



Test report No. : 32LE0328-SH-01-A
Page : 1 of 62
Issued date : November 15, 2012
Revised date : November 20, 2012
FCC ID : AJDK061

RADIO TEST REPORT

Test Report No.: 32LE0328-SH-01-A

Applicant : PIONEER CORPORATION
Type of Equipment : Car Audio with Bluetooth
Model No. : NXF-9338
FCC ID : AJDK061
Test regulation : FCC Part15 Subpart C: 2012
Test result : Complied

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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: October 23 to 31, 2012

Tested by:

Hikaru Shirasawa
Engineer of WiSE Japan,
UL Verification Service

Approved by :

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.
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13-EM-F0429

REVISION HISTORY

Original Test Report No.: 32LE0328-SH-01-A

[illegible]

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SECTION 1: Customer information

Company Name : PIONEER CORPORATION
Brand name : Pioneer
Address : 25-1 Aza-Nishi-machi, Yamada, Kawagoe-shi, Saitama, 350-8555, JAPAN
Telephone Number : +81-49-228-6415
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Contact Person : Makoto Kaieda

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

2.1 Identification of E.U.T.

Type of Equipment : Car Audio with Bluetooth
Model No. : NXF-9338
Serial No. : See Section 4.
Rating : DC 13.2V
Country of Mass-production : Japan
Condition of EUT : Engineering prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT : No modification by the test lab.
Receipt Date of Sample : October 10, 2012

2.2 Product description

Model: NXF-9338 (referred to as the EUT in this report) is a Car Audio with Bluetooth.

The EUT has a derived model: NXF-9138
Difference is the audio amplifier and the design.

Radio specification:

Bluetooth:

Equipment type : Transceiver
Frequency of operation : 2402-2480MHz
Bandwidth & channel spacing : 79MHz & 1MHz
Type of modulation : GFSK, $\pi/4$ DQPSK, 8DPSK
Antenna type : Ceramic patch antenna
Antenna gain with cable loss : +2dBi (max)
Antenna connector type : MHF series micro coaxial connector receptacle vertical
Operation temperature range : -20 to +65 deg.C.

Refer to the test report: 32LE0328-SH-01-B for Bluetooth part.

Wireless LAN:

Equipment type : Transceiver
Frequency of operation : 2412-2462MHz
Bandwidth & channel spacing : 20MHz & 5MHz
Type of modulation : BPSK, QPSK, CCK, 16QAM, 64QAM
Antenna type : Ceramic patch antenna
Antenna gain with cable loss : +2dBi (max)
Antenna connector type : MHF series micro coaxial connector receptacle vertical
Operation temperature range : 20 to +65 deg.C.

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FCC 15.31 (e)

The equipment provides the wireless transmitter with stable power supply (DC3.3V). Therefore, the equipment complies with the requirement.

FCC 15.203

The equipment and its antenna comply with this requirement since this antenna is built in the equipment and it cannot be replaced by end users.

Clock Frequency:

Item	Reason For Use	Frequency
Navi Board	NAVI SYSTEM CLOCK	32.4576MHz
	MIC AD (M3:12kHz)	12.288MHz
	PCIe (Oscillator)	100.01MHz
	SATA CLOCK	100.01MHz
	USB (Oscillator)	48MHz
	GPS CLOCK	16.368MHz
	MOST CLOCK	12.288MHz
	DOT CLOCK	33.231MHz
	NTSC CLOCK	27MHz
	GVIF CLOCK	24MHz
	DC-DC CONVERTER	416kHz
	DC-DC CONVERTER	463kHz
	REAL TIME CLOCK	32.768kHz
	RESET CPU CLOCK	4MHz
Audio Board	SYSTEM MICROCOMPUTER	16MHz
	MICROCOMPUTER COMMUNICATION	4MHz
	DC-DC CONVERTER	500kHz
	DC-DC CONVERTER	461kHz
	SUB MICROCOMPUTER	6MHz
	CAN MICROCOMPUTER	8MHz
	A/D CONVERTER	24.576MHz
	DVD MECH.	27MHz
	VIDEO_DAC	108MHz
	SDRAM	121.5MHz
	FM/AM TUNER	74.1MHz
	INTERMEDIATE FREQUENCY	10.7MHz
	XM FRONTEND	1871.004MHz
	XM FRONTEND	467.751MHz
	XM BACKEND	24.265MHz
	XM MICROCOMPUTER	4.7175MHz
Panel Board	PANEL MICROCOMPUTER	9.83MHz
	DC-DC CONVERTER	100kHz
	BLUETOOTH MODULE	26MHz
	BLUETOOTH DIGITAL AUDIO BIT CLOCK	2.086MHz

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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 August 13, 2012 and effective September 12, 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

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)	N/A	N/A
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	5.3dB Freq.: 12060MHz Polarization: Horizontal Detection: Average Mode: Tx 2412MHz / 11g	Complied
Power density	ANSI C63.10:2009	FCC 15.247 (e)	Conducted	N/A	* See data	Complied

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

*1) These tests were also referred to KDB 558074 (FCC), "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

*2) The test is not applicable since the EUT has no AC mains.

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.10:2009, RSS-Gen 4.6.1	-	Conducted	-	-

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

* Other than above, no addition, exclusion nor deviation has been made from the standard.

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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 (±)
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

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%

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 EMI & 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)
Radiated emission (below 1GHz) *3)	Transmitting IEEE 802.11g	2437MHz	44	6Mbps, PN9
Other items	Transmitting IEEE 802.11b	2412MHz, 2437MHz, 2462MHz	44	1Mbps, PN9
	Transmitting IEEE 802.11g	2412MHz, 2437MHz, 2462MHz	44	6Mbps, PN9
	Transmitting IEEE 802.11n-20	2412MHz, 2437MHz, 2462MHz	44	MCS0, PN9
*1) Software: UniTest Ver: 7.2.1.5 *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.

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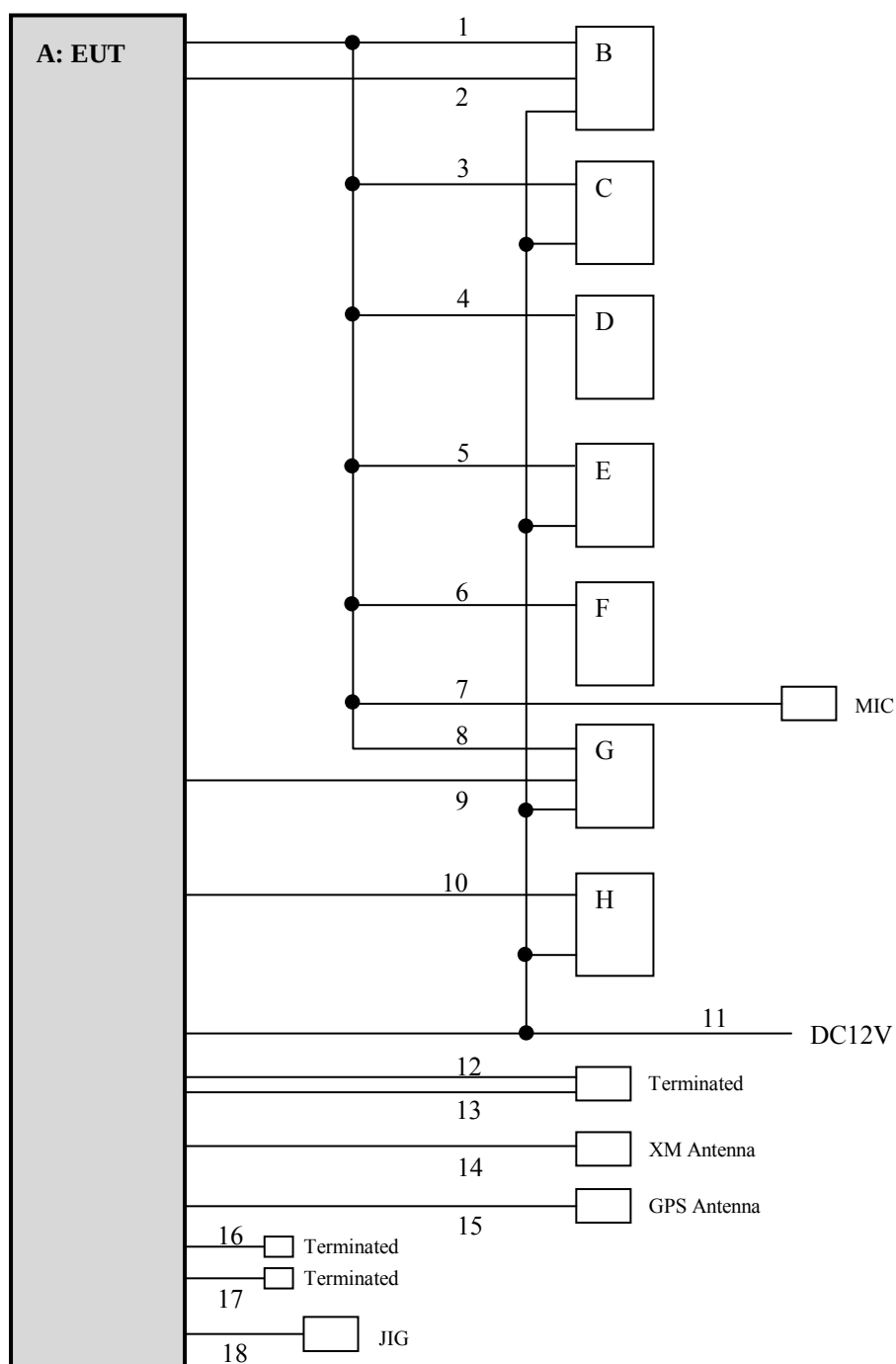
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4.2 Configuration of tested system



* Test data was taken under worse case conditions.

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Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Car Audio with Bluetooth	NXF-9338	*1)	Pioneer	EUT
B	Display	86110-30330	329003456	DENSO	-
C	Remote Control Device	84780-30080	0244AA	-	-
D	Steering Switch	-	-	-	-
E	Air-Condition ECU	88650-30P80	177700-6524	DENSO	-
F	Rear Camera	-	-	-	-
G	DCM	86741-53040	A1000004900E70	DENSO	-
H	Amplifier	86280-53190	LVD:K1LD014	Pioneer	-

*1) Antenna terminal conducted tests: AAB999999US, Radiated emission tests: AAB999998US

List of cables used

No.	Cable name	Length (m)	Shield		Remark
			Cable	Connector	
1	Signal cable for Display	2.0	Unshielded	Unshielded	-
2	Image output cable	2.0	Unshielded	Unshielded	-
3	Signal cable for Remote control	2.0	Unshielded	Unshielded	-
4	Signal cable for Steering Switch	2.0	Unshielded	Unshielded	-
5	Signal cable for Air-Condition ECU	2.0	Unshielded	Unshielded	-
6	Signal cable for Rear Camera	2.0	Unshielded	Unshielded	-
7	Signal cable for MIC	4.0	Shielded	Shielded	-
8	Signal cable for DCM	2.0	Unshielded	Unshielded	-
9	Signal cable for DCM	1.2	Unshielded	Unshielded	-
10	Signal cable for Amplifier	2.0	Shielded	Shielded	-
11	DC power cable	4.0	Unshielded	Unshielded	-
12	AV cable	2.0	Unshielded	Unshielded	-
13	USB cable	2.0	Shielded	Shielded	-
14	Antenna cable for XM	2.4	Shielded	Shielded	-
15	Antenna cable for GPS	1.6	Shielded	Shielded	-
16	Antenna cable for Radio	0.15	Shielded	Shielded	-
17	Antenna cable for Radio	0.15	Shielded	Shielded	-
18	JIG cable	0.6	Unshielded	Unshielded	-

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

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SECTION 5: 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

SECTION 6: 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 7.1 Option 1 and 7.2 Option 2 of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

Summary of the test results: Pass
Refer to APPENDIX

SECTION 7: 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 8.1.3 Option 3 of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

Summary of the test results: Pass
Refer to APPENDIX

SECTION 8: 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 / 9kHz

The test was measured based on Method 9.1 Option 1 of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

Summary of the test results: Pass
Refer to APPENDIX

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SECTION 9: Radiated emission

9.1 Operating environment

Test room : See test data (APPENDIX)
Temperature : See test data (APPENDIX)
Humidity : See test data (APPENDIX)

9.2 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 its peripherals was aligned and flushed with rear of tabletop. I/O cables that were connected to the peripherals were bundled in center. They were folded back and for the forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. Photographs of the set up are shown in APPENDIX.

9.3 Test conditions

Frequency range : 30MHz to 25GHz
EUT position : Table top

9.4 Test procedure

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

The radiated emission measurements were made with the following detection.

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

*1) Average Power Measurement was measured based on 10.2.3.3 and 8.2.1 of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

The carrier level and noise levels were fixed at angle of 23.5 deg. based on the product specification.

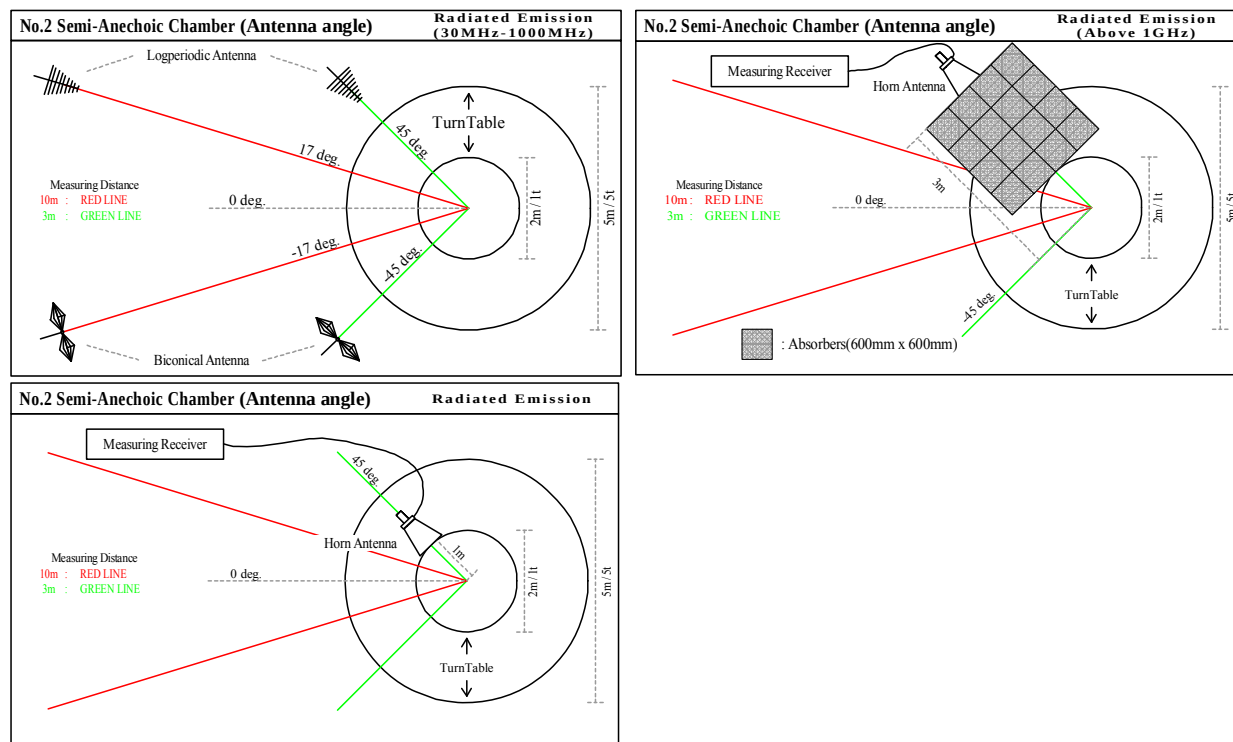
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Figure 1. Antenna angle

9.5 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.

9.6 Results

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

Refer to APPENDIX

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Contents of APPENDIXES

APPENDIX 1: Data of Radio tests

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

Radiated emission

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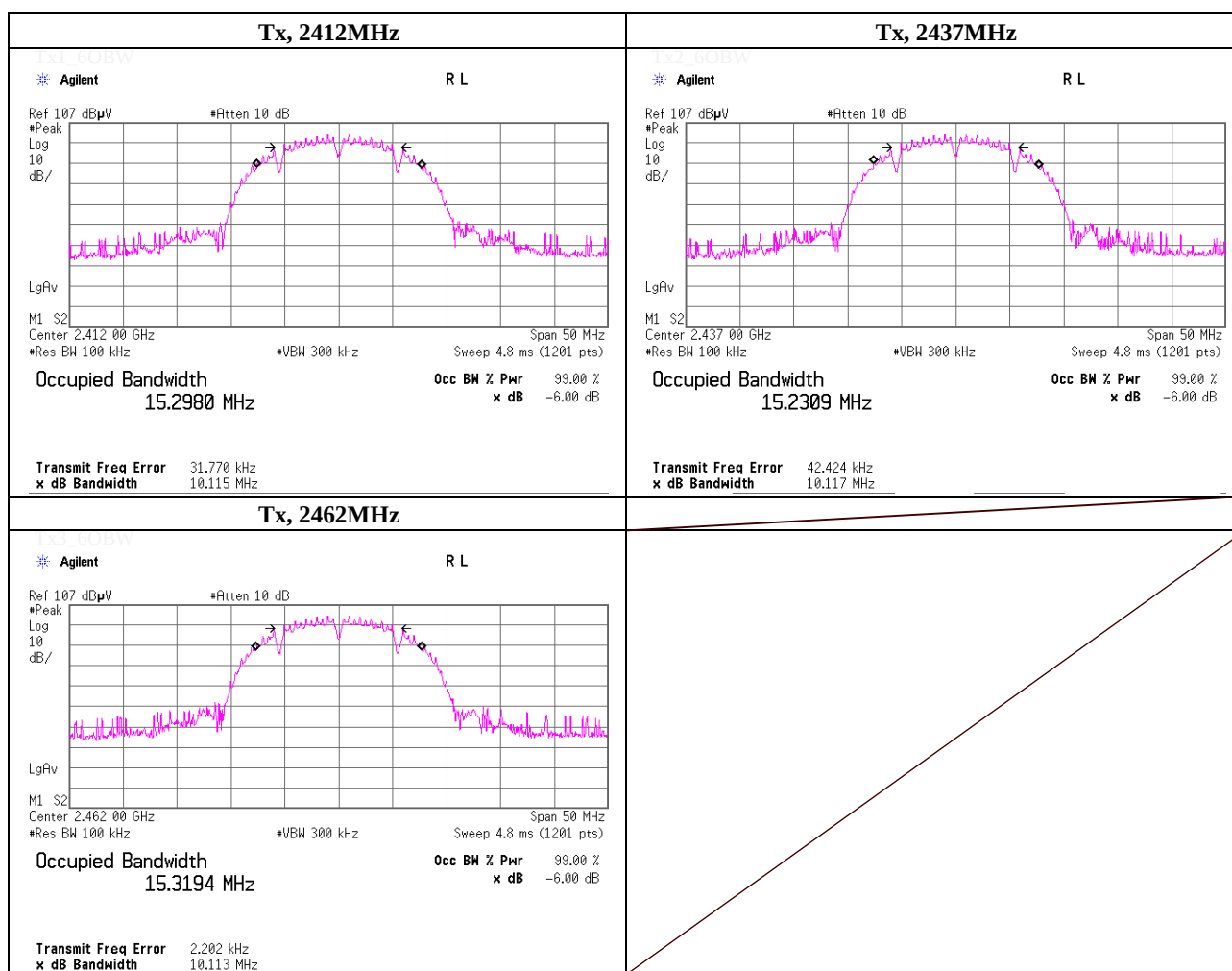
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APPENDIX 1: Data of Radio tests

-6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	October 23, 2012	
Temperature / Humidity	25deg.C , 55%RH	
Engineer	Tatsuya Arai	
Mode	Tx, IEEE802.11b, PN9, worst data mode 1Mbps	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	10.115	> 0.500
2437.0000	10.117	> 0.500
2462.0000	10.113	> 0.500



