



Test report No. : 10008145S-A
Page : 1 of 69
Issued date : May 15, 2013
Revised date : June 18, 2013
FCC ID : AZDK30357

RADIO TEST REPORT

Test Report No.: 10008145S-A

Applicant : Canon Inc.
Type of Equipment : Wireless LAN Module
Model No. : K30357
FCC ID : AZDK30357
Test regulation : FCC Part15 Subpart C: 2012
Test result : Complied

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

Date of test: April 9 to 23, 2013

Tested by:

S. Takano

Shinichi Takano
Engineer of WiSE Japan,
UL Verification Service

Approved by :

G. Ishiwata

Go Ishiwata
Manager 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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SECTION 1: Customer information

Company Name : Canon Inc.
Address : 3-451 Tsukagoshi, Saiwai-ku, Kawasaki, Kanagawa 212-8530, Japan
Telephone Number : +81-44-542-2111
Facsimile Number : +81-44-548-7513
Contact Person : Kenichi Nampei

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

2.1 Identification of E.U.T.

Type of Equipment : Wireless LAN Module
Model Number : K30357
Serial Number : See Section 4.
Rating : DC3.3V
Country of Mass-production : Thailand, Vietnam
Condition of EUT : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample : April 9, 2013
Modification of EUT : No modification by the test lab.

2.2 Product description

Model: K30357 (referred to as the EUT in this report) is a Wireless LAN Module.

Clock frequency(ies) in the system : 40MHz

<Radio part>

Equipment type : Transceiver
Frequency of operation : 2412-2462MHz (IEEE 802.11b, 11g, 11n-HT20)
2422-2452MHz (IEEE 802.11n-HT40)
Bandwidth : 20MHz (IEEE 802.11b, 11g, 11n-HT20), 40MHz (IEEE 802.11n-HT40)
Channel spacing : 5MHz
Type of modulation : DSSS (IEEE 802.11b), OFDM (IEEE 802.11g/n)
Antenna type : Pattern antenna (meander)
Antenna connector type : U.FL
Antenna gain : 1.08 dBi
ITU code : D1D, G1D
Operation temperature range : -5 to +55 deg.C

FCC 15.31 (e) / 212

The module is constantly provided the stable voltage from the host device regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC 15.203 / 212

The antenna is not removable from the EUT. Therefore, the equipment complies with the antenna requirement.
The antenna connector is a unique type and not used by end user.

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SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : Test specification: FCC Part 15 Subpart C: 2012, final revised on December 27, 2012 and effective January 28, 2013
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

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 *2)	6.8dB Freq.: 0.45187MHz Detector: AV Phase: N Mode: Tx 2437MHz, 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	5.5dB Freq.: 2508.664MHz Polarization: Vertical Detection: Average Mode: Tx 2437MHz / 11n-20HT	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 v03r01 (FCC), "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247". *2) The test was performed with the EUT installed in the host device.						

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied bandwidth (99%)	ANSI C63.4:2009, 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.

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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) 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	4.9 dB	5.1 dB	4.9 dB
	300MHz-1GHz	5.0 dB	5.2 dB	4.9 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	4.6 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 the site margin.

Radiated emission test

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

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%

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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
☐ 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	-

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

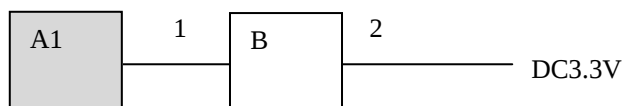
4.1 Operating mode

Test item	Mode	Tested frequency	Power setting *1)	Worst data rate *2)
Conducted emission Radiated emission (below 1GHz) *3)	Transmitting IEEE 802.11g	2437MHz	12dBm	6Mbps, PN9
Other items	Transmitting IEEE 802.11b	2412MHz, 2437MHz, 2462MHz	13dBm	1Mbps, PN9
	Transmitting IEEE 802.11g	2412MHz, 2437MHz, 2462MHz	ch1: 7dBm, ch6: 12dBm, ch11: 7dBm	6Mbps, PN9
	Transmitting IEEE 802.11n-20	2412MHz, 2437MHz, 2462MHz	ch1: 7dBm, ch6: 12dBm, ch11: 7dBm	MCS0, PN9
	Transmitting IEEE 802.11n-40	2422MHz, 2437MHz, 2452MHz	7dBm	MCS3, PN9
*1) Software used for the test: MFG-USB-8782-FC8-X86, Version: 1.1.7.34-14.1.11.p75 *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

4.2.1 Radiated emission test and Antenna port conducted test



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A1	Wireless LAN Module	K30357	*1)	Canon	EUT
B	WLAN JOINT PCB	-	-	Canon	-

*1) Radiated emission: 1304NK037, Other test: 1304NK054

List of cables used

No.	Name	Length (m)	Shield-Cable	Shield-Connector	Remarks
1	Flat	0.1	Unshielded	Unshielded	-
2	DC	1.3	Unshielded	Unshielded	-

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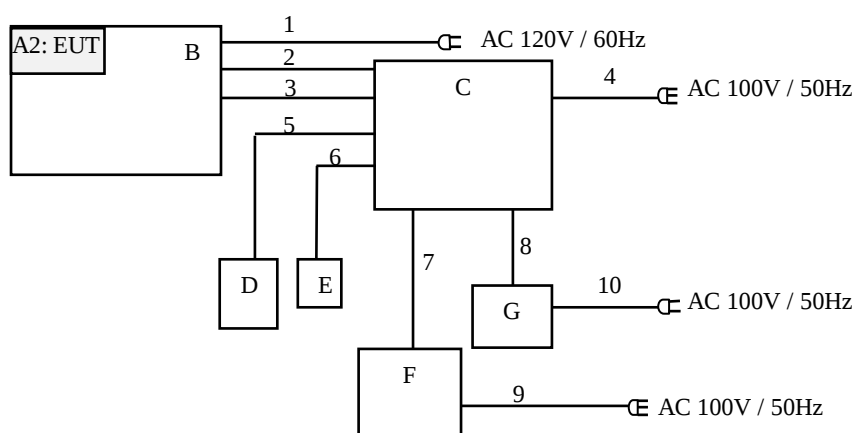
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4.2.2 Conducted emission test



*Cabling and setup were taken into consideration and test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A2	Wireless LAN Module	K30357	1304NK006	CANON	EUT
B	MULTIFUNCTION PRINTER	K10390	DE-06	CANON	-
C	Personal Computer	ThinkCentre A42	L3A1407	Lenovo	-
D	Keyboard	KU-0225	0051066	Lenovo	-
E	Mouse	M-UAE96	-	Hewlett Packard	-
F	LCD Monitor	L551	28651025	EIZO NANA0	-
G	Modem	ME3314B	6K07040	OMRON	-

List of cables used

No.	Name	Length (m)	Shield-Cable	Shield-Connector	Remarks
1	AC	1.8	Unshielded	Unshielded	-
2	USB	1.8	Shielded	Shielded	-
3	LAN	3.0	Unshielded	Unshielded	-
4	AC	2.0	Unshielded	Unshielded	-
5	USB	1.8	Shielded	Shielded	-
6	USB	1.8	Shielded	Shielded	-
7	RGB	1.8	Shielded	Shielded	-
8	RS232	3.0	Shielded	Shielded	-
9	AC	2.0	Unshielded	Unshielded	-
10	AC	1.8	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 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 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. Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN to the input power source. 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 host device within a Shielded room. The EUT was connected to a Line Impedance Stabilization Network (LISN). An overview sweep with peak detection has been performed. The measurements had been performed with a quasi-peak detector and if required, 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

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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 urethane 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 : 9kHz to 25GHz
EUT position : Table top

6.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on a semi-anechoic chamber with a ground plane and at a distance of 3m (below 15GHz) / 1m (above 15GHz). Measurements were performed with quasi-peak, peak and average detector.

<Below 30MHz>

The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for vertical polarization (antenna angle: 0deg.to 360deg.) and horizontal polarization. Drawing of the antenna direction is shown in Figure 1.

<Above 30MHz>

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. Drawing of the antenna direction is shown in Figure 2.

The radiated emission measurements were made with the following detection.

<Below 30MHz>

Frequency	9kHz to 90kHz & 110kHz to 150kHz	90kHz to 110kHz	150kHz to 490kHz	490kHz to 30MHz
Detection type	PK/AV	QP	PK/AV	QP
IF Bandwidth	200Hz	200Hz	9kHz	9kHz

<Above 30MHz>

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

* FCC Part 15 Section 15.31 (f)(2) (9kHz-30MHz)

9kHz – 490kHz [Limit at 3m]= [Limit at 300m]-40log (3[m]/300[m])

490kHz – 30MHz [Limit at 3m]= [Limit at 30m]-40log (3[m]/30[m])

*1) Average Power Measurement was measured based on 12.2.5.1 and 12.2.5.2 of KDB 558074 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

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

Worst case:

Antenna polarization	Carrier (Band edge)	Spurious		
		Below 1GHz	Above 1GHz	
			1-2.8GHz	2.8-25GHz
Horizontal	Y	Z	Y	Z
Vertical	Z	Y	Z	Y

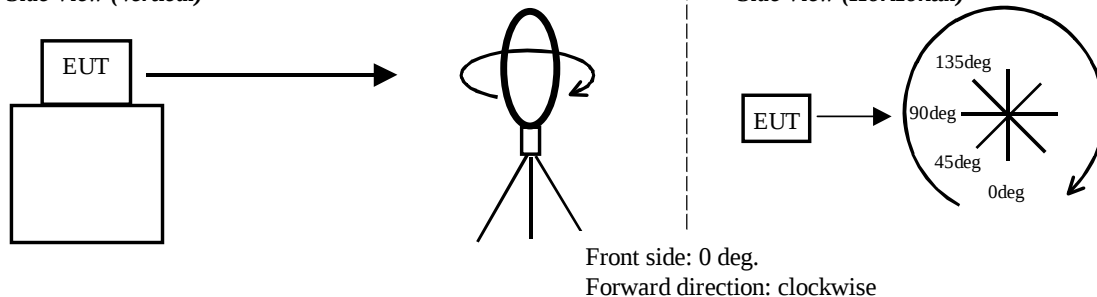
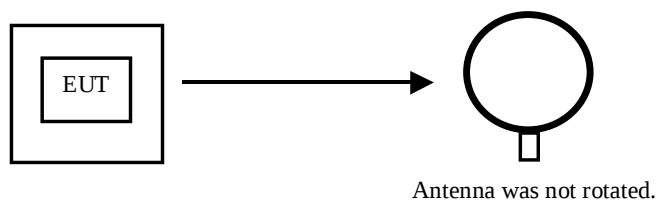
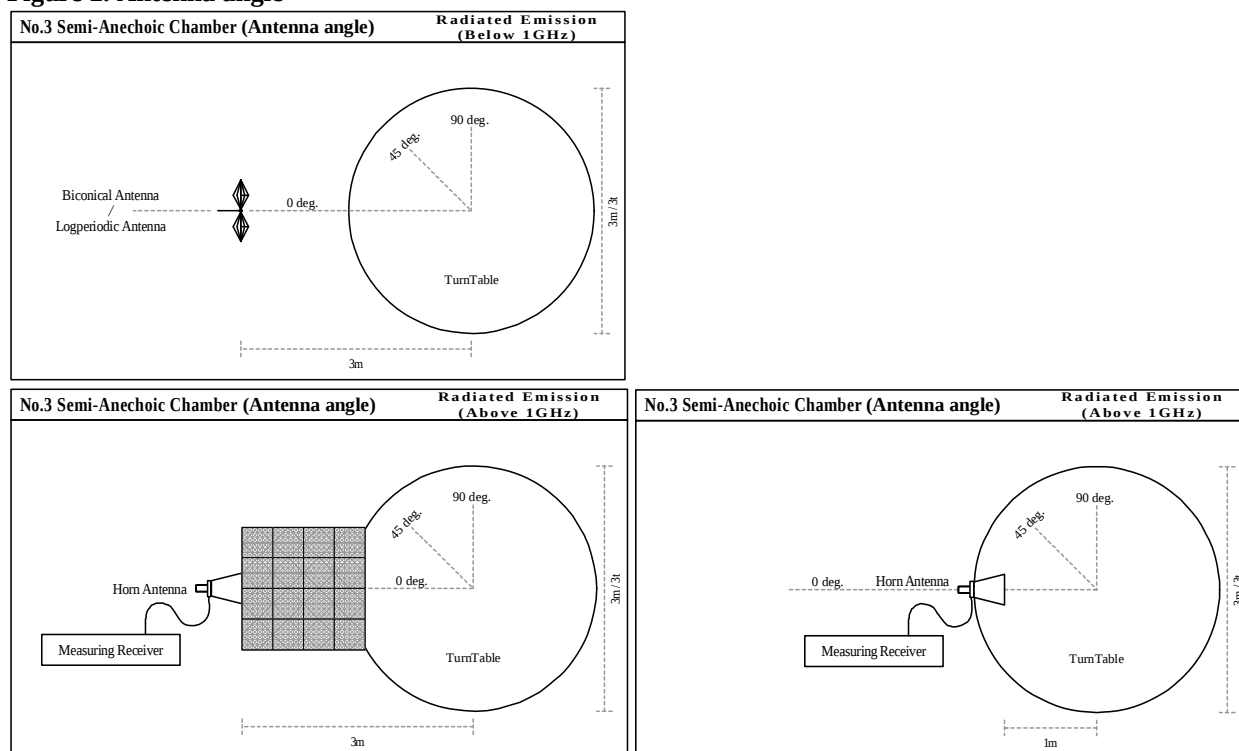
Figure 1. Direction of the Loop Antenna**Side View (Vertical)****Top View (Horizontal)**

Figure 2. Antenna angle



6.5 Band edge

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

6.6 Results

Summary of the test results :

Pass

* No noise was detected above the 5th order harmonics.

Refer to APPENDIX 1

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SECTION 7: 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. 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 8: 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 KDB 558074 "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: 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 KDB 558074 "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 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 KDB 558074 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

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
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.3 Shielded Room
Date : 2013/04/18

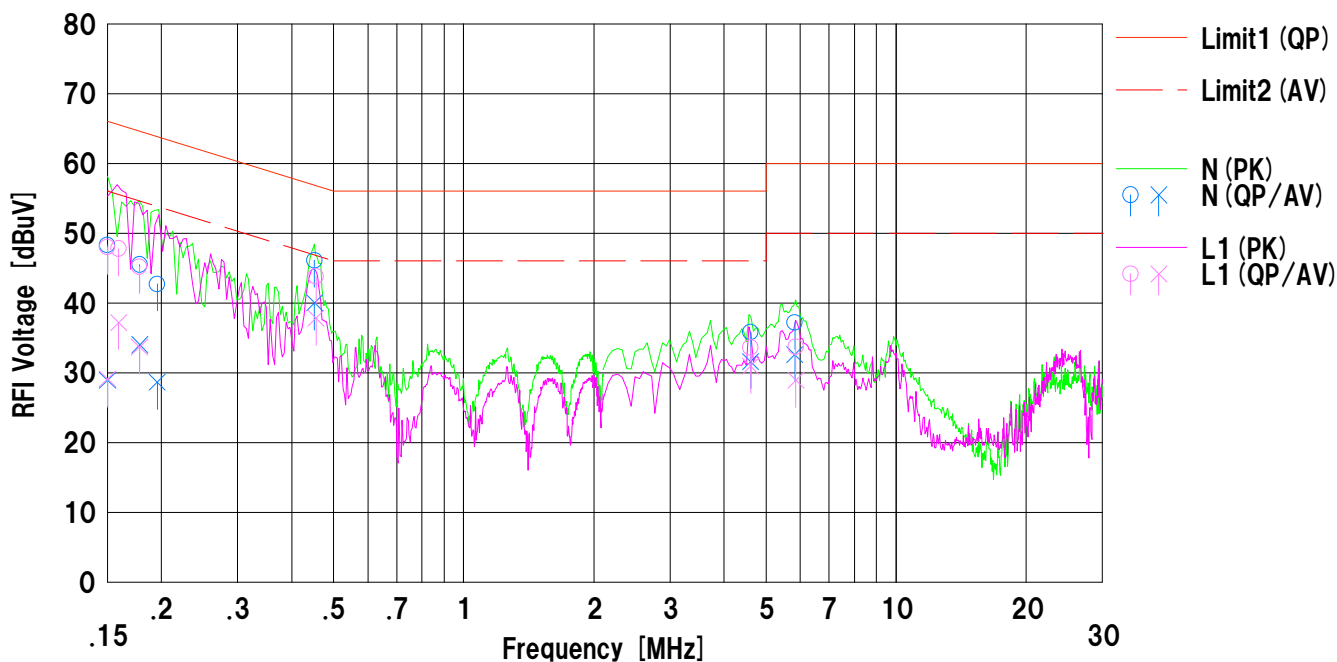
Company : CANON INC.
Kind of EUT : Wireless LAN Module
Model No. : K30357
Serial No. : 1304NK006

Mode : 11g Tx 2437MHz
Order No. : 10008145S
Power : DC3.3V (Printer 120V/60Hz)
Temp./Humi. : 25deg.C/47%RH

Remarks : -

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

Engineer : Shinichi Takano



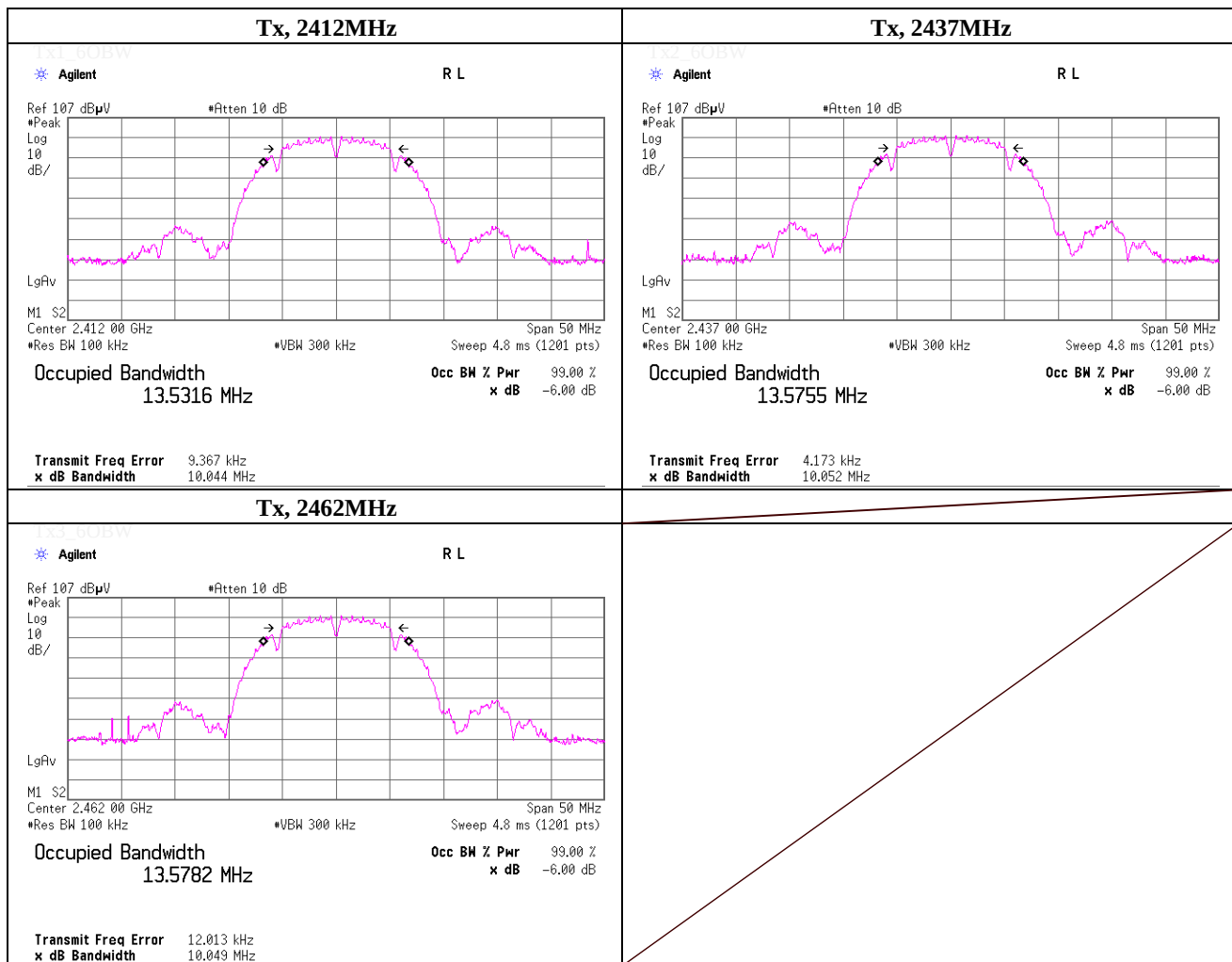
No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15000	35.6	162	12.7	48.3	28.9	66.0	56.0	17.7	27.1	N	
2	0.17813	32.8	213	12.7	45.5	34.0	64.5	54.5	19.0	20.5	N	
3	0.19562	30.0	159	12.7	42.7	28.6	63.7	53.7	21.0	25.1	N	
4	0.45187	33.4	273	12.7	46.1	40.0	56.8	46.8	10.7	6.8	N	
5	4.60869	22.9	187	12.9	35.8	31.6	56.0	46.0	20.2	14.4	N	
6	5.83505	24.2	196	13.0	37.2	32.6	60.0	50.0	22.8	17.4	N	
7	0.15000	35.3	164	12.7	48.0	29.1	66.0	56.0	18.0	26.9	L1	
8	0.15908	35.1	245	12.7	47.8	37.2	65.5	55.5	17.7	18.3	L1	
9	0.17796	32.5	210	12.7	45.2	33.7	64.5	54.5	19.3	20.8	L1	
10	0.45587	31.1	251	12.7	43.8	37.8	56.7	46.7	12.9	8.9	L1	
11	4.60772	20.7	180	12.9	33.6	30.9	56.0	46.0	22.4	15.1	L1	
12	5.86012	20.7	159	13.0	33.7	28.9	60.0	50.0	26.3	21.1	L1	

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

-6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 11, 2013	
Temperature / Humidity	26deg.C , 40%RH	
Engineer	Shinichi Takano	
Mode	Tx, IEEE802.11b, PN9, worst data mode 1Mbps	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	10.044	> 0.500
2437.0000	10.052	> 0.500
2462.0000	10.049	> 0.500



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Shonan EMC Lab.

