RADIO TEST REPORT

Test Report No.: 10243431S-A

Applicant	:	**Honda Engineering Co., Ltd.**
Type of Equipment	:	**WLAN CARD**
Model No.	:	**E3000-02-01**
FCC ID	:	**N43E30000201**
Test regulation	:	**FCC Part15 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 limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.

Date of test: March 7 to 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

UL Japan, Inc.
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REVISION HISTORY

Original Test Report No.: 10243431S-A

Revision	Test report No.	Date	Page revised	Contents
-(Original)	10243431S-A	July 2, 2014	-	-
1	10243431S-A	July 30, 2014	1, 2, 43, 44	P43, 44: Correction of misdescription

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Contents

SECTION 1: Customer information

Applicant:

Company Name	:	Honda Engineering Co., Ltd.
Address	:	6-1, Hagadai, Haga-Machi, Haga-Gun, Tochigi, 321-3395 Japan
Telephone Number	:	+81-28-677-6946
Facsimile Number	:	+81-28-677-6980
Contact Person	:	Tomokazu Takasaka

Manufacturer:

Company Name	:	NEC Engineering, Ltd.
Address	:	1753 Shimonumabe, Nakahara-ku, Kawasaki-shi, Kanagawa 211-8666 Japan
Telephone Number	:	+81-44-455-8765
Facsimile Number	:	+81-44-455-8927
Contact Person	:	Atsushi Suzuki

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

2.1 Identification of E.U.T.

Type of Equipment	:	WLAN CARD
Model Number	:	E3000-02-01
Serial Number	:	Refer to 4.2 in this report.
Rating	:	DC5V
Country of Mass-production	:	Japan
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample	:	March 7, 2014
Modification of EUT	:	No modification by the test lab.

2.2 Product description

Model: E3000-02-01 (referred to as the EUT in this report) is a WLAN CARD.

Clock frequency(ies) in the system : 32.768kHz, 26MHz

Radio specification:

Equipment type	:	Transceiver
Frequency of operation *1)	:	2.4GHz: 2412-2462MHz (IEEE 802.11b, 11g, 11n-20HT)
		W52: 5180-5240MHz (IEEE 802.11a, 11n-20HT)
		W53: 5260-5320MHz (IEEE 802.11a, 11n-20HT)
		W56: 5500-5700MHz (IEEE 802.11a, 11n-20HT)
		W58: 5745-5825MHz (IEEE 802.11a, 11n-20HT)
Bandwidth	:	20MHz
Channel spacing	:	5MHz (2.4GHz), 20MHz (IEEE 802.11a, 11n-20HT, 5GHz))
Type of modulation	:	DSSS, OFDM
Antenna type	:	2.4GHz band: λ/4 monopole, 5GHz band: λ/4 dipole
Antenna gain with cable loss	:	2.4GHz band: 1.6dBi, 5GHz band: 4.1dBi
Antenna connector type	:	SMD
ITU code	:	D1D, G1D
Operation temperature range	:	0 to +60 deg.C

*1) Refer to the test reports: 10243431S-C and 10243431S-E for FCC 15.407.
* The EUT does not perform simultaneous transmission of 2.4GHz and 5GHz Wireless LAN.

FCC 15.31 (e)
The RF Module has its own regulator. The RF Module is constantly provided voltage (DC1.8V and DC3.3V) through the regulator regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC 15.203
The antenna is not removable from the EUT. Therefore the equipment complies with the requirement.

SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : FCC Part 15 Subpart C: 2014, final revised on 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 15.209 Radiated emission limits, general requirements
Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

* The revision on May 1, 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	12.4dB Freq.: 25.00005MHz Detection: Average Phase: L1 Mode: Tx 2462MHz, 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	1.7dB Freq.: 375.050MHz Polarization: Horizontal Detection: Quasi-Peak Mode: Tx 2462MHz, 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

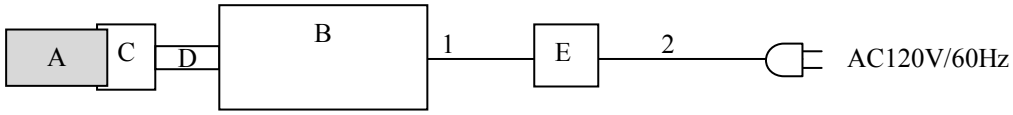
4.1 Operating mode

Test item	Mode	Tested frequency	Worst data mode *1)	Power setting *2)
Conducted emission Radiated emission (below 1GHz) *3)	Transmitting IEEE 802.11g	2462MHz	PN9, 24Mbps	13dBm
Radiated emission (above 1GHz)	Transmitting IEEE 802.11b	2412MHz, 2437MHz, 2462MHz	PN9, 1Mbps	17dBm
	Transmitting IEEE 802.11g	2412MHz, 2437MHz, 2462MHz	PN9, 24Mbps	13dBm
	Transmitting IEEE 802.11n-20HT	2412MHz, 2437MHz, 2462MHz	PN9, MCS1 (Long GI)	12dBm
	Transmitting IEEE 802.11a	5745MHz, 5785MHz, 5825MHz	PN9, 6Mbps	12dBm
	Transmitting IEEE 802.11n-20HT	5745MHz, 5785MHz, 5825MHz	PN9, MCS0 (Long GI)	12dBm
Other items	Transmitting IEEE 802.11b	2412MHz, 2437MHz, 2462MHz	PN9, 1Mbps	17dBm
	Transmitting IEEE 802.11g	2412MHz, 2437MHz, 2462MHz	PN9, 24Mbps	13dBm
	Transmitting IEEE 802.11n-20HT	2412MHz, 2437MHz, 2462MHz	PN9, MCS1 (Long GI)	12dBm
	Transmitting IEEE 802.11a	5745MHz, 5785MHz, 5825MHz	PN9, 6Mbps	12dBm
	Transmitting IEEE 802.11n-20HT	5745MHz, 5785MHz, 5825MHz	PN9, MCS0 (Long GI)	12dBm

*1) The worst condition was determined based on the test result of Maximum Peak Output Power.
*2) Software for the power setting: WlanCalib ver.1.0.0.0
*3) Test operating mode was determined as follows according to "Section 1 of 6 802.11 a/b/g/n testing- Managing Complex Regulatory Approvals - "of TCB Council Workshop October 2009.

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

4.2 Configuration and peripherals



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	WLAN CARD	E3000-02-01	*1)	NEC Engineering	EUT
B	3.0G LET	E3000-01-PP2	4200119	Honda Engineering	-
C	3.0G LET SUB TEST BOARD	E21-089163-420	-	NEC	-
D	WIRE LESS BOARD FPC	E21-089163-507-2	-	OKI CABLE	-
E	AC Adapter	UIA336-12	705-0926329	UNIFIVE Technology	-

*1) Antenna terminal conducted tests: 2BE030014K, Conducted/Radiated emission tests: 2BE030022J

List of cables used

No.	Cable Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC	1.8	Unshielded	Unshielded	-
2	AC	2.0	Unshielded	Unshielded	-

SECTION 5: Conducted emission

5.1 Operating environment

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

5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 2.0m, 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 AC adapter was connected to a Line Impedance Stabilization Network (LISN).
An overview sweep with peak detection has been performed.
The measurements had been performed with a quasi-peak detector and if required, a CISPR average detector.
The conducted emission measurements were made with the following detection of the test receiver.

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

5.5 Results

Summary of the test results : Pass
Refer to APPENDIX 1

SECTION 6: Radiated emission

6.1 Operating environment

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

6.2 Test configuration

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

6.3 Test conditions

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

6.4 Test procedure

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

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

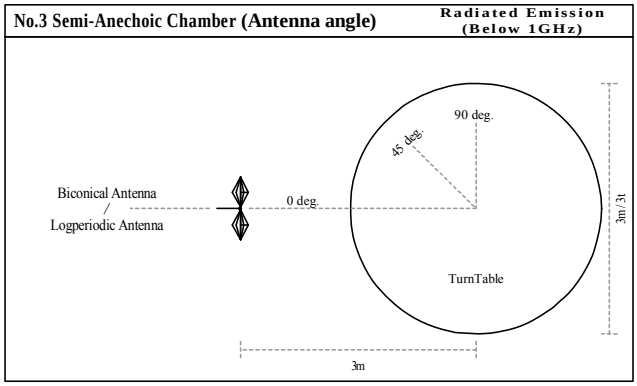
2.4GHz band

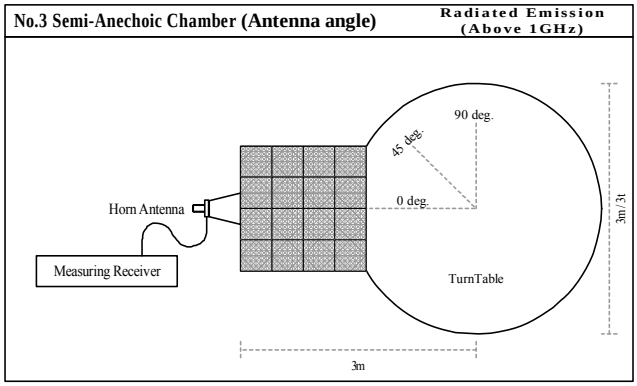
Antenna polarization	Carrier	Spurious (Below 1GHz)	Spurious (1-15GHz)	Spurious (15-18GHz)	Spurious (18-26.5GHz)
Horizontal	X	Y	X	X	X
Vertical	X	Y	X	X	X

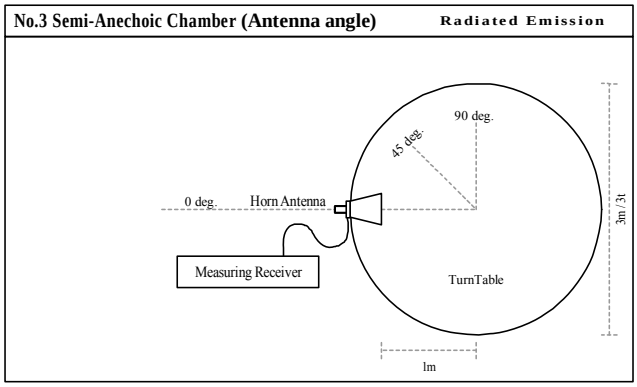
5GHz band

Antenna polarization	Carrier	Spurious (1-15GHz)	Spurious (15-18GHz)	Spurious (18-26.5GHz)	Spurious (26.5-40GHz)
Horizontal	X	X	X	X	X
Vertical	Z	Y	Y	Y	X

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, 5725MHz and 5850MHz is below the 20dBc. Refer to the data.

6.6 Results

Summary of the test results : Pass
* No noise was detected above the 3rd 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

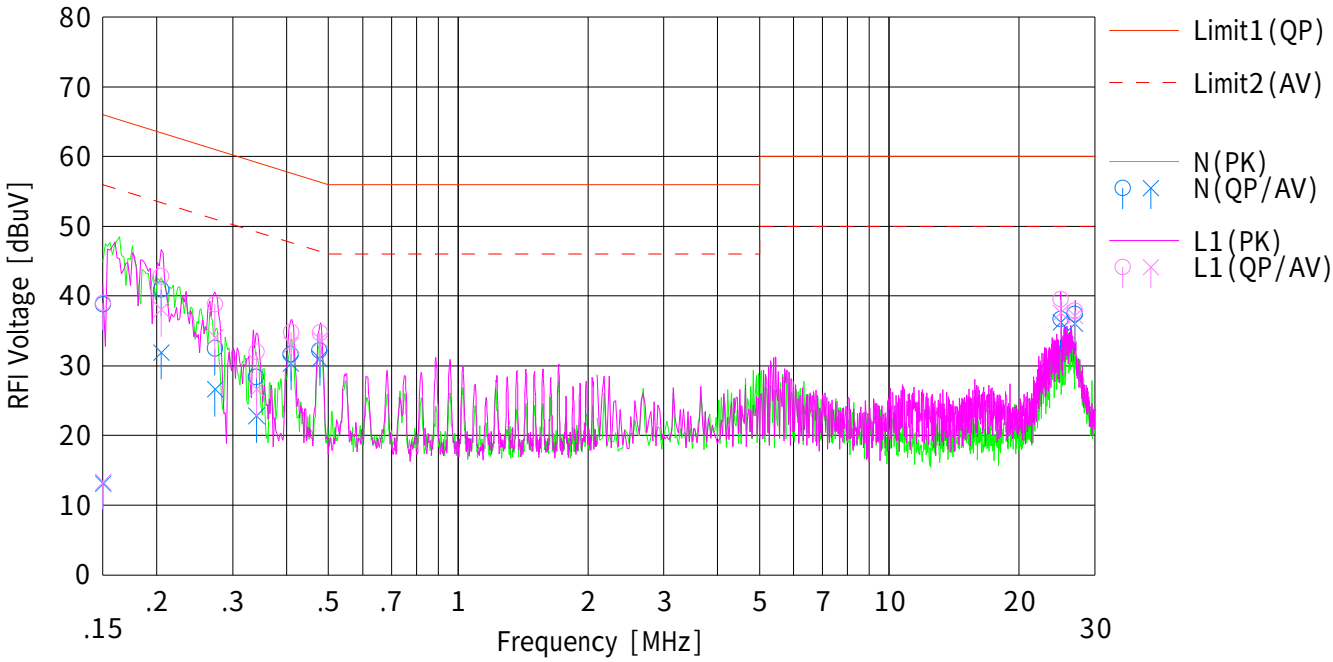
DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2014/03/16

Mode : 11g, 2462MHz
Order No. : 10243431S
Power : AC 120V / 60Hz
Temp./Humi. : 24deg.C. / 34%RH

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

Engineer : Yasumasa Owaki



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	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	26.1	0.4	12.7	38.8	13.1	66.0	56.0	27.2	42.9	N	
2	0.20485	28.2	19.2	12.7	40.9	31.9	63.4	53.4	22.5	21.5	N	
3	0.27304	19.8	13.9	12.7	32.5	26.6	61.0	51.0	28.5	24.4	N	
4	0.34071	15.7	10.1	12.7	28.4	22.8	59.1	49.1	30.7	26.3	N	
5	0.40956	18.9	17.6	12.7	31.6	30.3	57.6	47.6	26.0	17.3	N	
6	0.47752	19.5	18.3	12.7	32.2	31.0	56.3	46.3	24.1	15.3	N	
7	24.99998	23.0	22.5	13.7	36.7	36.2	60.0	50.0	23.3	13.8	N	
8	27.00416	23.6	22.2	13.8	37.4	36.0	60.0	50.0	22.6	14.0	N	
9	0.15000	26.3	0.6	12.7	39.0	13.3	66.0	56.0	27.0	42.7	L1	
10	0.20483	30.1	25.3	12.7	42.8	38.0	63.4	53.4	20.6	15.4	L1	
11	0.27308	26.1	21.4	12.7	38.8	34.1	61.0	51.0	22.2	16.9	L1	
12	0.34122	19.3	13.9	12.7	32.0	26.6	59.1	49.1	27.1	22.5	L1	
13	0.41000	22.1	20.3	12.7	34.8	33.0	57.6	47.6	22.8	14.6	L1	
14	0.47822	22.0	21.0	12.7	34.7	33.7	56.3	46.3	21.6	12.6	L1	
15	25.00005	25.8	23.9	13.7	39.5	37.6	60.0	50.0	20.5	12.4	L1	
16	27.00435	24.1	23.3	13.8	37.9	37.1	60.0	50.0	22.1	12.9	L1	

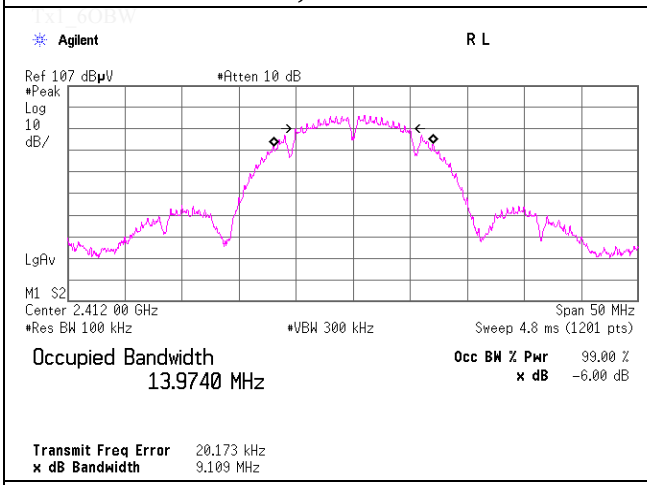
Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(Cable+ATT)[dB]
LISN: SLS-05

-6dB Bandwidth

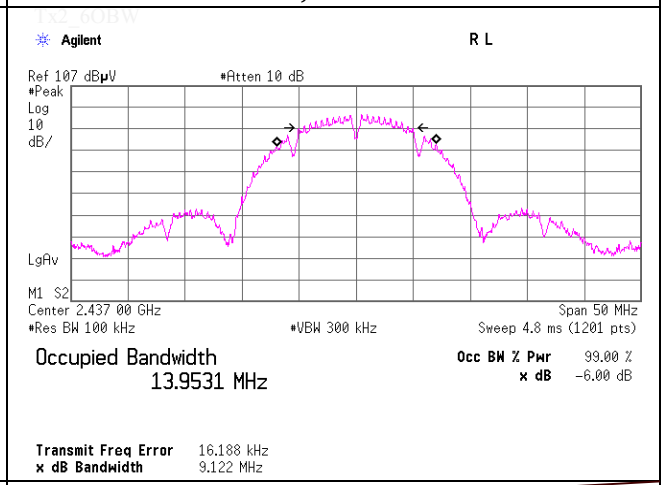
Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	March 11, 2014	
Temperature / Humidity	24deg.C , 39%RH	
Engineer	Tatsuya Arai	
Mode	Tx, IEEE802.11b, PN9, worst data mode 1Mbps	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	9.109	> 0.500
2437.0000	9.122	> 0.500
2462.0000	9.111	> 0.500

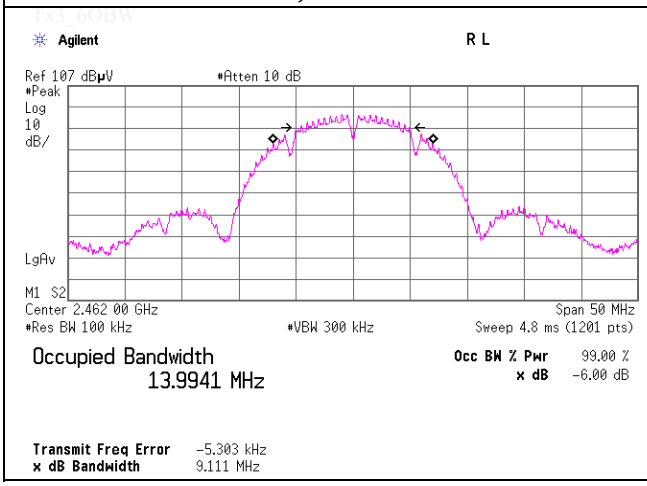
Tx, 2412MHz

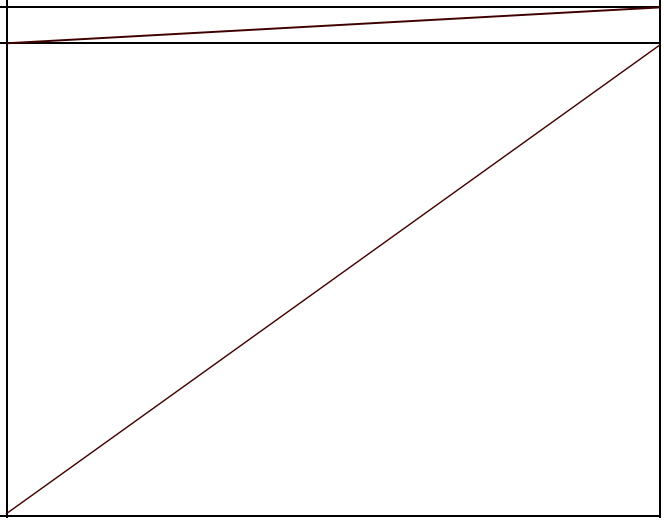


Tx, 2437MHz



Tx, 2462MHz



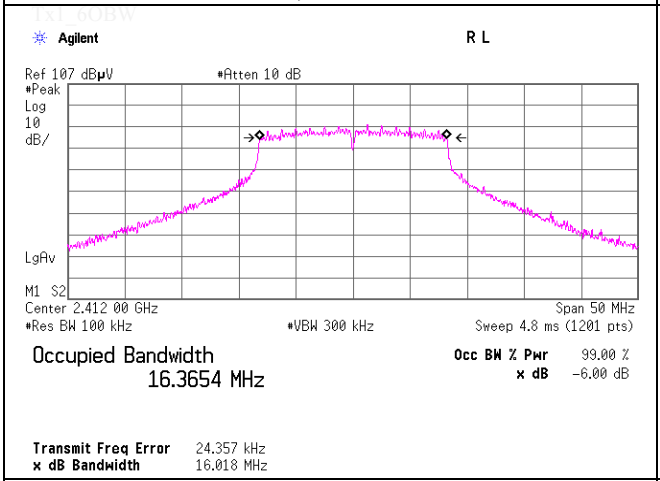


-6dB Bandwidth

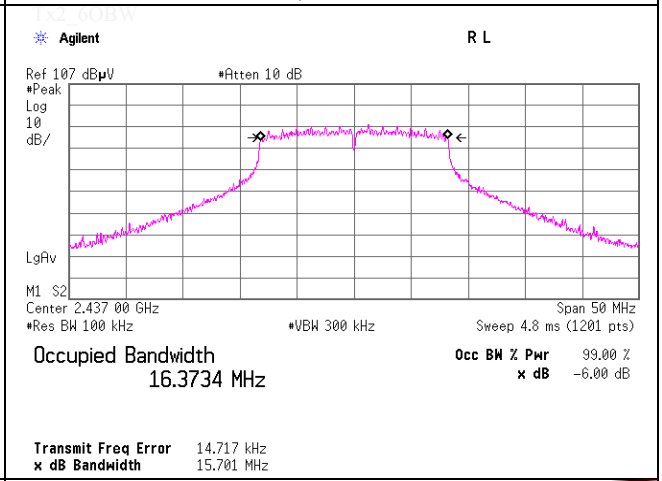
Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	March 11, 2014	
Temperature / Humidity	24deg.C , 39%RH	
Engineer	Tatsuya Arai	
Mode	Tx, IEEE802.11g, PN9, worst data mode 24Mbps	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	16.018	> 0.500
2437.0000	15.701	> 0.500
2462.0000	15.697	> 0.500

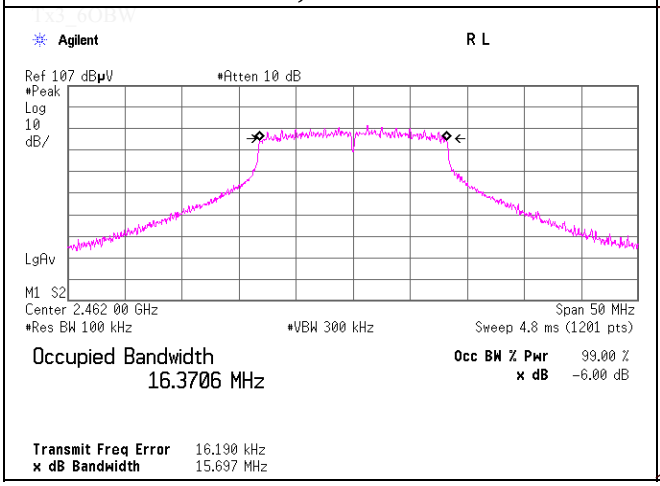
Tx, 2412MHz



Tx, 2437MHz



Tx, 2462MHz



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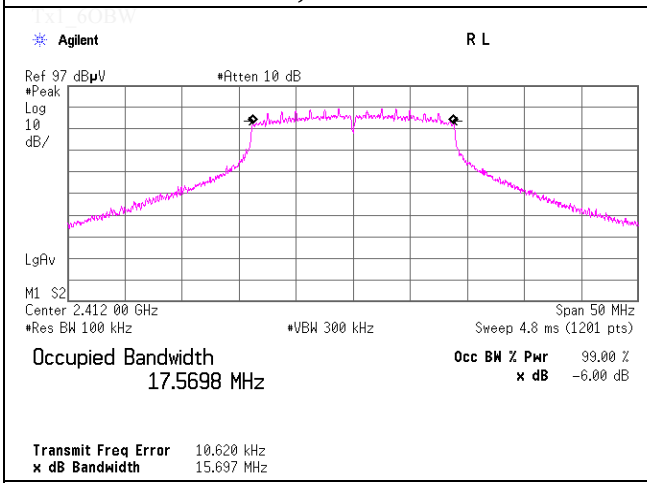
-6dB Bandwidth

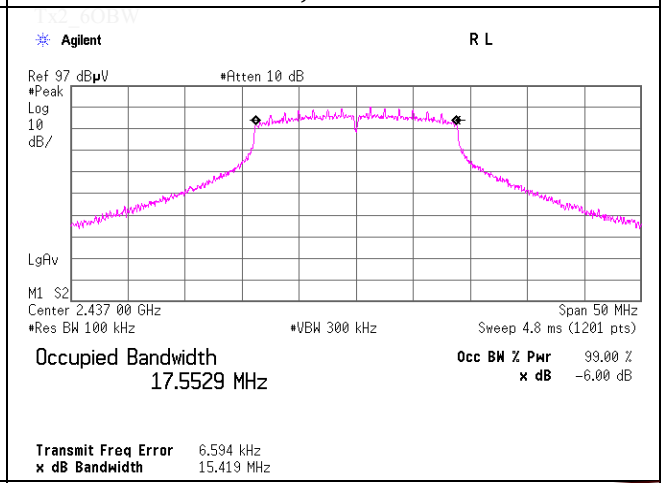
Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	March 11, 2014	
Temperature / Humidity	24deg.C , 39%RH	
Engineer	Tatsuya Arai	
Mode	Tx, IEEE802.11n-20HT, PN9, worst data mode 1(MCS)	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	15.697	> 0.500
2437.0000	15.419	> 0.500
2462.0000	15.709	> 0.500