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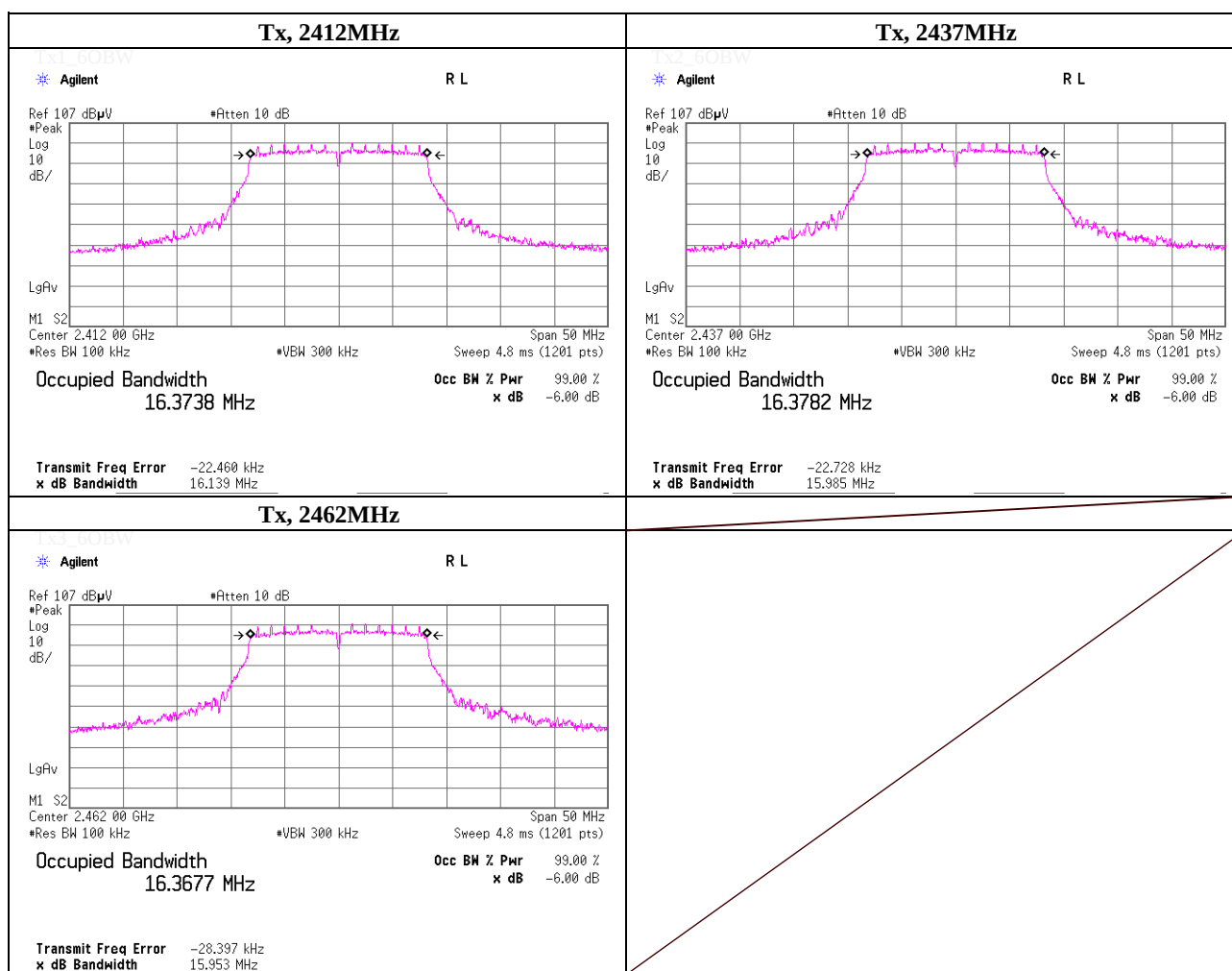
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-6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	October 23, 2012	
Temperature / Humidity	25deg.C , 55%RH	
Engineer	Tatsuya Arai	
Mode	Tx, IEEE802.11g, PN9, worst data mode 6Mbps	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	16.139	> 0.500
2437.0000	15.985	> 0.500
2462.0000	15.953	> 0.500



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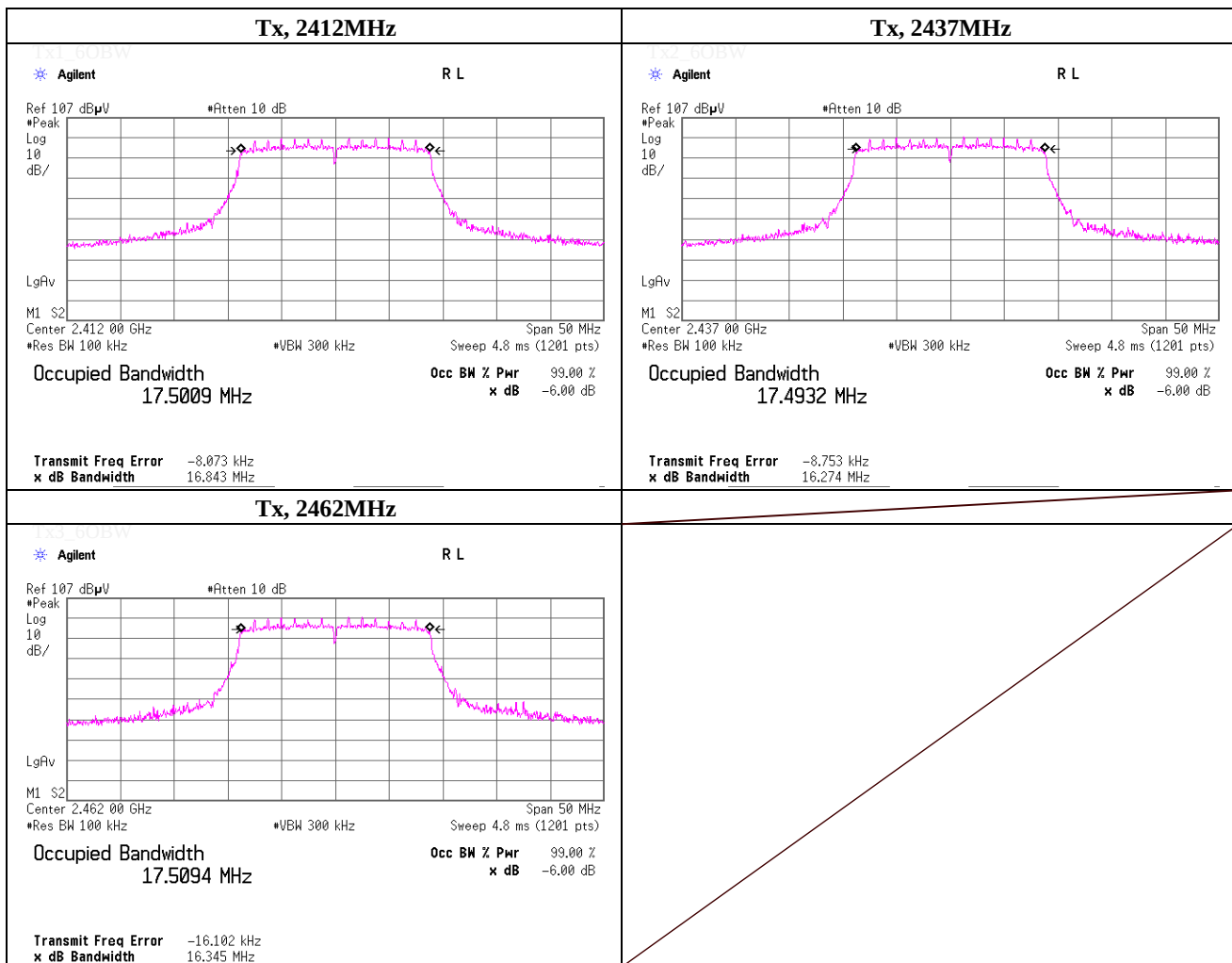
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-6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	October 23, 2012	
Temperature / Humidity	25deg.C , 55%RH	
Engineer	Tatsuya Arai	
Mode	Tx, IEEE802.11n (HT20), PN9, worst data mode 0(MCS)	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	16.843	> 0.500
2437.0000	16.274	> 0.500
2462.0000	16.345	> 0.500



Maximum Peak Conducted Output Power

(Option 3)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date October 23, 2012
 Temperature / Humidity 25deg.C , 55%RH
 Engineer Tatsuya Arai
 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	4.96	1.45	10.00	16.41	43.75	30.00	1000	13.59
Mid	2437.0	5.45	1.45	10.00	16.90	48.98	30.00	1000	13.10
High	2462.0	5.39	1.45	10.00	16.84	48.31	30.00	1000	13.16

Sample Calculation:

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

[Pre check]

	Data rate	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin
	[Mbps]					[dBm]	[mW]	[dBm]	[mW]	
	1	2437.0	5.45	1.45	10.00	16.90	48.98	30.00	1000	13.10
	2	2437.0	5.38	1.45	10.00	16.83	48.19	30.00	1000	13.17
	5.5	2437.0	5.42	1.45	10.00	16.87	48.64	30.00	1000	13.13
	11	2437.0	5.43	1.45	10.00	16.88	48.75	30.00	1000	13.12

Worst

Sample Calculation:

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

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

Maximum Peak Conducted Output Power

(Option 3)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date October 23, 2012
 Temperature / Humidity 25deg.C , 55%RH
 Engineer Tatsuya Arai
 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 [dB]
					[dBm]	[mW]	[dBm]	[mW]	
Low	2412.0	10.38	1.45	10.00	21.83	152.41	30.00	1000	8.17
Mid	2437.0	10.56	1.45	10.00	22.01	158.85	30.00	1000	7.99
High	2462.0	10.49	1.45	10.00	21.94	156.31	30.00	1000	8.06

Sample Calculation:

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

[Pre check]

	Data rate	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin
	[Mbps]					[dBm]	[mW]	[dBm]	[mW]	
	6	2437.0	10.56	1.45	10.00	22.01	158.85	30.00	1000	7.99
	9	2437.0	10.42	1.45	10.00	21.87	153.82	30.00	1000	8.13
	12	2437.0	10.52	1.45	10.00	21.97	157.40	30.00	1000	8.03
	18	2437.0	10.47	1.45	10.00	21.92	155.60	30.00	1000	8.08
	24	2437.0	10.53	1.45	10.00	21.98	157.76	30.00	1000	8.02
	36	2437.0	10.54	1.45	10.00	21.99	158.12	30.00	1000	8.01
	48	2437.0	10.44	1.45	10.00	21.89	154.53	30.00	1000	8.11
	54	2437.0	10.54	1.45	10.00	21.99	158.12	30.00	1000	8.01

Worst

Sample Calculation:

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

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Maximum Peak Conducted Output Power

(Option 3)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date October 23, 2012
 Temperature / Humidity 25deg.C , 55%RH
 Engineer Tatsuya Arai
 Mode Tx, IEEE802.11n (HT20), 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 [dB]
					[dBm]	[mW]	[dBm]	[mW]	
Low	2412.0	10.31	1.45	10.00	21.76	149.97	30.00	1000	8.24
Mid	2437.0	10.35	1.45	10.00	21.80	151.36	30.00	1000	8.20
High	2462.0	10.41	1.45	10.00	21.86	153.46	30.00	1000	8.14

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 [dB]	
						[dBm]	[mW]	[dBm]	[mW]		
	0	2437.0	10.35	1.45	10.00	21.80	151.36	30.00	1000	8.20	Worst
	1	2437.0	10.32	1.45	10.00	21.77	150.31	30.00	1000	8.23	
	2	2437.0	10.28	1.45	10.00	21.73	148.94	30.00	1000	8.27	
	3	2437.0	10.33	1.45	10.00	21.78	150.66	30.00	1000	8.22	
	4	2437.0	10.31	1.45	10.00	21.76	149.97	30.00	1000	8.24	
	5	2437.0	8.75	1.45	10.00	20.20	104.71	30.00	1000	9.80	
	6	2437.0	9.12	1.45	10.00	20.57	114.02	30.00	1000	9.43	
	7	2437.0	8.74	1.45	10.00	20.19	104.47	30.00	1000	9.81	

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.2 Semi Anechoic Chamber
 Date October 29, 2012 October 30, 2012
 Temperature / Humidity 25 deg.C , 35%RH 24 deg.C , 41%RH
 Engineer Hikaru Shirasawa 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.	2388.330	PK	60.3	27.2	14.1	38.2	63.4	73.9	10.5	220	88	
Hori.	2390.000	PK	60.6	27.2	14.1	38.2	63.7	73.9	10.2	220	88	
Hori.	2517.000	PK	47.3	27.5	14.1	38.1	50.8	73.9	23.1	100	31	
Hori.	3330.784	PK	47.5	28.8	5.3	37.9	43.7	73.9	30.2	110	251	
Hori.	4824.000	PK	49.2	30.8	6.6	37	49.6	73.9	24.3	100	198	
Hori.	7236.000	PK	46.2	36.2	8	39	51.4	73.9	22.5	100	0	
Hori.	9648.000	PK	43.8	38.3	9.2	37.2	54.1	73.9	19.8	100	359	
Hori.	12060.000	PK	45.3	39.2	10.5	37.9	57.1	73.9	16.8	100	0	
Hori.	2388.330	AV	39.5	27.2	14.1	38.2	42.6	53.9	11.3	220	88	
Hori.	2390.000	AV	38.9	27.2	14.1	38.2	42	53.9	11.9	220	88	
Hori.	2517.000	AV	36.2	27.5	14.1	38.1	39.7	53.9	14.2	100	31	
Hori.	3330.784	AV	41.5	28.8	5.3	37.9	37.7	53.9	16.2	110	251	
Hori.	4824.000	AV	45.3	30.8	6.6	37	45.7	53.9	8.2	100	198	
Hori.	7236.000	AV	36.5	36.2	8	39	41.7	53.9	12.2	100	0	
Hori.	9648.000	AV	34.3	38.3	9.2	37.2	44.6	53.9	9.3	100	359	
Hori.	12060.000	AV	35.9	39.2	10.5	37.9	47.7	53.9	6.2	100	0	
Vert.	2388.330	PK	58.3	27.2	14.1	38.2	61.4	73.9	12.5	233	0	
Vert.	2390.000	PK	58.7	27.2	14.1	38.2	61.8	73.9	12.1	233	0	
Vert.	2517.000	PK	45	27.5	14.1	38.1	48.5	73.9	25.4	100	111	
Vert.	3330.724	PK	48.5	28.8	5.3	37.9	44.7	73.9	29.2	100	198	
Vert.	4824.000	PK	48.5	30.8	6.6	37	48.9	73.9	25.0	100	209	
Vert.	7236.000	PK	46.7	36.2	8	39	51.9	73.9	22.0	100	0	
Vert.	9648.000	PK	43.6	38.3	9.2	37.2	53.9	73.9	20.0	359	0	
Vert.	12060.000	PK	45.8	39.2	10.5	37.9	57.6	73.9	16.3	100	0	
Vert.	2388.330	AV	37.6	27.2	14.1	38.2	40.7	53.9	13.2	233	0	
Vert.	2390.000	AV	37.5	27.2	14.1	38.2	40.6	53.9	13.3	233	0	
Vert.	2517.000	AV	34.5	27.5	14.1	38.1	38	53.9	15.9	100	111	
Vert.	3330.724	AV	42.4	28.8	5.3	37.9	38.6	53.9	15.3	100	198	
Vert.	4824.000	AV	44.2	30.8	6.6	37	44.6	53.9	9.3	100	209	
Vert.	7236.000	AV	36.8	36.2	8	39	42	53.9	11.9	100	0	
Vert.	9648.000	AV	34.4	38.3	9.2	37.2	44.7	53.9	9.2	359	0	
Vert.	12060.000	AV	36.1	39.2	10.5	37.9	47.9	53.9	6.0	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).

*The 10th harmonic was not seen so the result was its base noise level.

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

20dBc Data Sheet (RBW 100kHz, VBW 300kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	94.3	27.3	14.1	38.2	97.5	-	-	
Hori.	2400.000	PK	50.3	27.3	14.1	38.2	53.5	77.5	24	
Vert.	2412.000	PK	92.8	27.3	14.1	38.2	96.0	-	-	
Vert.	2400.000	PK	48.7	27.3	14.1	38.2	51.9	76	24.1	

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.2 Semi Anechoic Chamber
 Date October 29, 2012 October 30, 2012
 Temperature / Humidity 25 deg.C , 35%RH 24 deg.C , 41%RH
 Engineer Hikaru Shirasawa 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.	2593.000	PK	45.6	27.6	14.2	38.1	49.3	73.9	24.6	100	35	
Hori.	3330.809	PK	46.7	28.8	5.3	37.9	42.9	73.9	31.0	100	253	
Hori.	3913.006	PK	43.9	29.5	5.9	37.6	41.7	73.9	32.2	100	0	
Hori.	4874.000	PK	43.6	31	6.6	36.9	44.3	73.9	29.6	100	88	
Hori.	7311.000	PK	45.3	36.2	8.2	39	50.7	73.9	23.2	100	359	
Hori.	9748.000	PK	43.1	38.4	9.3	37.2	53.6	73.9	20.3	100	0	
Hori.	12185.000	PK	44.6	39.2	10.5	37.7	56.6	73.9	17.3	100	359	
Hori.	2593.000	AV	35.8	27.6	14.2	38.1	39.5	53.9	14.4	100	35	
Hori.	3330.809	AV	40.1	28.8	5.3	37.9	36.3	53.9	17.6	100	253	
Hori.	3913.006	AV	33.5	29.5	5.9	37.6	31.3	53.9	22.6	100	0	
Hori.	4874.000	AV	34.6	31	6.6	36.9	35.3	53.9	18.6	100	88	
Hori.	7311.000	AV	36.2	36.2	8.2	39	41.6	53.9	12.3	100	359	
Hori.	9748.000	AV	34.2	38.4	9.3	37.2	44.7	53.9	9.2	100	0	
Hori.	12185.000	AV	35	39.2	10.5	37.7	47	53.9	6.9	100	359	
Vert.	2593.000	PK	46.2	27.6	14.2	38.1	49.9	73.9	24.0	100	23	
Vert.	3330.774	PK	48.3	28.8	5.3	37.9	44.5	73.9	29.4	100	233	
Vert.	3909.986	PK	44.9	29.5	5.9	37.6	42.7	73.9	31.2	100	236	
Vert.	4874.000	PK	43.8	31	6.6	36.9	44.5	73.9	29.4	100	96	
Vert.	7311.000	PK	45.8	36.2	8.2	39	51.2	73.9	22.7	100	0	
Vert.	9748.000	PK	43.3	38.4	9.3	37.2	53.8	73.9	20.1	100	359	
Vert.	12185.000	PK	43.9	39.2	10.5	37.7	55.9	73.9	18.0	100	0	
Vert.	2593.000	AV	36.5	27.6	14.2	38.1	40.2	53.9	13.7	100	23	
Vert.	3330.774	AV	41.2	28.8	5.3	37.9	37.4	53.9	16.5	100	233	
Vert.	3909.986	AV	34	29.5	5.9	37.6	31.8	53.9	22.1	100	236	
Vert.	4874.000	AV	35	31	6.6	36.9	35.7	53.9	18.2	100	96	
Vert.	7311.000	AV	35.8	36.2	8.2	39	41.2	53.9	12.7	100	0	
Vert.	9748.000	AV	34	38.4	9.3	37.2	44.5	53.9	9.4	100	359	
Vert.	12185.000	AV	34.8	39.2	10.5	37.7	46.8	53.9	7.1	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).

*The 10th harmonic was not seen so the result was its base noise level.