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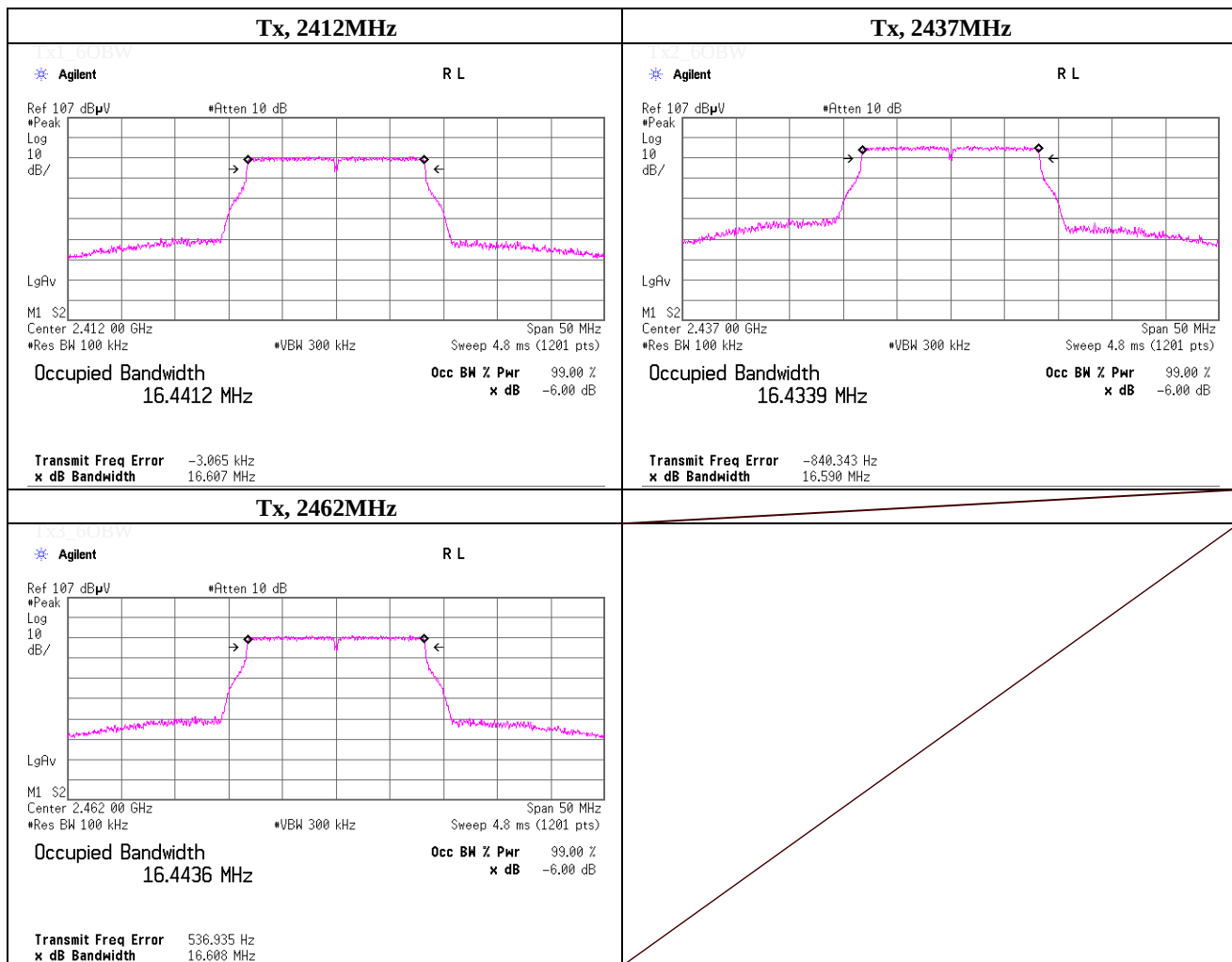
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

-6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 11, 2013	
Temperature / Humidity	26deg.C , 40%RH	
Engineer	Shinichi Takano	
Mode	Tx, IEEE802.11g, PN9, worst data mode 6Mbps	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	16.607	> 0.500
2437.0000	16.590	> 0.500
2462.0000	16.608	> 0.500



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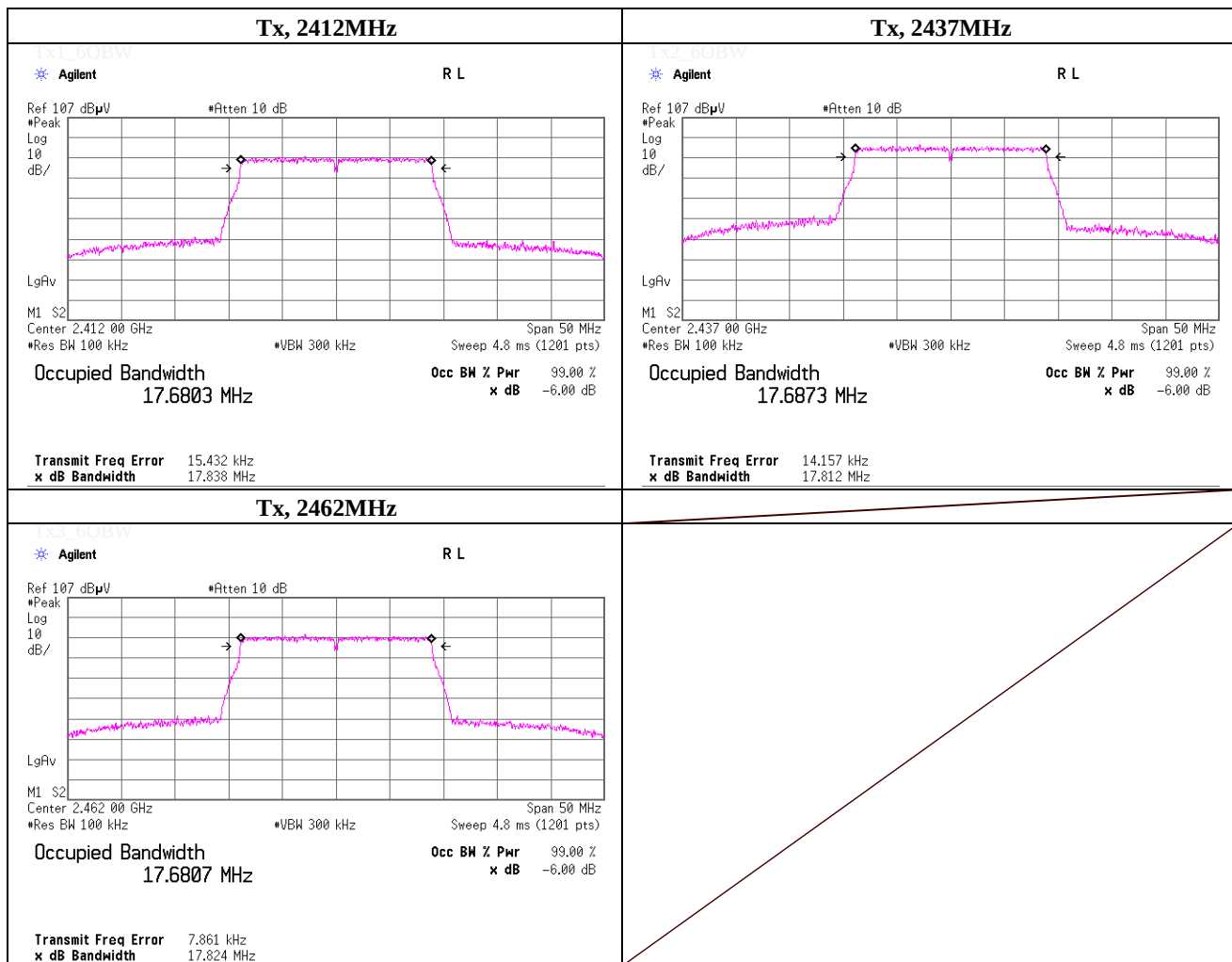
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

-6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 11, 2013	
Temperature / Humidity	26deg.C , 40%RH	
Engineer	Shinichi Takano	
Mode	Tx, IEEE802.11n-20HT, PN9, worst data mode 0(MCS)	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	17.838	> 0.500
2437.0000	17.812	> 0.500
2462.0000	17.824	> 0.500

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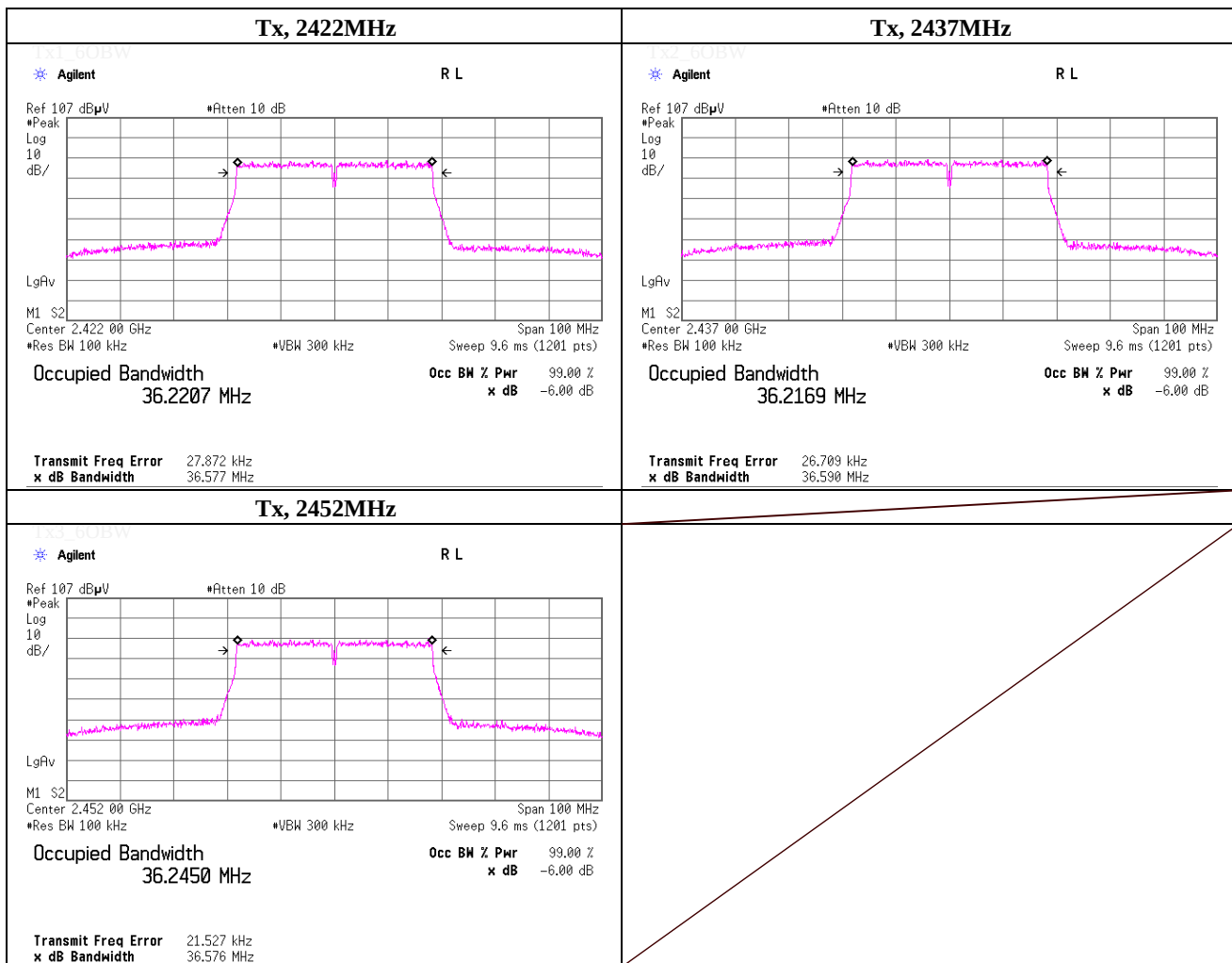
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

-6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 11, 2013	
Temperature / Humidity	26deg.C , 40%RH	
Engineer	Shinichi Takano	
Mode	Tx, IEEE802.11n-40HT, PN9, worst data mode 3(MCS)	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2422.0000	36.577	> 0.500
2437.0000	36.590	> 0.500
2452.0000	36.576	> 0.500

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Maximum Peak Conducted Output Power

(Method 9.1.3 PKPM1)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date April 11, 2013
Temperature / Humidity 26deg.C , 40%RH
Engineer Shinichi Takano
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
					[dBm]	[mW]	[dBm]	[mW]	[dB]
Low	2412.0	3.54	1.24	9.91	14.69	29.44	30.00	1000	15.31
Mid	2437.0	4.31	1.25	9.91	15.47	35.24	30.00	1000	14.53
High	2462.0	4.14	1.25	9.92	15.31	33.96	30.00	1000	14.69

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
						[dBm]	[mW]	[dBm]	[mW]	[dB]
	1	2437.0	4.31	1.25	9.91	15.47	35.24	30.00	1000	14.53
	2	2437.0	4.27	1.25	9.91	15.43	34.91	30.00	1000	14.57
	5.5	2437.0	3.56	1.25	9.91	14.72	29.65	30.00	1000	15.28
	11	2437.0	4.23	1.25	9.91	15.39	34.59	30.00	1000	14.61

Worst

Sample Calculation:

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

UL Japan, Inc.
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Maximum Peak Conducted Output Power

(Method 9.1.3 PKPM1)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date April 11, 2013
Temperature / Humidity 26deg.C , 40%RH
Engineer Shinichi Takano
Mode Tx, IEEE802.11g, PN9, worst data mode : 6 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
					[dBm]	[mW]	[dBm]	[mW]	[dB]
Low	2412.0	5.31	1.24	9.91	16.46	44.26	30.00	1000	13.54
Mid	2437.0	10.92	1.25	9.91	22.08	161.44	30.00	1000	7.92
High	2462.0	5.63	1.25	9.92	16.80	47.86	30.00	1000	13.20

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
						[dBm]	[mW]	[dBm]	[mW]	[dB]
	6	2437.0	10.92	1.25	9.91	22.08	161.44	30.00	1000	7.92
	9	2437.0	9.72	1.25	9.91	20.88	122.46	30.00	1000	9.12
	12	2437.0	10.75	1.25	9.91	21.91	155.24	30.00	1000	8.09
	18	2437.0	9.82	1.25	9.91	20.98	125.31	30.00	1000	9.02
	24	2437.0	10.84	1.25	9.91	22.00	158.49	30.00	1000	8.00
	36	2437.0	10.59	1.25	9.91	21.75	149.62	30.00	1000	8.25
	48	2437.0	10.01	1.25	9.91	21.17	130.92	30.00	1000	8.83
	54	2437.0	10.05	1.25	9.91	21.21	132.13	30.00	1000	8.79

Worst

Sample Calculation:

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

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Maximum Peak Conducted Output Power

(Method 9.1.3 PKPM1)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date April 11, 2013
 Temperature / Humidity 26deg.C , 40%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		Limit		Margin
					[dBm]	[mW]	[dBm]	[mW]	[dB]
Low	2412.0	4.28	1.24	9.91	15.43	34.91	30.00	1000	14.57
Mid	2437.0	9.85	1.25	9.91	21.01	126.18	30.00	1000	8.99
High	2462.0	4.53	1.25	9.92	15.70	37.15	30.00	1000	14.30

Sample Calculation:

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

[Pre check]

	Mode (MCS)	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin
						[dBm]	[mW]	[dBm]	[mW]	[dB]
	0	2437.0	9.85	1.25	9.91	21.01	126.18	30.00	1000	8.99
	1	2437.0	9.68	1.25	9.91	20.84	121.34	30.00	1000	9.16
	2	2437.0	9.82	1.25	9.91	20.98	125.31	30.00	1000	9.02
	3	2437.0	9.72	1.25	9.91	20.88	122.46	30.00	1000	9.12
	4	2437.0	9.52	1.25	9.91	20.68	116.95	30.00	1000	9.32
	5	2437.0	9.23	1.25	9.91	20.39	109.40	30.00	1000	9.61
	6	2437.0	9.33	1.25	9.91	20.49	111.94	30.00	1000	9.51
	7	2437.0	9.32	1.25	9.91	20.48	111.69	30.00	1000	9.52

Worst

Sample Calculation:

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

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Maximum Peak Conducted Output Power

(Method 9.1.3 PKPM1)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date April 11, 2013
 Temperature / Humidity 26deg.C , 40%RH
 Engineer Shinichi Takano
 Mode Tx, IEEE802.11n-40HT, PN9, worst data mode : 3 (MCS)

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

Ch	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin
					[dBm]	[mW]	[dBm]	[mW]	[dB]
Low	2422.0	5.20	1.24	9.91	16.35	43.15	30.00	1000	13.65
Mid	2437.0	5.42	1.25	9.91	16.58	45.50	30.00	1000	13.42
High	2452.0	5.44	1.25	9.92	16.61	45.81	30.00	1000	13.39

Sample Calculation:

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

[Pre check]

	Mode (MCS)	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin
						[dBm]	[mW]	[dBm]	[mW]	[dB]
	0	2437.0	4.52	1.25	9.91	15.68	36.98	30.00	1000	14.32
	1	2437.0	4.61	1.25	9.91	15.77	37.76	30.00	1000	14.23
	2	2437.0	5.19	1.25	9.91	16.35	43.15	30.00	1000	13.65
	3	2437.0	5.42	1.25	9.91	16.58	45.50	30.00	1000	13.42
	4	2437.0	5.23	1.25	9.91	16.39	43.55	30.00	1000	13.61
	5	2437.0	4.08	1.25	9.91	15.24	33.42	30.00	1000	14.76
	6	2437.0	3.73	1.25	9.91	14.89	30.83	30.00	1000	15.11
	7	2437.0	3.67	1.25	9.91	14.83	30.41	30.00	1000	15.17

Worst

Sample Calculation:

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

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Radiated Emission

Test place No.3 Semi Anechoic Chamber
 Date April 10, 2013 April 10, 2013 April 16, 2013
 Temperature / Humidity 24 deg.C, 31 %RH 24 deg.C, 31 %RH 26 deg.C, 34 %RH
 Engineer Wataru Kojima Takahiro Suzuki Shinichi Takano
 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.	2390.000	PK	51.0	27.4	14.8	41.4	51.8	73.9	22.1	100	166	
Hori.	4824.000	PK	46.9	31.1	6.8	41.2	43.6	73.9	30.3	100	270	
Hori.	6432.000	PK	48.0	34.9	7.5	40.6	49.8	73.9	24.1	130	12	
Hori.	7236.000	PK	47.4	36.6	8.4	41.4	51.0	73.9	22.9	100	0	
Hori.	9648.000	PK	43.5	38.6	9.5	38.9	52.7	73.9	21.2	100	0	
Hori.	12060.000	PK	44.6	39.5	10.8	39.4	55.5	73.9	18.4	100	0	
Hori.	2390.000	AV	41.2	27.4	14.8	41.4	42.0	53.9	11.9	100	166	
Hori.	4824.000	AV	43.0	31.1	6.8	41.2	39.7	53.9	14.2	100	270	
Hori.	6432.000	AV	41.7	34.9	7.5	40.6	43.5	53.9	10.4	130	12	
Hori.	7236.000	AV	38.9	36.6	8.4	41.4	42.5	53.9	11.4	100	0	
Hori.	9648.000	AV	35.9	38.6	9.5	38.9	45.1	53.9	8.8	100	0	
Hori.	12060.000	AV	37.0	39.5	10.8	39.4	47.9	53.9	6.0	100	0	
Vert.	2390.000	PK	51.1	27.4	14.8	41.4	51.9	73.9	22.0	100	359	
Vert.	4824.000	PK	48.3	31.1	6.8	41.2	45.0	73.9	28.9	113	165	
Vert.	6432.000	PK	47.7	34.9	7.5	40.6	49.5	73.9	24.4	100	3	
Vert.	7236.000	PK	46.0	36.6	8.4	41.4	49.6	73.9	24.3	100	0	
Vert.	9648.000	PK	44.7	38.6	9.5	38.9	53.9	73.9	20.0	100	0	
Vert.	12060.000	PK	45.8	39.5	10.8	39.4	56.7	73.9	17.2	100	0	
Vert.	2390.000	AV	41.7	27.4	14.8	41.4	42.5	53.9	11.4	100	359	
Vert.	4824.000	AV	41.1	31.1	6.8	41.2	37.8	53.9	16.1	113	165	
Vert.	6432.000	AV	40.7	34.9	7.5	40.6	42.5	53.9	11.4	100	3	
Vert.	7236.000	AV	37.8	36.6	8.4	41.4	41.4	53.9	12.5	100	0	
Vert.	9648.000	AV	36.1	38.6	9.5	38.9	45.3	53.9	8.6	100	0	
Vert.	12060.000	AV	36.7	39.5	10.8	39.4	47.6	53.9	6.3	100	0	

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

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

*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	95.2	27.5	14.8	41.4	96.1	-	-	
Hori.	2397.012	PK	42.0	27.4	14.8	41.4	42.8	76.1	33.3	
Hori.	2400.000	PK	50.4	27.4	14.8	41.4	51.2	76.1	24.9	
Vert.	2412.000	PK	96.9	27.5	14.8	41.4	97.8	-	-	
Vert.	2396.992	PK	50.4	27.4	14.8	41.4	51.2	77.8	26.6	
Vert.	2400.000	PK	43.0	27.4	14.8	41.4	43.8	77.8	34.0	

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

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Radiated Emission

Test place No.3 Semi Anechoic Chamber
 Date April 9, 2013 April 10, 2013 April 10, 2013 April 16, 2013
 Temperature / Humidity 23 deg.C, 33 %RH 24 deg.C, 31 %RH 24 deg.C, 31 %RH 26 deg.C, 34 %RH
 Engineer Shinichi Takano Wataru Kojima Takahiro Suzuki Shinichi Takano
 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.	4874.000	PK	47.6	31.3	6.9	41.1	44.7	73.9	29.2	100	229	
Hori.	6498.667	PK	48.4	35.2	7.5	40.7	50.4	73.9	23.5	130	346	
Hori.	7311.000	PK	47.8	36.6	9.2	41.4	52.2	73.9	21.7	100	0	
Hori.	9748.000	PK	44.7	38.7	10.2	38.9	54.7	73.9	19.2	100	0	
Hori.	12185.000	PK	45.9	39.5	11.4	39.3	57.5	73.9	16.4	100	0	
Hori.	4874.000	AV	38.6	31.3	6.9	41.1	35.7	53.9	18.2	100	229	
Hori.	6498.667	AV	40.8	35.2	7.5	40.7	42.8	53.9	11.1	130	346	
Hori.	7311.000	AV	37.6	36.6	9.2	41.4	42.0	53.9	11.9	100	0	
Hori.	9748.000	AV	35.6	38.7	10.2	38.9	45.6	53.9	8.3	100	0	
Hori.	12185.000	AV	35.4	39.5	11.4	39.3	47.0	53.9	6.9	100	0	
Vert.	4874.000	PK	47.8	31.3	6.9	41.1	44.9	73.9	29.0	100	194	
Vert.	6498.667	PK	49.4	35.2	7.5	40.7	51.4	73.9	22.5	100	3	
Vert.	7311.000	PK	46.9	36.6	9.2	41.4	51.3	73.9	22.6	100	0	
Vert.	9748.000	PK	44.4	38.7	10.2	38.9	54.4	73.9	19.5	100	0	
Vert.	12185.000	PK	45.1	39.5	11.4	39.3	56.7	73.9	17.2	100	0	
Vert.	4874.000	AV	39.3	31.3	6.9	41.1	36.4	53.9	17.5	100	194	
Vert.	6498.667	AV	41.9	35.2	7.5	40.7	43.9	53.9	10.0	100	3	
Vert.	7311.000	AV	37.5	36.6	9.2	41.4	41.9	53.9	12.0	100	0	
Vert.	9748.000	AV	35.6	38.7	10.2	38.9	45.6	53.9	8.3	100	0	
Vert.	12185.000	AV	35.2	39.5	11.4	39.3	46.8	53.9	7.1	100	0	

