



RADIO TEST REPORT

Test Report No.: 32JE0015-SH-01-C-R1

Applicant : **Sony Corporation**
Type of Equipment : **Interchangeable Lens Digital Camera**
Model No. : **NEX-6**
FCC ID : **AK8NEX6**
Test regulation : **FCC Part15 Subpart C: 2012**
Test result : **Complied**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the 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.
7. This report is a revised version of 32JE0015-SH-01-C. 32JE0015-SH-01-C is replaced with this report.

Date of test: June 14 to July 7, 2012

Tested by: *H. Shirasawa*

Hikaru Shirasawa
Engineer of WiSE Japan,
UL Verification Service

Approved by : *T. Imamura*

Toyokazu Imamura
Leader of WiSE Japan,
UL Verification Service

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



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13-EM-F0429

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SECTION 1: Customer information

Company Name : Sony Corporation
Address : Shinagawa INTERCITY C Tower 2-15-3, Konan Minato-ku, Tokyo, Japan
Telephone Number : +81-3-5769-5605
Facsimile Number : +81-3-5769-5996
Contact Person : Keizo Tsuneki

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

2.1 Identification of E.U.T.

Type of Equipment : Interchangeable Lens Digital Camera
Model Number : NEX-6
Serial Number : Refer to clause 4.2.
Rating : DC7.6V
Country of Mass-production : Thailand
Condition of EUT : Engineering prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample : June 4, 2012
Modification of EUT : No modification by the test lab.

2.2 Product description

Model: NEX-6 (referred to as the EUT in this report) is an Interchangeable Lens Digital Camera.

Clock frequency(ies) in the system : 32.768kHz, 10MHz, 12MHz, 33MHz

Radio specification

Equipment type : Transceiver
Frequency of operation : 2412-2462MHz
Bandwidth & channel spacing : 20MHz & 5MHz
Type of modulation : DSSS: CCK, DQPSK, DBPSK
OFDM: 64QAM, 16QAM, QPSK, BPSK
ITU code : D1D, G1D
Antenna type : Inverted F
Antenna connector type : None
Antenna gain : -5.18 dBi
Operation temperature range : 0 to 40 deg.C.

FCC 15.31 (e)

The RF transmitter 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

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

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SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : FCC Part 15 Subpart C: 2012, final revised on May 17, 2012 and effective June 18, 2012
 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 17, 2012 does not affect the test specification applied to the EUT.

The EUT will be tested for the compliance with FCC Part 15 Subpart B by the customer.

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2009 7. AC powerline conducted emission measurements	FCC 15.207	-	N/A	26.5dB Freq.: 0.15031MHz Phase: N Detector: Quasi-Peak Mode: Tx 2437MHz, IEEE 802.11n	Complied
6dB bandwidth	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(2) & 15.209	Conducted	N/A	* See data	Complied
Maximum peak output power	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (b)(3) & 15.209	Conducted	N/A		Complied
Spurious emission & Restricted band edges	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.109, 15.247 (d) & 15.209	Conducted / Radiated	N/A	3.3dB Freq.: 323.998MHz Detector: Quasi-Peak Polarization: Horizontal Mode: Tx 2437MHz, IEEE 802.11n	Complied
Power density	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (e) & 15.209	Conducted	N/A	* See data	Complied

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

These tests were also referred to "Guidance on Measurement for Digital Transmission Systems Section15.247".

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2009 13. Measurement of intentional radiators, 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.

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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) AMN/LISN	9kHz-150kHz	4.0 dB	4.0 dB	3.9 dB
	150kHz-30MHz	3.6 dB	3.6 dB	3.6 dB
Radiated emission (Measurement distance: 3m)	9kHz-30MHz	3.7 dB	3.7 dB	3.6 dB
	30MHz-300MHz	4.9 dB	5.1 dB	5.0 dB
	300MHz-1GHz	5.0 dB	5.2 dB	5.0 dB
	1GHz-15GHz	4.8 dB	4.8 dB	4.9 dB
Radiated emission (Measurement distance: 1m)	15GHz-18GHz	5.6 dB	5.6 dB	5.6 dB
	18GHz-40GHz	4.8 dB	4.3 dB	4.4 dB

*1: SAC=Semi-Anechoic Chamber

*2: SR= Shielded Room is applied besides radiated emission

Conducted emission test

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

Radiated emission test

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

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

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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
<input type="checkbox"/> No.1 Semi-anechoic chamber	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input type="checkbox"/> No.2 Semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input checked="" type="checkbox"/> No.3 Semi-anechoic chamber	697847	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
<input type="checkbox"/> No.4 Full-anechoic chamber	-	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
<input type="checkbox"/> No.1 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input checked="" type="checkbox"/> No.2 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.3 shielded room	-	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
<input type="checkbox"/> No.4 shielded room	-	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
<input checked="" type="checkbox"/> No.5 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
<input type="checkbox"/> No.6 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-

3.6 Test setup, Data of test & Test instruments

Refer to APPENDIX 1 to 3.

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

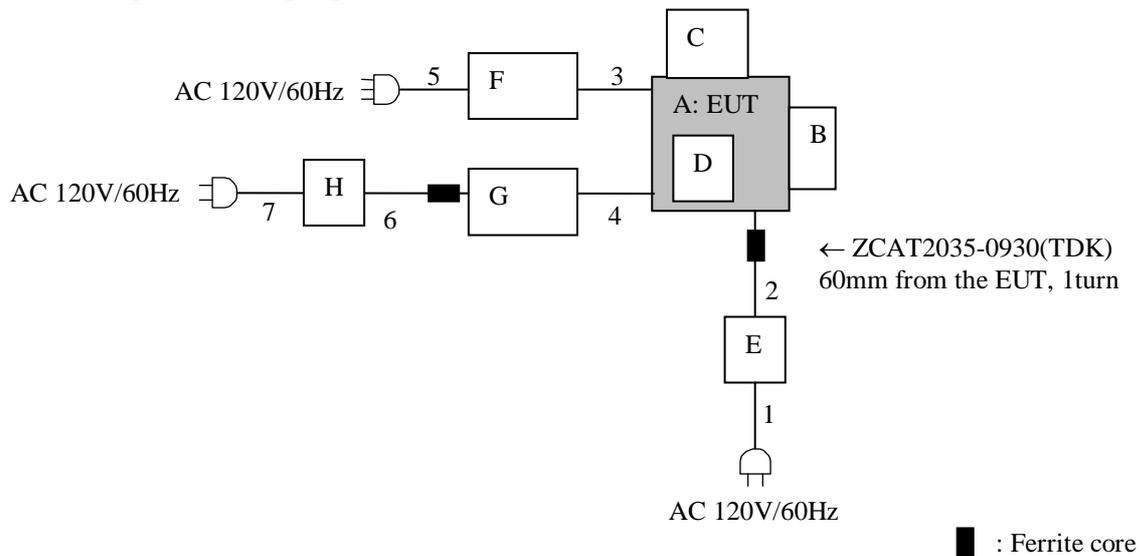
4.1 Operating mode

Test item	Mode	Tested frequency	Power setting *1)	Worst data rate *2)
Conducted emission & Radiated emission (below 1GHz) *3)	Transmitting IEEE 802.11n (HT20)	2437MHz	7	MCS6, PN9
Other items	Transmitting IEEE 802.11b	2412MHz, 2437MHz, 2462MHz	7	1Mbps, PN9
	Transmitting IEEE 802.11g	2412MHz, 2437MHz, 2462MHz	7	24Mbps, PN9
	Transmitting IEEE 802.11n (HT20)	2412MHz, 2437MHz, 2462MHz	7	MCS6, PN9

*1) Test software: 20120521
*2) The worst condition was determined based on the test result of Maximum Peak Output Power.
*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 worst case conditions.

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Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Interchangeable Lens Digital Camera	NEX-6	*1)	SONY	EUT
B	Interchangeable Lens	SEL1855	7308468	SONY	-
C	Flash	HVL-F60	-	SONY	-
D	Memory Stick	MS-HX8B	-	SONY	-
E	AC Adaptor	AC-PW20	12033004300	SONY	-
F	LCD Monitor	E2200HD	ETH2901919026	BenQ	-
G	Laptop PC	Latitude E5500	0DW634	DELL	-
H	AC Adaptor	HA90PE0-00	0W529F	DELL	-

*1) Conducted/Radiated emission: 131, Antenna terminal conducted test: 111

List of cables used

No.	Cable	Length (m)	Shield-Cable	Shield-Connector	Remarks
1	AC	2.0	Unshielded	Unshielded	-
2	DC	1.6	Unshielded	Unshielded	-
3	HDMI	1.5	Shielded	Shielded	-
4	USB	1.0	Shielded	Shielded	-
5	AC	1.8	Unshielded	Unshielded	-
6	DC	1.8	Unshielded	Unshielded	-
7	AC	0.9	Unshielded	Unshielded	-

* All cables used for the measurement are exclusive use or marketed.

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SECTION 5: Conducted emission

5.1 Operating environment

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

5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 0.8m above the conducting ground plane. The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals 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 and excess AC cable was bundled in center. I/O cables that were connected to the peripherals were bundled in center. They were folded back and for the forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. 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 via AC adaptor within a Shielded room. The EUT was connected to a Line Impedance Stabilization Network (LISN) via AC adaptor. An overview sweep with peak detection has been performed. The measurements had been performed with a quasi-peak detector and if required, an average detector. The conducted emission measurements were made with the following detection of the test receiver.

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

5.5 Results

Summary of the test results : Pass
Refer to APPENDIX 1

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

Test procedure

The bandwidth was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 1

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SECTION 7: Maximum peak output power

Test procedure

The Maximum Peak Output Power was measured with a power meter connected to the antenna port.

Detection type: Peak / Average *1)

Summary of the test results: Pass

Refer to APPENDIX 1

*1) Testing using an average detector was performed in order to confirm that the output power of the EUT met the exclusion limits stated in FCC Part 2 Section 2.1093 and FCC radio frequency (RF) Exposure Guidelines in Supplement C to OET 65 and the EUT was exempt from RF exposure SAR evaluation.

SECTION 8: Radiated emission

8.1 Operating environment

Test place : See test data (APPENDIX 1)

Temperature : See test data (APPENDIX 1)

Humidity : See test data (APPENDIX 1)

8.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 0.8m above the conducting ground plane.

The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.

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

Photographs of the set up are shown in APPENDIX 3.

8.3 Test conditions

Frequency range : 30MHz - 25GHz

EUT position : Table top

8.4 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 of the test receiver.

Frequency	30-1000MHz	1-25GHz	
Detection type	Quasi-Peak	Peak	* Average
IF Bandwidth	120kHz	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: *1)

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

*1) Refer to the VBW (Average) calculation sheet in APPENDIX 1.

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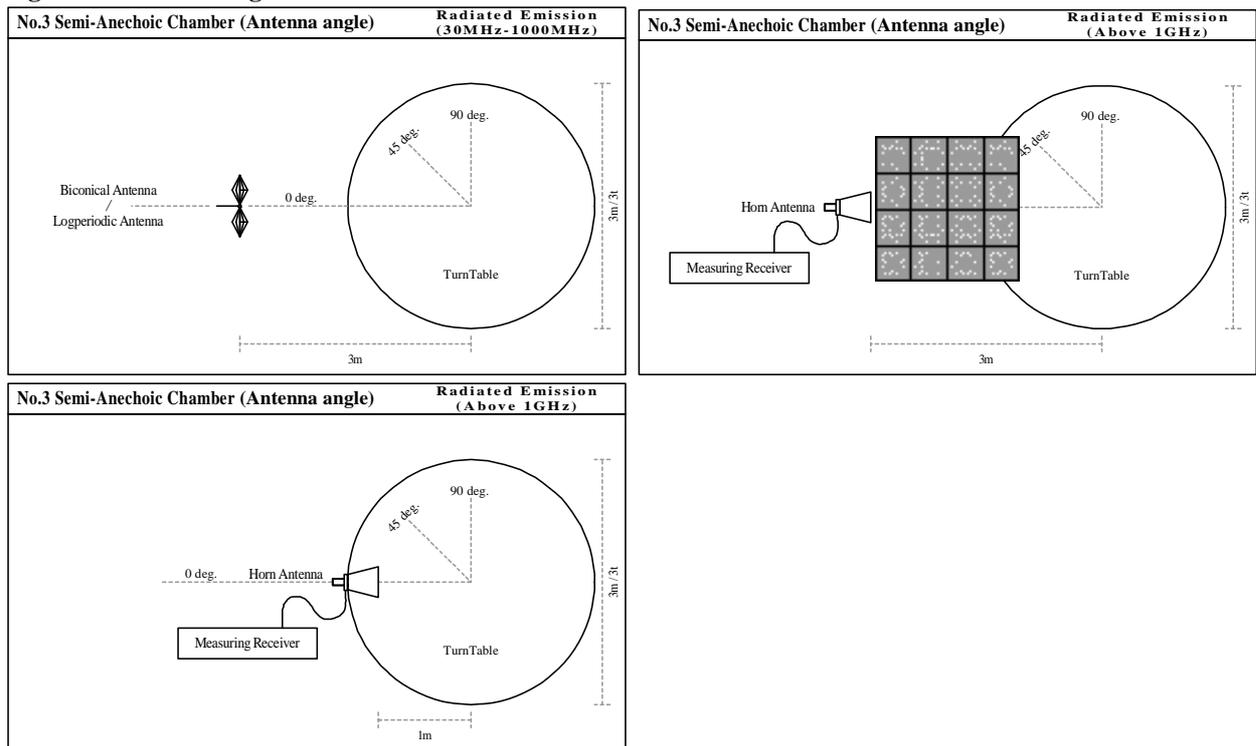
The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT and to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Worst position:

Antenna polarization \ Frequency	Carrier	Spurious			
		Below 1GHz	1-15GHz	15-18GHz	18-25GHz
Horizontal	X	Z	X	X	X
Vertical	Z	Z	Z	Z	Z

The display angle can be changed in 0 to 90 deg. based on the product specification. Therefore, the carrier level and noise levels were compared at each angle, and the test was made at the position (90 deg.) that has the maximum noise.

Figure 1. Antenna angle



8.5 Band edge

Band edge level is below the limits of FCC 15.209. Refer to the data.

8.6 Results

Summary of the test results : Pass *No noise was detected above the 5th order harmonics.

Refer to APPENDIX 1

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SECTION 9: Spurious emissions (Antenna port conducted)

Test procedure

The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port.

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

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 *1)

RBW / VBW : 30kHz / 100kHz *2)

*1) PSD Option 1 of " Measurement of Digital Transmission Systems Operating under Section 15.247".

*2) The test was not performed at RBW: 3kHz that was stated in the Regulation. However, the measurement value with RBW: 3kHz is less than the value of RBW: 30kHz and the test data met the limit with RBW: 30kHz.