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

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.2 Semi Anechoic Chamber
 Date October 29, 2012 October 30, 2012
 Temperature / Humidity 25 deg.C , 35%RH 24 deg.C , 41%RH
 Engineer Hikaru Shirasawa 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	52.6	27.4	14.1	38.1	56	73.9	17.9	141	331	
Hori.	2484.670	PK	52.3	27.4	14.1	38.1	55.7	73.9	18.2	141	331	
Hori.	2620.000	PK	46.3	27.7	14.2	38.1	50.1	73.9	23.8	100	28	
Hori.	3330.846	PK	47.1	28.8	5.3	37.9	43.3	73.9	30.6	100	253	
Hori.	4924.000	PK	45.5	31.1	6.6	36.9	46.3	73.9	27.6	100	198	
Hori.	7386.000	PK	45.3	36.3	8.3	39	50.9	73.9	23.0	100	0	
Hori.	9848.000	PK	42.4	38.6	9.3	37.2	53.1	73.9	20.8	100	359	
Hori.	12310.000	PK	42.9	39.1	10.7	37.6	55.1	73.9	18.8	100	0	
Hori.	2483.500	AV	34.8	27.4	14.1	38.1	38.2	53.9	15.7	141	331	
Hori.	2484.670	AV	34.6	27.4	14.1	38.1	38	53.9	15.9	141	331	
Hori.	2620.000	AV	36.2	27.7	14.2	38.1	40	53.9	13.9	100	28	
Hori.	3330.846	AV	39.7	28.8	5.3	37.9	35.9	53.9	18.0	100	253	
Hori.	4924.000	AV	37.5	31.1	6.6	36.9	38.3	53.9	15.6	100	198	
Hori.	7386.000	AV	36.2	36.3	8.3	39	41.8	53.9	12.1	100	0	
Hori.	9848.000	AV	33.7	38.6	9.3	37.2	44.4	53.9	9.5	100	359	
Hori.	12310.000	AV	34.1	39.1	10.7	37.6	46.3	53.9	7.6	100	0	
Vert.	2483.500	PK	60.1	27.4	14.1	38.1	63.5	73.9	10.4	128	127	
Vert.	2484.670	PK	60	27.4	14.1	38.1	63.4	73.9	10.5	128	127	
Vert.	2620.000	PK	45.1	27.7	14.2	38.1	48.9	73.9	25.0	100	0	
Vert.	3330.811	PK	47.2	28.8	5.3	37.9	43.4	73.9	30.5	100	207	
Vert.	4924.000	PK	45.7	31.1	6.6	36.9	46.5	73.9	27.4	112	191	
Vert.	7386.000	PK	45.7	36.3	8.3	39	51.3	73.9	22.6	100	0	
Vert.	9848.000	PK	42.1	38.6	9.3	37.2	52.8	73.9	21.1	100	359	
Vert.	12310.000	PK	42.7	39.1	10.7	37.6	54.9	73.9	19.0	100	0	
Vert.	2483.500	AV	37.4	27.4	14.1	38.1	40.8	53.9	13.1	128	127	
Vert.	2484.670	AV	37.2	27.4	14.1	38.1	40.6	53.9	13.3	128	127	
Vert.	2620.000	AV	35.2	27.7	14.2	38.1	39	53.9	14.9	100	0	
Vert.	3330.811	AV	41.9	28.8	5.3	37.9	38.1	53.9	15.8	100	207	
Vert.	4924.000	AV	39.8	31.1	6.6	36.9	40.6	53.9	13.3	112	191	
Vert.	7386.000	AV	35.5	36.3	8.3	39	41.1	53.9	12.8	100	0	
Vert.	9848.000	AV	33.6	38.6	9.3	37.2	44.3	53.9	9.6	100	359	
Vert.	12310.000	AV	33.8	39.1	10.7	37.6	46	53.9	7.9	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).

*The 10th harmonic was not seen so the result was its base noise level.

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

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.2 Semi Anechoic Chamber
 Date October 29, 2012 October 30, 2012
 Temperature / Humidity 25 deg.C , 35%RH 24 deg.C , 41%RH
 Engineer Hikaru Shirasawa Hikaru Shirasawa
 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.	2390.000	PK	56.1	27.2	14.1	38.2		59.2	73.9	14.7	219	90	
Hori.	2510.000	PK	48.2	27.4	14.1	38.1		51.6	73.9	22.3	219	90	
Hori.	3330.936	PK	48.4	28.8	5.3	37.9		44.6	73.9	29.3	100	207	
Hori.	4824.000	PK	42.6	30.8	6.6	37.0		43.0	73.9	30.9	100	0	
Hori.	7236.000	PK	45.4	36.2	8.0	39.0		50.6	73.9	23.3	359	0	
Hori.	9648.000	PK	43.4	38.3	9.2	37.2		53.7	73.9	20.2	100	0	
Hori.	12060.000	PK	45.6	39.2	10.5	37.9		57.4	73.9	16.5	100	359	
Hori.	2510.000	AV	38.2	27.4	14.1	38.1		41.6	53.9	12.3	219	90	
Hori.	3330.936	AV	42.5	28.8	5.3	37.9		38.7	53.9	15.2	100	207	
Vert.	2390.000	PK	52.9	27.2	14.1	38.2		56.0	73.9	17.9	188	4	
Vert.	2510.000	PK	44.7	27.4	14.1	38.1		48.1	73.9	25.8	188	4	
Vert.	3330.846	PK	48.3	28.8	5.3	37.9		44.5	73.9	29.4	100	198	
Vert.	4824.000	PK	45.0	30.8	6.6	37.0		45.4	73.9	28.5	100	0	
Vert.	7236.000	PK	45.9	36.2	8.0	39.0		51.1	73.9	22.8	100	359	
Vert.	9648.000	PK	44.2	38.3	9.2	37.2		54.5	73.9	19.4	100	0	
Vert.	12060.000	PK	45.4	39.2	10.5	37.9		57.2	73.9	16.7	100	359	
Vert.	2510.000	AV	35.2	27.4	14.1	38.1		38.6	53.9	15.3	188	4	
Vert.	3330.846	AV	42.4	28.8	5.3	37.9		38.6	53.9	15.3	100	198	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	41.4	27.2	14.1	38.2	0.5	45.0	53.9	8.9	
Hori.	4824.000	AV	34.4	30.8	6.6	37.0	0.5	35.3	53.9	18.6	
Hori.	7236.000	AV	36.8	36.2	8.0	39.0	0.5	42.5	53.9	11.4	
Hori.	9648.000	AV	34.9	38.3	9.2	37.2	0.5	45.7	53.9	8.2	
Hori.	12060.000	AV	36.3	39.2	10.5	37.9	0.5	48.6	53.9	5.3	
Vert.	2390.000	AV	39.3	27.2	14.1	38.2	0.5	42.9	53.9	11.0	
Vert.	4824.000	AV	34.0	30.8	6.6	37.0	0.5	34.9	53.9	19.0	
Vert.	7236.000	AV	36.8	36.2	8.0	39.0	0.5	42.5	53.9	11.4	
Vert.	9648.000	AV	34.4	38.3	9.2	37.2	0.5	45.2	53.9	8.7	
Vert.	12060.000	AV	36.0	39.2	10.5	37.9	0.5	48.3	53.9	5.6	

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

*8.2.4 Alternative 1 was applied to AV detection, since the duty cycle is less than 98% and video triggering or signal gating cannot be used.

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

*The 10th harmonic was not seen so the result was its base noise level.

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

20dBc Data Sheet (RBW 100kHz, VBW 300kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]		Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	91.1	27.3	14.1	38.2		94.3	-	-	
Hori.	2400.000	PK	54.4	27.3	14.1	38.2		57.6	74.3	16.7	
Vert.	2412.000	PK	88.9	27.3	14.1	38.2		92.1	-	-	
Vert.	2400.000	PK	51.2	27.3	14.1	38.2		54.4	72.1	17.7	

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

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Shonan EMC Lab.

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.2 Semi Anechoic Chamber
Date October 29, 2012 October 30, 2012
Temperature / Humidity 25 deg.C , 35%RH 24 deg.C , 41%RH
Engineer Hikaru Shirasawa Hikaru Shirasawa
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.	149.997	QP	37.6	14.9	8.7	31.8		29.4	43.5	14.1	194	130	
Hori.	199.999	QP	41.4	16.5	9.4	31.8		35.5	43.5	8.0	162	286	
Hori.	250.002	QP	43.8	17.0	10.2	31.7		39.3	46.0	6.7	133	222	
Hori.	465.313	QP	41.2	17.0	8.0	31.7		34.5	46.0	11.5	100	245	
Hori.	479.774	QP	46.1	17.1	8.1	31.7		39.6	46.0	6.4	100	236	
Hori.	487.039	QP	44.8	17.2	8.1	31.7		38.4	46.0	7.6	100	357	
Hori.	487.039	QP	44.8	17.7	8.3	31.7		39.1	46.0	6.9	100	228	
Hori.	2560.000	PK	48.6	27.5	14.1	38.1		52.1	73.9	21.8	216	87	
Hori.	3330.873	PK	46.9	28.8	5.3	37.9		43.1	73.9	30.8	100	0	
Hori.	4874.000	PK	42.5	31.0	6.6	36.9		43.2	73.9	30.7	100	0	
Hori.	7311.000	PK	46.1	36.2	8.2	39.0		51.5	73.9	22.4	359	0	
Hori.	9748.000	PK	42.5	38.4	9.3	37.2		53.0	73.9	20.9	100	0	
Hori.	12185.000	PK	44.3	39.2	10.5	37.7		56.3	73.9	17.6	100	359	
Hori.	2560.000	AV	37.9	27.5	14.1	38.1		41.4	53.9	12.5	216	87	
Hori.	3330.873	AV	40.3	28.8	5.3	37.9		36.5	53.9	17.4	100	0	
Vert.	592.146	QP	38.1	19.1	8.7	31.7		34.2	46.0	11.8	100	109	
Vert.	2560.000	PK	46.2	27.5	14.1	38.1		49.7	73.9	24.2	187	359	
Vert.	3330.778	PK	48.1	28.8	5.3	37.9		44.3	73.9	29.6	100	207	
Vert.	4874.000	PK	43.0	31.0	6.6	36.9		43.7	73.9	30.2	100	0	
Vert.	7311.000	PK	45.4	36.2	8.2	39.0		50.8	73.9	23.1	100	359	
Vert.	9748.000	PK	44.1	38.4	9.3	37.2		54.6	73.9	19.3	100	0	
Vert.	12185.000	PK	44.6	39.2	10.5	37.7		56.6	73.9	17.3	100	359	
Vert.	2560.000	AV	36.0	27.5	14.1	38.1		39.5	53.9	14.4	187	359	
Vert.	3330.778	AV	43.1	28.8	5.3	37.9		39.3	53.9	14.6	100	207	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4874.000	AV	32.4	31.0	6.6	36.9	0.5	33.6	53.9	20.3	
Hori.	7311.000	AV	35.4	36.2	8.2	39.0	0.5	41.3	53.9	12.6	
Hori.	9748.000	AV	33.8	38.4	9.3	37.2	0.5	44.8	53.9	9.1	
Hori.	12185.000	AV	35.1	39.2	10.5	37.7	0.5	47.6	53.9	6.3	
Vert.	4874.000	AV	33.1	31.0	6.6	36.9	0.5	34.3	53.9	19.6	
Vert.	7311.000	AV	35.7	36.2	8.2	39.0	0.5	41.6	53.9	12.3	
Vert.	9748.000	AV	33.6	38.4	9.3	37.2	0.5	44.6	53.9	9.3	
Vert.	12185.000	AV	34.6	39.2	10.5	37.7	0.5	47.1	53.9	6.8	

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

*8.2.4 Alternative 1 was applied to AV detection, since the duty cycle is less than 98% and video triggering or signal gating cannot be used.

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

*The 10th harmonic was not seen so the result was its base noise level.

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

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.2 Semi Anechoic Chamber
Date October 29, 2012 October 30, 2012
Temperature / Humidity 25 deg.C , 35%RH 24 deg.C , 41%RH
Engineer Hikaru Shirasawa Hikaru Shirasawa
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.	2483.500	PK	54.2	27.4	14.1	38.1		57.6	73.9	16.3	218	323	
Hori.	2560.000	PK	44.3	27.5	14.1	38.1		47.8	73.9	26.1	218	323	
Hori.	3330.772	PK	46.7	28.8	5.3	37.9		42.9	73.9	31.0	100	252	
Hori.	4924.000	PK	42.9	31.1	6.6	36.9		43.7	73.9	30.2	100	0	
Hori.	7386.000	PK	45.2	36.3	8.3	39.0		50.8	73.9	23.1	359	0	
Hori.	9848.000	PK	43.5	38.6	9.3	37.2		54.2	73.9	19.7	100	0	
Hori.	12310.000	PK	43.4	39.1	10.7	37.6		55.6	73.9	18.3	100	359	
Hori.	2560.000	AV	34.3	27.5	14.1	38.1		37.8	53.9	16.1	218	323	
Hori.	3330.772	AV	40.1	28.8	5.3	37.9		36.3	53.9	17.6	100	252	
Vert.	2483.500	PK	53.0	27.4	14.1	38.1		56.4	73.9	17.5	207	122	
Vert.	2560.000	PK	44.6	27.5	14.1	38.1		48.1	73.9	25.8	207	122	
Vert.	3330.902	PK	49.7	28.8	5.3	37.9		45.9	73.9	28.0	100	217	
Vert.	4924.000	PK	43.2	31.1	6.6	36.9		44.0	73.9	29.9	100	0	
Vert.	7386.000	PK	45.5	36.3	8.3	39.0		51.1	73.9	22.8	100	359	
Vert.	9848.000	PK	42.9	38.6	9.3	37.2		53.6	73.9	20.3	100	0	
Vert.	12310.000	PK	43.5	39.1	10.7	37.6		55.7	73.9	18.2	100	359	
Vert.	2560.000	AV	35.2	27.5	14.1	38.1		38.7	53.9	15.2	207	122	
Vert.	3330.902	AV	43.9	28.8	5.3	37.9		40.1	53.9	13.8	100	217	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	39.0	27.4	14.1	38.1	0.5	42.9	53.9	11.0	
Hori.	4924.000	AV	33.4	31.1	6.6	36.9	0.5	34.7	53.9	19.2	
Hori.	7386.000	AV	35.5	36.3	8.3	39.0	0.5	41.6	53.9	12.3	
Hori.	9848.000	AV	33.4	38.6	9.3	37.2	0.5	44.6	53.9	9.3	
Hori.	12310.000	AV	33.9	39.1	10.7	37.6	0.5	46.6	53.9	7.3	
Vert.	2483.500	AV	39.1	27.4	14.1	38.1	0.5	43.0	53.9	10.9	
Vert.	4924.000	AV	33.5	31.1	6.6	36.9	0.5	34.8	53.9	19.1	
Vert.	7386.000	AV	35.7	36.3	8.3	39.0	0.5	41.8	53.9	12.1	
Vert.	9848.000	AV	32.0	38.6	9.3	37.2	0.5	43.2	53.9	10.7	
Vert.	12310.000	AV	33.6	39.1	10.7	37.6	0.5	46.3	53.9	7.6	

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

*8.2.4 Alternative 1 was applied to AV detection, since the duty cycle is less than 98% and video triggering or signal gating cannot be used.

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

*The 10th harmonic was not seen so the result was its base noise level.

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

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.2 Semi Anechoic Chamber
Date October 29, 2012 October 31, 2012
Temperature / Humidity 25 deg.C , 35%RH 25 deg.C , 43%RH
Engineer Hikaru Shirasawa Hikaru Shirasawa
Mode Tx, 2412 MHz
Tx, IEEE802.11n (HT20), 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	51.4	27.2	14.1	38.2		54.5	73.9	19.4	219	86	
Hori.	2547.000	PK	47.6	27.5	14.1	38.1		51.1	73.9	22.8	100	0	
Hori.	3331.136	PK	45.6	28.8	5.3	37.9		41.8	73.9	32.1	100	339	
Hori.	4824.000	PK	43.7	30.8	6.6	37.0		44.1	73.9	29.8	100	0	
Hori.	7236.000	PK	46.8	36.2	8.0	39.0		52.0	73.9	21.9	100	0	
Hori.	9648.000	PK	42.6	38.3	9.2	37.2		52.9	73.9	21.0	100	0	
Hori.	12060.000	PK	45.7	39.2	10.5	37.9		57.5	73.9	16.4	100	0	
Hori.	2547.000	AV	34.0	27.5	14.1	38.1		37.5	53.9	16.4	100	0	
Hori.	3331.136	AV	39.6	28.8	5.3	37.9		35.8	53.9	18.1	100	339	
Vert.	2390.000	PK	51.5	27.2	14.1	38.2		54.6	73.9	19.3	157	346	
Vert.	2547.000	PK	45.6	27.5	14.1	38.1		49.1	73.9	24.8	202	0	
Vert.	3331.136	PK	48.3	28.8	5.3	37.9		44.5	73.9	29.4	176	256	
Vert.	4824.000	PK	43.5	30.8	6.6	37.0		43.9	73.9	30.0	100	0	
Vert.	7236.000	PK	45.6	36.2	8.0	39.0		50.8	73.9	23.1	100	0	
Vert.	9648.000	PK	43.5	38.3	9.2	37.2		53.8	73.9	20.1	100	0	
Vert.	12060.000	PK	44.6	39.2	10.5	37.9		56.4	73.9	17.5	100	0	
Vert.	2547.000	AV	36.7	27.5	14.1	38.1		40.2	53.9	13.7	202	0	
Vert.	3331.136	AV	42.3	28.8	5.3	37.9		38.5	53.9	15.4	176	256	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	37.3	27.2	14.1	38.2	0.5	40.9	53.9	13.0	
Hori.	4824.000	AV	35.4	30.8	6.6	37.0	0.5	36.3	53.9	17.6	
Hori.	7236.000	AV	38.2	36.2	8.0	39.0	0.5	43.9	53.9	10.0	
Hori.	9648.000	AV	35.0	38.3	9.2	37.2	0.5	45.8	53.9	8.1	
Hori.	12060.000	AV	33.2	39.2	10.5	37.9	0.5	45.5	53.9	8.4	
Vert.	2390.000	AV	39.8	27.2	14.1	38.2	0.5	43.4	53.9	10.5	
Vert.	4824.000	AV	34.3	30.8	6.6	37.0	0.5	35.2	53.9	18.7	
Vert.	7236.000	AV	37.5	36.2	8.0	39.0	0.5	43.2	53.9	10.7	
Vert.	9648.000	AV	35.6	38.3	9.2	37.2	0.5	46.4	53.9	7.5	
Vert.	12060.000	AV	33.7	39.2	10.5	37.9	0.5	46.0	53.9	7.9	

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

*8.2.4 Alternative 1 was applied to AV detection, since the duty cycle is less than 98% and video triggering or signal gating cannot be used.

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

*The 10th harmonic was not seen so the result was its base noise level.

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

20dBc Data Sheet (RBW 100kHz, VBW 300kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]		Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	90.0	27.3	14.1	38.2		93.2	-	-	
Hori.	2400.000	PK	50.5	27.3	14.1	38.2		53.7	73.2	19.5	
Vert.	2412.000	PK	90.2	27.3	14.1	38.2		93.4	-	-	
Vert.	2400.000	PK	49.2	27.3	14.1	38.2		52.4	73.4	21	

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.2 Semi Anechoic Chamber
Date October 29, 2012 October 31, 2012
Temperature / Humidity 25 deg.C , 35%RH 25 deg.C , 43%RH
Engineer Hikaru Shirasawa Hikaru Shirasawa
Mode Tx, 2437 MHz
Tx, IEEE802.11n (HT20), 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.	2547.000	PK	47.8	27.5	14.1	38.1		51.3	73.9	22.6	201	305	
Hori.	3330.936	PK	44.7	28.8	5.3	37.9		40.9	73.9	33.0	103	81	
Hori.	4874.000	PK	42.6	31.0	6.6	36.9		43.3	73.9	30.6	100	0	
Hori.	7311.000	PK	45.0	36.2	8.2	39.0		50.4	73.9	23.5	100	0	
Hori.	9748.000	PK	42.8	38.4	9.3	37.2		53.3	73.9	20.6	100	0	
Hori.	12185.000	PK	44.8	39.2	10.5	37.7		56.8	73.9	17.1	100	0	
Hori.	2547.000	AV	35.6	27.5	14.1	38.1		39.1	53.9	14.8	201	305	
Hori.	3330.936	AV	39.8	28.8	5.3	37.9		36.0	53.9	17.9	103	81	
Vert.	2547.000	PK	47.4	27.5	14.1	38.1		50.9	73.9	23.0	187	20	
Vert.	3330.936	PK	48.7	28.8	5.3	37.9		44.9	73.9	29.0	100	0	
Vert.	4874.000	PK	44.2	31.0	6.6	36.9		44.9	73.9	29.0	100	0	
Vert.	7311.000	PK	45.4	36.2	8.2	39.0		50.8	73.9	23.1	100	0	
Vert.	9748.000	PK	43.8	38.4	9.3	37.2		54.3	73.9	19.6	100	0	
Vert.	12185.000	PK	44.8	39.2	10.5	37.7		56.8	73.9	17.1	100	0	
Vert.	2547.000	AV	35.6	27.5	14.1	38.1		39.1	53.9	14.8	187	20	
Vert.	3330.936	AV	44.9	28.8	5.3	37.9		41.1	53.9	12.8	100	0	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4874.000	AV	34.6	31.0	6.6	36.9	0.5	35.8	53.9	18.1	
Hori.	7311.000	AV	35.6	36.2	8.2	39.0	0.5	41.5	53.9	12.4	
Hori.	9748.000	AV	35.0	38.4	9.3	37.2	0.5	46.0	53.9	7.9	
Hori.	12185.000	AV	34.3	39.2	10.5	37.7	0.5	46.8	53.9	7.1	
Vert.	4874.000	AV	34.0	31.0	6.6	36.9	0.5	35.2	53.9	18.7	
Vert.	7311.000	AV	37.2	36.2	8.2	39.0	0.5	43.1	53.9	10.8	
Vert.	9748.000	AV	35.7	38.4	9.3	37.2	0.5	46.7	53.9	7.2	
Vert.	12185.000	AV	34.8	39.2	10.5	37.7	0.5	47.3	53.9	6.6	

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

*8.2.4 Alternative 1 was applied to AV detection, since the duty cycle is less than 98% and video triggering or signal gating cannot be used.

