



RADIO TEST REPORT

Test Report No.: 32KE0289-SH-01-B

Applicant : Welcat Inc.
Type of Equipment : Wireless 2D-code Handy Terminal
Model No. : GTX-221-G
FCC ID : Q98GTX221G
Test regulation : FCC Part15 Subpart C: 2012
Test result : Complied

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

Date of test: August 2 to 17, 2012

Tested by: *S. Takano*
Shinichi Takano
Engineer of WiSE Japan,
UL Verification Service

Approved by : *T. Imamura*
Toyokazu Imamura
Leader of WiSE Japan,
UL Verification Service

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



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13-EM-F0429

REVISION HISTORY

Original Test Report No.: 32KE0289-SH-01-B

[illegible]

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SECTION 1: Customer information

Company Name : Welcat Inc.
Address : 4-12-8 Higashi-Shinagawa, Shinagawa Seaside East Tower 6F,
Shinagawa-ku, Tokyo 140-0002 Japan
Telephone Number : +81-3-5463-8582
Facsimile Number : +81-3-5463-8587
Contact Person : Masakiyo Yamazaki

SECTION 2: Equipment under test (E.U.T.)**2.1 Identification of E.U.T.**

Type of Equipment : Wireless 2D-code Handy Terminal
Model Number : GTX-221-G
Serial Number : Refer to clause 4.2.
Rating : DC3.8V
Country of Mass-production : Japan
Condition of EUT : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample : August 2, 2012
Modification of EUT : No modification by the test lab.

2.2 Product description

Model: GTX-221-G (referred to as the EUT in this report) is a Wireless 2D-code Handy Terminal.

Clock frequency(ies) in the system : MAIN CPU:13MHz,32.768MHz
Bluetooth Module:16MHz, 26MHz
WLAN Module: 38.4MHz

Radio specification (WLAN part)

Equipment type : Transceiver
Frequency of operation : 2412-2462MHz
Bandwidth & channel spacing : 20MHz & 5MHz
Type of modulation : DSSS: CCK, DQPSK, DBPSK
OFDM: 64QAM, 16QAM, QPSK, BPSK
ITU code : D1D, G1D
Antenna type : PWB Pattern antenna
Antenna connector type : None
Antenna gain : -0.90 dBi
Operation temperature range : -5 to 45 deg.C.

Radio specification (Bluetooth part)

Equipment type : Transceiver
Frequency of operation : 2402-2480MHz
Bandwidth / Channel spacing : 79MHz & 1MHz
Type of modulation : FHSS (GFSK, $\pi/4$ -DQPSK, 8DPSK)
Antenna type : Chip antenna
Antenna connector type : None
Antenna gain with cable loss : 1.0dBi
ITU code : F1D, G1D
Operation temperature range : -5 to 45 deg.C.

* For Bluetooth part, Refer to the test report: 32KE0289-SH-01-A.

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FCC 15.31 (e)

The RF transmitter is constantly provided voltage (DC1.8V and DC3.3V) through the regulator regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC 15.203

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

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SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : FCC Part 15 Subpart C: 2012, final revised on July 23, 2012 and effective August 22, 2012
 Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
 Section 15.207 Conducted limits
 Section 15.209 Radiated emission limits, general requirements
 Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz,
 and 5725-5850MHz

* The revision on July 23, 2012 does not affect the test specification applied to the EUT.

The EUT has been tested for compliance with FCC Part 15 Subpart B. Refer to the test report 32KE0289-SH-01-C.

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2009 7. AC powerline conducted emission measurements	FCC 15.207	-	N/A	15.4 dB Freq.: 0.17605MHz Phase: N Detector: Quasi-Peak Mode: Tx 2462MHz, IEEE 802.11g	Complied
6dB bandwidth	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(2) & 15.209	Conducted	N/A	* See data	Complied
Maximum peak output power	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (b)(3) & 15.209	Conducted	N/A		Complied
Spurious emission & Restricted band edges	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.109, 15.247 (d) & 15.209	Conducted / Radiated	N/A	6.6dB (Freq.: 2483.500MHz Detector: Average Polarization: Horizontal Mode: Tx 2462MHz, IEEE 802.11b and 11g)	Complied
Power density	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (e) & 15.209	Conducted	N/A	* See data	Complied

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

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

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2009 13. Measurement of intentional radiators, RSS-Gen 4.6.1	-	Conducted	-	-

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

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

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3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Item	Frequency range	No.1 SAC ^{*1} /SR ^{*2} (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
Conducted emission (AC Mains) AMN/LISN	150kHz-30MHz	3.6 dB	3.6 dB	3.5 dB
Radiated emission (Measurement distance: 3m)	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 site margin.

