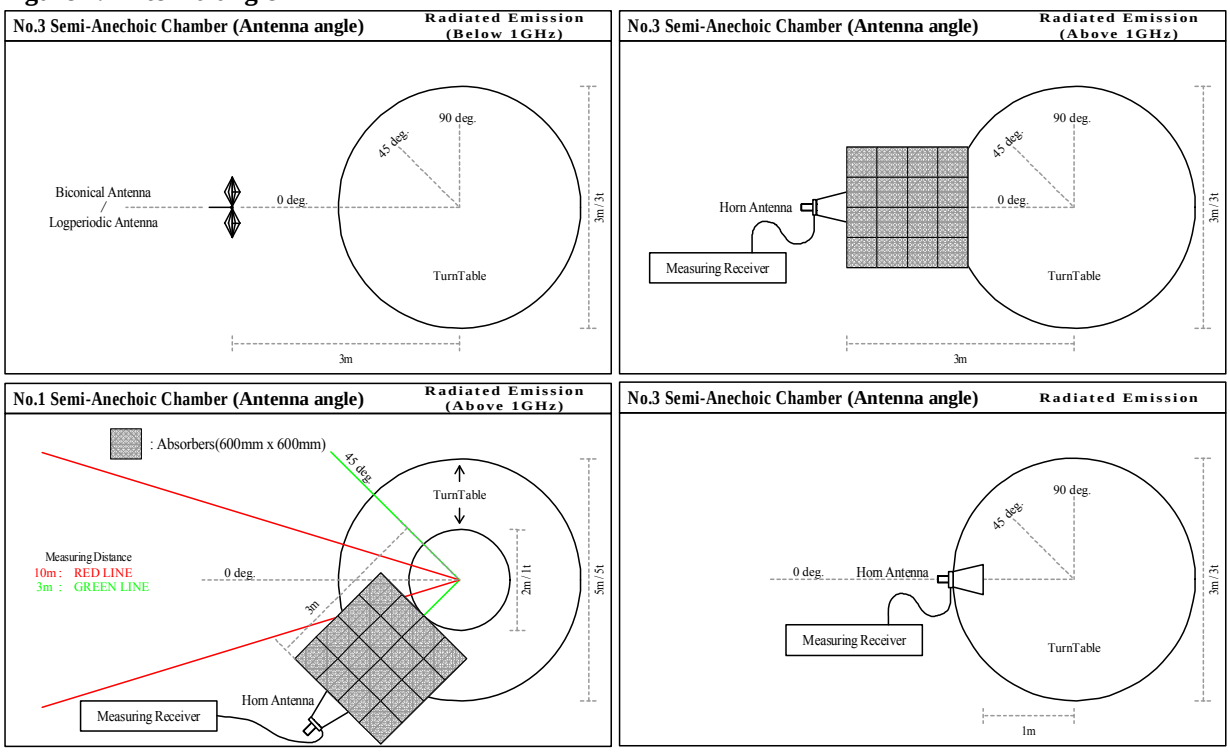
Frequency	30-1000MHz	1-25GHz		20dBc
Detection type	Quasi-Peak	Peak	Average *1)	Peak
IF Bandwidth	120kHz	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 3MHz Detector: RMS	RBW: 100kHz VBW: 300kHz

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

The carrier levels and noise levels were confirmed at each position of X, Y and Z axes to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Antenna polarization	Carrier	Spurious (Below 1GHz)	Spurious (1-15GHz)	Spurious (15-18GHz)	Spurious (18-25GHz)
Horizontal	X	X	X	X	X
Vertical	X	X	Y	Y	Y

Figure 1. Antenna angle



6.5 Band edge

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

6.6 Results

Summary of the test results : Pass
* No noise was detected above the 9th order harmonics.

Refer to APPENDIX 1

SECTION 7: 6dB bandwidth & Occupied bandwidth (99%)

Test procedure
The bandwidth was measured with a spectrum analyzer connected to the antenna port.
The test was measured based on Method 8.1 Option 1 and 8.2 Option 2 of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

Summary of the test results: Pass
Refer to APPENDIX 1

SECTION 8: Maximum peak output power

Test procedure
The Maximum Peak Output Power was measured with a power meter connected to the antenna port.
The test was measured based on Method 9.1.3 PKPM1 of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

Summary of the test results: Pass
Refer to APPENDIX 1

SECTION 9: Out of band emissions (Antenna port conducted)

Test procedure
The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port.
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.
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=10kHz)

Summary of the test results: Pass
Refer to APPENDIX 1

SECTION 10: Peak power density

Test procedure
The peak power density was measured with a spectrum analyzer connected to the antenna port.

Instrument used : Spectrum Analyzer
RBW / VBW : 3kHz / 9.1kHz

The test was measured based on Method 10.2 PKPSD of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

Summary of the test results: Pass
Refer to APPENDIX 1

Contents of APPENDIXES

APPENDIX 1: Data of Radio tests

Conducted emission
6dB bandwidth
Maximum peak output power
Radiated emission
Spurious emission (Antenna port conducted)
Peak power density
Occupied bandwidth

APPENDIX 2: Test instruments

Test instruments

APPENDIX 3: Photographs of test setup

Conducted emission
Radiated emission
Pre-check of the worst position

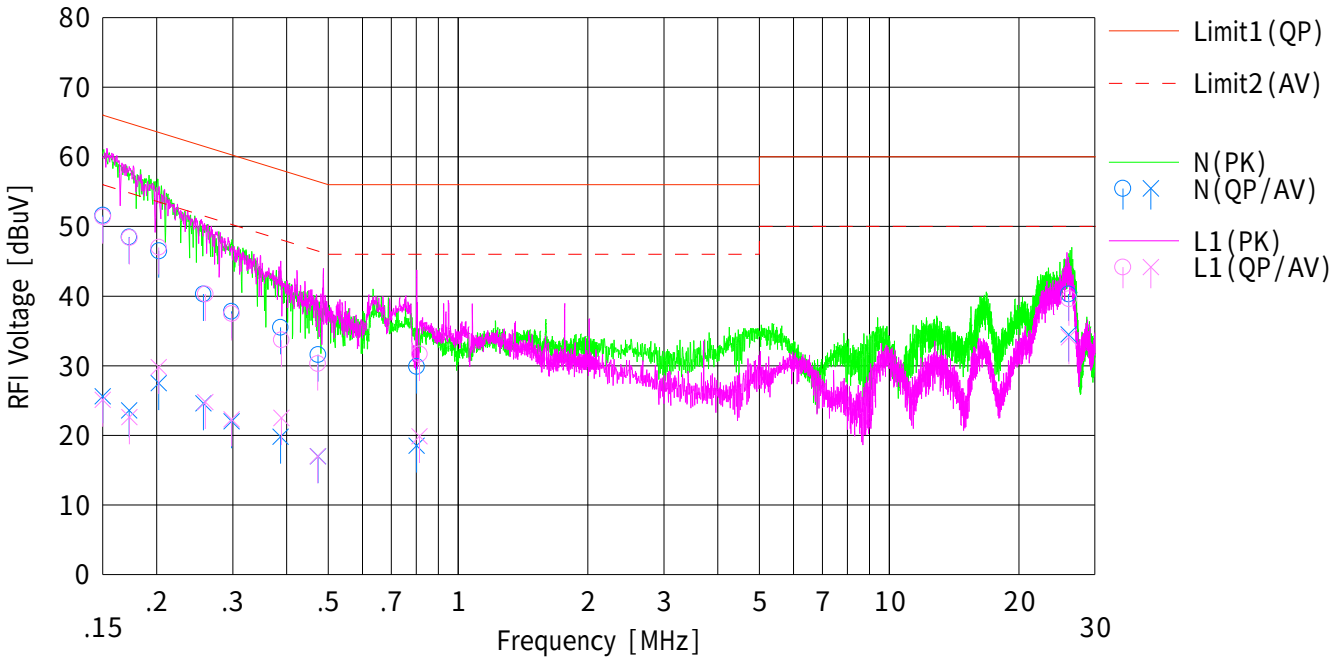
DATA OF CONDUCTED EMISSION TEST

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

Company	: Anritu Corporation	Mode	: Tx 11g 2412MHz
Kind of EUT	: Network Master Pro	Order No.	: 10229869S
Model No.	: MT1000A	Power	: AC120V / 60Hz
Serial No.	: 708230036	Temp./Humi.	: 23deg.C./30%RH
Remarks	: -		

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

Engineer : Tatsuya Arai



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	39.0	13.0	12.6	51.6	25.6	65.9	55.9	14.3	30.3	N	
2	0.17248	35.9	11.0	12.6	48.5	23.6	64.8	54.8	16.3	31.2	N	
3	0.20229	33.9	14.9	12.6	46.5	27.5	63.5	53.5	17.0	26.0	N	
4	0.25637	27.7	12.0	12.6	40.3	24.6	61.5	51.5	21.2	26.9	N	
5	0.29797	25.1	9.3	12.7	37.8	22.0	60.2	50.2	22.4	28.2	N	
6	0.38716	22.8	7.1	12.7	35.5	19.8	58.1	48.1	22.6	28.3	N	
7	0.47300	19.0	4.4	12.6	31.6	17.0	56.4	46.4	24.8	29.4	N	
8	0.80139	17.2	5.8	12.7	29.9	18.5	56.0	46.0	26.1	27.5	N	
9	26.06000	26.6	20.8	13.7	40.3	34.5	60.0	50.0	19.7	15.5	N	
10	0.15000	38.8	12.5	12.6	51.4	25.1	65.9	55.9	14.5	30.8	L1	
11	0.17296	35.8	10.0	12.6	48.4	22.6	64.8	54.8	16.4	32.2	L1	
12	0.20213	34.4	17.2	12.6	47.0	29.8	63.5	53.5	16.5	23.7	L1	
13	0.25916	27.7	12.2	12.6	40.3	24.8	61.4	51.4	21.1	26.6	L1	
14	0.29818	24.8	9.6	12.7	37.5	22.3	60.2	50.2	22.7	27.9	L1	
15	0.38908	21.0	9.8	12.7	33.7	22.5	58.0	48.0	24.3	25.5	L1	
16	0.47261	17.7	4.4	12.6	30.3	17.0	56.4	46.4	26.1	29.4	L1	
17	0.81376	19.0	7.2	12.7	31.7	19.9	56.0	46.0	24.3	26.1	L1	
18	26.11000	25.9	20.4	13.7	39.6	34.1	60.0	50.0	20.4	15.9	L1	

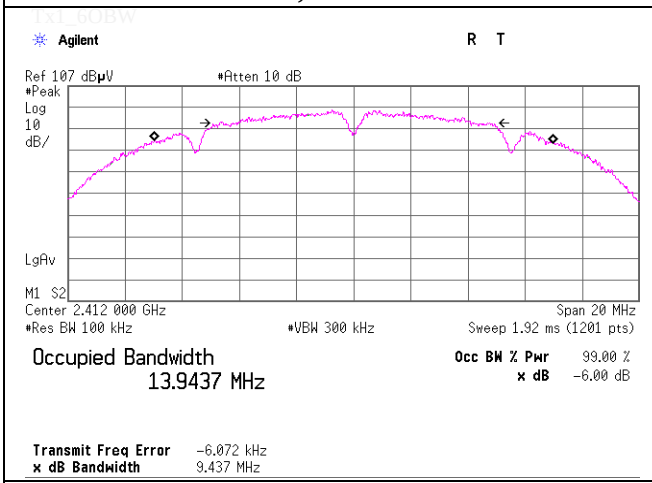
Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(LISN+Cable+ATT)[dB]
LISN:SLS-05

-6dB Bandwidth

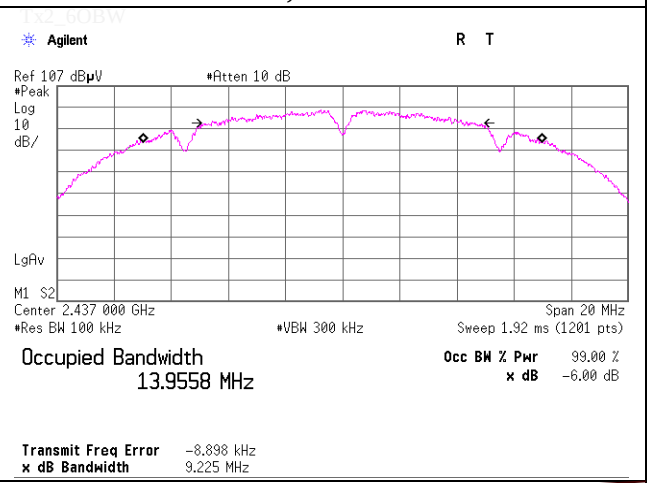
Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 14, 2014	
Temperature / Humidity	24deg.C , 33%RH	
Engineer	Akio Hayashi	
Mode	Tx, IEEE802.11b , PN9, worst preamble mode Short, worst data mode 2Mbps	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	9.437	> 0.500
2437.0000	9.225	> 0.500
2462.0000	9.084	> 0.500