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

*The 10th harmonic was not seen so the result was its base noise level.

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

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.2 Semi Anechoic Chamber
Date October 29, 2012 October 31, 2012
Temperature / Humidity 25 deg.C , 35%RH 25 deg.C , 43%RH
Engineer Hikaru Shirasawa Hikaru Shirasawa
Mode Tx, 2462 MHz
Tx, IEEE802.11n (HT20), 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.	2483.500	PK	51.3	27.4	14.1	38.1		54.7	73.9	19.2	213	19	
Hori.	2547.000	PK	48.0	27.5	14.1	38.1		51.5	73.9	22.4	100	103	
Hori.	3331.380	PK	47.6	28.8	5.3	37.9		43.8	73.9	30.1	100	264	
Hori.	4924.000	PK	42.6	31.1	6.6	36.9		43.4	73.9	30.5	100	0	
Hori.	7386.000	PK	46.0	36.3	8.3	39.0		51.6	73.9	22.3	100	0	
Hori.	9848.000	PK	42.3	38.6	9.3	37.2		53.0	73.9	20.9	100	0	
Hori.	12310.000	PK	45.9	39.1	10.7	37.6		58.1	73.9	15.8	100	0	
Hori.	2547.000	AV	35.9	27.5	14.1	38.1		39.4	53.9	14.5	100	103	
Hori.	3331.380	AV	40.8	28.8	5.3	37.9		37.0	53.9	16.9	100	264	
Vert.	2483.500	PK	53.4	27.4	14.1	38.1		56.8	73.9	17.1	140	127	
Vert.	2547.000	PK	46.7	27.5	14.1	38.1		50.2	73.9	23.7	213	354	
Vert.	3331.380	PK	48.7	28.8	5.3	37.9		44.9	73.9	29.0	131	218	
Vert.	4924.000	PK	45.6	31.1	6.6	36.9		46.4	73.9	27.5	100	0	
Vert.	7386.000	PK	46.7	36.3	8.3	39.0		52.3	73.9	21.6	100	0	
Vert.	9848.000	PK	44.2	38.6	9.3	37.2		54.9	73.9	19.0	100	0	
Vert.	12310.000	PK	45.0	39.1	10.7	37.6		57.2	73.9	16.7	100	0	
Vert.	2547.000	AV	37.6	27.5	14.1	38.1		41.1	53.9	12.8	213	354	
Vert.	3331.380	AV	43.8	28.8	5.3	37.9		40.0	53.9	13.9	131	218	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	37.6	27.4	14.1	38.1	0.5	41.5	53.9	12.4	
Hori.	4924.000	AV	35.0	31.1	6.6	36.9	0.5	36.3	53.9	17.6	
Hori.	7386.000	AV	35.8	36.3	8.3	39.0	0.5	41.9	53.9	12.0	
Hori.	9848.000	AV	35.3	38.6	9.3	37.2	0.5	46.5	53.9	7.4	
Hori.	12310.000	AV	34.3	39.1	10.7	37.6	0.5	47.0	53.9	6.9	
Vert.	2483.500	AV	38.9	27.4	14.1	38.1	0.5	42.8	53.9	11.1	
Vert.	4924.000	AV	34.0	31.1	6.6	36.9	0.5	35.3	53.9	18.6	
Vert.	7386.000	AV	37.3	36.3	8.3	39.0	0.5	43.4	53.9	10.5	
Vert.	9848.000	AV	36.2	38.6	9.3	37.2	0.5	47.4	53.9	6.5	
Vert.	12310.000	AV	34.0	39.1	10.7	37.6	0.5	46.7	53.9	7.2	

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

*8.2.4 Alternative 1 was applied to AV detection, since the duty cycle is less than 98% and video triggering or signal gating cannot be used.

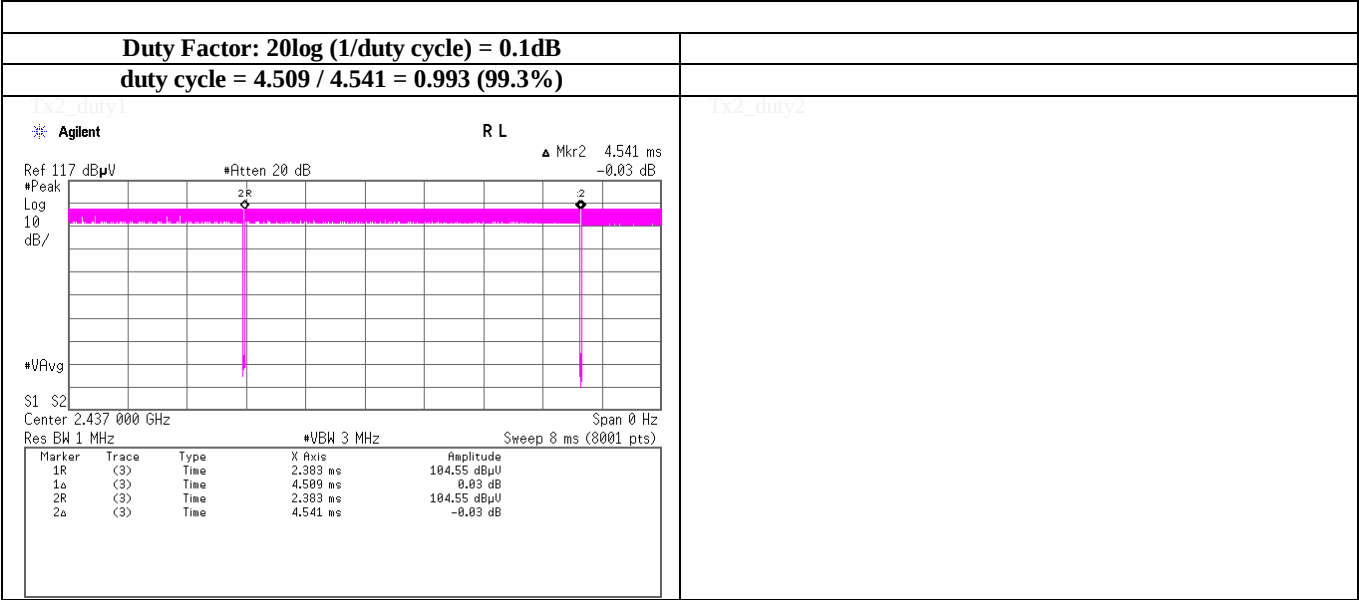
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

*The 10th harmonic was not seen so the result was its base noise level.

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

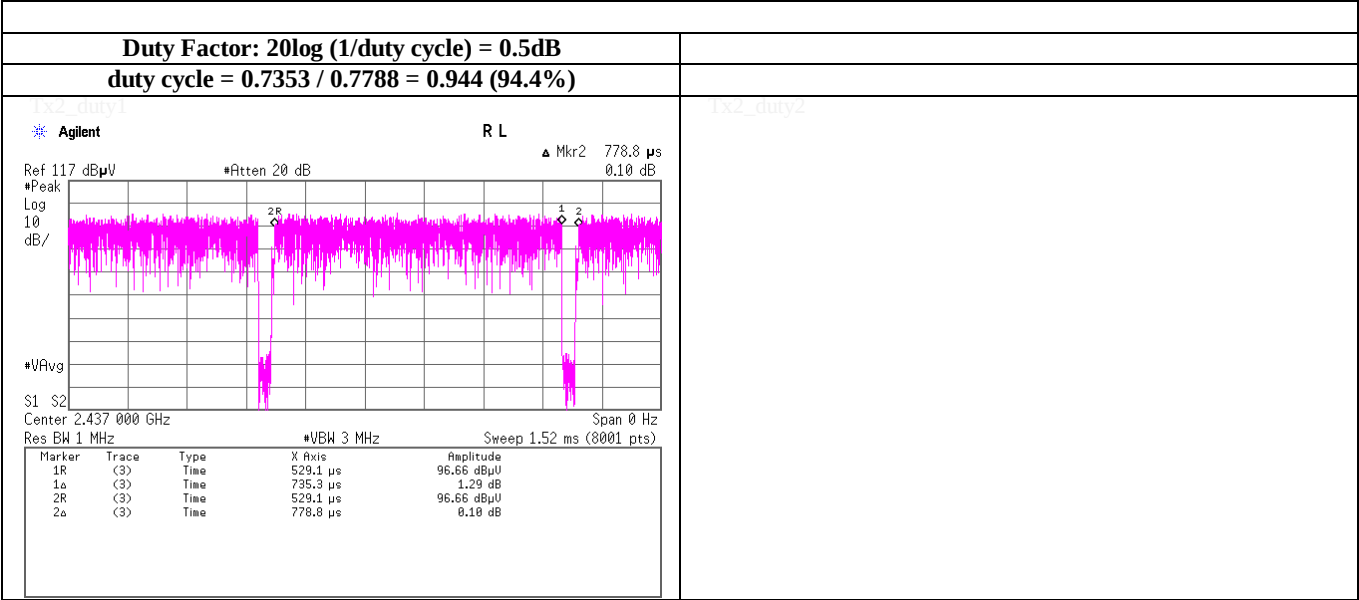
Duty Factor Calculation chart

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



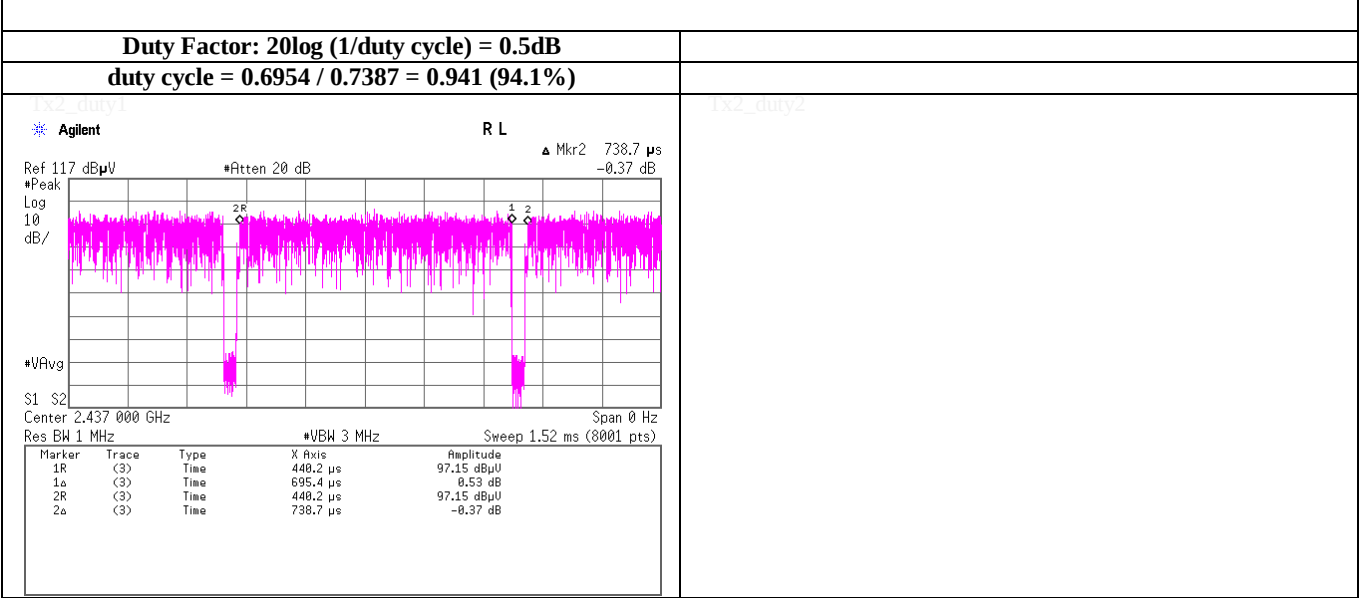
Duty Factor Calculation chart

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



Duty Factor Calculation chart

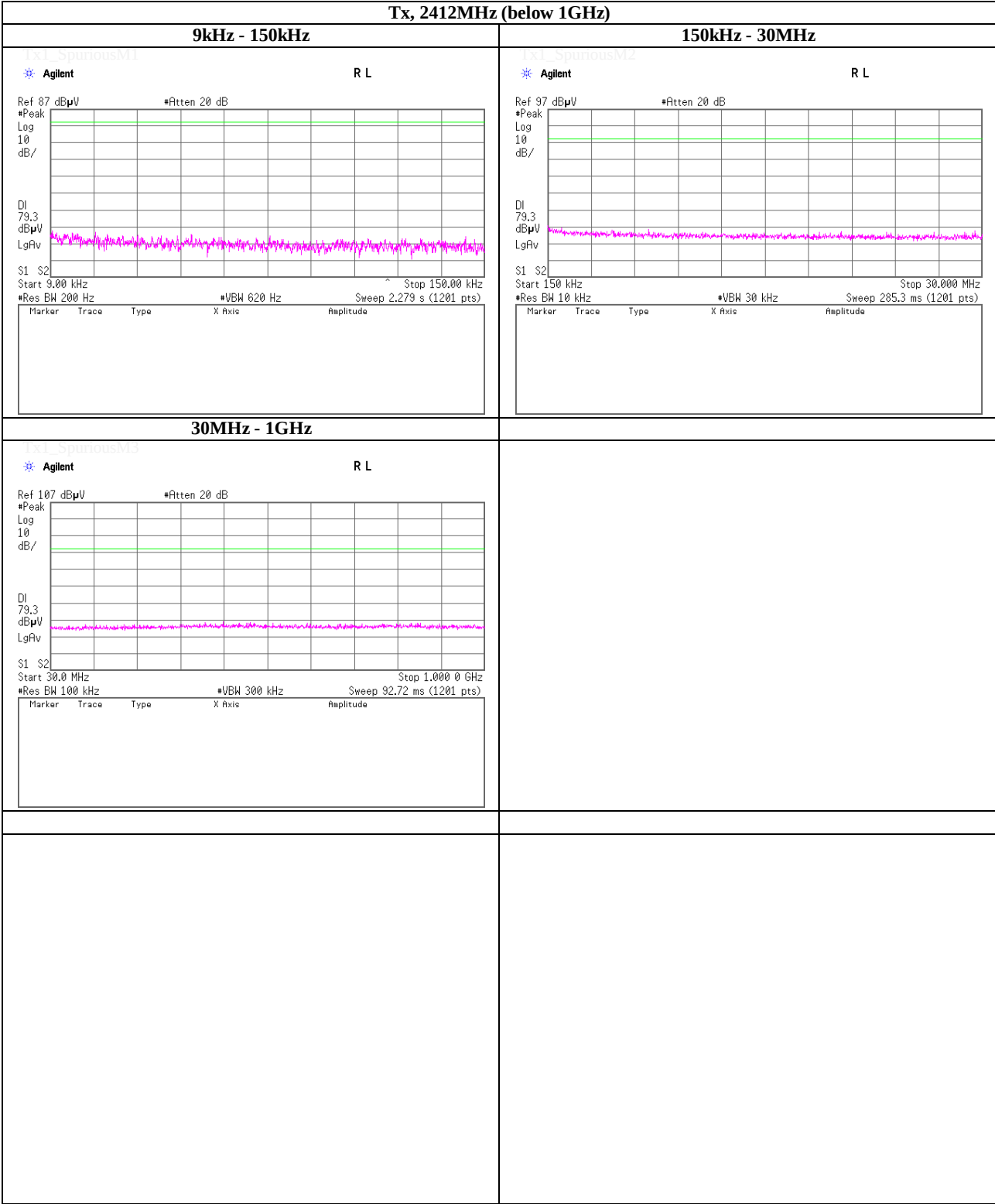
Tx, IEEE802.11n (HT20), PN9, worst data mode 0(MCS)

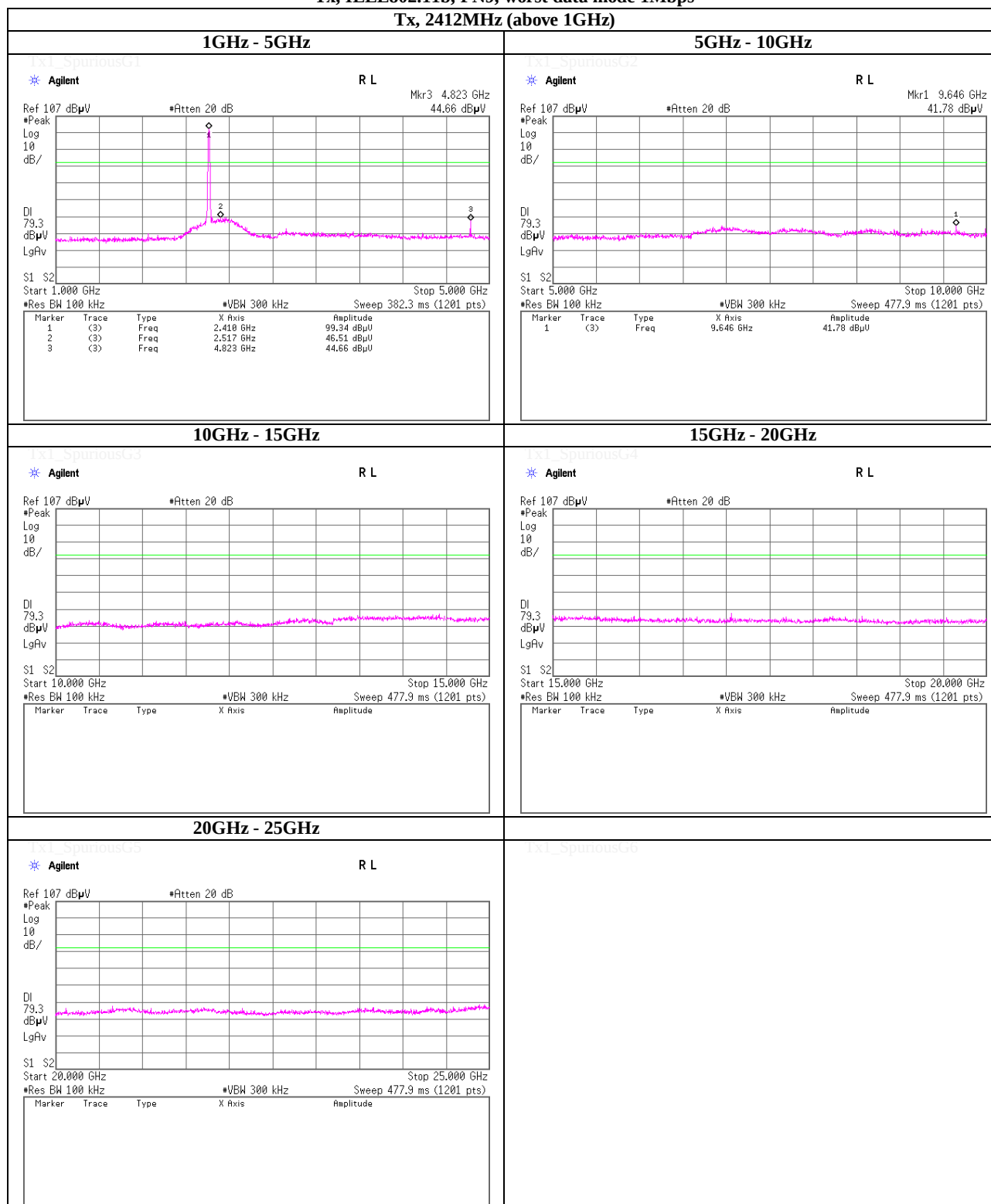


(Reference chart) Spurious emission (Conducted)

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

Tx, 2412MHz (below 1GHz)