Radiated emission test

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

Frequency Measurement uncertainty for this test was: (±) 5.3×10^{-6} .

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 Full-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

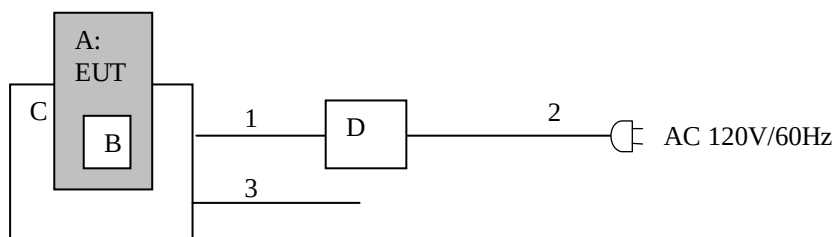
4.1 Operating mode

Test item	Mode	Tested frequency	Power setting	Worst data rate *2)
Conducted emission & Radiated emission (below 1GHz) *3)	Transmitting IEEE 802.11g	2462MHz	Fixed (The setting is not controlled by the software and it is equivalent to that of mass-produced items.)	6Mbps, PN9
Other items	Transmitting IEEE 802.11b	2412MHz, 2437MHz, 2462MHz		1Mbps, PN9
	Transmitting IEEE 802.11g	2412MHz, 2437MHz, 2462MHz		6Mbps, PN9

*1) Test software: WLAN RF TEST(Ver1.04)
*2) The worst condition was determined based on the test result of Maximum Peak Output Power.
*3) Test operating mode was determined as follows according to “Section 1 of 6 802.11 a/b/g/n testing- Managing Complex Regulatory Approvals - ”of TCB Council Workshop October 2009.

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

4.2 Configuration and peripherals



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Wireless 2D-code Handy Terminal	GTX-221-G	*1)	Welcat Inc.	EUT
B	Li-ion Battery pack	BP-004	1106-17	Welcat Inc.	-
C	Cradle	-	-	Welcat Inc.	-
D	AC Adaptor	GPE402-055300W	-	Welcat Inc.	-

*1) Conducted/Radiated emission: 21C01, Antenna terminal conducted test: 21C15

* Radiated emission test was performed also in stand-alone(Item A and B).

List of cables used

No.	Cable	Length (m)	Shield-Cable	Shield-Connector	Remarks
1	DC	1.7	Unshielded	Unshielded	-
2	AC	1.7	Unshielded	Unshielded	-
3	USB	1.5	Shielded	Shielded	-

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

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SECTION 5: Conducted emission

5.1 Operating environment

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

5.2 Test configuration

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

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

The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals was aligned and was flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from LISN and excess AC cable was bundled in center. I/O cables that were connected to the peripherals were bundled in center. They were folded back and for the forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane.

Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN to the input power source. All unused 50ohm connectors of the LISN were resistively terminated in 50ohm when not connected to the measuring equipment.

Photographs of the set up are shown in APPENDIX 3.

5.3 Test conditions

Frequency range : 0.15 - 30MHz
EUT position : Table top

5.4 Test procedure

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT via AC adaptor within a Shielded room. The EUT was connected to a Line Impedance Stabilization Network (LISN) via AC adaptor.

An overview sweep with peak detection has been performed.

The measurements had been performed with a quasi-peak detector and if required, an average detector.

The conducted emission measurements were made with the following detection of the test receiver.

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

5.5 Results

Summary of the test results : Pass

Refer to APPENDIX 1

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

Test procedure

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

Summary of the test results: Pass

Refer to APPENDIX 1

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SECTION 7: Maximum peak output power

Test procedure

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

Detection type: Peak / Average *1)

Summary of the test results: Pass

Refer to APPENDIX 1

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

SECTION 8: Radiated emission

8.1 Operating environment

Test place : See test data (APPENDIX 1)

Temperature : See test data (APPENDIX 1)

Humidity : See test data (APPENDIX 1)

8.2 Test configuration

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

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

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

Photographs of the set up are shown in APPENDIX 3.

8.3 Test conditions

Frequency range : 30MHz - 25GHz

EUT position : Table top

8.4 Test procedure

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

The radiated emission measurements were made with the following detection of the test receiver.