Summary of the test results: Pass

Refer to APPENDIX 1

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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
99% Occupied bandwidth

APPENDIX 2: Test instruments

Test instruments

APPENDIX 3: Photographs of test setup

Conducted emission
Radiated emission
Pre-check of worst position

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DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.2 Shielded Room
Date : 2012/07/07

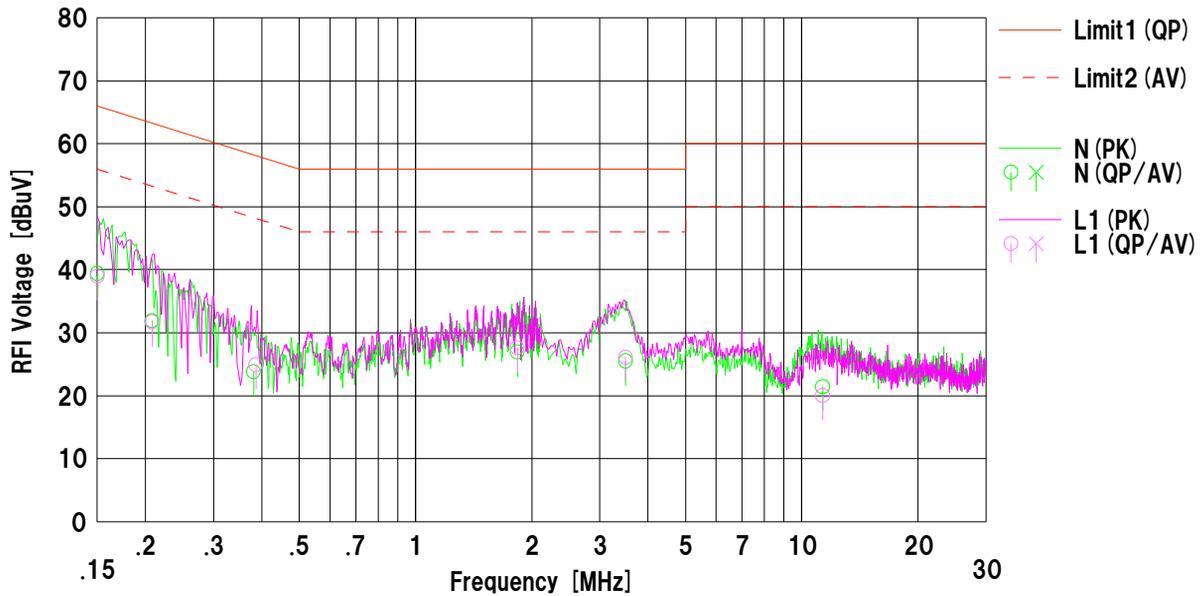
Company : Sony Corporation
Kind of EUT : Interchangeable Lens Digital Camera
Model No. : NEX-6
Serial No. : 131

Mode : IEEE802.11n (20MHz) 2437MHz
Report No. : 32JE0015-SH-01-C-R1
Power : AC120V/60Hz
Temp./Humi. : 26deg.C / 55%RH

Remarks : -

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

Engineer : Tatsuya Arai



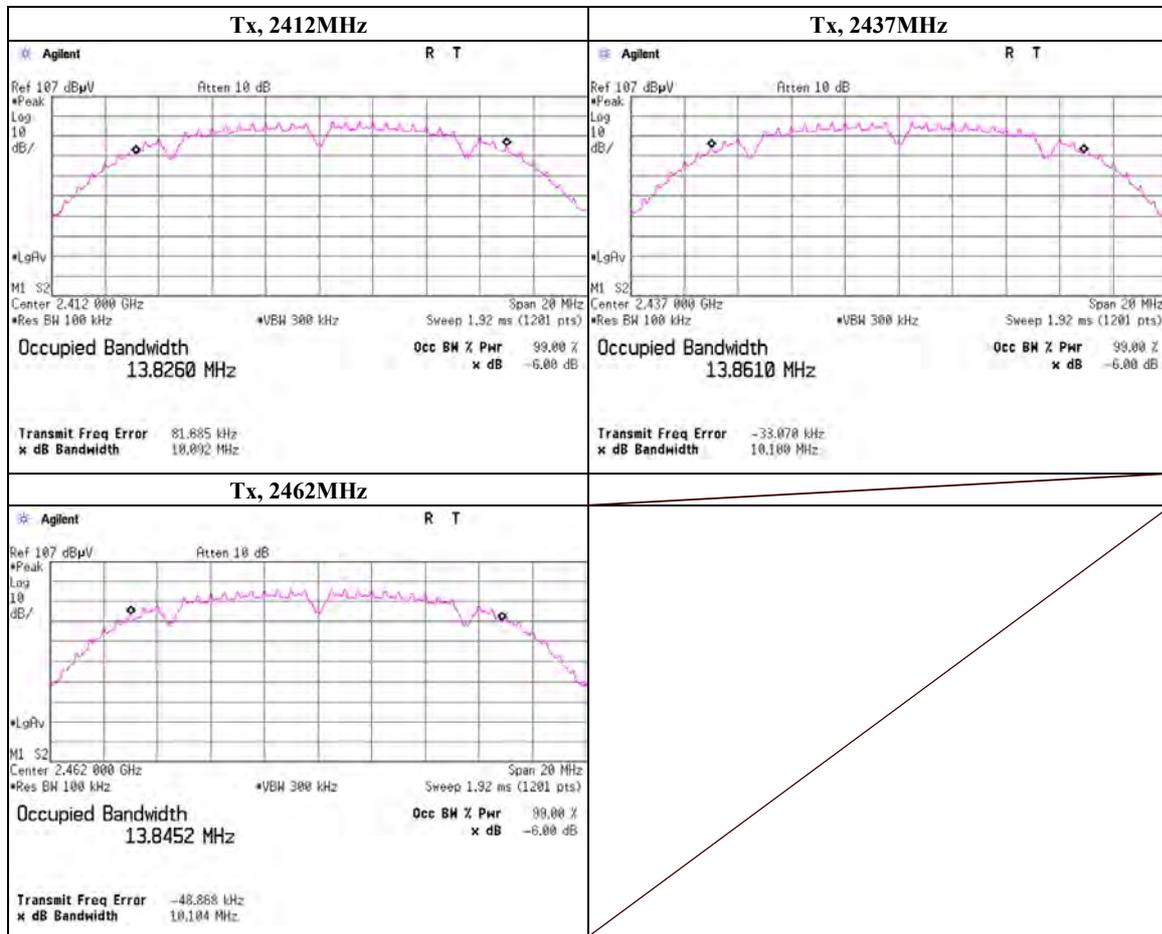
No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15031	26.7	---	12.7	39.4	---	65.9	55.9	26.5	---	N	
2	0.20800	19.2	---	12.7	31.9	---	63.2	53.2	31.3	---	N	
3	0.38080	11.1	---	12.7	23.8	---	58.2	48.2	34.4	---	N	
4	1.83900	14.1	---	12.8	26.9	---	56.0	46.0	29.1	---	N	
5	3.49794	12.6	---	12.9	25.5	---	56.0	46.0	30.5	---	N	
6	11.34931	8.1	---	13.3	21.4	---	60.0	50.0	38.6	---	N	
7	0.15000	26.3	---	12.7	39.0	---	65.9	55.9	26.9	---	L1	
8	0.20800	19.0	---	12.7	31.7	---	63.2	53.2	31.5	---	L1	
9	0.38640	12.2	---	12.7	24.9	---	58.1	48.1	33.2	---	L1	
10	1.83900	14.8	---	12.8	27.6	---	56.0	46.0	28.4	---	L1	
11	3.49800	13.2	---	12.9	26.1	---	56.0	46.0	29.9	---	L1	
12	11.34900	6.7	---	13.3	20.0	---	60.0	50.0	40.0	---	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable+ATT) [dB]
LISN:SLS-03

-6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	June 14, 2012	
Temperature / Humidity	25deg.C , 48%RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, IEEE802.11b, PN9, worst data mode 1Mbps	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	10.092	> 0.500
2437.0000	10.100	> 0.500
2462.0000	10.104	> 0.500

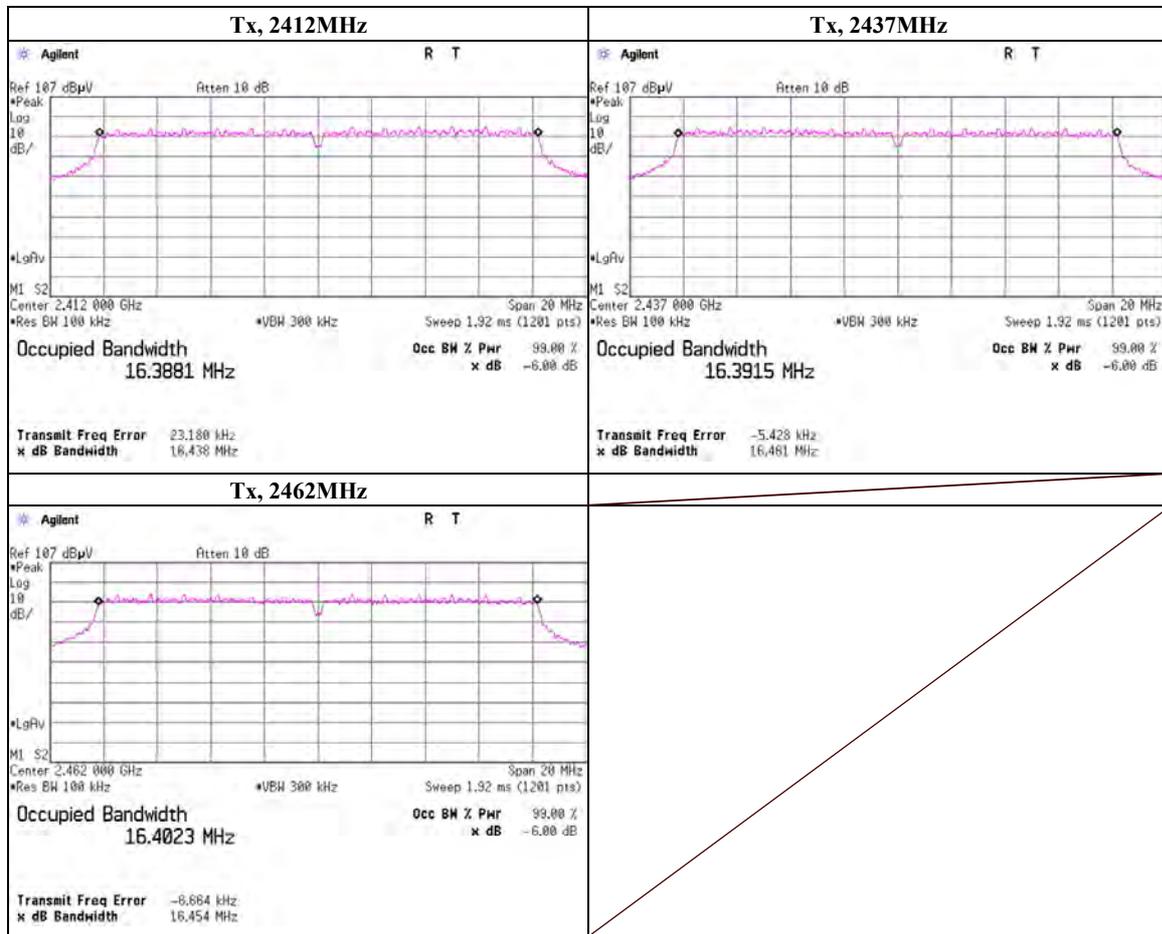


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-6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	June 14, 2012	
Temperature / Humidity	25deg.C , 48%RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, IEEE802.11g, PN9, worst data mode 24Mbps	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	16.438	> 0.500
2437.0000	16.461	> 0.500
2462.0000	16.454	> 0.500

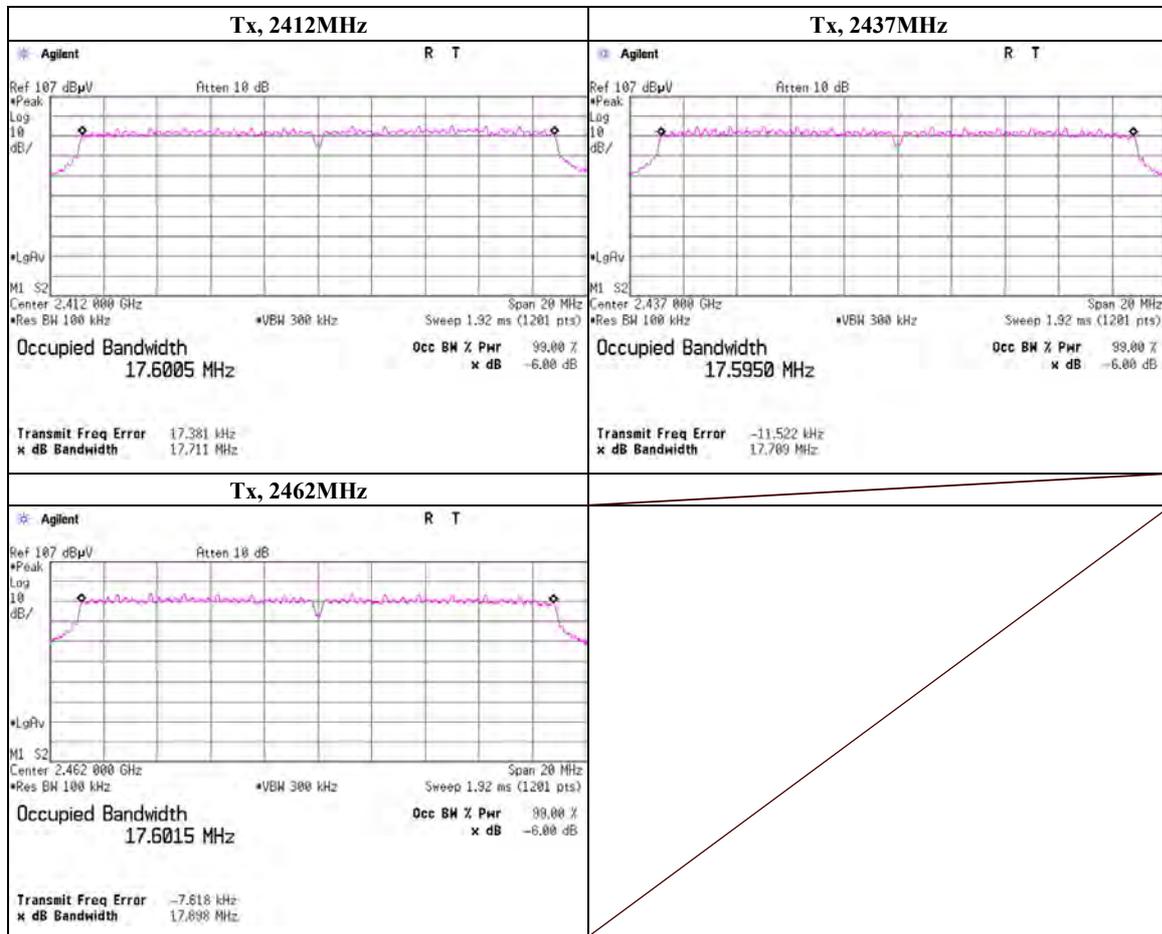


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 Telephone : +81 463 50 6400
 Facsimile : +81 463 50 6401

-6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	June 14, 2012	
Temperature / Humidity	25deg.C , 48%RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, IEEE802.11n, PN9, worst data mode 6(MCS)	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	17.711	> 0.500
2437.0000	17.709	> 0.500
2462.0000	17.698	> 0.500



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Peak Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date June 14, 2012
 Temperature / Humidity 25deg.C , 48%RH
 Engineer Hikaru Shirasawa
 Mode Tx, IEEE802.11b, PN9, worst data mode : 1 Mbps

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

Ch	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
Low	2412.0	-1.51	0.84	9.97	9.30	8.51	30.00	1000	20.70
Mid	2437.0	-1.41	0.84	9.97	9.40	8.71	30.00	1000	20.60
High	2462.0	-2.40	0.85	9.97	8.42	6.95	30.00	1000	21.58

Sample Calculation:

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

[Pre check]

	Data rate [Mbps]	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]	Worst
						[dBm]	[mW]	[dBm]	[mW]		
	1	2437.0	-1.41	0.84	9.97	9.40	8.71	30.00	1000	20.60	
	2	2437.0	-1.52	0.84	9.97	9.29	8.49	30.00	1000	20.71	
	5.5	2437.0	-1.53	0.84	9.97	9.28	8.47	30.00	1000	20.72	
	11	2437.0	-1.55	0.84	9.97	9.26	8.43	30.00	1000	20.74	

Sample Calculation:

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

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Average Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date June 14, 2012
 Temperature / Humidity 25deg.C , 48%RH
 Engineer Hikaru Shirasawa
 Mode Tx, IEEE802.11b, PN9, worst data mode : 1 Mbps

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

Ch	Freq. [MHz]	P/M (Average) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
Low	2412.0	-4.88	1.76	9.97	6.85	4.84
Mid	2437.0	-5.12	1.76	9.97	6.61	4.58
High	2462.0	-6.08	1.77	9.97	5.66	3.68

Sample Calculation:

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

[Pre check]

Data rate [Mbps]	Freq. [MHz]	P/M (Average) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		
					[dBm]	[mW]	
1	2437.0	-5.12	1.76	9.97	6.61	4.58	Worst
2	2437.0	-5.15	1.76	9.97	6.58	4.55	
6	2437.0	-5.20	1.76	9.97	6.53	4.50	
11	2437.0	-5.33	1.76	9.97	6.40	4.37	

Sample Calculation:

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/6/29 2012/6/30 2012/7/1
 Temperature / Humidity 26 deg.C , 56%RH 26 deg.C , 55%RH 23 deg.C , 64%RH
 Engineer Akira Sato Tatsuya Arai Hikaru Shirasawa
 Mode Tx, 2412 MHz
 Tx, IEEE802.11b, PN9, worst data mode 1Mbps