(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

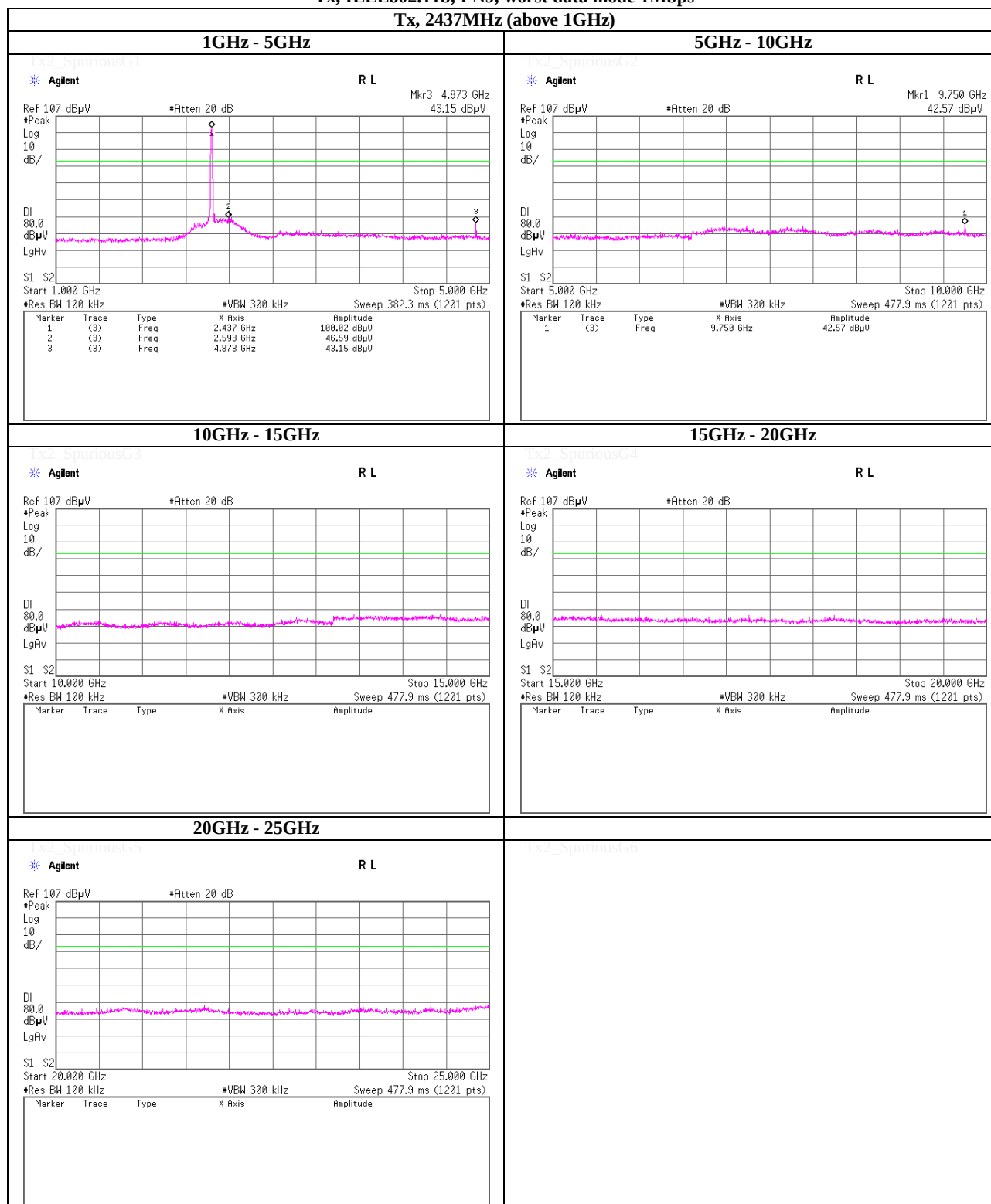
Facsimile : +81 463 50 6401

(Reference chart) Spurious emission (Conducted)

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

Tx, 2437MHz (below 1GHz)



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

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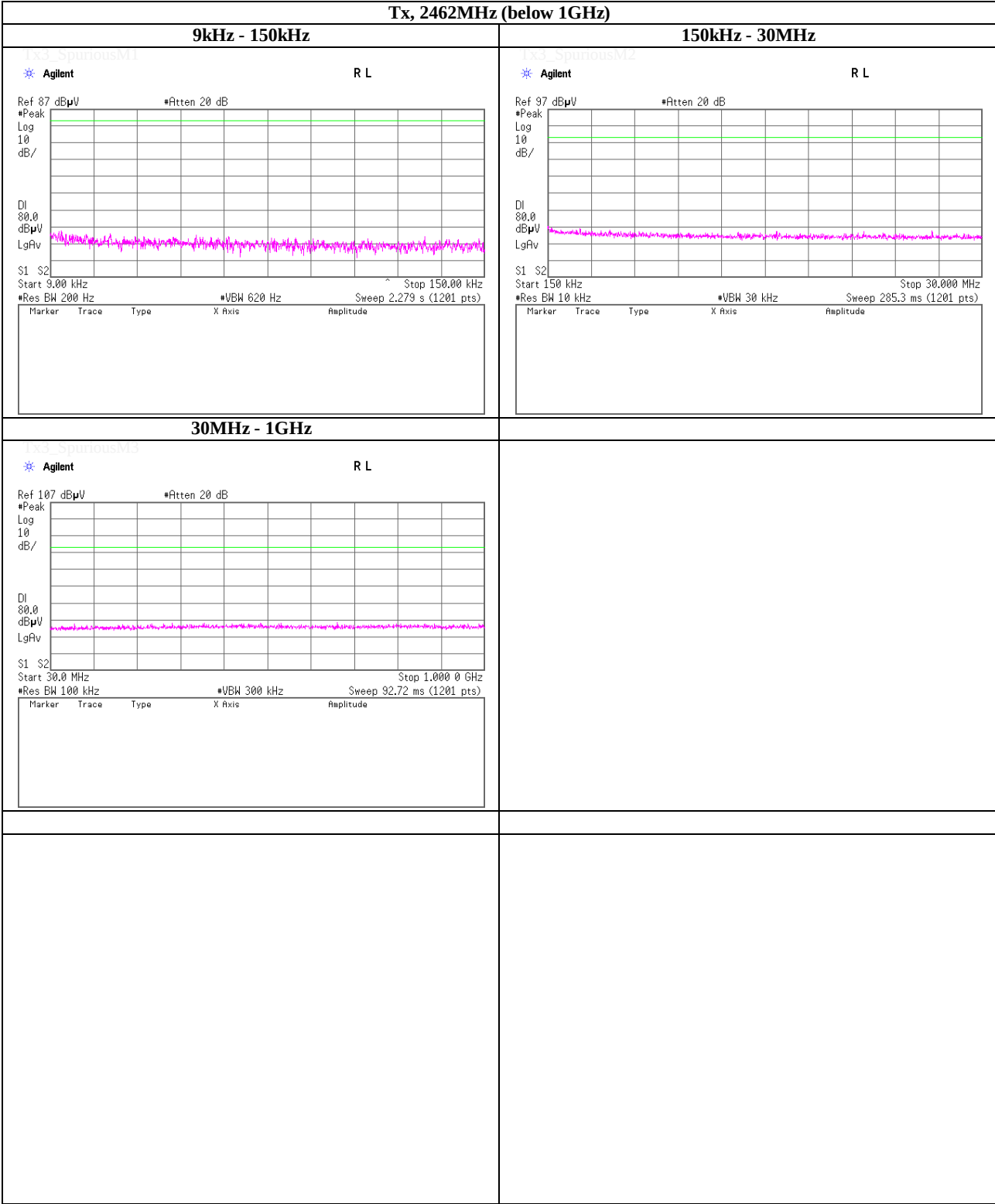
Telephone : +81 463 50 6400

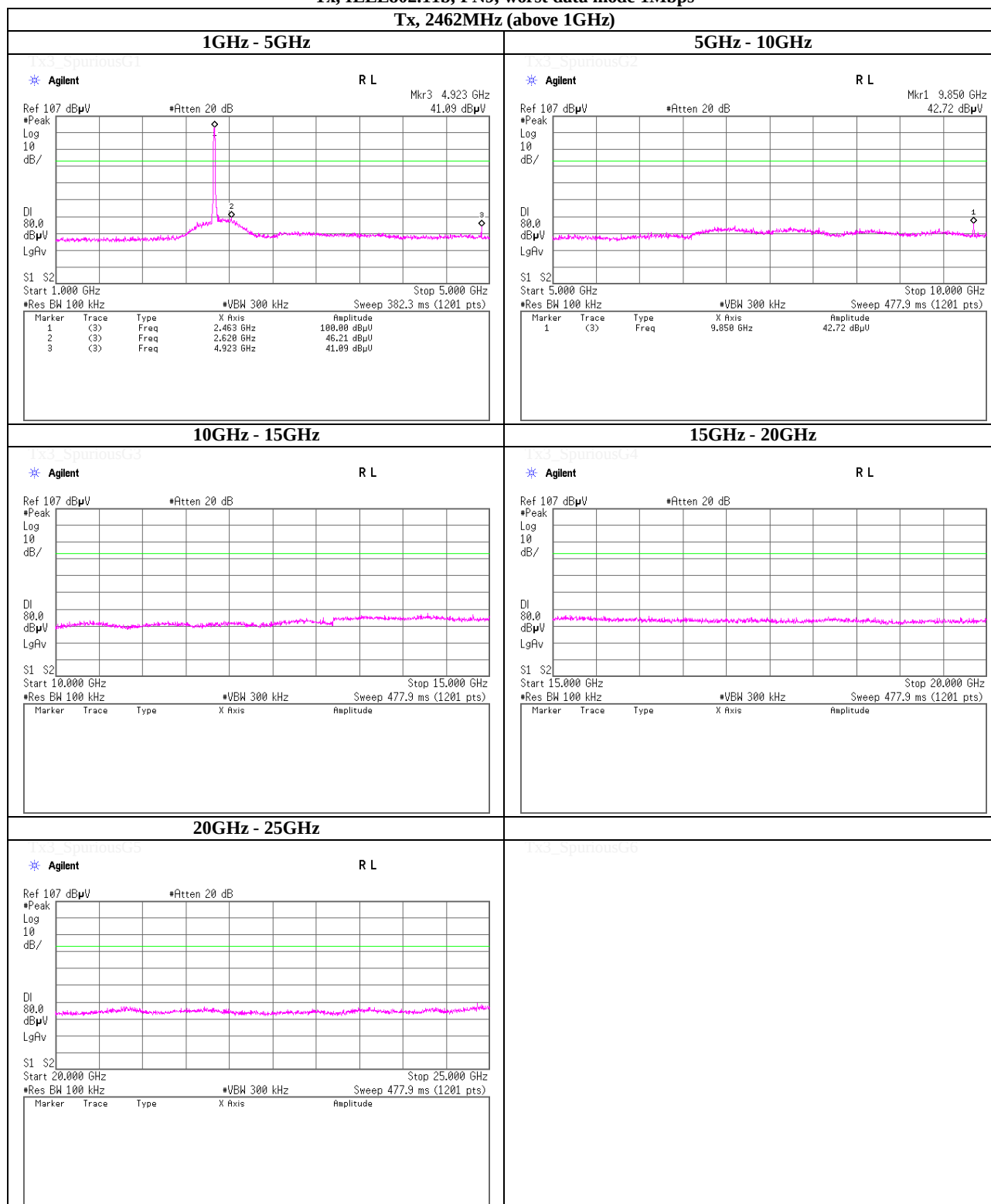
Facsimile : +81 463 50 6401

(Reference chart) Spurious emission (Conducted)

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

Tx, 2462MHz (below 1GHz)



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

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Telephone : +81 463 50 6400

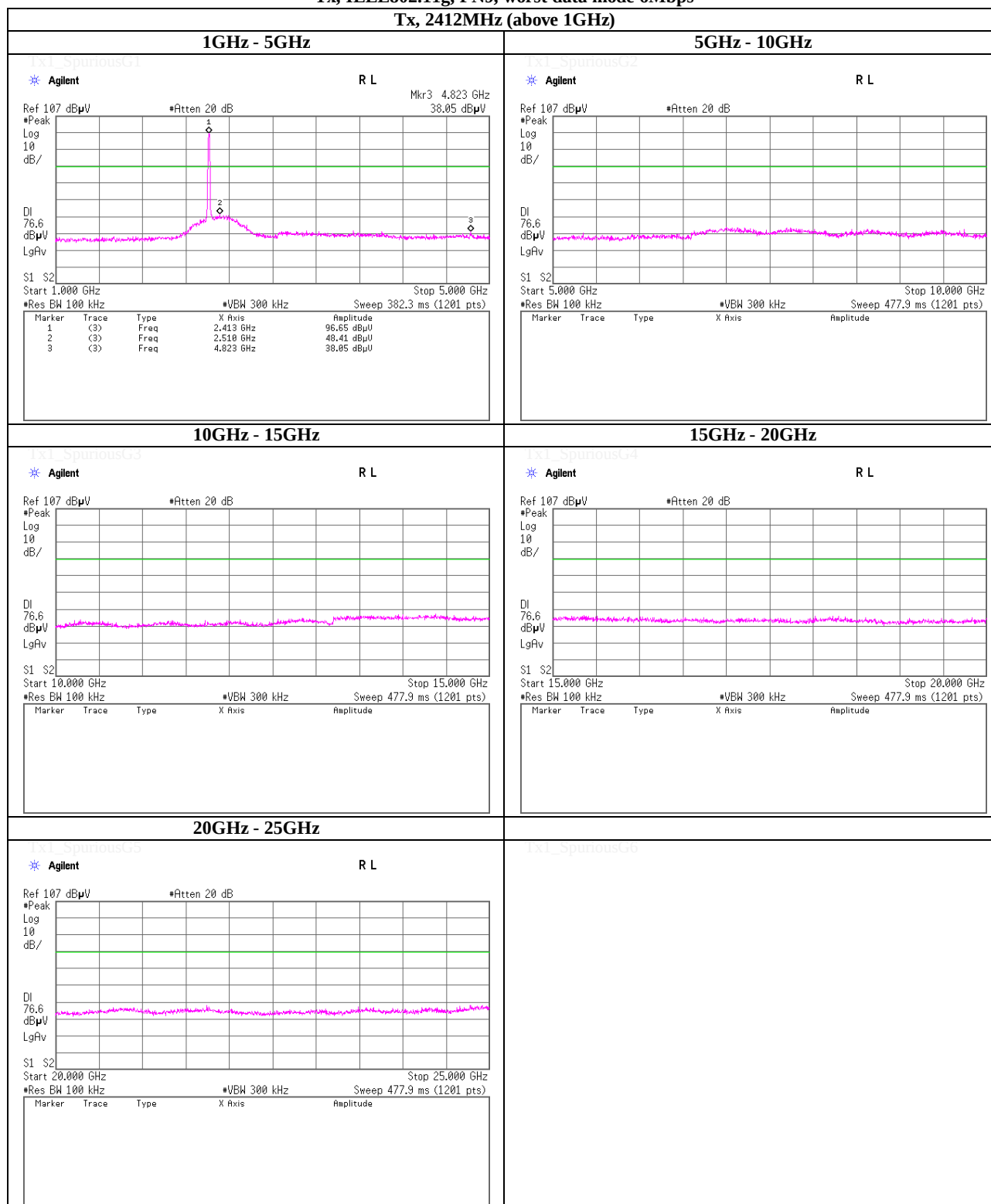
Facsimile : +81 463 50 6401

(Reference chart) Spurious emission (Conducted)

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

Tx, 2412MHz (below 1GHz)



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

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

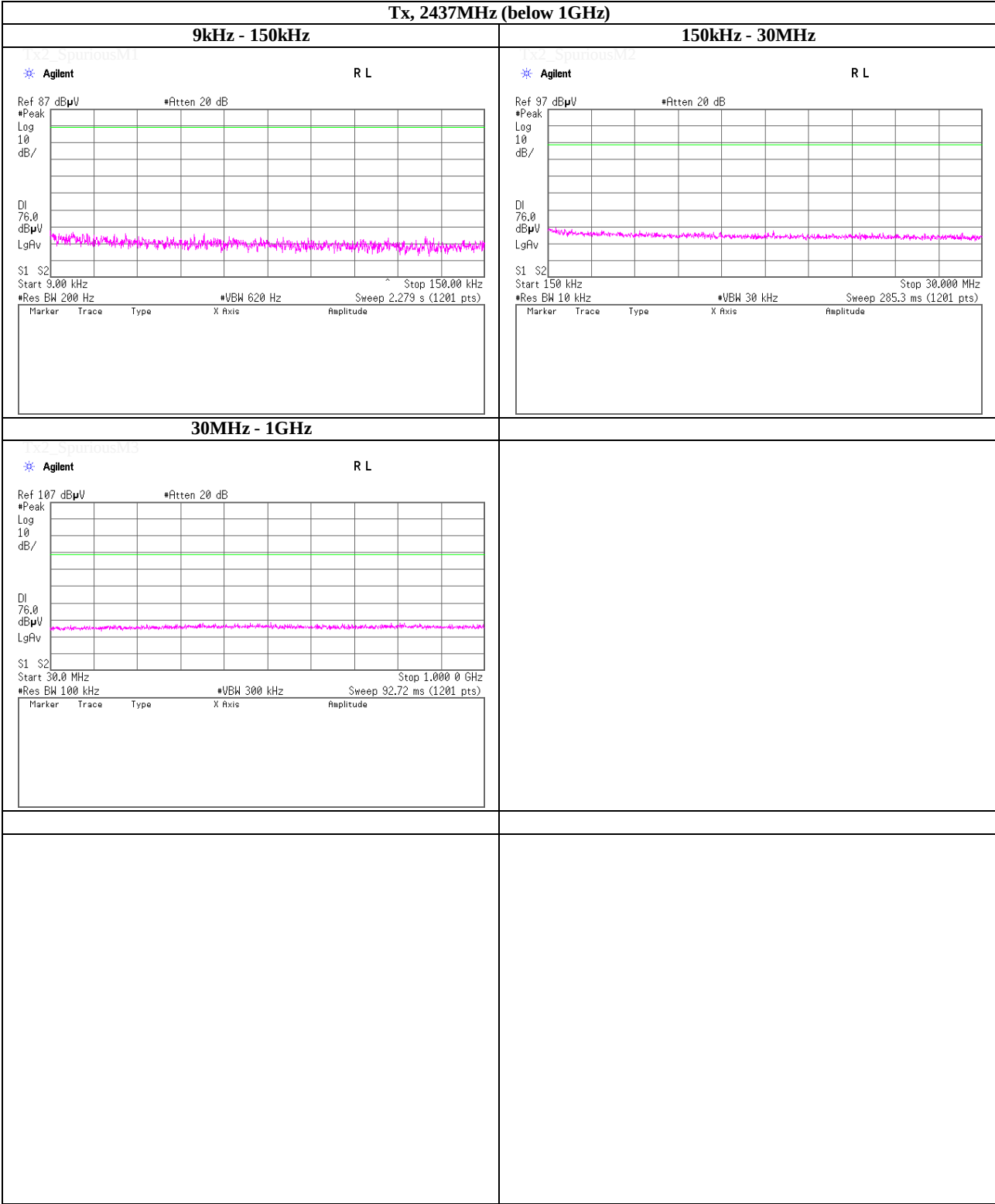
Telephone : +81 463 50 6400

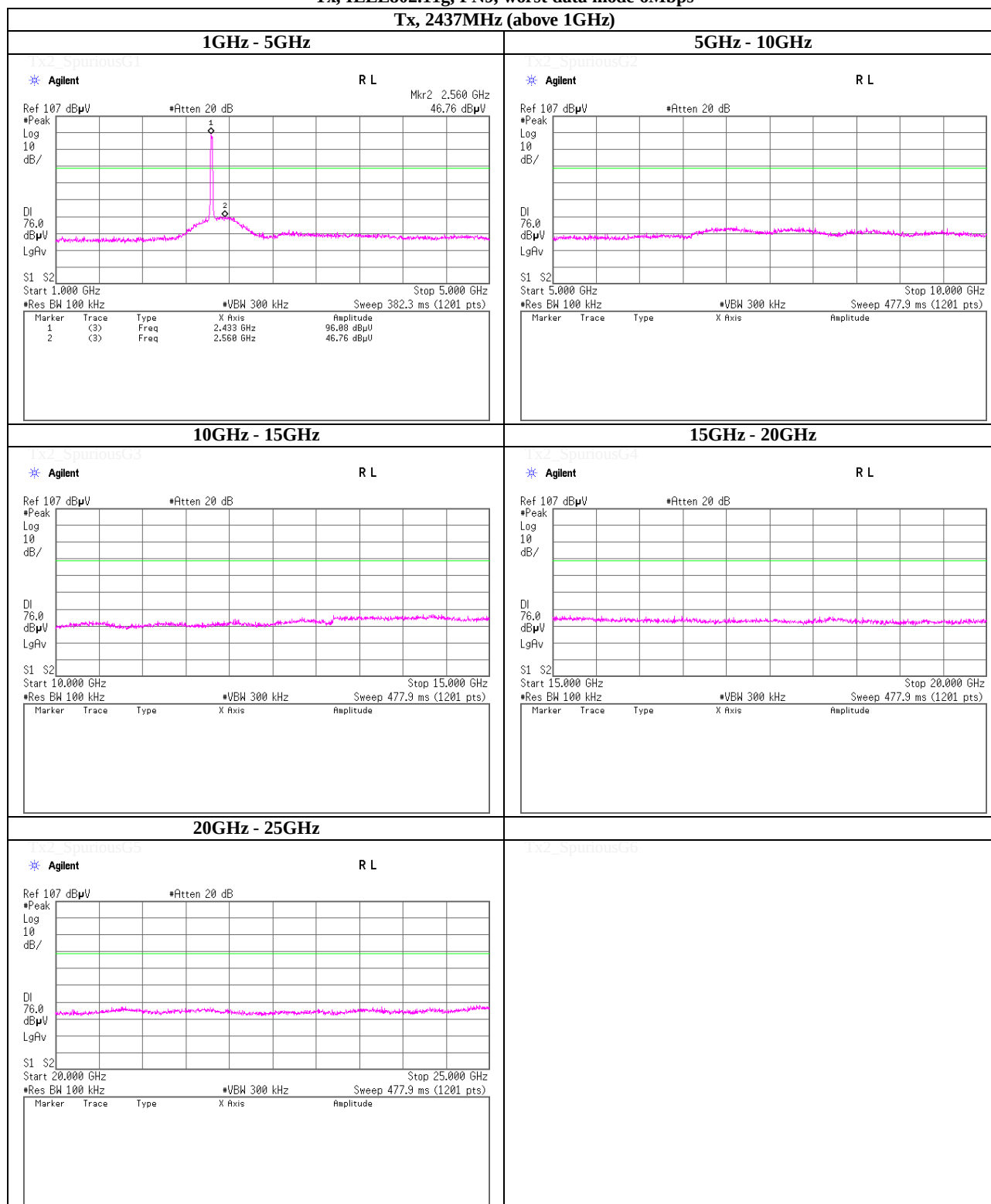
Facsimile : +81 463 50 6401

(Reference chart) Spurious emission (Conducted)