Frequency	30-1000MHz	1-25GHz		20dBc
Detection type	Quasi-Peak	Peak	* Average	Peak
IF Bandwidth	120kHz	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 10Hz	RBW: 100kHz VBW: 300kHz

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

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

Worst position:

Antenna polarization \ Frequency	Carrier	Spurious	
		Below 1GHz	1-25GHz
Horizontal	Z	Y	Y
Vertical	Y	X or Cradle	X

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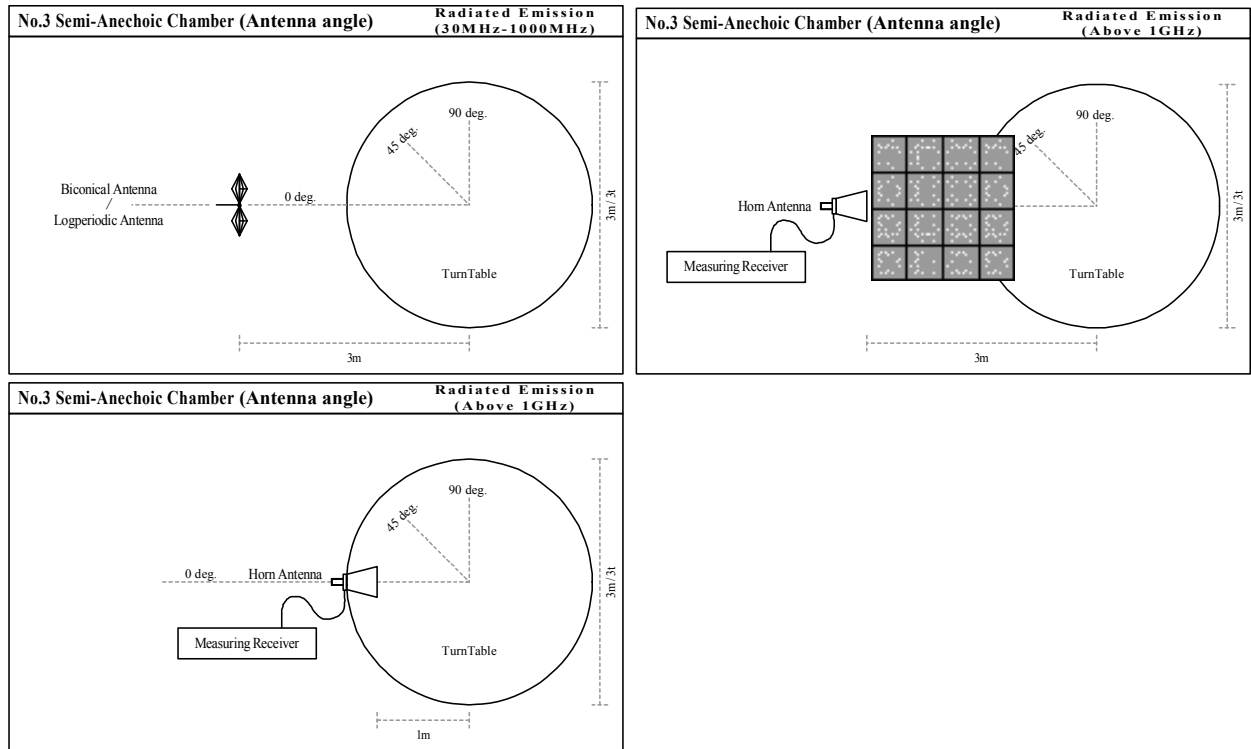
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Figure 1. Antenna angle



8.5 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.

8.6 Results

Summary of the test results : Pass
Refer to APPENDIX 1

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SECTION 9: Spurious emissions (Antenna port conducted)

Test procedure

The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port.
In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.
In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.
Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.
(9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=10kHz)

Summary of the test results: Pass
Refer to APPENDIX 1

SECTION 10: Peak power density

Test procedure

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

Instrument used : Spectrum Analyzer *1)
RBW / VBW : 30kHz / 100kHz *2)

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

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

Summary of the test results: Pass
Refer to APPENDIX 1

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Contents of APPENDIXES

APPENDIX 1: Data of Radio tests

Conducted emission
6dB bandwidth
Maximum peak output power
Radiated emission
Spurious emission (Antenna port conducted)
Peak power density
99% Occupied bandwidth

APPENDIX 2: Test instruments

Test instruments

APPENDIX 3: Photographs of test setup

Conducted emission
Radiated emission
Pre-check of worst position

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APPENDIX 1: Data of Radio tests

DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2012/08/17

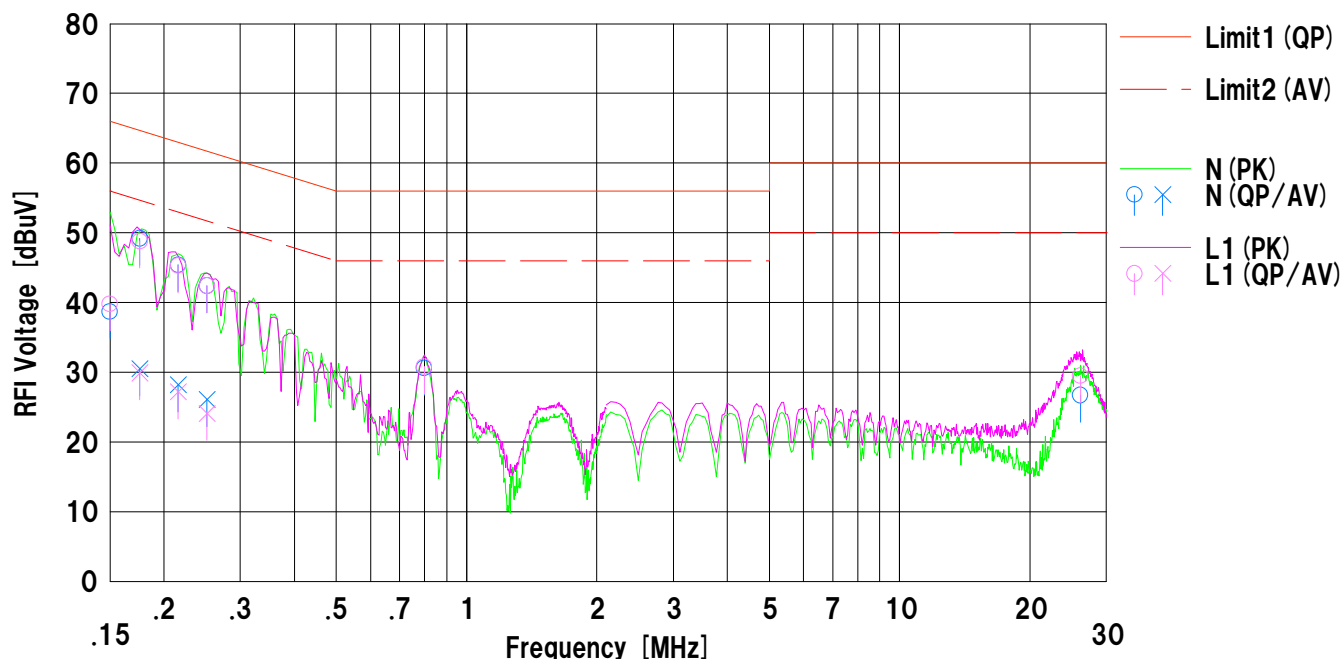
Company : Welcat Inc.
Kind of EUT : Wireless 2D-code Handy Terminal
Model No. : GTX-221-G
Serial No. : 21C01

Mode : IEEE 802.11g Tx2462MHz
Report No. : 32KE0289-SH-01-B
Power : AC 120V / 60Hz
Temp./Humi. : 25deg.C. / 64%RH