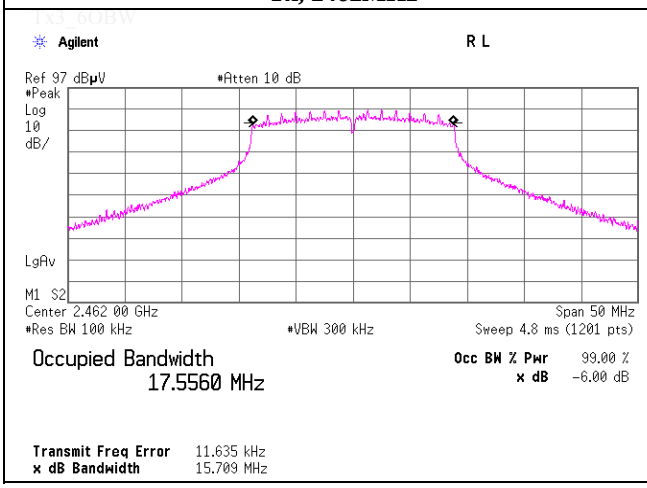
Tx, 2412MHz

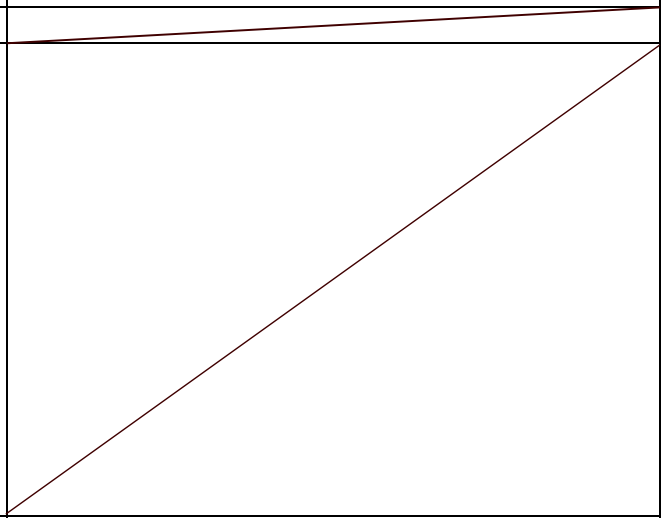


Tx, 2437MHz



Tx, 2462MHz





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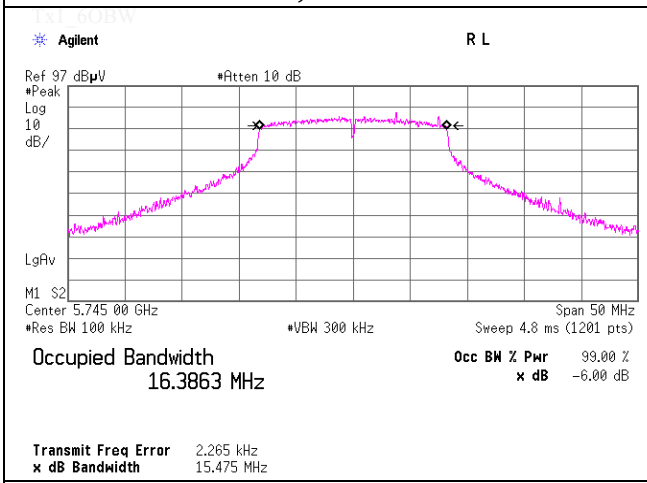
-6dB Bandwidth

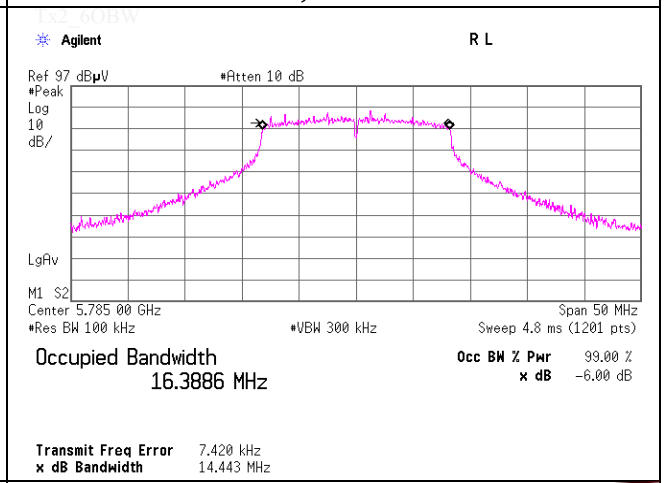
Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	March 11, 2014	
Temperature / Humidity	24deg.C , 39%RH	
Engineer	Tatsuya Arai	
Mode	Tx, IEEE802.11a, PN9, worst data mode 6Mbps	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
5745.0000	15.475	> 0.500
5785.0000	14.443	> 0.500
5825.0000	15.356	> 0.500

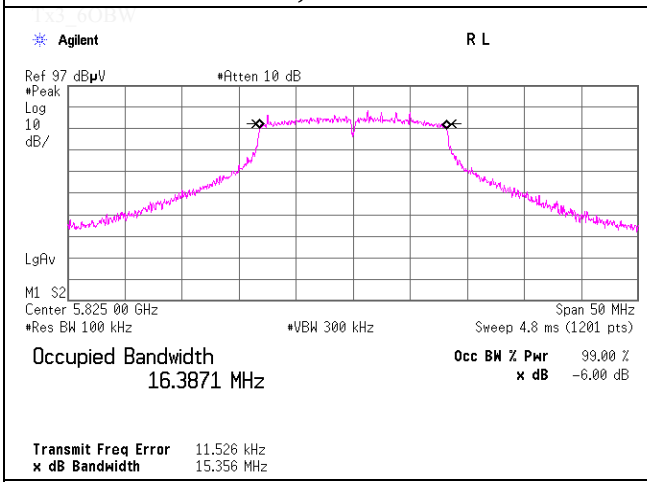
Tx, 5745MHz



Tx, 5785MHz



Tx, 5825MHz



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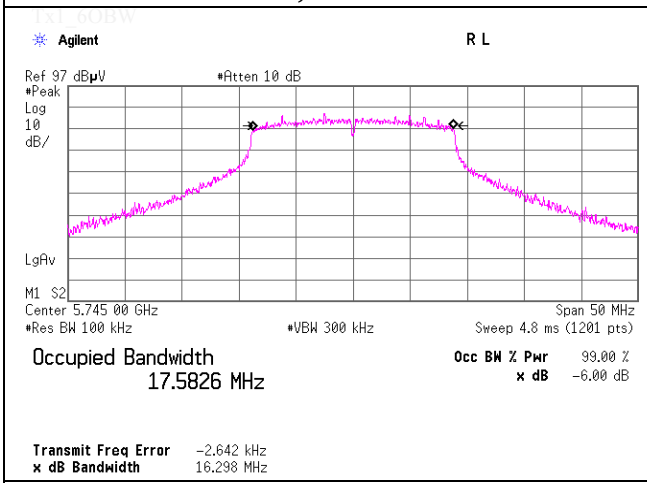
-6dB Bandwidth

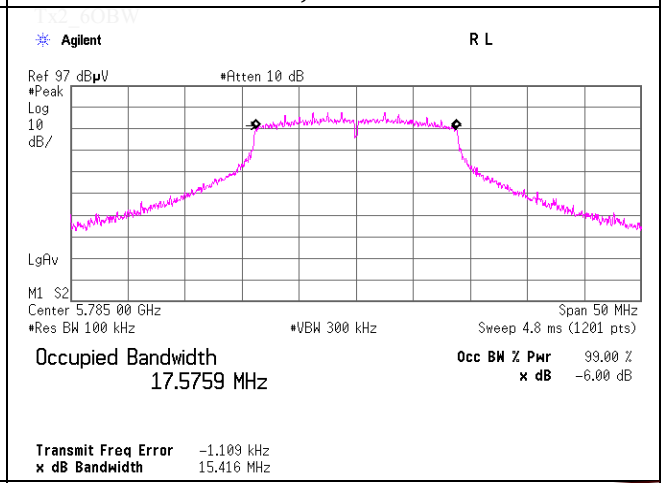
Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	March 11, 2014	
Temperature / Humidity	24deg.C , 39%RH	
Engineer	Tatsuya Arai	
Mode	Tx, IEEE802.11n-20HT, PN9, worst data mode 0(MCS)	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
5745.0000	16.298	> 0.500
5785.0000	15.416	> 0.500
5825.0000	15.309	> 0.500

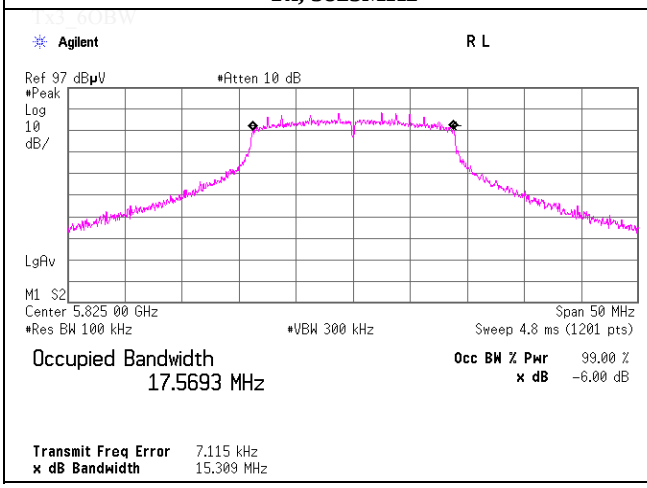
Tx, 5745MHz

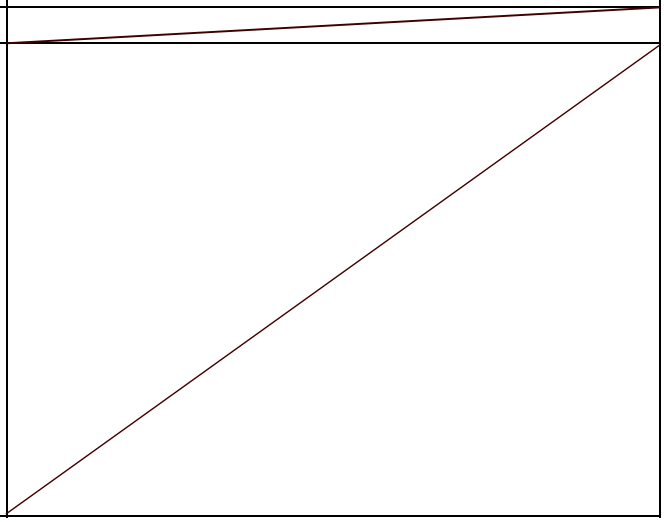


Tx, 5785MHz



Tx, 5825MHz





Maximum Peak Conducted Output Power

(PKPM1)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room	
Date	March 10, 2014		
Temperature / Humidity	24deg.C , 37%RH		
Engineer	Shinichi Takano		
Mode	Tx, IEEE802.11b, PN9,	worst data mode :	1 Mbps

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

Ch	Freq.	P/M (Peak) Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
Low	2412.0	-2.76	1.99	20.23	19.46	88.31	30.00	1000	10.54
Mid	2437.0	-2.62	1.99	20.23	19.60	91.20	30.00	1000	10.40
High	2462.0	-2.53	2.00	20.23	19.70	93.33	30.00	1000	10.30

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

[Pre check]

Data rate	Freq.	P/M (Peak) Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	
[Mbps]	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	
1	2412.0	-2.76	1.99	20.23	**19.46**	88.31	30.00	1000	**10.54**	**Worst**
2	2412.0	-2.79	1.99	20.23	19.43	87.70	30.00	1000	10.57	
5.5	2412.0	-3.05	1.99	20.23	19.17	82.60	30.00	1000	10.83	
11	2412.0	-3.08	1.99	20.23	19.14	82.04	30.00	1000	10.86	

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

Maximum Conducted Output Power (Reference data for SAR testing)

(AVGPM)

Test place	UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date	March 10, 2014
Temperature / Humidity	24deg.C , 37%RH
Engineer	Shinichi Takano
Mode	Tx, IEEE802.11b, PN9, worst data mode : 1 Mbps

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

Ch	Freq.	P/M (AV) Reading	Cable Loss	Atten. Loss	Duty Factor	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
Low	2412.0	-4.88	1.99	20.23	0.02	17.36	54.45	30.00	1000	12.64
Mid	2437.0	-4.76	1.99	20.23	0.02	17.48	55.98	30.00	1000	12.52
High	2462.0	-4.68	2.00	20.23	0.02	17.57	57.15	30.00	1000	12.43

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

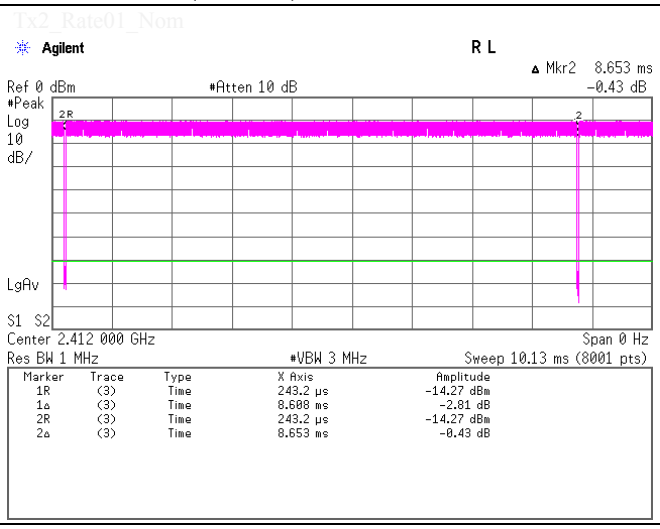
[Pre check]

	Data rate	Freq.	P/M (AV) Reading	Cable Loss	Atten. Loss	Duty Factor	Result		Limit		Margin	
	[Mbps]	[MHz]	[dBm]	[dB]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	
	1	2412.0	-4.88	1.99	20.23	0.02	**17.36**	54.45	30.00	1000	**12.64**	**Worst**
	2	2412.0	-4.96	1.99	20.23	0.04	17.30	53.70	30.00	1000	12.70	
	5.5	2412.0	-5.06	1.99	20.23	0.11	17.27	53.33	30.00	1000	12.73	
	11	2412.0	-5.11	1.99	20.23	0.21	17.32	53.95	30.00	1000	12.68	

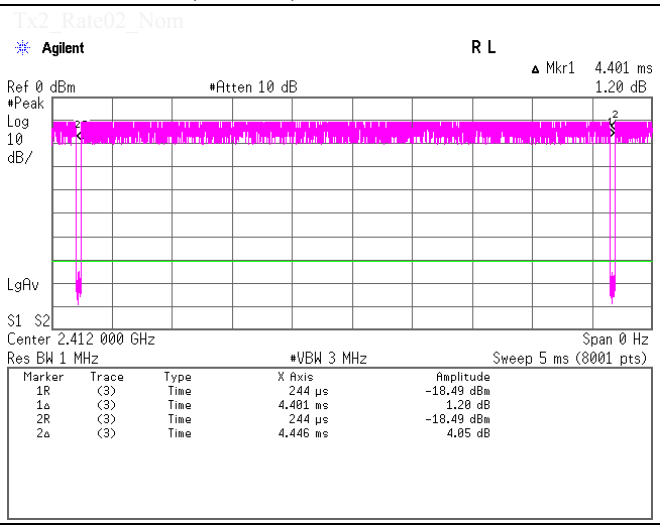
Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor

Duty Factor Caliculation chart for Maximum Conducted Output Power

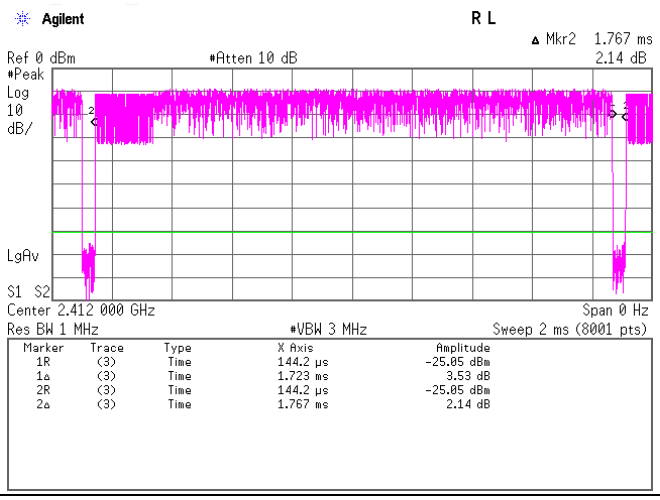
1[Mbps]: Duty Factor =10*log(1/x)= 0.02 dB
x:Ton/(Ton+Toff)= 8.61 / 8.65



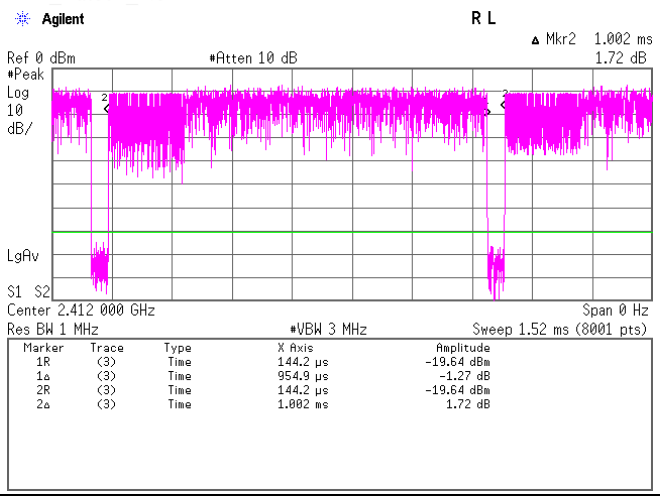
2[Mbps]: Duty Factor =10*log(1/x)= 0.04 dB
x:Ton/(Ton+Toff)= 4.40 / 4.45



5.5[Mbps]: Duty Factor =10*log(1/x)= 0.11 dB
x:Ton/(Ton+Toff)= 1.72 / 1.77



11[Mbps]: Duty Factor =10*log(1/x)= 0.21 dB
x:Ton/(Ton+Toff)= 0.95 / 1.00



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Maximum Peak Conducted Output Power

(PKPM1)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room	
Date	March 10, 2014		
Temperature / Humidity	24deg.C , 37%RH		
Engineer	Shinichi Takano		
Mode	Tx, IEEE802.11g, PN9,	worst data mode :	24 Mbps

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

Ch	Freq.	P/M (Peak) Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
Low	2412.0	1.22	1.99	20.23	23.44	220.80	30.00	1000	6.56
Mid	2437.0	1.32	1.99	20.23	23.54	225.94	30.00	1000	6.46
High	2462.0	1.35	2.00	20.23	23.58	228.03	30.00	1000	6.42

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

[Pre check]

	Data rate	Freq.	P/M (Peak) Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	
	[Mbps]	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	
	6	2412.0	1.12	1.99	20.23	23.34	215.77	30.00	1000	6.66	
	9	2412.0	1.07	1.99	20.23	23.29	213.30	30.00	1000	6.71	
	12	2412.0	0.86	1.99	20.23	23.08	203.24	30.00	1000	6.92	
	18	2412.0	0.84	1.99	20.23	23.06	202.30	30.00	1000	6.94	
	24	2412.0	1.22	1.99	20.23	**23.44**	220.80	30.00	1000	**6.56**	**Worst**
	36	2412.0	1.00	1.99	20.23	23.22	209.89	30.00	1000	6.78	
	48	2412.0	1.03	1.99	20.23	23.25	211.35	30.00	1000	6.75	
	54	2412.0	0.78	1.99	20.23	23.00	199.53	30.00	1000	7.00	

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

Maximum Conducted Output Power (Reference data for SAR testing)

(AVGPM)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room	
Date	March 10, 2014		
Temperature / Humidity	24deg.C , 37%RH		
Engineer	Shinichi Takano		
Mode	Tx, IEEE802.11g, PN9,	worst data mode :	24 Mbps

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

Ch	Freq.	P/M (AV) Reading	Cable Loss	Atten. Loss	Duty Factor	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
Low	2412.0	-9.18	1.99	20.23	0.55	13.59	22.86	30.00	1000	16.41
Mid	2437.0	-9.06	1.99	20.23	0.55	13.71	23.50	30.00	1000	16.29
High	2462.0	-8.94	2.00	20.23	0.55	13.84	24.21	30.00	1000	16.16

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

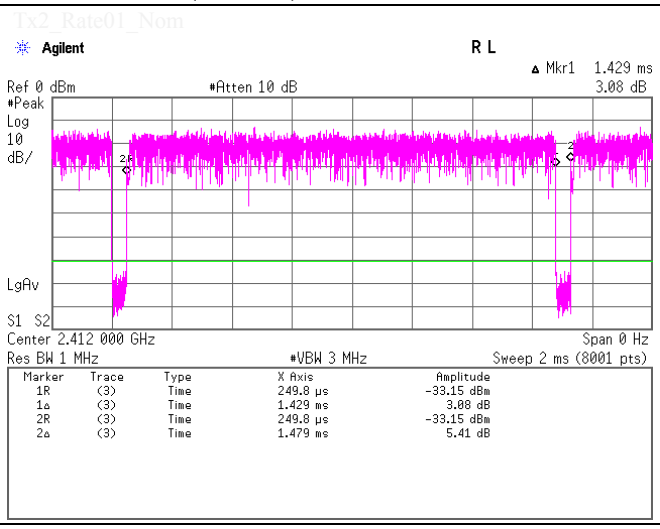
[Pre check]

	Data rate	Freq.	P/M (AV) Reading	Cable Loss	Atten. Loss	Duty Factor	Result		Limit		Margin	
	[Mbps]	[MHz]	[dBm]	[dB]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	
	6	2412.0	-8.86	1.99	20.23	0.15	13.51	22.44	30.00	1000	16.49	
	9	2412.0	-8.93	1.99	20.23	0.22	13.51	22.44	30.00	1000	16.49	
	12	2412.0	-9.02	1.99	20.23	0.29	13.49	22.34	30.00	1000	16.51	
	18	2412.0	-9.16	1.99	20.23	0.42	13.48	22.28	30.00	1000	16.52	
	24	2412.0	-9.18	1.99	20.23	0.55	**13.59**	22.86	30.00	1000	**16.41**	**Worst**
	36	2412.0	-9.44	1.99	20.23	0.79	13.57	22.75	30.00	1000	16.43	
	48	2412.0	-9.68	1.99	20.23	1.00	13.54	22.59	30.00	1000	16.46	
	54	2412.0	-9.76	1.99	20.23	1.08	13.54	22.59	30.00	1000	16.46	

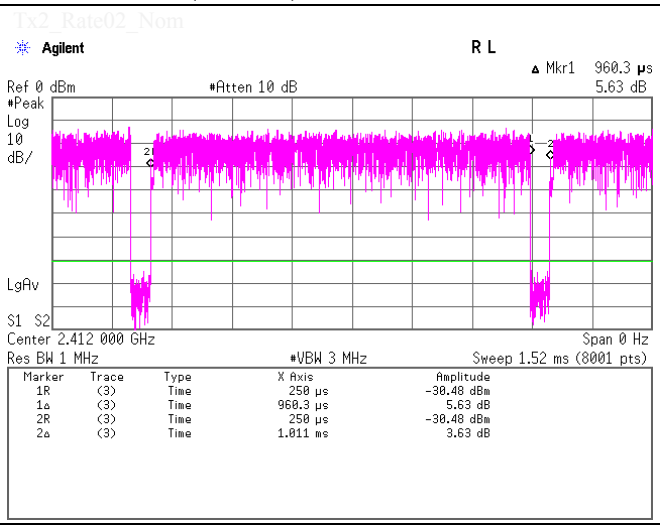
Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor

Duty Factor Caliculation chart for Maximum Conducted Output Power

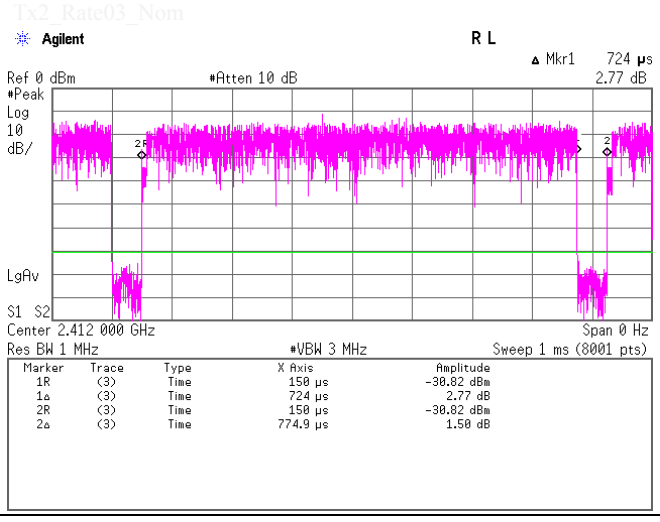
6[Mbps]: Duty Factor =10*log(1/x)= 0.15 dB
x:Ton/(Ton+Toff)= 1.43 / 1.48



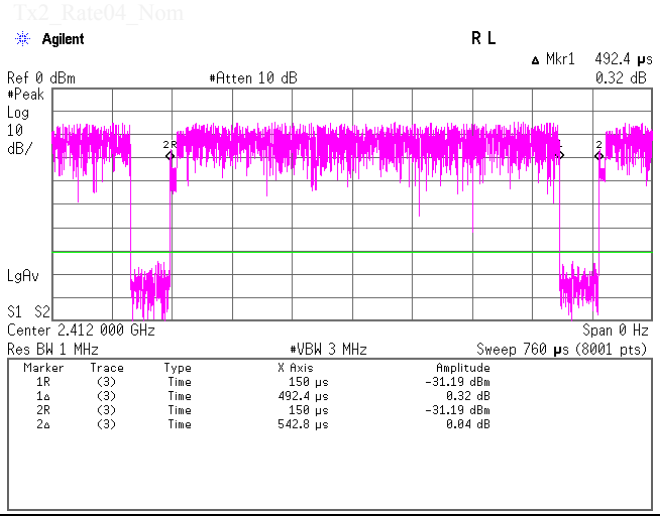
9[Mbps]: Duty Factor =10*log(1/x)= 0.22 dB
x:Ton/(Ton+Toff)= 0.96 / 1.01