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

Tx, 2437MHz (below 1GHz)



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

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

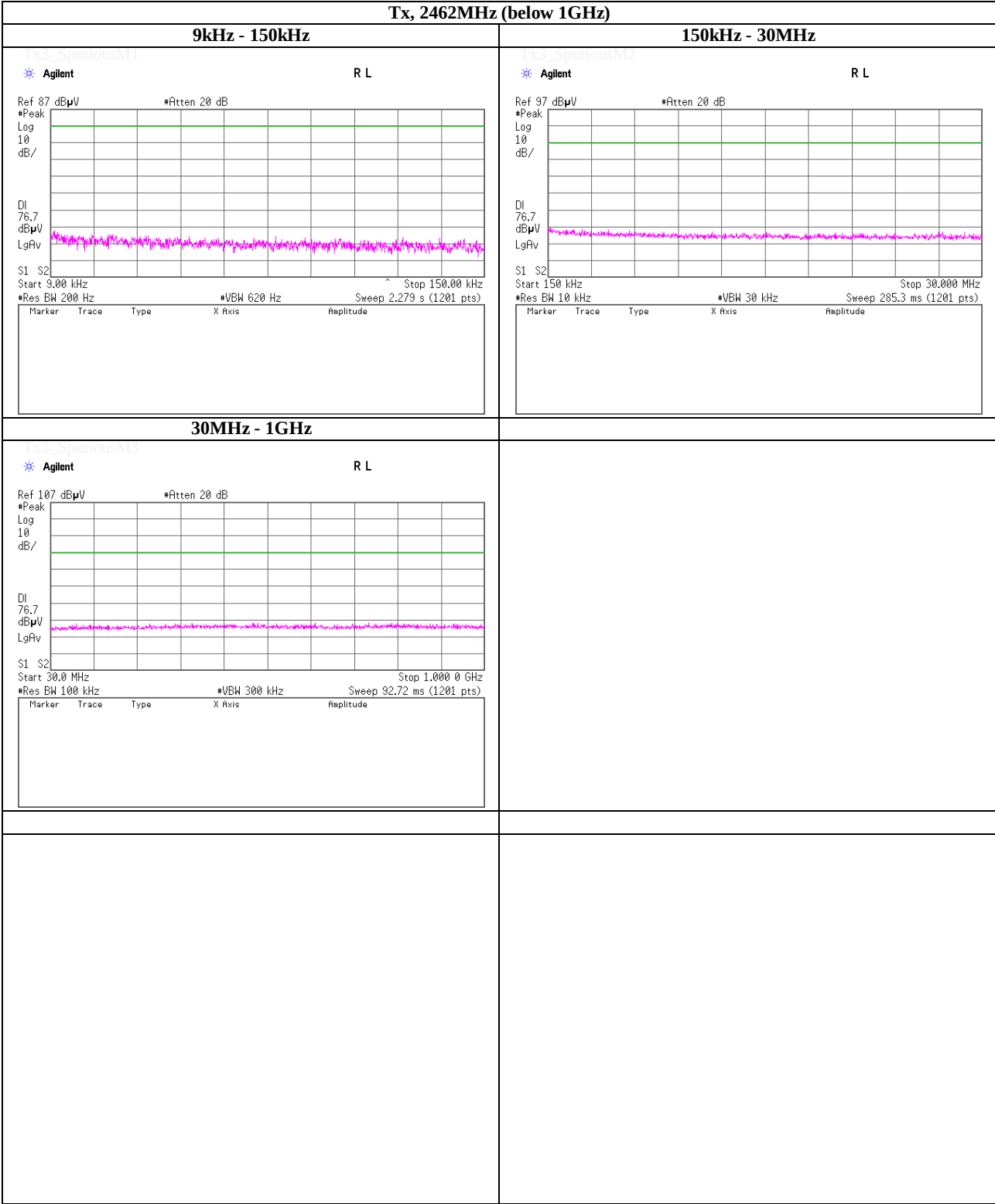
Telephone : +81 463 50 6400

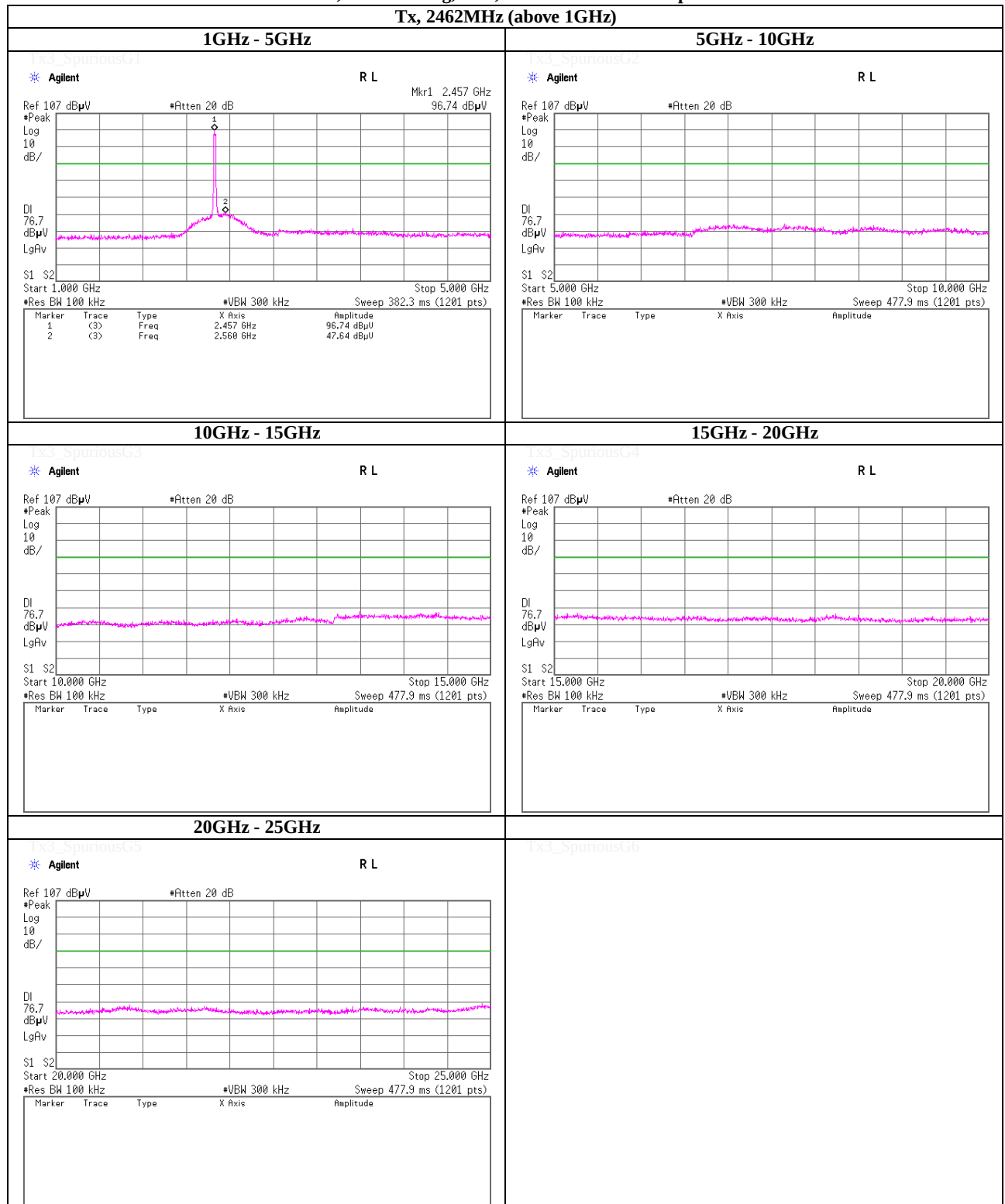
Facsimile : +81 463 50 6401

(Reference chart) Spurious emission (Conducted)

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

Tx, 2462MHz (below 1GHz)



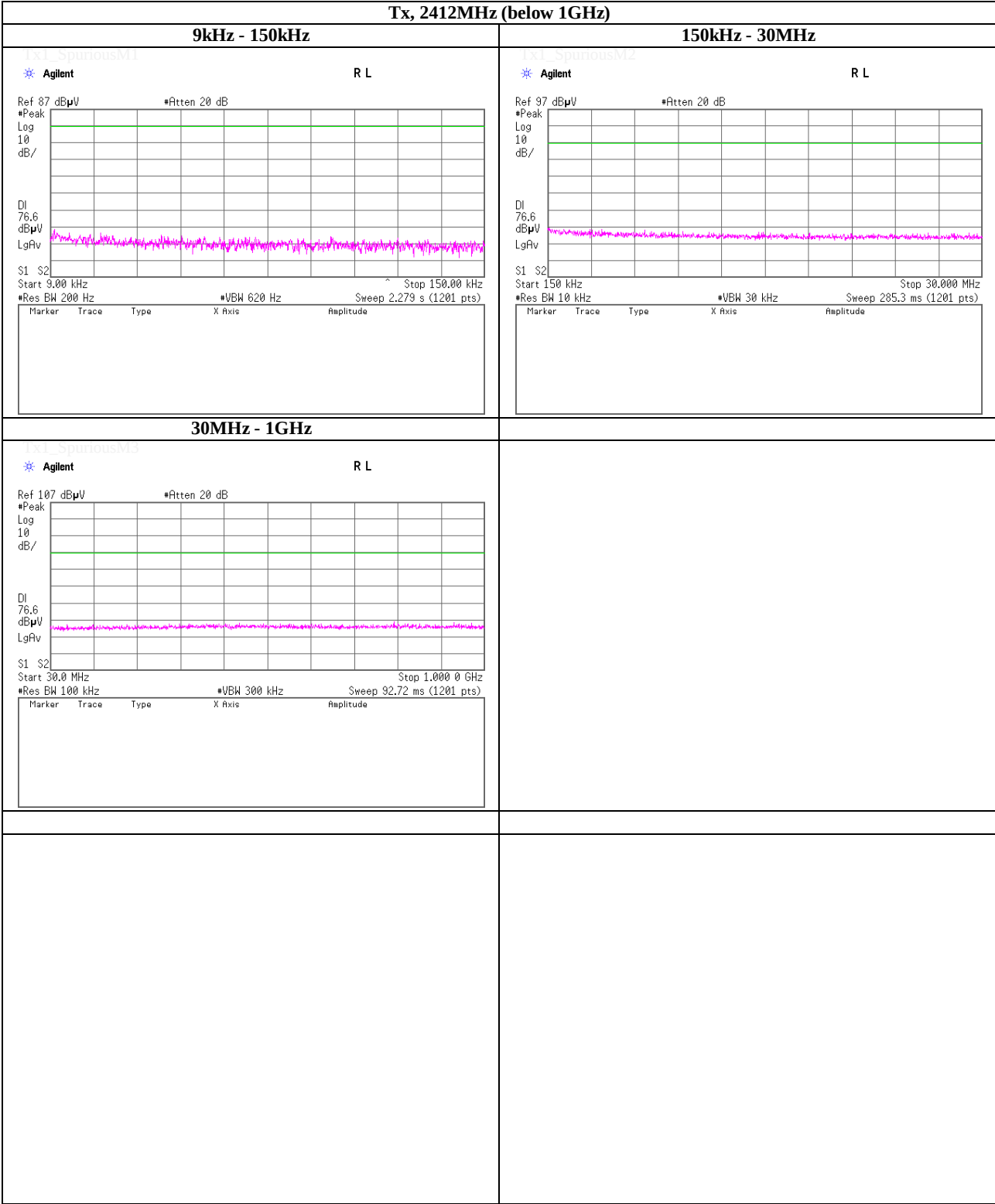
(Reference chart) Spurious emission (Conducted)**Tx, IEEE802.11g, PN9, worst data mode 6Mbps****Tx, 2462MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.**

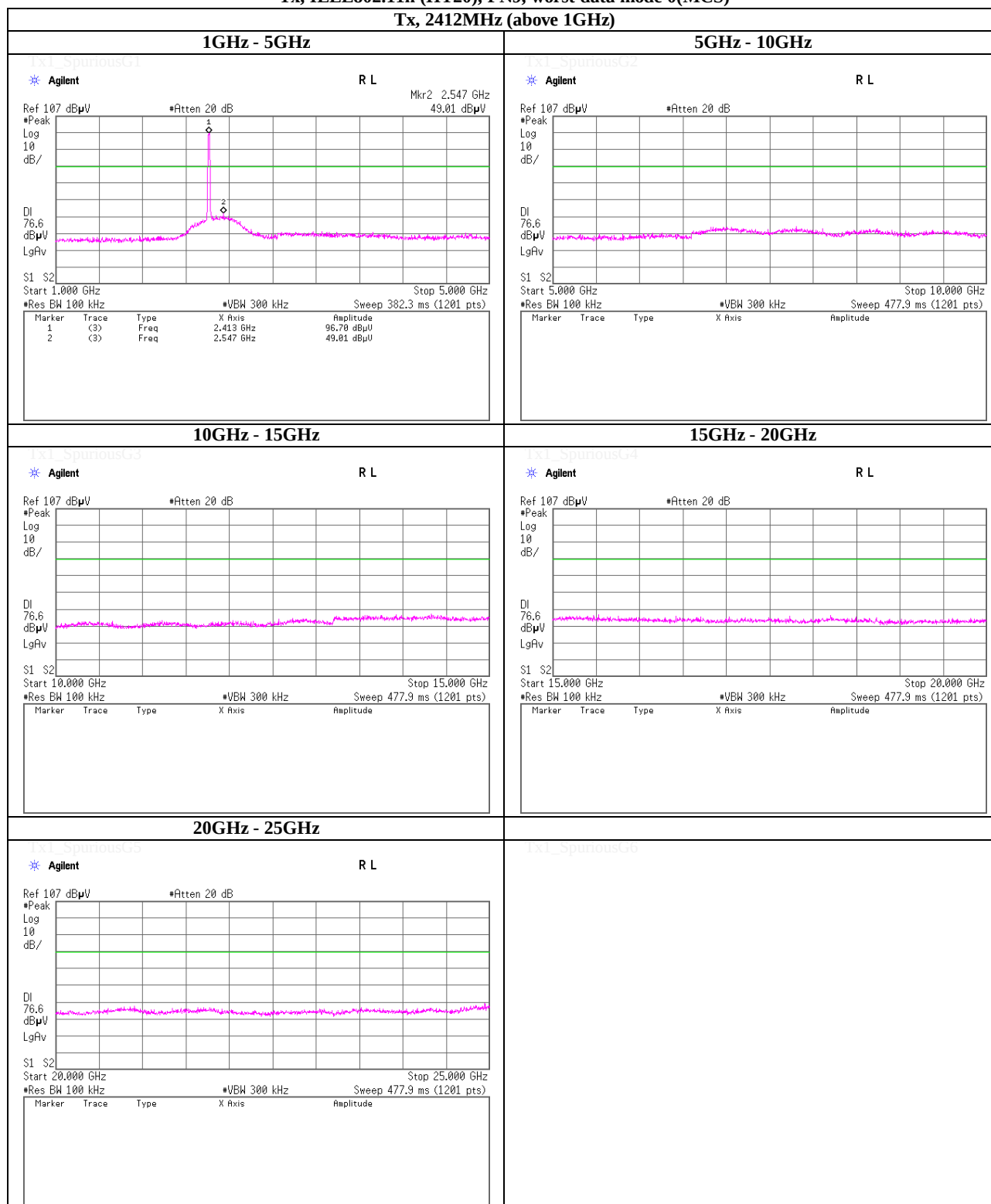
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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(Reference chart) Spurious emission (Conducted)
Tx, IEEE802.11n (HT20), PN9, worst data mode 0(MCS)



(Reference chart) Spurious emission (Conducted)**Tx, IEEE802.11n (HT20), PN9, worst data mode 0(MCS)****Tx, 2412MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.**