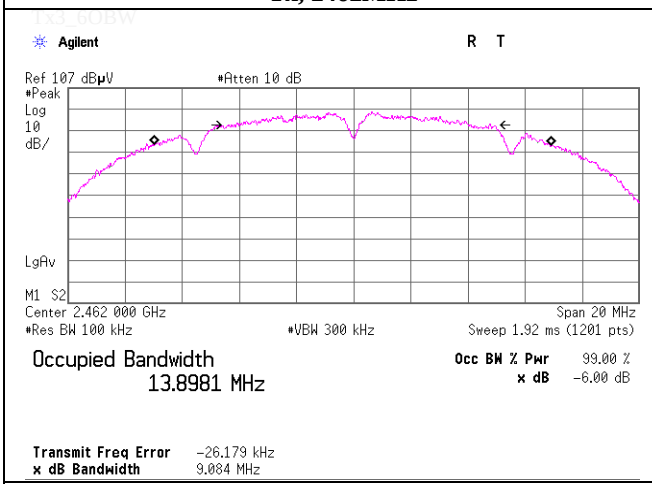
Tx, 2412MHz



Tx, 2437MHz



Tx, 2462MHz



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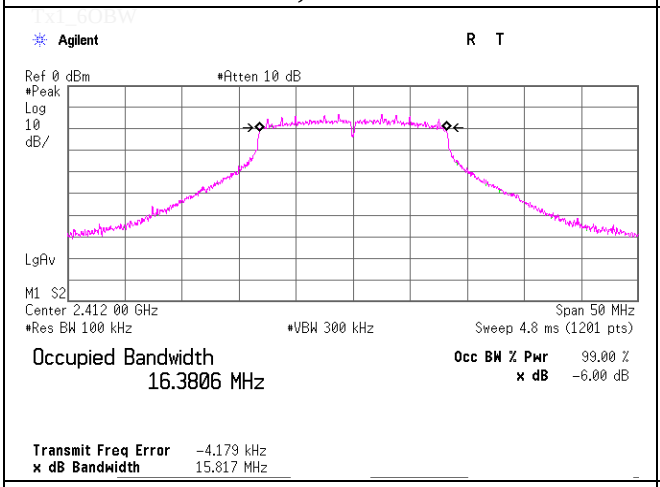
-6dB Bandwidth

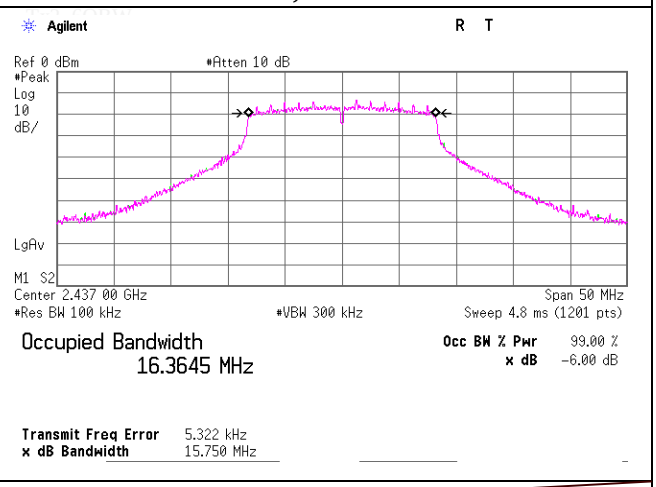
Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 14, 2014	
Temperature / Humidity	24deg.C , 33%RH	
Engineer	Akio Hayashi	
Mode	Tx, IEEE802.11g, PN9, worst data mode 9Mbps	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	15.817	> 0.500
2437.0000	15.750	> 0.500
2462.0000	15.879	> 0.500

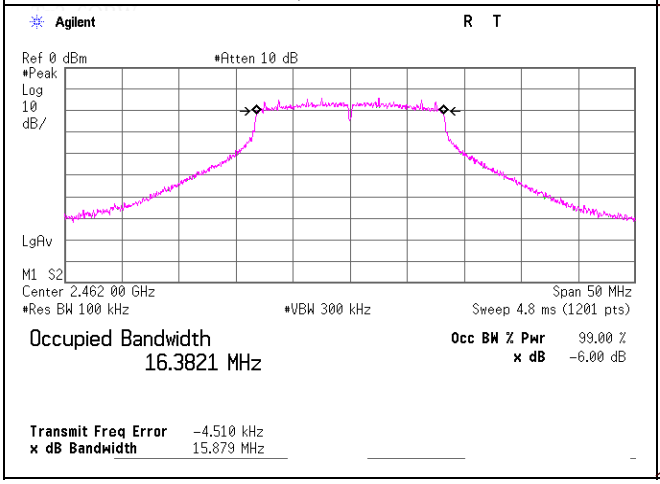
Tx, 2412MHz



Tx, 2437MHz



Tx, 2462MHz



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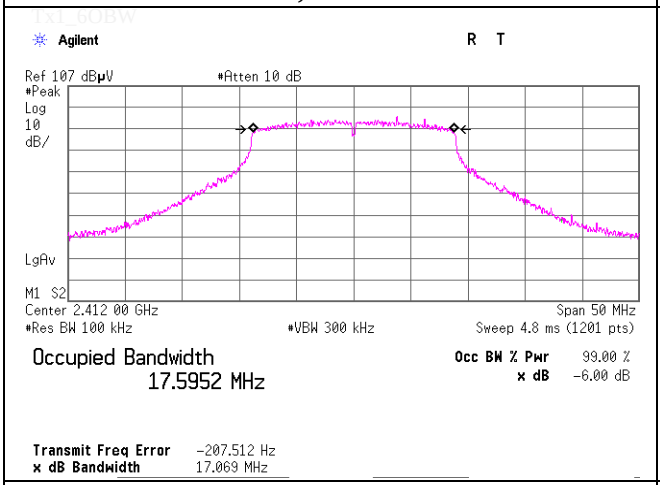
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

-6dB Bandwidth

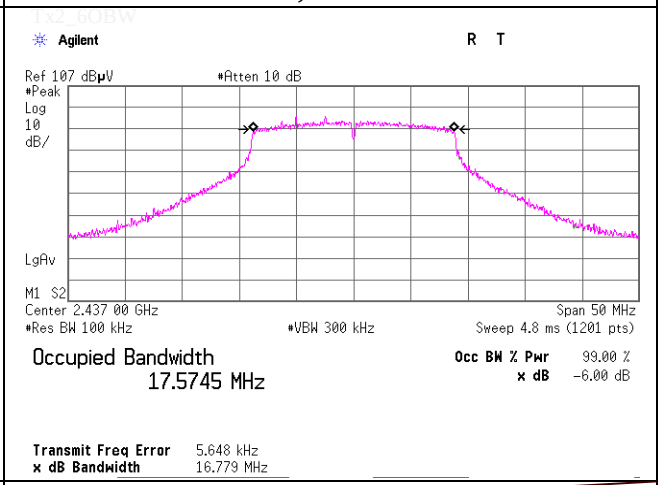
Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 14, 2014	
Temperature / Humidity	24deg.C , 33%RH	
Engineer	Akio Hayashi	
Mode	Tx, IEEE802.11n(HT20), PN9, worst preamble mode Greenfield, worst data mode 0(MCS)	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	17.069	> 0.500
2437.0000	16.779	> 0.500
2462.0000	16.498	> 0.500

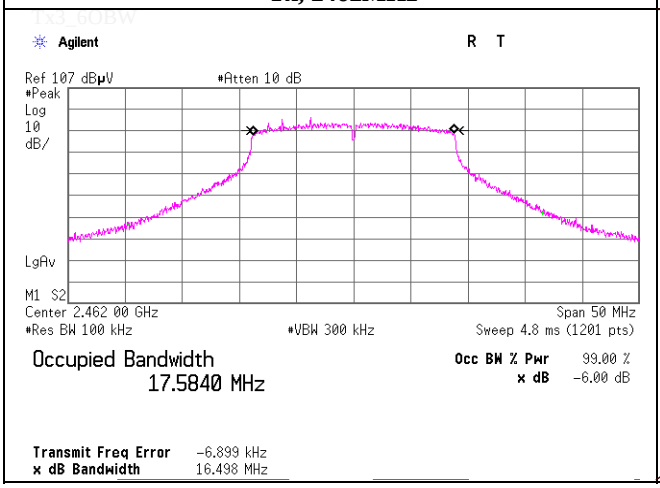
Tx, 2412MHz



Tx, 2437MHz



Tx, 2462MHz



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Maximum Peak Conducted Output Power

(PKPM1)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room	
Date	April 14, 2014		
Temperature / Humidity	24deg.C , 33%RH		
Engineer	Akio Hayashi		
Mode	Tx, IEEE802.11b , PN9,	worst preamble : Short	worst data mode : 2 Mbps

(* P/M: Power Meter with power sensor)

Ch	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Result [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
Low	2412.0	-0.15	2.07	9.98	11.90	15.49	30.00	1000	18.10
Mid	2437.0	-0.26	2.07	9.98	11.79	15.10	30.00	1000	18.21
High	2462.0	-0.65	2.08	9.98	11.41	13.84	30.00	1000	18.59

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

[Pre check]

Preamble mode	Data rate [Mbps]	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Result [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
Long	1	2437.0	-0.37	2.07	9.98	11.68	14.72	30.00	1000	18.32
	2	2437.0	-0.34	2.07	9.98	11.71	14.83	30.00	1000	18.29
	5.5	2437.0	-0.67	2.07	9.98	11.38	13.74	30.00	1000	18.62
	11	2437.0	-0.72	2.07	9.98	11.33	13.58	30.00	1000	18.67

Preamble mode	Data rate [Mbps]	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Result [mW]	Limit [dBm]	Limit [mW]	Margin [dB]	
Short	1	2437.0	-0.27	2.07	9.98	11.78	15.07	30.00	1000	18.22	
	2	2437.0	-0.26	2.07	9.98	**11.79**	15.10	30.00	1000	**18.21**	**Worst**
	5.5	2437.0	-0.61	2.07	9.98	11.44	13.93	30.00	1000	18.56	
	11	2437.0	-0.62	2.07	9.98	11.43	13.90	30.00	1000	18.57	

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

Maximum Conducted Output Power (Reference Data)

(AVGPM)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room	
Date	April 14, 2014		
Temperature / Humidity	24deg.C , 33%RH		
Engineer	Akio Hayashi		
Mode	Tx, IEEE802.11b , PN9,	worst preamble : short	worst data mode : 1 Mbps

(* P/M: Power Meter with power sensor, AV: Average)

Ch	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]		Result [dBm]	Result [mW]
Low	2412.0	-2.70	2.07	9.98		9.35	8.61
Mid	2437.0	-2.92	2.07	9.98		9.13	8.18
High	2462.0	-3.32	2.08	9.98		8.74	7.48

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss
E.I.R.P = Result + Antenna Gain

[Pre check]

Preamble mode	Data rate [Mbps]	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]		Result [dBm]	Result [mW]
long	1	2437.0	-3.02	2.07	9.98		9.03	8.00
	2	2437.0	-3.39	2.07	9.98		8.66	7.35
	5.5	2437.0	-4.61	2.07	9.98		7.44	5.55
	11	2437.0	-5.94	2.07	9.98		6.11	4.08

Preamble mode	Data rate [Mbps]	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]		Result [dBm]	Result [mW]
short	1	2437.0	-2.92	2.07	9.98		**9.13**	8.18
	2	2437.0	-3.34	2.07	9.98		8.71	7.43
	5.5	2437.0	-4.55	2.07	9.98		7.50	5.62
	11	2437.0	-5.94	2.07	9.98		6.11	4.08

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

Maximum Peak Conducted Output Power

(PKPM1)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 14, 2014	
Temperature / Humidity	24deg.C , 33%RH	
Engineer	Akio Hayashi	
Mode	Tx, IEEE802.11g, PN9,	worst data mode : 9 Mbps