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

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

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

Radiated Emission

Test place No.3 Semi Anechoic Chamber
 Date April 10, 2013 April 10, 2013 April 16, 2013
 Temperature / Humidity 24 deg.C, 31 %RH 24 deg.C, 31 %RH 26 deg.C, 34 %RH
 Engineer Wataru Kojima Takahiro Suzuki Shinichi Takano
 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	50.1	27.5	14.9	41.4	51.1	73.9	22.8	100	165	
Hori.	4924.000	PK	50.5	31.5	6.9	41.0	47.9	73.9	26.0	100	249	
Hori.	6565.325	PK	48.2	35.3	7.6	40.8	50.3	73.9	23.6	100	249	
Hori.	7386.000	PK	46.6	36.7	8.4	41.5	50.2	73.9	23.7	100	0	
Hori.	9848.000	PK	41.6	38.9	9.5	38.9	51.1	73.9	22.8	100	0	
Hori.	12310.000	PK	42.7	39.5	10.8	39.3	53.7	73.9	20.2	100	0	
Hori.	2483.500	AV	40.5	27.5	14.9	41.4	41.5	53.9	12.4	100	165	
Hori.	4924.000	AV	47.3	31.5	6.9	41.0	44.7	53.9	9.2	100	249	
Hori.	6565.325	AV	41.4	35.3	7.6	40.8	43.5	53.9	10.4	100	249	
Hori.	7386.000	AV	36.2	36.7	8.4	41.5	39.8	53.9	14.1	100	0	
Hori.	9848.000	AV	34.4	38.9	9.5	38.9	43.9	53.9	10.0	100	0	
Hori.	12310.000	AV	34.1	39.5	10.8	39.3	45.1	53.9	8.8	100	0	
Vert.	2483.500	PK	51.1	27.5	14.9	41.4	52.1	73.9	21.8	100	359	
Vert.	4924.000	PK	51.9	31.5	6.9	41.0	49.3	73.9	24.6	100	195	
Vert.	6565.325	PK	49.1	35.3	7.6	40.8	51.2	73.9	22.7	100	359	
Vert.	7386.000	PK	46.9	36.7	8.4	41.5	50.5	73.9	23.4	100	0	
Vert.	9848.000	PK	43.8	38.9	9.5	38.9	53.3	73.9	20.6	100	0	
Vert.	12310.000	PK	44.0	39.5	10.8	39.3	55.0	73.9	18.9	100	0	
Vert.	2483.500	AV	41.8	27.5	14.9	41.4	42.8	53.9	11.1	100	359	
Vert.	4924.000	AV	46.6	31.5	6.9	41.0	44.0	53.9	9.9	100	195	
Vert.	6565.325	AV	42.4	35.3	7.6	40.8	44.5	53.9	9.4	100	359	
Vert.	7386.000	AV	37.8	36.7	8.4	41.5	41.4	53.9	12.5	100	0	
Vert.	9848.000	AV	35.0	38.9	9.5	38.9	44.5	53.9	9.4	100	0	
Vert.	12310.000	AV	35.2	39.5	10.8	39.3	46.2	53.9	7.7	100	0	

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

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

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

Radiated Emission

Test place No.3 Semi Anechoic Chamber
 Date April 9, 2013 April 10, 2013 April 10, 2013 April 16, 2013
 Temperature / Humidity 23 deg.C, 33 %RH 24 deg.C, 31 %RH 24 deg.C, 31 %RH 26 deg.C, 34 %RH
 Engineer Shinichi Takano Wataru Kojima Takahiro Suzuki Shinichi Takano
 Mode Tx, 2412 MHz
 Tx, IEEE802.11g, PN9, worst data mode 6Mbps

(* 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.	2339.825	PK	48.2	27.4	14.7	41.4	48.9	73.9	25.0	100	168	
Hori.	2390.000	PK	54.3	27.4	14.2	41.4	54.5	73.9	19.4	100	335	
Hori.	2484.488	PK	50.7	27.5	14.9	41.4	51.7	73.9	22.2	100	168	
Hori.	4824.000	PK	46.5	31.1	6.8	41.2	43.2	73.9	30.7	100	0	
Hori.	7236.000	PK	44.1	36.6	8.4	41.4	47.7	73.9	26.2	100	0	
Hori.	9648.000	PK	45.0	38.6	9.5	38.9	54.2	73.9	19.7	100	0	
Hori.	12060.000	PK	44.9	39.5	10.8	39.4	55.8	73.9	18.1	100	0	
Hori.	2339.825	AV	39.4	27.4	14.7	41.4	40.1	53.9	13.8	100	168	
Hori.	2390.000	AV	43.3	27.4	14.2	41.4	43.5	53.9	10.4	100	335	
Hori.	2484.488	AV	40.9	27.5	14.9	41.4	41.9	53.9	12.0	100	168	
Hori.	4824.000	AV	38.8	31.1	6.8	41.2	35.5	53.9	18.4	100	0	
Hori.	7236.000	AV	38.7	36.6	8.4	41.4	42.3	53.9	11.6	100	0	
Hori.	9648.000	AV	36.2	38.6	9.5	38.9	45.4	53.9	8.5	100	0	
Hori.	12060.000	AV	36.8	39.5	10.8	39.4	47.7	53.9	6.2	100	0	
Vert.	2339.775	PK	49.0	27.4	14.7	41.4	49.7	73.9	24.2	100	359	
Vert.	2390.000	PK	55.6	27.4	14.2	41.4	55.8	73.9	18.1	100	359	
Vert.	2484.280	PK	50.2	27.5	14.9	41.4	51.2	73.9	22.7	100	359	
Vert.	4824.000	PK	46.0	31.1	6.8	41.2	42.7	73.9	31.2	100	358	
Vert.	7236.000	PK	44.0	36.6	8.4	41.4	47.6	73.9	26.3	100	0	
Vert.	9648.000	PK	43.9	38.6	9.5	38.9	53.1	73.9	20.8	100	0	
Vert.	12060.000	PK	45.0	39.5	10.8	39.4	55.9	73.9	18.0	100	0	
Vert.	2339.775	AV	40.0	27.4	14.7	41.4	40.7	53.9	13.2	100	359	
Vert.	2390.000	AV	44.0	27.4	14.2	41.4	44.2	53.9	9.7	100	359	
Vert.	2484.280	AV	42.1	27.5	14.9	41.4	43.1	53.9	10.8	100	359	
Vert.	4824.000	AV	44.1	31.1	6.8	41.2	40.8	53.9	13.1	100	358	
Vert.	7236.000	AV	38.8	36.6	8.4	41.4	42.4	53.9	11.5	100	0	
Vert.	9648.000	AV	36.1	38.6	9.5	38.9	45.3	53.9	8.6	100	0	
Vert.	12060.000	AV	37.1	39.5	10.8	39.4	48.0	53.9	5.9	100	0	

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

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	87.7	27.5	14.2	41.4	88.0	-	-	
Hori.	2400.000	PK	47.4	27.4	14.2	41.4	47.6	68.0	20.4	
Vert.	2412.000	PK	88.7	27.5	14.2	41.4	89.0	-	-	
Vert.	2400.000	PK	48.1	27.4	14.2	41.4	48.3	69.0	20.7	

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

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Radiated Emission

Test place No.3 Semi Anechoic Chamber
 Date April 10, 2013 April 10, 2013 April 16, 2013 April 22, 2013
 Temperature / Humidity 24 deg.C, 31 %RH 24 deg.C, 31 %RH 26 deg.C, 34 %RH 24 deg.C, 34 %RH
 Engineer Wataru Kojima Takahiro Suzuki Shinichi Takano Akira Sato
 Mode Tx, 2437 MHz
 Tx, IEEE802.11g, PN9, worst data mode 6Mbps

(* 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.	40.000	QP	22.0	14.7	6.6	32.2	11.1	40.0	28.9	100	265	
Hori.	400.000	QP	25.5	16.2	9.0	32.0	18.7	46.0	27.3	100	355	
Hori.	2364.812	PK	51.6	27.4	14.8	41.4	52.4	73.9	21.5	142	165	
Hori.	2509.228	PK	54.2	27.6	14.9	41.4	55.3	73.9	18.6	100	165	
Hori.	4874.000	PK	46.0	31.3	6.9	41.1	43.1	73.9	30.8	100	0	
Hori.	7311.000	PK	46.5	36.6	8.4	41.4	50.1	73.9	23.8	100	0	
Hori.	9748.000	PK	43.7	38.7	9.5	38.9	53.0	73.9	20.9	100	0	
Hori.	12185.000	PK	42.2	39.5	10.8	39.3	53.2	73.9	20.7	100	0	
Hori.	2364.812	AV	42.9	27.4	14.8	41.4	43.7	53.9	10.2	142	165	
Hori.	2509.228	AV	45.0	27.6	14.9	41.4	46.1	53.9	7.8	100	165	
Hori.	4874.000	AV	37.7	31.3	6.9	41.1	34.8	53.9	19.1	100	0	
Hori.	7311.000	AV	37.6	36.6	8.4	41.4	41.2	53.9	12.7	100	0	
Hori.	9748.000	AV	35.1	38.7	9.5	38.9	44.4	53.9	9.5	100	0	
Hori.	12185.000	AV	35.0	39.5	10.8	39.3	46.0	53.9	7.9	100	0	
Vert.	40.000	QP	22.0	14.7	6.6	32.2	11.1	40.0	28.9	100	258	
Vert.	400.000	QP	25.6	16.2	9.0	32.0	18.8	46.0	27.2	100	3	
Vert.	2364.790	PK	52.3	27.4	14.8	41.4	53.1	73.9	20.8	160	359	
Vert.	2509.284	PK	55.2	27.6	14.9	41.4	56.3	73.9	17.6	100	359	
Vert.	4874.000	PK	45.7	31.3	6.9	41.1	42.8	73.9	31.1	100	0	
Vert.	7311.000	PK	46.1	36.6	8.4	41.4	49.7	73.9	24.2	100	0	
Vert.	9748.000	PK	44.0	38.7	9.5	38.9	53.3	73.9	20.6	100	0	
Vert.	12185.000	PK	41.6	39.5	10.8	39.3	52.6	73.9	21.3	100	0	
Vert.	2364.790	AV	43.7	27.4	14.8	41.4	44.5	53.9	9.4	160	359	
Vert.	2509.284	AV	47.0	27.6	14.9	41.4	48.1	53.9	5.8	100	359	
Vert.	4874.000	AV	37.5	31.3	6.9	41.1	34.6	53.9	19.3	100	0	
Vert.	7311.000	AV	37.5	36.6	8.4	41.4	41.1	53.9	12.8	100	0	
Vert.	9748.000	AV	35.2	38.7	9.5	38.9	44.5	53.9	9.4	100	0	
Vert.	12185.000	AV	35.1	39.5	10.8	39.3	46.1	53.9	7.8	100	0	

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

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).

Radiated Emission

Test place No.3 Semi Anechoic Chamber
 Date April 9, 2013 April 10, 2013 April 10, 2013 April 16, 2013
 Temperature / Humidity 23 deg.C, 33 %RH 24 deg.C, 31 %RH 24 deg.C, 31 %RH 26 deg.C, 34 %RH
 Engineer Shinichi Takano Wataru Kojima Takahiro Suzuki Shinichi Takano
 Mode Tx, 2462 MHz
 Tx, IEEE802.11g, PN9, worst data mode 6Mbps

(* 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.	2389.921	PK	49.7	27.4	14.8	41.4	50.5	73.9	23.4	100	336	
Hori.	2483.500	PK	55.9	27.5	14.3	41.4	56.3	73.9	17.6	132	340	
Hori.	2534.279	PK	50.6	27.6	14.9	41.4	51.7	73.9	22.2	100	336	
Hori.	4924.000	PK	46.1	31.5	6.9	41.0	43.5	73.9	30.4	100	0	
Hori.	7386.000	PK	45.5	36.7	8.4	41.5	49.1	73.9	24.8	100	0	
Hori.	9848.000	PK	43.8	38.9	9.5	38.9	53.3	73.9	20.6	100	0	
Hori.	12310.000	PK	44.0	39.5	10.8	39.3	55.0	73.9	18.9	100	0	
Hori.	2389.921	AV	40.3	27.4	14.8	41.4	41.1	53.9	12.8	100	336	
Hori.	2483.500	AV	45.7	27.5	14.3	41.4	46.1	53.9	7.8	132	340	
Hori.	2534.279	AV	41.1	27.6	14.9	41.4	42.2	53.9	11.7	100	336	
Hori.	4924.000	AV	37.5	31.5	6.9	41.0	34.9	53.9	19.0	100	0	
Hori.	7386.000	AV	37.6	36.7	8.4	41.5	41.2	53.9	12.7	100	0	
Hori.	9848.000	AV	35.6	38.9	9.5	38.9	45.1	53.9	8.8	100	0	
Hori.	12310.000	AV	35.3	39.5	10.8	39.3	46.3	53.9	7.6	100	0	
Vert.	2389.815	PK	49.6	27.4	14.8	41.4	50.4	73.9	23.5	100	359	
Vert.	2483.500	PK	57.5	27.5	14.3	41.4	57.9	73.9	16.0	132	359	
Vert.	2534.244	PK	51.4	27.6	14.9	41.4	52.5	73.9	21.4	100	359	
Vert.	4924.000	PK	45.9	31.5	6.9	41.0	43.3	73.9	30.6	100	0	
Vert.	7386.000	PK	45.3	36.7	8.4	41.5	48.9	73.9	25.0	100	0	
Vert.	9848.000	PK	43.6	38.9	9.5	38.9	53.1	73.9	20.8	100	0	
Vert.	12310.000	PK	43.5	39.5	10.8	39.3	54.5	73.9	19.4	100	0	
Vert.	2389.815	AV	40.4	27.4	14.8	41.4	41.2	53.9	12.7	100	359	
Vert.	2483.500	AV	46.8	27.5	14.3	41.4	47.2	53.9	6.7	132	359	
Vert.	2534.244	AV	41.9	27.6	14.9	41.4	43.0	53.9	10.9	100	359	
Vert.	4924.000	AV	37.6	31.5	6.9	41.0	35.0	53.9	18.9	100	0	
Vert.	7386.000	AV	37.7	36.7	8.4	41.5	41.3	53.9	12.6	100	0	
Vert.	9848.000	AV	35.4	38.9	9.5	38.9	44.9	53.9	9.0	100	0	
Vert.	12310.000	AV	35.4	39.5	10.8	39.3	46.4	53.9	7.5	100	0	

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

Distance factor : 15GHz ~40GHz : $20\log(3.0\text{m}/1.0\text{m}) = 9.5\text{dB}$

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

Radiated Emission

Test place No.3 Semi Anechoic Chamber
 Date April 9, 2013 April 10, 2013 April 10, 2013 April 16, 2013
 Temperature / Humidity 23 deg.C, 33 %RH 24 deg.C, 31 %RH 24 deg.C, 31 %RH 26 deg.C, 34 %RH
 Engineer Shinichi Takano Wataru Kojima Takahiro Suzuki Shinichi Takano
 Mode Tx, 2412 MHz
 Tx, IEEE802.11n-20HT, PN9, worst data mode 0(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.	2340.328	PK	49.4	27.4	14.7	41.4	50.1	73.9	23.8	100	166	
Hori.	2390.000	PK	56.6	27.4	14.2	41.4	56.8	73.9	17.1	100	337	
Hori.	2483.623	PK	49.7	27.5	14.9	41.4	50.7	73.9	23.2	100	166	
Hori.	4824.000	PK	47.0	31.1	6.8	41.2	43.7	73.9	30.2	100	0	
Hori.	7236.000	PK	47.3	36.6	8.4	41.4	50.9	73.9	23.0	100	0	
Hori.	9648.000	PK	44.5	38.6	9.5	38.9	53.7	73.9	20.2	100	0	
Hori.	12060.000	PK	43.9	39.5	10.8	39.4	54.8	73.9	19.1	100	0	
Hori.	2340.328	AV	40.1	27.4	14.7	41.4	40.8	53.9	13.1	100	166	
Hori.	2390.000	AV	44.6	27.4	14.2	41.4	44.8	53.9	9.1	100	337	
Hori.	2483.623	AV	41.3	27.5	14.9	41.4	42.3	53.9	11.6	100	166	
Hori.	4824.000	AV	37.8	31.1	6.8	41.2	34.5	53.9	19.4	100	0	
Hori.	7236.000	AV	38.6	36.6	8.4	41.4	42.2	53.9	11.7	100	0	
Hori.	9648.000	AV	35.2	38.6	9.5	38.9	44.4	53.9	9.5	100	0	
Hori.	12060.000	AV	36.0	39.5	10.8	39.4	46.9	53.9	7.0	100	0	
Vert.	2340.415	PK	49.8	27.4	14.7	41.4	50.5	73.9	23.4	100	359	
Vert.	2390.000	PK	57.4	27.4	14.2	41.4	57.6	73.9	16.3	100	359	
Vert.	2483.704	PK	51.3	27.5	14.9	41.4	52.3	73.9	21.6	100	359	
Vert.	4824.000	PK	47.4	31.1	6.8	41.2	44.1	73.9	29.8	100	0	
Vert.	7236.000	PK	48.8	36.6	8.4	41.4	52.4	73.9	21.5	100	0	
Vert.	9648.000	PK	46.0	38.6	9.5	38.9	55.2	73.9	18.7	100	0	
Vert.	12060.000	PK	44.8	39.5	10.8	39.4	55.7	73.9	18.2	100	0	
Vert.	2340.415	AV	40.3	27.4	14.7	41.4	41.0	53.9	12.9	100	359	
Vert.	2390.000	AV	45.1	27.4	14.2	41.4	45.3	53.9	8.6	100	359	
Vert.	2483.704	AV	42.4	27.5	14.9	41.4	43.4	53.9	10.5	100	359	
Vert.	4824.000	AV	38.7	31.1	6.8	41.2	35.4	53.9	18.5	100	0	
Vert.	7236.000	AV	38.8	36.6	8.4	41.4	42.4	53.9	11.5	100	0	
Vert.	9648.000	AV	36.4	38.6	9.5	38.9	45.6	53.9	8.3	100	0	
Vert.	12060.000	AV	36.0	39.5	10.8	39.4	46.9	53.9	7.0	100	0	

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

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	87.9	27.5	14.2	41.4	88.2	-	-	
Hori.	2400.000	PK	49.7	27.4	14.2	41.4	49.9	68.2	18.3	
Vert.	2412.000	PK	89.4	27.5	14.2	41.4	89.7	-	-	
Vert.	2400.000	PK	50.3	27.4	14.2	41.4	50.5	69.7	19.2	

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

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Radiated Emission

Test place No.3 Semi Anechoic Chamber
 Date April 10, 2013 April 10, 2013 April 16, 2013
 Temperature / Humidity 24 deg.C, 31 %RH 24 deg.C, 31 %RH 26 deg.C, 34 %RH
 Engineer Wataru Kojima Takahiro Suzuki Shinichi Takano
 Mode Tx, 2437 MHz
 Tx, IEEE802.11n-20HT, PN9, worst data mode 0(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.	2365.369	PK	52.3	27.4	14.8	41.4	53.1	73.9	20.8	144	167	
Hori.	2508.736	PK	53.9	27.6	14.9	41.4	55.0	73.9	18.9	100	167	
Hori.	4874.000	PK	44.1	31.3	6.9	41.1	41.2	73.9	32.7	100	0	
Hori.	7311.000	PK	44.8	36.6	8.4	41.4	48.4	73.9	25.5	100	0	
Hori.	9748.000	PK	44.2	38.7	9.5	38.9	53.5	73.9	20.4	100	0	
Hori.	12185.000	PK	44.8	39.5	10.8	39.3	55.8	73.9	18.1	100	0	
Hori.	2365.369	AV	43.2	27.4	14.8	41.4	44.0	53.9	9.9	144	167	
Hori.	2508.736	AV	45.2	27.6	14.9	41.4	46.3	53.9	7.6	100	167	
Hori.	4874.000	AV	37.4	31.3	6.9	41.1	34.5	53.9	19.4	100	0	
Hori.	7311.000	AV	36.8	36.6	8.4	41.4	40.4	53.9	13.5	100	0	
Hori.	9748.000	AV	35.3	38.7	9.5	38.9	44.6	53.9	9.3	100	0	
Hori.	12185.000	AV	36.0	39.5	10.8	39.3	47.0	53.9	6.9	100	0	
Vert.	2365.424	PK	52.3	27.4	14.8	41.4	53.1	73.9	20.8	146	359	
Vert.	2508.664	PK	56.2	27.6	14.9	41.4	57.3	73.9	16.6	100	359	
Vert.	4874.000	PK	43.8	31.3	6.9	41.1	40.9	73.9	33.0	100	0	
Vert.	7311.000	PK	45.0	36.6	8.4	41.4	48.6	73.9	25.3	100	0	
Vert.	9748.000	PK	43.8	38.7	9.5	38.9	53.1	73.9	20.8	100	0	
Vert.	12185.000	PK	44.4	39.5	10.8	39.3	55.4	73.9	18.5	100	0	
Vert.	2365.424	AV	44.2	27.4	14.8	41.4	45.0	53.9	8.9	146	359	
Vert.	2508.664	AV	47.3	27.6	14.9	41.4	48.4	53.9	5.5	100	359	
Vert.	4874.000	AV	37.0	31.3	6.9	41.1	34.1	53.9	19.8	100	0	
Vert.	7311.000	AV	36.6	36.6	8.4	41.4	40.2	53.9	13.7	100	0	
Vert.	9748.000	AV	35.2	38.7	9.5	38.9	44.5	53.9	9.4	100	0	
Vert.	12185.000	AV	35.9	39.5	10.8	39.3	46.9	53.9	7.0	100	0	