12[Mbps]: Duty Factor =10*log(1/x)= 0.29 dB
x:Ton/(Ton+Toff)= 0.72 / 0.77



18[Mbps]: Duty Factor =10*log(1/x)= 0.42 dB
x:Ton/(Ton+Toff)= 0.49 / 0.54



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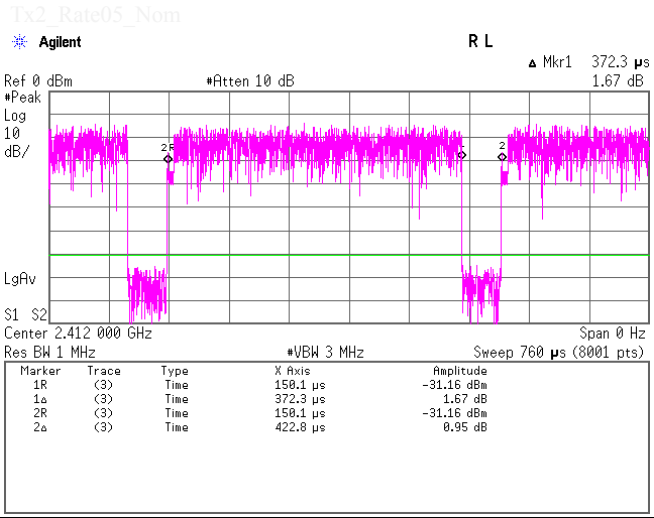
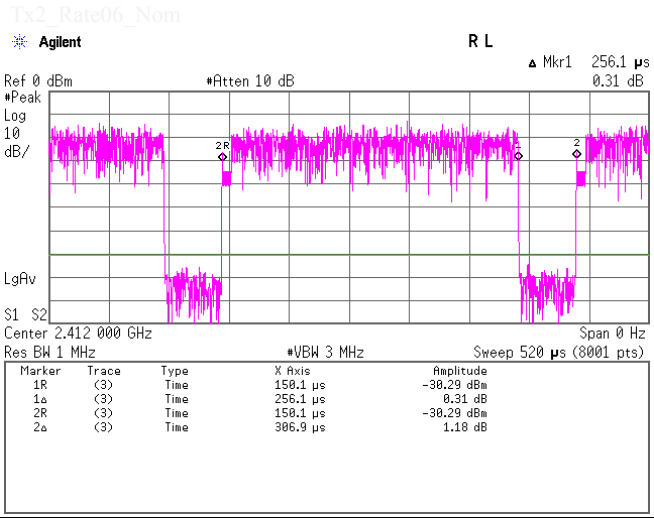
Duty Factor Caliculation chart for Maximum Conducted Output Power

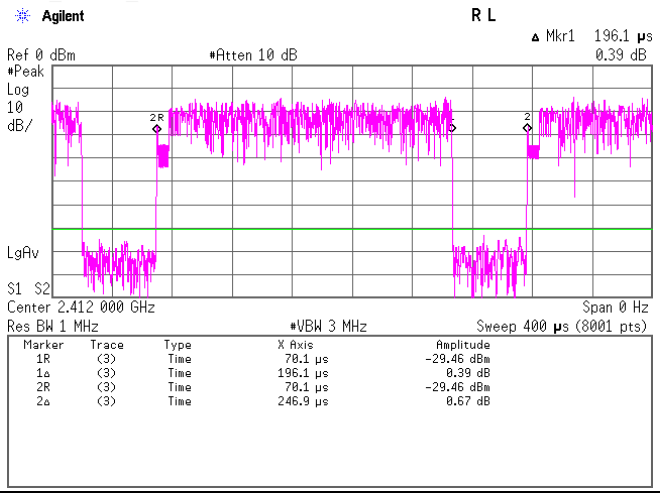
24[Mbps]: Duty Factor =10*log(1/x)= 0.55 dB
x:Ton/(Ton+Toff)= 0.37 / 0.42



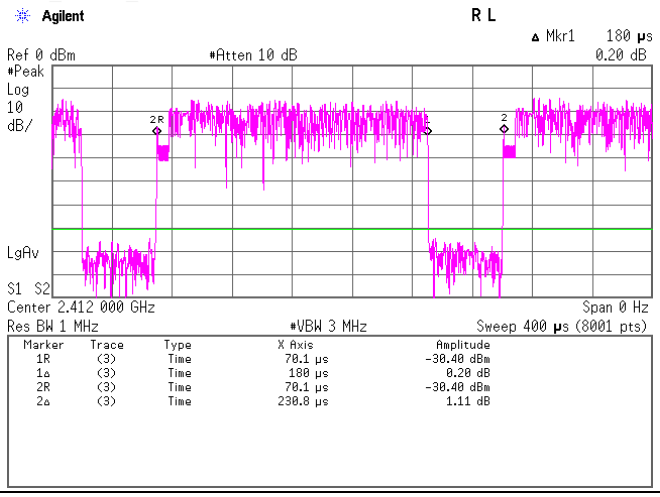
36[Mbps]: Duty Factor =10*log(1/x)= 0.79 dB
x:Ton/(Ton+Toff)= 0.26 / 0.31



48[Mbps]: Duty Factor =10*log(1/x)= 1 dB
x:Ton/(Ton+Toff)= 0.20 / 0.25



54[Mbps]: Duty Factor =10*log(1/x)= 1.08 dB
x:Ton/(Ton+Toff)= 0.18 / 0.23



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Maximum Peak Conducted Output Power

(PKPM1)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room	
Date	March 10, 2014		
Temperature / Humidity	24deg.C , 37%RH		
Engineer	Shinichi Takano		
Mode	Tx, IEEE802.11n-20HT, PN9,	worst data mode :	1 (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	1.03	1.99	20.23	23.25	211.35	30.00	1000	6.75
Mid	2437.0	1.15	1.99	20.23	23.37	217.27	30.00	1000	6.63
High	2462.0	1.05	2.00	20.23	23.28	212.81	30.00	1000	6.72

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

[Pre check]
Long Guard Interval

	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]	
	0	2412.0	0.79	1.99	20.23	23.01	199.99	30.00	1000	6.99	
	1	2412.0	1.03	1.99	20.23	**23.25**	211.35	30.00	1000	**6.75**	**Worst**
	2	2412.0	0.56	1.99	20.23	22.78	189.67	30.00	1000	7.22	
	3	2412.0	0.58	1.99	20.23	22.80	190.55	30.00	1000	7.20	
	4	2412.0	0.60	1.99	20.23	22.82	191.43	30.00	1000	7.18	
	5	2412.0	0.91	1.99	20.23	23.13	205.59	30.00	1000	6.87	
	6	2412.0	0.42	1.99	20.23	22.64	183.65	30.00	1000	7.36	
	7	2412.0	0.47	1.99	20.23	22.69	185.78	30.00	1000	7.31	

Short Guard Interval

	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]
	0	2412.0	0.65	1.99	20.23	22.87	193.64	30.00	1000	7.13
	1	2412.0	0.95	1.99	20.23	23.17	207.49	30.00	1000	6.83
	2	2412.0	0.53	1.99	20.23	22.75	188.36	30.00	1000	7.25
	3	2412.0	0.49	1.99	20.23	22.71	186.64	30.00	1000	7.29
	4	2412.0	0.57	1.99	20.23	22.79	190.11	30.00	1000	7.21
	5	2412.0	0.98	1.99	20.23	23.20	208.93	30.00	1000	6.80
	6	2412.0	0.49	1.99	20.23	22.71	186.64	30.00	1000	7.29
	7	2412.0	0.22	1.99	20.23	22.44	175.39	30.00	1000	7.56

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

Maximum Conducted Output Power (Reference data for SAR testing)

(AVGPM)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room	
Date	March 10, 2014		
Temperature / Humidity	24deg.C , 37%RH		
Engineer	Shinichi Takano		
Mode	Tx, IEEE802.11n-20HT, PN9,	worst data mode :	7 (MCS)

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

Ch	Freq.	P/M (AV) Reading	Cable Loss	Atten. Loss	Duty Factor	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
Low	2412.0	-10.71	1.99	20.23	1.13	12.64	18.37	30.00	1000	17.36
Mid	2437.0	-10.54	1.99	20.23	1.13	12.81	19.10	30.00	1000	17.19
High	2462.0	-10.49	2.00	20.23	1.13	12.87	19.36	30.00	1000	17.13

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

[Pre check]

Long Guard Interval

	Mode	Freq.	P/M (AV) Reading	Cable Loss	Atten. Loss	Duty Factor	Result		Limit		Margin	
	(MCS)	[MHz]	[dBm]	[dB]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	
	0	2412.0	-9.86	1.99	20.23	0.16	12.52	17.86	30.00	1000	17.48	
	1	2412.0	-10.07	1.99	20.23	0.31	12.46	17.62	30.00	1000	17.54	
	2	2412.0	-10.18	1.99	20.23	0.44	12.48	17.70	30.00	1000	17.52	
	3	2412.0	-10.21	1.99	20.23	0.56	12.57	18.07	30.00	1000	17.43	
	4	2412.0	-10.45	1.99	20.23	0.78	12.55	17.99	30.00	1000	17.45	
	5	2412.0	-10.68	1.99	20.23	0.98	12.52	17.86	30.00	1000	17.48	
	6	2412.0	-10.75	1.99	20.23	1.05	12.52	17.86	30.00	1000	17.48	
	7	2412.0	-10.71	1.99	20.23	1.13	**12.64**	18.37	30.00	1000	**17.36**	**Worst**

Short Guard Interval

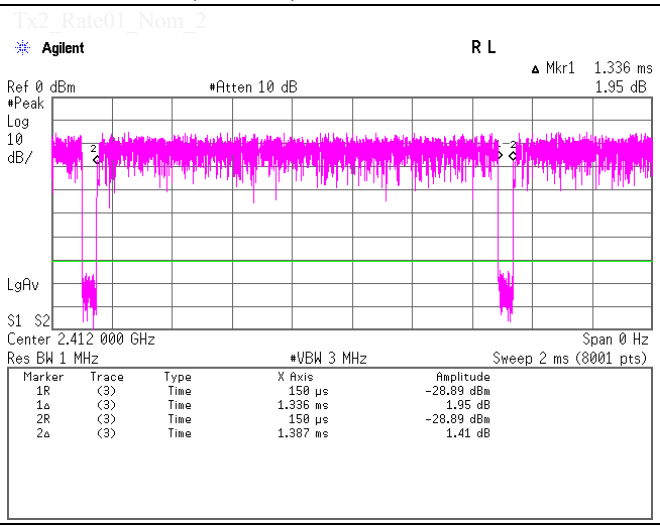
	Mode	Freq.	P/M (AV) Reading	Cable Loss	Atten. Loss	Duty Factor	Result		Limit		Margin
	(MCS)	[MHz]	[dBm]	[dB]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
	0	2412.0	-9.92	1.99	20.23	0.18	12.48	17.70	30.00	1000	17.52
	1	2412.0	-10.04	1.99	20.23	0.34	12.52	17.86	30.00	1000	17.48
	2	2412.0	-10.23	1.99	20.23	0.48	12.47	17.66	30.00	1000	17.53
	3	2412.0	-10.32	1.99	20.23	0.64	12.54	17.95	30.00	1000	17.46
	4	2412.0	-10.52	1.99	20.23	0.85	12.55	17.99	30.00	1000	17.45
	5	2412.0	-10.73	1.99	20.23	1.06	12.55	17.99	30.00	1000	17.45
	6	2412.0	-10.82	1.99	20.23	1.14	12.54	17.95	30.00	1000	17.46
	7	2412.0	-10.83	1.99	20.23	1.23	12.62	18.28	30.00	1000	17.38

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

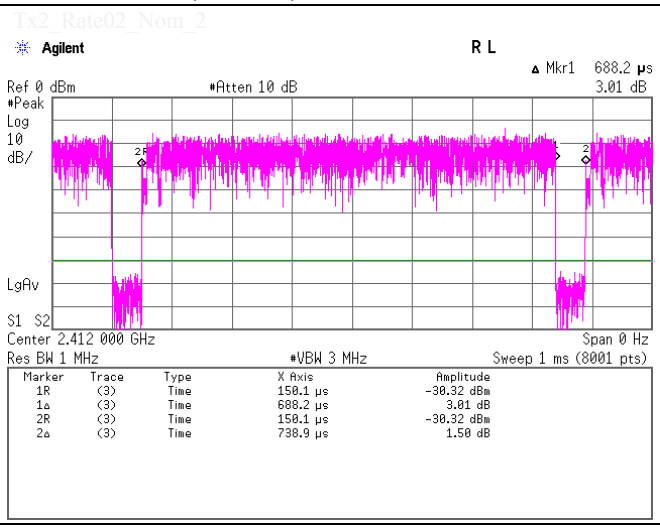
Duty Factor Caliculation chart for Maximum Conducted Output Power

Long Guard Interval

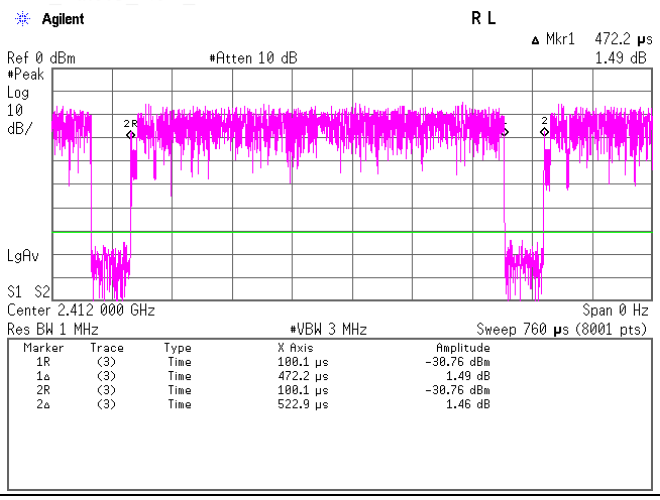
0(MCS): Duty Factor =10*log(1/x)= 0.16 dB
x:Ton/(Ton+Toff)= 1.34 / 1.39



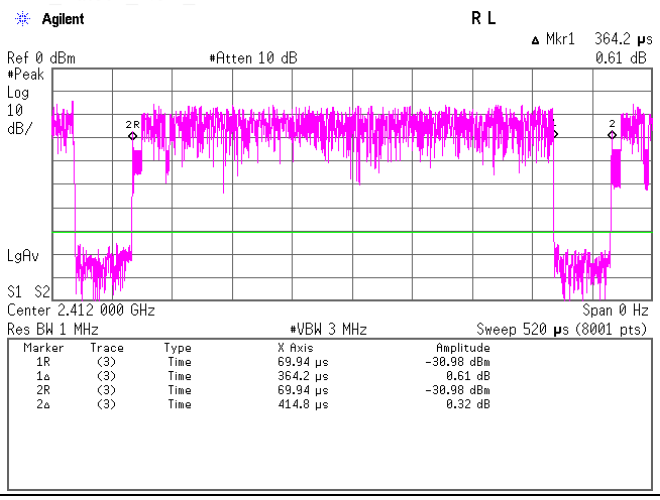
1(MCS): Duty Factor =10*log(1/x)= 0.31 dB
x:Ton/(Ton+Toff)= 0.69 / 0.74



2(MCS): Duty Factor =10*log(1/x)= 0.44 dB
x:Ton/(Ton+Toff)= 0.47 / 0.52



3(MCS): Duty Factor =10*log(1/x)= 0.56 dB
x:Ton/(Ton+Toff)= 0.36 / 0.41



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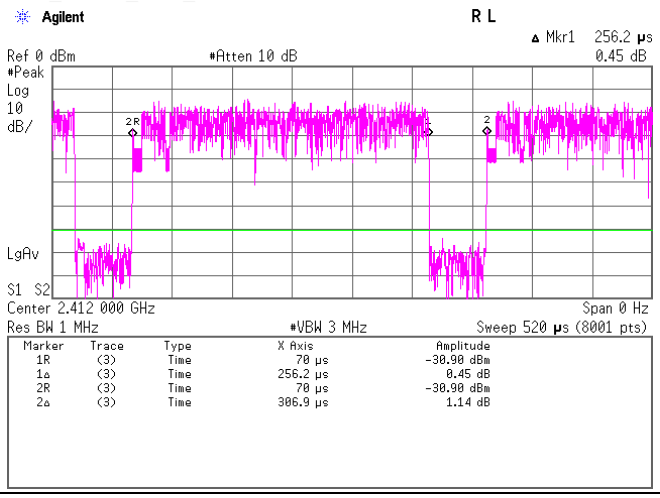
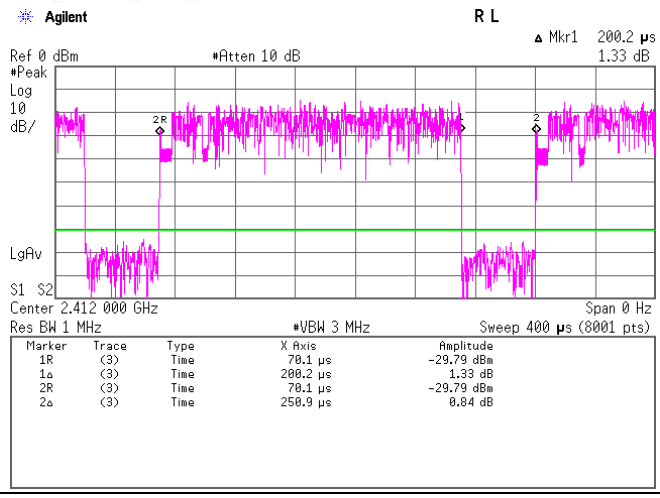
Duty Factor Caliculation chart for Maximum Conducted Output Power

Long Guard Interval

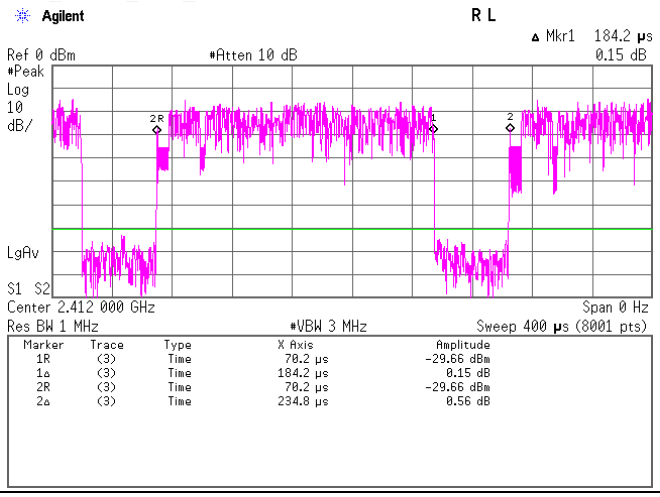
4(MCS): Duty Factor =10*log(1/x)= 0.78 dB
x:Ton/(Ton+Toff)= 0.26 / 0.31



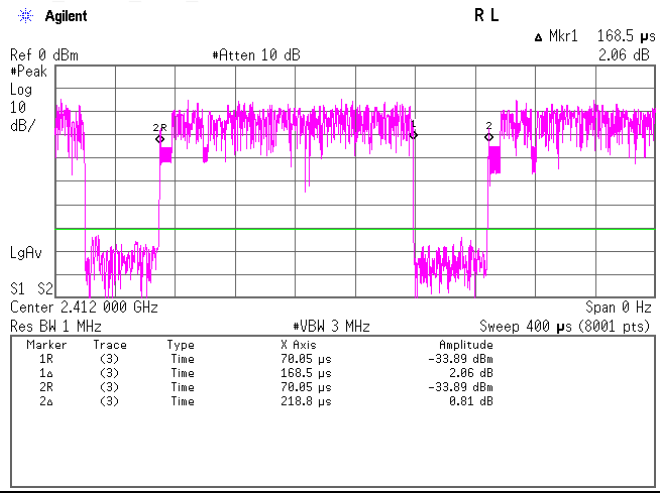
5(MCS): Duty Factor =10*log(1/x)= 0.98 dB
x:Ton/(Ton+Toff)= 0.20 / 0.25



6(MCS): Duty Factor =10*log(1/x)= 1.05 dB
x:Ton/(Ton+Toff)= 0.18 / 0.23



7(MCS): Duty Factor =10*log(1/x)= 1.13 dB
x:Ton/(Ton+Toff)= 0.17 / 0.22



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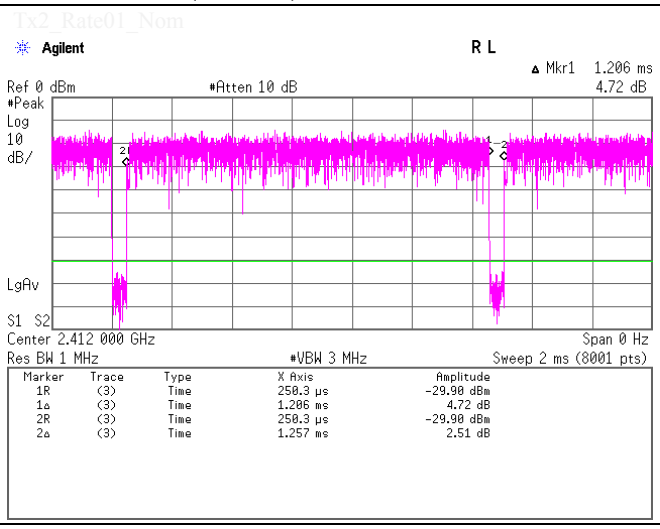
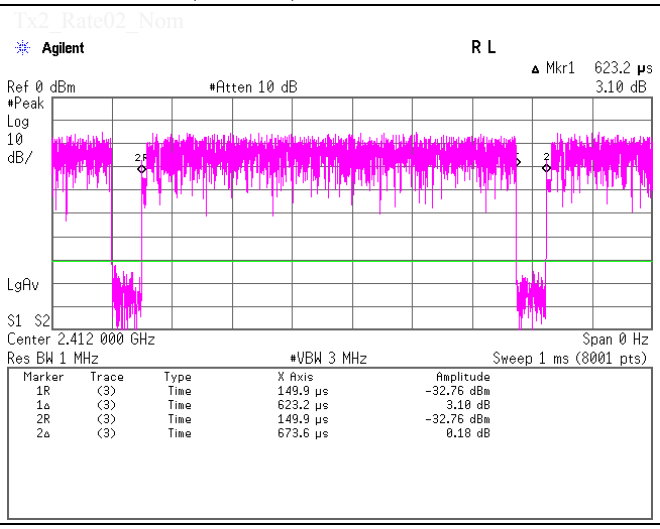
Duty Factor Caliculation chart for Maximum Conducted Output Power

Short Guard Interval

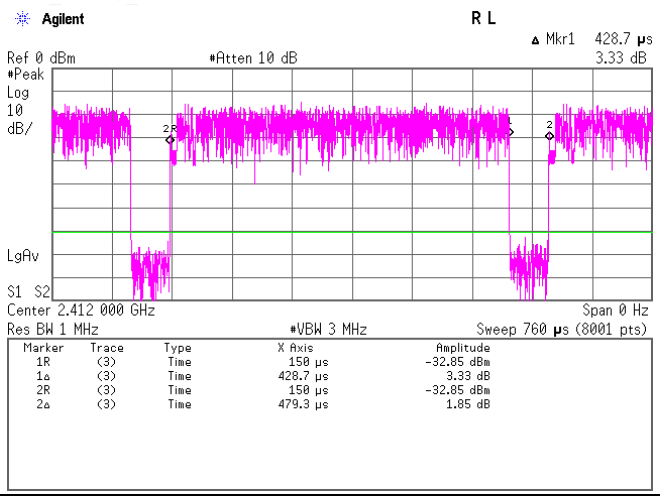
0(MCS): Duty Factor =10*log(1/x)= 0.18 dB
x:Ton/(Ton+Toff)= 1.21 / 1.26



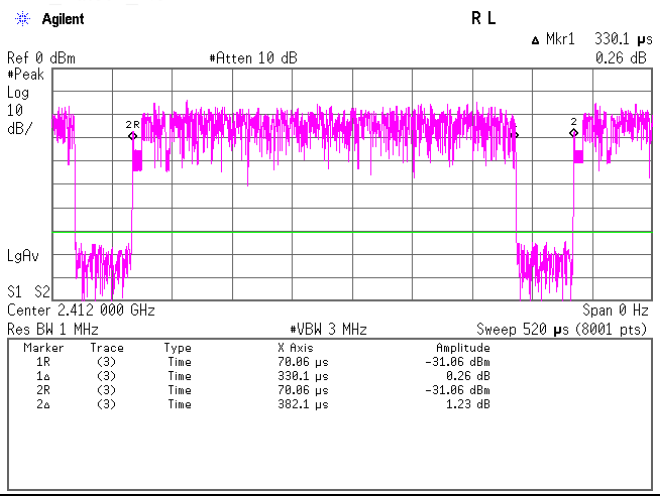
1(MCS): Duty Factor =10*log(1/x)= 0.34 dB
x:Ton/(Ton+Toff)= 0.62 / 0.67



2(MCS): Duty Factor =10*log(1/x)= 0.48 dB
x:Ton/(Ton+Toff)= 0.43 / 0.48



3(MCS): Duty Factor =10*log(1/x)= 0.64 dB
x:Ton/(Ton+Toff)= 0.33 / 0.38



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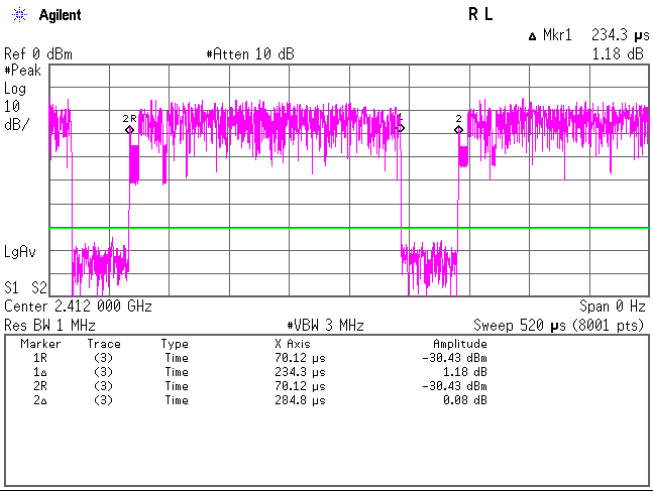
Duty Factor Caliculation chart for Maximum Conducted Output Power

Short Guard Interval

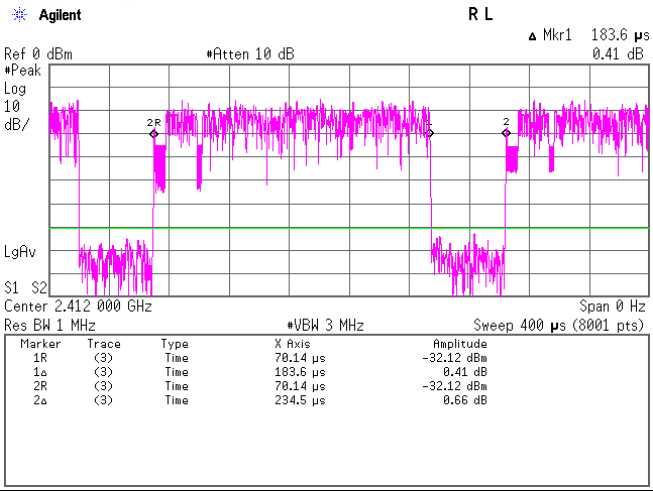
4(MCS): Duty Factor =10*log(1/x)= 0.85 dB
x:Ton/(Ton+Toff)= 0.23 / 0.28