(* P/M: Power Meter with power sensor)

Ch	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Result [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
Low	2412.0	9.29	2.07	9.98	21.34	136.14	30.00	1000	8.66
Mid	2437.0	8.72	2.07	9.98	20.77	119.40	30.00	1000	9.23
High	2462.0	7.95	2.08	9.98	20.01	100.23	30.00	1000	9.99

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

[Pre check]

	Data rate [Mbps]	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Result [mW]	Limit [dBm]	Limit [mW]	Margin [dB]	
	6	2437.0	8.23	2.07	9.98	20.28	106.66	30.00	1000	9.72	
	9	2437.0	8.72	2.07	9.98	**20.77**	119.40	30.00	1000	**9.23**	**Worst**
	12	2437.0	8.28	2.07	9.98	20.33	107.89	30.00	1000	9.67	
	18	2437.0	8.17	2.07	9.98	20.22	105.20	30.00	1000	9.78	
	24	2437.0	8.03	2.07	9.98	20.08	101.86	30.00	1000	9.92	
	36	2437.0	8.37	2.07	9.98	20.42	110.15	30.00	1000	9.58	
	48	2437.0	7.91	2.07	9.98	19.96	99.08	30.00	1000	10.04	
	54	2437.0	7.96	2.07	9.98	20.01	100.23	30.00	1000	9.99	

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

Maximum Conducted Output Power (Reference Data)

(AVGPM)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 14, 2014	
Temperature / Humidity	24deg.C , 33%RH	
Engineer	Akio Hayashi	
Mode	Tx, IEEE802.11g, PN9,	worst data mode : 9 Mbps

(* P/M: Power Meter with power sensor, AV: Average)

Ch	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]		Result [dBm]	Result [mW]
Low	2412.0	-4.18	2.07	9.98		7.87	6.12
Mid	2437.0	-4.03	2.07	9.98		8.02	6.34
High	2462.0	-4.68	2.08	9.98		7.38	5.47

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

[Pre check]

	Data rate [Mbps]	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]		Result [dBm]	Result [mW]
	6	2437.0	-4.04	2.07	9.98		8.01	6.32
	9	2437.0	-4.03	2.07	9.98		**8.02**	6.34
	12	2437.0	-5.06	2.07	9.98		6.99	5.00
	18	2437.0	-5.81	2.07	9.98		6.24	4.21
	24	2437.0	-6.45	2.07	9.98		5.60	3.63
	36	2437.0	-7.66	2.07	9.98		4.39	2.75
	48	2437.0	-8.29	2.07	9.98		3.76	2.38
	54	2437.0	-8.72	2.07	9.98		3.33	2.15

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

Maximum Peak Conducted Output Power

(PKPM1)

Test place	UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date	April 14, 2014
Temperature / Humidity	24deg.C , 33%RH
Engineer	Akio Hayashi
Mode	Tx, IEEE802.11n(HT20), PN9, worst preamble : Greenfield worst data mode : 0 (MCS)

(* P/M: Power Meter with power sensor)

Ch	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Result [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
Low	2412.0	8.87	2.07	9.98	20.92	123.59	30.00	1000	9.08
Mid	2437.0	8.90	2.07	9.98	20.95	124.45	30.00	1000	9.05
High	2462.0	8.28	2.08	9.98	20.34	108.14	30.00	1000	9.66

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

[Pre check]

Preamble mode	Mode (MCS)	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Result [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
Mixed	0	2437.0	8.52	2.07	9.98	20.57	114.02	30.00	1000	9.43
	1	2437.0	8.56	2.07	9.98	20.61	115.08	30.00	1000	9.39
	2	2437.0	8.06	2.07	9.98	20.11	102.57	30.00	1000	9.89
	3	2437.0	8.49	2.07	9.98	20.54	113.24	30.00	1000	9.46
	4	2437.0	8.45	2.07	9.98	20.50	112.20	30.00	1000	9.50
	5	2437.0	8.08	2.07	9.98	20.13	103.04	30.00	1000	9.87
	6	2437.0	7.85	2.07	9.98	19.90	97.72	30.00	1000	10.10
	7	2437.0	8.09	2.07	9.98	20.14	103.28	30.00	1000	9.86

Preamble mode	Mode (MCS)	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Result [mW]	Limit [dBm]	Limit [mW]	Margin [dB]	
Greenfield	0	2437.0	8.90	2.07	9.98	**20.95**	124.45	30.00	1000	**9.05**	**Worst**
	1	2437.0	8.20	2.07	9.98	20.25	105.93	30.00	1000	9.75	
	2	2437.0	8.26	2.07	9.98	20.31	107.40	30.00	1000	9.69	
	3	2437.0	8.17	2.07	9.98	20.22	105.20	30.00	1000	9.78	
	4	2437.0	8.77	2.07	9.98	20.82	120.78	30.00	1000	9.18	
	5	2437.0	8.34	2.07	9.98	20.39	109.40	30.00	1000	9.61	
	6	2437.0	8.15	2.07	9.98	20.20	104.71	30.00	1000	9.80	
	7	2437.0	8.59	2.07	9.98	20.64	115.88	30.00	1000	9.36	

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

Maximum Conducted Output Power (Reference Data)

(AVGPM)

Test place	UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date	April 14, 2014
Temperature / Humidity	24deg.C , 33%RH
Engineer	Akio Hayashi
Mode	Tx, IEEE802.11n(HT20), PN9, worst preamble : Greenfield worst data mode : 0 (MCS)

(* P/M: Power Meter with power sensor, AV: Average)

Ch	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result [dBm]	Result [mW]
Low	2412.0	-3.68	2.07	9.98		8.37	6.87
Mid	2437.0	-4.00	2.07	9.98		8.05	6.38
High	2462.0	-4.19	2.08	9.98		7.87	6.12

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

[Pre check]

Preamble mode	Mode (MCS)	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result [dBm]	Result [mW]
Mixed	0	2437.0	-4.04	2.07	9.98		8.01	6.32
	1	2437.0	-5.02	2.07	9.98		7.03	5.05
	2	2437.0	-5.89	2.07	9.98		6.16	4.13
	3	2437.0	-6.46	2.07	9.98		5.59	3.62
	4	2437.0	-7.56	2.07	9.98		4.49	2.81
	5	2437.0	-8.35	2.07	9.98		3.70	2.34
	6	2437.0	-8.88	2.07	9.98		3.17	2.07
	7	2437.0	-8.94	2.07	9.98		3.11	2.05

Preamble mode	Mode (MCS)	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result [dBm]	Result [mW]
Greenfield	0	2437.0	-4.00	2.07	9.98		**8.05**	6.38
	1	2437.0	-4.71	2.07	9.98		7.34	5.42
	2	2437.0	-5.59	2.07	9.98		6.46	4.43
	3	2437.0	-6.18	2.07	9.98		5.87	3.86
	4	2437.0	-7.12	2.07	9.98		4.93	3.11
	5	2437.0	-8.01	2.07	9.98		4.04	2.54
	6	2437.0	-8.30	2.07	9.98		3.75	2.37
	7	2437.0	-8.58	2.07	9.98		3.47	2.22

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

Radiated Emission

Test place	No.1, No.3 Semi Anechoic Chamber			
Date	February 28, 2014	March 2, 2014	March 24, 2014	April 16, 2014
Temperature / Humidity	23 deg.C, 30 %RH	20 deg.C, 35 %RH	21 deg.C, 33 %RH	22 deg.C, 47 %RH
Engineer	Tatsuya Arai	Tatsuya Arai	Tatsuya Arai	Tatsuya Arai
Mode	Tx, 2412 MHz			
	Tx, IEEE802.11b, PN9			

(* 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.	1749.945	PK	48.2	26.1	14.0	38.6	49.7	73.9	24.2	100	191	
Hori.	2390.000	PK	45.7	28.1	14.1	40.9	47.0	73.9	26.9	100	131	
Hori.	4824.000	PK	47.7	31.1	7.9	37.1	49.6	73.9	24.3	100	197	
Hori.	7236.000	PK	46.0	37.1	9.1	39.4	52.8	73.9	21.1	100	0	
Hori.	9648.000	PK	43.5	38.6	10.2	37.6	54.7	73.9	19.2	100	0	
Hori.	12060.000	PK	46.2	39.6	11.3	38.5	58.6	73.9	15.3	100	0	
Hori.	19296.000	PK	49.0	41.1	2.2	48.0	44.3	73.9	29.6	100	199	
Hori.	1749.945	AV	43.3	26.1	14.0	38.6	44.8	53.9	9.1	100	191	*2
Hori.	2390.000	AV	36.2	28.1	14.1	40.9	37.5	53.9	16.4	100	131	*1
Vert.	1629.182	PK	47.2	25.9	13.8	38.6	48.3	73.9	25.6	125	273	
Vert.	1749.948	PK	49.6	26.1	14.0	38.6	51.1	73.9	22.8	100	265	
Vert.	2390.000	PK	46.1	28.1	14.1	40.9	47.4	73.9	26.5	100	116	
Vert.	4824.000	PK	45.8	31.1	7.9	37.1	47.7	73.9	26.2	119	107	
Vert.	7236.000	PK	45.8	37.1	9.1	39.4	52.6	73.9	21.3	100	0	
Vert.	9648.000	PK	43.6	38.6	10.2	37.6	54.8	73.9	19.1	100	0	
Vert.	12060.000	PK	46.1	39.6	11.3	38.5	58.5	73.9	15.4	100	0	
Vert.	19296.000	PK	48.0	41.1	2.2	48.0	43.3	73.9	30.6	100	157	
Vert.	1629.182	AV	36.2	25.9	13.8	38.6	37.3	53.9	16.6	125	273	*2
Vert.	1749.948	AV	44.2	26.1	14.0	38.6	45.7	53.9	**8.2**	100	265	*2
Vert.	2390.000	AV	36.1	28.1	14.1	40.9	37.4	53.9	16.5	100	116	*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
*1) Out of Band emission (Leakage Power)
*2) Continuous wave (no pulse emission)

Average measurement value with duty factor

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.	4824.000	AV	39.7	31.1	7.9	37.1	1.9	43.5	53.9	10.4	
Hori.	7236.000	AV	36.7	37.1	9.1	39.4	1.9	45.4	53.9	8.5	
Hori.	9648.000	AV	34.3	38.6	10.2	37.6	1.9	47.4	53.9	6.5	
Hori.	12060.000	AV	35.3	39.6	11.3	38.5	1.9	49.6	53.9	**4.3**	
Hori.	19296.000	AV	43.5	41.1	2.2	48.0	1.9	40.7	53.9	13.2	
Vert.	4824.000	AV	38.7	31.1	7.9	37.1	1.9	42.5	53.9	11.4	
Vert.	7236.000	AV	36.8	37.1	9.1	39.4	1.9	45.5	53.9	8.4	
Vert.	9648.000	AV	34.5	38.6	10.2	37.6	1.9	47.6	53.9	6.3	
Vert.	12060.000	AV	35.2	39.6	11.3	38.5	1.9	49.5	53.9	4.4	
Vert.	19296.000	AV	41.5	41.1	2.2	48.0	1.9	38.7	53.9	15.2	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier) + Duty factor
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	91.7	28.2	14.2	40.9	93.2	-	-	
Hori.	2398.400	PK	43.1	28.1	14.1	40.9	44.4	73.2	28.8	
Hori.	2400.000	PK	39.4	28.1	14.1	40.9	40.7	73.2	32.5	
Vert.	2412.000	PK	89.5	28.2	14.2	40.9	91.0	-	-	
Vert.	2398.417	PK	41.3	28.1	14.1	40.9	42.6	71.0	28.4	
Vert.	2400.000	PK	38.7	28.1	14.1	40.9	40.0	71.0	31.0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)

Radiated Emission

Test place	No.1, No.3 Semi Anechoic Chamber			
Date	February 28, 2014	March 2, 2014	March 24, 2014	April 16, 2014
Temperature / Humidity	23 deg.C, 30 %RH	20 deg.C, 35 %RH	21 deg.C, 33 %RH	22 deg.C, 47 %RH
Engineer	Tatsuya Arai	Tatsuya Arai	Tatsuya Arai	Tatsuya Arai
Mode	Tx, 2437 MHz			
	Tx, IEEE802.11b, PN9			