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

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

*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
 Date April 9, 2013 April 10, 2013 April 10, 2013 April 16, 2013
 Temperature / Humidity 23 deg.C, 33 %RH 24 deg.C, 31 %RH 24 deg.C, 31 %RH 26 deg.C, 34 %RH
 Engineer Shinichi Takano Wataru Kojima Takahiro Suzuki Shinichi Takano
 Mode Tx, 2462 MHz
 Tx, IEEE802.11n-20HT, PN9, worst data mode 0(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.	2390.000	PK	49.7	27.4	14.8	41.4	50.5	73.9	23.4	100	334	
Hori.	2483.500	PK	56.2	27.5	14.3	41.4	56.6	73.9	17.3	135	339	
Hori.	2533.544	PK	50.8	27.6	14.9	41.4	51.9	73.9	22.0	100	334	
Hori.	4924.000	PK	45.5	31.5	6.9	41.0	42.9	73.9	31.0	100	0	
Hori.	7386.000	PK	45.4	36.7	8.4	41.5	49.0	73.9	24.9	100	0	
Hori.	9848.000	PK	43.1	38.9	9.5	38.9	52.6	73.9	21.3	100	0	
Hori.	12310.000	PK	44.0	39.5	10.8	39.3	55.0	73.9	18.9	100	0	
Hori.	2390.000	AV	40.8	27.4	14.8	41.4	41.6	53.9	12.3	100	334	
Hori.	2483.500	AV	45.3	27.5	14.3	41.4	45.7	53.9	8.2	135	339	
Hori.	2533.544	AV	41.8	27.6	14.9	41.4	42.9	53.9	11.0	100	334	
Hori.	4924.000	AV	37.8	31.5	6.9	41.0	35.2	53.9	18.7	100	0	
Hori.	7386.000	AV	37.7	36.7	8.4	41.5	41.3	53.9	12.6	100	0	
Hori.	9848.000	AV	33.5	38.9	9.5	38.9	43.0	53.9	10.9	100	0	
Hori.	12310.000	AV	35.8	39.5	10.8	39.3	46.8	53.9	7.1	100	0	
Vert.	2390.000	PK	50.3	27.4	14.8	41.4	51.1	73.9	22.8	100	359	
Vert.	2483.500	PK	57.9	27.5	14.3	41.4	58.3	73.9	15.6	132	359	
Vert.	2533.624	PK	51.6	27.6	14.9	41.4	52.7	73.9	21.2	100	359	
Vert.	4924.000	PK	42.9	31.5	6.9	41.0	40.3	73.9	33.6	100	0	
Vert.	7386.000	PK	45.5	36.7	8.4	41.5	49.1	73.9	24.8	100	0	
Vert.	9848.000	PK	42.7	38.9	9.5	38.9	52.2	73.9	21.7	100	0	
Vert.	12310.000	PK	43.6	39.5	10.8	39.3	54.6	73.9	19.3	100	0	
Vert.	2390.000	AV	40.9	27.4	14.8	41.4	41.7	53.9	12.2	100	359	
Vert.	2483.500	AV	46.3	27.5	14.3	41.4	46.7	53.9	7.2	132	359	
Vert.	2533.624	AV	42.7	27.6	14.9	41.4	43.8	53.9	10.1	100	359	
Vert.	4924.000	AV	37.7	31.5	6.9	41.0	35.1	53.9	18.8	100	0	
Vert.	7386.000	AV	37.8	36.7	8.4	41.5	41.4	53.9	12.5	100	0	
Vert.	9848.000	AV	34.3	38.9	9.5	38.9	43.8	53.9	10.1	100	0	
Vert.	12310.000	AV	35.7	39.5	10.8	39.3	46.7	53.9	7.2	100	0	

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

Distance factor : 15GHz ~40GHz : $20\log(3.0\text{m}/1.0\text{m}) = 9.5\text{dB}$

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

Radiated Emission

Test place No.3 Semi Anechoic Chamber
 Date April 9, 2013 April 10, 2013
 Temperature / Humidity 23 deg.C, 33 %RH 24 deg.C, 31 %RH
 Engineer Shinichi Takano Takahiro Suzuki
 Mode Tx, 2422 MHz
 Tx, IEEE802.11n-40HT, PN9, worst data mode 3(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.	2390.000	PK	55.2	27.4	14.2	41.4	55.4	73.9	18.5	100	329	
Hori.	4844.000	PK	46.1	31.2	6.8	41.1	43.0	73.9	30.9	100	0	
Hori.	7266.000	PK	47.8	36.6	8.4	41.4	51.4	73.9	22.5	100	0	
Hori.	9688.000	PK	44.9	38.6	9.5	38.9	54.1	73.9	19.8	100	0	
Hori.	12110.000	PK	45.0	39.5	10.9	39.4	56.0	73.9	17.9	100	0	
Hori.	2390.000	AV	45.8	27.4	14.2	41.4	46.0	53.9	7.9	100	329	
Hori.	4844.000	AV	37.3	31.2	6.8	41.1	34.2	53.9	19.7	100	0	
Hori.	7266.000	AV	38.3	36.6	8.4	41.4	41.9	53.9	12.0	100	0	
Hori.	9688.000	AV	35.9	38.6	9.5	38.9	45.1	53.9	8.8	100	0	
Hori.	12110.000	AV	36.6	39.5	10.9	39.4	47.6	53.9	6.3	100	0	
Vert.	2390.000	PK	56.0	27.4	14.2	41.4	56.2	73.9	17.7	100	359	
Vert.	4844.000	PK	46.6	31.2	6.8	41.1	43.5	73.9	30.4	100	0	
Vert.	7266.000	PK	47.1	36.6	8.4	41.4	50.7	73.9	23.2	100	0	
Vert.	9688.000	PK	43.7	38.6	9.5	38.9	52.9	73.9	21.0	100	0	
Vert.	12110.000	PK	45.5	39.5	10.9	39.4	56.5	73.9	17.4	100	0	
Vert.	2390.000	AV	46.9	27.4	14.2	41.4	47.1	53.9	6.8	100	359	
Vert.	4844.000	AV	37.3	31.2	6.8	41.1	34.2	53.9	19.7	100	0	
Vert.	7266.000	AV	38.3	36.6	8.4	41.4	41.9	53.9	12.0	100	0	
Vert.	9688.000	AV	35.7	38.6	9.5	38.9	44.9	53.9	9.0	100	0	
Vert.	12110.000	AV	36.4	39.5	10.9	39.4	47.4	53.9	6.5	100	0	

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

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

*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.	2422.000	PK	86.4	27.5	14.2	41.4	86.7	-	-	
Hori.	2400.000	PK	46.5	27.4	14.2	41.4	46.7	66.7	20.0	
Vert.	2422.000	PK	87.2	27.5	14.2	41.4	87.5	-	-	
Vert.	2400.000	PK	47.3	27.4	14.2	41.4	47.5	67.5	20.0	

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

Radiated Emission

Test place No.3 Semi Anechoic Chamber
 Date April 10, 2013 April 16, 2013
 Temperature / Humidity 24 deg.C, 31 %RH 26 deg.C, 34 %RH
 Engineer Takahiro Suzuki Shinichi Takano
 Mode Tx, 2437 MHz
 Tx, IEEE802.11n-40HT, PN9, worst data mode 3(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.	4874.000	PK	45.7	31.3	6.9	41.1	42.8	73.9	31.1	100	0	
Hori.	7311.000	PK	46.3	36.6	8.4	41.4	49.9	73.9	24.0	100	0	
Hori.	9748.000	PK	46.9	38.7	9.5	38.9	56.2	73.9	17.7	100	136	
Hori.	12185.000	PK	44.9	39.5	10.8	39.3	55.9	73.9	18.0	100	0	
Hori.	4874.000	AV	36.8	31.3	6.9	41.1	33.9	53.9	20.0	100	0	
Hori.	7311.000	AV	37.7	36.6	8.4	41.4	41.3	53.9	12.6	100	0	
Hori.	9748.000	AV	37.8	38.7	9.5	38.9	47.1	53.9	6.8	100	136	
Hori.	12185.000	AV	36.3	39.5	10.8	39.3	47.3	53.9	6.6	100	0	
Vert.	4874.000	PK	46.5	31.3	6.9	41.1	43.6	73.9	30.3	100	0	
Vert.	7311.000	PK	47.0	36.6	8.4	41.4	50.6	73.9	23.3	100	0	
Vert.	9748.000	PK	44.8	38.7	9.5	38.9	54.1	73.9	19.8	100	98	
Vert.	12185.000	PK	44.9	39.5	10.8	39.3	55.9	73.9	18.0	100	0	
Vert.	4874.000	AV	36.9	31.3	6.9	41.1	34.0	53.9	19.9	100	0	
Vert.	7311.000	AV	37.7	36.6	8.4	41.4	41.3	53.9	12.6	100	0	
Vert.	9748.000	AV	35.6	38.7	9.5	38.9	44.9	53.9	9.0	100	98	
Vert.	12185.000	AV	36.6	39.5	10.8	39.3	47.6	53.9	6.3	100	0	

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

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

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

Radiated Emission

Test place No.3 Semi Anechoic Chamber
 Date April 9, 2013 April 10, 2013
 Temperature / Humidity 23 deg.C, 33 %RH 24 deg.C, 31 %RH
 Engineer Shinichi Takano Takahiro Suzuki
 Mode Tx, 2452 MHz
 Tx, IEEE802.11n-40HT, PN9, worst data mode 3(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.	2483.500	PK	57.4	27.5	14.3	41.4	57.8	73.9	16.1	100	331	
Hori.	4904.000	PK	46.9	31.4	6.9	41.0	44.2	73.9	29.7	100	0	
Hori.	7356.000	PK	47.4	36.6	8.4	41.5	50.9	73.9	23.0	100	61	
Hori.	9808.000	PK	43.3	38.8	9.6	38.9	52.8	73.9	21.1	100	0	
Hori.	12260.000	PK	45.0	39.5	10.8	39.3	56.0	73.9	17.9	100	5	
Hori.	2483.500	AV	46.2	27.5	14.3	41.4	46.6	53.9	7.3	100	331	
Hori.	4904.000	AV	36.9	31.4	6.9	41.0	34.2	53.9	19.7	100	0	
Hori.	7356.000	AV	37.8	36.6	8.4	41.5	41.3	53.9	12.6	100	61	
Hori.	9808.000	AV	34.8	38.8	9.6	38.9	44.3	53.9	9.6	100	0	
Hori.	12260.000	AV	35.6	39.5	10.8	39.3	46.6	53.9	7.3	100	5	
Vert.	2483.500	PK	58.5	27.5	14.3	41.4	58.9	73.9	15.0	128	359	
Vert.	4904.000	PK	45.7	31.4	6.9	41.0	43.0	73.9	30.9	100	0	
Vert.	7356.000	PK	46.6	36.6	8.4	41.5	50.1	73.9	23.8	100	127	
Vert.	9808.000	PK	43.9	38.8	9.6	38.9	53.4	73.9	20.5	100	0	
Vert.	12260.000	PK	44.7	39.5	10.8	39.3	55.7	73.9	18.2	100	99	
Vert.	2483.500	AV	47.5	27.5	14.3	41.4	47.9	53.9	6.0	128	359	
Vert.	4904.000	AV	37.4	31.4	6.9	41.0	34.7	53.9	19.2	100	0	
Vert.	7356.000	AV	38.3	36.6	8.4	41.5	41.8	53.9	12.1	100	127	
Vert.	9808.000	AV	35.2	38.8	9.6	38.9	44.7	53.9	9.2	100	0	
Vert.	12260.000	AV	35.8	39.5	10.8	39.3	46.8	53.9	7.1	100	99	

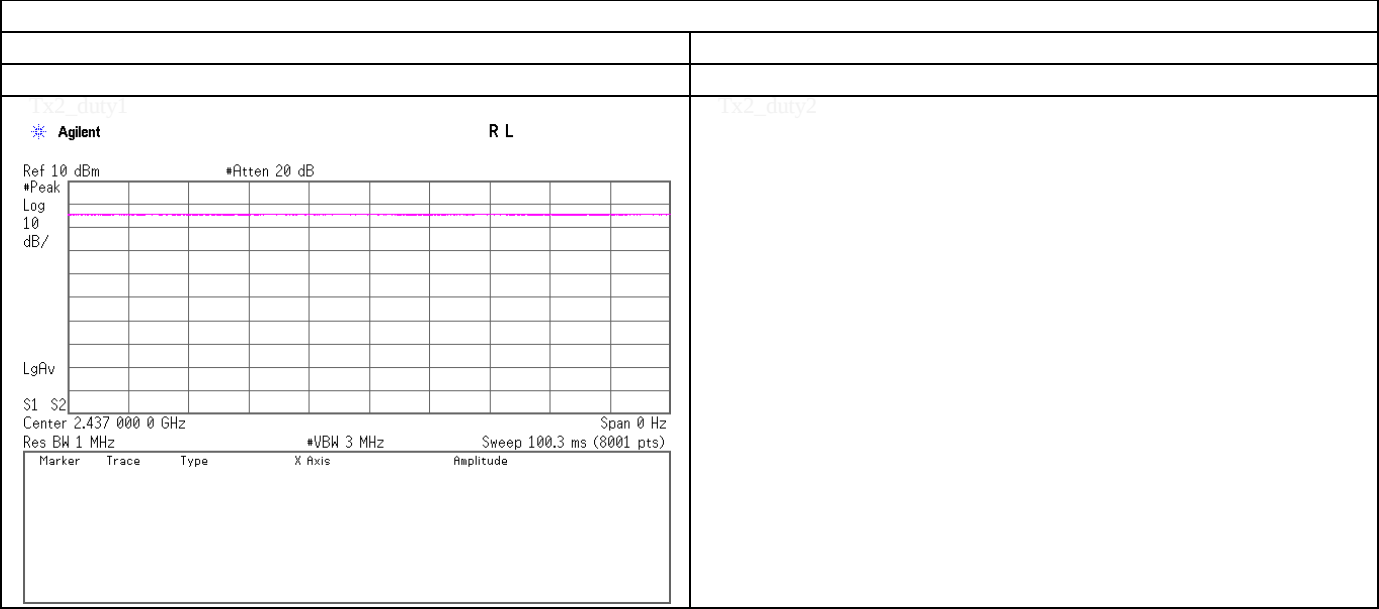
Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