(* 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.	2386.500	PK	46.0	27.2	14.2	41.1	46.3	73.9	27.6	111	224	
Hori.	2390.000	PK	48.8	27.2	14.2	41.1	49.1	73.9	24.8	111	224	
Hori.	2398.050	PK	49.2	27.3	14.2	41.1	49.6	73.9	24.3	111	224	
Hori.	2400.000	PK	46.5	27.3	14.2	41.1	46.9	73.9	27.0	111	224	
Hori.	2507.650	PK	45.6	27.5	14.3	41.1	46.3	73.9	27.6	111	224	
Hori.	4824.000	PK	45.7	31.1	6.8	41.0	42.6	73.9	31.3	100	0	
Hori.	7236.000	PK	47.8	36.6	8.5	41.3	51.6	73.9	22.3	100	0	
Hori.	9648.000	PK	43.7	38.2	9.4	38.8	52.5	73.9	21.4	100	0	
Hori.	2386.500	AV	34.5	27.2	14.2	41.1	34.8	53.9	19.1	111	224	
Hori.	2390.000	AV	34.6	27.2	14.2	41.1	34.9	53.9	19.0	111	224	
Hori.	2398.050	AV	34.8	27.3	14.2	41.1	35.2	53.9	18.7	111	224	
Hori.	2400.000	AV	35.6	27.3	14.2	41.1	36.0	53.9	17.9	111	224	
Hori.	2507.650	AV	34.8	27.5	14.3	41.1	35.5	53.9	18.4	111	224	
Hori.	4824.000	AV	34.7	31.1	6.8	41.0	31.6	53.9	22.3	100	0	
Hori.	7236.000	AV	36.1	36.6	8.5	41.3	39.9	53.9	14.0	100	0	
Hori.	9648.000	AV	32.4	38.2	9.4	38.8	41.2	53.9	12.7	100	0	
Vert.	2386.500	PK	46.9	27.2	14.2	41.1	47.2	73.9	26.7	111	121	
Vert.	2390.000	PK	46.2	27.2	14.2	41.1	46.5	73.9	27.4	111	121	
Vert.	2398.050	PK	48.5	27.3	14.2	41.1	48.9	73.9	25.0	111	121	
Vert.	2400.000	PK	47.1	27.3	14.2	41.1	47.5	73.9	26.4	111	121	
Vert.	2507.000	PK	44.3	27.5	14.3	41.1	45.0	73.9	28.9	111	121	
Vert.	4824.000	PK	45.4	31.1	6.8	41.0	42.3	73.9	31.6	100	0	
Vert.	7236.000	PK	47.3	36.6	8.5	41.3	51.1	73.9	22.8	100	0	
Vert.	9648.000	PK	44.6	38.2	9.4	38.8	53.4	73.9	20.5	100	0	
Vert.	2386.500	AV	34.4	27.2	14.2	41.1	34.7	53.9	19.2	111	121	
Vert.	2390.000	AV	34.5	27.2	14.2	41.1	34.8	53.9	19.1	111	121	
Vert.	2398.050	AV	38.2	27.3	14.2	41.1	38.6	53.9	15.3	111	121	
Vert.	2400.000	AV	35.3	27.3	14.2	41.1	35.7	53.9	18.2	111	121	
Vert.	2507.000	AV	34.9	27.5	14.3	41.1	35.6	53.9	18.3	111	121	
Vert.	4824.000	AV	34.5	31.1	6.8	41.0	31.4	53.9	22.5	100	0	
Vert.	7236.000	AV	36.0	36.6	8.5	41.3	39.8	53.9	14.1	100	0	
Vert.	9648.000	AV	32.3	38.2	9.4	38.8	41.1	53.9	12.8	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/6/29 2012/6/30 2012/7/1
 Temperature / Humidity 26 deg.C , 56%RH 26 deg.C , 55%RH 23 deg.C , 64%RH
 Engineer Akira Sato Tatsuya Arai Hikaru Shirasawa
 Mode Tx, 2437 MHz
 Tx, IEEE802.11b, PN9, worst data mode 1Mbps

(* 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.	2497.000	PK	46.9	27.5	14.3	41.1	47.6	73.9	26.3	176	205	
Hori.	4874.000	PK	46.3	31.2	6.9	41.0	43.4	73.9	30.5	100	0	
Hori.	7311.000	PK	46.7	36.7	8.6	41.4	50.6	73.9	23.3	100	0	
Hori.	9748.000	PK	44.3	38.5	9.5	38.8	53.5	73.9	20.4	100	0	
Hori.	2497.000	AV	34.2	27.5	14.3	41.1	34.9	53.9	19.0	176	205	
Hori.	4874.000	AV	34.5	31.2	6.9	41.0	31.6	53.9	22.3	100	0	
Hori.	7311.000	AV	36.0	36.7	8.6	41.4	39.9	53.9	14.0	100	0	
Hori.	9748.000	AV	32.4	38.5	9.5	38.8	41.6	53.9	12.3	100	0	
Vert.	2497.000	PK	45.6	27.5	14.3	41.1	46.3	73.9	27.6	100	120	
Vert.	4874.000	PK	45.9	31.2	6.9	41.0	43.0	73.9	30.9	100	0	
Vert.	7311.000	PK	47.7	36.7	8.6	41.4	51.6	73.9	22.3	100	0	
Vert.	9748.000	PK	43.9	38.5	9.5	38.8	53.1	73.9	20.8	100	0	
Vert.	2497.000	AV	34.7	27.5	14.3	41.1	35.4	53.9	18.5	100	120	
Vert.	4874.000	AV	34.6	31.2	6.9	41.0	31.7	53.9	22.2	100	0	
Vert.	7311.000	AV	36.0	36.7	8.6	41.4	39.9	53.9	14.0	100	0	
Vert.	9748.000	AV	32.5	38.5	9.5	38.8	41.7	53.9	12.2	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor : 15GHz -40GHz : $20\log(3.0m/1.0m)= 9.5dB$

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/6/29 2012/6/30 2012/7/1
 Temperature / Humidity 26 deg.C , 56%RH 26 deg.C , 55%RH 23 deg.C , 64%RH
 Engineer Akira Sato Tatsuya Arai Hikaru Shirasawa
 Mode Tx, 2462 MHz
 Tx, IEEE802.11b, PN9, worst data mode 1Mbps

(* 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	47.7	27.5	14.3	41.1	48.4	73.9	25.5	100	152	
Hori.	2489.065	PK	46.0	27.5	14.3	41.1	46.7	73.9	27.2	100	152	
Hori.	4924.000	PK	46.2	31.3	6.9	40.9	43.5	73.9	30.4	100	0	
Hori.	7386.000	PK	47.7	36.9	8.7	41.4	51.9	73.9	22.0	100	0	
Hori.	9848.000	PK	45.1	38.7	9.5	38.8	54.5	73.9	19.4	100	0	
Hori.	2383.440	AV	34.2	27.2	14.2	41.1	34.5	53.9	19.4	100	152	
Hori.	2483.500	AV	34.5	27.5	14.3	41.1	35.2	53.9	18.7	100	152	
Hori.	2489.065	AV	34.5	27.5	14.3	41.1	35.2	53.9	18.7	100	152	
Hori.	4924.000	AV	34.8	31.3	6.9	40.9	32.1	53.9	21.8	100	0	
Hori.	7386.000	AV	36.3	36.9	8.7	41.4	40.5	53.9	13.4	100	0	
Hori.	9848.000	AV	32.7	38.7	9.5	38.8	42.1	53.9	11.8	100	0	
Vert.	2383.440	PK	46.8	27.2	14.2	41.1	47.1	73.9	26.8	100	152	
Vert.	2483.500	PK	47.3	27.5	14.3	41.1	48.0	73.9	25.9	100	152	
Vert.	2489.065	PK	47.2	27.5	14.3	41.1	47.9	73.9	26.0	100	152	
Vert.	4924.000	PK	46.7	31.3	6.9	40.9	44.0	73.9	29.9	100	0	
Vert.	7386.000	PK	48.3	36.9	8.7	41.4	52.5	73.9	21.4	100	0	
Vert.	9848.000	PK	43.7	38.7	9.5	38.8	53.1	73.9	20.8	100	0	
Vert.	2383.440	AV	34.4	27.2	14.2	41.1	34.7	53.9	19.2	100	152	
Vert.	2483.500	AV	34.4	27.5	14.3	41.1	35.1	53.9	18.8	100	152	
Vert.	2489.065	AV	34.5	27.5	14.3	41.1	35.2	53.9	18.7	100	152	
Vert.	4924.000	AV	33.4	31.3	6.9	40.9	30.7	53.9	23.2	100	0	
Vert.	7386.000	AV	34.8	36.9	8.7	41.4	39.0	53.9	14.9	100	0	
Vert.	9848.000	AV	32.6	38.7	9.5	38.8	42.0	53.9	11.9	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor : 15GHz ~40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/6/29 2012/6/30 2012/7/1
 Temperature / Humidity 26 deg.C , 56%RH 26 deg.C , 55%RH 23 deg.C , 64%RH
 Engineer Akira Sato Tatsuya Arai Hikaru Shirasawa
 Mode Tx, 2412 MHz
 Tx, IEEE802.11g, PN9, worst data mode 24Mbps

(* 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	27.2	14.2	41.1	48.5	73.9	25.4	100	146	
Hori.	2400.000	PK	63.0	27.3	14.2	41.1	63.4	73.9	10.5	100	146	
Hori.	2513.060	PK	47.9	27.6	14.3	41.1	48.7	73.9	25.2	100	146	
Hori.	4824.000	PK	46.6	31.1	6.8	41.0	43.5	73.9	30.4	100	0	
Hori.	7236.000	PK	47.6	36.6	8.5	41.3	51.4	73.9	22.5	100	0	
Hori.	9648.000	PK	43.7	38.2	9.4	38.8	52.5	73.9	21.4	100	0	
Hori.	2390.000	AV	36.2	27.2	14.2	41.1	36.5	53.9	17.4	100	146	
Hori.	2400.000	AV	46.0	27.3	14.2	41.1	46.4	53.9	7.5	100	146	
Hori.	2513.060	AV	35.4	27.6	14.3	41.1	36.2	53.9	17.7	100	146	
Hori.	4824.000	AV	35.6	31.1	6.8	41.0	32.5	53.9	21.4	100	0	
Hori.	7236.000	AV	36.9	36.6	8.5	41.3	40.7	53.9	13.2	100	0	
Hori.	9648.000	AV	33.4	38.2	9.4	38.8	42.2	53.9	11.7	100	0	
Vert.	2390.000	PK	50.6	27.2	14.2	41.1	50.9	73.9	23.0	100	125	
Vert.	2400.000	PK	66.1	27.3	14.2	41.1	66.5	73.9	7.4	100	125	
Vert.	2513.060	PK	46.0	27.6	14.3	41.1	46.8	73.9	27.1	100	125	
Vert.	4824.000	PK	46.8	31.1	6.8	41.0	43.7	73.9	30.2	100	0	
Vert.	7236.000	PK	47.8	36.6	8.5	41.3	51.6	73.9	22.3	100	0	
Vert.	9648.000	PK	44.7	38.2	9.4	38.8	53.5	73.9	20.4	100	0	
Vert.	2390.000	AV	36.9	27.2	14.2	41.1	37.2	53.9	16.7	100	125	
Vert.	2400.000	AV	49.2	27.3	14.2	41.1	49.6	53.9	4.3	100	125	
Vert.	2513.060	AV	36.0	27.6	14.3	41.1	36.8	53.9	17.1	100	125	
Vert.	4824.000	AV	35.9	31.1	6.8	41.0	32.8	53.9	21.1	100	0	
Vert.	7236.000	AV	37.2	36.6	8.5	41.3	41.0	53.9	12.9	100	0	
Vert.	9648.000	AV	33.4	38.2	9.4	38.8	42.2	53.9	11.7	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor : 15GHz ~40GHz : 20log(3.0m/1.0m)= 9.5dB

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 Engineer Akira Sato Tatsuya Arai Hikaru Shirasawa
 Mode Tx, 2437 MHz
 Tx, IEEE802.11g, PN9, worst data mode 24Mbps

(* 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.	2490.000	PK	46.8	27.5	14.3	41.1	47.5	73.9	26.4	100	322	
Hori.	4874.000	PK	46.9	31.2	6.9	41.0	44.0	73.9	29.9	100	0	
Hori.	7311.000	PK	48.0	36.7	8.6	41.4	51.9	73.9	22.0	100	0	
Hori.	9748.000	PK	44.0	38.5	9.5	38.8	53.2	73.9	20.7	100	0	
Hori.	2490.000	AV	35.5	27.5	14.3	41.1	36.2	53.9	17.7	100	322	
Hori.	4874.000	AV	36.0	31.2	6.9	41.0	33.1	53.9	20.8	100	0	
Hori.	7311.000	AV	36.9	36.7	8.6	41.4	40.8	53.9	13.1	100	0	
Hori.	9748.000	AV	33.6	38.5	9.5	38.8	42.8	53.9	11.1	100	0	
Vert.	2490.000	PK	46.8	27.5	14.3	41.1	47.5	73.9	26.4	100	121	
Vert.	4874.000	PK	46.1	31.2	6.9	41.0	43.2	73.9	30.7	100	0	
Vert.	7311.000	PK	47.0	36.7	8.6	41.4	50.9	73.9	23.0	100	0	
Vert.	9748.000	PK	44.7	38.5	9.5	38.8	53.9	73.9	20.0	100	0	
Vert.	2490.000	AV	35.5	27.5	14.3	41.1	36.2	53.9	17.7	100	121	
Vert.	4874.000	AV	36.1	31.2	6.9	41.0	33.2	53.9	20.7	100	0	
Vert.	7311.000	AV	37.4	36.7	8.6	41.4	41.3	53.9	12.6	100	0	
Vert.	9748.000	AV	33.6	38.5	9.5	38.8	42.8	53.9	11.1	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

UL Japan, Inc.
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 Telephone : +81 463 50 6400
 Facsimile : +81 463 50 6401

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/6/29 2012/6/30 2012/7/1
 Temperature / Humidity 26 deg.C , 56%RH 26 deg.C , 55%RH 23 deg.C , 64%RH
 Engineer Akira Sato Tatsuya Arai Hikaru Shirasawa
 Mode Tx, 2462 MHz
 Tx, IEEE802.11g, PN9, worst data mode 24Mbps

(* 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.	2380.000	PK	46.5	27.2	14.2	41.1	46.8	73.9	27.1	137	206	
Hori.	2483.500	PK	48.5	27.5	14.3	41.1	49.2	73.9	24.7	137	206	
Hori.	4924.000	PK	46.8	31.3	6.9	40.9	44.1	73.9	29.8	100	0	
Hori.	7386.000	PK	47.7	36.9	8.7	41.4	51.9	73.9	22.0	100	0	
Hori.	9848.000	PK	44.4	38.7	9.5	38.8	53.8	73.9	20.1	100	0	
Hori.	2380.000	AV	35.4	27.2	14.2	41.1	35.7	53.9	18.2	137	206	
Hori.	2483.500	AV	36.0	27.5	14.3	41.1	36.7	53.9	17.2	137	206	
Hori.	4924.000	AV	36.1	31.3	6.9	40.9	33.4	53.9	20.5	100	0	
Hori.	7386.000	AV	37.2	36.9	8.7	41.4	41.4	53.9	12.5	100	0	
Hori.	9848.000	AV	33.7	38.7	9.5	38.8	43.1	53.9	10.8	100	0	
Vert.	2380.000	PK	46.9	27.2	14.2	41.1	47.2	73.9	26.7	154	124	
Vert.	2483.500	PK	49.1	27.5	14.3	41.1	49.8	73.9	24.1	154	124	
Vert.	4924.000	PK	46.3	31.3	6.9	40.9	43.6	73.9	30.3	100	0	
Vert.	7386.000	PK	47.2	36.9	8.7	41.4	51.4	73.9	22.5	100	0	
Vert.	9848.000	PK	44.2	38.7	9.5	38.8	53.6	73.9	20.3	100	0	
Vert.	2380.000	AV	35.5	27.2	14.2	41.1	35.8	53.9	18.1	154	124	
Vert.	2483.500	AV	36.5	27.5	14.3	41.1	37.2	53.9	16.7	154	124	
Vert.	4924.000	AV	36.1	31.3	6.9	40.9	33.4	53.9	20.5	100	0	
Vert.	7386.000	AV	37.5	36.9	8.7	41.4	41.7	53.9	12.2	100	0	
Vert.	9848.000	AV	33.8	38.7	9.5	38.8	43.2	53.9	10.7	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/6/29 2012/6/30 2012/7/1
 Temperature / Humidity 26 deg.C , 56%RH 26 deg.C , 55%RH 23 deg.C , 64%RH
 Engineer Akira Sato Tatsuya Arai Hikaru Shirasawa
 Mode Tx, 2412 MHz
 Tx, IEEE802.11n, PN9, worst data mode 6(MCS)