Tx2_Rate05_Nom



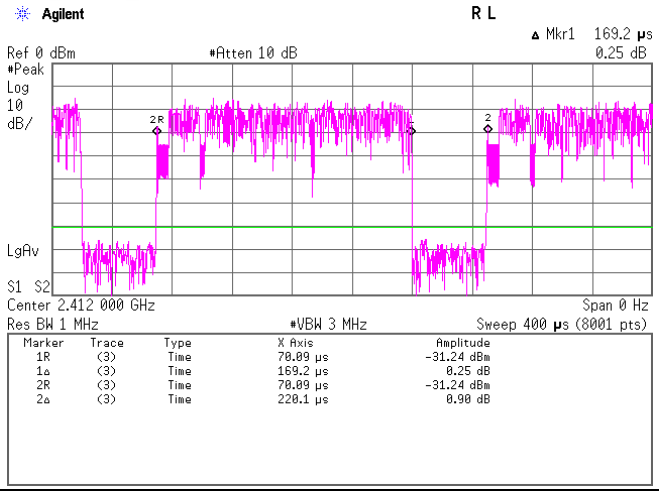
5(MCS): Duty Factor =10*log(1/x)= 1.06 dB
x:Ton/(Ton+Toff)= 0.18 / 0.23

Tx2_Rate06_Nom



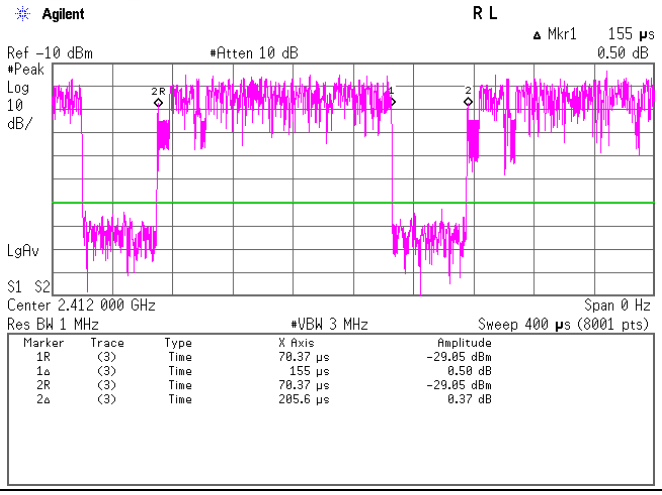
6(MCS): Duty Factor =10*log(1/x)= 1.14 dB
x:Ton/(Ton+Toff)= 0.17 / 0.22

Tx2_Rate07_Nom



7(MCS): Duty Factor =10*log(1/x)= 1.23 dB
x:Ton/(Ton+Toff)= 0.16 / 0.21

Tx2_Rate08_Nom



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Maximum Peak Conducted Output Power

(PKPM1)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room	
Date	March 10, 2014		
Temperature / Humidity	24deg.C , 37%RH		
Engineer	Shinichi Takano		
Mode	Tx, IEEE802.11a, PN9,	worst data mode :	6 Mbps

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

Ch	Freq.	P/M (Peak) Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
Low	5745.0	-1.48	3.48	20.25	22.25	167.88	30.00	1000	7.75
Mid	5785.0	-1.54	3.48	20.24	22.18	165.20	30.00	1000	7.82
High	5825.0	-1.56	3.48	20.24	22.16	164.44	30.00	1000	7.84

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

[Pre check]

	Data rate	Freq.	P/M (Peak) Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	
	[Mbps]	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	
	6	5745.0	-1.48	3.48	20.25	**22.25**	167.88	30.00	1000	**7.75**	**Worst**
	9	5745.0	-1.53	3.48	20.25	22.20	165.96	30.00	1000	7.80	
	12	5745.0	-1.59	3.48	20.25	22.14	163.68	30.00	1000	7.86	
	18	5745.0	-1.63	3.48	20.25	22.10	162.18	30.00	1000	7.90	
	24	5745.0	-1.54	3.48	20.25	22.19	165.58	30.00	1000	7.81	
	36	5745.0	-1.52	3.48	20.25	22.21	166.34	30.00	1000	7.79	
	48	5745.0	-1.56	3.48	20.25	22.17	164.82	30.00	1000	7.83	
	54	5745.0	-1.59	3.48	20.25	22.14	163.68	30.00	1000	7.86	

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

Maximum Conducted Output Power (Reference data for SAR testing)

(AVGPM)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room	
Date	March 10, 2014		
Temperature / Humidity	24deg.C , 37%RH		
Engineer	Shinichi Takano		
Mode	Tx, IEEE802.11a, PN9,	worst data mode :	18 Mbps

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

Ch	Freq.	P/M (AV) Reading	Cable Loss	Atten. Loss	Duty Factor	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
Low	5745.0	-10.57	3.48	20.25	0.43	13.59	22.86	30.00	1000	16.41
Mid	5785.0	-10.65	3.48	20.24	0.43	13.50	22.39	30.00	1000	16.50
High	5825.0	-10.71	3.48	20.24	0.43	13.44	22.08	30.00	1000	16.56

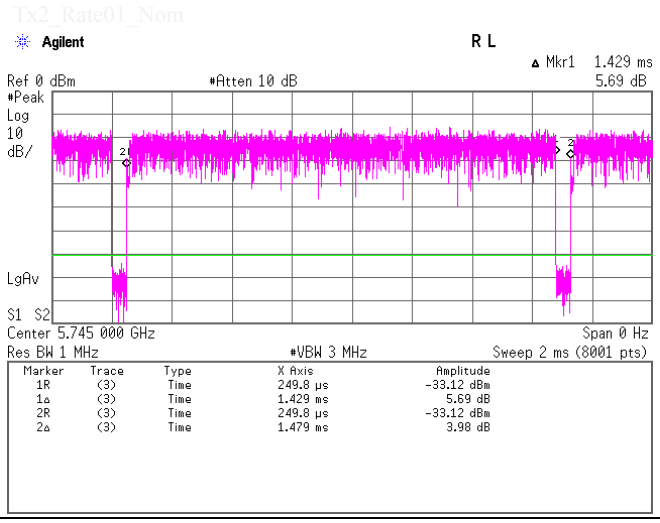
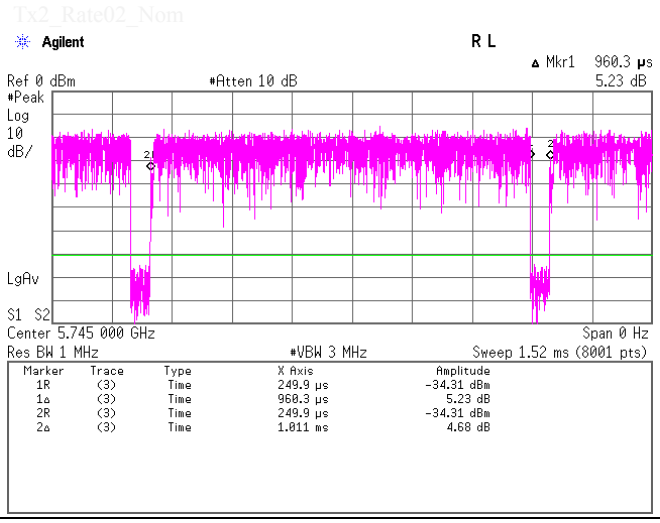
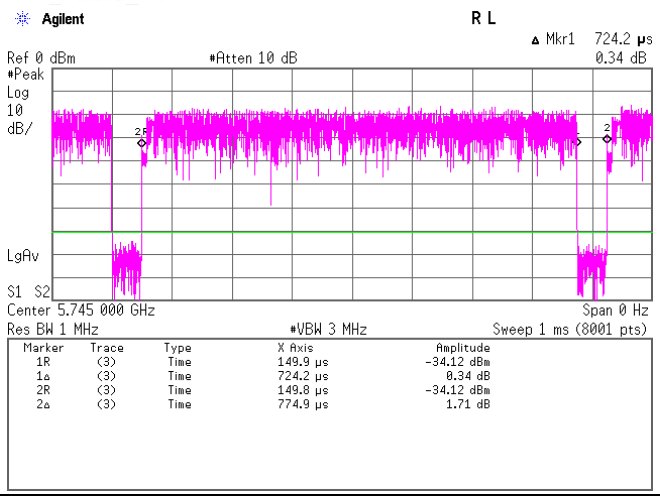
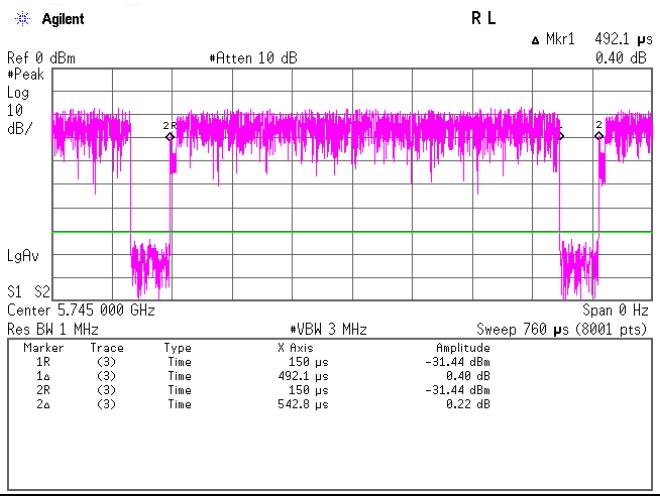
Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor

[Pre check]

	Data rate	Freq.	P/M (AV) Reading	Cable Loss	Atten. Loss	Duty Factor	Result		Limit		Margin	
	[Mbps]	[MHz]	[dBm]	[dB]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	
	6	5745.0	-10.32	3.48	20.25	0.15	13.56	22.70	30.00	1000	16.44	
	9	5745.0	-10.40	3.48	20.25	0.22	13.55	22.65	30.00	1000	16.45	
	12	5745.0	-10.46	3.48	20.25	0.29	13.56	22.70	30.00	1000	16.44	
	18	5745.0	-10.57	3.48	20.25	0.43	**13.59**	22.86	30.00	1000	**16.41**	**Worst**
	24	5745.0	-10.73	3.48	20.25	0.55	13.55	22.65	30.00	1000	16.45	
	36	5745.0	-10.93	3.48	20.25	0.78	13.58	22.80	30.00	1000	16.42	
	48	5745.0	-11.23	3.48	20.25	1.00	13.50	22.39	30.00	1000	16.50	
	54	5745.0	-11.24	3.48	20.25	1.08	13.57	22.75	30.00	1000	16.43	

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

Duty Factor Caliculation chart for Maximum Conducted Output Power

6[Mbps]: Duty Factor =10*log(1/x)= 0.15 dB **x:Ton/(Ton+Toff)= 1.43 / 1.48**	**9[Mbps]: Duty Factor =10*log(1/x)= 0.22 dB** **x:Ton/(Ton+Toff)= 0.96 / 1.01**
	
12[Mbps]: Duty Factor =10*log(1/x)= 0.29 dB **x:Ton/(Ton+Toff)= 0.72 / 0.77**	**18[Mbps]: Duty Factor =10*log(1/x)= 0.43 dB** **x:Ton/(Ton+Toff)= 0.49 / 0.54**
	

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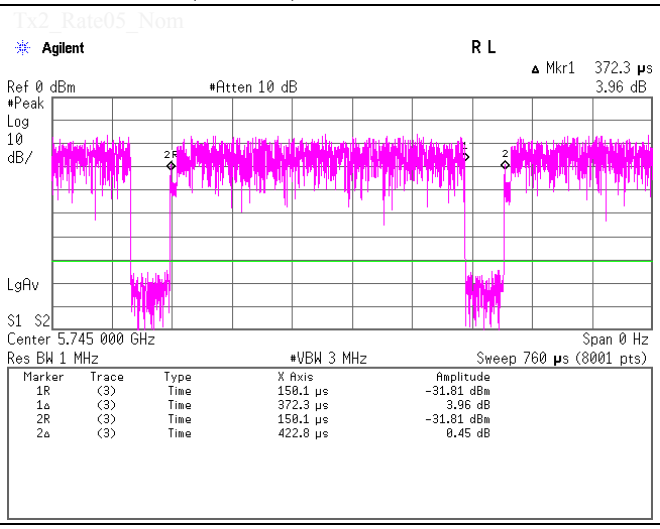
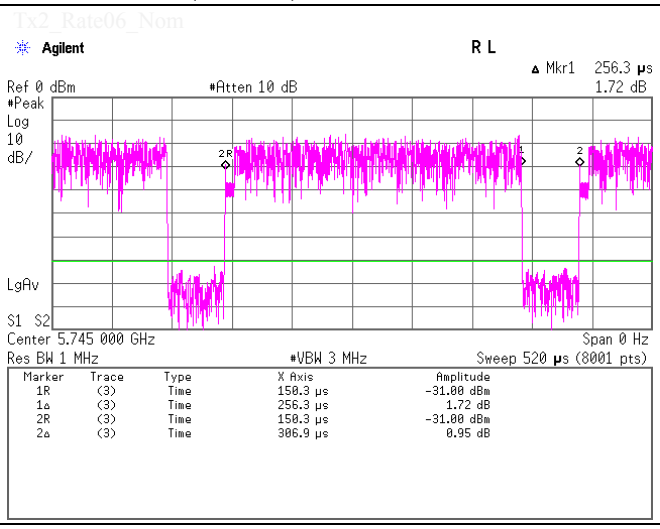
Duty Factor Caliculation chart for Maximum Conducted Output Power

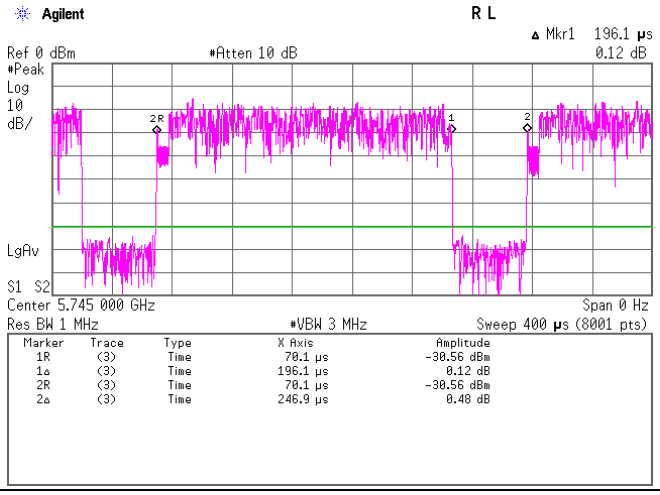
24[Mbps]: Duty Factor =10*log(1/x)= 0.55 dB
x:Ton/(Ton+Toff)= 0.37 / 0.42



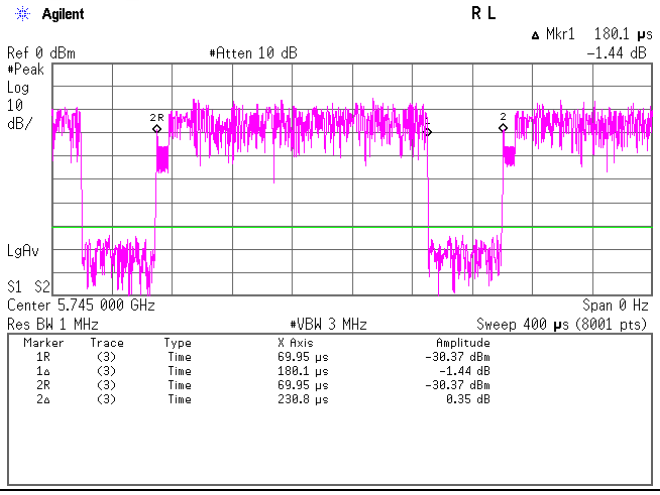
36[Mbps]: Duty Factor =10*log(1/x)= 0.78 dB
x:Ton/(Ton+Toff)= 0.26 / 0.31



48[Mbps]: Duty Factor =10*log(1/x)= 1 dB
x:Ton/(Ton+Toff)= 0.20 / 0.25



54[Mbps]: Duty Factor =10*log(1/x)= 1.08 dB
x:Ton/(Ton+Toff)= 0.18 / 0.23



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Maximum Peak Conducted Output Power

(PKPM1)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room	
Date	March 10, 2014		
Temperature / Humidity	24deg.C , 37%RH		
Engineer	Shinichi Takano		
Mode	Tx, IEEE802.11n-20HT, PN9,	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	5745.0	-1.45	3.48	20.25	22.28	169.04	30.00	1000	7.72
Mid	5785.0	-1.55	3.48	20.24	22.17	164.82	30.00	1000	7.83
High	5825.0	-1.61	3.48	20.24	22.11	162.55	30.00	1000	7.89

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

[Pre check]
Long Guard Interval

	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]	
	0	5745.0	-1.45	3.48	20.25	**22.28**	169.04	30.00	1000	**7.72**	**Worst**
	1	5745.0	-1.48	3.48	20.25	22.25	167.88	30.00	1000	7.75	
	2	5745.0	-1.54	3.48	20.25	22.19	165.58	30.00	1000	7.81	
	3	5745.0	-1.56	3.48	20.25	22.17	164.82	30.00	1000	7.83	
	4	5745.0	-1.56	3.48	20.25	22.17	164.82	30.00	1000	7.83	
	5	5745.0	-1.53	3.48	20.25	22.20	165.96	30.00	1000	7.80	
	6	5745.0	-1.60	3.48	20.25	22.13	163.31	30.00	1000	7.87	
	7	5745.0	-1.67	3.48	20.25	22.06	160.69	30.00	1000	7.94	

Short Guard Interval

	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]
	0	5745.0	-1.57	3.48	20.25	22.16	164.44	30.00	1000	7.84
	1	5745.0	-1.53	3.48	20.25	22.20	165.96	30.00	1000	7.80
	2	5745.0	-1.56	3.48	20.25	22.17	164.82	30.00	1000	7.83
	3	5745.0	-1.59	3.48	20.25	22.14	163.68	30.00	1000	7.86
	4	5745.0	-1.64	3.48	20.25	22.09	161.81	30.00	1000	7.91
	5	5745.0	-1.47	3.48	20.25	22.26	168.27	30.00	1000	7.74
	6	5745.0	-1.71	3.48	20.25	22.02	159.22	30.00	1000	7.98
	7	5745.0	-1.67	3.48	20.25	22.06	160.69	30.00	1000	7.94

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

Maximum Conducted Output Power (Reference data for SAR testing)

(AVGPM)

Test place	UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date	March 10, 2014
Temperature / Humidity	24deg.C , 37%RH
Engineer	Shinichi Takano
Mode	Tx, IEEE802.11n-20HT, PN9, worst data mode : 7 (MCS)

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

Ch	Freq.	P/M (AV) Reading	Cable Loss	Atten. Loss	Duty Factor	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
Low	5745.0	-11.36	3.48	20.25	1.14	13.51	22.44	30.00	1000	16.49
Mid	5785.0	-11.38	3.48	20.24	1.14	13.48	22.28	30.00	1000	16.52
High	5825.0	-11.47	3.48	20.24	1.14	13.39	21.83	30.00	1000	16.61

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

[Pre check]

Long Guard Interval

	Mode	Freq.	P/M (AV) Reading	Cable Loss	Atten. Loss	Duty Factor	Result		Limit		Margin	
	(MCS)	[MHz]	[dBm]	[dB]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	
	0	5745.0	-10.44	3.48	20.25	0.16	13.45	22.13	30.00	1000	16.55	
	1	5745.0	-10.59	3.48	20.25	0.31	13.45	22.13	30.00	1000	16.55	
	2	5745.0	-10.74	3.48	20.25	0.45	13.44	22.08	30.00	1000	16.56	
	3	5745.0	-10.85	3.48	20.25	0.56	13.44	22.08	30.00	1000	16.56	
	4	5745.0	-11.06	3.48	20.25	0.78	13.45	22.13	30.00	1000	16.55	
	5	5745.0	-11.25	3.48	20.25	0.98	13.46	22.18	30.00	1000	16.54	
	6	5745.0	-11.33	3.48	20.25	1.06	13.46	22.18	30.00	1000	16.54	
	7	5745.0	-11.36	3.48	20.25	1.14	**13.51**	22.44	30.00	1000	**16.49**	**Worst**

Short Guard Interval

	Mode	Freq.	P/M (AV) Reading	Cable Loss	Atten. Loss	Duty Factor	Result		Limit		Margin
	(MCS)	[MHz]	[dBm]	[dB]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
	0	5745.0	-10.48	3.48	20.25	0.18	13.43	22.03	30.00	1000	16.57
	1	5745.0	-10.61	3.48	20.25	0.34	13.46	22.18	30.00	1000	16.54
	2	5745.0	-10.77	3.48	20.25	0.48	13.44	22.08	30.00	1000	16.56
	3	5745.0	-10.96	3.48	20.25	0.62	13.39	21.83	30.00	1000	16.61
	4	5745.0	-11.15	3.48	20.25	0.85	13.43	22.03	30.00	1000	16.57
	5	5745.0	-11.35	3.48	20.25	1.07	13.45	22.13	30.00	1000	16.55
	6	5745.0	-11.47	3.48	20.25	1.14	13.40	21.88	30.00	1000	16.60
	7	5745.0	-11.46	3.48	20.25	1.22	13.49	22.34	30.00	1000	16.51

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

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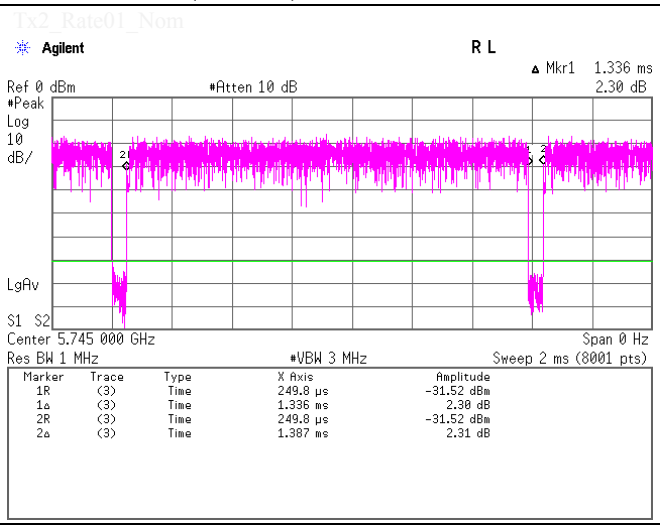
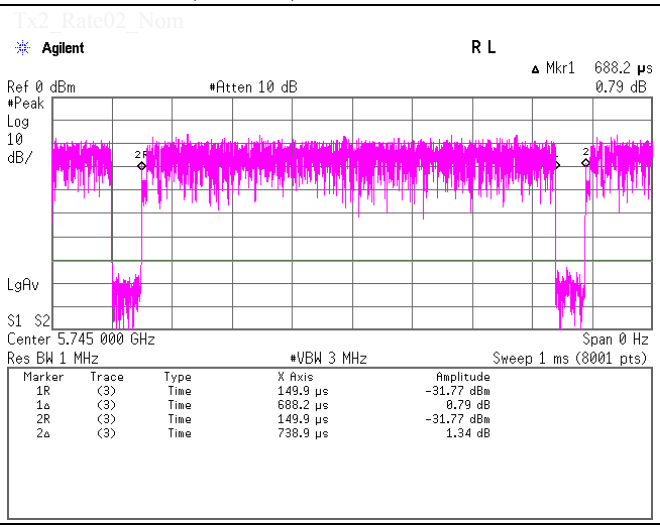
Duty Factor Caliculation chart for Maximum Conducted Output Power

Long Guard Interval

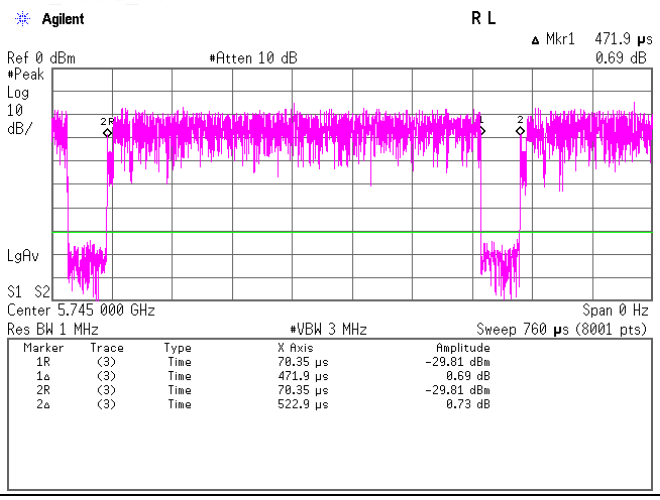
0(MCS): Duty Factor =10*log(1/x)= 0.16 dB
x:Ton/(Ton+Toff)= 1.34 / 1.39



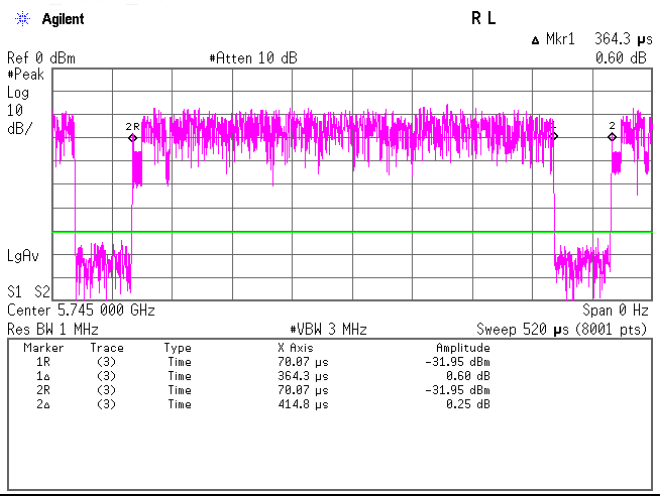
1(MCS): Duty Factor =10*log(1/x)= 0.31 dB
x:Ton/(Ton+Toff)= 0.69 / 0.74