(* 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.	1749.955	PK	48.1	26.1	14.0	38.6	49.6	73.9	24.3	100	190	
Hori.	4873.000	PK	44.3	31.3	7.9	37.1	46.4	73.9	27.5	134	172	
Hori.	7311.000	PK	45.4	37.2	9.1	39.4	52.3	73.9	21.6	100	0	
Hori.	9748.000	PK	43.4	38.7	10.1	37.6	54.6	73.9	19.3	100	0	
Hori.	12185.000	PK	44.2	39.6	11.3	38.4	56.7	73.9	17.2	100	0	
Hori.	19496.000	PK	50.7	41.1	2.2	47.6	46.4	73.9	27.5	100	197	
Hori.	1749.955	AV	41.8	26.1	14.0	38.6	43.3	53.9	**10.6**	100	190	*1
Vert.	1629.173	PK	47.3	25.9	13.8	38.6	48.4	73.9	25.5	120	269	
Vert.	1750.000	PK	48.5	26.1	14.0	38.6	50.0	73.9	23.9	136	185	
Vert.	4873.000	PK	44.8	31.3	7.9	37.1	46.9	73.9	27.0	130	179	
Vert.	7311.000	PK	45.4	37.2	9.1	39.4	52.3	73.9	21.6	100	0	
Vert.	9748.000	PK	43.3	38.7	10.1	37.6	54.5	73.9	19.4	100	0	
Vert.	12185.000	PK	44.3	39.6	11.3	38.4	56.8	73.9	17.1	100	0	
Vert.	19496.000	PK	47.8	41.1	2.2	47.6	43.5	73.9	30.4	100	158	
Vert.	1629.173	AV	38.3	25.9	13.8	38.6	39.4	53.9	14.5	120	269	*1
Vert.	1750.000	AV	40.3	26.1	14.0	38.6	41.8	53.9	12.1	136	185	*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
*1) Continuous wave (no pulse emission)

Average measurement value with duty factor

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.	4873.000	AV	35.8	31.3	7.9	37.1	1.9	39.8	53.9	14.1	
Hori.	7311.000	AV	35.8	37.2	9.1	39.4	1.9	44.6	53.9	9.3	
Hori.	9748.000	AV	34.4	38.7	10.1	37.6	1.9	47.5	53.9	6.4	
Hori.	12185.000	AV	35.2	39.6	11.3	38.4	1.9	49.6	53.9	4.3	
Hori.	19496.000	AV	47.0	41.1	2.2	47.6	1.9	44.6	53.9	9.3	
Vert.	4873.000	AV	36.4	31.3	7.9	37.1	1.9	40.4	53.9	13.5	
Vert.	7311.000	AV	36.3	37.2	9.1	39.4	1.9	45.1	53.9	8.8	
Vert.	9748.000	AV	34.3	38.7	10.1	37.6	1.9	47.4	53.9	6.5	
Vert.	12185.000	AV	35.4	39.6	11.3	38.4	1.9	49.8	53.9	**4.1**	
Vert.	19496.000	AV	42.3	41.1	2.2	47.6	1.9	39.9	53.9	14.0	

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

Radiated Emission

Test place	No.1, No.3 Semi Anechoic Chamber			
Date	February 28, 2014	March 2, 2014	March 24, 2014	April 16, 2014
Temperature / Humidity	23 deg.C, 30 %RH	20 deg.C, 35 %RH	21 deg.C, 33 %RH	22 deg.C, 47 %RH
Engineer	Tatsuya Arai	Tatsuya Arai	Tatsuya Arai	Tatsuya Arai
Mode	Tx, 2462 MHz			
	Tx, IEEE802.11b, PN9			

(* 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.	1749.961	PK	46.1	26.1	14.0	38.6	47.6	73.9	26.3	100	292	
Hori.	2483.500	PK	47.3	28.4	14.2	40.9	49.0	73.9	24.9	107	138	
Hori.	4924.000	PK	45.1	31.6	7.8	37.0	47.5	73.9	26.4	131	199	
Hori.	7386.000	PK	45.0	37.3	9.3	39.4	52.2	73.9	21.7	100	0	
Hori.	9848.000	PK	42.7	38.9	10.1	37.5	54.2	73.9	19.7	100	0	
Hori.	12310.000	PK	43.2	39.6	11.3	38.3	55.8	73.9	18.1	100	0	
Hori.	19696.000	PK	49.3	41.1	2.3	47.7	45.0	73.9	28.9	100	198	
Hori.	1749.961	AV	37.7	26.1	14.0	38.6	39.2	53.9	14.7	100	292	*2
Hori.	2483.500	AV	37.6	28.4	14.2	40.9	39.3	53.9	14.6	107	138	*1
Vert.	1629.104	PK	48.0	25.9	13.8	38.6	49.1	73.9	24.8	100	277	
Vert.	1749.943	PK	49.5	26.1	14.0	38.6	51.0	73.9	22.9	100	261	
Vert.	2483.500	PK	46.1	28.4	14.2	40.9	47.8	73.9	26.1	138	97	
Vert.	4924.000	PK	45.3	31.6	7.8	37.0	47.7	73.9	26.2	126	178	
Vert.	7386.000	PK	45.3	37.3	9.3	39.4	52.5	73.9	21.4	100	0	
Vert.	9848.000	PK	42.6	38.9	10.1	37.5	54.1	73.9	19.8	100	0	
Vert.	12310.000	PK	43.3	39.6	11.3	38.3	55.9	73.9	18.0	100	0	
Vert.	19696.000	PK	47.4	41.1	2.3	47.7	43.1	73.9	30.8	100	155	
Vert.	1629.104	AV	40.1	25.9	13.8	38.6	41.2	53.9	12.7	100	277	*2
Vert.	1749.943	AV	43.2	26.1	14.0	38.6	44.7	53.9	**9.2**	100	261	*2
Vert.	2483.500	AV	36.6	28.4	14.2	40.9	38.3	53.9	15.6	138	97	*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
*1) Out of Band emission (Leakage Power)
*2) Continuous wave (no pulse emission)

Average measurement value with duty factor

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.	4924.000	AV	36.5	31.6	7.8	37.0	1.9	40.8	53.9	13.1	
Hori.	7386.000	AV	36.2	37.3	9.3	39.4	1.9	45.3	53.9	8.6	
Hori.	9848.000	AV	34.0	38.9	10.1	37.5	1.9	47.4	53.9	6.5	
Hori.	12310.000	AV	34.4	39.6	11.3	38.3	1.9	48.9	53.9	**5.0**	
Hori.	19696.000	AV	47.2	41.1	2.3	47.7	1.9	44.8	53.9	9.1	
Vert.	4924.000	AV	37.6	31.6	7.8	37.0	1.9	41.9	53.9	12.0	
Vert.	7386.000	AV	35.8	37.3	9.3	39.4	1.9	44.9	53.9	9.0	
Vert.	9848.000	AV	34.2	38.9	10.1	37.5	1.9	47.6	53.9	6.3	
Vert.	12310.000	AV	34.3	39.6	11.3	38.3	1.9	48.8	53.9	5.1	
Vert.	19696.000	AV	42.0	41.1	2.3	47.7	1.9	39.6	53.9	14.3	

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

Radiated Emission

Test place	No.1, No.3 Semi Anechoic Chamber			
Date	February 28, 2014	March 2, 2014	March 24, 2014	April 16, 2014
Temperature / Humidity	23 deg.C, 30 %RH	20 deg.C, 35 %RH	21 deg.C, 33 %RH	22 deg.C, 47 %RH
Engineer	Tatsuya Arai	Tatsuya Arai	Tatsuya Arai	Tatsuya Arai
Mode	Tx, 2412 MHz			
	Tx, IEEE802.11g, PN9			

(* 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.	349.109	QP	45.1	15.0	8.8	32.0	36.9	46.0	9.1	146	241	
Hori.	400.000	QP	48.8	16.3	9.0	32.0	42.1	46.0	3.9	100	265	
Hori.	1750.000	PK	46.5	26.1	14.0	38.6	48.0	73.9	25.9	100	266	
Hori.	2390.000	PK	49.4	28.1	14.1	40.9	50.7	73.9	23.2	100	135	
Hori.	4824.000	PK	44.0	31.1	7.9	37.1	45.9	73.9	28.0	100	0	
Hori.	7236.000	PK	44.8	37.1	9.1	39.4	51.6	73.9	22.3	100	0	
Hori.	9648.000	PK	42.2	38.6	10.2	37.6	53.4	73.9	20.5	100	0	
Hori.	12060.000	PK	44.3	39.6	11.3	38.5	56.7	73.9	17.2	100	0	
Hori.	19296.000	PK	47.1	41.1	2.2	48.0	42.4	73.9	31.5	100	0	
Hori.	1750.000	AV	41.1	26.1	14.0	38.6	42.6	53.9	11.3	100	266	*2
Hori.	2390.000	AV	37.3	28.1	14.1	40.9	38.6	53.9	15.3	100	135	*1
Vert.	72.014	QP	43.3	6.3	6.9	32.2	24.3	40.0	15.7	100	160	
Vert.	105.913	QP	42.0	10.9	7.2	32.1	28.0	43.5	15.5	100	295	
Vert.	116.371	QP	46.4	12.5	7.2	32.1	34.0	43.5	9.5	100	228	
Vert.	126.815	QP	43.7	13.5	7.2	32.1	32.3	43.5	11.2	100	198	
Vert.	155.161	QP	44.8	14.7	7.7	32.1	35.1	43.5	8.4	100	346	
Vert.	400.000	QP	48.6	16.3	9.0	32.0	41.9	46.0	4.1	158	49	
Vert.	777.602	QP	39.3	20.4	10.5	31.7	38.5	46.0	7.5	100	296	
Vert.	892.158	QP	41.1	21.5	10.8	31.1	42.3	46.0	**3.7**	100	1	
Vert.	930.943	QP	37.0	21.9	10.9	30.8	39.0	46.0	7.0	100	304	
Vert.	1750.000	PK	49.7	26.1	14.0	38.6	51.2	73.9	22.7	100	265	
Vert.	2390.000	PK	46.8	28.1	14.1	40.9	48.1	73.9	25.8	100	126	
Vert.	4824.000	PK	43.1	31.1	7.9	37.1	45.0	73.9	28.9	100	0	
Vert.	7236.000	PK	45.1	37.1	9.1	39.4	51.9	73.9	22.0	100	0	
Vert.	9648.000	PK	42.9	38.6	10.2	37.6	54.1	73.9	19.8	100	0	
Vert.	12060.000	PK	45.6	39.6	11.3	38.5	58.0	73.9	15.9	100	0	
Vert.	19296.000	PK	48.5	41.1	2.2	48.0	43.8	73.9	30.1	100	164	
Vert.	1750.000	AV	43.2	26.1	14.0	38.6	44.7	53.9	9.2	100	265	*2
Vert.	2390.000	AV	36.4	28.1	14.1	40.9	37.7	53.9	16.2	100	126	*1

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB
*1) Out of Band emission (Leakage Power)
*2) Continuous wave (no pulse emission)

Average measurement value with duty factor

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.	4824.000	AV	31.0	31.1	7.9	37.1	3.8	36.7	53.9	17.2	
Hori.	7236.000	AV	33.5	37.1	9.1	39.4	3.8	44.1	53.9	9.8	
Hori.	9648.000	AV	31.8	38.6	10.2	37.6	3.8	46.8	53.9	7.1	
Hori.	12060.000	AV	32.3	39.6	11.3	38.5	3.8	48.5	53.9	5.4	
Hori.	19296.000	AV	42.0	41.1	2.2	48.0	3.8	41.1	53.9	12.8	
Vert.	4824.000	AV	30.9	31.1	7.9	37.1	3.8	36.6	53.9	17.3	
Vert.	7236.000	AV	33.7	37.1	9.1	39.4	3.8	44.3	53.9	9.6	
Vert.	9648.000	AV	31.1	38.6	10.2	37.6	3.8	46.1	53.9	7.8	
Vert.	12060.000	AV	32.7	39.6	11.3	38.5	3.8	48.9	53.9	**5.0**	
Vert.	19296.000	AV	39.6	41.1	2.2	48.0	3.8	38.7	53.9	15.2	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier) + Duty factor
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	88.8	28.2	14.2	40.9	90.3	-	-	
Hori.	2400.000	PK	58.8	28.1	14.1	40.9	60.1	70.3	10.2	
Vert.	2412.000	PK	85.6	28.2	14.2	40.9	87.1	-	-	
Vert.	2400.000	PK	54.5	28.1	14.1	40.9	55.8	67.1	11.3	

Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter) - Gain(Amplifier)

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Radiated Emission

Test place	No.1, No.3 Semi Anechoic Chamber			
Date	February 28, 2014	March 2, 2014	March 24, 2014	April 16, 2014
Temperature / Humidity	23 deg.C, 30 %RH	20 deg.C, 35 %RH	21 deg.C, 33 %RH	22 deg.C, 47 %RH
Engineer	Tatsuya Arai	Tatsuya Arai	Tatsuya Arai	Tatsuya Arai
Mode	Tx, 2437 MHz			
	Tx, IEEE802.11g, PN9			

(* 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.	1749.834	PK	47.8	26.1	14.0	38.6	49.3	73.9	24.6	120	188	
Hori.	4873.000	PK	44.0	31.3	7.9	37.1	46.1	73.9	27.8	100	0	
Hori.	7311.000	PK	46.6	37.2	9.1	39.4	53.5	73.9	20.4	100	0	
Hori.	9748.000	PK	43.7	38.7	10.1	37.6	54.9	73.9	19.0	100	0	
Hori.	12185.000	PK	45.2	39.6	11.3	38.4	57.7	73.9	16.2	100	0	
Hori.	19496.000	PK	50.6	41.1	2.2	47.6	46.3	73.9	27.6	100	200	
Hori.	1749.834	AV	41.0	26.1	14.0	38.6	42.5	53.9	11.4	120	188	*1
Vert.	1749.974	PK	49.6	26.1	14.0	38.6	51.1	73.9	22.8	100	267	
Vert.	2555.643	PK	43.4	27.0	15.0	38.1	47.3	73.9	26.6	100	0	
Vert.	4873.000	PK	43.0	31.3	7.9	37.1	45.1	73.9	28.8	100	0	
Vert.	7311.000	PK	44.7	37.2	9.1	39.4	51.6	73.9	22.3	100	0	
Vert.	9748.000	PK	42.2	38.7	10.1	37.6	53.4	73.9	20.5	100	0	
Vert.	12185.000	PK	43.9	39.6	11.3	38.4	56.4	73.9	17.5	100	0	
Vert.	19496.000	PK	47.6	41.1	2.2	47.6	43.3	73.9	30.6	100	165	
Vert.	1749.974	AV	42.8	26.1	14.0	38.6	44.3	53.9	**9.6**	100	267	
Vert.	2555.643	AV	34.7	27.0	15.0	38.1	38.6	53.9	15.3	100	0	*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
*1) Continuous wave (no pulse emission)

Average measurement value with duty factor

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.	4873.000	AV	30.8	31.3	7.9	37.1	3.8	36.7	53.9	17.2	
Hori.	7311.000	AV	33.1	37.2	9.1	39.4	3.8	43.8	53.9	10.1	
Hori.	9748.000	AV	31.5	38.7	10.1	37.6	3.8	46.5	53.9	7.4	
Hori.	12185.000	AV	32.3	39.6	11.3	38.4	3.8	48.6	53.9	**5.3**	
Hori.	19496.000	AV	47.0	41.1	2.2	47.6	3.8	46.5	53.9	7.4	
Vert.	4873.000	AV	30.9	31.3	7.9	37.1	3.8	36.8	53.9	17.1	
Vert.	7311.000	AV	33.3	37.2	9.1	39.4	3.8	44.0	53.9	9.9	
Vert.	9748.000	AV	30.9	38.7	10.1	37.6	3.8	45.9	53.9	8.0	
Vert.	12185.000	AV	32.0	39.6	11.3	38.4	3.8	48.3	53.9	5.6	
Vert.	19496.000	AV	40.4	41.1	2.2	47.6	3.8	39.9	53.9	14.0	

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

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Radiated Emission

Test place	No.1, No.3 Semi Anechoic Chamber			
Date	February 28, 2014	March 2, 2014	March 24, 2014	April 16, 2014
Temperature / Humidity	23 deg.C, 30 %RH	20 deg.C, 35 %RH	21 deg.C, 33 %RH	22 deg.C, 47 %RH
Engineer	Tatsuya Arai	Tatsuya Arai	Tatsuya Arai	Tatsuya Arai
Mode	Tx, 2462 MHz			
	Tx, IEEE802.11g, PN9			

(* 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.	1750.038	PK	47.8	26.1	14.0	38.6	49.3	73.9	24.6	126	193	
Hori.	2483.500	PK	55.2	28.4	14.2	40.9	56.9	73.9	17.0	106	137	
Hori.	2579.440	PK	43.8	27.1	15.0	38.1	47.8	73.9	26.1	100	0	
Hori.	4924.000	PK	43.0	31.6	7.8	37.0	45.4	73.9	28.5	100	0	
Hori.	7386.000	PK	45.8	37.3	9.3	39.4	53.0	73.9	20.9	100	0	
Hori.	9848.000	PK	42.9	38.9	10.1	37.5	54.4	73.9	19.5	100	0	
Hori.	12310.000	PK	45.0	39.6	11.3	38.3	57.6	73.9	16.3	100	0	
Hori.	19696.000	PK	52.0	41.1	2.3	47.7	47.7	73.9	26.2	100	200	
Hori.	1750.038	AV	41.7	26.1	14.0	38.6	43.2	53.9	10.7	126	193	*2
Hori.	2483.500	AV	39.4	28.4	14.2	40.9	41.1	53.9	12.8	106	137	*1
Hori.	2579.440	AV	34.8	27.1	15.0	38.1	38.8	53.9	15.1	100	0	*2
Vert.	1749.965	PK	50.1	26.1	14.0	38.6	51.6	73.9	22.3	100	270	
Vert.	2483.500	PK	48.5	28.4	14.2	40.9	50.2	73.9	23.7	100	121	
Vert.	4924.000	PK	43.0	31.6	7.8	37.0	45.4	73.9	28.5	100	0	
Vert.	7386.000	PK	44.9	37.3	9.3	39.4	52.1	73.9	21.8	100	0	
Vert.	9848.000	PK	43.3	38.9	10.1	37.5	54.8	73.9	19.1	100	0	
Vert.	12310.000	PK	46.0	39.6	11.3	38.3	58.6	73.9	15.3	100	0	
Vert.	19696.000	PK	46.2	41.1	2.3	47.7	41.9	73.9	32.0	100	160	
Vert.	1749.965	AV	42.6	26.1	14.0	38.6	44.1	53.9	**9.8**	100	270	*2
Vert.	2483.500	AV	36.9	28.4	14.2	40.9	38.6	53.9	15.3	100	121	*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
*1) Out of Band emission (Leakage Power)
*2) Continuous wave (no pulse emission)

Average measurement value with duty factor

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.	4924.000	AV	30.7	31.6	7.8	37.0	3.8	36.9	53.9	17.0	
Hori.	7386.000	AV	33.1	37.3	9.3	39.4	3.8	44.1	53.9	9.8	
Hori.	9848.000	AV	31.0	38.9	10.1	37.5	3.8	46.3	53.9	7.6	
Hori.	12310.000	AV	32.7	39.6	11.3	38.3	3.8	49.1	53.9	**4.8**	
Hori.	19696.000	AV	47.7	41.1	2.3	47.7	3.8	47.2	53.9	6.7	
Vert.	4924.000	AV	30.9	31.6	7.8	37.0	3.8	37.1	53.9	16.8	
Vert.	7386.000	AV	33.0	37.3	9.3	39.4	3.8	44.0	53.9	9.9	
Vert.	9848.000	AV	31.1	38.9	10.1	37.5	3.8	46.4	53.9	7.5	
Vert.	12310.000	AV	32.7	39.6	11.3	38.3	3.8	49.1	53.9	**4.8**	
Vert.	19696.000	AV	39.1	41.1	2.3	47.7	3.8	38.6	53.9	15.3	

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

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Radiated Emission

Test place	No.1, No.3 Semi Anechoic Chamber			
Date	February 28, 2014	March 2, 2014	March 24, 2014	April 16, 2014
Temperature / Humidity	23 deg.C, 30 %RH	20 deg.C, 35 %RH	21 deg.C, 33 %RH	22 deg.C, 47 %RH
Engineer	Tatsuya Arai	Tatsuya Arai	Tatsuya Arai	Tatsuya Arai
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.	1749.950	PK	47.4	26.1	14.0	38.6	48.9	73.9	25.0	100	136	
Hori.	2390.000	PK	50.3	28.1	14.1	40.9	51.6	73.9	22.3	100	135	
Hori.	4824.000	PK	44.8	31.1	7.9	37.1	46.7	73.9	27.2	100	0	
Hori.	7236.000	PK	45.0	37.1	9.1	39.4	51.8	73.9	22.1	100	0	
Hori.	9648.000	PK	42.0	38.6	10.2	37.6	53.2	73.9	20.7	100	0	
Hori.	12060.000	PK	44.4	39.6	11.3	38.5	56.8	73.9	17.1	100	0	
Hori.	19296.000	PK	49.1	41.1	2.2	48.0	44.4	73.9	29.5	100	200	
Hori.	1749.950	AV	39.6	26.1	14.0	38.6	41.1	53.9	12.8	100	136	*2
Hori.	2390.000	AV	38.1	28.1	14.1	40.9	39.4	53.9	14.5	100	135	*1
Vert.	1749.999	PK	50.0	26.1	14.0	38.6	51.5	73.9	22.4	100	269	
Vert.	2390.000	PK	48.9	28.1	14.1	40.9	50.2	73.9	23.7	100	114	
Vert.	4824.000	PK	44.6	31.1	7.9	37.1	46.5	73.9	27.4	100	0	
Vert.	7236.000	PK	46.0	37.1	9.1	39.4	52.8	73.9	21.1	100	0	
Vert.	9648.000	PK	43.0	38.6	10.2	37.6	54.2	73.9	19.7	100	0	
Vert.	12060.000	PK	44.8	39.6	11.3	38.5	57.2	73.9	16.7	100	0	
Vert.	19296.000	PK	47.8	41.1	2.2	48.0	43.1	73.9	30.8	100	159	
Vert.	1749.999	AV	44.1	26.1	14.0	38.6	45.6	53.9	**8.3**	100	269	*2
Vert.	2390.000	AV	36.5	28.1	14.1	40.9	37.8	53.9	16.1	100	114	*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
*1) Out of Band emission (Leakage Power)
*2) Continuous wave (no pulse emission)

Average measurement value with duty factor

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.	4824.000	AV	31.1	31.1	7.9	37.1	2.7	35.7	53.9	18.2	
Hori.	7236.000	AV	33.3	37.1	9.1	39.4	2.7	42.8	53.9	11.1	
Hori.	9648.000	AV	32.1	38.6	10.2	37.6	2.7	46.0	53.9	7.9	
Hori.	12060.000	AV	32.2	39.6	11.3	38.5	2.7	47.3	53.9	6.6	
Hori.	19296.000	AV	43.4	41.1	2.2	48.0	2.7	41.4	53.9	12.5	
Vert.	4824.000	AV	30.9	31.1	7.9	37.1	2.7	35.5	53.9	18.4	
Vert.	7236.000	AV	33.3	37.1	9.1	39.4	2.7	42.8	53.9	11.1	
Vert.	9648.000	AV	31.0	38.6	10.2	37.6	2.7	44.9	53.9	9.0	
Vert.	12060.000	AV	32.8	39.6	11.3	38.5	2.7	47.9	53.9	**6.0**	
Vert.	19296.000	AV	41.6	41.1	2.2	48.0	2.7	39.6	53.9	14.3	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier) + Duty factor
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	89.4	28.2	14.2	40.9	90.9	-	-	
Hori.	2400.000	PK	59.0	28.1	14.1	40.9	60.3	70.9	10.6	
Vert.	2412.000	PK	85.3	28.2	14.2	40.9	86.8	-	-	
Vert.	2400.000	PK	54.6	28.1	14.1	40.9	55.9	66.8	10.9	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)