(* 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.	2383.918	PK	46.3	27.2	14.2	41.1	46.6	73.9	27.3	113	209	
Hori.	2390.000	PK	47.8	27.2	14.2	41.1	48.1	73.9	25.8	113	209	
Hori.	2400.000	PK	62.6	27.3	14.2	41.1	63.0	73.9	10.9	113	209	
Hori.	4824.000	PK	46.3	31.1	6.8	41.0	43.2	73.9	30.7	100	0	
Hori.	7236.000	PK	48.1	36.6	8.5	41.3	51.9	73.9	22.0	100	0	
Hori.	9648.000	PK	43.5	38.2	9.4	38.8	52.3	73.9	21.6	100	0	
Hori.	2383.918	AV	36.1	27.2	14.2	41.1	36.4	53.9	17.5	113	209	
Hori.	2390.000	AV	37.2	27.2	14.2	41.1	37.5	53.9	16.4	113	209	
Hori.	2400.000	AV	47.5	27.3	14.2	41.1	47.9	53.9	6.0	113	209	
Hori.	4824.000	AV	35.7	31.1	6.8	41.0	32.6	53.9	21.3	100	0	
Hori.	7236.000	AV	37.4	36.6	8.5	41.3	41.2	53.9	12.7	100	0	
Hori.	9648.000	AV	33.7	38.2	9.4	38.8	42.5	53.9	11.4	100	0	
Vert.	2383.918	PK	46.9	27.2	14.2	41.1	47.2	73.9	26.7	102	123	
Vert.	2390.000	PK	50.0	27.2	14.2	41.1	50.3	73.9	23.6	102	123	
Vert.	2400.000	PK	65.6	27.3	14.2	41.1	66.0	73.9	7.9	102	123	
Vert.	4824.000	PK	46.0	31.1	6.8	41.0	42.9	73.9	31.0	100	0	
Vert.	7236.000	PK	47.8	36.6	8.5	41.3	51.6	73.9	22.3	100	0	
Vert.	9648.000	PK	43.0	38.2	9.4	38.8	51.8	73.9	22.1	100	0	
Vert.	2383.918	AV	36.3	27.2	14.2	41.1	36.6	53.9	17.3	102	123	
Vert.	2390.000	AV	38.2	27.2	14.2	41.1	38.5	53.9	15.4	102	123	
Vert.	2400.000	AV	50.1	27.3	14.2	41.1	50.5	53.9	3.4	102	123	
Vert.	4824.000	AV	36.3	31.1	6.8	41.0	33.2	53.9	20.7	100	0	
Vert.	7236.000	AV	37.2	36.6	8.5	41.3	41.0	53.9	12.9	100	0	
Vert.	9648.000	AV	33.9	38.2	9.4	38.8	42.7	53.9	11.2	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor : 15GHz ~40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/6/29 2012/6/29 2012/6/30 2012/7/1
 Temperature / Humidity 26 deg.C , 56%RH 26 deg.C , 56%RH 26 deg.C , 55%RH 23 deg.C , 64%RH
 Engineer Akio Hayashi Akira Sato Tatsuya Arai Hikaru Shirasawa
 Mode Tx, 2437 MHz
 Tx, IEEE802.11n, PN9, worst data mode 6(MCS)

(* 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.	159.745	QP	40.5	15.2	7.8	32.1	31.4	43.5	12.1	205	184	
Hori.	184.323	QP	43.7	15.9	7.7	32.1	35.2	43.5	8.3	172	168	
Hori.	233.473	QP	43.7	16.8	8.2	32.0	36.7	46.0	9.3	203	214	
Hori.	258.048	QP	43.7	17.5	8.3	32.0	37.5	46.0	8.5	190	315	
Hori.	269.999	QP	42.3	17.9	8.4	32.0	36.6	46.0	9.4	178	51	
Hori.	323.998	QP	51.5	14.5	8.7	32.0	42.7	46.0	3.3	100	185	
Hori.	431.998	QP	43.6	16.8	9.2	32.0	37.6	46.0	8.4	100	0	
Hori.	593.965	QP	38.7	18.9	9.8	32.0	35.4	46.0	10.6	188	221	
Hori.	674.999	QP	37.2	20.1	10.0	31.9	35.4	46.0	10.6	179	118	
Hori.	2507.000	PK	46.5	27.5	14.3	41.1	47.2	73.9	26.7	141	204	
Hori.	4874.000	PK	47.1	31.2	6.9	41.0	44.2	73.9	29.7	100	0	
Hori.	7311.000	PK	47.8	36.7	8.6	41.4	51.7	73.9	22.2	100	0	
Hori.	9748.000	PK	44.1	38.5	9.5	38.8	53.3	73.9	20.6	100	0	
Hori.	2507.000	AV	35.9	27.5	14.3	41.1	36.6	53.9	17.3	141	204	
Hori.	4874.000	AV	35.8	31.2	6.9	41.0	32.9	53.9	21.0	100	0	
Hori.	7311.000	AV	37.4	36.7	8.6	41.4	41.3	53.9	12.6	100	0	
Hori.	9748.000	AV	33.7	38.5	9.5	38.8	42.9	53.9	11.0	100	0	
Vert.	61.439	QP	51.2	8.0	6.5	32.2	33.5	40.0	6.5	100	221	
Vert.	323.998	QP	46.7	14.5	8.7	32.0	37.9	46.0	8.1	100	17	
Vert.	2507.000	PK	46.2	27.5	14.3	41.1	46.9	73.9	27.0	100	121	
Vert.	4874.000	PK	46.9	31.2	6.9	41.0	44.0	73.9	29.9	100	0	
Vert.	7311.000	PK	47.5	36.7	8.6	41.4	51.4	73.9	22.5	100	0	
Vert.	9748.000	PK	44.4	38.5	9.5	38.8	53.6	73.9	20.3	100	0	
Vert.	2507.000	AV	36.0	27.5	14.3	41.1	36.7	53.9	17.2	100	121	
Vert.	4874.000	AV	36.0	31.2	6.9	41.0	33.1	53.9	20.8	100	0	
Vert.	7311.000	AV	37.4	36.7	8.6	41.4	41.3	53.9	12.6	100	0	
Vert.	9748.000	AV	33.7	38.5	9.5	38.8	42.9	53.9	11.0	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/6/29 2012/6/30 2012/7/1
 Temperature / Humidity 26 deg.C , 56%RH 26 deg.C , 55%RH 23 deg.C , 64%RH
 Engineer Akira Sato Tatsuya Arai Hikaru Shirasawa
 Mode Tx, 2462 MHz
 Tx, IEEE802.11n, PN9, worst data mode 6(MCS)

(* 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.	2383.860	PK	47.3	27.2	14.2	41.1	47.6	73.9	26.3	214	222	
Hori.	2483.500	PK	47.9	27.5	14.3	41.1	48.6	73.9	25.3	214	222	
Hori.	4924.000	PK	46.1	31.3	6.9	40.9	43.4	73.9	30.5	100	0	
Hori.	7386.000	PK	48.1	36.9	8.7	41.4	52.3	73.9	21.6	100	0	
Hori.	9848.000	PK	44.5	38.7	9.5	38.8	53.9	73.9	20.0	100	0	
Hori.	2383.860	AV	36.4	27.2	14.2	41.1	36.7	53.9	17.2	214	222	
Hori.	2483.500	AV	36.7	27.5	14.3	41.1	37.4	53.9	16.5	214	222	
Hori.	4924.000	AV	36.6	31.3	6.9	40.9	33.9	53.9	20.0	100	0	
Hori.	7386.000	AV	37.7	36.9	8.7	41.4	41.9	53.9	12.0	100	0	
Hori.	9848.000	AV	34	38.7	9.5	38.8	43.4	53.9	10.5	100	0	
Vert.	2383.860	PK	48	27.2	14.2	41.1	48.3	73.9	25.6	116	118	
Vert.	2483.500	PK	58.9	27.5	14.3	41.1	59.6	73.9	14.3	116	118	
Vert.	4924.000	PK	46.8	31.3	6.9	40.9	44.1	73.9	29.8	100	0	
Vert.	7386.000	PK	47.9	36.9	8.7	41.4	52.1	73.9	21.8	100	0	
Vert.	9848.000	PK	44.3	38.7	9.5	38.8	53.7	73.9	20.2	100	0	
Vert.	2383.860	AV	36.8	27.2	14.2	41.1	37.1	53.9	16.8	116	118	
Vert.	2483.500	AV	43.3	27.5	14.3	41.1	44	53.9	9.9	116	118	
Vert.	4924.000	AV	36.2	31.3	6.9	40.9	33.5	53.9	20.4	100	0	
Vert.	7386.000	AV	37.6	36.9	8.7	41.4	41.8	53.9	12.1	100	0	
Vert.	9848.000	AV	34	38.7	9.5	38.8	43.4	53.9	10.5	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor : 15GHz ~40GHz : 20log(3.0m/1.0m)= 9.5dB

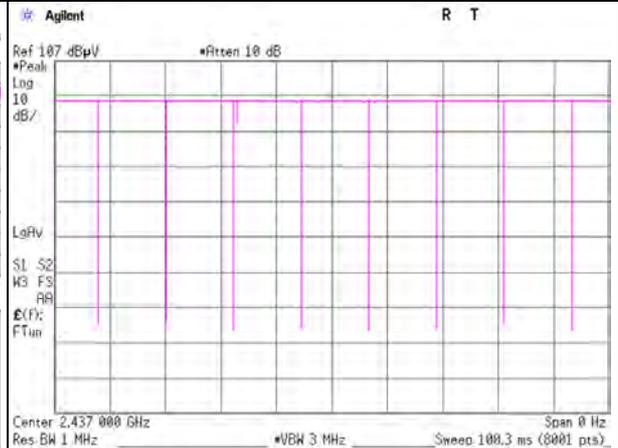
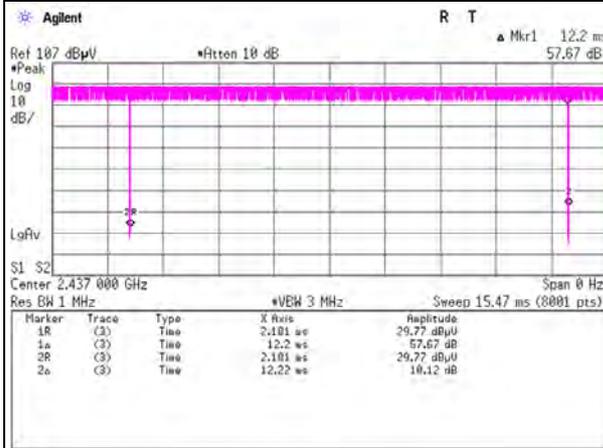
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VBW(Average) Calculation chart

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

VBW (Average) Calculation

VBW: 1/(ON Time) = 0.082kHz<82Hz



tx2_duty3

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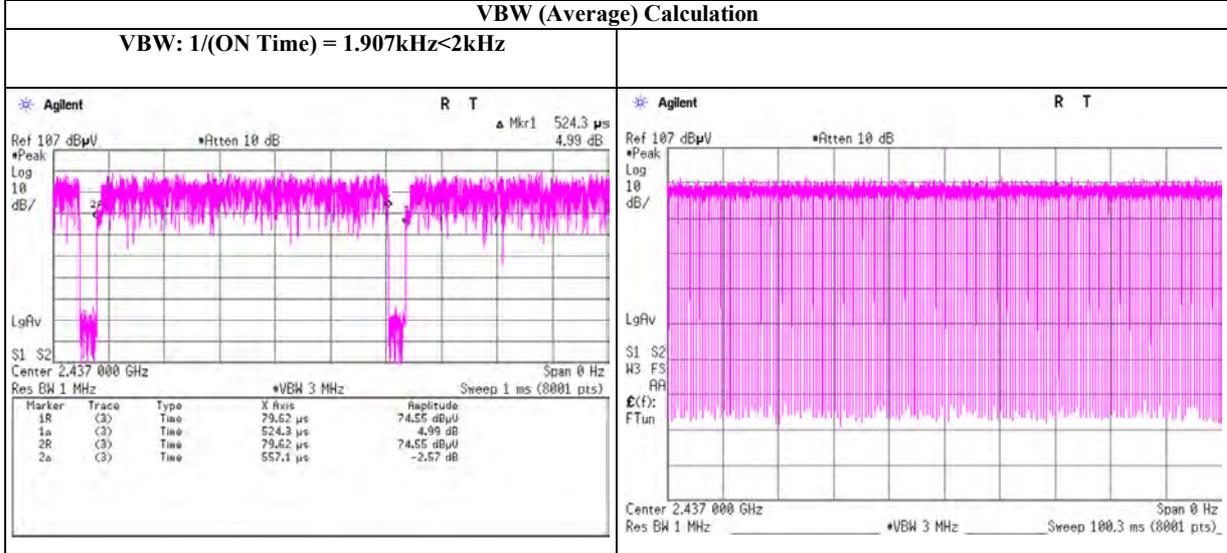
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VBW(Average) Calculation chart

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

VBW (Average) Calculation



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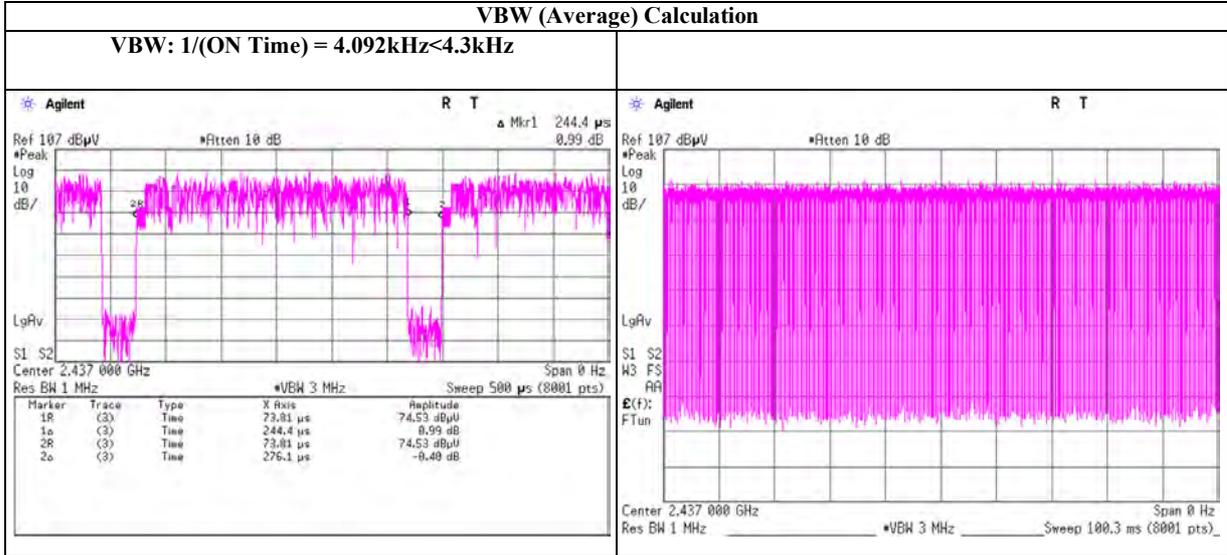
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VBW(Average) Calculation chart

Tx, IEEE802.11n, PN9, worst data mode 6(MCS)



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Spurious emission (Conducted)
Tx, IEEE802.11b, PN9, worst data mode 1Mbps

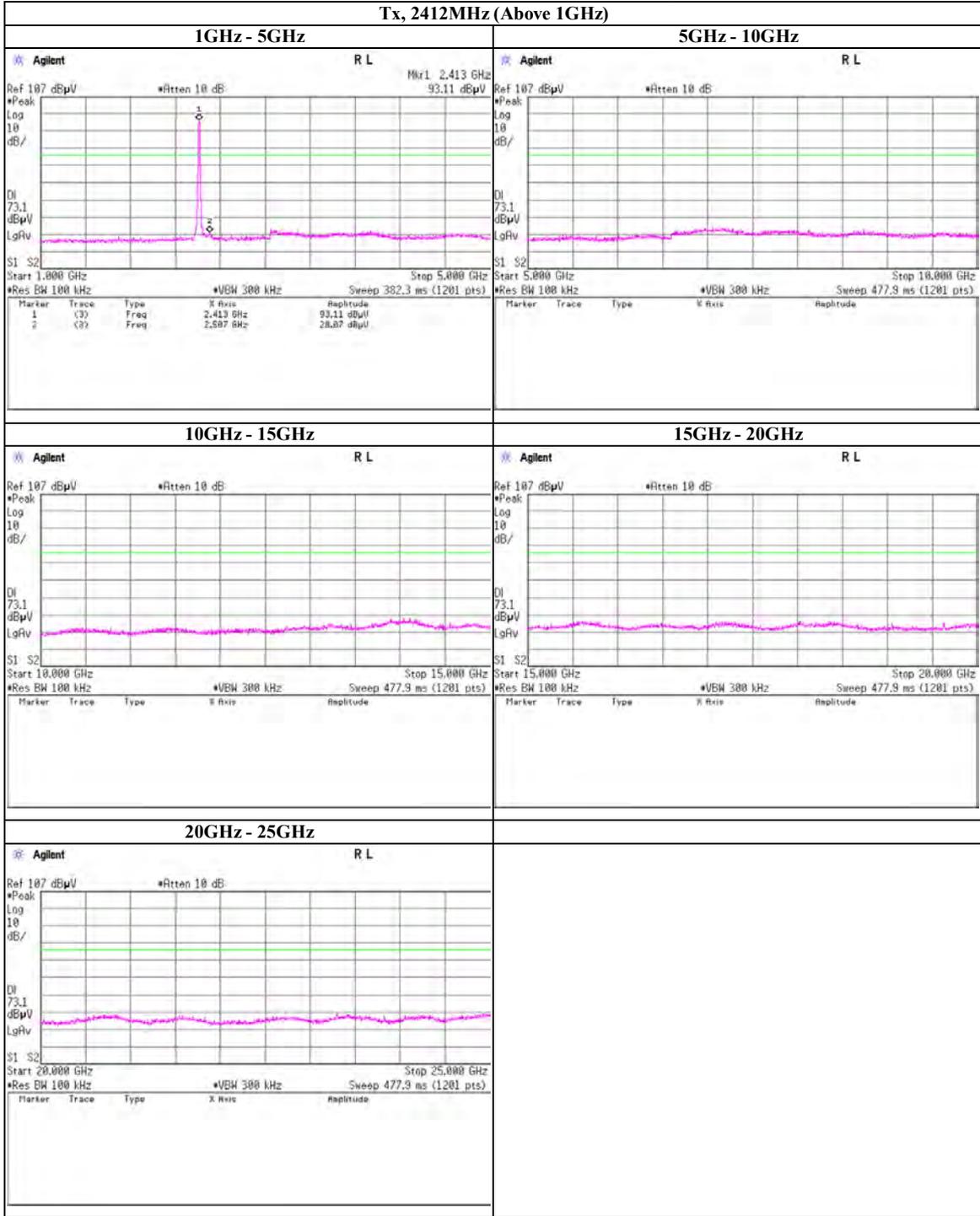
Tx, 2412MHz (Below 1GHz)