2(MCS): Duty Factor =10*log(1/x)= 0.45 dB
x:Ton/(Ton+Toff)= 0.47 / 0.52



3(MCS): Duty Factor =10*log(1/x)= 0.56 dB
x:Ton/(Ton+Toff)= 0.36 / 0.41



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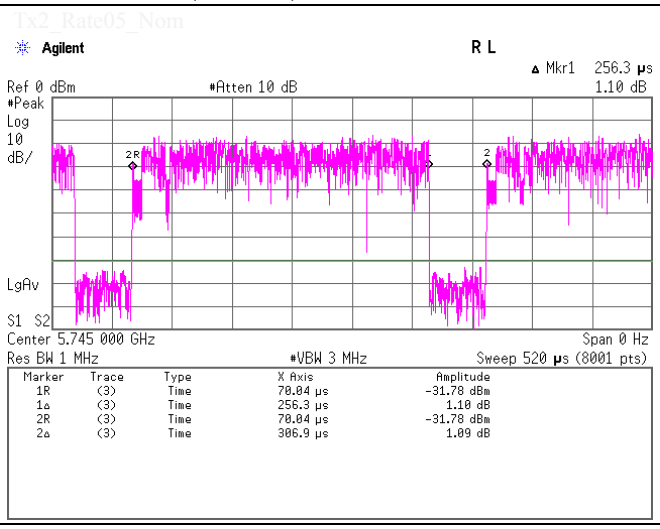
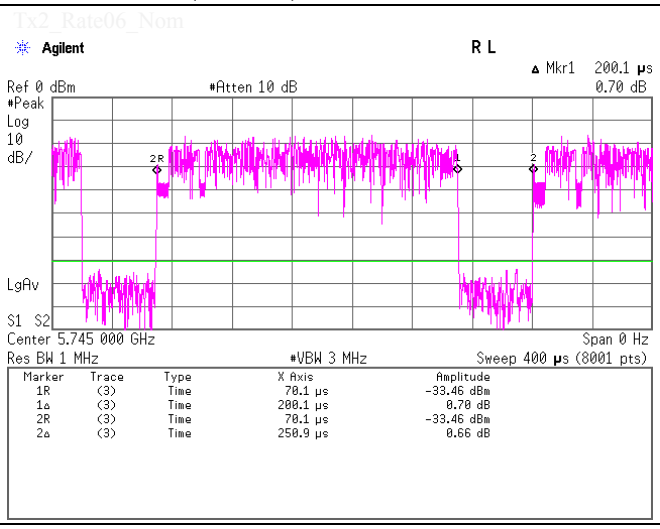
Duty Factor Caliculation chart for Maximum Conducted Output Power

Long Guard Interval

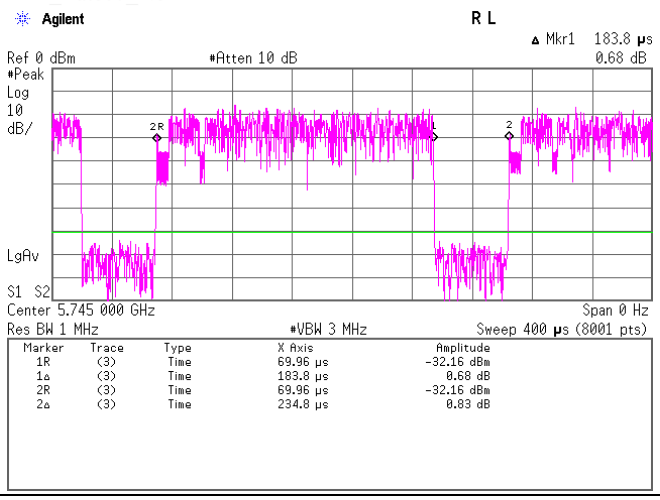
4(MCS): Duty Factor =10*log(1/x)= 0.78 dB
x:Ton/(Ton+Toff)= 0.26 / 0.31



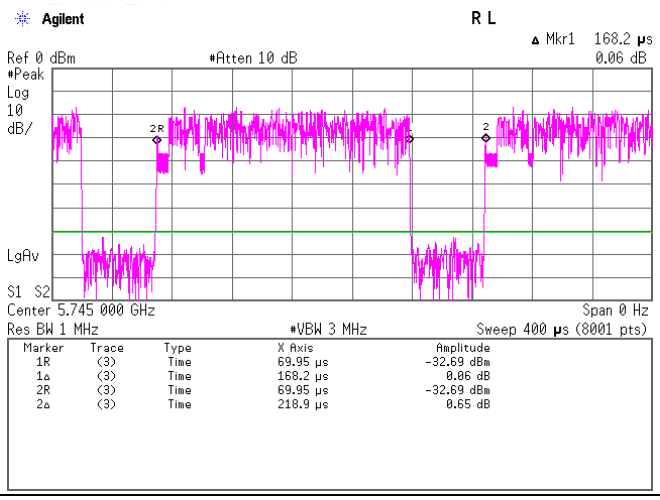
5(MCS): Duty Factor =10*log(1/x)= 0.98 dB
x:Ton/(Ton+Toff)= 0.20 / 0.25



6(MCS): Duty Factor =10*log(1/x)= 1.06 dB
x:Ton/(Ton+Toff)= 0.18 / 0.23



7(MCS): Duty Factor =10*log(1/x)= 1.14 dB
x:Ton/(Ton+Toff)= 0.17 / 0.22



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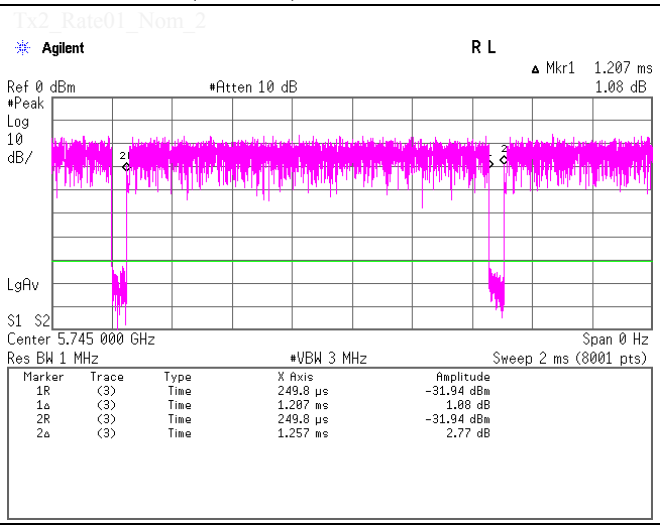
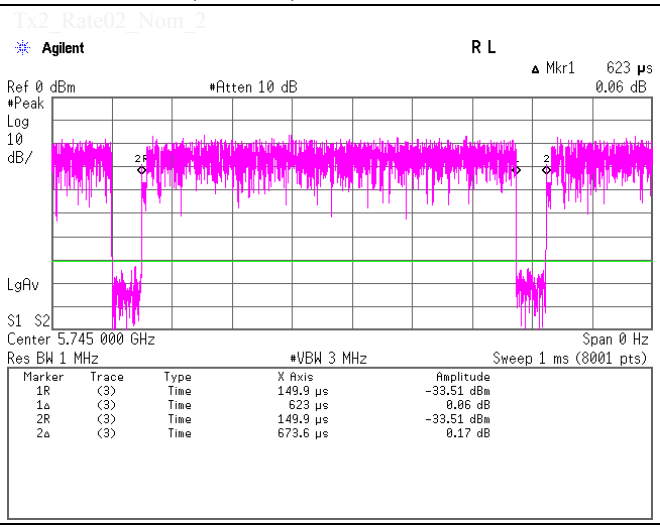
Duty Factor Caliculation chart for Maximum Conducted Output Power

Short Guard Interval

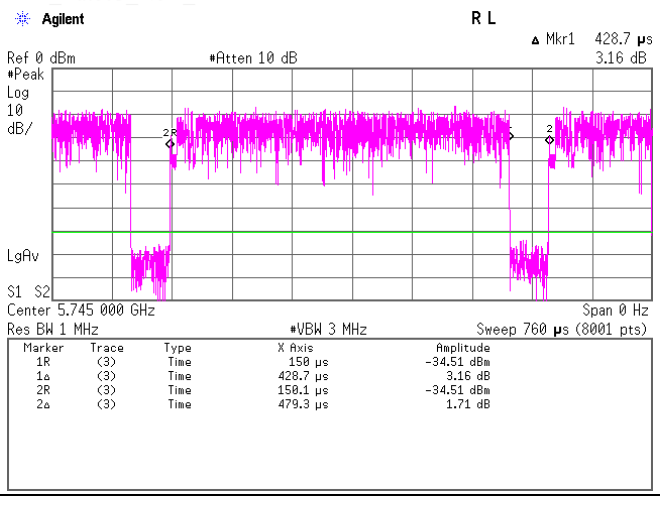
0(MCS): Duty Factor =10*log(1/x)= 0.18 dB
x:Ton/(Ton+Toff)= 1.21 / 1.26



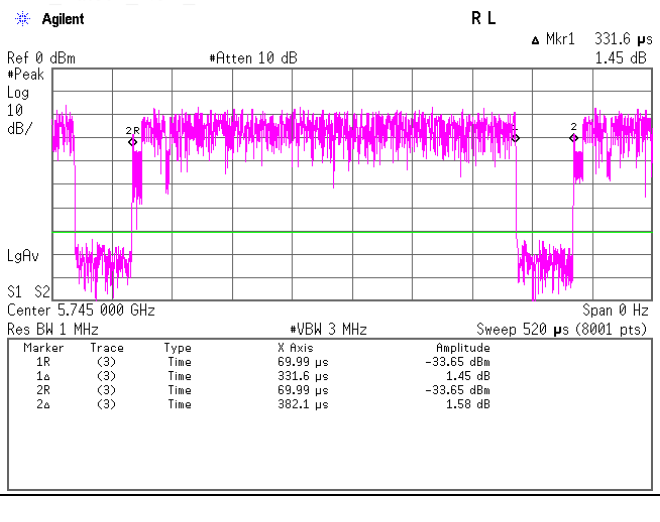
1(MCS): Duty Factor =10*log(1/x)= 0.34 dB
x:Ton/(Ton+Toff)= 0.62 / 0.67



2(MCS): Duty Factor =10*log(1/x)= 0.48 dB
x:Ton/(Ton+Toff)= 0.43 / 0.48



3(MCS): Duty Factor =10*log(1/x)= 0.62 dB
x:Ton/(Ton+Toff)= 0.33 / 0.38



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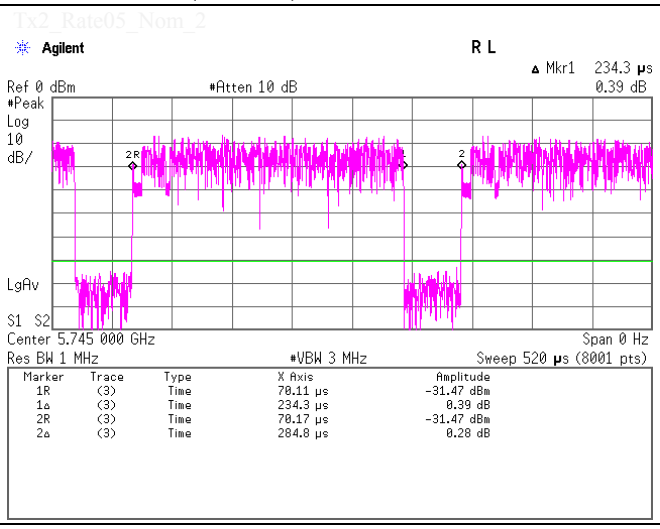
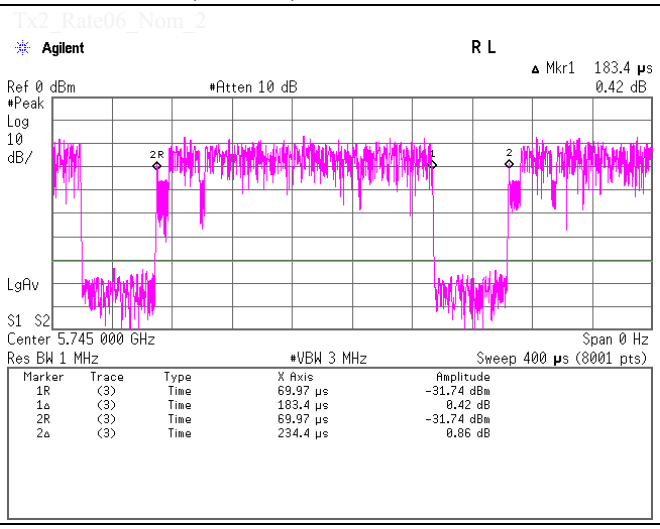
Duty Factor Caliculation chart for Maximum Conducted Output Power

Short Guard Interval

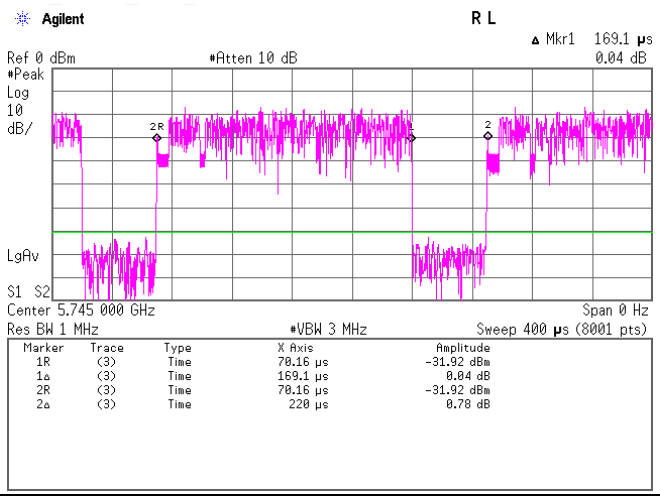
4(MCS): Duty Factor =10*log(1/x)= 0.85 dB
x:Ton/(Ton+Toff)= 0.23 / 0.28



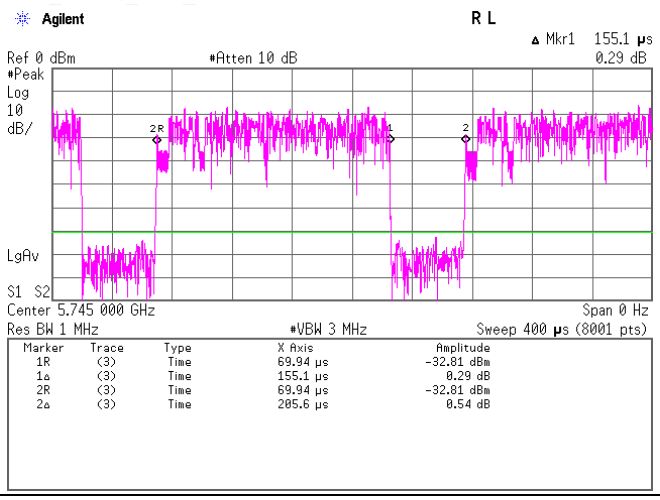
5(MCS): Duty Factor =10*log(1/x)= 1.07 dB
x:Ton/(Ton+Toff)= 0.18 / 0.23



6(MCS): Duty Factor =10*log(1/x)= 1.14 dB
x:Ton/(Ton+Toff)= 0.17 / 0.22



7(MCS): Duty Factor =10*log(1/x)= 1.22 dB
x:Ton/(Ton+Toff)= 0.16 / 0.21



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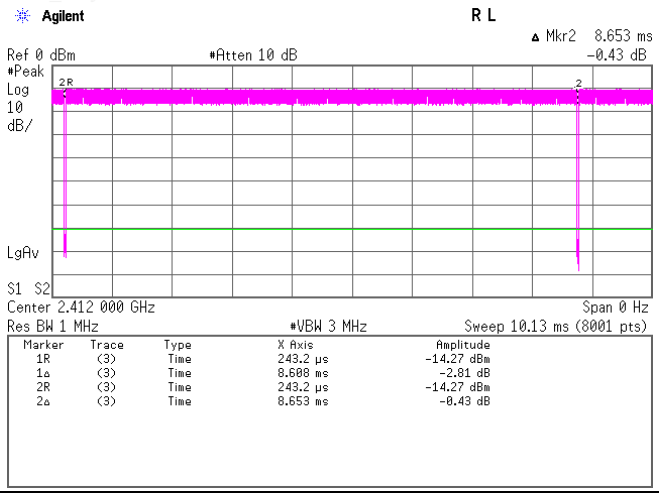
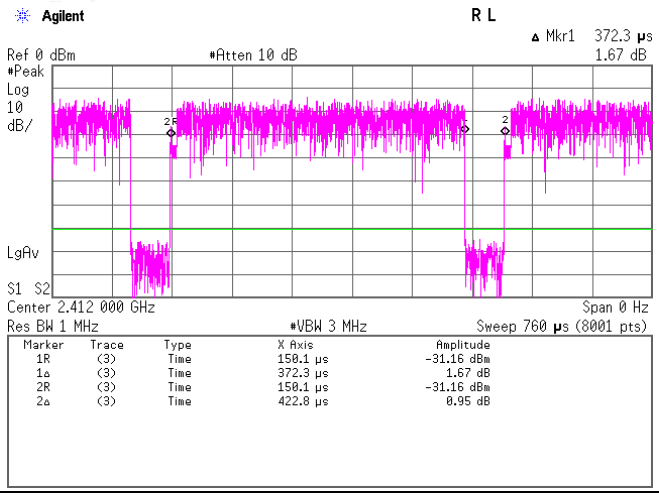
Burst rate confirmation

Tx, IEEE802.11b, PN9, worst data mode 1Mbps

duty cycle = 8.608 / 8.653 = 0.995 (99.5%)	
	

Duty Factor Calculation chart

Tx, IEEE802.11g, PN9, worst data mode 24Mbps

Duty Factor Calculation	
Duty Factor: 20log (1/duty cycle) = 1.1dB	
duty cycle = 0.3723 / 0.4228 = 0.881 (88.1%)	
	

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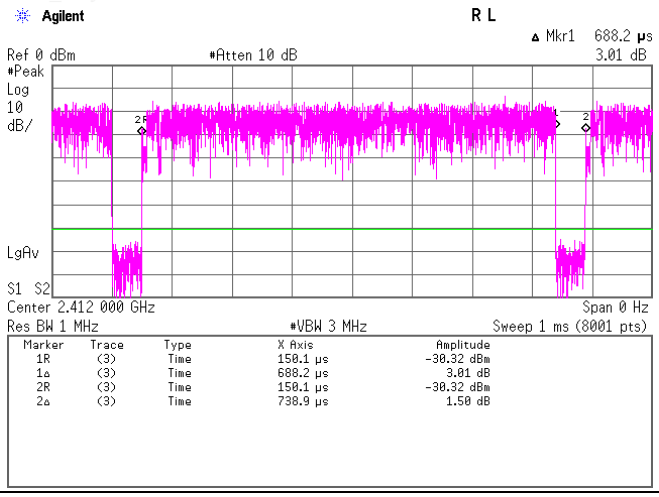
Duty Factor Calculation chart

Tx, IEEE802.11n-20HT, PN9, worst data mode 1(MCS)

Duty Factor Calculation	
Duty Factor: 20log (1/duty cycle) = 0.6dB	
duty cycle = 0.6882 / 0.7389 = 0.931 (93.1%)	
	

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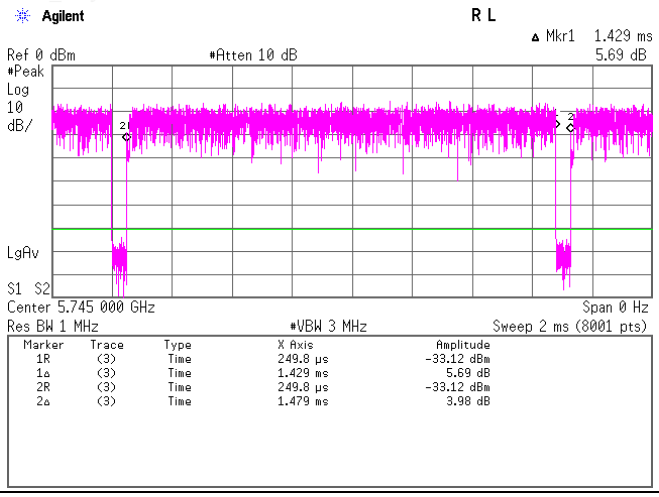
Duty Factor Calculation chart

Tx, IEEE802.11a, PN9, worst data mode 6Mbps

Duty Factor Calculation	
Duty Factor: 20log (1/duty cycle) = 0.3dB	
duty cycle = 1.429 / 1.479 = 0.966 (96.6%)	
	

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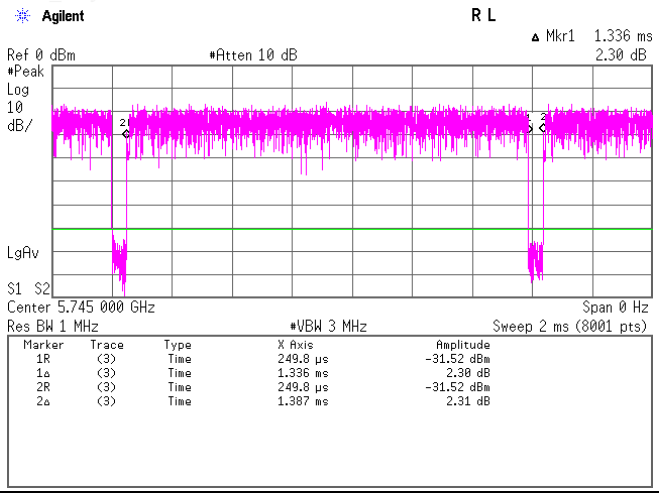
Duty Factor Calculation chart

Tx, IEEE802.11n-20HT, PN9, worst data mode 0(MCS)

Duty Factor Calculation	
Duty Factor: 20log (1/duty cycle) = 0.3dB	
duty cycle = 1.336 / 1.387 = 0.963 (96.3%)	
	

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	March 10, 2014	March 11, 2014
Temperature / Humidity	21 deg.C, 41 %RH	20 deg.C, 33 %RH
Engineer	Tatsuya Arai	Tatsuya Arai
Mode	Tx, 2412 MHz	
	Tx, IEEE802.11b	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	44.5	26.8	14.7	38.2	47.8	73.9	26.1	100	109	
Hori.	2491.508	PK	45.8	26.9	14.8	38.1	49.4	73.9	24.5	100	0	
Hori.	3600.121	PK	45.0	28.1	6.9	37.9	42.1	73.9	31.8	100	78	
Hori.	4824.000	PK	42.4	31.1	7.9	37.1	44.3	73.9	29.6	100	0	
Hori.	7236.000	PK	44.9	37.1	9.1	39.4	51.7	73.9	22.2	100	0	
Hori.	9648.000	PK	42.3	38.6	10.2	37.6	53.5	73.9	20.4	100	0	
Hori.	12060.000	PK	43.2	39.6	11.3	38.5	55.6	73.9	18.3	100	0	
Hori.	2390.000	AV	35.9	26.8	14.7	38.2	39.2	53.9	14.7	100	109	
Hori.	2491.508	AV	34.2	26.9	14.8	38.1	37.8	53.9	16.1	100	0	
Hori.	3600.121	AV	37.8	28.1	6.9	37.9	34.9	53.9	19.0	100	78	
Hori.	4824.000	AV	32.9	31.1	7.9	37.1	34.8	53.9	19.1	100	0	
Hori.	7236.000	AV	34.5	37.1	9.1	39.4	41.3	53.9	12.6	100	0	
Hori.	9648.000	AV	32.4	38.6	10.2	37.6	43.6	53.9	10.3	100	0	
Hori.	12060.000	AV	34.2	39.6	11.3	38.5	46.6	53.9	**7.3**	100	0	
Vert.	2390.000	PK	42.9	26.8	14.7	38.2	46.2	73.9	27.7	100	309	
Vert.	2491.508	PK	43.2	26.9	14.8	38.1	46.8	73.9	27.1	100	0	
Vert.	3600.121	PK	49.9	28.1	6.9	37.9	47.0	73.9	26.9	100	96	
Vert.	4824.000	PK	41.9	31.1	7.9	37.1	43.8	73.9	30.1	100	0	
Vert.	7236.000	PK	44.3	37.1	9.1	39.4	51.1	73.9	22.8	100	0	
Vert.	9648.000	PK	42.1	38.6	10.2	37.6	53.3	73.9	20.6	100	0	
Vert.	12060.000	PK	43.1	39.6	11.3	38.5	55.5	73.9	18.4	100	0	
Vert.	2390.000	AV	35.7	26.8	14.7	38.2	39.0	53.9	14.9	100	309	
Vert.	2491.508	AV	37.1	26.9	14.8	38.1	40.7	53.9	13.2	100	0	
Vert.	3600.121	AV	43.8	28.1	6.9	37.9	40.9	53.9	13.0	100	96	
Vert.	4824.000	AV	33.6	31.1	7.9	37.1	35.5	53.9	18.4	100	0	
Vert.	7236.000	AV	35.4	37.1	9.1	39.4	42.2	53.9	11.7	100	0	
Vert.	9648.000	AV	32.8	38.6	10.2	37.6	44.0	53.9	9.9	100	0	
Vert.	12060.000	AV	33.2	39.6	11.3	38.5	45.6	53.9	8.3	100	0	

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

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

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	99.8	26.8	14.7	38.2	103.1	-	-	
Hori.	2400.000	PK	52.4	26.8	14.7	38.2	55.7	83.1	27.4	
Vert.	2412.000	PK	86.9	26.8	14.7	38.2	90.2	-	-	
Vert.	2400.000	PK	46.3	26.8	14.7	38.2	49.6	70.2	20.6	

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

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	March 10, 2014	March 11, 2014
Temperature / Humidity	21 deg.C, 41 %RH	20 deg.C, 33 %RH
Engineer	Tatsuya Arai	Tatsuya Arai
Mode	Tx, 2437 MHz	
	Tx, IEEE802.11b	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2593.462	PK	40.5	27.1	15.0	38.1	44.5	73.9	29.4	100	0	
Hori.	2843.210	PK	43.9	27.8	7.1	38.1	40.7	73.9	33.2	100	117	
Hori.	3600.422	PK	43.3	28.1	6.9	37.9	40.4	73.9	33.5	100	231	
Hori.	4874.000	PK	41.9	31.3	7.9	37.1	44.0	73.9	29.9	100	0	
Hori.	7311.000	PK	44.4	37.2	9.1	39.4	51.3	73.9	22.6	100	0	
Hori.	9748.000	PK	41.1	38.7	10.1	37.6	52.3	73.9	21.6	100	0	
Hori.	12185.000	PK	42.3	39.6	11.3	38.4	54.8	73.9	19.1	100	0	
Hori.	2593.462	AV	34.8	27.1	15.0	38.1	38.8	53.9	15.1	100	0	
Hori.	2843.210	AV	41.5	27.8	7.1	38.1	38.3	53.9	15.6	100	117	
Hori.	3600.422	AV	38.8	28.1	6.9	37.9	35.9	53.9	18.0	100	231	
Hori.	4874.000	AV	33.2	31.3	7.9	37.1	35.3	53.9	18.6	100	0	
Hori.	7311.000	AV	35.2	37.2	9.1	39.4	42.1	53.9	11.8	100	0	
Hori.	9748.000	AV	33.8	38.7	10.1	37.6	45.0	53.9	8.9	100	0	
Hori.	12185.000	AV	32.4	39.6	11.3	38.4	44.9	53.9	9.0	100	0	
Vert.	2593.462	PK	43.9	27.1	15.0	38.1	47.9	73.9	26.0	100	0	
Vert.	2843.210	PK	47.2	27.8	7.1	38.1	44.0	73.9	29.9	100	2	
Vert.	3600.422	PK	49.1	28.1	6.9	37.9	46.2	73.9	27.7	100	253	
Vert.	4874.000	PK	42.1	31.3	7.9	37.1	44.2	73.9	29.7	100	0	
Vert.	7311.000	PK	43.5	37.2	9.1	39.4	50.4	73.9	23.5	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	42.9	39.6	11.3	38.4	55.4	73.9	18.5	100	0	
Vert.	2593.462	AV	35.4	27.1	15.0	38.1	39.4	53.9	14.5	100	0	
Vert.	2843.210	AV	40.3	27.8	7.1	38.1	37.1	53.9	16.8	100	2	
Vert.	3600.422	AV	43.2	28.1	6.9	37.9	40.3	53.9	13.6	100	253	
Vert.	4874.000	AV	33.2	31.3	7.9	37.1	35.3	53.9	18.6	100	0	
Vert.	7311.000	AV	34.5	37.2	9.1	39.4	41.4	53.9	12.5	100	0	
Vert.	9748.000	AV	32.1	38.7	10.1	37.6	43.3	53.9	10.6	100	0	
Vert.	12185.000	AV	33.9	39.6	11.3	38.4	46.4	53.9	**7.5**	100	0	