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

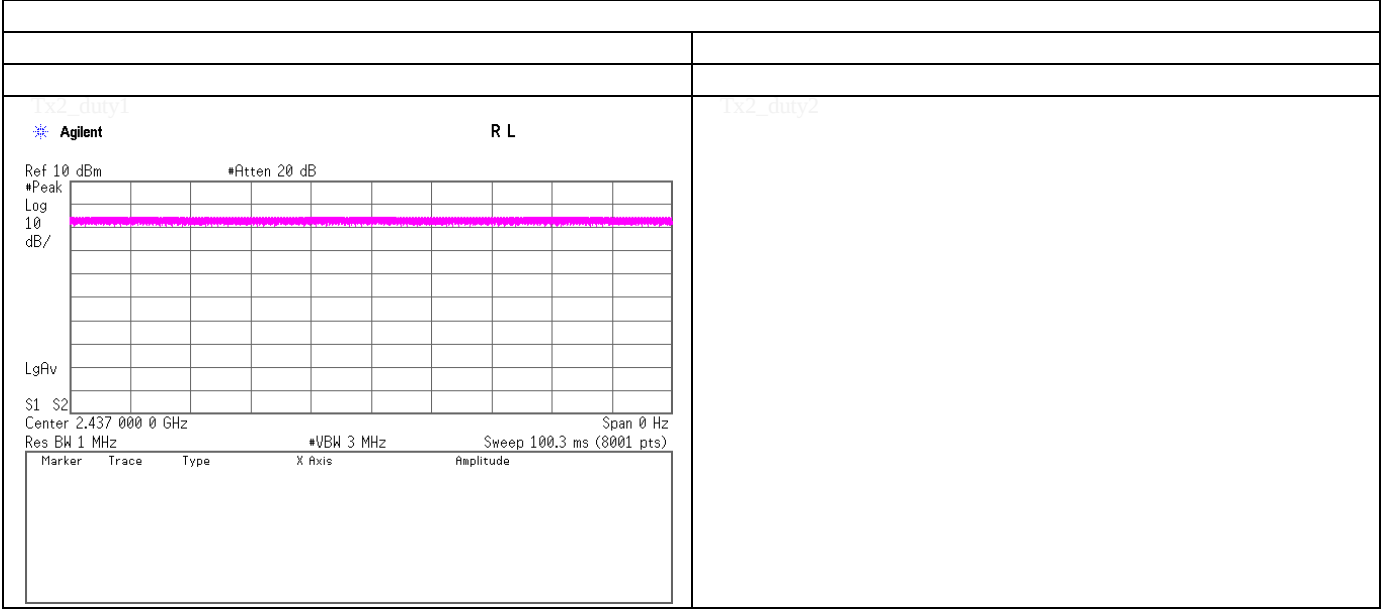
Burst rate confirmation

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



Burst rate confirmation

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



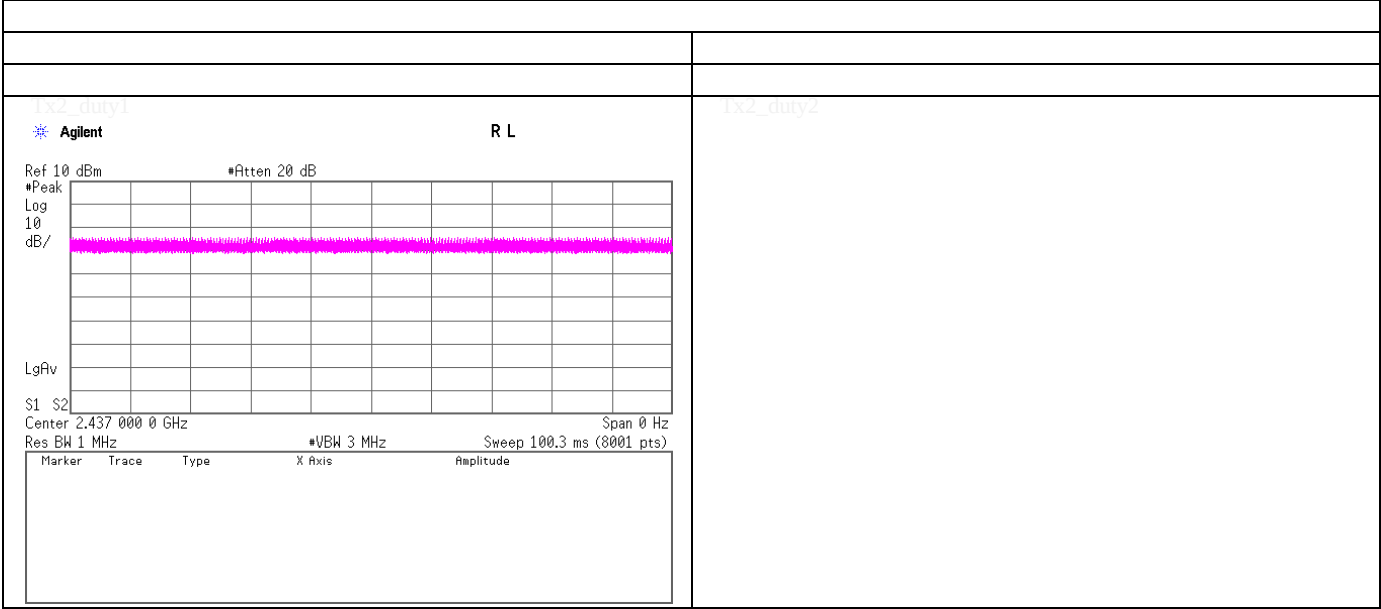
Burst rate confirmation

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

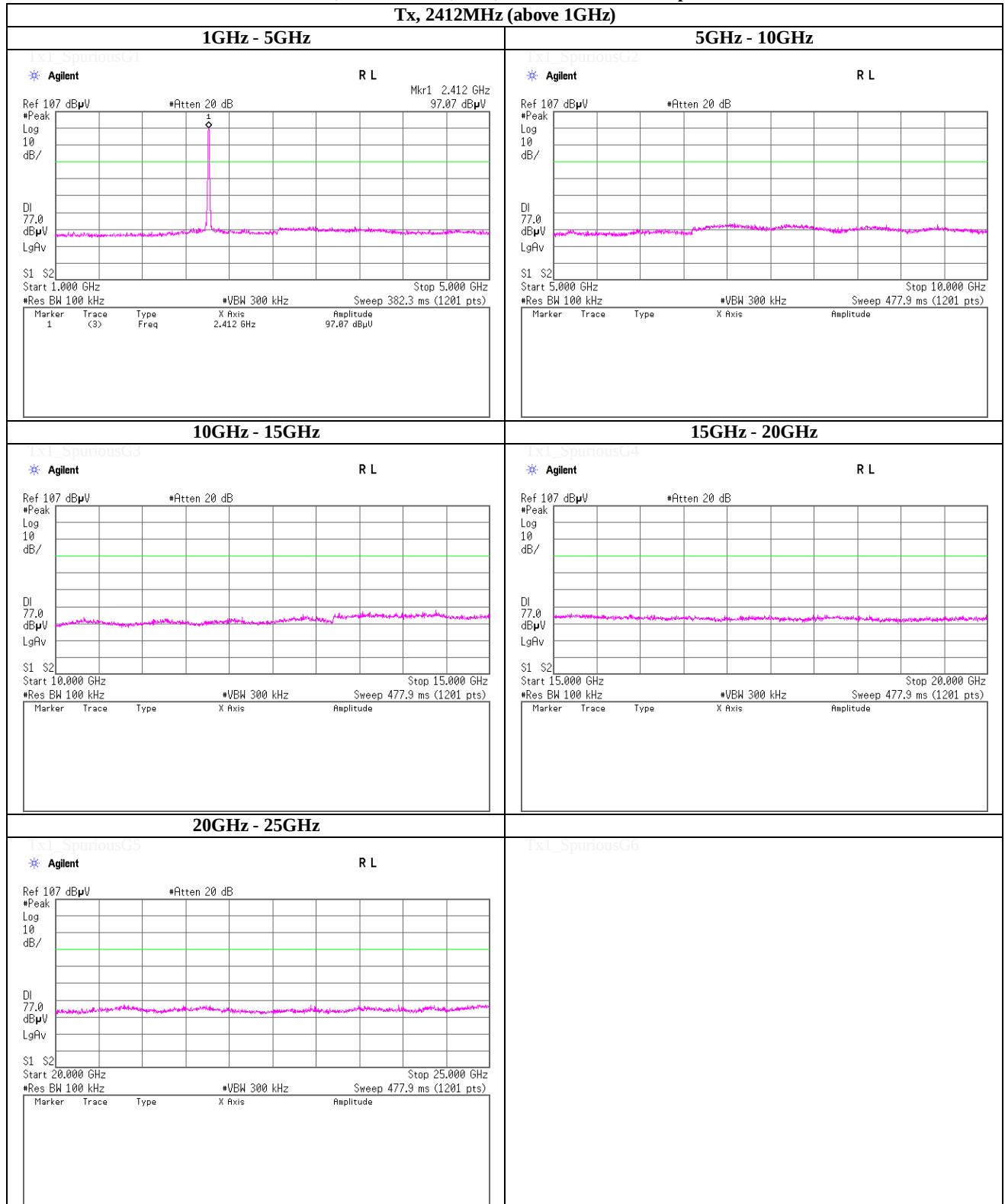


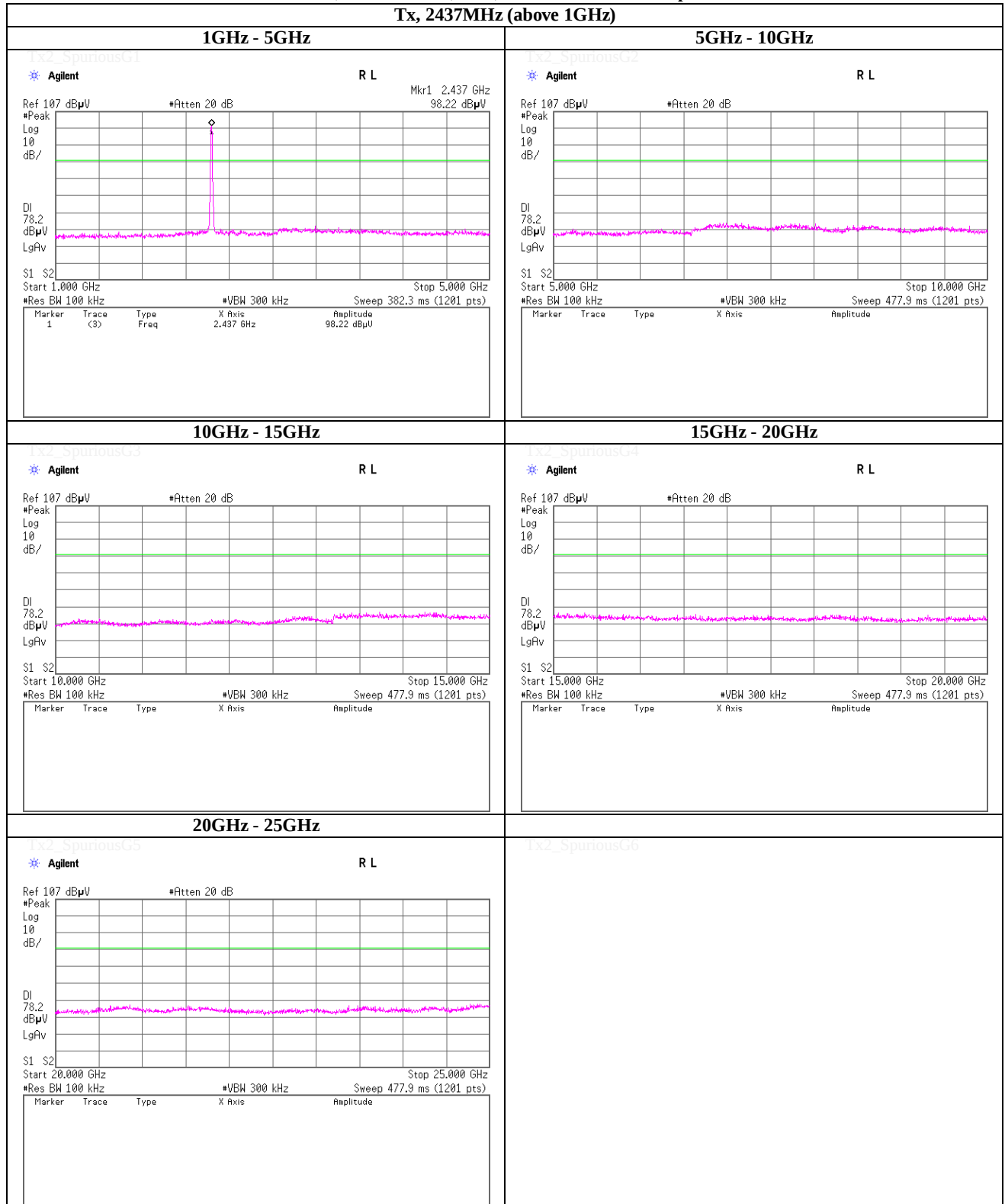
Burst rate confirmation

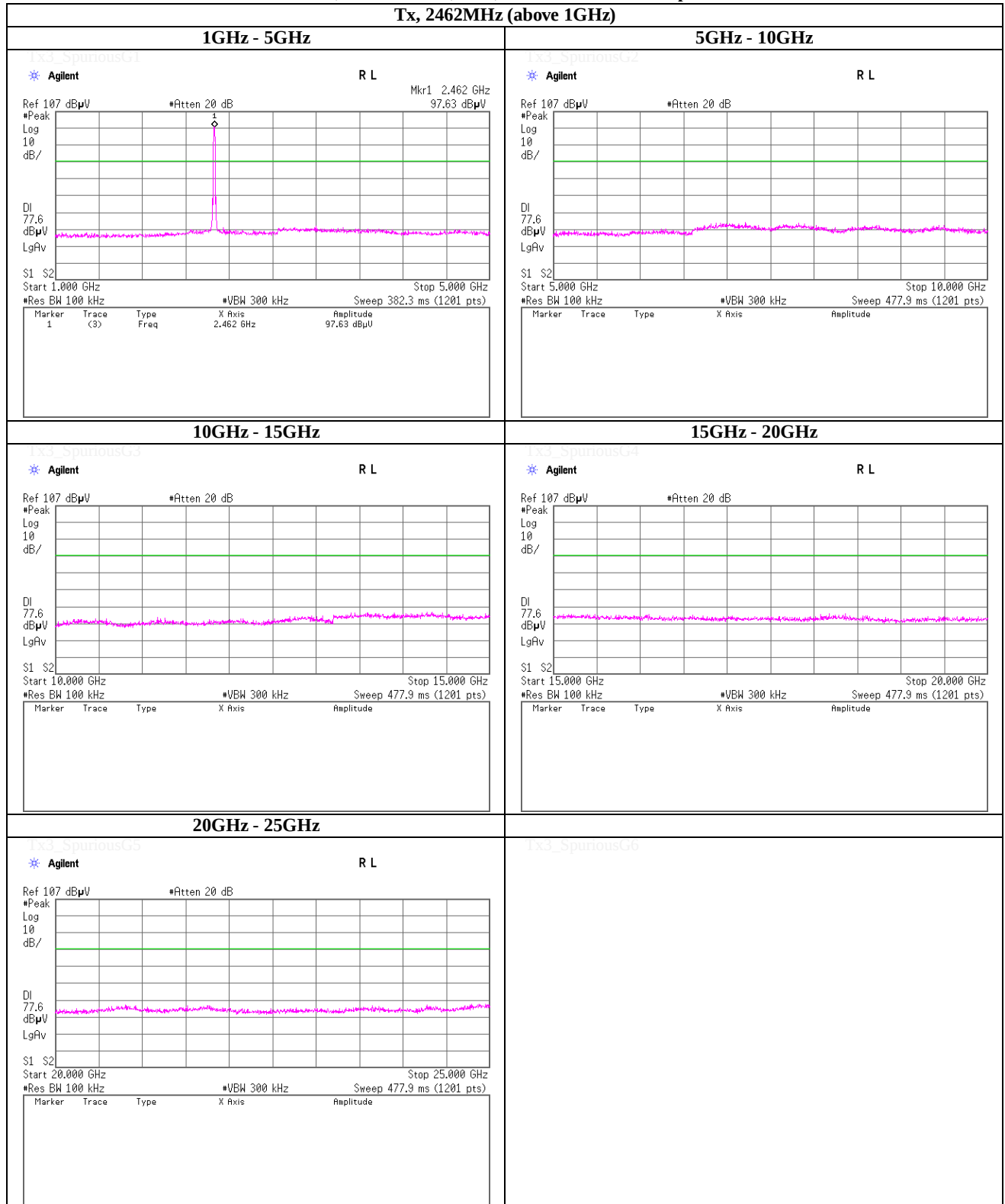
Tx, IEEE802.11n-40HT, PN9, worst data mode 3(MCS)

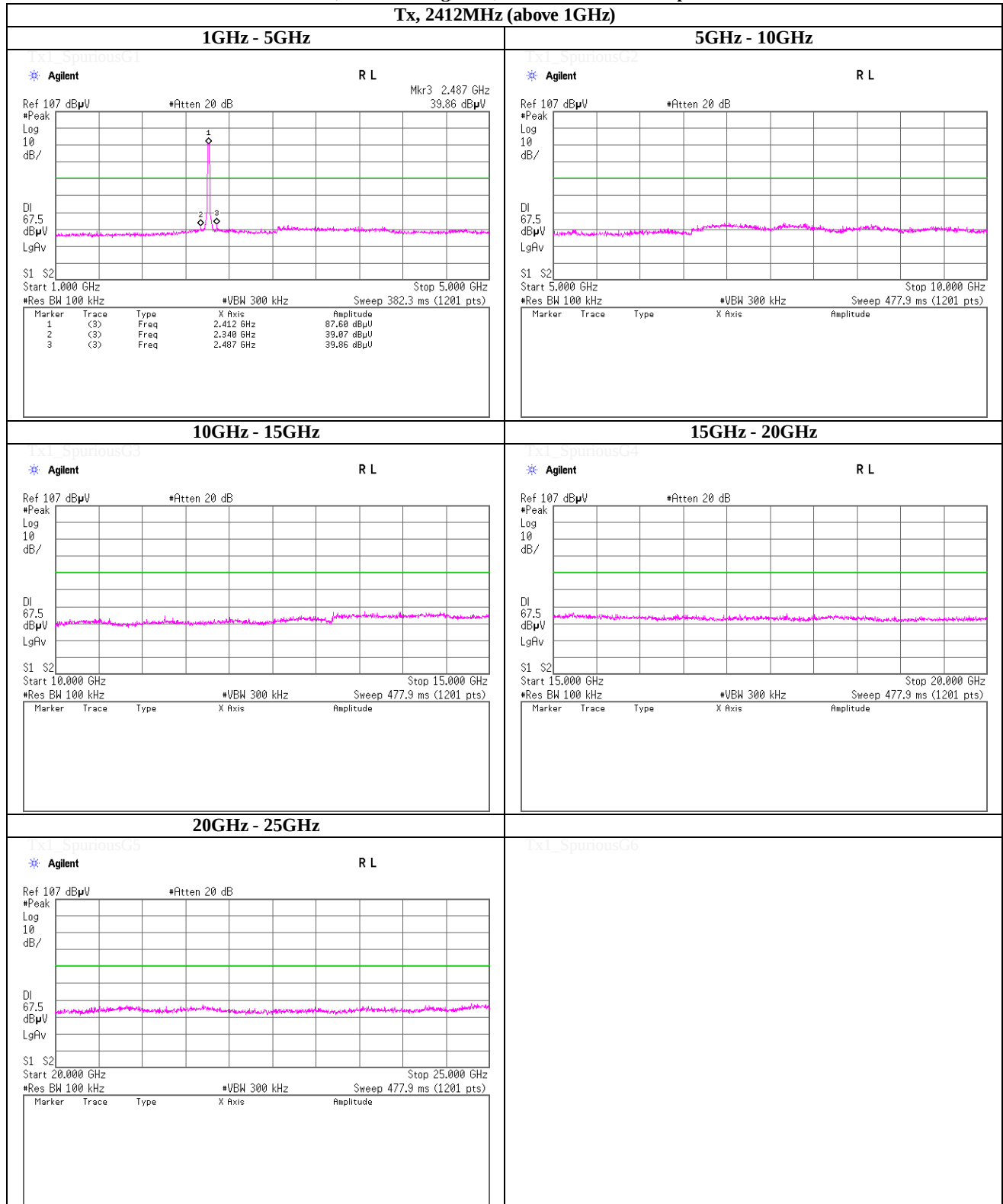


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Telephone : +81 463 50 6400
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(Reference chart) Spurious emission (Conducted)**Tx, IEEE802.11b, PN9, worst data mode 1Mbps****Tx, 2412MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.****1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN****Telephone : +81 463 50 6400****Facsimile : +81 463 50 6401**

(Reference chart) Spurious emission (Conducted)**Tx, IEEE802.11b, PN9, worst data mode 1Mbps****Tx, 2437MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.****1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN****Telephone : +81 463 50 6400****Facsimile : +81 463 50 6401**

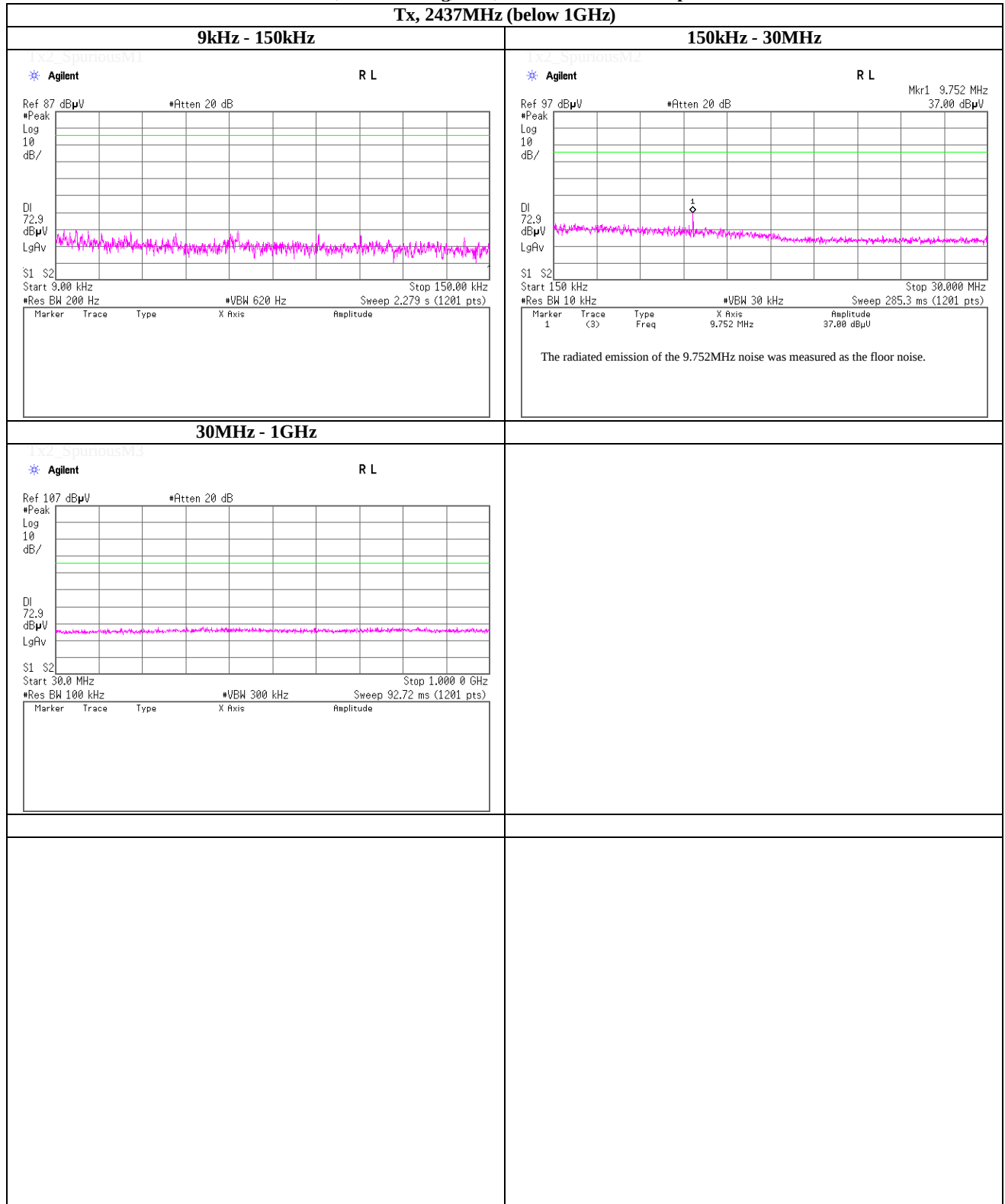
(Reference chart) Spurious emission (Conducted)**Tx, IEEE802.11b, PN9, worst data mode 1Mbps****Tx, 2462MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.****1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN****Telephone : +81 463 50 6400****Facsimile : +81 463 50 6401**

(Reference chart) Spurious emission (Conducted)**Tx, IEEE802.11g, PN9, worst data mode 6Mbps****Tx, 2412MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.**

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Telephone : +81 463 50 6400

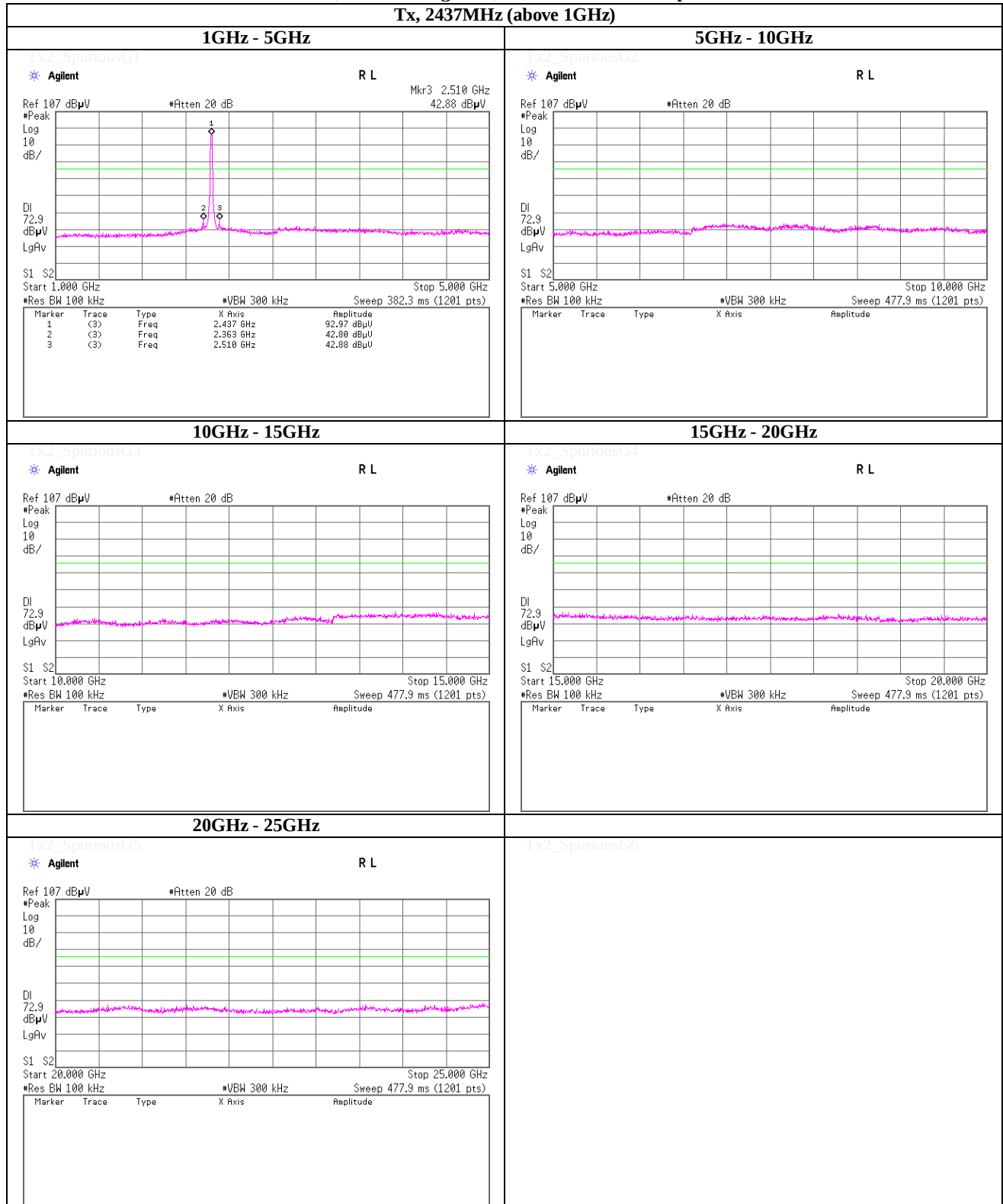
Facsimile : +81 463 50 6401

(Reference chart) Spurious emission (Conducted)**Tx, IEEE802.11g, PN9, worst data mode 6Mbps****Tx, 2437MHz (below 1GHz)****UL Japan, Inc.****Shonan EMC Lab.**

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Telephone : +81 463 50 6400

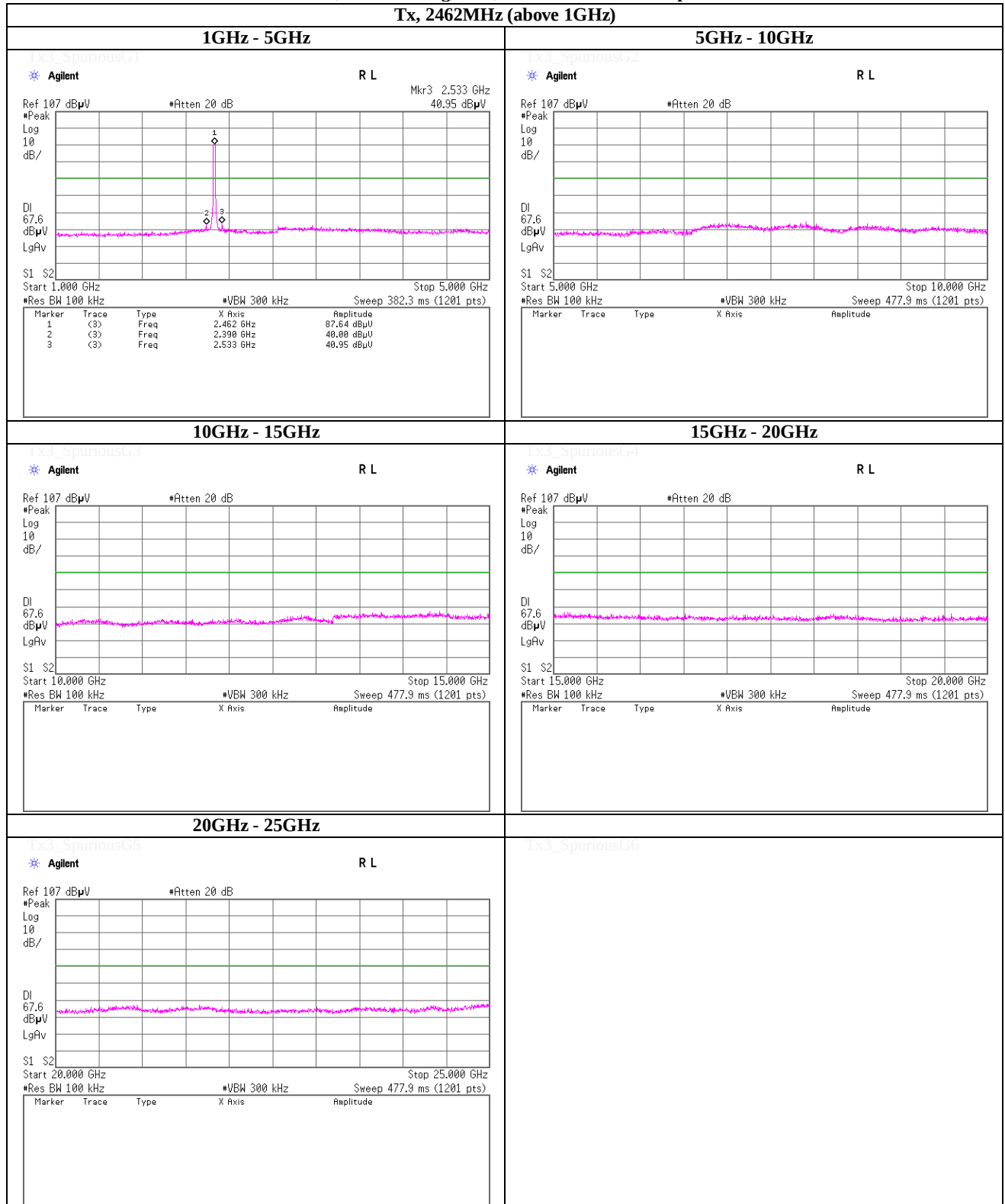
Facsimile : +81 463 50 6401

(Reference chart) Spurious emission (Conducted)**Tx, IEEE802.11g, PN9, worst data mode 6Mbps****Tx, 2437MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.**