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Spurious emission (Conducted)
Tx, IEEE802.11b, PN9, worst data mode 1Mbps

Tx, 2412MHz (Above 1GHz)



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Spurious emission (Conducted)
Tx, IEEE802.11b, PN9, worst data mode 1Mbps

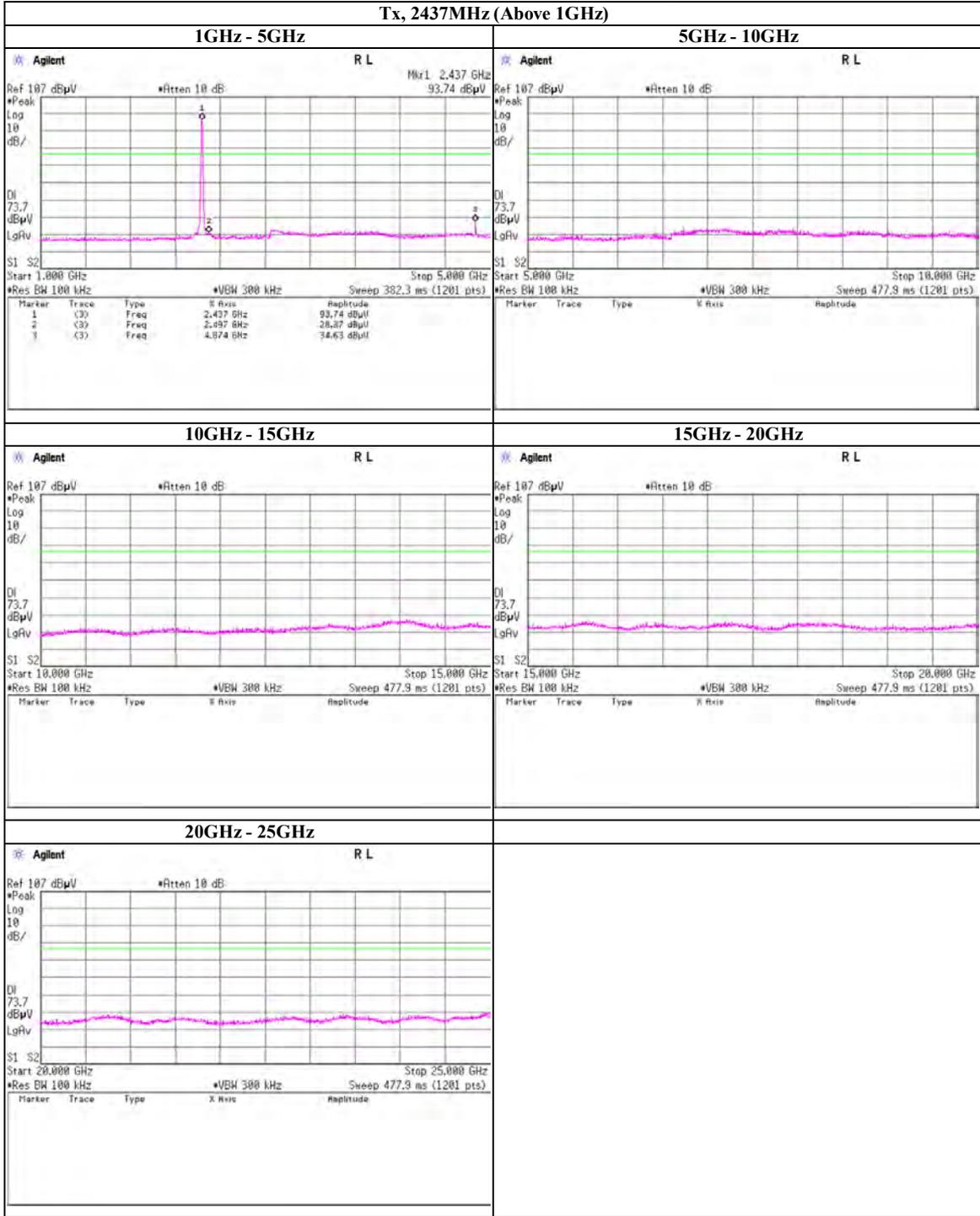
Tx, 2437MHz (Below 1GHz)



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Spurious emission (Conducted)
Tx, IEEE802.11b, PN9, worst data mode 1Mbps

Tx, 2437MHz (Above 1GHz)



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Spurious emission (Conducted)

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

Tx, 2462MHz (Below 1GHz)



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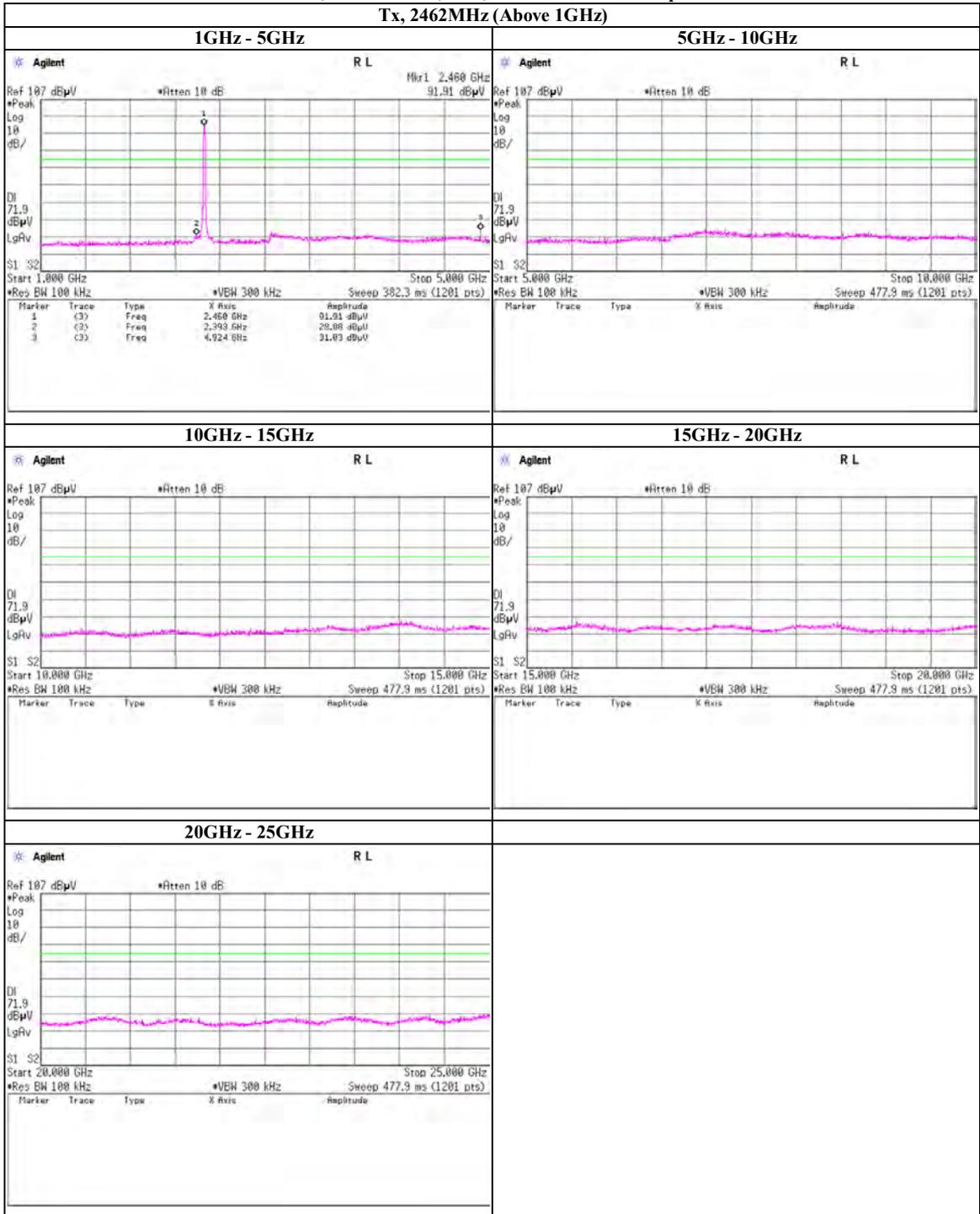
Telephone : +81 463 50 6400

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Spurious emission (Conducted)

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

Tx, 2462MHz (Above 1GHz)



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Shonan EMC Lab.

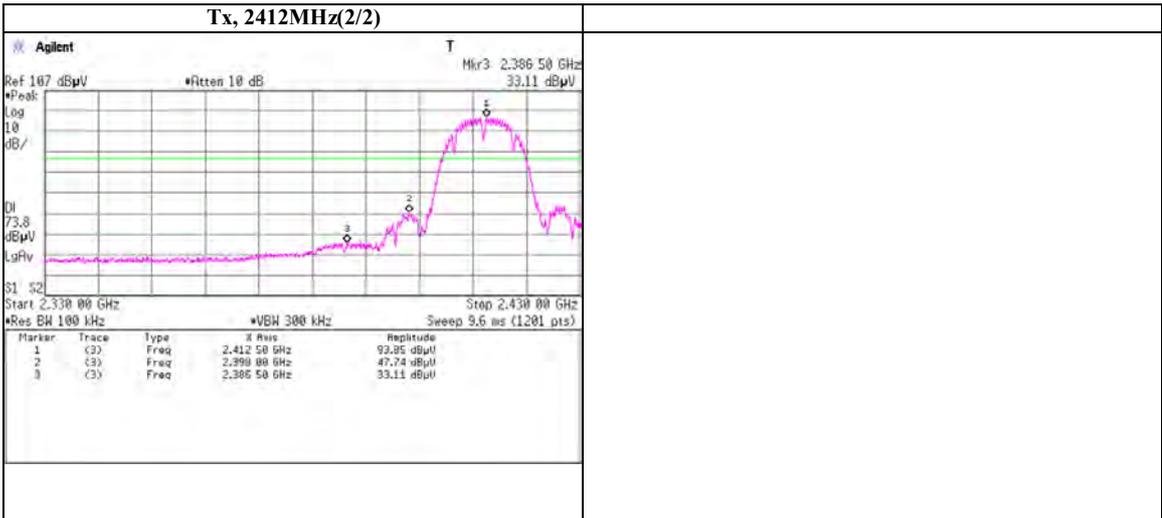
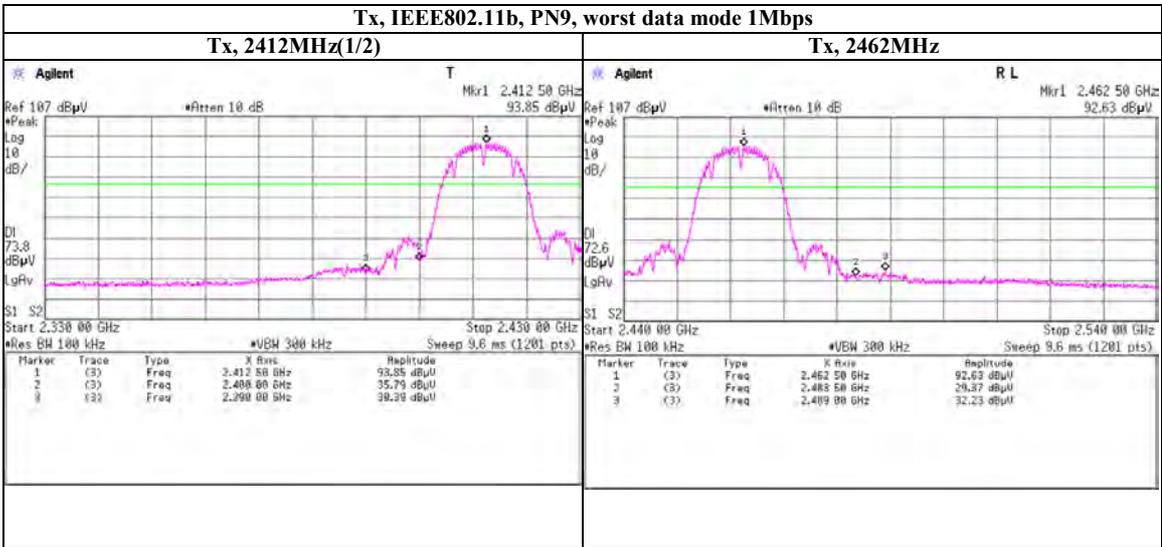
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Spurious emission (Conducted)

Band Edge compliance



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Spurious emission (Conducted)
Tx, IEEE802.11g, PN9, worst data mode 24Mbps

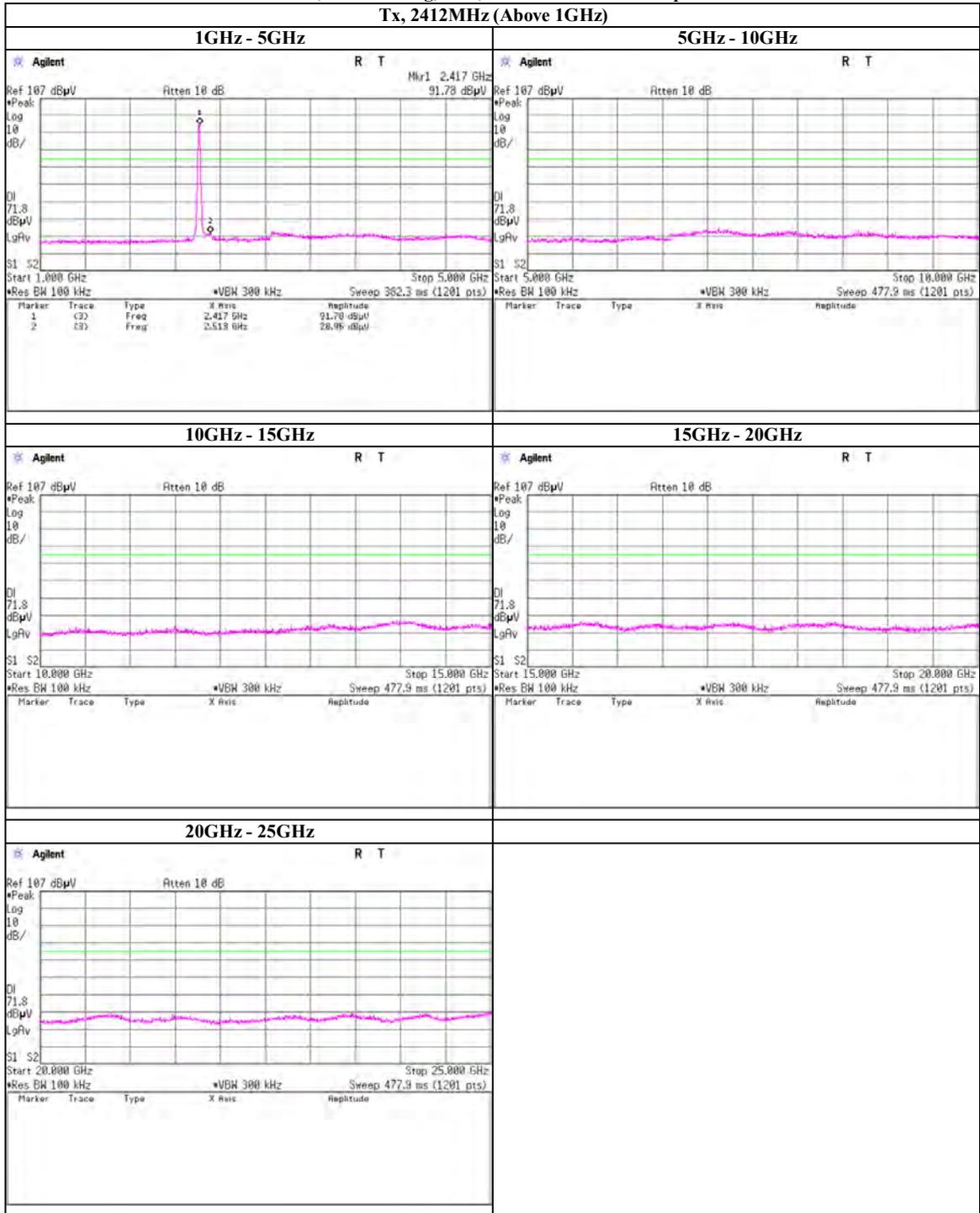
Tx, 2412MHz (Below 1GHz)