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

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

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	March 10, 2014	March 11, 2014
Temperature / Humidity	21 deg.C, 41 %RH	20 deg.C, 33 %RH
Engineer	Tatsuya Arai	Tatsuya Arai
Mode	Tx, 2462 MHz	
	Tx, IEEE802.11b	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	42.9	26.9	14.8	38.1	46.5	73.9	27.4	100	0	
Hori.	2872.349	PK	45.6	27.9	7.1	38.1	42.5	73.9	31.4	100	110	
Hori.	3600.203	PK	42.3	28.1	6.9	37.9	39.4	73.9	34.5	100	2	
Hori.	4924.000	PK	41.8	31.6	7.8	37.0	44.2	73.9	29.7	100	0	
Hori.	7386.000	PK	45.2	37.3	9.3	39.4	52.4	73.9	21.5	100	0	
Hori.	9848.000	PK	41.5	38.9	10.1	37.5	53.0	73.9	20.9	100	0	
Hori.	2483.500	AV	34.2	26.9	14.8	38.1	37.8	53.9	16.1	100	0	
Hori.	2872.349	AV	37.8	27.9	7.1	38.1	34.7	53.9	19.2	100	110	
Hori.	3600.203	AV	35.2	28.1	6.9	37.9	32.3	53.9	21.6	100	2	
Hori.	4924.000	AV	34.9	31.6	7.8	37.0	37.3	53.9	16.6	100	0	
Hori.	7386.000	AV	33.9	37.3	9.3	39.4	41.1	53.9	12.8	100	0	
Hori.	9848.000	AV	32.1	38.9	10.1	37.5	43.6	53.9	10.3	100	0	
Vert.	2483.500	PK	44.6	26.9	14.8	38.1	48.2	73.9	25.7	100	6	
Vert.	2872.349	PK	46.9	27.9	7.1	38.1	43.8	73.9	30.1	100	28	
Vert.	3600.203	PK	47.2	28.1	6.9	37.9	44.3	73.9	29.6	100	278	
Vert.	4924.000	PK	42.9	31.6	7.8	37.0	45.3	73.9	28.6	100	0	
Vert.	7386.000	PK	44.5	37.3	9.3	39.4	51.7	73.9	22.2	100	0	
Vert.	9848.000	PK	41.7	38.9	10.1	37.5	53.2	73.9	20.7	100	0	
Vert.	2483.500	AV	36.7	26.9	14.8	38.1	40.3	53.9	13.6	100	6	
Vert.	2872.349	AV	42.9	27.9	7.1	38.1	39.8	53.9	14.1	100	28	
Vert.	3600.203	AV	36.5	28.1	6.9	37.9	33.6	53.9	20.3	100	278	
Vert.	4924.000	AV	34.2	31.6	7.8	37.0	36.6	53.9	17.3	100	0	
Vert.	7386.000	AV	34.8	37.3	9.3	39.4	42.0	53.9	11.9	100	0	
Vert.	9848.000	AV	35.0	38.9	10.1	37.5	46.5	53.9	**7.4**	100	0	

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

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

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	March 10, 2014	March 11, 2014
Temperature / Humidity	21 deg.C, 41 %RH	20 deg.C, 33 %RH
Engineer	Tatsuya Arai	Tatsuya Arai
Mode	Tx, 2412 MHz	
	Tx, IEEE802.11g	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	52.2	26.8	14.7	38.2	55.5	73.9	18.4	100	120	
Hori.	2537.071	PK	40.4	27.0	14.9	38.1	44.2	73.9	29.7	100	0	
Hori.	2814.042	PK	47.3	27.7	7.3	38.1	44.2	73.9	29.7	100	130	
Hori.	3199.906	PK	44.5	28.2	6.7	38.1	41.3	73.9	32.6	100	20	
Hori.	3599.800	PK	42.3	28.1	6.9	37.9	39.4	73.9	34.5	100	0	
Hori.	4824.000	PK	44.2	31.1	7.9	37.1	46.1	73.9	27.8	100	0	
Hori.	7236.000	PK	44.1	37.1	9.1	39.4	50.9	73.9	23.0	100	0	
Hori.	9648.000	PK	40.4	38.6	10.2	37.6	51.6	73.9	22.3	100	0	
Hori.	12060.000	PK	42.3	39.6	11.3	38.5	54.7	73.9	19.2	100	0	
Hori.	2390.000	AV	37.9	26.8	14.7	38.2	41.2	53.9	12.7	100	120	*1
Hori.	2537.071	AV	32.9	27.0	14.9	38.1	36.7	53.9	17.2	100	0	*2
Hori.	2814.042	AV	37.9	27.7	7.3	38.1	34.8	53.9	19.1	100	130	*2
Hori.	3199.906	AV	34.9	28.2	6.7	38.1	31.7	53.9	22.2	100	20	*2
Hori.	3599.800	AV	35.1	28.1	6.9	37.9	32.2	53.9	21.7	100	0	*2
Vert.	2390.000	PK	48.9	26.8	14.7	38.2	52.2	73.9	21.7	100	0	
Vert.	2537.071	PK	48.9	27.0	14.9	38.1	52.7	73.9	21.2	100	0	
Vert.	2814.042	PK	46.6	27.7	7.3	38.1	43.5	73.9	30.4	100	139	
Vert.	3199.906	PK	46.2	28.2	6.7	38.1	43.0	73.9	30.9	100	243	
Vert.	3599.800	PK	46.4	28.1	6.9	37.9	43.5	73.9	30.4	100	98	
Vert.	4824.000	PK	41.9	31.1	7.9	37.1	43.8	73.9	30.1	100	0	
Vert.	7236.000	PK	43.5	37.1	9.1	39.4	50.3	73.9	23.6	100	0	
Vert.	9648.000	PK	41.2	38.6	10.2	37.6	52.4	73.9	21.5	100	0	
Vert.	12060.000	PK	42.9	39.6	11.3	38.5	55.3	73.9	18.6	100	0	
Vert.	2390.000	AV	35.2	26.8	14.7	38.2	38.5	53.9	15.4	100	0	*1
Vert.	2537.071	AV	33.9	27.0	14.9	38.1	37.7	53.9	16.2	100	0	*2
Vert.	2814.042	AV	39.8	27.7	7.3	38.1	36.7	53.9	17.2	100	139	*2
Vert.	3199.906	AV	35.4	28.2	6.7	38.1	32.2	53.9	21.7	100	243	*2
Vert.	3599.800	AV	37.8	28.1	6.9	37.9	34.9	53.9	19.0	100	98	*2

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
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB)
*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	33.8	31.1	7.9	37.1	1.1	36.8	53.9	17.1	
Hori.	7236.000	AV	32.1	37.1	9.1	39.4	1.1	40.0	53.9	13.9	
Hori.	9648.000	AV	34.5	38.6	10.2	37.6	1.1	46.8	53.9	7.1	
Hori.	12060.000	AV	35.2	39.6	11.3	38.5	1.1	48.7	53.9	**5.2**	
Vert.	4824.000	AV	35.4	31.1	7.9	37.1	1.1	38.4	53.9	15.5	
Vert.	7236.000	AV	35.9	37.1	9.1	39.4	1.1	43.8	53.9	10.1	
Vert.	9648.000	AV	32.1	38.6	10.2	37.6	1.1	44.4	53.9	9.5	
Vert.	12060.000	AV	33.2	39.6	11.3	38.5	1.1	46.7	53.9	7.2	

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	80.5	26.8	14.7	38.2	83.8	-	-	
Hori.	2400.000	PK	54.6	26.8	14.7	38.2	57.9	63.8	5.9	
Vert.	2412.000	PK	80.2	26.8	14.7	38.2	83.5	-	-	
Vert.	2400.000	PK	51.4	26.8	14.7	38.2	54.7	63.5	8.8	

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

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	March 10, 2014	March 11, 2014
Temperature / Humidity	21 deg.C, 41 %RH	20 deg.C, 33 %RH
Engineer	Tatsuya Arai	Tatsuya Arai
Mode	Tx, 2437 MHz	
	Tx, IEEE802.11g	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2814.002	PK	44.9	27.7	7.3	38.1	41.8	73.9	32.1	100	34	
Hori.	3599.442	PK	43.5	28.1	6.9	37.9	40.6	73.9	33.3	100	0	
Hori.	4874.000	PK	40.9	31.3	7.9	37.1	43.0	73.9	30.9	100	0	
Hori.	7311.000	PK	43.9	37.2	9.1	39.4	50.8	73.9	23.1	100	0	
Hori.	9748.000	PK	41.0	38.7	10.1	37.6	52.2	73.9	21.7	100	0	
Hori.	12185.000	PK	43.3	39.6	11.3	38.4	55.8	73.9	18.1	100	0	
Hori.	2814.002	AV	39.1	27.7	7.3	38.1	36.0	53.9	17.9	100	34	*1
Hori.	3599.442	AV	34.2	28.1	6.9	37.9	31.3	53.9	22.6	100	0	*1
Vert.	2814.002	PK	47.9	27.7	7.3	38.1	44.8	73.9	29.1	100	299	
Vert.	3599.442	PK	49.2	28.1	6.9	37.9	46.3	73.9	27.6	100	10	
Vert.	4874.000	PK	42.9	31.3	7.9	37.1	45.0	73.9	28.9	100	0	
Vert.	7311.000	PK	45.1	37.2	9.1	39.4	52.0	73.9	21.9	100	0	
Vert.	9748.000	PK	41.5	38.7	10.1	37.6	52.7	73.9	21.2	100	0	
Vert.	12185.000	PK	42.3	39.6	11.3	38.4	54.8	73.9	19.1	100	0	
Vert.	2814.002	AV	41.0	27.7	7.3	38.1	37.9	53.9	16.0	100	299	*1
Vert.	3599.442	AV	38.2	28.1	6.9	37.9	35.3	53.9	18.6	100	10	*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
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB)
*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.	4874.000	AV	31.7	31.3	7.9	37.1	1.1	34.9	53.9	19.0	
Hori.	7311.000	AV	32.9	37.2	9.1	39.4	1.1	40.9	53.9	13.0	
Hori.	9748.000	AV	31.2	38.7	10.1	37.6	1.1	43.5	53.9	10.4	
Hori.	12185.000	AV	34.5	39.6	11.3	38.4	1.1	48.1	53.9	**5.8**	
Vert.	4874.000	AV	35.0	31.3	7.9	37.1	1.1	38.2	53.9	15.7	
Vert.	7311.000	AV	36.2	37.2	9.1	39.4	1.1	44.2	53.9	9.7	
Vert.	9748.000	AV	34.5	38.7	10.1	37.6	1.1	46.8	53.9	7.1	
Vert.	12185.000	AV	33.9	39.6	11.3	38.4	1.1	47.5	53.9	6.4	

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

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	March 10, 2014	March 11, 2014	March 16, 2014
Temperature / Humidity	21 deg.C, 41 %RH	20 deg.C, 33 %RH	20 deg.C, 31 %RH
Engineer	Tatsuya Arai	Tatsuya Arai	Yasumasa Owaki
Mode	Tx, 2462 MHz Tx, IEEE802.11g		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	174.997	QP	47.9	15.7	7.8	32.1	39.3	43.5	4.2	192	293	
Hori.	325.001	QP	52.5	14.4	8.7	32.0	43.6	46.0	2.4	100	287	
Hori.	375.050	QP	51.7	15.7	8.9	32.0	44.3	46.0	**1.7**	100	284	
Hori.	800.004	QP	42.9	20.6	10.6	31.6	42.5	46.0	3.5	115	56	
Hori.	2483.500	PK	47.5	26.9	14.8	38.1	51.1	73.9	22.8	100	0	
Hori.	2813.989	PK	47.2	27.7	7.3	38.1	44.1	73.9	29.8	100	333	
Hori.	3600.084	PK	43.2	28.1	6.9	37.9	40.3	73.9	33.6	100	22	
Hori.	4924.000	PK	42.1	31.6	7.8	37.0	44.5	73.9	29.4	100	0	
Hori.	7386.000	PK	44.8	37.3	9.3	39.4	52.0	73.9	21.9	100	0	
Hori.	9848.000	PK	41.2	38.9	10.1	37.5	52.7	73.9	21.2	100	0	
Hori.	12310.000	PK	42.9	39.6	11.3	38.3	55.5	73.9	18.4	100	0	
Hori.	2483.500	AV	38.9	26.9	14.8	38.1	42.5	53.9	11.4	100	0	*1
Hori.	2813.989	AV	40.2	27.7	7.3	38.1	37.1	53.9	16.8	100	333	*2
Hori.	3600.084	AV	36.5	28.1	6.9	37.9	33.6	53.9	20.3	100	22	*2
Vert.	174.999	QP	46.1	15.7	7.8	32.1	37.5	43.5	6.0	100	96	
Vert.	2483.500	PK	48.4	26.9	14.8	38.1	52.0	73.9	21.9	100	129	
Vert.	2813.989	PK	48.4	27.7	7.3	38.1	45.3	73.9	28.6	100	34	
Vert.	3600.084	PK	47.9	28.1	6.9	37.9	45.0	73.9	28.9	100	222	
Vert.	4924.000	PK	41.6	31.6	7.8	37.0	44.0	73.9	29.9	100	0	
Vert.	7386.000	PK	43.2	37.3	9.3	39.4	50.4	73.9	23.5	100	0	
Vert.	9848.000	PK	42.8	38.9	10.1	37.5	54.3	73.9	19.6	100	0	
Vert.	12310.000	PK	41.2	39.6	11.3	38.3	53.8	73.9	20.1	100	0	
Vert.	2483.500	AV	41.1	26.9	14.8	38.1	44.7	53.9	9.2	100	129	*1
Vert.	2813.989	AV	41.2	27.7	7.3	38.1	38.1	53.9	15.8	100	34	*2
Vert.	3600.084	AV	36.9	28.1	6.9	37.9	34.0	53.9	19.9	100	222	*2

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
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB)
*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	31.9	31.6	7.8	37.0	1.1	35.4	53.9	18.5	
Hori.	7386.000	AV	34.6	37.3	9.3	39.4	1.1	42.9	53.9	11.0	
Hori.	9848.000	AV	33.7	38.9	10.1	37.5	1.1	46.3	53.9	7.6	
Hori.	12310.000	AV	34.5	39.6	11.3	38.3	1.1	48.2	53.9	5.7	
Vert.	4924.000	AV	37.0	31.6	7.8	37.0	1.1	40.5	53.9	13.4	
Vert.	7386.000	AV	35.8	37.3	9.3	39.4	1.1	44.1	53.9	9.8	
Vert.	9848.000	AV	33.8	38.9	10.1	37.5	1.1	46.4	53.9	7.5	
Vert.	12310.000	AV	32.1	39.6	11.3	38.3	1.1	45.8	53.9	8.1	

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

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	March 10, 2014	March 11, 2014
Temperature / Humidity	21 deg.C, 41 %RH	20 deg.C, 33 %RH
Engineer	Tatsuya Arai	Tatsuya Arai
Mode	Tx, 2412 MHz	
	Tx, IEEE802.11n-20HT	

(* 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.	2390.000	PK	48.2	26.8	14.7	38.2	51.5	73.9	22.4	100	67	
Hori.	2813.992	PK	46.2	27.7	7.3	38.1	43.1	73.9	30.8	100	120	
Hori.	3599.998	PK	44.1	28.1	6.9	37.9	41.2	73.9	32.7	100	142	
Hori.	4824.000	PK	41.9	31.1	7.9	37.1	43.8	73.9	30.1	100	0	
Hori.	7236.000	PK	43.2	37.1	9.1	39.4	50.0	73.9	23.9	100	0	
Hori.	9648.000	PK	41.2	38.6	10.2	37.6	52.4	73.9	21.5	100	0	
Hori.	12060.000	PK	42.0	39.6	11.3	38.5	54.4	73.9	19.5	100	0	
Hori.	2390.000	AV	35.6	26.8	14.7	38.2	38.9	53.9	15.0	100	67	*1
Hori.	2813.992	AV	39.7	27.7	7.3	38.1	36.6	53.9	17.3	100	120	*2
Hori.	3599.998	AV	34.2	28.1	6.9	37.9	31.3	53.9	22.6	100	142	*2
Vert.	2390.000	PK	44.9	26.8	14.7	38.2	48.2	73.9	25.7	100	230	
Vert.	2813.992	PK	48.6	27.7	7.3	38.1	45.5	73.9	28.4	100	302	
Vert.	3599.998	PK	44.5	28.1	6.9	37.9	41.6	73.9	32.3	100	222	
Vert.	4824.000	PK	42.1	31.1	7.9	37.1	44.0	73.9	29.9	100	0	
Vert.	7236.000	PK	44.5	37.1	9.1	39.4	51.3	73.9	22.6	100	0	
Vert.	9648.000	PK	41.1	38.6	10.2	37.6	52.3	73.9	21.6	100	0	
Vert.	12060.000	PK	41.2	39.6	11.3	38.5	53.6	73.9	20.3	100	0	
Vert.	2390.000	AV	38.9	26.8	14.7	38.2	42.2	53.9	11.7	100	230	*1
Vert.	2813.992	AV	41.2	27.7	7.3	38.1	38.1	53.9	15.8	100	302	*2
Vert.	3599.998	AV	40.2	28.1	6.9	37.9	37.3	53.9	16.6	100	222	*2

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
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB)
*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	33.9	31.1	7.9	37.1	0.6	36.4	53.9	17.5	
Hori.	7236.000	AV	34.2	37.1	9.1	39.4	0.6	41.6	53.9	12.3	
Hori.	9648.000	AV	33.7	38.6	10.2	37.6	0.6	45.5	53.9	8.4	
Hori.	12060.000	AV	33.7	39.6	11.3	38.5	0.6	46.7	53.9	7.2	
Vert.	4824.000	AV	32.4	31.1	7.9	37.1	0.6	34.9	53.9	19.0	
Vert.	7236.000	AV	36.1	37.1	9.1	39.4	0.6	43.5	53.9	10.4	
Vert.	9648.000	AV	32.5	38.6	10.2	37.6	0.6	44.3	53.9	9.6	
Vert.	12060.000	AV	32.4	39.6	11.3	38.5	0.6	45.4	53.9	8.5	

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	79.2	26.8	14.7	38.2	82.5	-	-	
Hori.	2400.000	PK	56.1	26.8	14.7	38.2	59.4	62.5	**3.1**	
Vert.	2412.000	PK	80.2	26.8	14.7	38.2	83.5	-	-	
Vert.	2400.000	PK	56.4	26.8	14.7	38.2	59.7	63.5	3.8	

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

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	March 10, 2014	March 11, 2014
Temperature / Humidity	21 deg.C, 41 %RH	20 deg.C, 33 %RH
Engineer	Tatsuya Arai	Tatsuya Arai
Mode	Tx, 2437 MHz	
	Tx, IEEE802.11n-20HT	

(* 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.	2814.001	PK	47.2	27.7	7.3	38.1	44.1	73.9	29.8	100	350	
Hori.	3600.289	PK	42.3	28.1	6.9	37.9	39.4	73.9	34.5	100	0	
Hori.	4874.000	PK	41.2	31.3	7.9	37.1	43.3	73.9	30.6	100	0	
Hori.	7311.000	PK	44.5	37.2	9.1	39.4	51.4	73.9	22.5	100	0	
Hori.	9748.000	PK	40.9	38.7	10.1	37.6	52.1	73.9	21.8	100	0	
Hori.	12185.000	PK	41.2	39.6	11.3	38.4	53.7	73.9	20.2	100	0	
Hori.	2814.001	AV	38.0	27.7	7.3	38.1	34.9	53.9	19.0	100	350	*1
Hori.	3600.289	AV	36.5	28.1	6.9	37.9	33.6	53.9	20.3	100	0	*1
Vert.	2814.001	PK	48.3	27.7	7.3	38.1	45.2	73.9	28.7	100	302	
Vert.	3600.289	PK	44.1	28.1	6.9	37.9	41.2	73.9	32.7	100	226	
Vert.	4874.000	PK	41.6	31.3	7.9	37.1	43.7	73.9	30.2	100	0	
Vert.	7311.000	PK	43.9	37.2	9.1	39.4	50.8	73.9	23.1	100	0	
Vert.	9748.000	PK	40.9	38.7	10.1	37.6	52.1	73.9	21.8	100	0	
Vert.	12185.000	PK	41.9	39.6	11.3	38.4	54.4	73.9	19.5	100	0	
Vert.	2814.001	AV	40.2	27.7	7.3	38.1	37.1	53.9	16.8	100	302	*1
Vert.	3600.289	AV	41.9	28.1	6.9	37.9	39.0	53.9	14.9	100	226	*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
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB)
*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.	4874.000	AV	33.2	31.3	7.9	37.1	0.6	35.9	53.9	18.0	
Hori.	7311.000	AV	34.0	37.2	9.1	39.4	0.6	41.5	53.9	12.4	
Hori.	9748.000	AV	32.3	38.7	10.1	37.6	0.6	44.1	53.9	9.8	
Hori.	12185.000	AV	34.3	39.6	11.3	38.4	0.6	47.4	53.9	**6.5**	
Vert.	4874.000	AV	32.6	31.3	7.9	37.1	0.6	35.3	53.9	18.6	
Vert.	7311.000	AV	35.0	37.2	9.1	39.4	0.6	42.5	53.9	11.4	
Vert.	9748.000	AV	32.0	38.7	10.1	37.6	0.6	43.8	53.9	10.1	
Vert.	12185.000	AV	34.0	39.6	11.3	38.4	0.6	47.1	53.9	6.8	

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

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	March 10, 2014	March 11, 2014
Temperature / Humidity	21 deg.C, 41 %RH	20 deg.C, 33 %RH
Engineer	Tatsuya Arai	Tatsuya Arai
Mode	Tx, 2462 MHz	
	Tx, IEEE802.11n-20HT	

(* 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.	2483.500	PK	49.3	26.9	14.8	38.1	52.9	73.9	21.0	100	80	
Hori.	2813.995	PK	48.2	27.7	7.3	38.1	45.1	73.9	28.8	100	20	
Hori.	3600.009	PK	42.9	28.1	6.9	37.9	40.0	73.9	33.9	100	0	
Hori.	4924.000	PK	41.6	31.6	7.8	37.0	44.0	73.9	29.9	100	0	
Hori.	7386.000	PK	44.5	37.3	9.3	39.4	51.7	73.9	22.2	100	0	
Hori.	9848.000	PK	41.3	38.9	10.1	37.5	52.8	73.9	21.1	100	0	
Hori.	12310.000	PK	42.9	39.6	11.3	38.3	55.5	73.9	18.4	100	0	
Hori.	2483.500	AV	38.7	26.9	14.8	38.1	42.3	53.9	11.6	100	80	*1
Hori.	2813.995	AV	38.9	27.7	7.3	38.1	35.8	53.9	18.1	100	20	*2
Hori.	3600.009	AV	34.0	28.1	6.9	37.9	31.1	53.9	22.8	100	0	*2
Vert.	2483.500	PK	52.3	26.9	14.8	38.1	55.9	73.9	18.0	100	89	
Vert.	2813.995	PK	46.9	27.7	7.3	38.1	43.8	73.9	30.1	100	179	
Vert.	3600.009	PK	45.2	28.1	6.9	37.9	42.3	73.9	31.6	100	98	
Vert.	4924.000	PK	42.0	31.6	7.8	37.0	44.4	73.9	29.5	100	0	
Vert.	7386.000	PK	44.3	37.3	9.3	39.4	51.5	73.9	22.4	100	0	
Vert.	9848.000	PK	41.2	38.9	10.1	37.5	52.7	73.9	21.2	100	0	
Vert.	12310.000	PK	41.7	39.6	11.3	38.3	54.3	73.9	19.6	100	0	
Vert.	2483.500	AV	42.1	26.9	14.8	38.1	45.7	53.9	8.2	100	89	*1
Vert.	2813.995	AV	40.2	27.7	7.3	38.1	37.1	53.9	16.8	100	179	*2
Vert.	3600.009	AV	34.5	28.1	6.9	37.9	31.6	53.9	22.3	100	98	*2

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
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB)
*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	32.1	31.6	7.8	37.0	0.6	35.1	53.9	18.8	
Hori.	7386.000	AV	33.0	37.3	9.3	39.4	0.6	40.8	53.9	13.1	
Hori.	9848.000	AV	32.6	38.9	10.1	37.5	0.6	44.7	53.9	9.2	
Hori.	12310.000	AV	33.1	39.6	11.3	38.3	0.6	46.3	53.9	7.6	
Vert.	4924.000	AV	31.8	31.6	7.8	37.0	0.6	34.8	53.9	19.1	
Vert.	7386.000	AV	34.2	37.3	9.3	39.4	0.6	42.0	53.9	11.9	
Vert.	9848.000	AV	32.6	38.9	10.1	37.5	0.6	44.7	53.9	9.2	
Vert.	12310.000	AV	33.4	39.6	11.3	38.3	0.6	46.6	53.9	**7.3**	