Radiated Emission

Test place	No.1, No.3 Semi Anechoic Chamber			
Date	February 28, 2014	March 2, 2014	March 24, 2014	April 16, 2014
Temperature / Humidity	23 deg.C, 30 %RH	20 deg.C, 35 %RH	21 deg.C, 33 %RH	22 deg.C, 47 %RH
Engineer	Tatsuya Arai	Tatsuya Arai	Tatsuya Arai	Tatsuya Arai
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.	1749.940	PK	47.1	26.1	14.0	38.6	48.6	73.9	25.3	100	150	
Hori.	2519.650	PK	44.7	26.9	14.9	38.1	48.4	73.9	25.5	100	0	
Hori.	4873.000	PK	44.4	31.3	7.9	37.1	46.5	73.9	27.4	100	2	
Hori.	7311.000	PK	44.5	37.2	9.1	39.4	51.4	73.9	22.5	100	357	
Hori.	9748.000	PK	42.0	38.7	10.1	37.6	53.2	73.9	20.7	100	357	
Hori.	12185.000	PK	44.9	39.6	11.3	38.4	57.4	73.9	16.5	100	357	
Hori.	19496.000	PK	50.0	41.1	2.2	47.6	45.7	73.9	28.2	100	200	
Hori.	1749.940	AV	40.5	26.1	14.0	38.6	42.0	53.9	11.9	100	150	*1
Hori.	2519.650	AV	34.8	26.9	14.9	38.1	38.5	53.9	15.4	100	0	*1
Vert.	1749.997	PK	49.2	26.1	14.0	38.6	50.7	73.9	23.2	100	272	
Vert.	4873.000	PK	46.5	31.3	7.9	37.1	48.6	73.9	25.3	100	250	
Vert.	7311.000	PK	45.5	37.2	9.1	39.4	52.4	73.9	21.5	100	1	
Vert.	9748.000	PK	43.3	38.7	10.1	37.6	54.5	73.9	19.4	100	352	
Vert.	12185.000	PK	45.6	39.6	11.3	38.4	58.1	73.9	15.8	100	2	
Vert.	19496.000	PK	47.7	41.1	2.2	47.6	43.4	73.9	30.5	100	160	
Vert.	1749.997	AV	43.5	26.1	14.0	38.6	45.0	53.9	**8.9**	100	272	*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
*1) Continuous wave (no pulse emission)

Average measurement value with duty factor

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.	4873.000	AV	31.6	31.3	7.9	37.1	2.7	36.4	53.9	17.5	
Hori.	7311.000	AV	33.5	37.2	9.1	39.4	2.7	43.1	53.9	10.8	
Hori.	9748.000	AV	31.6	38.7	10.1	37.6	2.7	45.5	53.9	8.4	
Hori.	12185.000	AV	32.5	39.6	11.3	38.4	2.7	47.7	53.9	6.2	
Hori.	19496.000	AV	45.0	41.1	2.2	47.6	2.7	43.4	53.9	10.5	
Vert.	4873.000	AV	32.6	31.3	7.9	37.1	2.7	37.4	53.9	16.5	
Vert.	7311.000	AV	33.6	37.2	9.1	39.4	2.7	43.2	53.9	10.7	
Vert.	9748.000	AV	31.2	38.7	10.1	37.6	2.7	45.1	53.9	8.8	
Vert.	12185.000	AV	32.7	39.6	11.3	38.4	2.7	47.9	53.9	**6.0**	
Vert.	19496.000	AV	41.0	41.1	2.2	47.6	2.7	39.4	53.9	14.5	

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

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Radiated Emission

Test place	No.1, No.3 Semi Anechoic Chamber			
Date	February 28, 2014	March 2, 2014	March 24, 2014	April 16, 2014
Temperature / Humidity	23 deg.C, 30 %RH	20 deg.C, 35 %RH	21 deg.C, 33 %RH	22 deg.C, 47 %RH
Engineer	Tatsuya Arai	Tatsuya Arai	Tatsuya Arai	Tatsuya Arai
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.	1749.959	PK	47.2	26.1	14.0	38.6	48.7	73.9	25.2	100	155	
Hori.	2483.500	PK	57.4	28.4	14.2	40.9	59.1	73.9	14.8	109	139	
Hori.	4924.000	PK	44.9	31.6	7.8	37.0	47.3	73.9	26.6	100	2	
Hori.	7386.000	PK	46.1	37.3	9.3	39.4	53.3	73.9	20.6	100	250	
Hori.	9848.000	PK	42.3	38.9	10.1	37.5	53.8	73.9	20.1	100	357	
Hori.	12310.000	PK	44.6	39.6	11.3	38.3	57.2	73.9	16.7	100	1	
Hori.	19696.000	PK	51.3	41.1	2.3	47.7	47.0	73.9	26.9	100	200	
Hori.	1749.959	AV	41.1	26.1	14.0	38.6	42.6	53.9	11.3	100	155	*2
Hori.	2483.500	AV	41.1	28.4	14.2	40.9	42.8	53.9	11.1	109	139	*1
Vert.	1629.128	PK	46.7	25.9	13.8	38.6	47.8	73.9	26.1	100	271	
Vert.	1749.998	PK	48.8	26.1	14.0	38.6	50.3	73.9	23.6	100	195	
Vert.	2483.500	PK	49.4	28.4	14.2	40.9	51.1	73.9	22.8	100	123	
Vert.	4924.000	PK	42.0	31.6	7.8	37.0	44.4	73.9	29.5	100	357	
Vert.	7386.000	PK	44.2	37.3	9.3	39.4	51.4	73.9	22.5	100	355	
Vert.	9848.000	PK	42.8	38.9	10.1	37.5	54.3	73.9	19.6	100	357	
Vert.	12310.000	PK	43.9	39.6	11.3	38.3	56.5	73.9	17.4	100	1	
Vert.	19696.000	PK	47.4	41.1	2.3	47.7	43.1	73.9	30.8	100	160	
Vert.	1629.128	AV	40.2	25.9	13.8	38.6	41.3	53.9	12.6	100	271	*2
Vert.	1749.998	AV	43.3	26.1	14.0	38.6	44.8	53.9	**9.1**	100	195	*2
Vert.	2483.500	AV	37.4	28.4	14.2	40.9	39.1	53.9	14.8	100	123	*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
*1) Out of Band emission (Leakage Power)
*2) Continuous wave (no pulse emission)

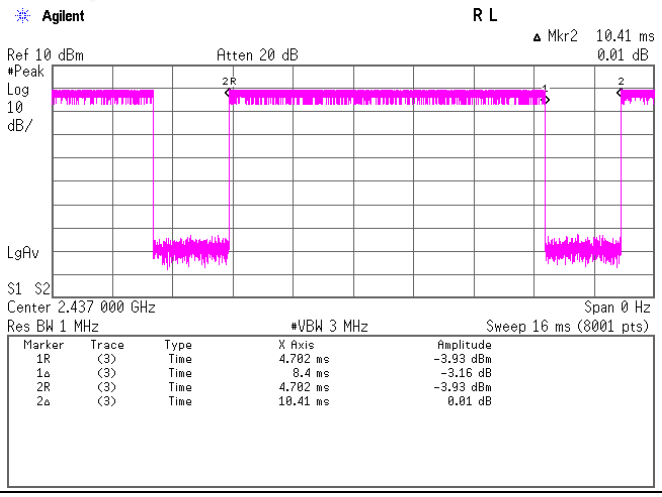
Average measurement value with duty factor

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.	4924.000	AV	31.4	31.6	7.8	37.0	2.7	36.5	53.9	17.4	
Hori.	7386.000	AV	33.4	37.3	9.3	39.4	2.7	43.3	53.9	10.6	
Hori.	9848.000	AV	31.4	38.9	10.1	37.5	2.7	45.6	53.9	8.3	
Hori.	12310.000	AV	31.9	39.6	11.3	38.3	2.7	47.2	53.9	**6.7**	
Hori.	19696.000	AV	47.4	41.1	2.3	47.7	2.7	45.8	53.9	8.1	
Vert.	4924.000	AV	30.9	31.6	7.8	37.0	2.7	36.0	53.9	17.9	
Vert.	7386.000	AV	33.1	37.3	9.3	39.4	2.7	43.0	53.9	10.9	
Vert.	9848.000	AV	30.9	38.9	10.1	37.5	2.7	45.1	53.9	8.8	
Vert.	12310.000	AV	31.8	39.6	11.3	38.3	2.7	47.1	53.9	6.8	
Vert.	19696.000	AV	40.5	41.1	2.3	47.7	2.7	38.9	53.9	15.0	

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

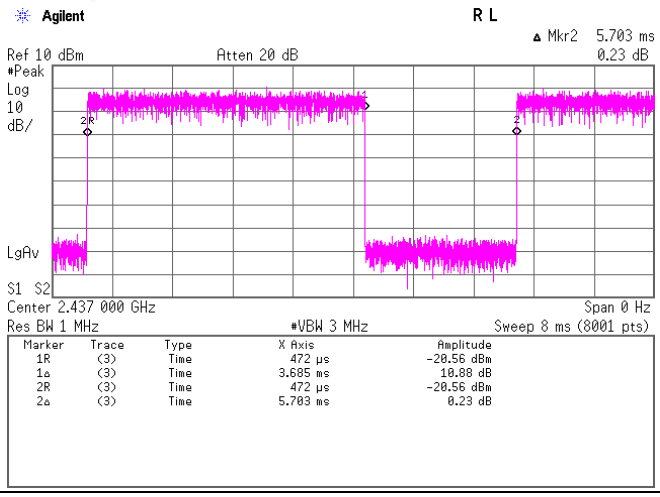
Duty Factor Calculation chart

Tx, IEEE802.11b , PN9, worst preamble mode Short, worst data mode 2Mbps

Duty Factor Calculation	
Duty Factor: 20log (1/duty cycle) = 1.9dB	
duty cycle = 8.4 / 10.41 = 0.807 (80.7%)	
Tx2_duty1  	Tx2_duty2

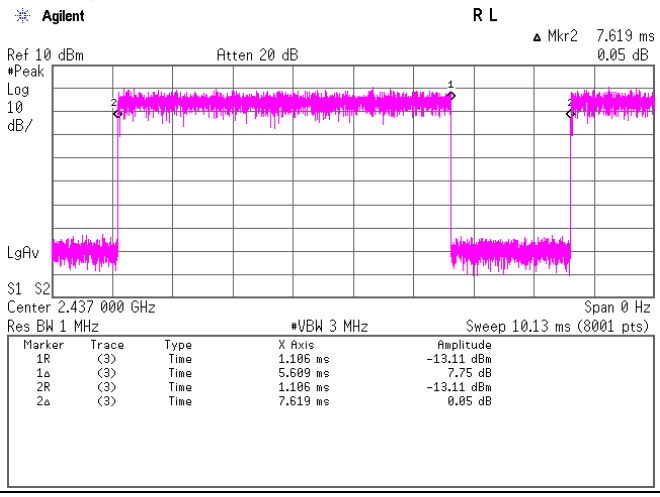
Duty Factor Calculation chart

Tx, IEEE802.11g, PN9, worst data mode 9Mbps

Duty Factor Calculation	
Duty Factor: 20log (1/duty cycle) = 3.8dB	
duty cycle = 3.685 / 5.703 = 0.646 (64.6%)	
Tx2_duty1  	Tx2_duty2

Duty Factor Calculation chart

Tx, IEEE802.11n(HT20), PN9, worst preamble mode Greenfield, worst data mode 0(MCS)

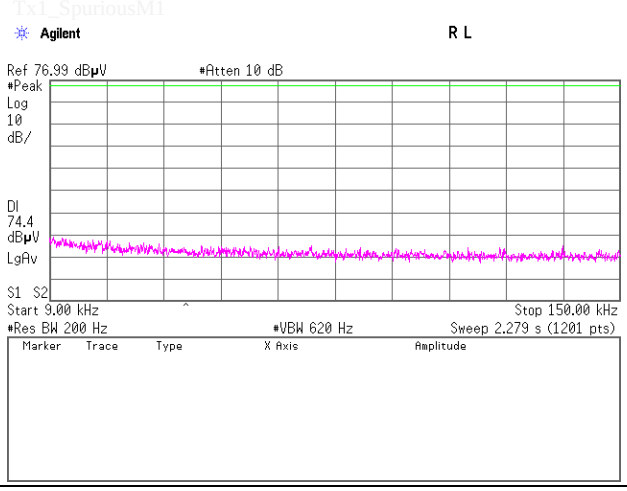
Duty Factor Calculation	
Duty Factor: 20log (1/duty cycle) = 2.7dB	
duty cycle = 5.609 / 7.619 = 0.736 (73.6%)	
Tx2_duty1  	Tx2_duty2

(Reference chart) Spurious emission (Conducted)