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Spurious emission (Conducted)
Tx, IEEE802.11g, PN9, worst data mode 24Mbps

Tx, 2412MHz (Above 1GHz)



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Spurious emission (Conducted)
Tx, IEEE802.11g, PN9, worst data mode 24Mbps

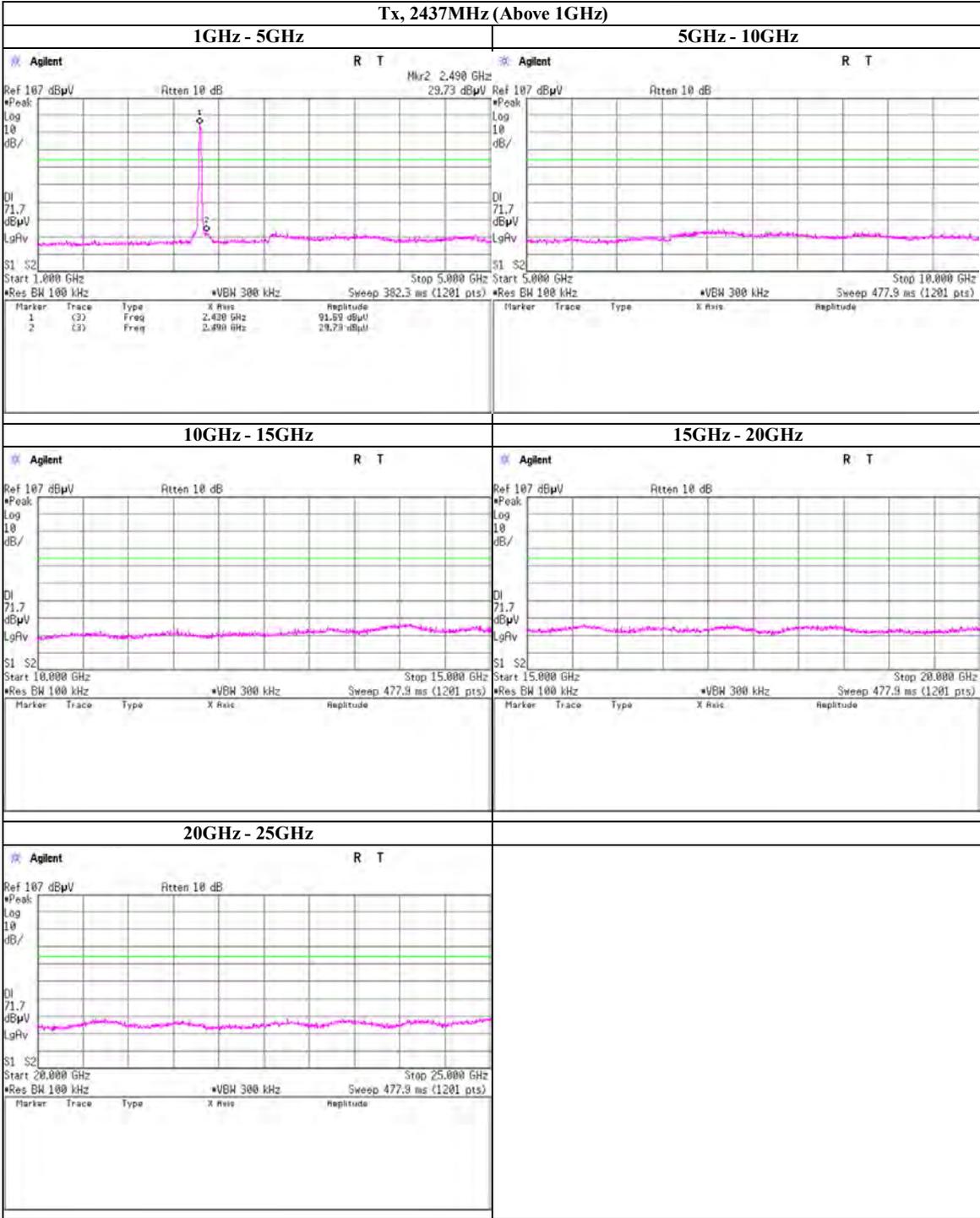
Tx, 2437MHz (Below 1GHz)



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Spurious emission (Conducted)
Tx, IEEE802.11g, PN9, worst data mode 24Mbps

Tx, 2437MHz (Above 1GHz)



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Spurious emission (Conducted)

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

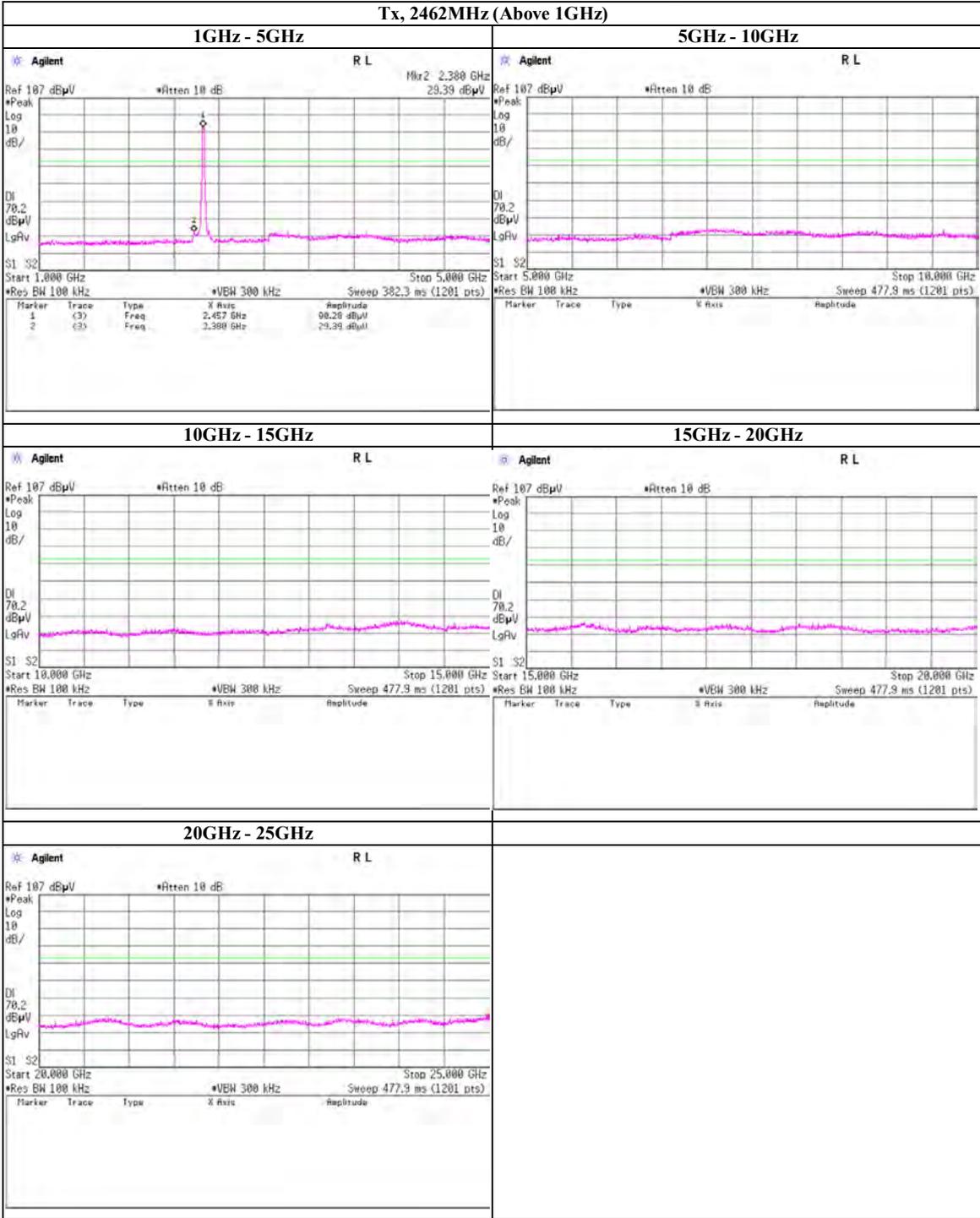
Tx, 2462MHz (Below 1GHz)



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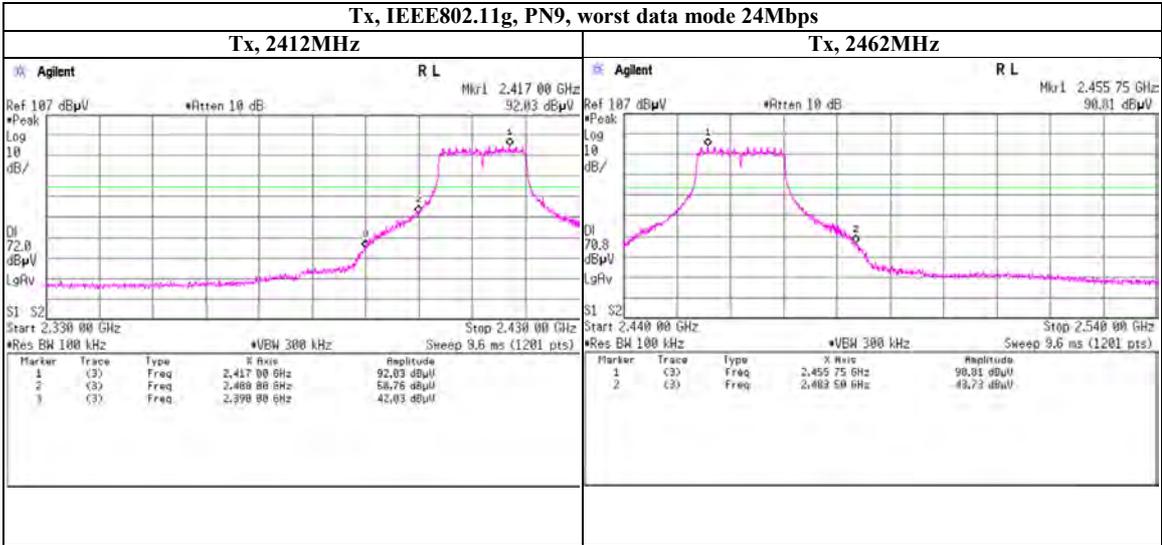
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Spurious emission (Conducted)

Band Edge compliance



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Spurious emission (Conducted)
Tx, IEEE802.11n, PN9, worst data mode 6(MCS)

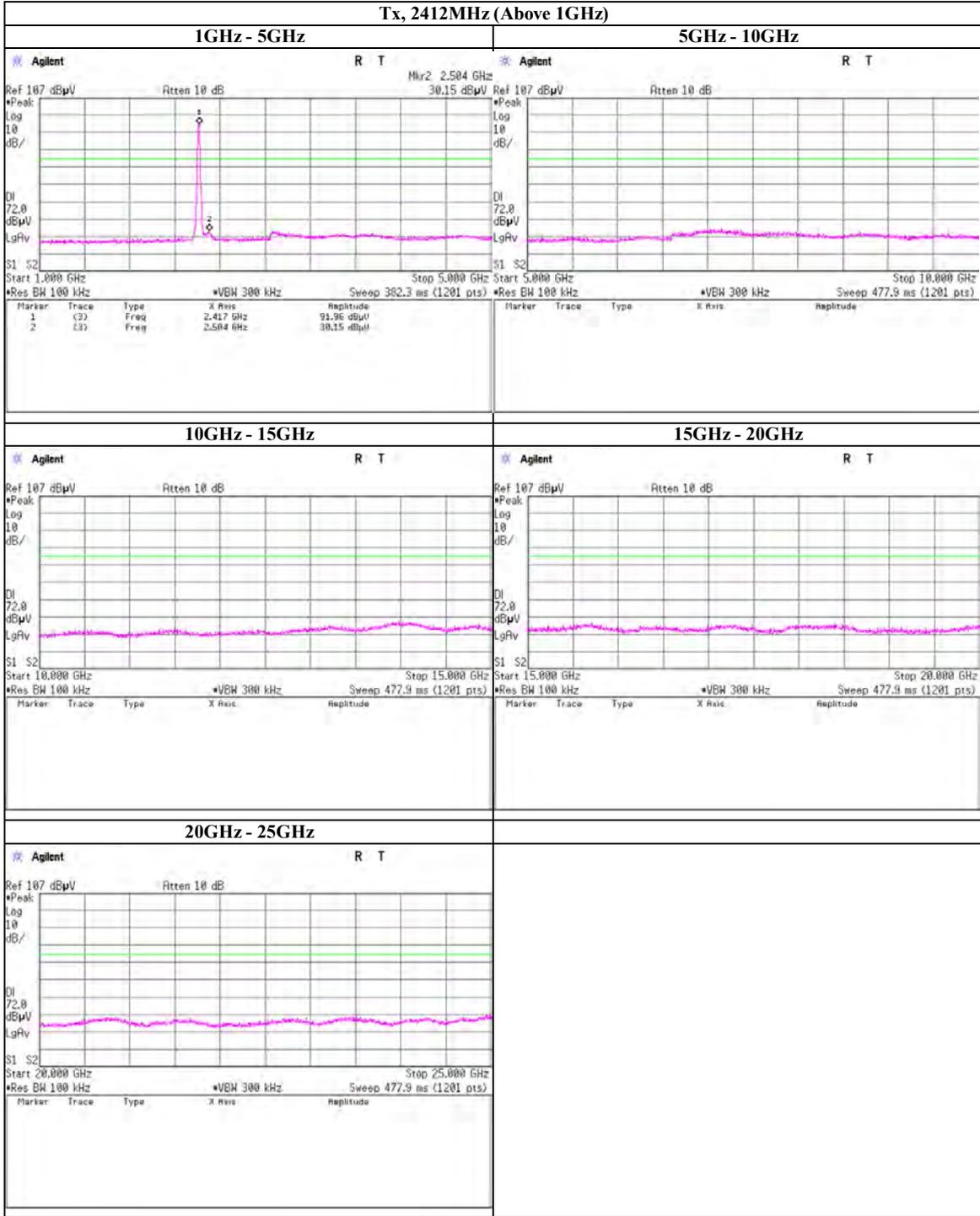
Tx, 2412MHz (Below 1GHz)



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Spurious emission (Conducted)
Tx, IEEE802.11n, PN9, worst data mode 6(MCS)

Tx, 2412MHz (Above 1GHz)



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Spurious emission (Conducted)
Tx, IEEE802.11n, PN9, worst data mode 6(MCS)

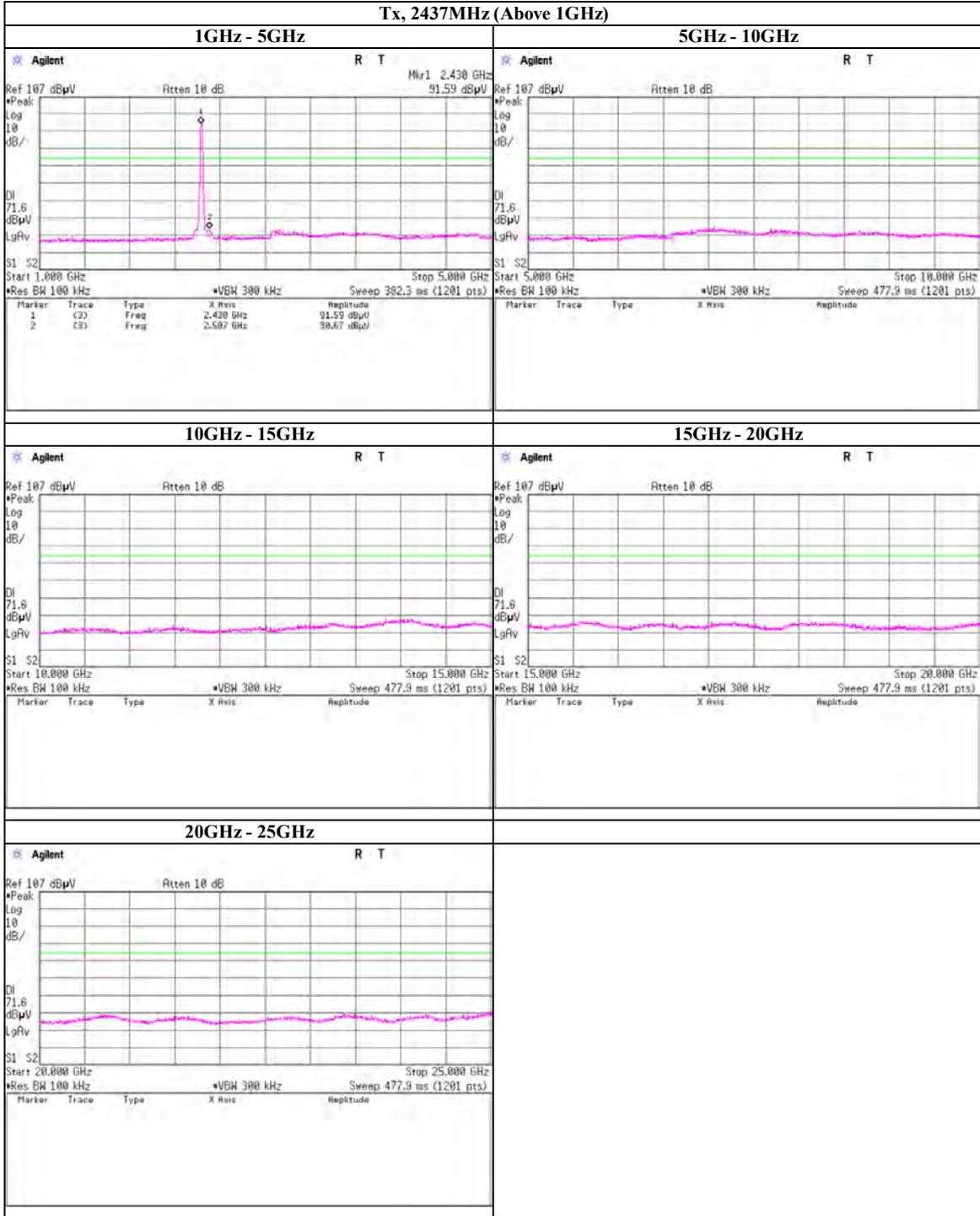
Tx, 2437MHz (Below 1GHz)