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Telephone : +81 463 50 6400

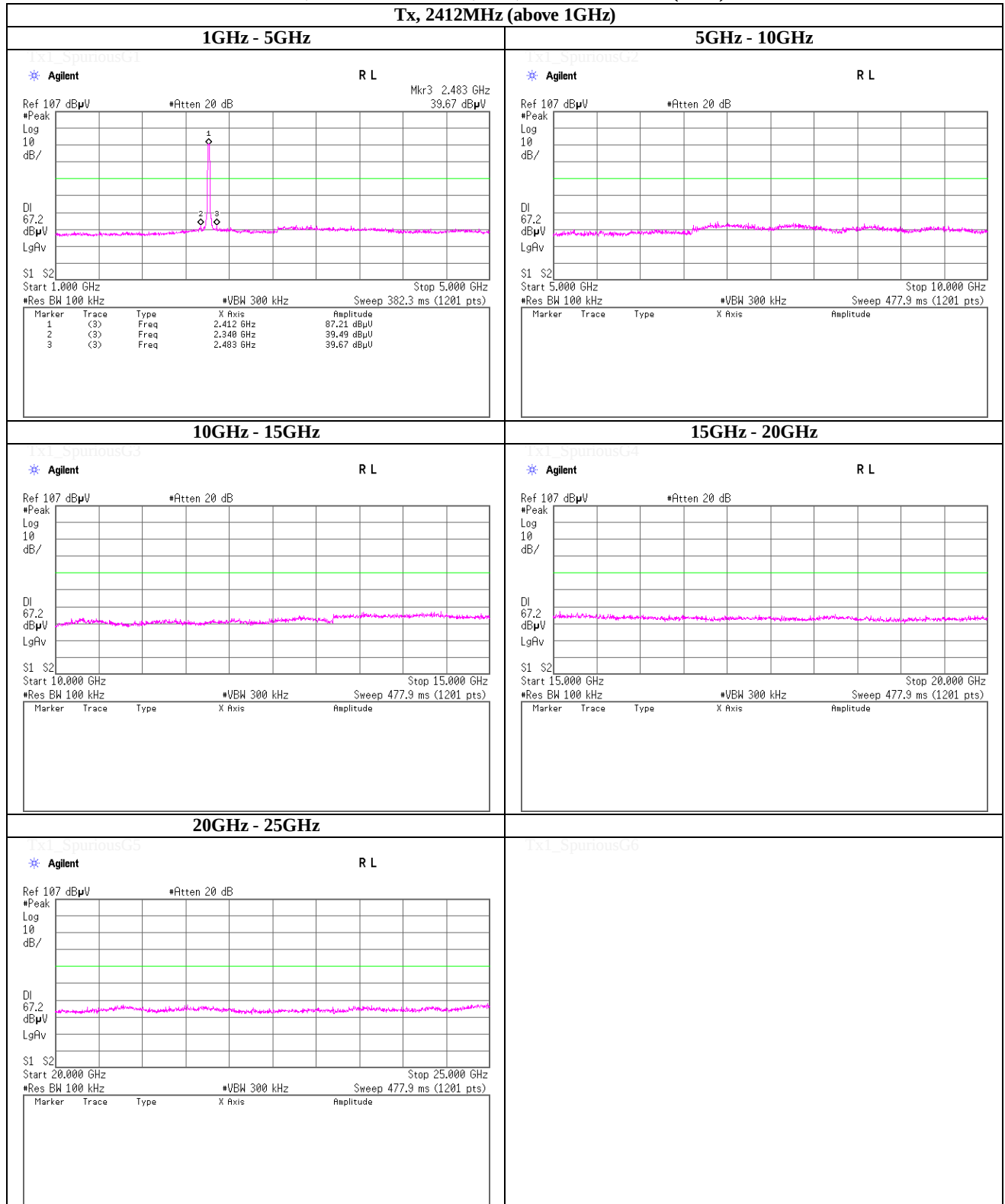
Facsimile : +81 463 50 6401

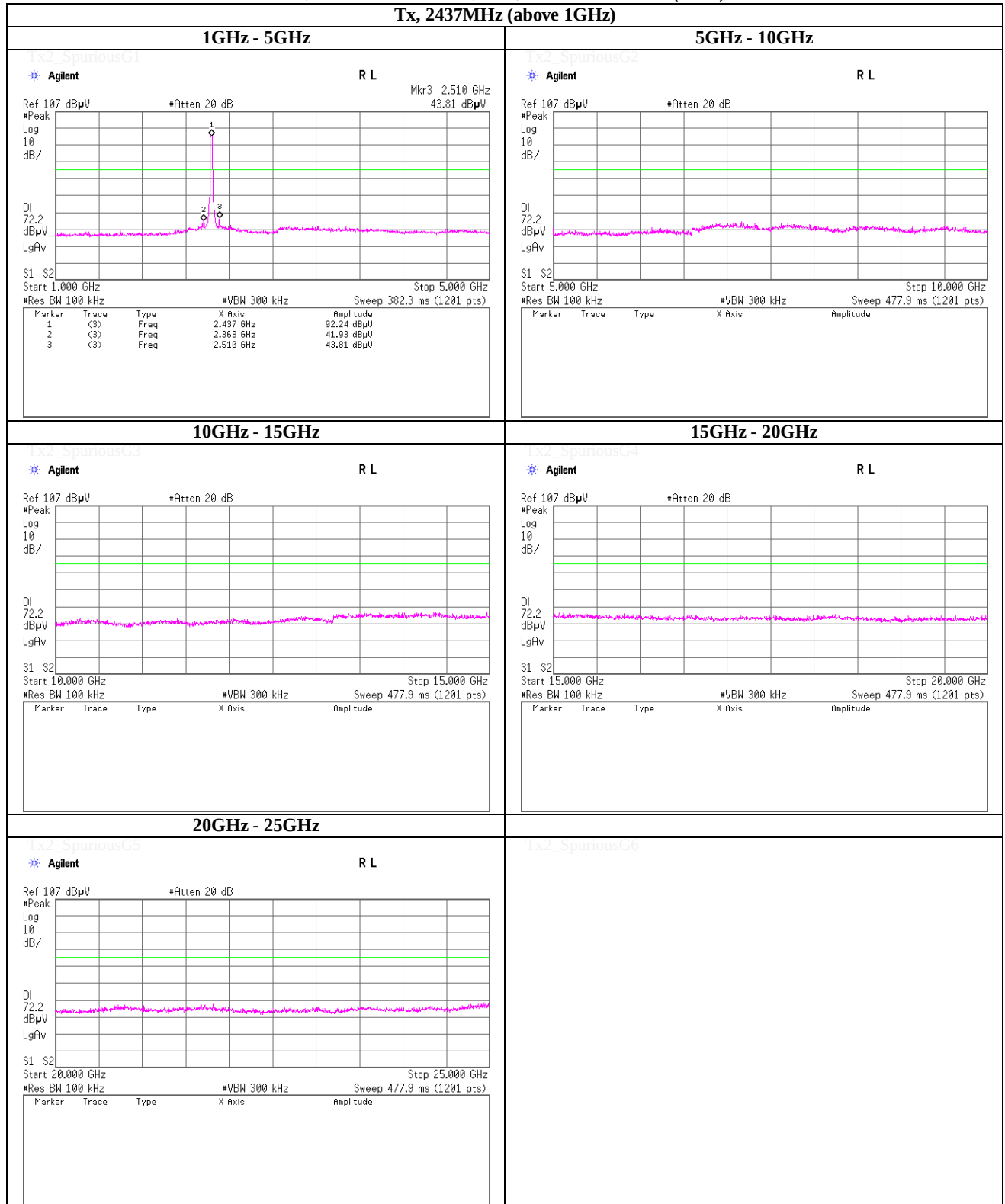
(Reference chart) Spurious emission (Conducted)**Tx, IEEE802.11g, PN9, worst data mode 6Mbps****Tx, 2462MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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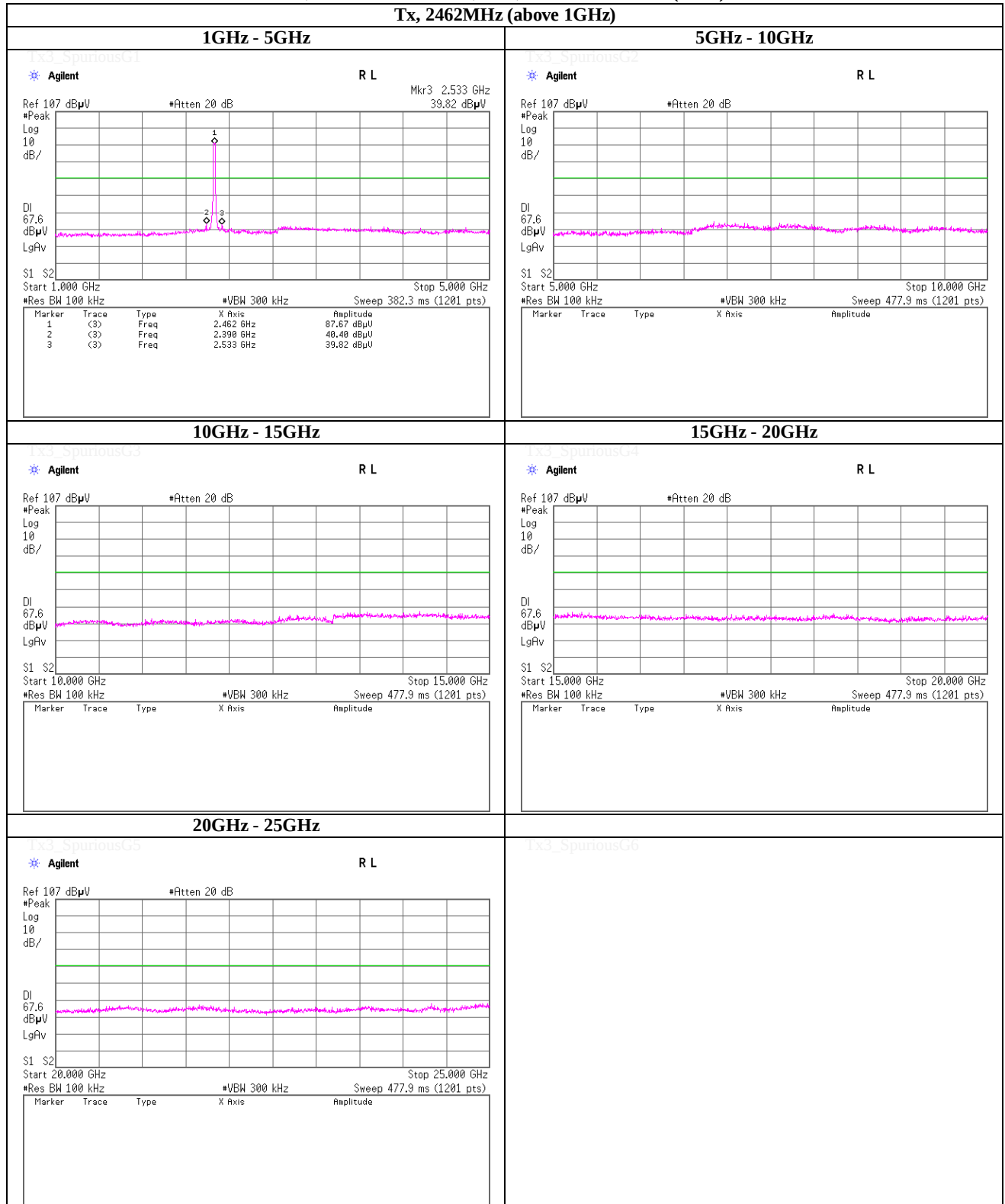
(Reference chart) Spurious emission (Conducted)**Tx, IEEE802.11n-20HT, PN9, worst data mode 0(MCS)****Tx, 2412MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.****1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN****Telephone : +81 463 50 6400****Facsimile : +81 463 50 6401**

(Reference chart) Spurious emission (Conducted)**Tx, IEEE802.11n-20HT, PN9, worst data mode 0(MCS)****Tx, 2437MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.**

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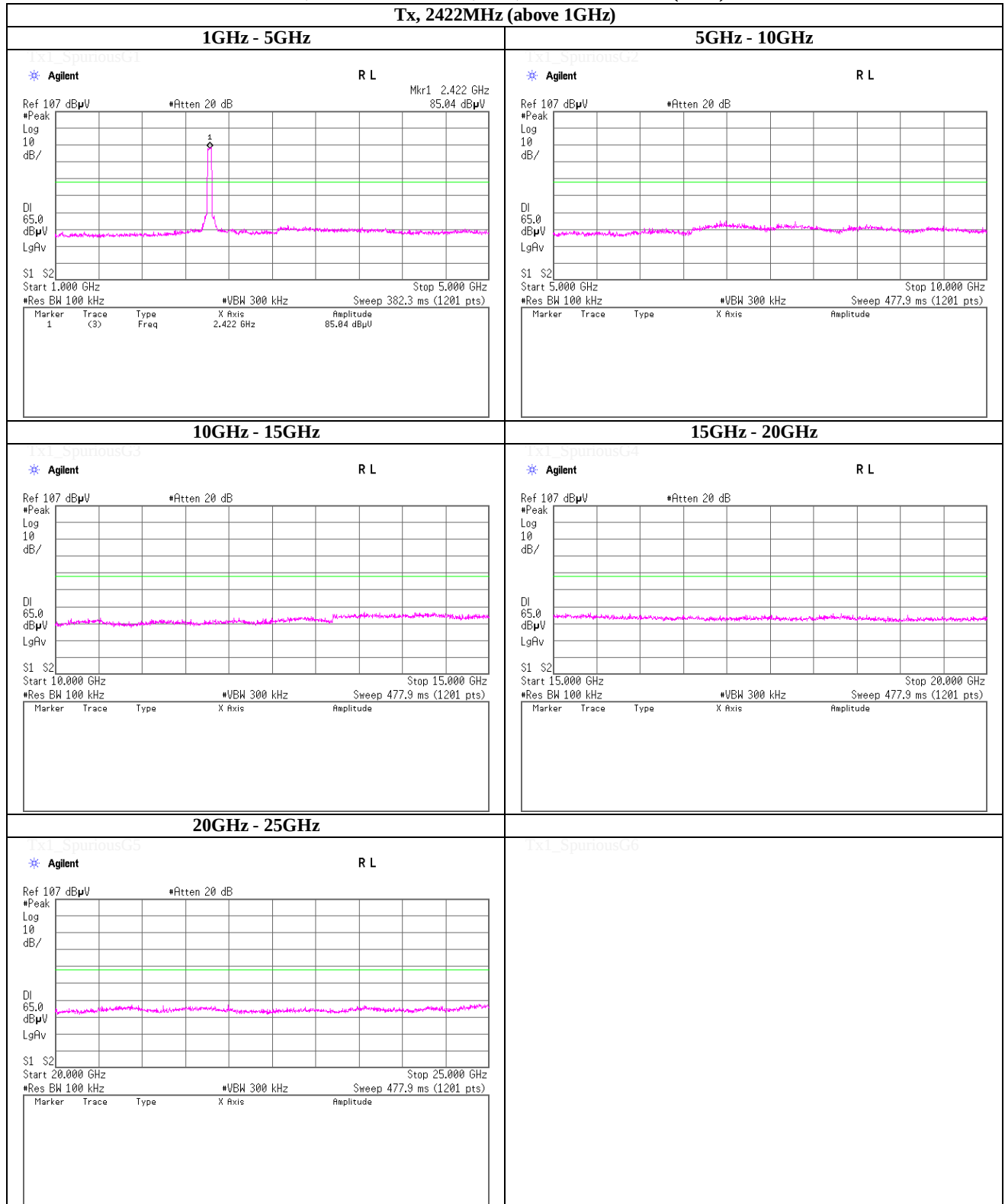
Facsimile : +81 463 50 6401

(Reference chart) Spurious emission (Conducted)**Tx, IEEE802.11n-20HT, PN9, worst data mode 0(MCS)****Tx, 2462MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.**

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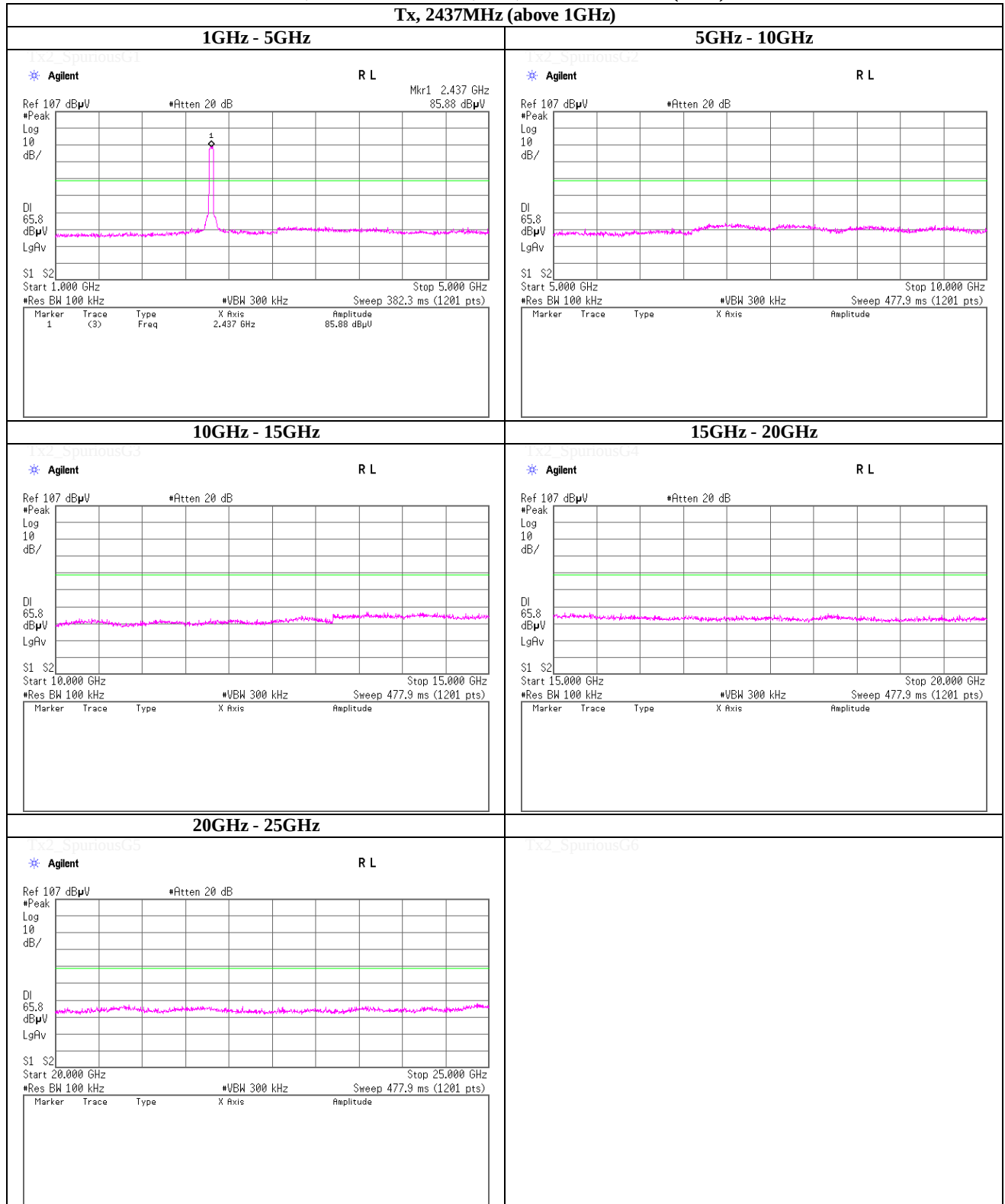
Facsimile : +81 463 50 6401

(Reference chart) Spurious emission (Conducted)**Tx, IEEE802.11n-40HT, PN9, worst data mode 3(MCS)****Tx, 2422MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.**

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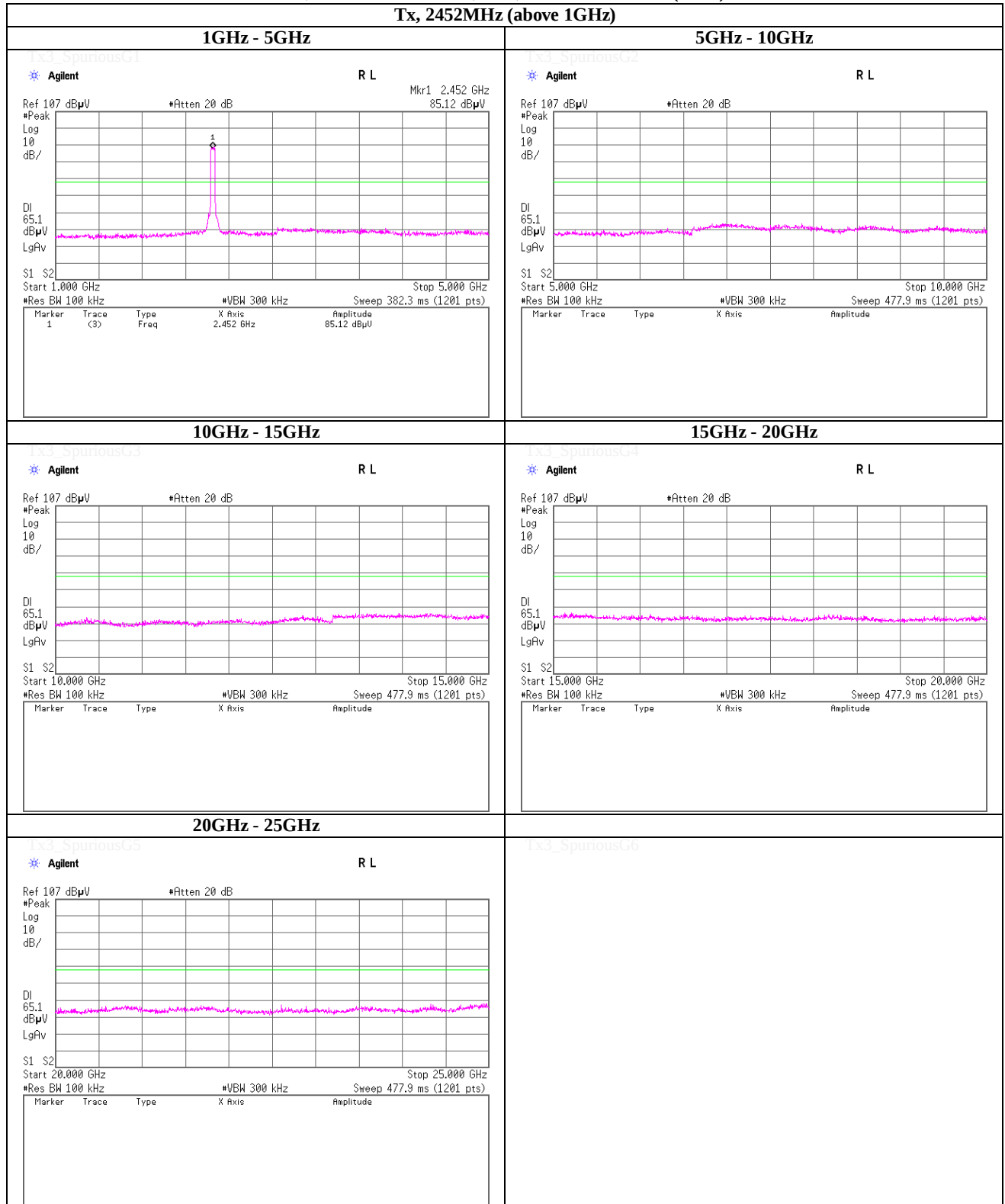
Facsimile : +81 463 50 6401