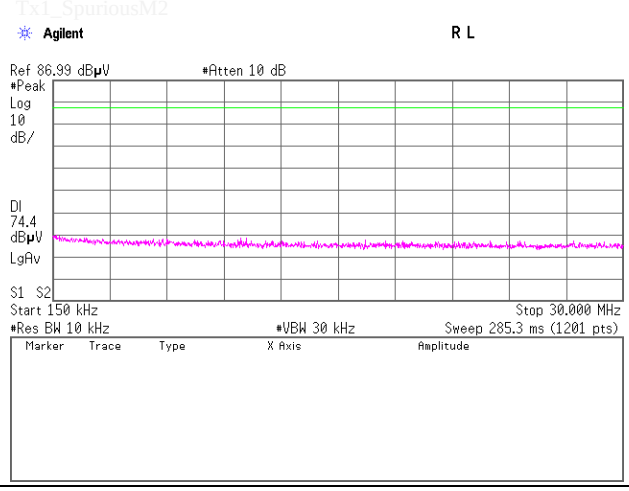
Tx, IEEE802.11g, PN9, worst data mode 9Mbps

Tx, 2412MHz (below 30MHz)

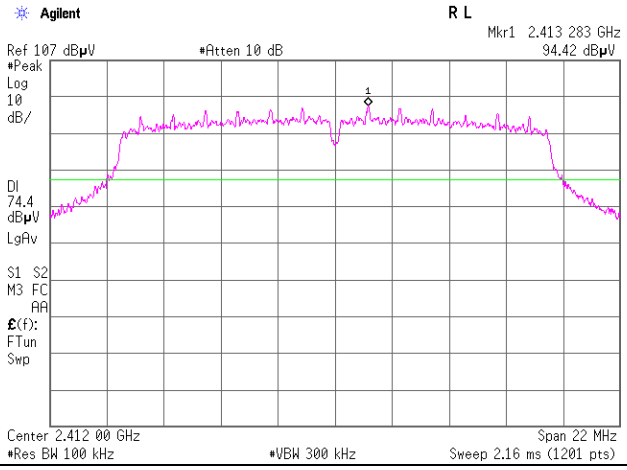
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc limit



Maximum Power Spectral Density

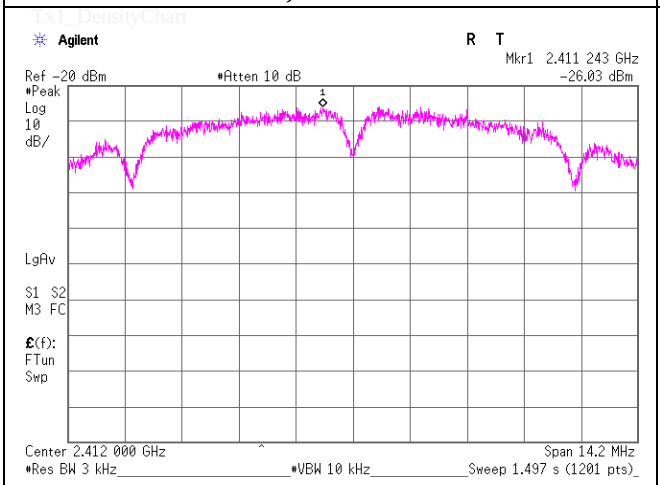
(PKPSD)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 14, 2014	
Temperature / Humidity	24deg.C , 33%RH	
Engineer	Akio Hayashi	
Mode	Tx, IEEE802.11b , PN9, worst preamble mode Short, worst data mode 2Mbps	

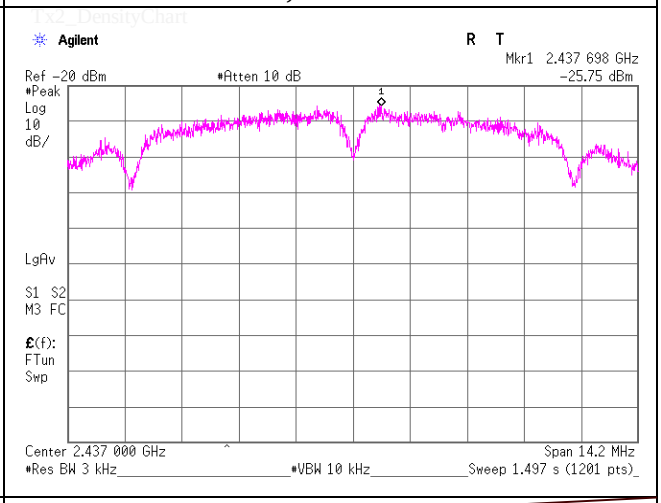
Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	2411.24	-26.03	2.07	9.98	-13.98	8.00	21.98
2437.0000	2437.70	-25.75	2.07	9.98	-13.70	8.00	21.70
2462.0000	2461.35	-26.03	2.08	9.98	-13.97	8.00	21.97

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

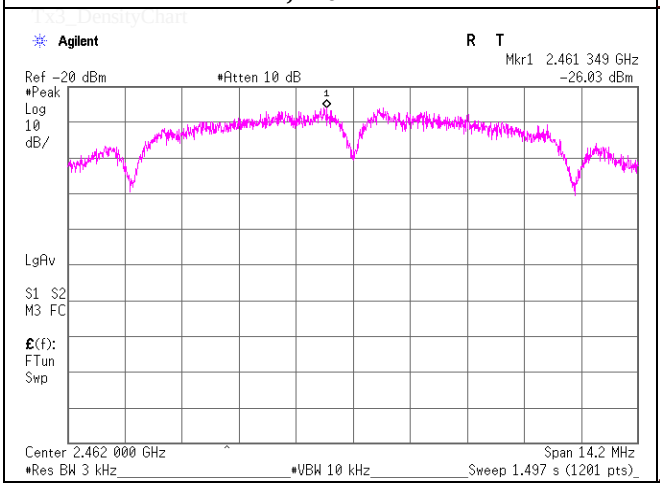
Tx, 2412MHz



Tx, 2437MHz



Tx, 2462MHz



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Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

Maximum Power Spectral Density

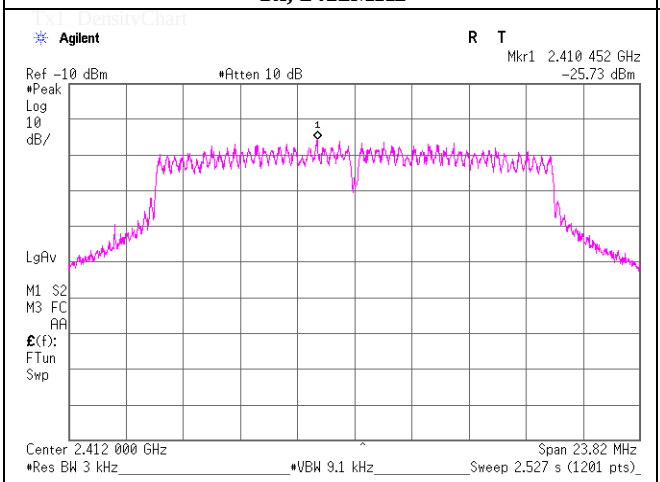
(PKPSD)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 14, 2014	
Temperature / Humidity	24deg.C , 33%RH	
Engineer	Akio Hayashi	
Mode	Tx, IEEE802.11g, PN9, worst data mode 9Mbps	

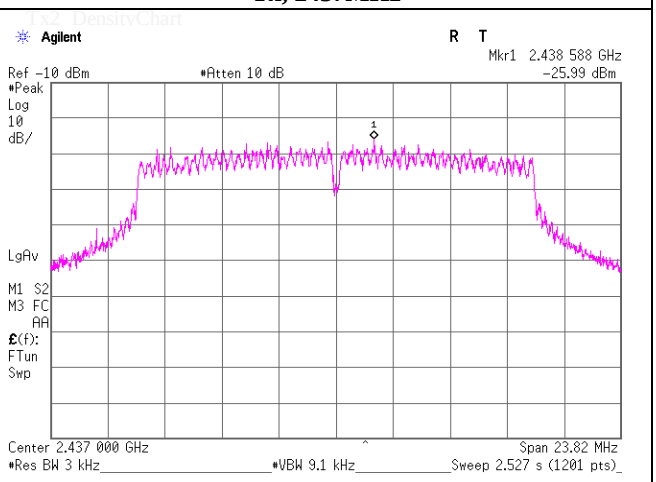
Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	241.05	-25.73	2.07	9.98	-13.68	8.00	21.68
2437.0000	243.86	-25.99	2.07	9.98	-13.94	8.00	21.94
2462.0000	245.88	-26.87	2.08	9.98	-14.81	8.00	22.81

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

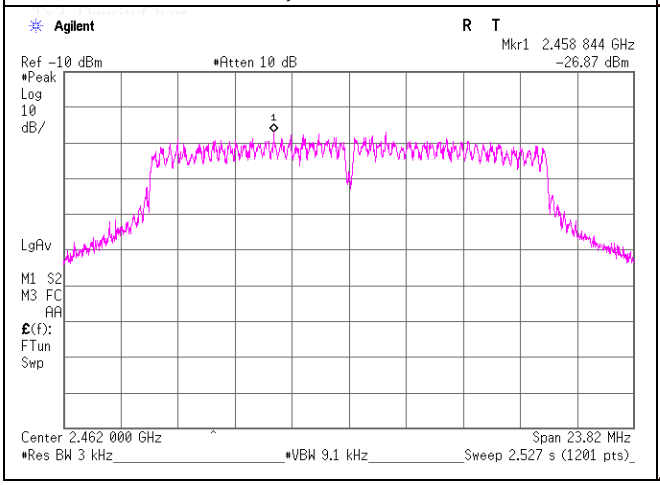
Tx, 2412MHz



Tx, 2437MHz



Tx, 2462MHz



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Maximum Power Spectral Density

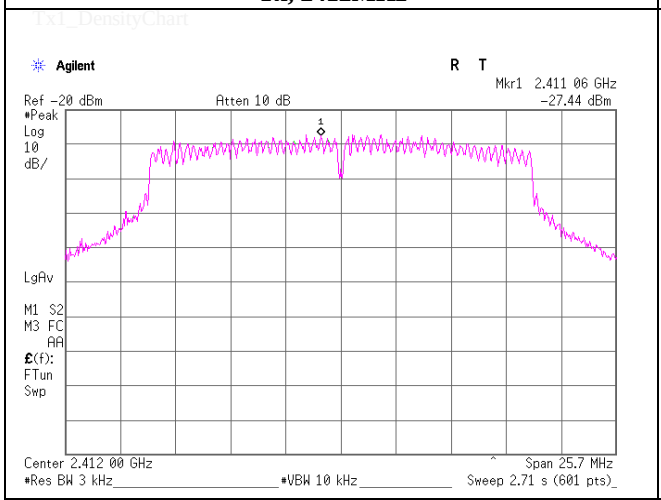
(PKPSD)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 14, 2014	
Temperature / Humidity	24deg.C , 33%RH	
Engineer	Akio Hayashi	
Mode	Tx, IEEE802.11n(HT20), PN9, worst preamble mode Greenfield, worst data mode 0(MCS)	

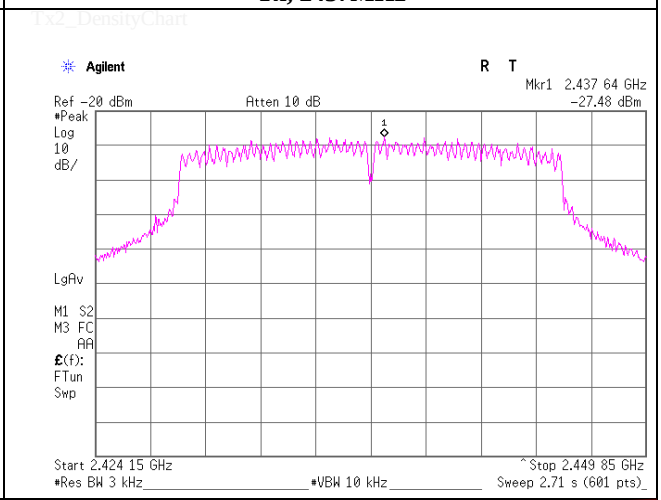
Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	2411.06	-27.44	2.07	9.98	-15.39	8.00	23.39
2437.0000	2437.64	-27.48	2.07	9.98	-15.43	8.00	23.43
2462.0000	2461.10	-27.37	2.08	9.98	-15.31	8.00	23.31