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

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	March 12, 2014	March 16, 2014
Temperature / Humidity	20 deg.C, 33 %RH	20 deg.C, 31 %RH
Engineer	Tatsuya Arai	Yasumasa Owaki
Mode	Tx, 5745 MHz	
	Tx, IEEE802.11a	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	11490.000	PK	40.5	39.5	10.3	38.5	51.8	73.9	22.1	100	0	
Hori.	17235.000	PK	43.8	41.5	3.5	38.9	49.9	73.9	24.0	100	0	
Vert.	11490.000	PK	39.4	39.5	10.3	38.5	50.7	73.9	23.2	100	0	
Vert.	17235.000	PK	42.9	41.5	3.5	38.9	49.0	73.9	24.9	100	0	

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

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.	11490.000	AV	32.4	39.5	10.3	38.5	0.3	44.0	53.9	9.9	
Hori.	17235.000	AV	35.8	41.5	3.5	38.9	0.3	42.2	53.9	11.7	
Vert.	11490.000	AV	33.7	39.5	10.3	38.5	0.3	45.3	53.9	**8.6**	
Vert.	17235.000	AV	34.6	41.5	3.5	38.9	0.3	41.0	53.9	12.9	

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.	5745.000	PK	71.0	32.4	17.4	37.6	83.2	-	-	
Hori.	5725.000	PK	39.0	32.4	17.4	37.6	51.2	63.2	12.0	
Vert.	5745.000	PK	72.3	32.4	17.4	37.6	84.5	-	-	
Vert.	5725.000	PK	32.3	32.4	17.4	37.6	44.5	64.5	20.0	

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

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	March 12, 2014	March 16, 2014
Temperature / Humidity	20 deg.C, 33 %RH	20 deg.C, 31 %RH
Engineer	Tatsuya Arai	Yasumasa Owaki
Mode	Tx, 5785 MHz	
	Tx, IEEE802.11a	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	11570.000	PK	43.2	39.5	10.3	38.5	54.5	73.9	19.4	100	0	
Hori.	17355.000	PK	44.2	42.4	3.8	38.9	51.5	73.9	22.4	100	0	
Vert.	11570.000	PK	44.2	39.5	10.3	38.5	55.5	73.9	18.4	100	0	
Vert.	17355.000	PK	44.2	42.4	3.8	38.9	51.5	73.9	22.4	100	0	

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

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.	11570.000	AV	33.6	39.5	10.3	38.5	0.3	45.2	53.9	8.7	
Hori.	17355.000	AV	36.3	42.4	3.8	38.9	0.3	43.9	53.9	10.0	
Vert.	11570.000	AV	33.8	39.5	10.3	38.5	0.3	45.4	53.9	**8.5**	
Vert.	17355.000	AV	36.7	42.4	3.8	38.9	0.3	44.3	53.9	9.6	

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

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	March 12, 2014	March 16, 2014
Temperature / Humidity	20 deg.C, 33 %RH	20 deg.C, 31 %RH
Engineer	Tatsuya Arai	Yasumasa Owaki
Mode	Tx, 5825 MHz	
	Tx, IEEE802.11a	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	11650.000	PK	43.2	39.5	10.3	38.5	54.5	73.9	19.4	100	0	
Hori.	17475.000	PK	44.0	43.3	3.9	39.0	52.2	73.9	21.7	100	0	
Vert.	11650.000	PK	42.5	39.5	10.3	38.5	53.8	73.9	20.1	100	0	
Vert.	17475.000	PK	44.8	43.3	3.9	39.0	53.0	73.9	20.9	100	0	

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

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.	11650.000	AV	32.7	39.5	10.3	38.5	0.3	44.3	53.9	9.6	
Hori.	17475.000	AV	36.2	43.3	3.9	39.0	0.3	44.7	53.9	9.2	
Vert.	11650.000	AV	33.8	39.5	10.3	38.5	0.3	45.4	53.9	**8.5**	
Vert.	17475.000	AV	35.8	43.3	3.9	39.0	0.3	44.3	53.9	9.6	

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.	5825.000	PK	72.9	32.5	17.5	37.7	85.2	-	-	
Hori.	5850.000	PK	31.0	32.5	17.6	37.8	43.3	65.2	21.9	
Hori.	5857.875	PK	32.1	32.5	17.7	37.8	44.5	65.2	20.7	
Vert.	5825.000	PK	68.1	32.5	17.5	37.7	80.4	-	-	
Vert.	5850.000	PK	34.9	32.5	17.6	37.8	47.2	60.4	13.2	
Vert.	5857.875	PK	33.9	32.5	17.7	37.8	46.3	60.4	14.1	

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

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	March 12, 2014	March 16, 2014
Temperature / Humidity	20 deg.C, 33 %RH	20 deg.C, 31 %RH
Engineer	Tatsuya Arai	Yasumasa Owaki
Mode	Tx, 5745 MHz	
	Tx, IEEE802.11n-20HT	

(* 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.	11490.000	PK	42.0	39.5	10.3	38.5	53.3	73.9	20.6	100	0	
Hori.	17235.000	PK	42.9	41.5	3.5	38.9	49.0	73.9	24.9	100	0	
Vert.	11490.000	PK	41.7	39.5	10.3	38.5	53.0	73.9	20.9	100	0	
Vert.	17235.000	PK	44.3	41.5	3.5	38.9	50.4	73.9	23.5	100	0	

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

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.	11490.000	AV	34.1	39.5	10.3	38.5	0.3	45.7	53.9	**8.2**	
Hori.	17235.000	AV	33.6	41.5	3.5	38.9	0.3	40.0	53.9	13.9	
Vert.	11490.000	AV	33.9	39.5	10.3	38.5	0.3	45.5	53.9	8.4	
Vert.	17235.000	AV	35.4	41.5	3.5	38.9	0.3	41.8	53.9	12.1	

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.	5745.000	PK	70.3	32.4	17.4	37.6	82.5	-	-	
Hori.	5725.000	PK	35.5	32.4	17.4	37.6	47.7	62.5	14.8	
Vert.	5745.000	PK	69.8	32.4	17.4	37.6	82.0	-	-	
Vert.	5725.000	PK	32.1	32.4	17.4	37.6	44.3	62.0	17.7	

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

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	March 12, 2014	March 16, 2014
Temperature / Humidity	20 deg.C, 33 %RH	20 deg.C, 31 %RH
Engineer	Tatsuya Arai	Yasumasa Owaki
Mode	Tx, 5785 MHz	
	Tx, IEEE802.11n-20HT	

(* 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.	11570.000	PK	41.2	39.5	10.3	38.5	52.5	73.9	21.4	100	0	
Hori.	17355.000	PK	44.5	42.4	3.8	38.9	51.8	73.9	22.1	100	0	
Vert.	11570.000	PK	41.3	39.5	10.3	38.5	52.6	73.9	21.3	100	0	
Vert.	17355.000	PK	43.9	42.4	3.8	38.9	51.2	73.9	22.7	100	0	

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

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.	11570.000	AV	32.8	39.5	10.3	38.5	0.3	44.4	53.9	9.5	
Hori.	17355.000	AV	34.8	42.4	3.8	38.9	0.3	42.4	53.9	11.5	
Vert.	11570.000	AV	33.8	39.5	10.3	38.5	0.3	45.4	53.9	**8.5**	
Vert.	17355.000	AV	35.5	42.4	3.8	38.9	0.3	43.1	53.9	10.8	

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

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	March 12, 2014	March 16, 2014
Temperature / Humidity	20 deg.C, 33 %RH	20 deg.C, 31 %RH
Engineer	Tatsuya Arai	Yasumasa Owaki
Mode	Tx, 5825 MHz	
	Tx, IEEE802.11n-20HT	

(* 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.	11650.000	PK	42.6	39.5	10.3	38.5	53.9	73.9	20.0	100	0	
Hori.	17475.000	PK	43.8	43.3	3.9	39.0	52.0	73.9	21.9	100	0	
Vert.	11650.000	PK	42.9	39.5	10.3	38.5	54.2	73.9	19.7	100	0	
Vert.	17475.000	PK	43.9	43.3	3.9	39.0	52.1	73.9	21.8	100	0	

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

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.	11650.000	AV	33.0	39.5	10.3	38.5	0.3	44.6	53.9	**9.3**	
Hori.	17475.000	AV	35.4	43.3	3.9	39.0	0.3	43.9	53.9	10.0	
Vert.	11650.000	AV	32.8	39.5	10.3	38.5	0.3	44.4	53.9	9.5	
Vert.	17475.000	AV	35.9	43.3	3.9	39.0	0.3	44.4	53.9	9.5	

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.	5825.000	PK	73.4	32.5	17.5	37.7	85.7	-	-	
Hori.	5850.000	PK	34.0	32.5	17.6	37.8	46.3	65.7	19.4	
Hori.	5857.875	PK	33.5	32.5	17.7	37.8	45.9	65.7	19.8	
Vert.	5825.000	PK	63.9	32.5	17.5	37.7	76.2	-	-	
Vert.	5850.000	PK	33.2	32.5	17.6	37.8	45.5	56.2	10.7	
Vert.	5857.875	PK	34.5	32.5	17.7	37.8	46.9	56.2	**9.3**	

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

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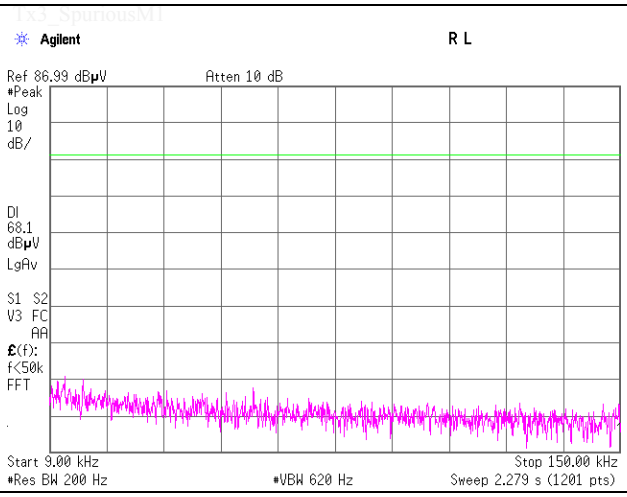
(Reference chart) Spurious emission (Conducted)

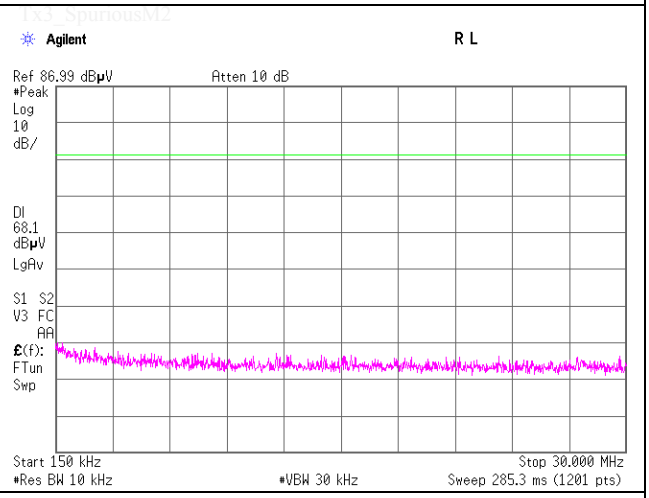
Tx, IEEE802.11g, PN9, worst data mode 24Mbps

Tx, 2462MHz (below 30MHz)

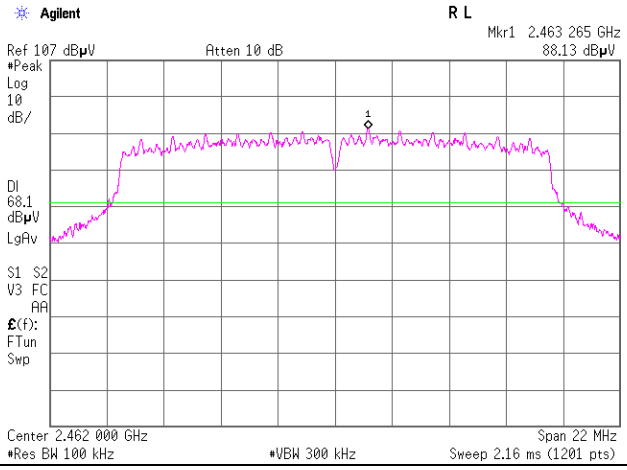
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc limit



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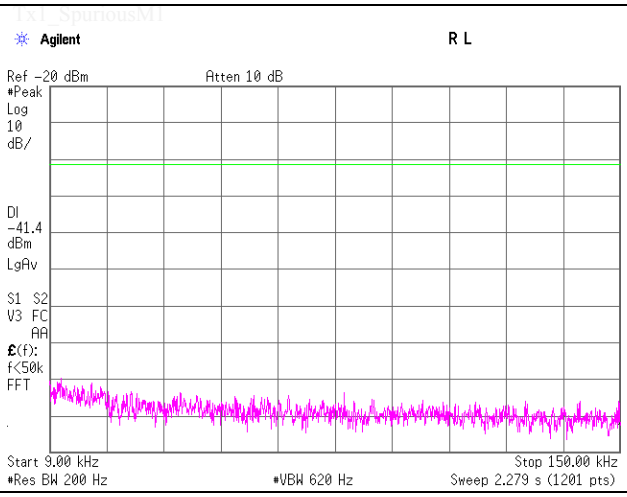
(Reference chart) Spurious emission (Conducted)

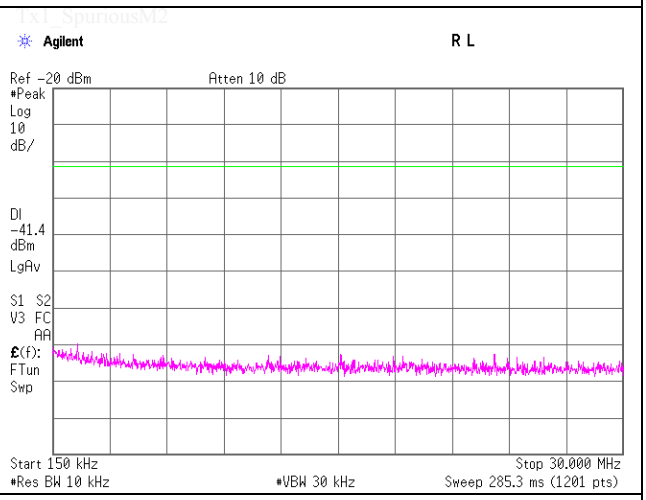
Tx, IEEE802.11n-20HT, PN9, worst data mode 0(MCS)

Tx, 5745MHz (below 30MHz)

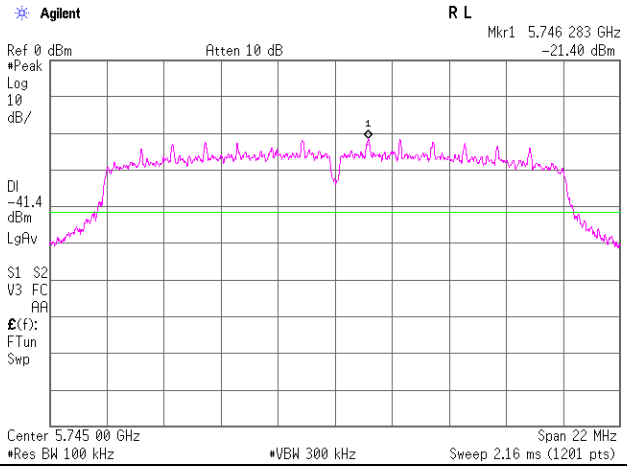
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc limit



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Maximum Power Spectral Density

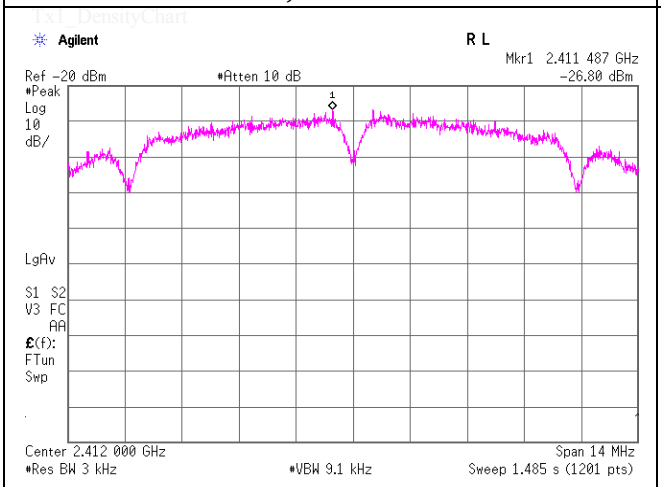
(PKPSD)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	March 11, 2014	
Temperature / Humidity	24deg.C , 39%RH	
Engineer	Tatsuya Arai	
Mode	Tx, IEEE802.11b, PN9, worst data mode 1Mbps	

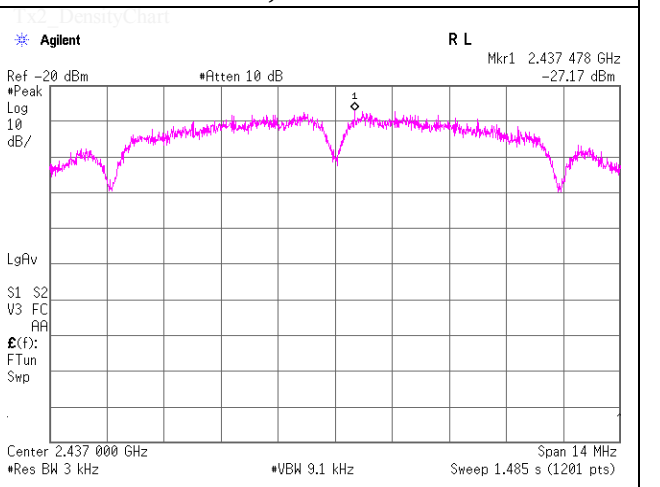
Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	2411.49	-26.80	1.99	20.23	-4.58	8.00	12.58
2437.0000	2437.48	-27.17	1.99	20.23	-4.95	8.00	12.95
2462.0000	2462.51	-26.75	2.00	20.23	-4.52	8.00	12.52

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

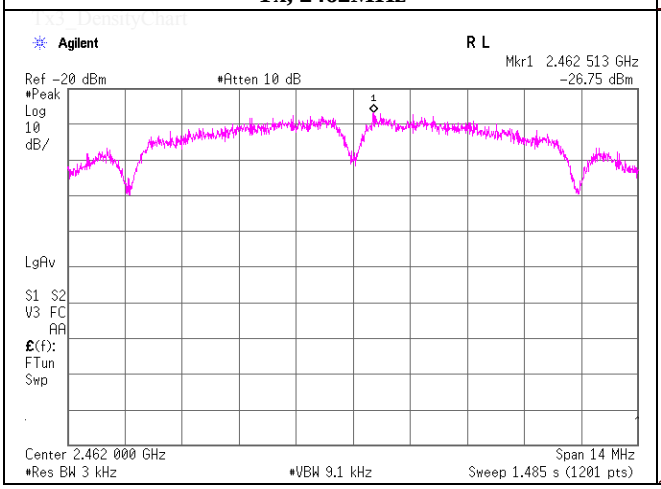
Tx, 2412MHz



Tx, 2437MHz



Tx, 2462MHz



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Maximum Power Spectral Density

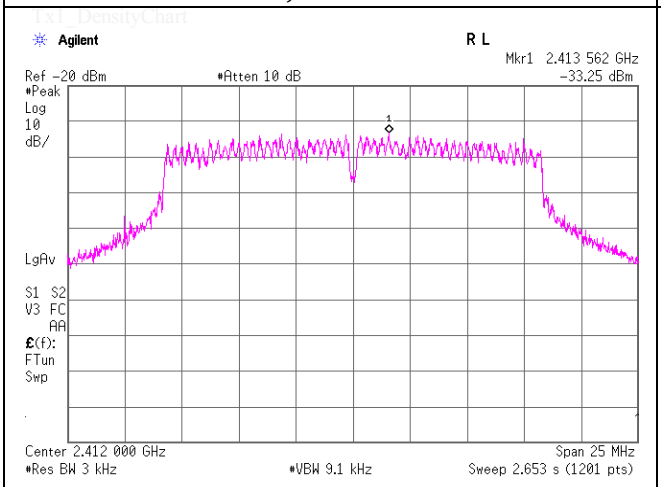
(PKPSD)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	March 11, 2014	
Temperature / Humidity	24deg.C , 39%RH	
Engineer	Tatsuya Arai	
Mode	Tx, IEEE802.11g, PN9, worst data mode 24Mbps	

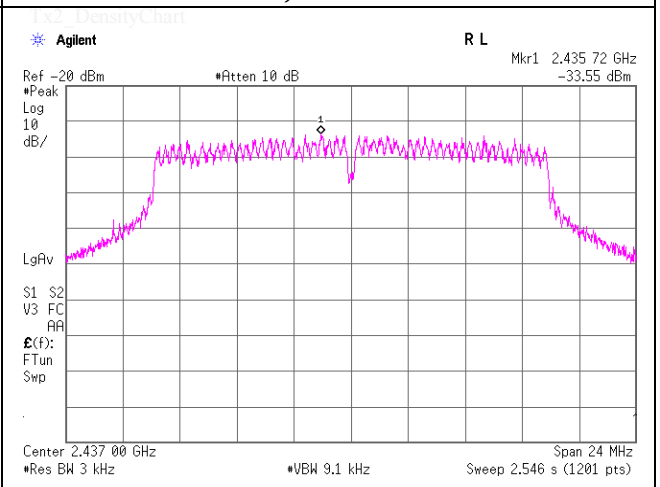
Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	2413.56	-33.25	1.99	20.23	-11.03	8.00	19.03
2437.0000	2435.72	-33.55	1.99	20.23	-11.33	8.00	19.33
2462.0000	2465.74	-33.32	2.00	20.23	-11.09	8.00	19.09

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

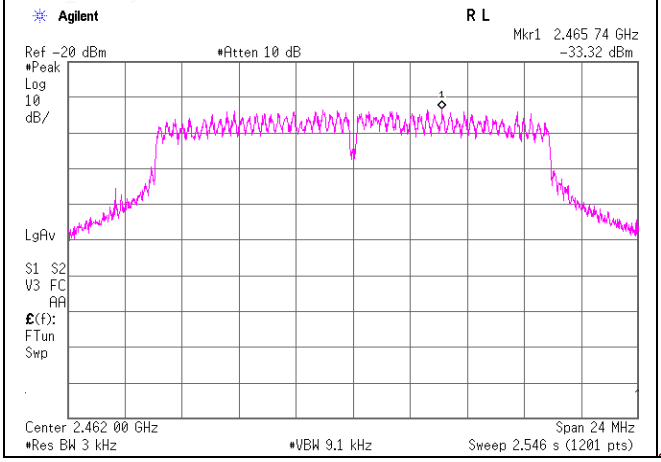
Tx, 2412MHz



Tx, 2437MHz



Tx, 2462MHz



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Maximum Power Spectral Density

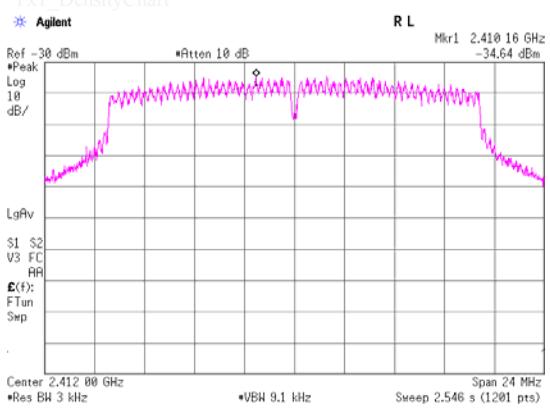
(PKPSD)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	March 11, 2014	
Temperature / Humidity	24deg.C , 39%RH	
Engineer	Tatsuya Arai	
Mode	Tx, IEEE802.11n-20HT, PN9, worst data mode 1(MCS)	

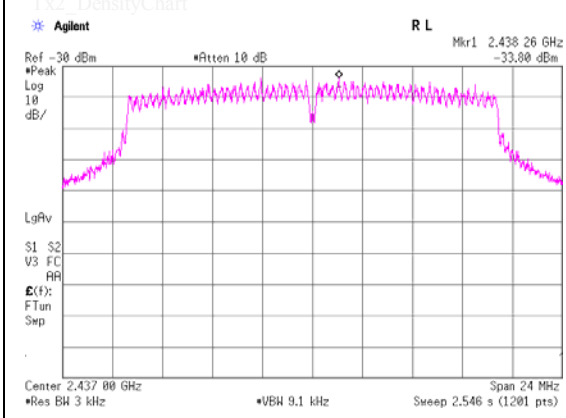
Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	2410.16	-34.64	1.99	20.23	-12.42	8.00	20.42
2437.0000	2438.26	-33.80	1.99	20.23	-11.58	8.00	19.58
2462.0000	2461.38	-34.49	2.00	20.23	-12.26	8.00	20.26

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

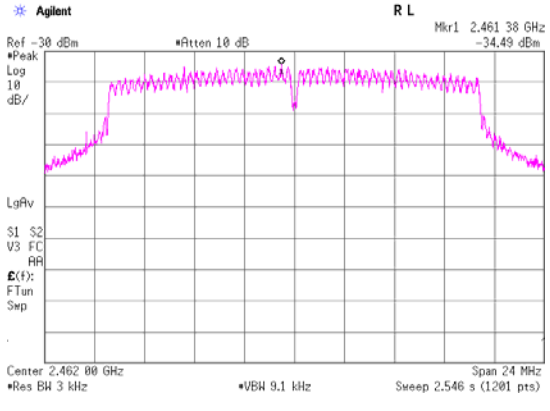
Tx, 2412MHz



Tx, 2437MHz



Tx, 2462MHz



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Maximum Power Spectral Density

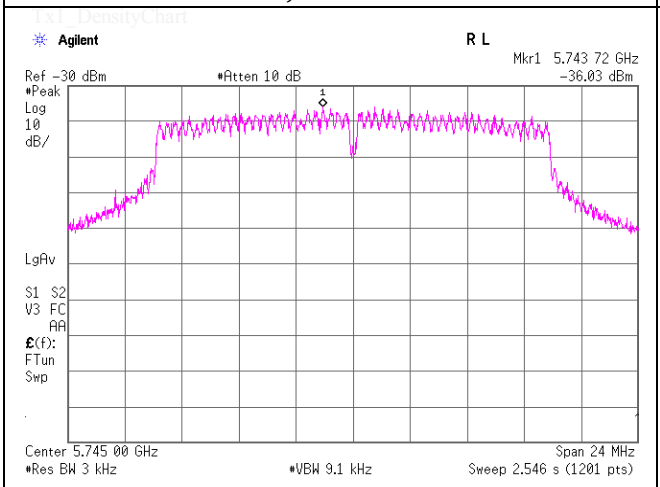
(PKPSD)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	March 11, 2014	
Temperature / Humidity	24deg.C , 39%RH	
Engineer	Tatsuya Arai	
Mode	Tx, IEEE802.11a, PN9, worst data mode 6Mbps	