(Reference chart) Spurious emission (Conducted)**Tx, IEEE802.11n-40HT, PN9, worst data mode 3(MCS)****Tx, 2437MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.**

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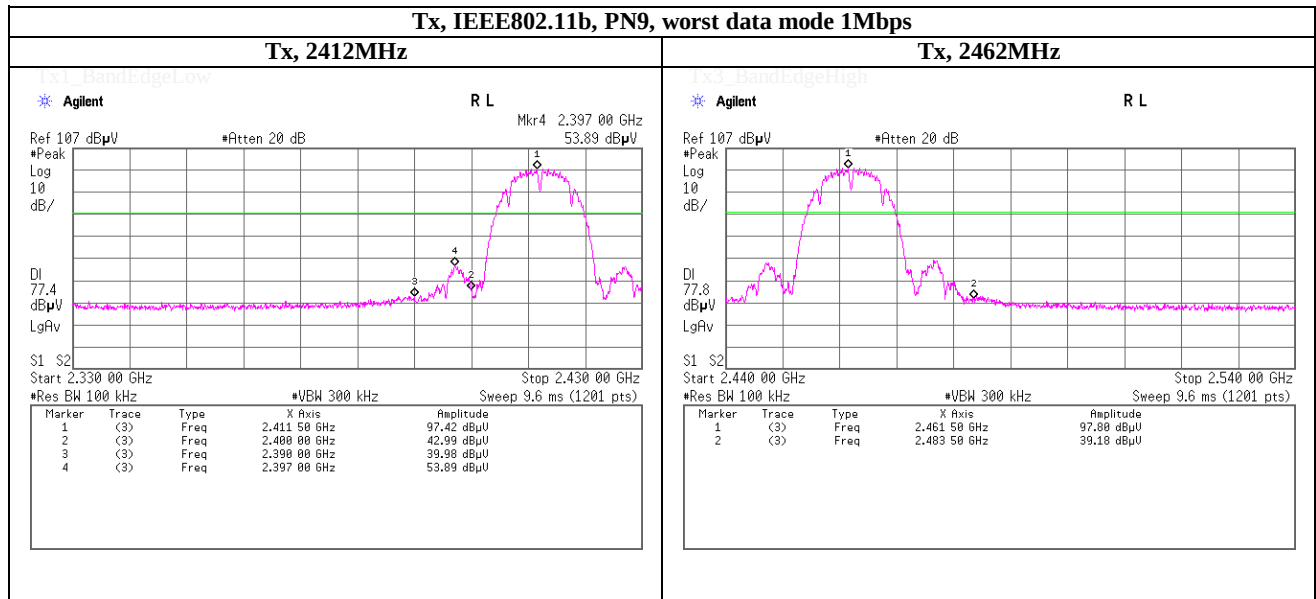
Facsimile : +81 463 50 6401

(Reference chart) Spurious emission (Conducted)**Tx, IEEE802.11n-40HT, PN9, worst data mode 3(MCS)****Tx, 2452MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.**

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Telephone : +81 463 50 6400

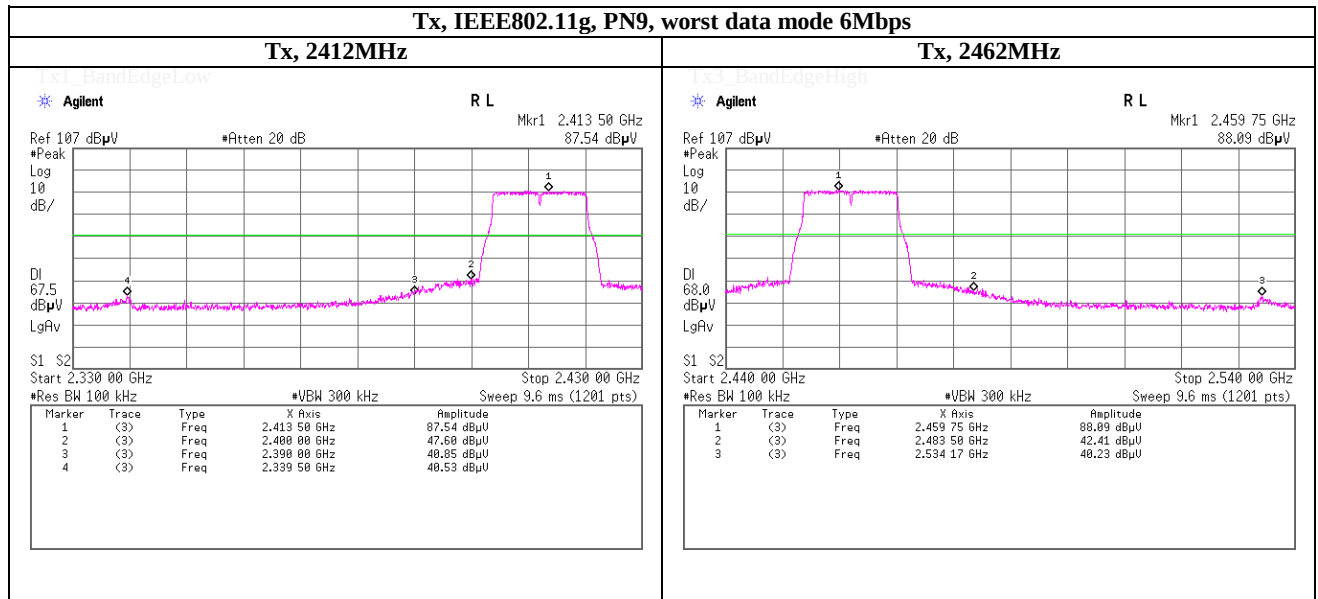
Facsimile : +81 463 50 6401

(Reference chart) Spurious emission (Conducted)**Band Edge compliance****UL Japan, Inc.****Shonan EMC Lab.**

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Telephone : +81 463 50 6400

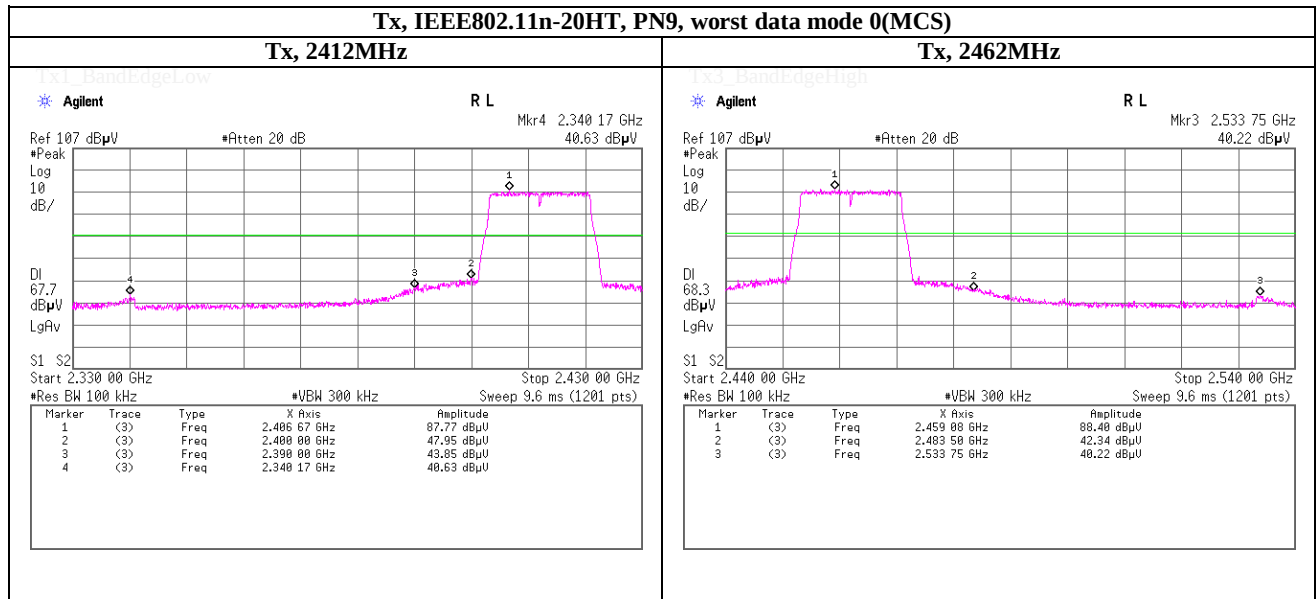
Facsimile : +81 463 50 6401

(Reference chart) Spurious emission (Conducted)**Band Edge compliance****UL Japan, Inc.****Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

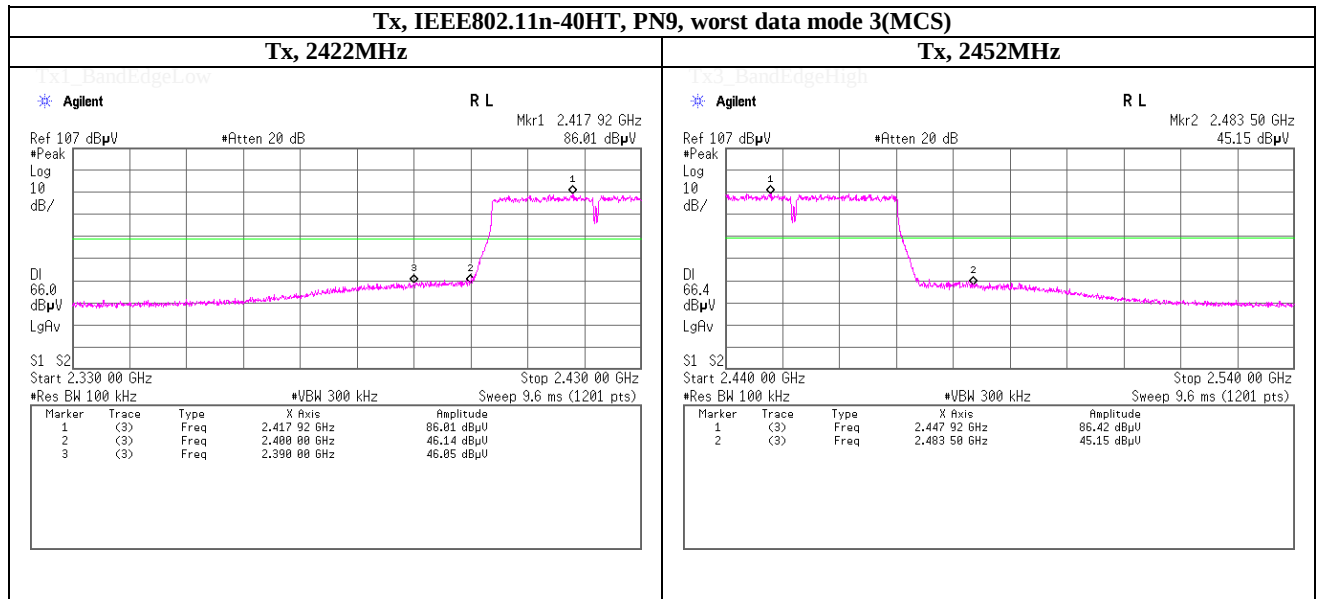
Facsimile : +81 463 50 6401

(Reference chart) Spurious emission (Conducted)**Band Edge compliance****UL Japan, Inc.****Shonan EMC Lab.**

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(Reference chart) Spurious emission (Conducted)**Band Edge compliance****UL Japan, Inc.****Shonan EMC Lab.**

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Maximum Power Spectral Density

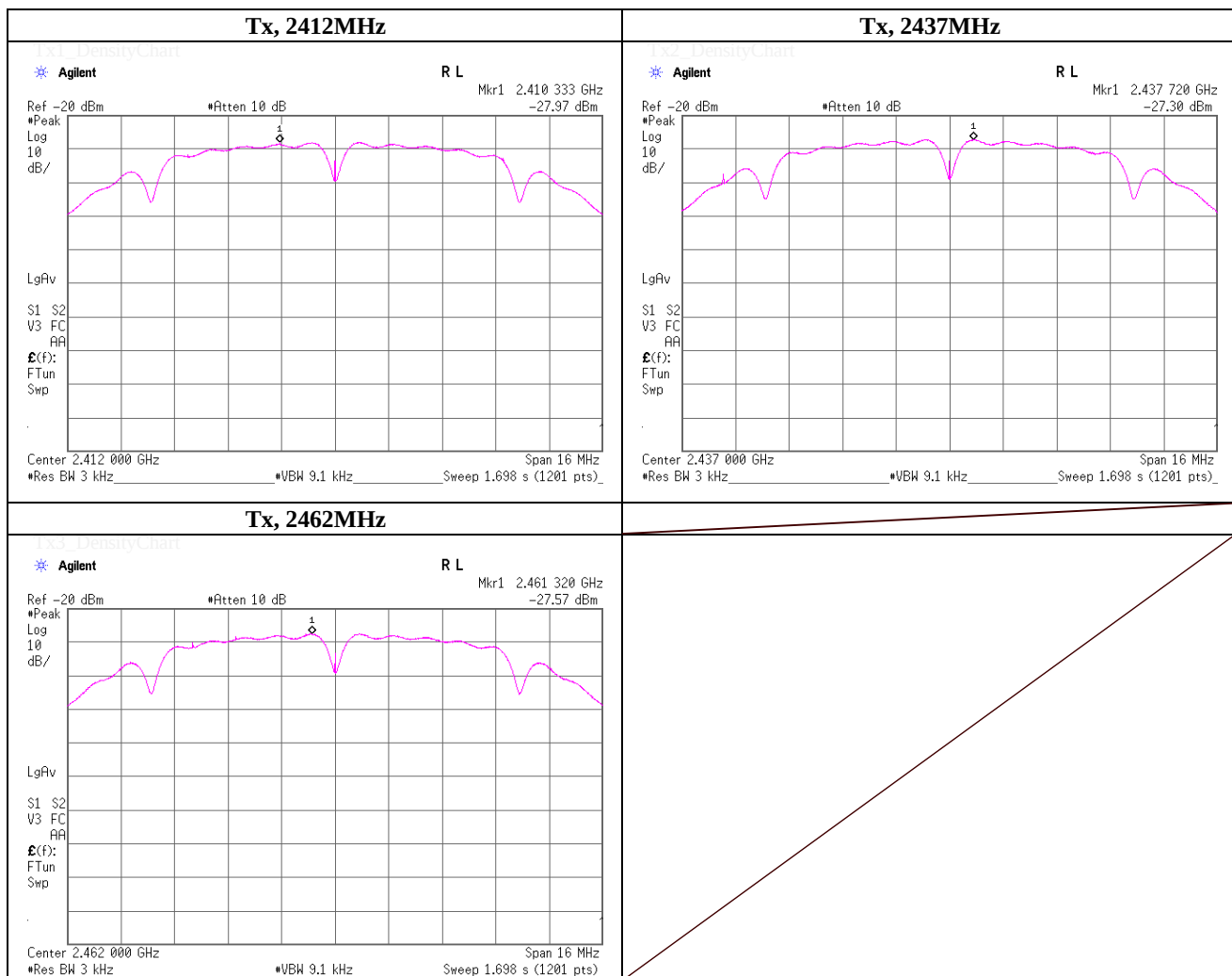
(Method 10.2 PKPSD)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 11, 2013	
Temperature / Humidity	26deg.C , 40%RH	
Engineer	Shinichi Takano	
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	2410.33	-27.97	1.24	9.91	-16.82	8.00	24.82
2437.0000	2437.72	-27.30	1.25	9.91	-16.14	8.00	24.14
2462.0000	2461.32	-27.57	1.25	9.92	-16.40	8.00	24.40

Sample Calculation:

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



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Maximum Power Spectral Density

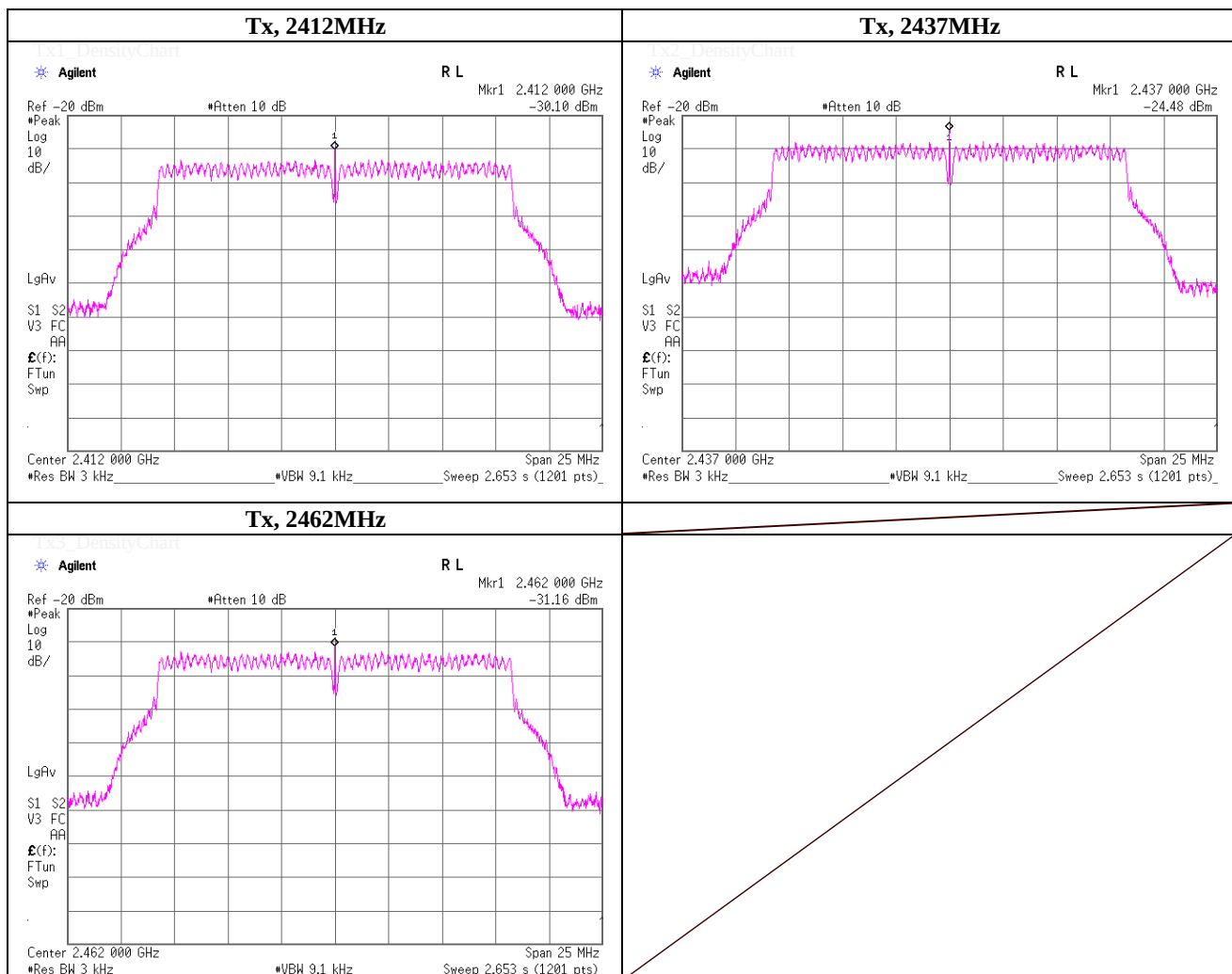
(Method 10.2 PKPSD)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 11, 2013	
Temperature / Humidity	26deg.C , 40%RH	
Engineer	Shinichi Takano	
Mode	Tx, IEEE802.11g, PN9, worst data mode 6Mbps	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	2412.00	-30.10	1.24	9.91	-18.95	8.00	26.95
2437.0000	2437.00	-24.48	1.25	9.91	-13.32	8.00	21.32
2462.0000	2462.00	-31.16	1.25	9.92	-19.99	8.00	27.99

Sample Calculation:

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



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Maximum Power Spectral Density

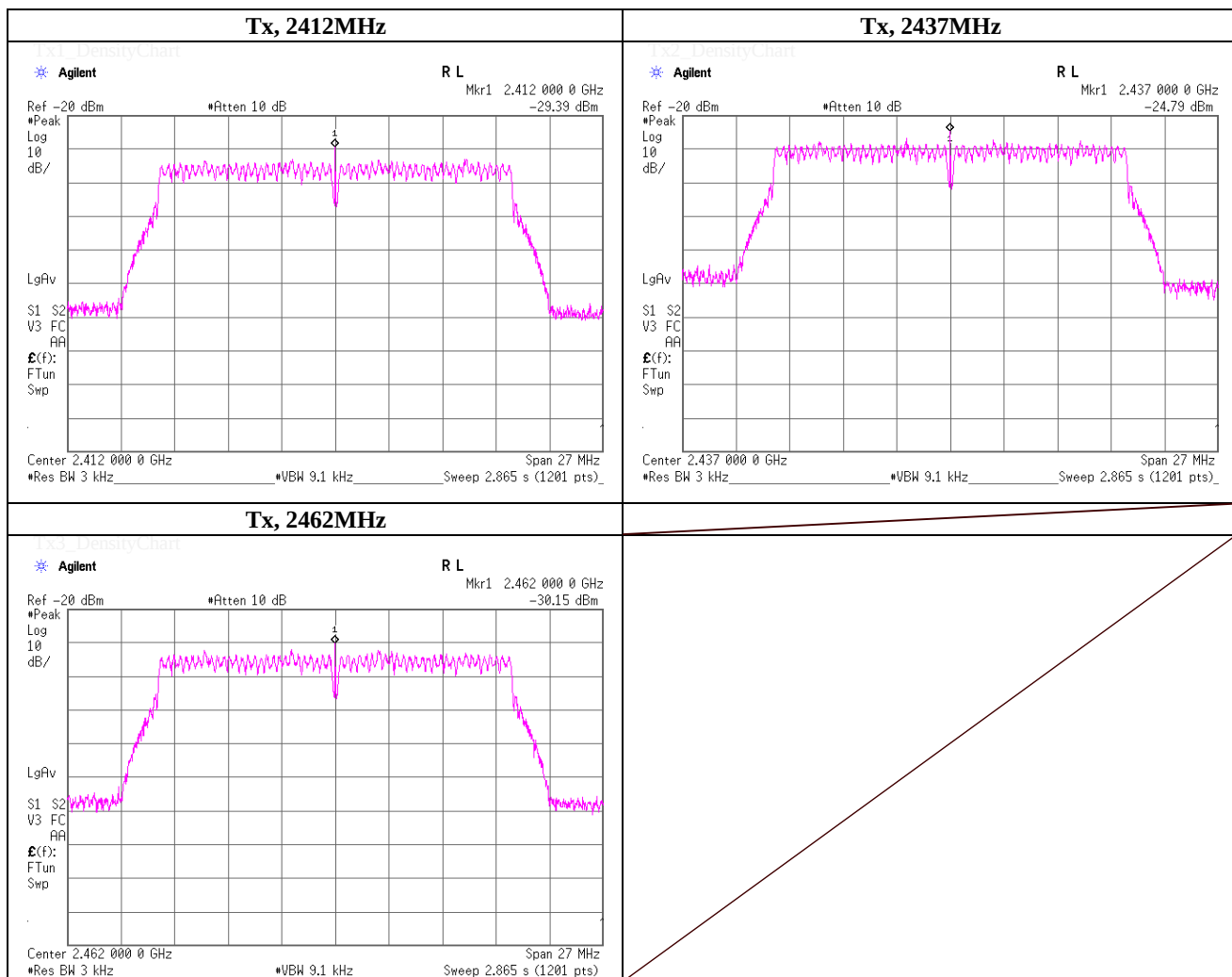
(Method 10.2 PKPSD)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 11, 2013	
Temperature / Humidity	26deg.C , 40%RH	
Engineer	Shinichi Takano	
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]
2412.0000	2412.00	-29.39	1.24	9.91	-18.24	8.00	26.24
2437.0000	2437.00	-24.79	1.25	9.91	-13.63	8.00	21.63
2462.0000	2462.00	-30.15	1.25	9.92	-18.98	8.00	26.98