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

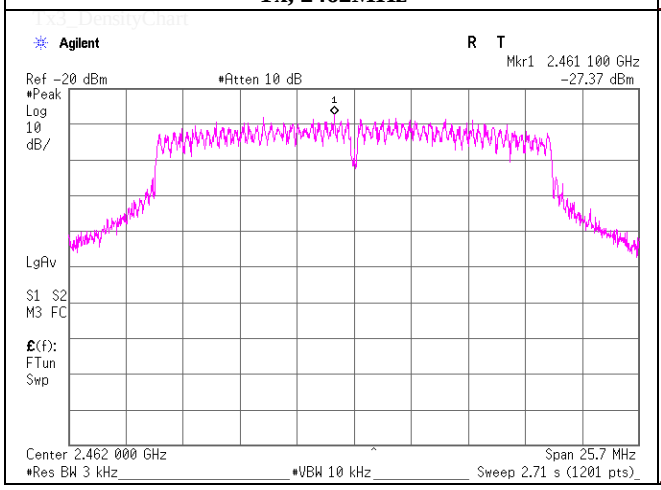
Tx, 2412MHz



Tx, 2437MHz



Tx, 2462MHz



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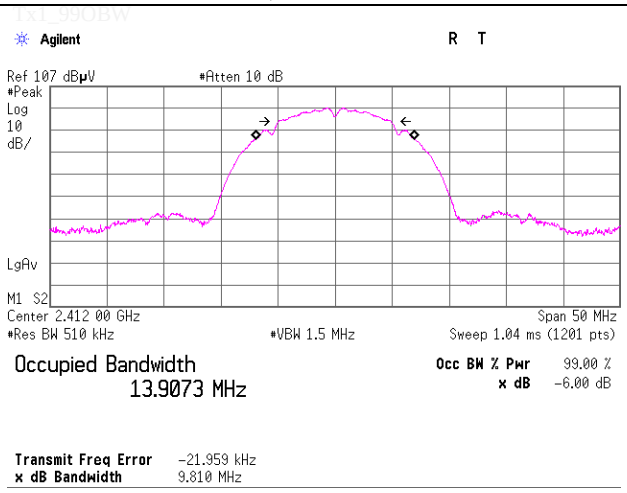
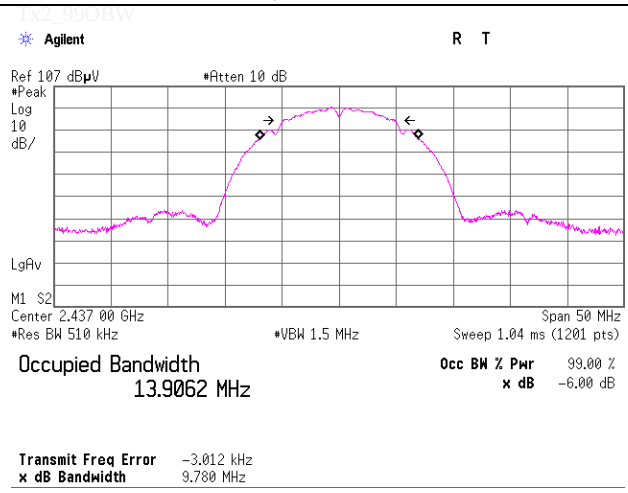
99% Occupied Bandwidth

Tx, IEEE802.11b , PN9, worst preamble mode Short, worst data mode 2Mbps

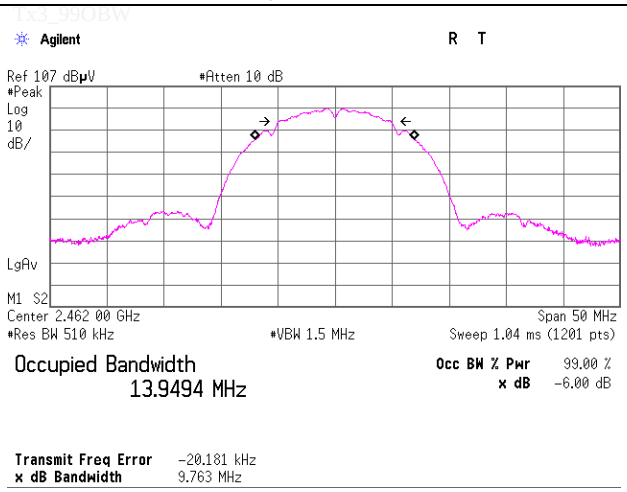
Tx, 2412MHz



Tx, 2437MHz



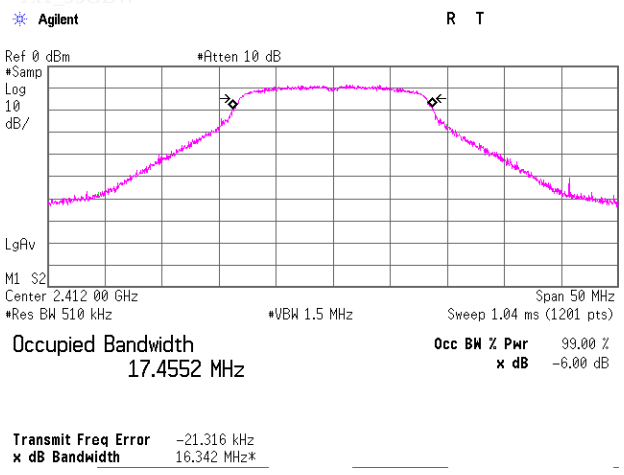
Tx, 2462MHz



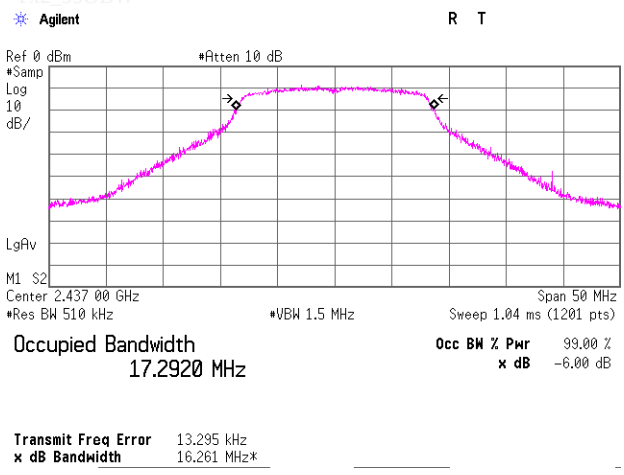
99% Occupied Bandwidth

Tx, IEEE802.11g, PN9, worst data mode 9Mbps

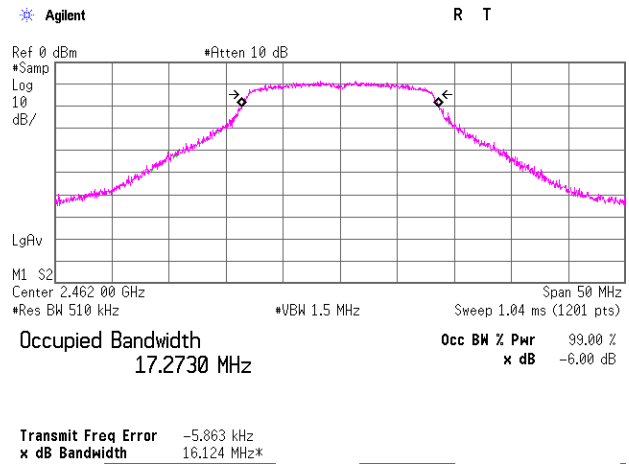
Tx, 2412MHz



Tx, 2437MHz



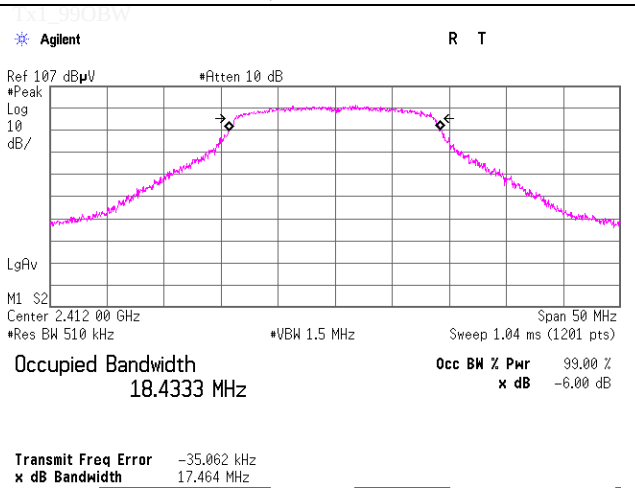
Tx, 2462MHz



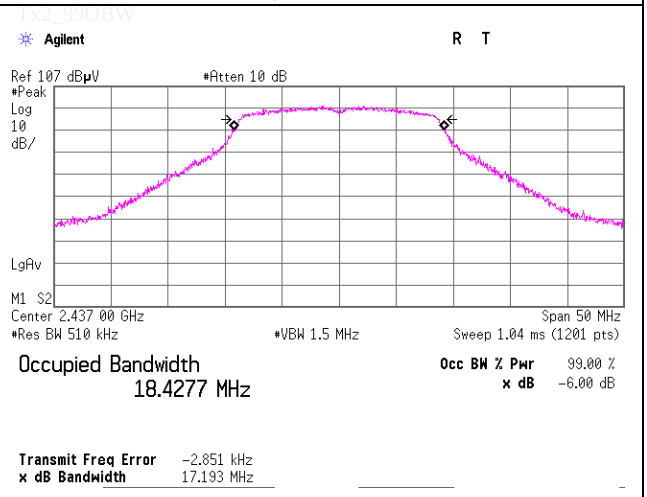
99% Occupied Bandwidth

Tx, IEEE802.11n(HT20), PN9, worst preamble mode Greenfield, worst data mode 0(MCS)

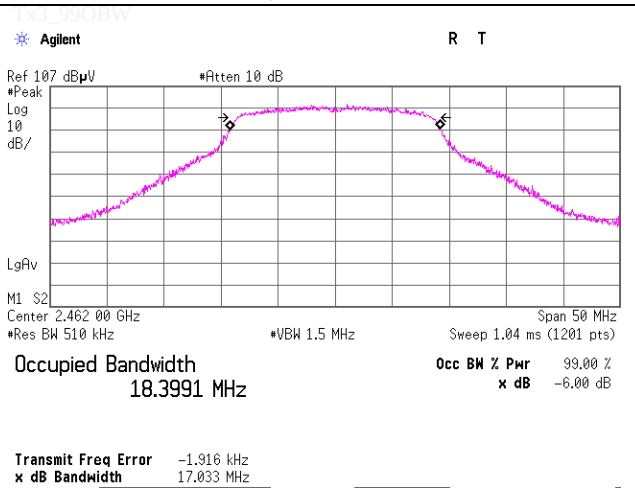
Tx, 2412MHz



Tx, 2437MHz



Tx, 2462MHz



APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2014/04/08 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2014/04/08 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	AT	2014/03/04 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	AT/RE	2014/02/03 * 12
SAT10-10	Attenuator	Weinschel Corp.	54A-10	37584	AT	2013/04/09 * 12
SCC-G13	Coaxial Cable	Suhner	SUCOFLEX 102	31599/2	AT	2014/03/14 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2013/07/09 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2013/07/22 * 12
SCC-G03	Coaxial Cable	Suhner	SUCOFLEX 104A	46499/4A	RE	2013/04/11 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2013/05/22 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2013/08/19 * 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-11	Measure	PROMART	SEN1935	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFI,MF)	-	RE	-
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2013/11/22 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	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
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2014/02/14 * 12
SAT6-06	Attenuator	JFW	50HF-006N	-	RE	2014/02/17 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2013/10/26 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	RE	2013/04/03 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2013/10/26 * 12
STR-03	Test Receiver	Rohde & Schwarz	ESI40	100054/040	RE	2013/07/09 * 12
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2013/07/03 * 12
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2014/03/14 * 12
SCC-G01	Coaxial Cable	Suhner	SUCOFLEX 104A	46497/4A	RE	2013/04/09 * 12
SCC-G21	Coaxial Cable	Suhner	SUCOFLEX 104	296169/4	RE	2013/05/22 * 12
SHA-01	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	RE	2013/08/12 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2014/02/21 * 12
SJM-08	Measure	PROMART	SEN1935	-	RE	-
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2013/11/22 * 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 ,
AT: Antenna terminal disturbance voltage