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Spurious emission (Conducted)
Tx, IEEE802.11n, PN9, worst data mode 6(MCS)

Tx, 2437MHz (Above 1GHz)



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Spurious emission (Conducted)
Tx, IEEE802.11n, PN9, worst data mode 6(MCS)

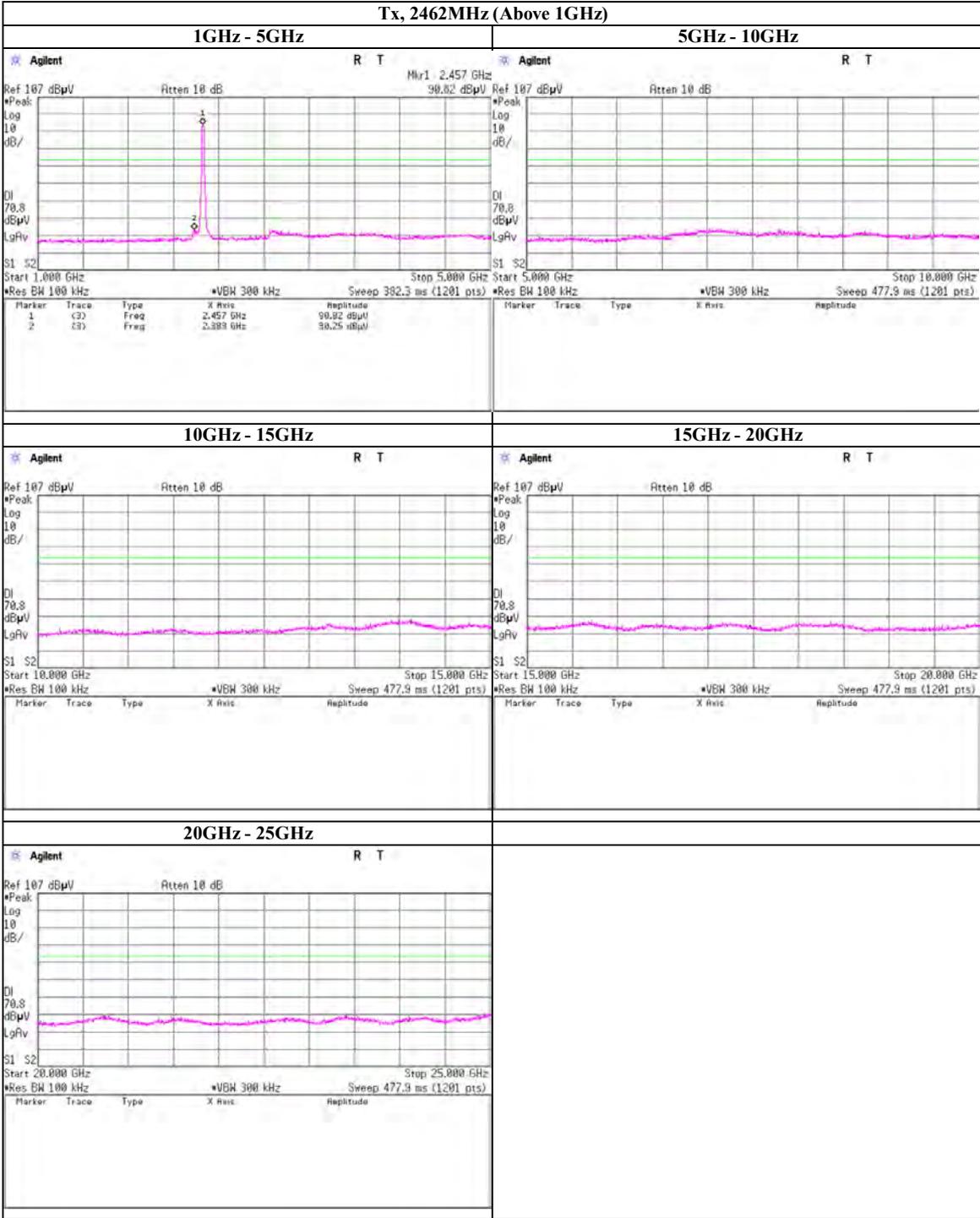
Tx, 2462MHz (Below 1GHz)



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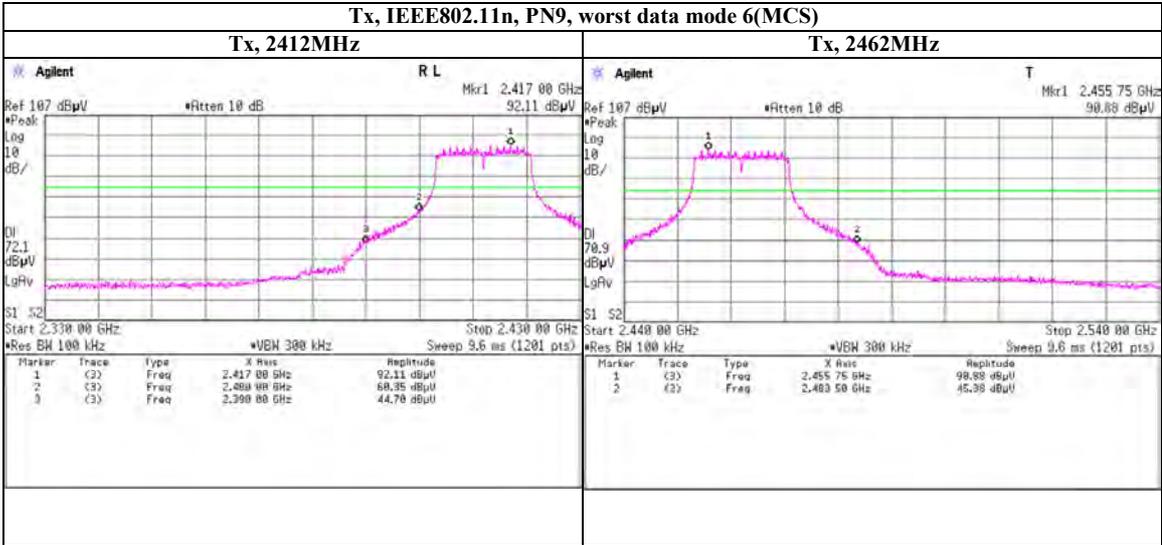
Tx, 2462MHz (Above 1GHz)



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Band Edge compliance



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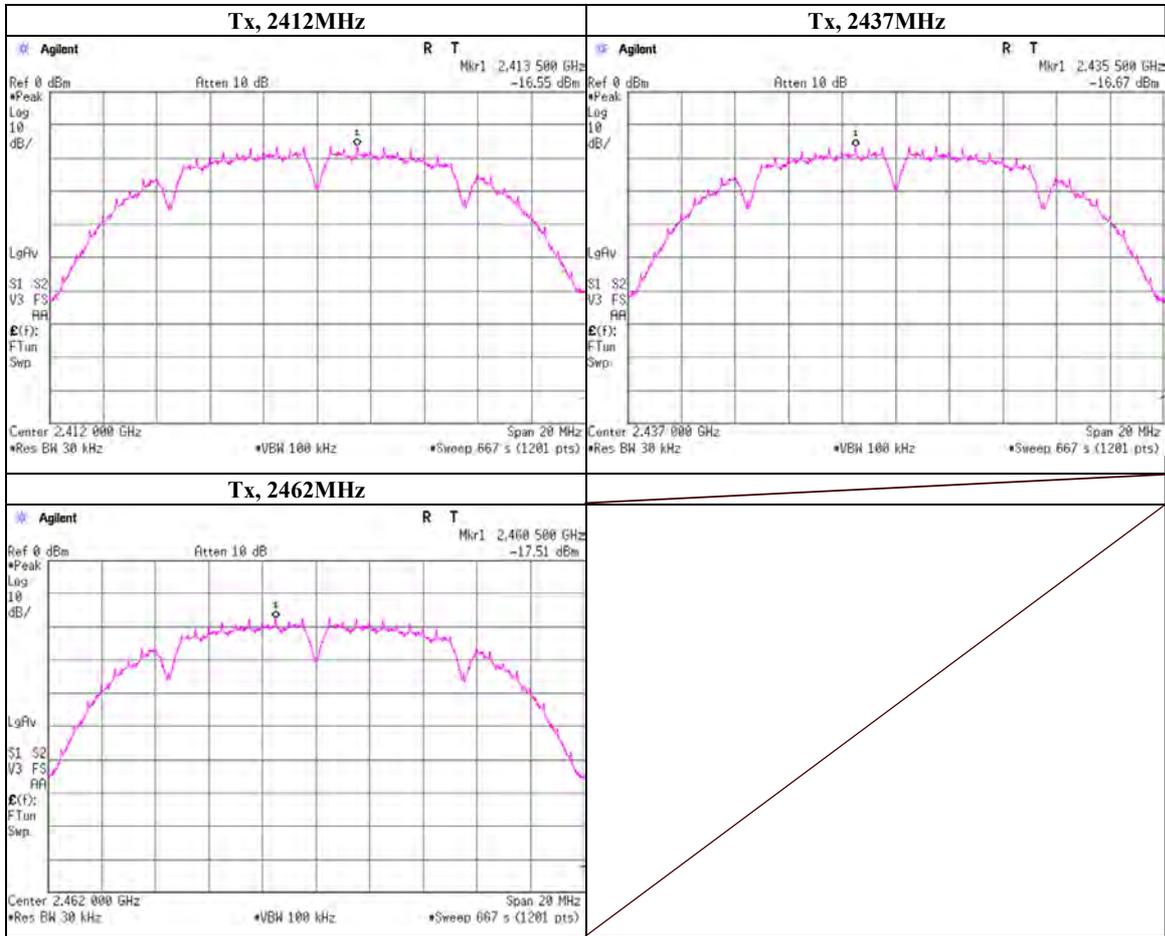
Power Density

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	June 14, 2012	
Temperature / Humidity	25deg.C , 48%RH	
Engineer	Hikaru Shirasawa	
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	2413.50	-16.55	0.84	9.97	-5.74	8.00	13.74
2437.0000	2435.50	-16.67	0.84	9.97	-5.86	8.00	13.86
2462.0000	2460.50	-17.51	0.85	9.97	-6.69	8.00	14.69

Sample Calculation:

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



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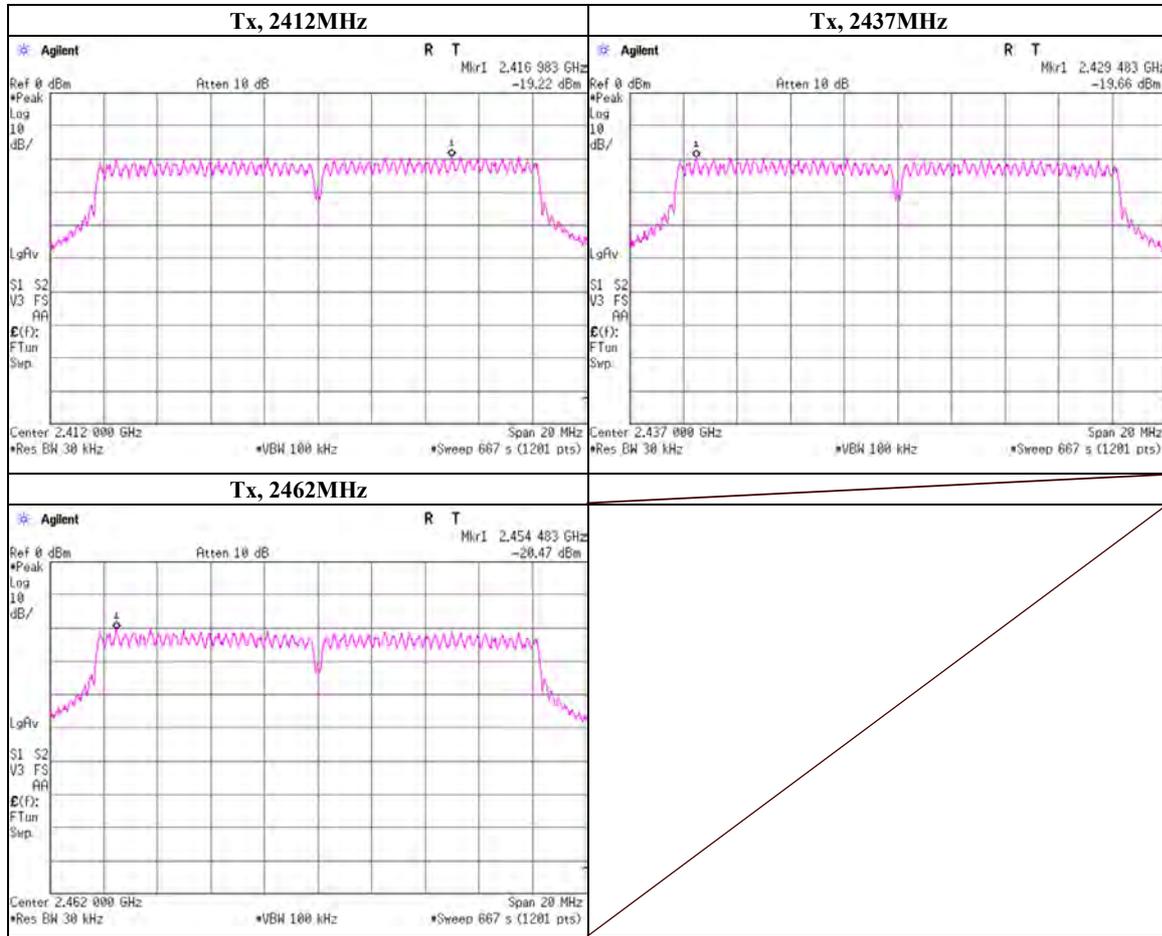
Power Density

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	June 14, 2012	
Temperature / Humidity	25deg.C , 48%RH	
Engineer	Hikaru Shirasawa	
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	2416.98	-19.22	0.84	9.97	-8.41	8.00	16.41
2437.0000	2429.48	-19.66	0.84	9.97	-8.85	8.00	16.85
2462.0000	2454.48	-20.47	0.85	9.97	-9.65	8.00	17.65

Sample Calculation:

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



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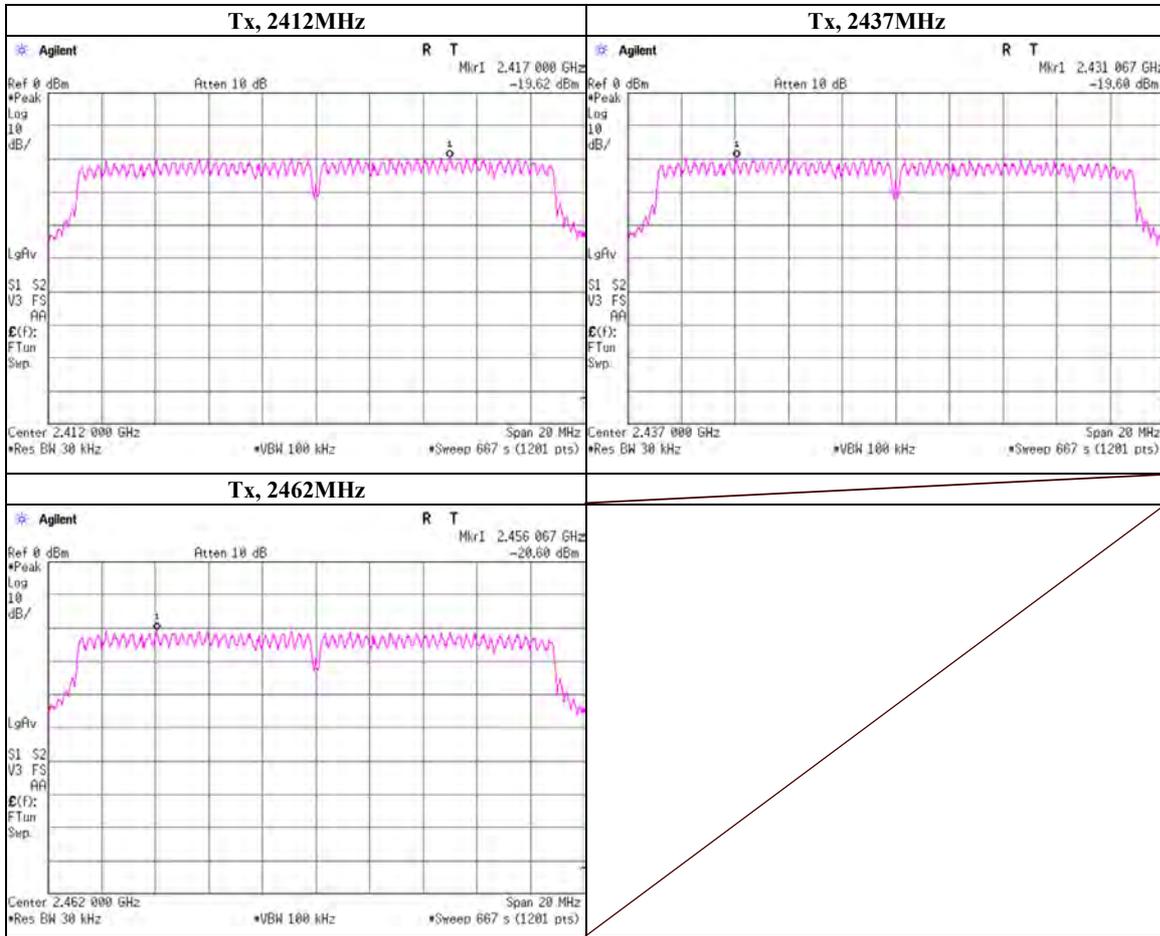
Power Density

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	June 14, 2012	
Temperature / Humidity	25deg.C , 48%RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, IEEE802.11n, PN9, worst data mode 6(MCS)	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	2417.00	-19.62	0.84	9.97	-8.81	8.00	16.81
2437.0000	2431.07	-19.60	0.84	9.97	-8.79	8.00	16.79
2462.0000	2456.07	-20.60	0.85	9.97	-9.78	8.00	17.78

Sample Calculation:

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



UL Japan, Inc.

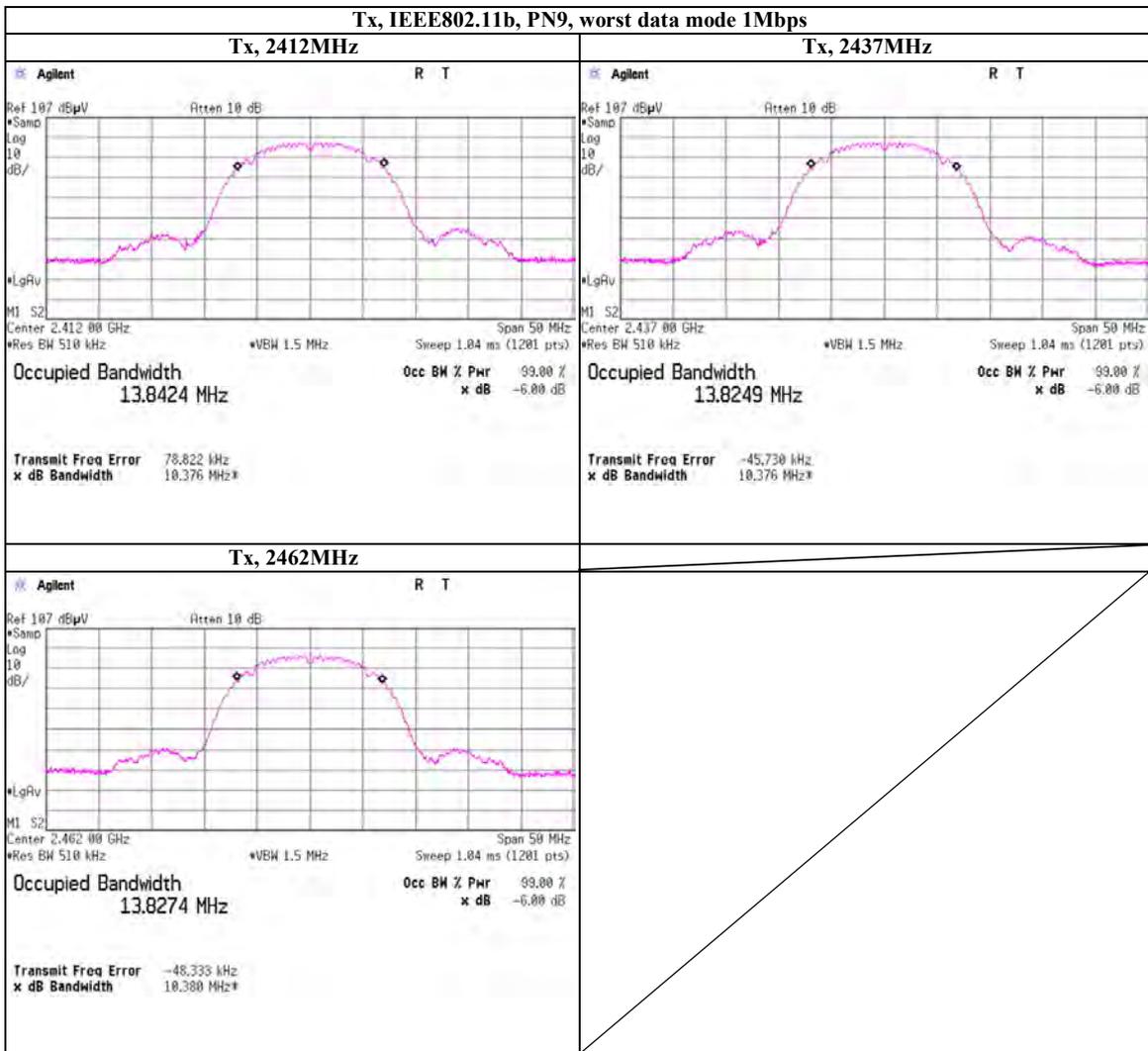
Shonan EMC Lab.

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Telephone : +81 463 50 6400

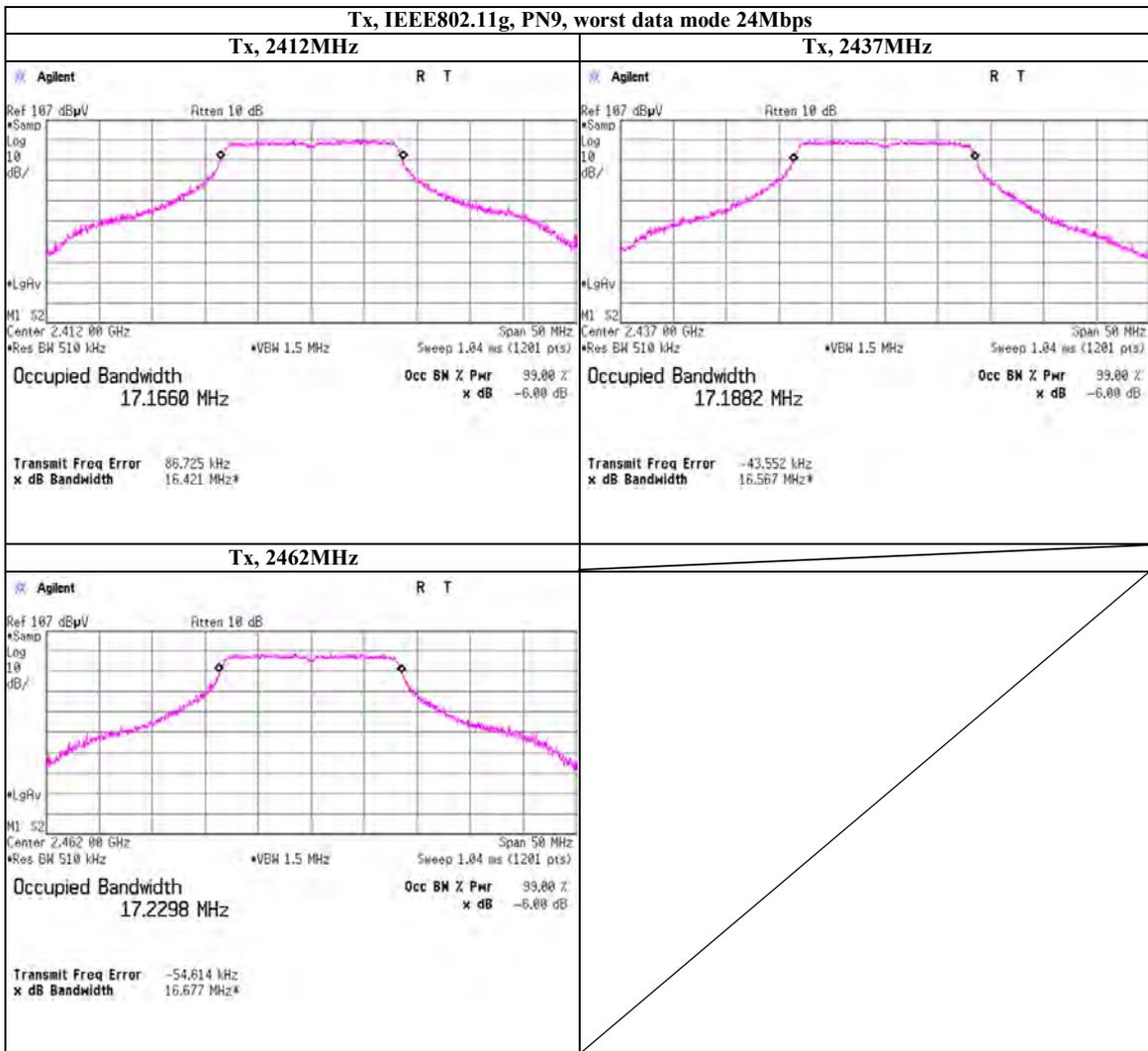
Facsimile : +81 463 50 6401

99% Occupied Bandwidth



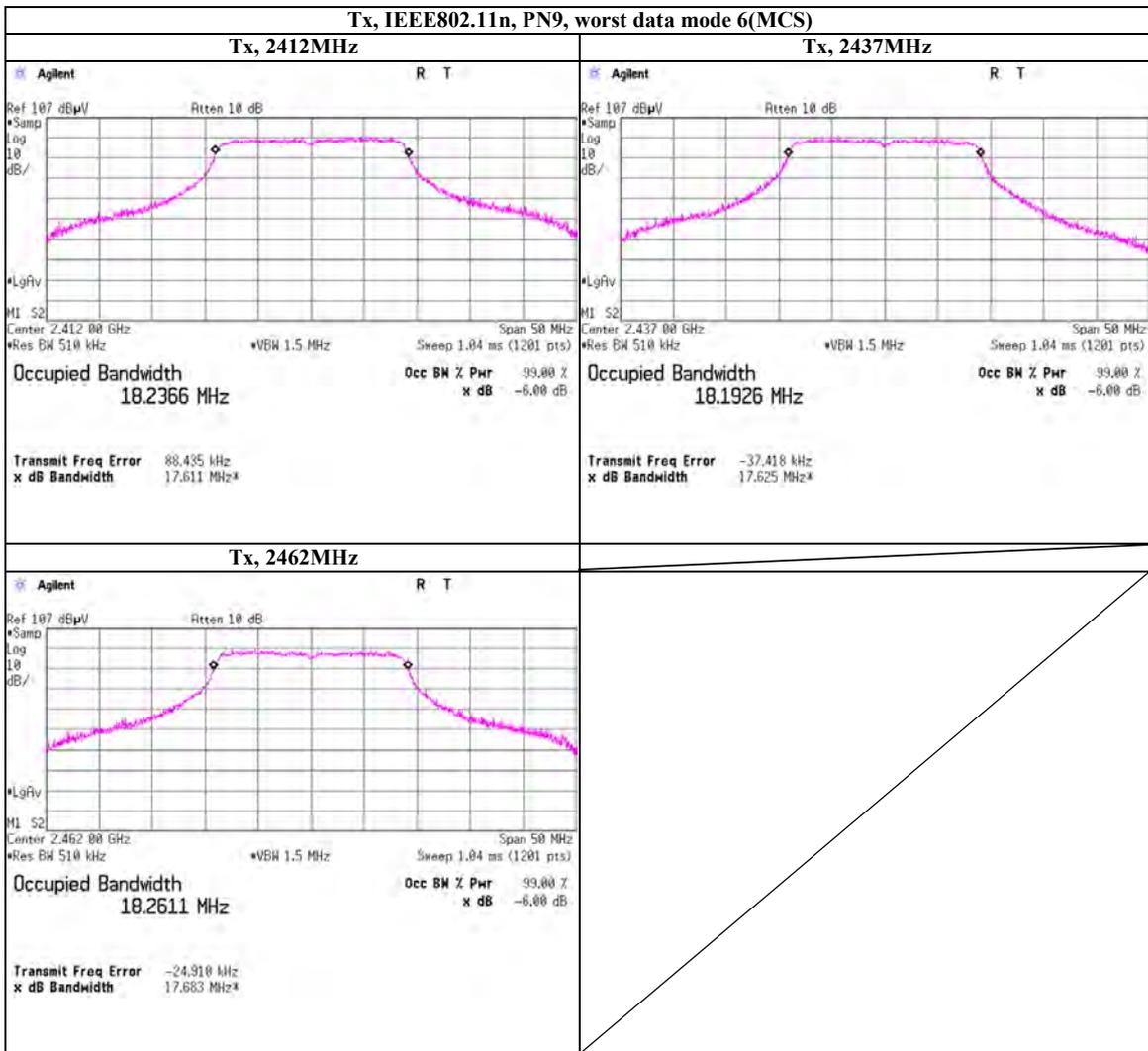
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99% Occupied Bandwidth



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99% Occupied Bandwidth



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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)
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2012/03/26 * 12
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2012/04/19 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2012/04/19 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	AT	2011/12/05 * 12
SAT10-10	Attenuator	Weinschel Corp.	54A-10	37584	AT	2012/04/06 * 12
SCC-G11	Coaxial Cable	Suhner	SUCOFLEX 102	31595/2	AT	2012/03/12 * 12
SCC-G14	Coaxial Cable	Suhner	SUCOFLEX 102	31600/2	AT	2012/03/12 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2012/02/10 * 12
SAT6-03	Attenuator	JFW	50HF-006N	-	RE	2012/02/10 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2011/10/23 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271 (RF Selector)	RE	2012/04/10 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2011/10/23 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2012/02/06 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE	2012/02/07 * 12
SJM-10	Measure	PROMART	SEN1935	-	RE	-
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2011/09/23 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFLMF)	-	RE	-
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2012/07/18 * 12
SCC-G03	Coaxial Cable	Suhner	SUCOFLEX 104A	46499/4A	RE	2012/04/10 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2012/05/22 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2011/08/28 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	RE	2012/02/16 * 12
SAT10-05	Attenuator(above 1GHz)	Agilent	8493C-010	74864	RE	2011/12/27 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2011/12/27 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2011/12/27 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2012/03/30 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2012/03/12 * 12
SCC-G17	Coaxial Cable	Suhner	SUCOFLEX 104A	46291/4A	RE	2012/03/12 * 12

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

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

Test Item :

- CE: Conducted emission ,
- RE: Radiated emission ,
- AT: Antenna terminal disturbance voltage

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Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SCC-B12/B13/SRSE-02	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/N S4906	-/0901-270(RF Selector)	CE	2012/04/10 * 12
SLS-03	LISN	Rohde & Schwarz	ENV216	100513	CE(EUT)	2012/02/23 * 12
SLS-04	LISN	Rohde & Schwarz	ENV216	100514	CE(AE)	2012/02/20 * 12
SAT3-05	Attenuator	JFW	50HF-003N	-	CE	2012/02/17 * 12
SOS-04	Humidity Indicator	A&D	AD-5681	4061512	CE	2012/03/26 * 12
STM-03	Terminator	TME	CT-01 BP	-	CE	2012/01/05 * 12
STR-02	Test Receiver	Rohde & Schwarz	ESCI	100575	CE	2011/08/04 * 12
SJM-02	Measure	KOMELON	KMC-36	-	CE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	CE	-

The expiration date of the calibration is the end of the expired month .
 As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .
 All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards .
Test Item :
 CE: Conducted emission ,
 RE: Radiated emission ,
 AT: Antenna terminal disturbance voltage