Sample Calculation:

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



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Maximum Power Spectral Density

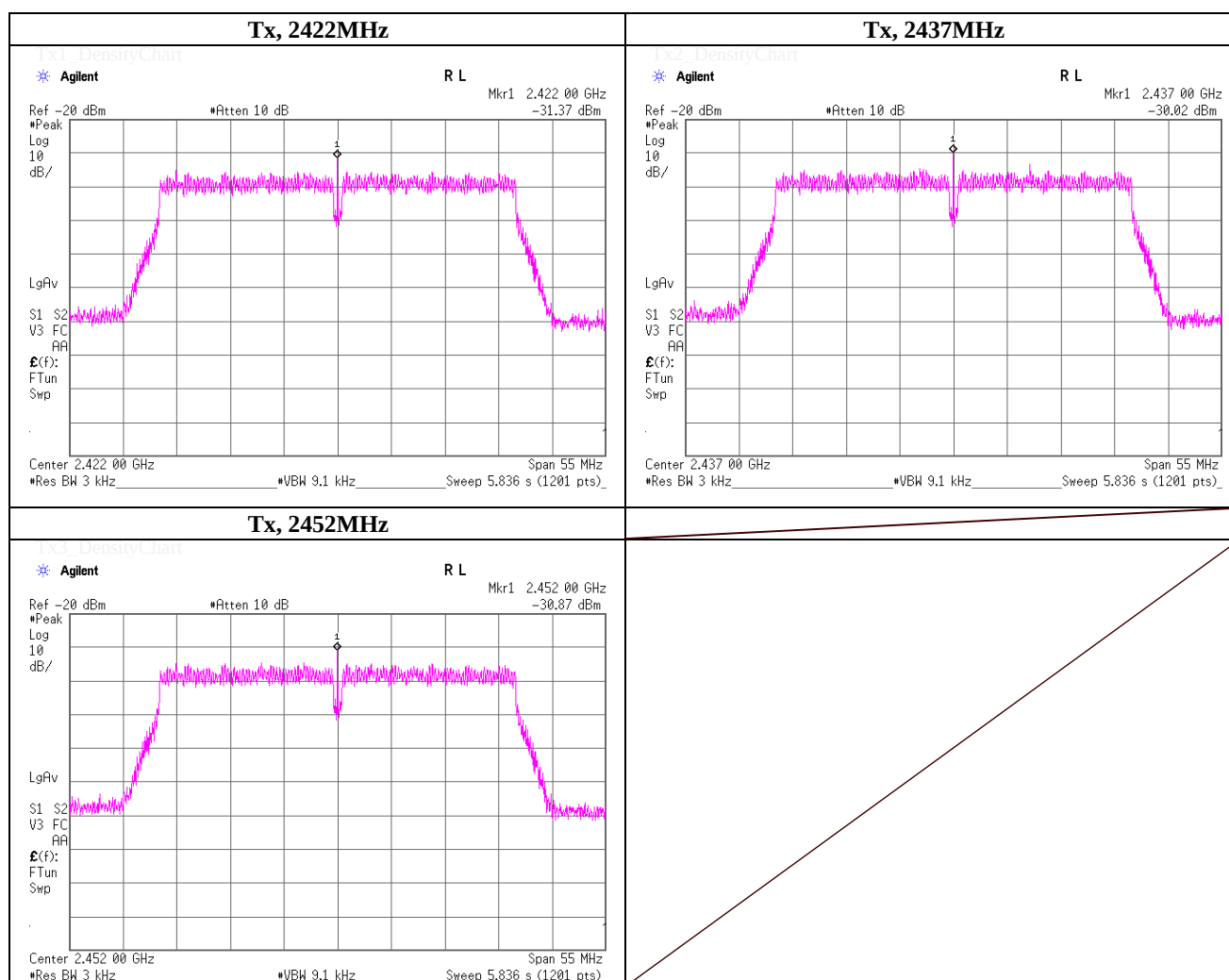
(Method 10.2 PKPSD)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 11, 2013	
Temperature / Humidity	26deg.C , 40%RH	
Engineer	Shinichi Takano	
Mode	Tx, IEEE802.11n-40HT, PN9, worst data mode 3(MCS)	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2422.0000	2422.00	-31.37	1.24	9.91	-20.22	8.00	28.22
2437.0000	2437.00	-30.02	1.25	9.91	-18.86	8.00	26.86
2452.0000	2452.00	-30.87	1.25	9.92	-19.70	8.00	27.70

Sample Calculation:

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



UL Japan, Inc.

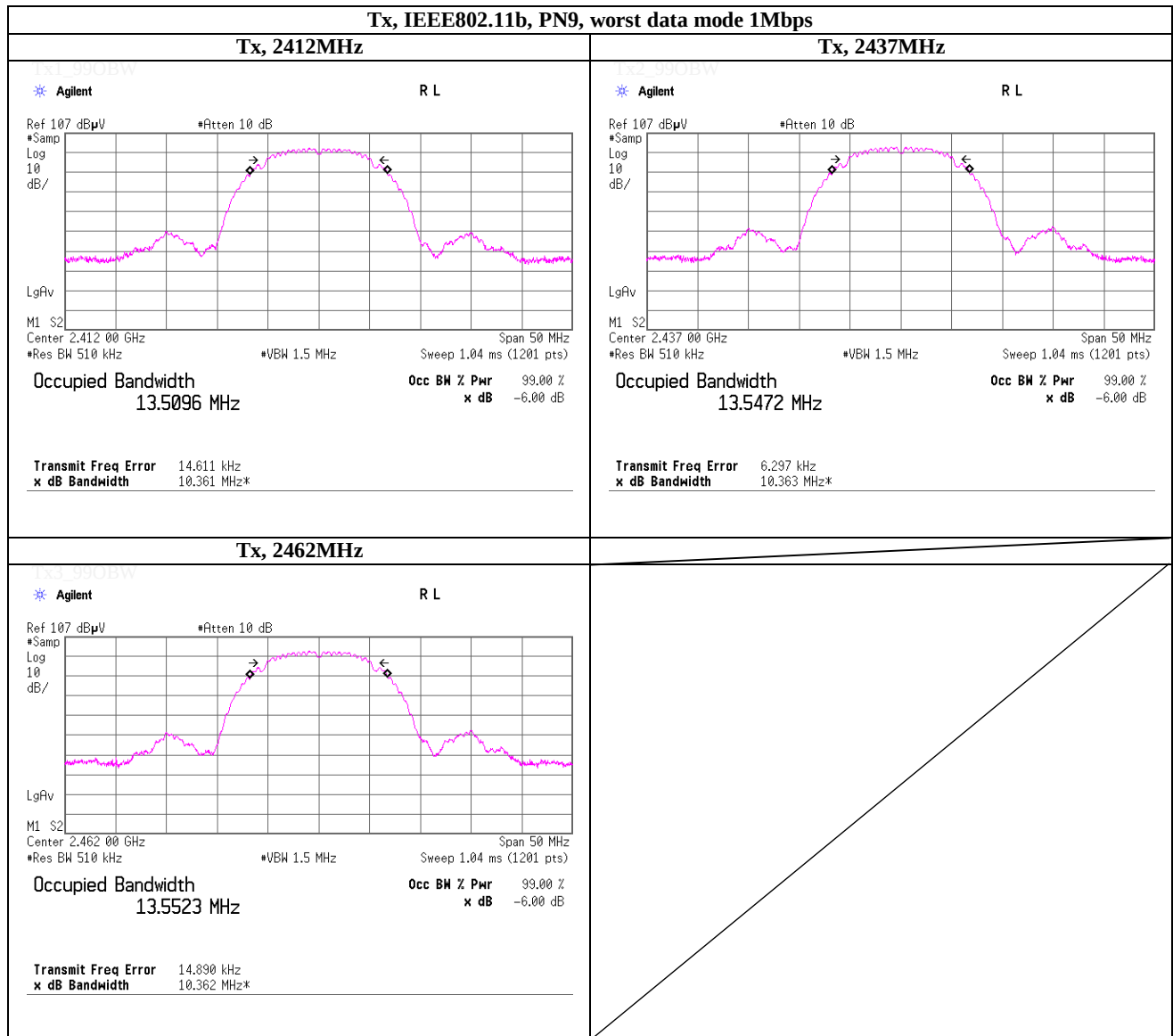
Shonan EMC Lab.

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99% Occupied Bandwidth



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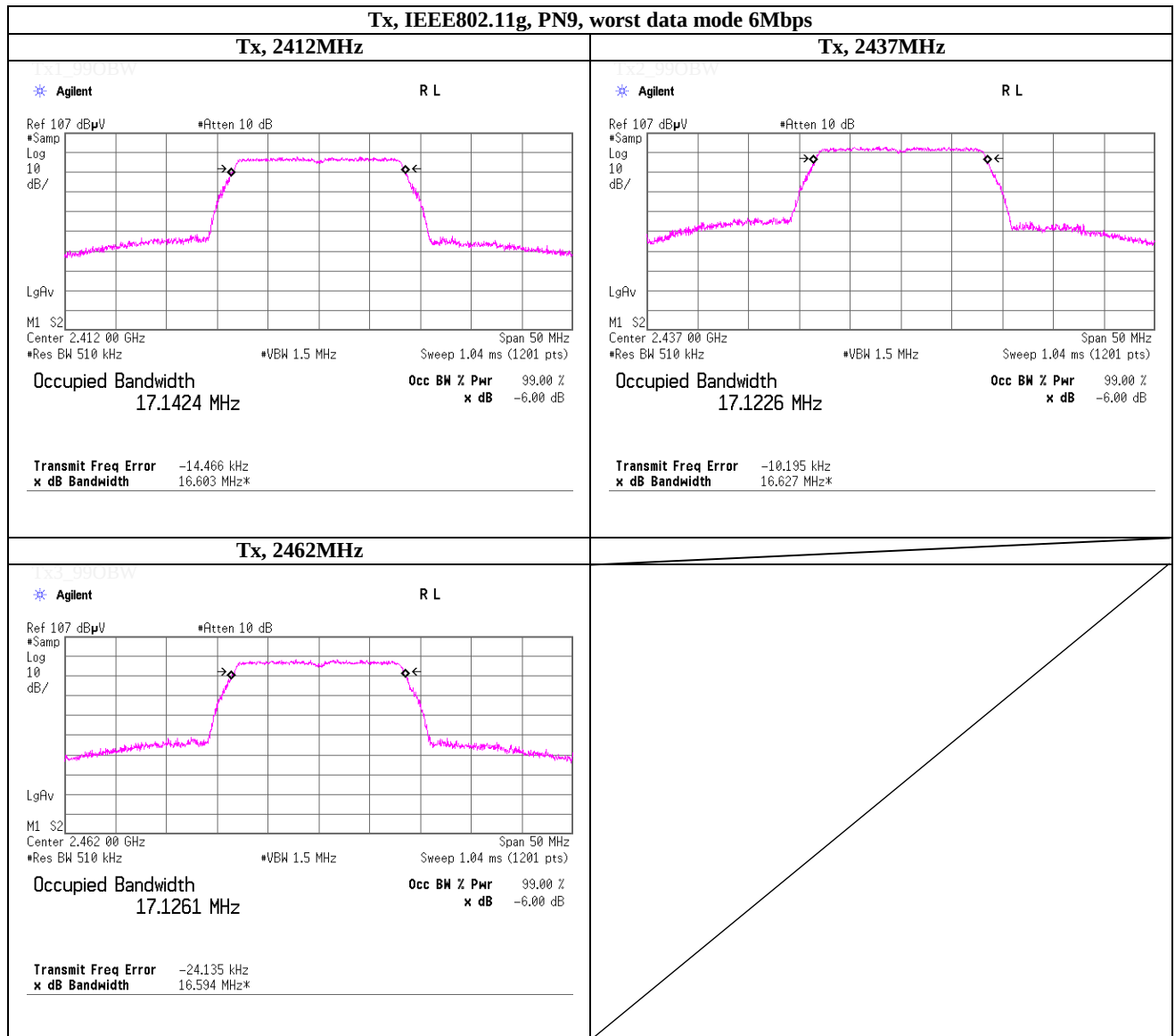
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99% Occupied Bandwidth



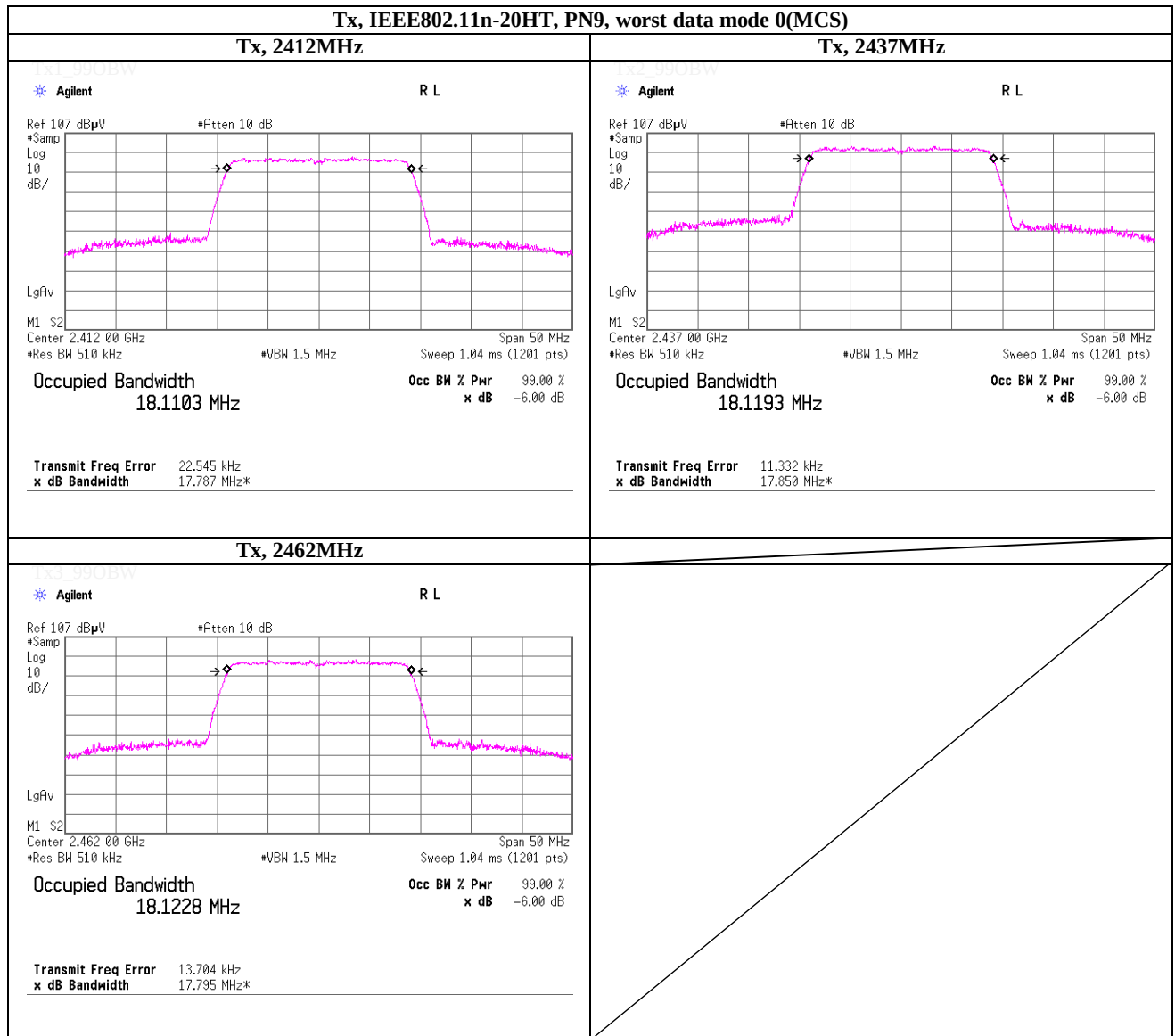
UL Japan, Inc.

Shonan EMC Lab.

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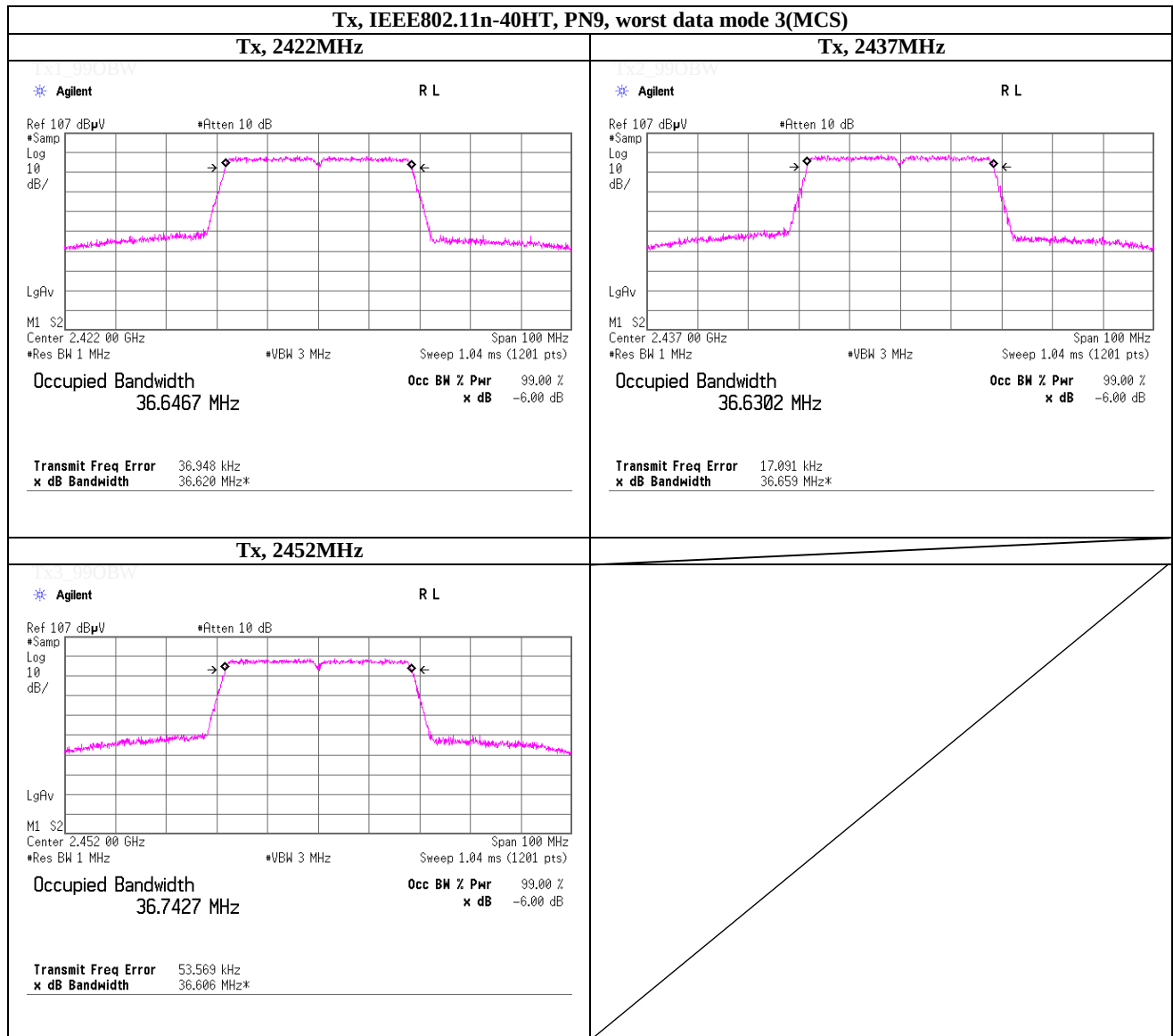
99% Occupied Bandwidth**UL Japan, Inc.****Shonan EMC Lab.**

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99% Occupied Bandwidth



UL Japan, Inc.

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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-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	AT,RE	2013/03/28 * 12
SCC-G12	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	AT	2013/03/16 * 12
SAT10-10	Attenuator	Weinschel Corp.	54A-10	37584	AT	2013/04/09 * 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
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2013/03/07 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2012/09/21 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2012/07/18 * 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	2012/05/22 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2012/08/17 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2013/02/27 * 12
SJM-11	Measure	PROMART	SEN1935	-	RE,CE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RF,MF)	-	RE,CE	-
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2012/12/18 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2012/12/18 * 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	2013/03/19 * 12
SCC-G15	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	RE	2013/03/16 * 12
SCC-C9/C10/SRSE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-271(RF Selector)	CE	2013/04/03 * 12
SLS-05	LISN	Rohde & Schwarz	ENV216	100516	CE(EUT)	2013/02/25 * 12
SLS-02	LISN	Rohde & Schwarz	ENV216	100512	CE(AE)	2013/02/21 * 12
SAT3-05	Attenuator	JFW	50HF-003N	-	CE	2013/02/12 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2013/03/07 * 12
STM-01	Terminator	TME	CT-01 BP	-	CE	2013/01/16 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	CE/RE	2013/02/27 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2013/02/12 * 12
SAT6-06	Attenuator	JFW	50HF-006N	-	RE	2013/02/12 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2012/10/08 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	RE	2013/04/03 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2012/10/08 * 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 tests