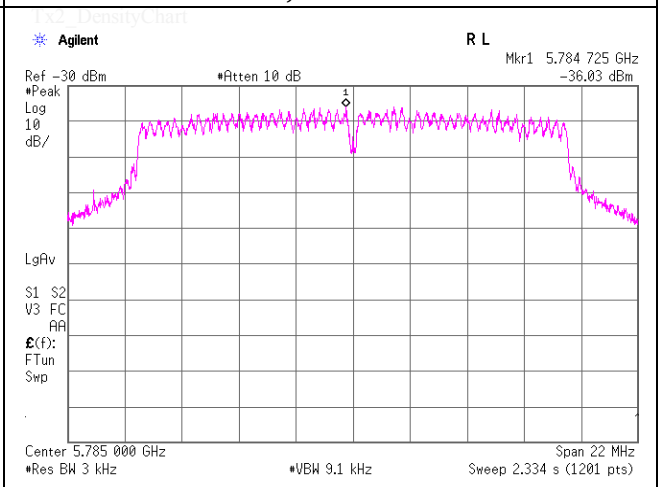
Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
5745.0000	5743.72	-36.03	3.48	20.25	-12.30	8.00	20.30
5785.0000	5784.73	-36.03	3.48	20.24	-12.31	8.00	20.31
5825.0000	5825.90	-35.45	3.48	20.24	-11.73	8.00	19.73

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

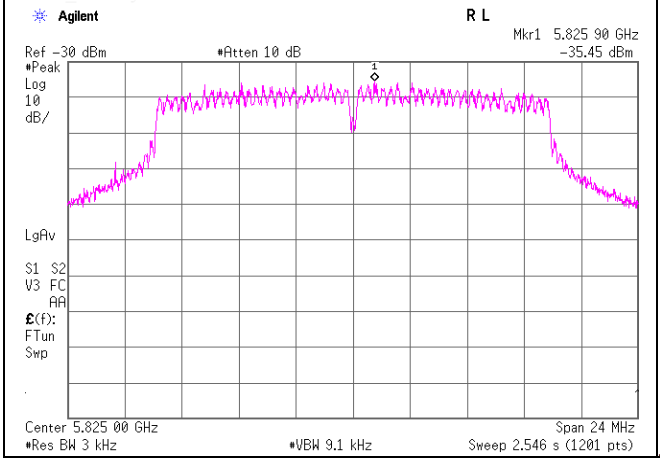
Tx, 5745MHz

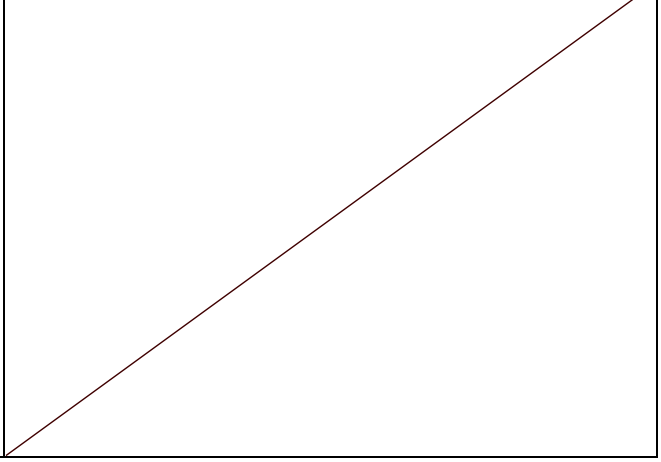


Tx, 5785MHz



Tx, 5825MHz





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Maximum Power Spectral Density

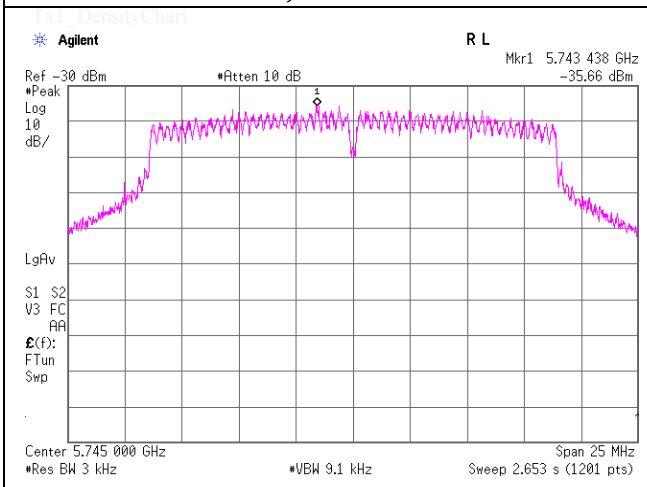
(PKPSD)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	March 11, 2014	
Temperature / Humidity	24deg.C , 39%RH	
Engineer	Tatsuya Arai	
Mode	Tx, IEEE802.11n-20HT, PN9, worst data mode 0(MCS)	

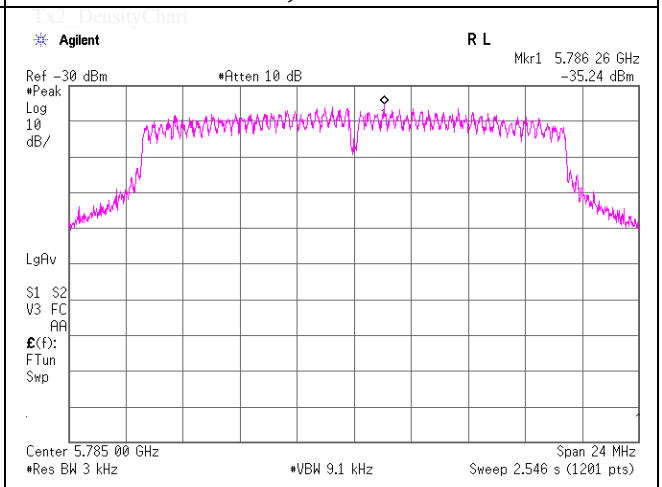
Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
5745.0000	5743.44	-35.66	3.48	20.25	-11.93	8.00	19.93
5785.0000	5786.26	-35.24	3.48	20.24	-11.52	8.00	19.52
5825.0000	5825.65	-34.95	3.48	20.24	-11.23	8.00	19.23

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

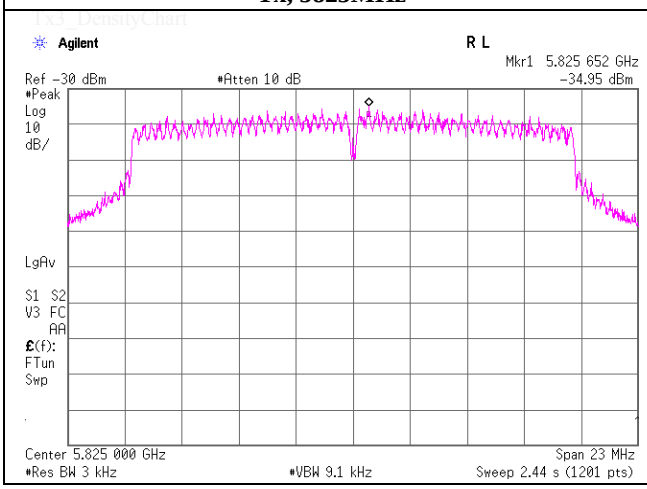
Tx, 5745MHz

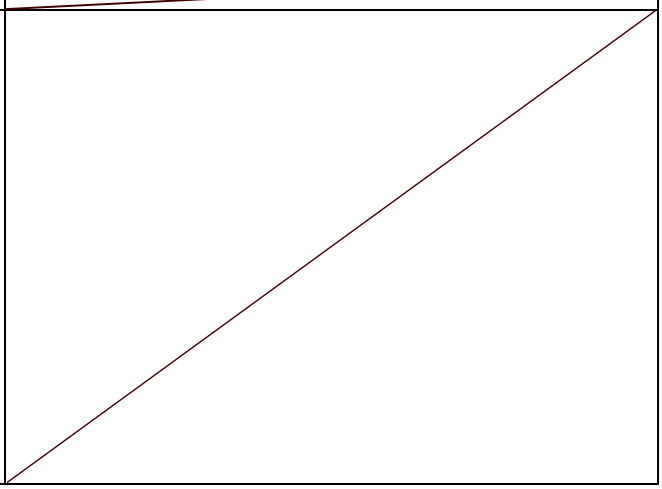


Tx, 5785MHz



Tx, 5825MHz





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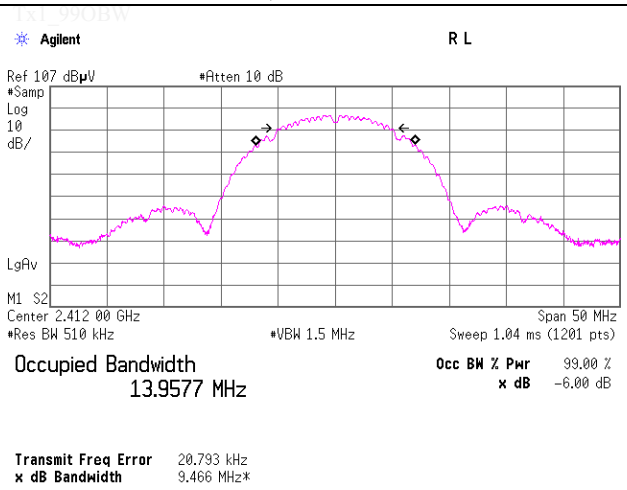
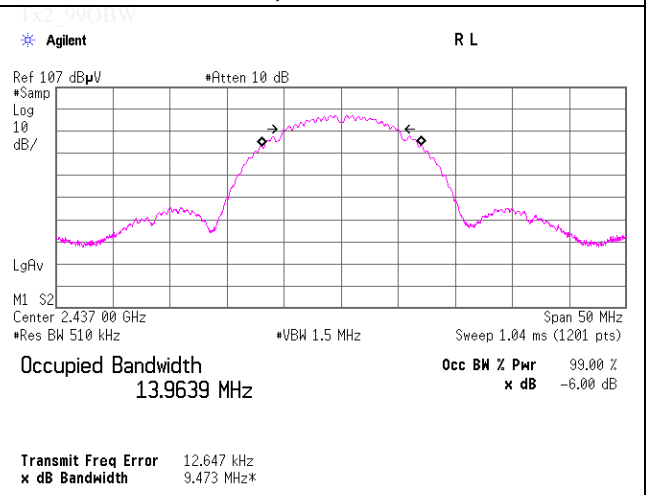
99% Occupied Bandwidth

Tx, IEEE802.11b, PN9, worst data mode 1Mbps

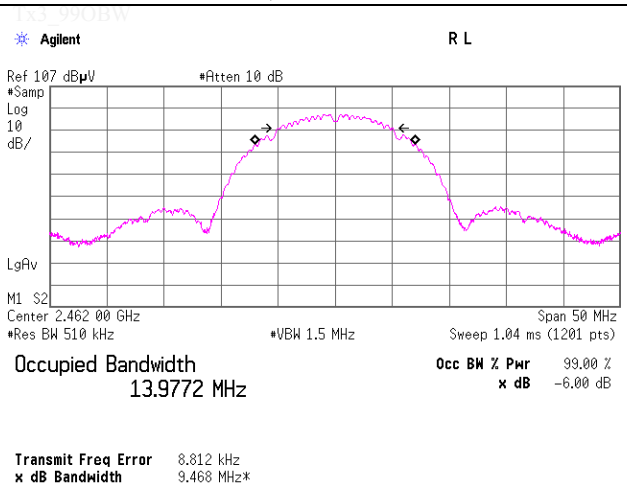
Tx, 2412MHz



Tx, 2437MHz



Tx, 2462MHz



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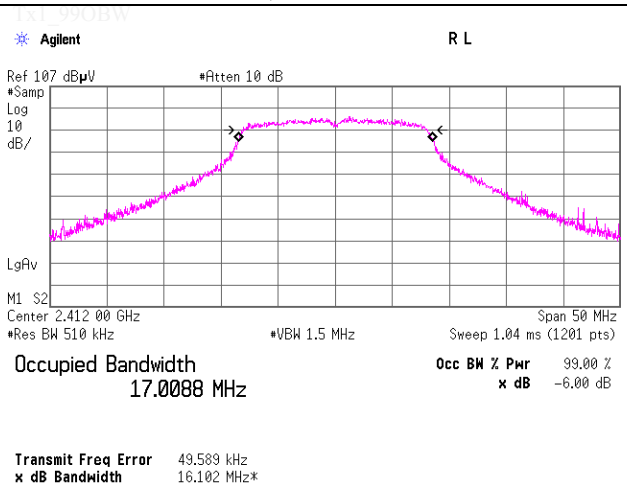
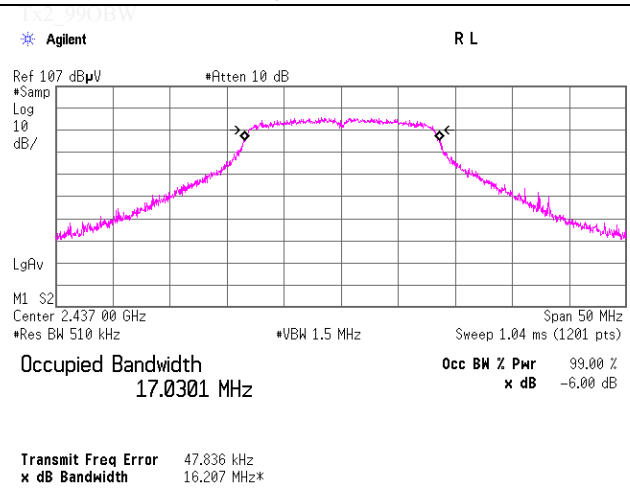
99% Occupied Bandwidth

Tx, IEEE802.11g, PN9, worst data mode 24Mbps

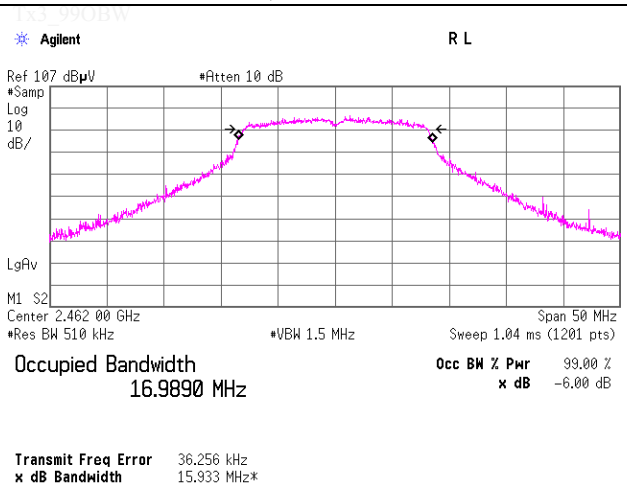
Tx, 2412MHz



Tx, 2437MHz



Tx, 2462MHz



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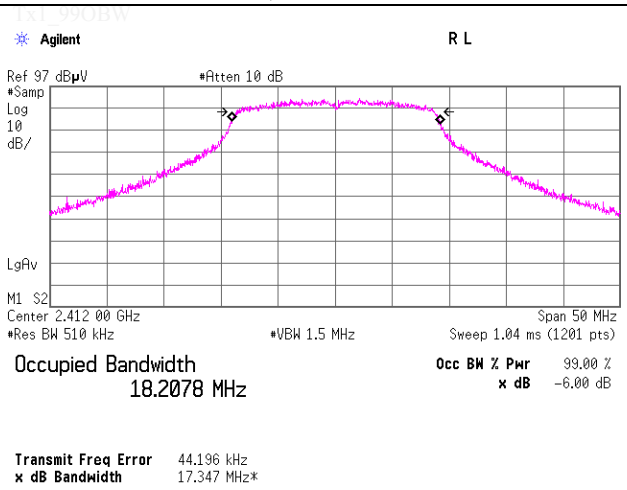
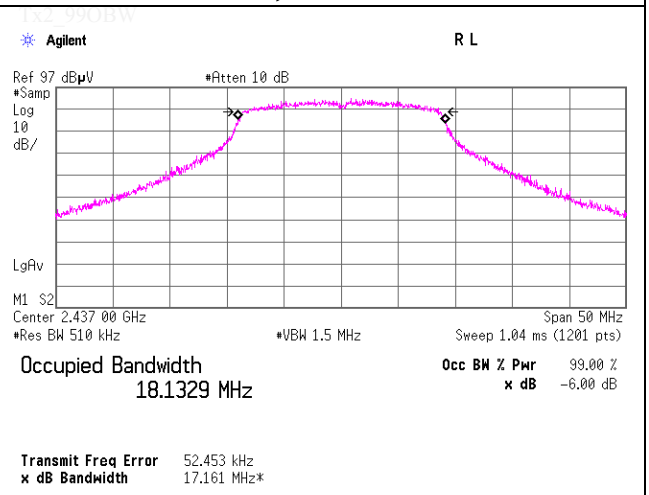
99% Occupied Bandwidth

Tx, IEEE802.11n-20HT, PN9, worst data mode 1(MCS)

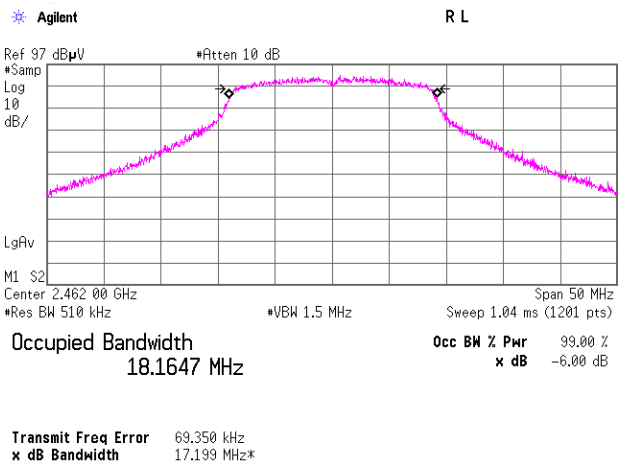
Tx, 2412MHz



Tx, 2437MHz



Tx, 2462MHz



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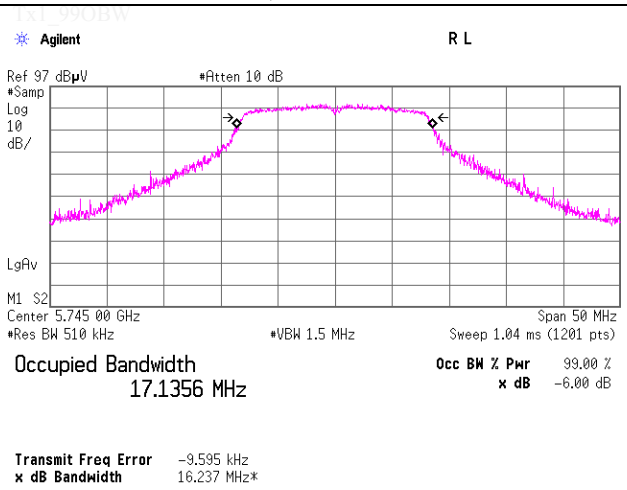
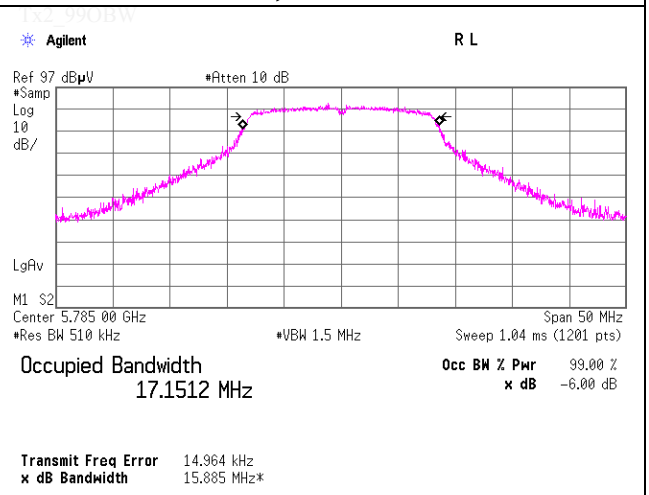
99% Occupied Bandwidth

Tx, IEEE802.11a, PN9, worst data mode 6Mbps

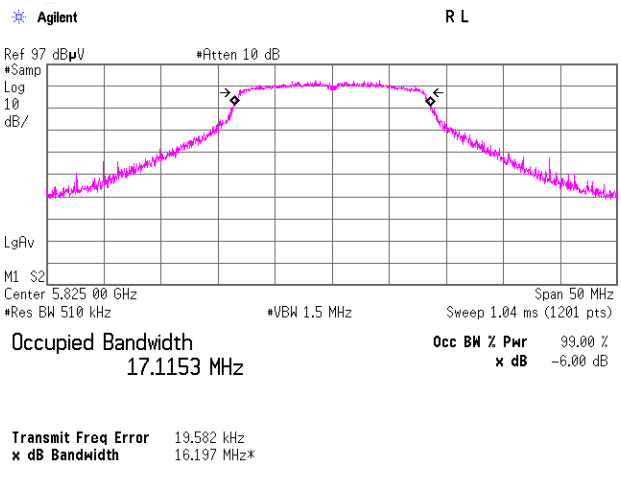
Tx, 5745MHz



Tx, 5785MHz



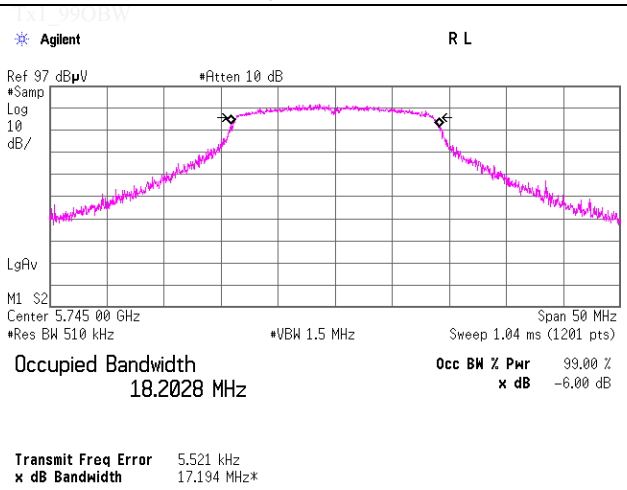
Tx, 5825MHz



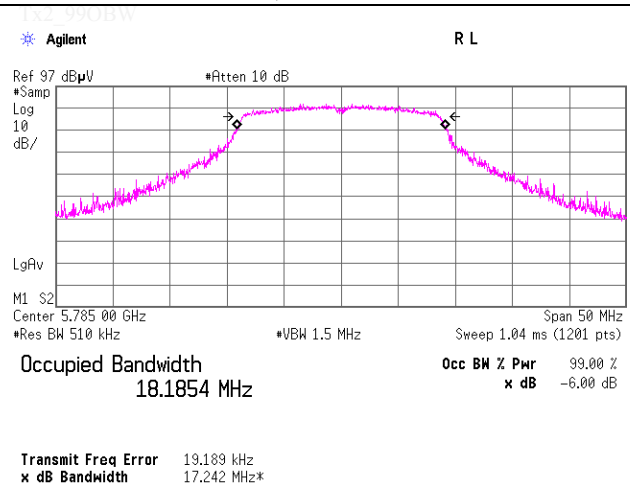
99% Occupied Bandwidth

Tx, IEEE802.11n-20HT, PN9, worst data mode 0(MCS)

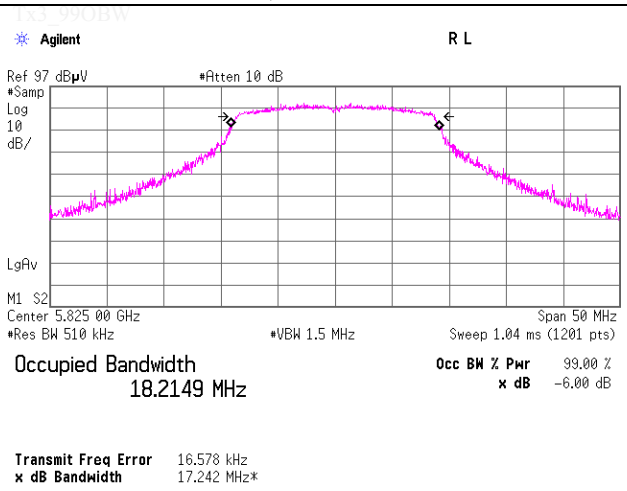
Tx, 5745MHz



Tx, 5785MHz



Tx, 5825MHz



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APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	AT	2014/02/03 * 12
SCC-G13	Coaxial Cable	Suhner	SUCOFLEX 102	31599/2	AT	2014/03/14 * 12
SAT20-05	Attenuator	Weinschel Corp.	54A-20	Y5649	AT	2013/11/27 * 12
SOS-10	Humidity Indicator	A&D	AD-5681	4064561	AT	2014/02/21 * 12
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2013/04/09 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2013/04/09 * 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
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2013/11/22 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2013/11/22 * 12
SHA-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
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	RE	2014/03/04 * 12
SJM-11	Measure	PROMART	SEN1935	-	RE/CE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFI,MF)	-	RE/CE	-
SCC-G16	Coaxial Cable	Suhner	SUCOFLEX 102	32704/2	RE	2014/03/13 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2013/03/14 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2014/03/14 * 12
SFL-03	Highpass Filter	MICRO-TRONICS	HPM50112	028	RE	2013/11/22 * 12
SHA-06	Horn Antenna	ETS LINDGREN	3160-10	LM3459	RE	2013/03/14 * 12
SAF-10	Pre Amplifier	TOYO Corporation	HAP26-40W	00000010	RE	2014/03/14 * 12
SCC-G19	Coaxial Cable	Suhner	SUCOFLEX 102A	1188/2A	RE	2014/03/14 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	RE	2014/02/03 * 12
SCC-C9/C10/ SRSE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/N S4906	-/0901-271(RF Selector)	CE	2013/04/03 * 12
SLS-05	LISN	Rohde & Schwarz	ENV216	100516	CE	2014/02/26 * 12
SAT3-05	Attenuator	JFW	50HF-003N	-	CE	2014/02/17 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2014/03/07 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	CE/RE	2014/03/04 * 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/C 3/C4/C5/C10/ SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhne r/Suhner/Suhner/Suhn er/TOYO	8D2W/12DSFA/14 1PE/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

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 conducted test