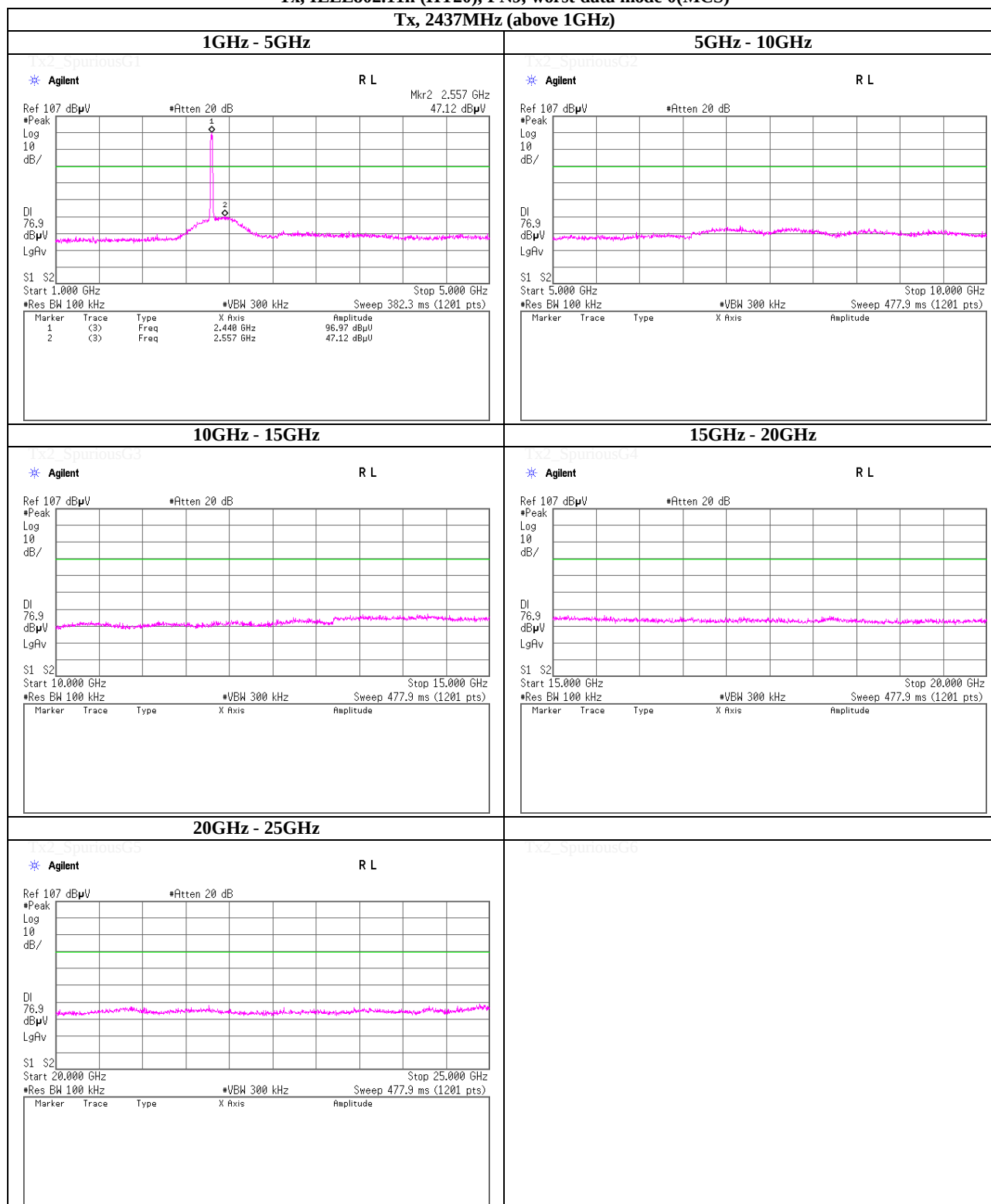
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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(Reference chart) Spurious emission (Conducted)
Tx, IEEE802.11n (HT20), PN9, worst data mode 0(MCS)



(Reference chart) Spurious emission (Conducted)**Tx, IEEE802.11n (HT20), PN9, worst data mode 0(MCS)****Tx, 2437MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.**

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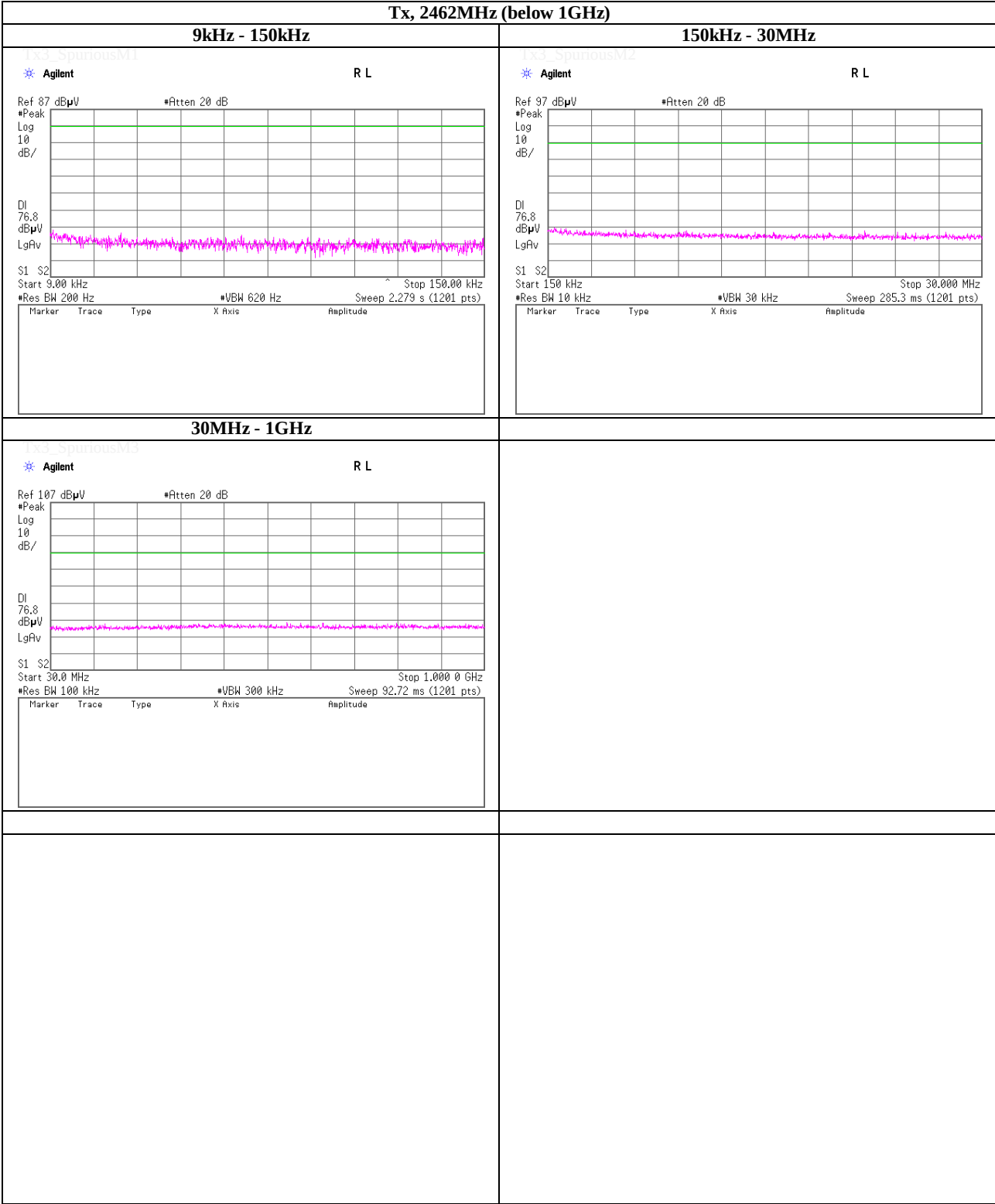
Telephone : +81 463 50 6400

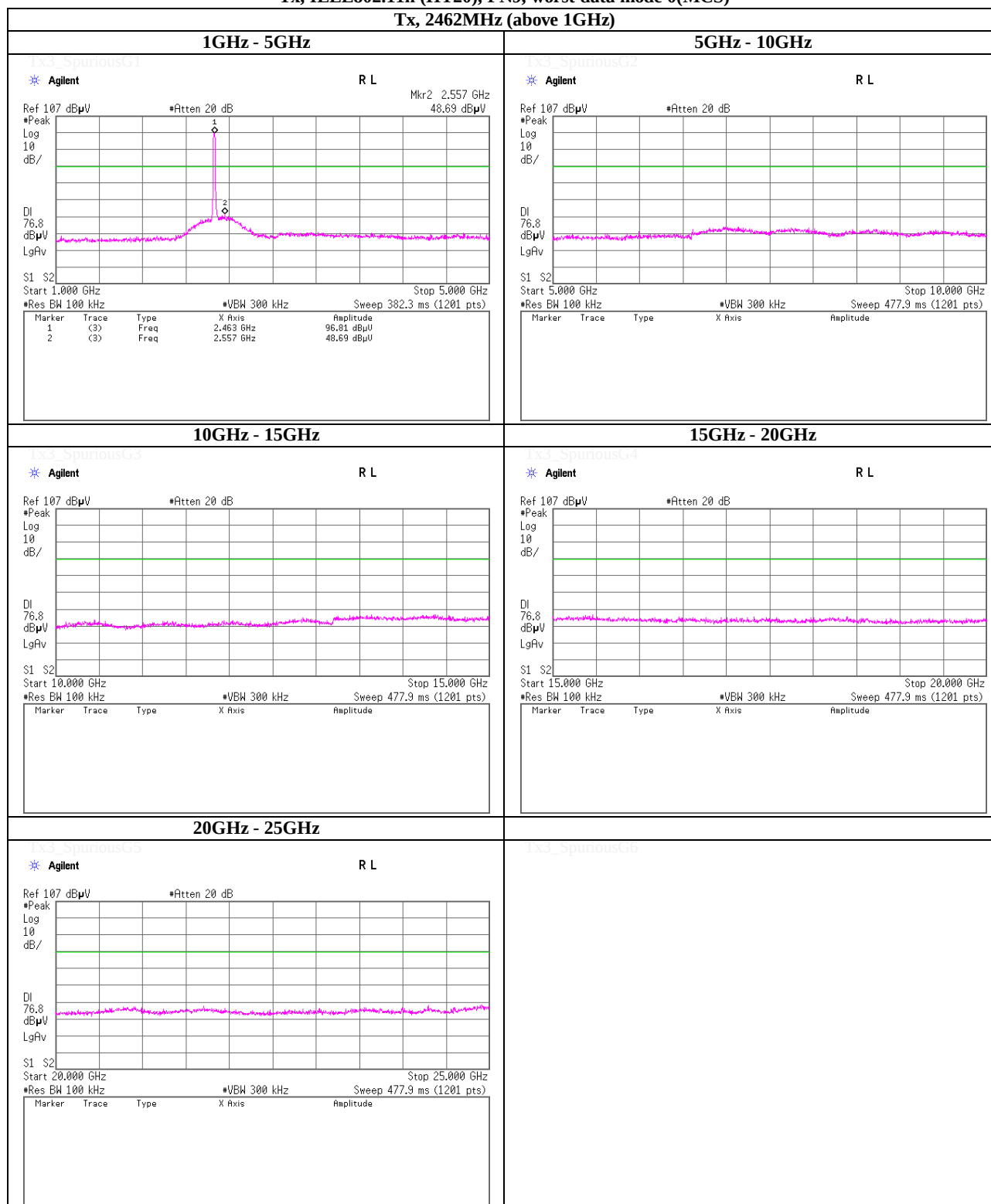
Facsimile : +81 463 50 6401

(Reference chart) Spurious emission (Conducted)

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

Tx, 2462MHz (below 1GHz)



(Reference chart) Spurious emission (Conducted)**Tx, IEEE802.11n (HT20), PN9, worst data mode 0(MCS)****Tx, 2462MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.**

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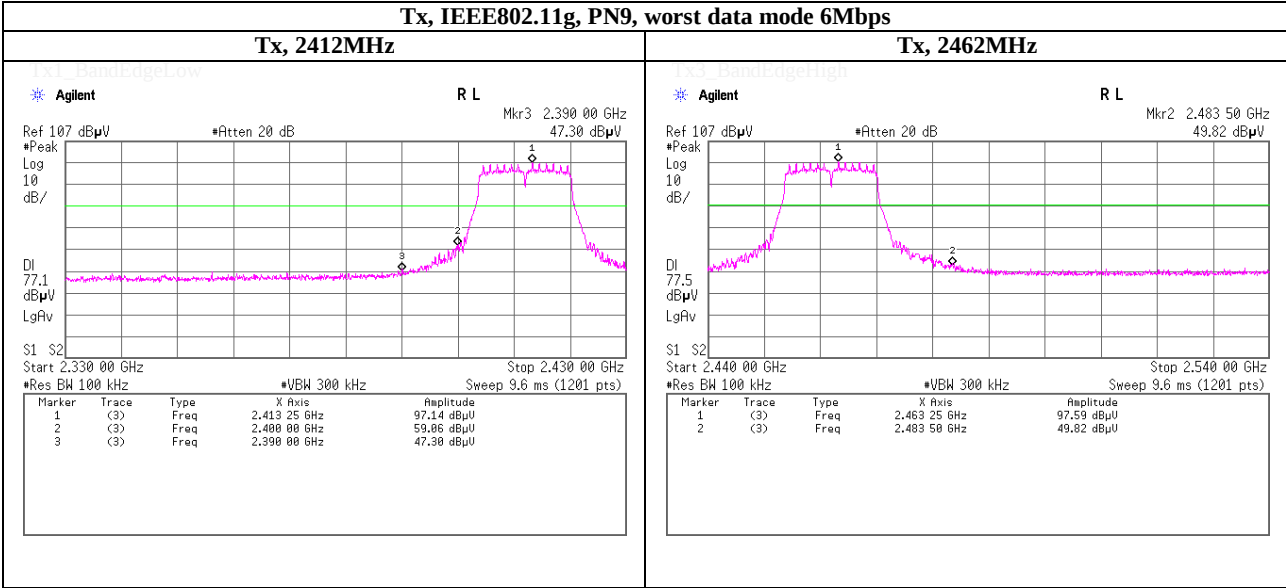
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

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(Reference chart) Spurious emission (Conducted)

Band Edge compliance



Maximum Power Spectral Density

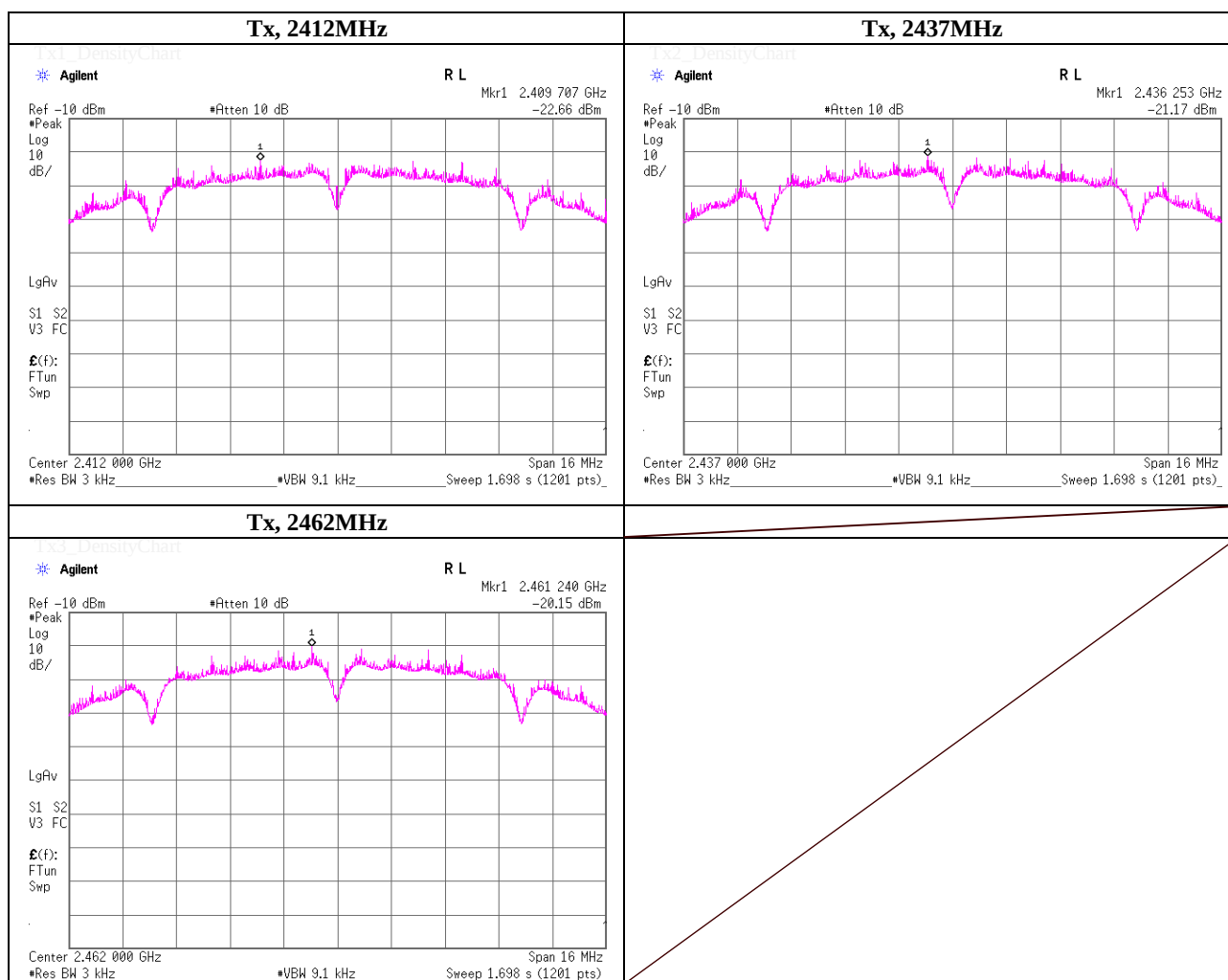
(Option 1)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	October 23, 2012	
Temperature / Humidity	25deg.C , 55%RH	
Engineer	Tatsuya Arai	
Mode	Tx, IEEE802.11b, PN9, worst data mode 1Mbps	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	2409.71	-22.66	1.45	10.00	-11.21	8.00	19.21
2437.0000	2436.25	-21.17	1.45	10.00	-9.72	8.00	17.72
2462.0000	2461.24	-20.15	1.45	10.00	-8.70	8.00	16.70

Sample Calculation:

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

**UL Japan, Inc.****Shonan EMC Lab.**

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Maximum Power Spectral Density

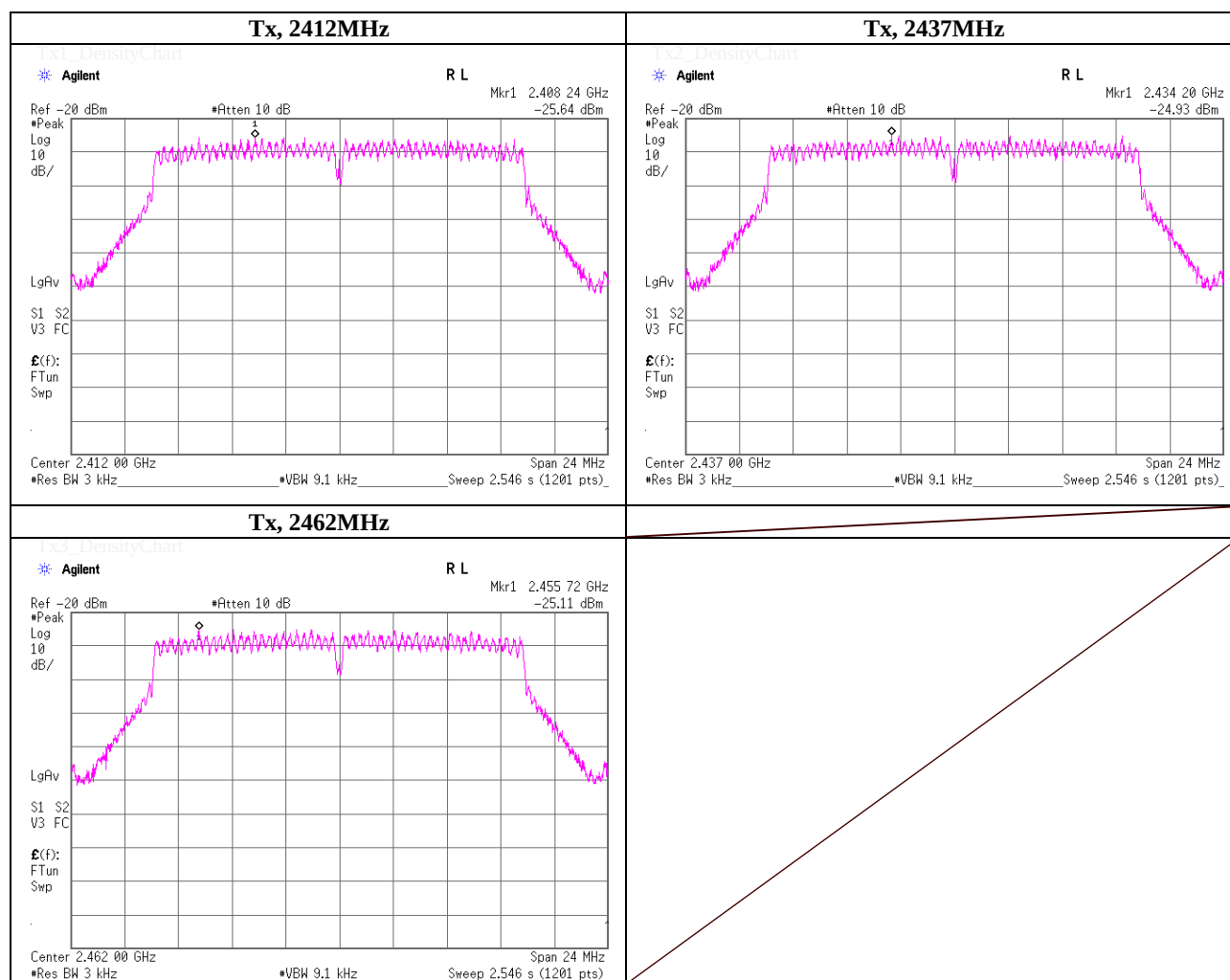
(Option 1)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	October 23, 2012	
Temperature / Humidity	25deg.C , 55%RH	
Engineer	Tatsuya Arai	
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	2408.24	-25.64	1.45	10.00	-14.19	8.00	22.19
2437.0000	2434.20	-24.93	1.45	10.00	-13.48	8.00	21.48
2462.0000	2455.72	-25.11	1.45	10.00	-13.66	8.00	21.66

Sample Calculation:

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

**UL Japan, Inc.****Shonan EMC Lab.**

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

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Maximum Power Spectral Density

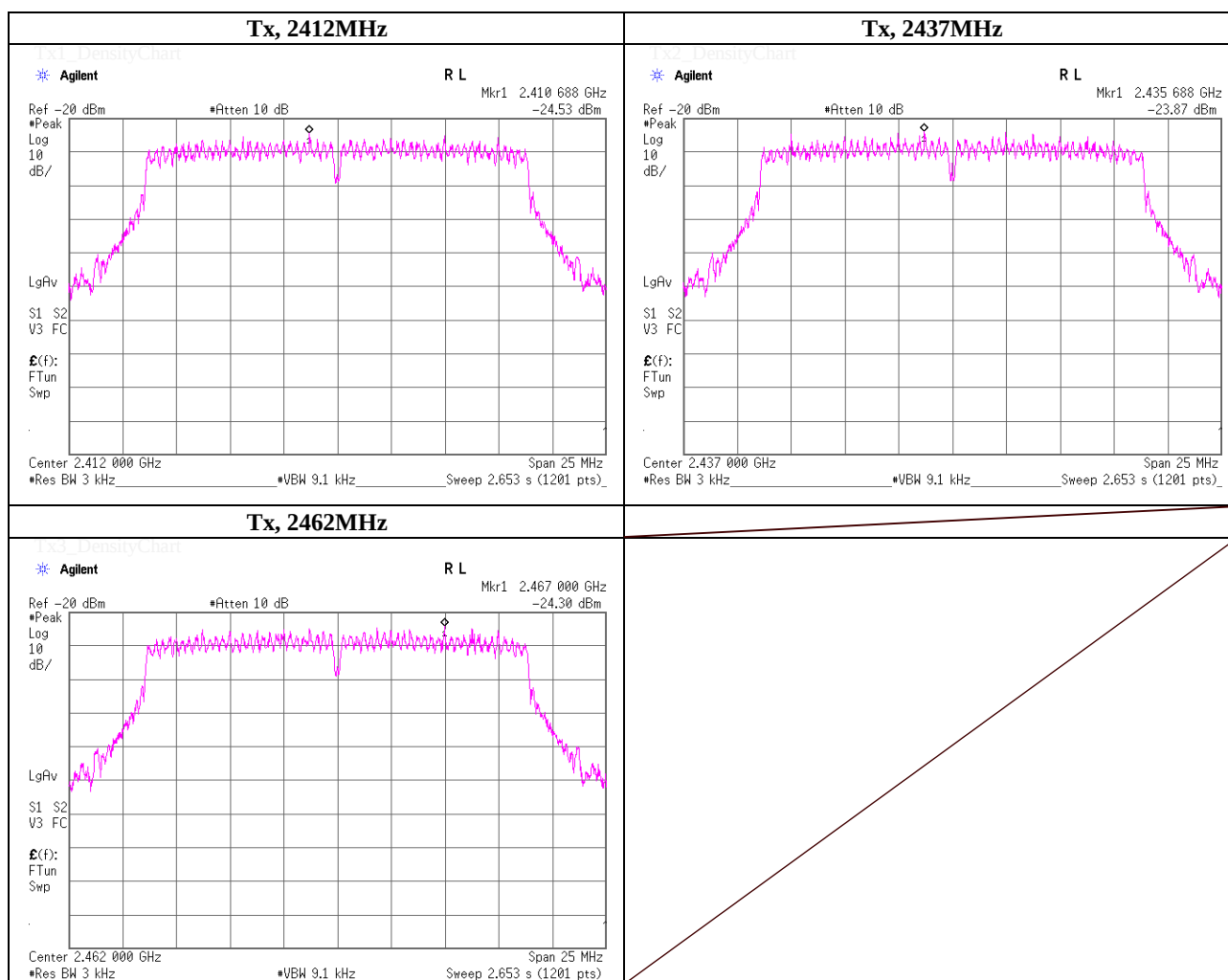
(Option 1)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	October 23, 2012	
Temperature / Humidity	25deg.C , 55%RH	
Engineer	Tatsuya Arai	
Mode	Tx, IEEE802.11n (HT20), 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	2410.69	-24.53	1.45	10.00	-13.08	8.00	21.08
2437.0000	2435.69	-23.87	1.45	10.00	-12.42	8.00	20.42
2462.0000	2467.00	-24.30	1.45	10.00	-12.85	8.00	20.85

Sample Calculation:

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

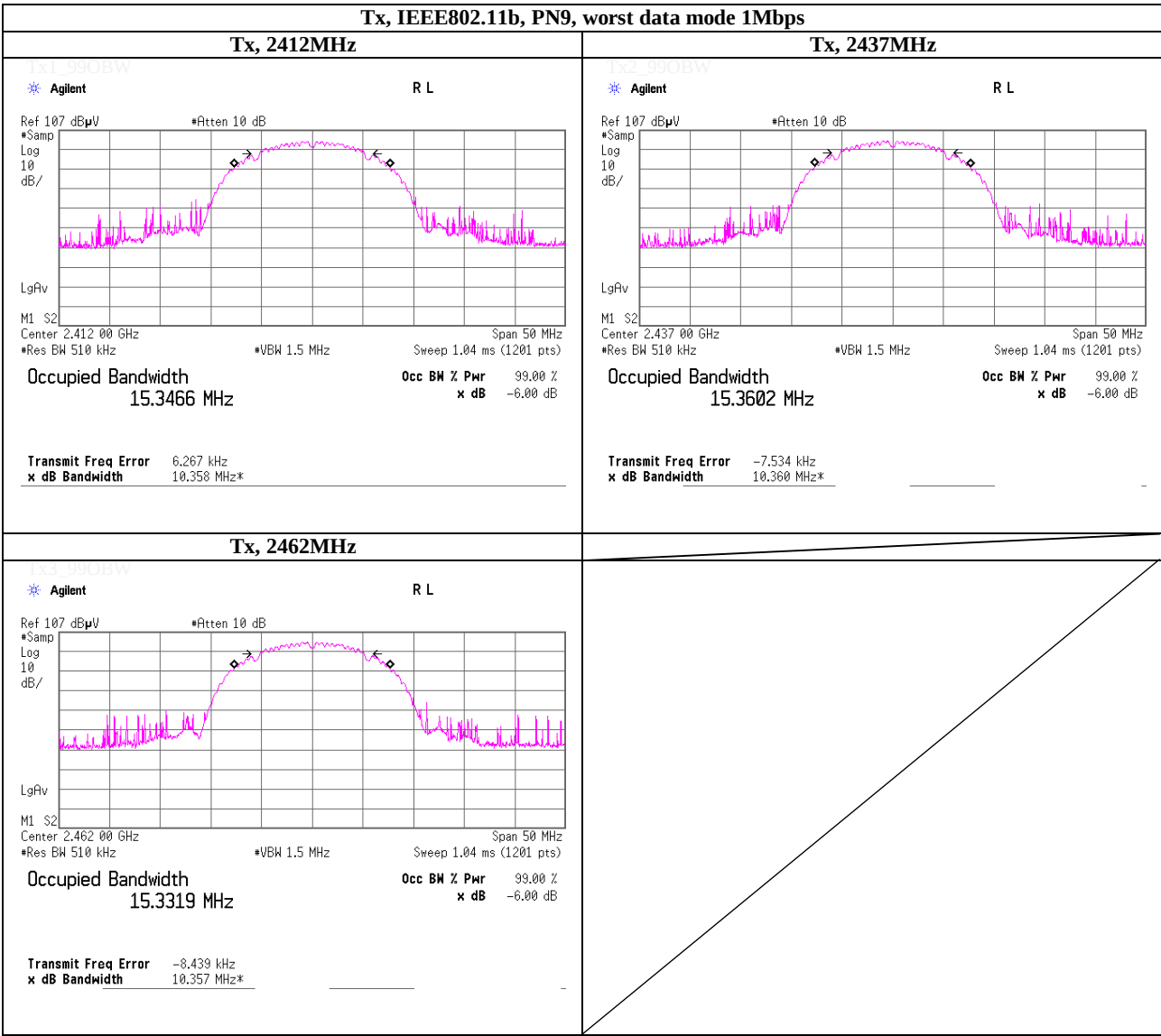
**UL Japan, Inc.****Shonan EMC Lab.**

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

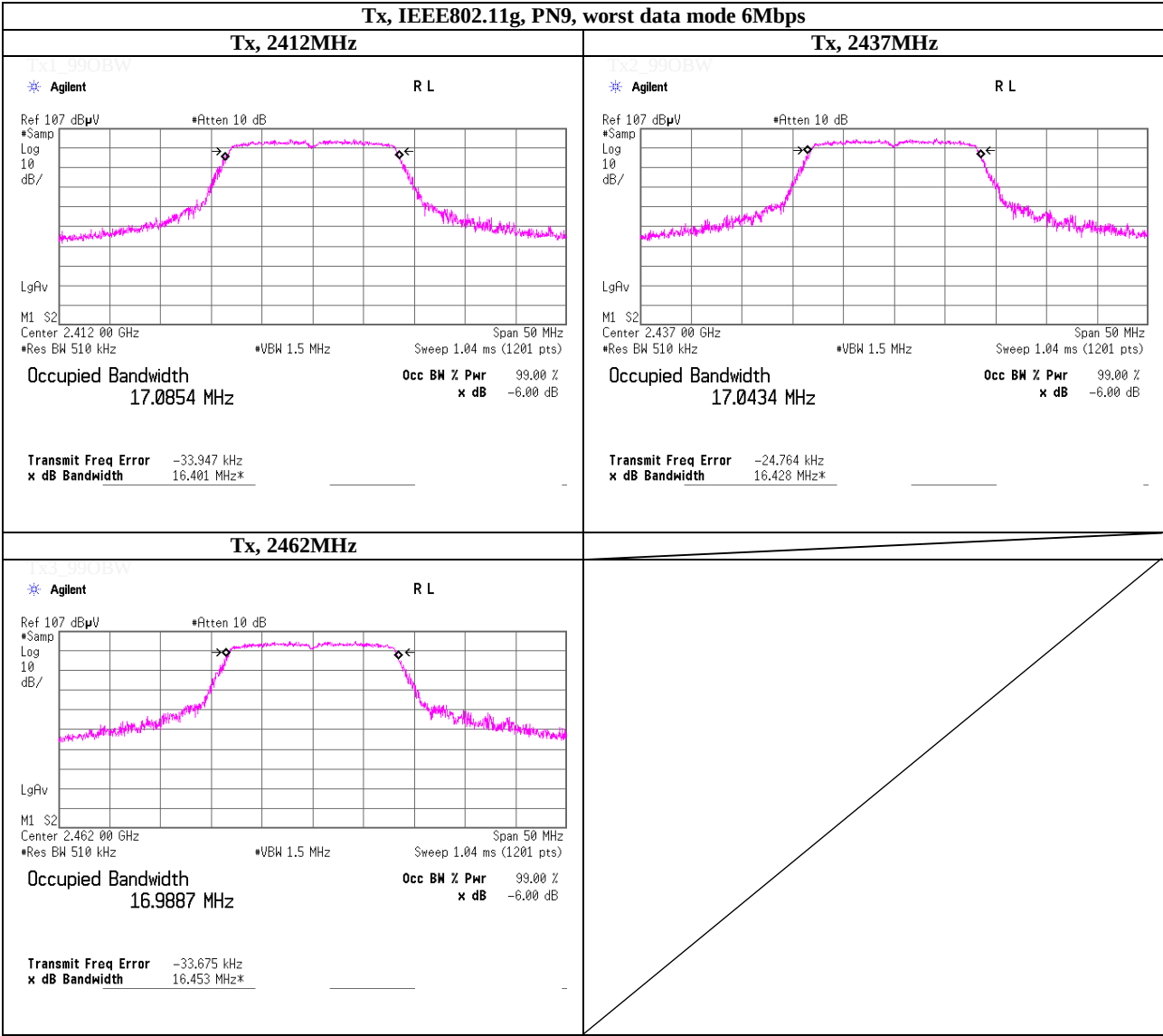
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

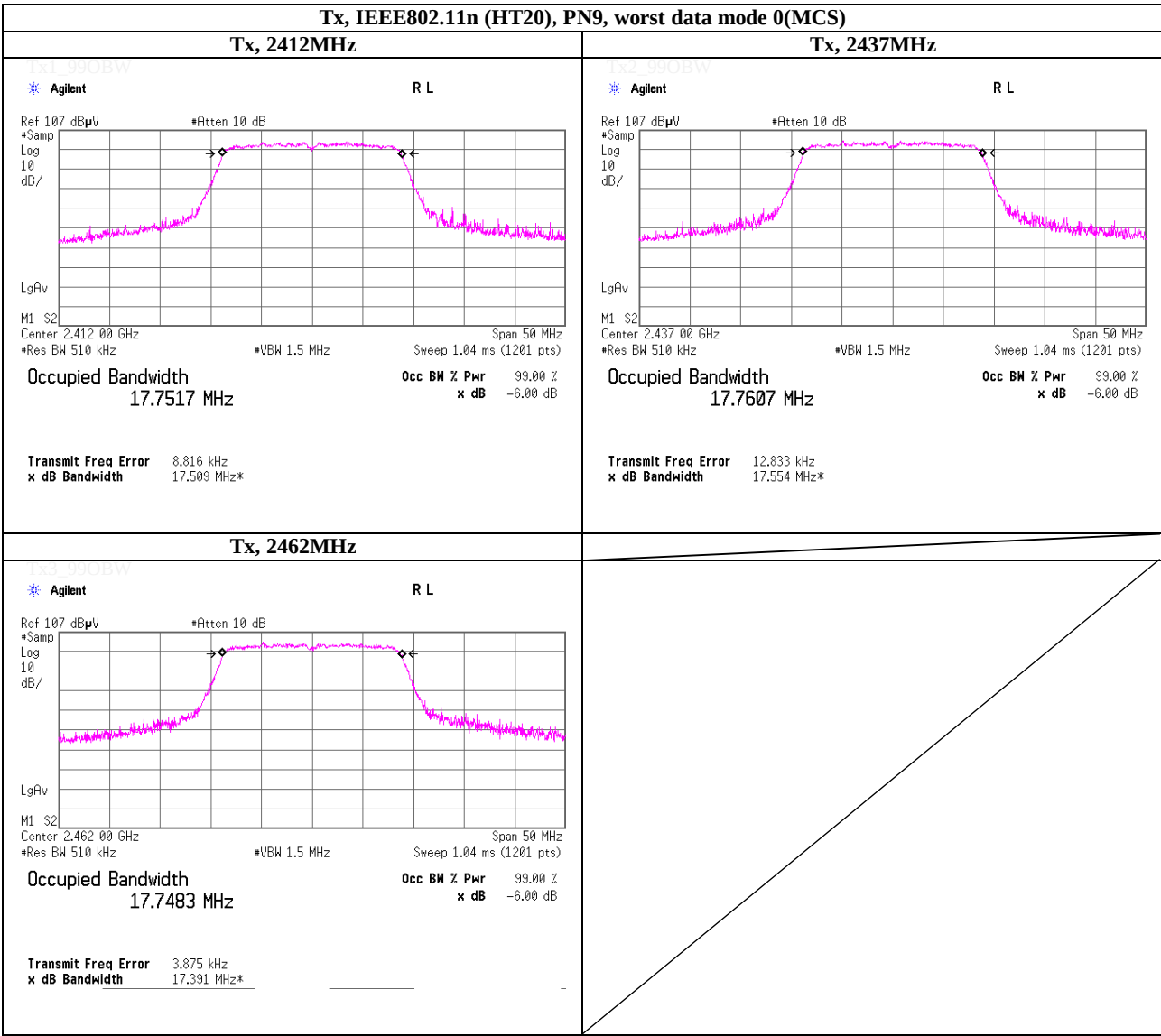
99% Occupied Bandwidth



99% Occupied Bandwidth



99% Occupied Bandwidth



APPENDIX 2

Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2012/04/19 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2012/04/19 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	AT	2012/03/16 * 12
SCC-G27	Coaxial Cable	Junkosha	MWX241-01000KM SKMS	SEP-20-12-001	AT	2012/09/26 * 12
SAT10-11	Attenuator	Weinschel Corp.	54A-10	37588	AT	2012/04/06 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2012/03/26 * 12
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2012/09/21 * 12
SAF-05	Pre Amplifier	TOYO Corporation	TPA0118-36	1440490	RE	2012/03/12 * 12
SCC-G02	Coaxial Cable	Suhner	SUCOFLEX 104A	46498/4A	RE	2012/04/10 * 12
SCC-G22	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	RE	2012/05/22 * 12
SHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-726	RE	2012/08/17 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2012/02/06 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2012/03/16 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
COTS-SEMI-I	EMI Software	TSJ	TEPTO-DV(RE,CE,RF,IMF)	-	RE	-
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2011/12/27 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2011/12/27 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2012/03/12 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2012/03/30 * 12
SCC-G17	Coaxial Cable	Suhner	SUCOFLEX 104A	46291/4A	RE	2012/03/12 * 12
SAF-02	Pre Amplifier	SONOMA	310N	290212	RE	2012/02/10 * 12
SAT6-02	Attenuator	JFW	50HF-006N	-	RE	2012/02/10 * 12
KAT3-11	Attenuator	JFW IND. INC.	50HF-003N	-	RE	2012/08/07 * 12
SBA-02	Biconical Antenna	Schwarzbeck	BBA9106	91032665	RE	2011/11/16 * 12
SCC-B1/B3/B5/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2012/04/10 * 12
SCC-B2/B4/B6/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2012/04/10 * 12
SLA-02	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A0893	RE	2011/11/16 * 12
STR-02	Test Receiver	Rohde & Schwarz	ESCI	100575	RE	2012/09/03 * 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 :

RE: Radiated emission ,

AT: Antenna terminal conducted test

APPENDIX 2

Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2012/04/19 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2012/04/19 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	AT	2012/03/16 * 12
SCC-G27	Coaxial Cable	Junkosha	MWX241-01000KM SKMS	SEP-20-12-001	AT	2012/09/26 * 12
SAT10-11	Attenuator	Weinschel Corp.	54A-10	37588	AT	2012/04/06 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2012/03/26 * 12
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2012/09/21 * 12
SAF-05	Pre Amplifier	TOYO Corporation	TPA0118-36	1440490	RE	2012/03/12 * 12
SCC-G02	Coaxial Cable	Suhner	SUCOFLEX 104A	46498/4A	RE	2012/04/10 * 12
SCC-G22	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	RE	2012/05/22 * 12
SHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-726	RE	2012/08/17 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2012/02/06 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2012/03/16 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
COTS-SEMI-I	EMI Software	TSJ	TEPTO-DV(RE,CE,RF,IMF)	-	RE	-
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2011/12/27 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2011/12/27 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2012/03/12 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2012/03/30 * 12
SCC-G17	Coaxial Cable	Suhner	SUCOFLEX 104A	46291/4A	RE	2012/03/12 * 12
SAF-02	Pre Amplifier	SONOMA	310N	290212	RE	2012/02/10 * 12
SAT6-02	Attenuator	JFW	50HF-006N	-	RE	2012/02/10 * 12
KAT3-11	Attenuator	JFW IND. INC.	50HF-003N	-	RE	2012/08/07 * 12
SBA-02	Biconical Antenna	Schwarzbeck	BBA9106	91032665	RE	2011/11/16 * 12
SCC-B1/B3/B5/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2012/04/10 * 12
SCC-B2/B4/B6/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2012/04/10 * 12
SLA-02	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0893	RE	2011/11/16 * 12
STR-02	Test Receiver	Rohde & Schwarz	ESCI	100575	RE	2012/09/03 * 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 :

RE: Radiated emission ,

AT: Antenna terminal conducted test