Remarks : Cradle

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

Engineer : Makoto Hosaka



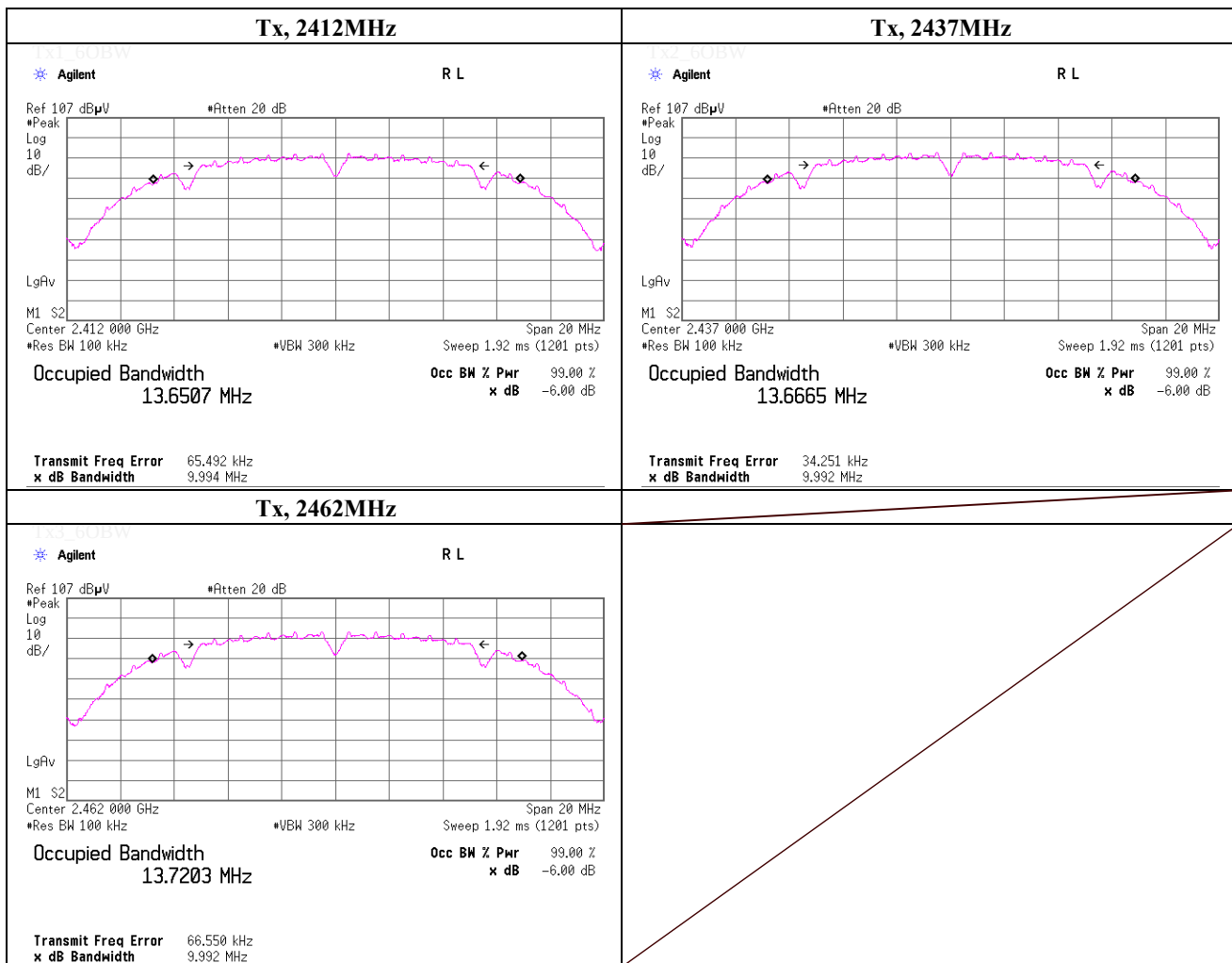
No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15000	26.0	---	12.7	38.7	---	66.0	56.0	27.3	---	N	
2	0.17605	36.5	17.8	12.7	49.2	30.5	64.6	54.6	15.4	24.1	N	
3	0.21591	32.7	15.5	12.7	45.4	28.2	62.9	52.9	17.5	24.7	N	
4	0.25165	29.7	13.4	12.7	42.4	26.1	61.7	51.7	19.3	25.6	N	
5	0.79818	17.9	---	12.7	30.6	---	56.0	46.0	25.4	---	N	
6	26.15355	12.9	---	13.8	26.7	---	60.0	50.0	33.3	---	N	
7	0.15000	27.1	---	12.7	39.8	---	66.0	56.0	26.2	---	L1	
8	0.17605	36.1	17.2	12.7	48.8	29.9	64.6	54.6	15.8	24.7	L1	
9	0.21591	32.6	14.5	12.7	45.3	27.2	62.9	52.9	17.6	25.7	L1	
10	0.25165	29.7	11.4	12.7	42.4	24.1	61.7	51.7	19.3	27.6	L1	
11	0.79818	18.1	---	12.7	30.8	---	56.0	46.0	25.2	---	L1	
12	26.15355	15.7	---	13.8	29.5	---	60.0	50.0	30.5	---	L1	

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

-6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	August 3, 2012	
Temperature / Humidity	26deg.C , 49%RH	
Engineer	Shinichi Takano	
Mode	Tx, IEEE802.11b, PN9, worst data mode 1Mbps	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	9.994	> 0.500
2437.0000	9.992	> 0.500
2462.0000	9.992	> 0.500

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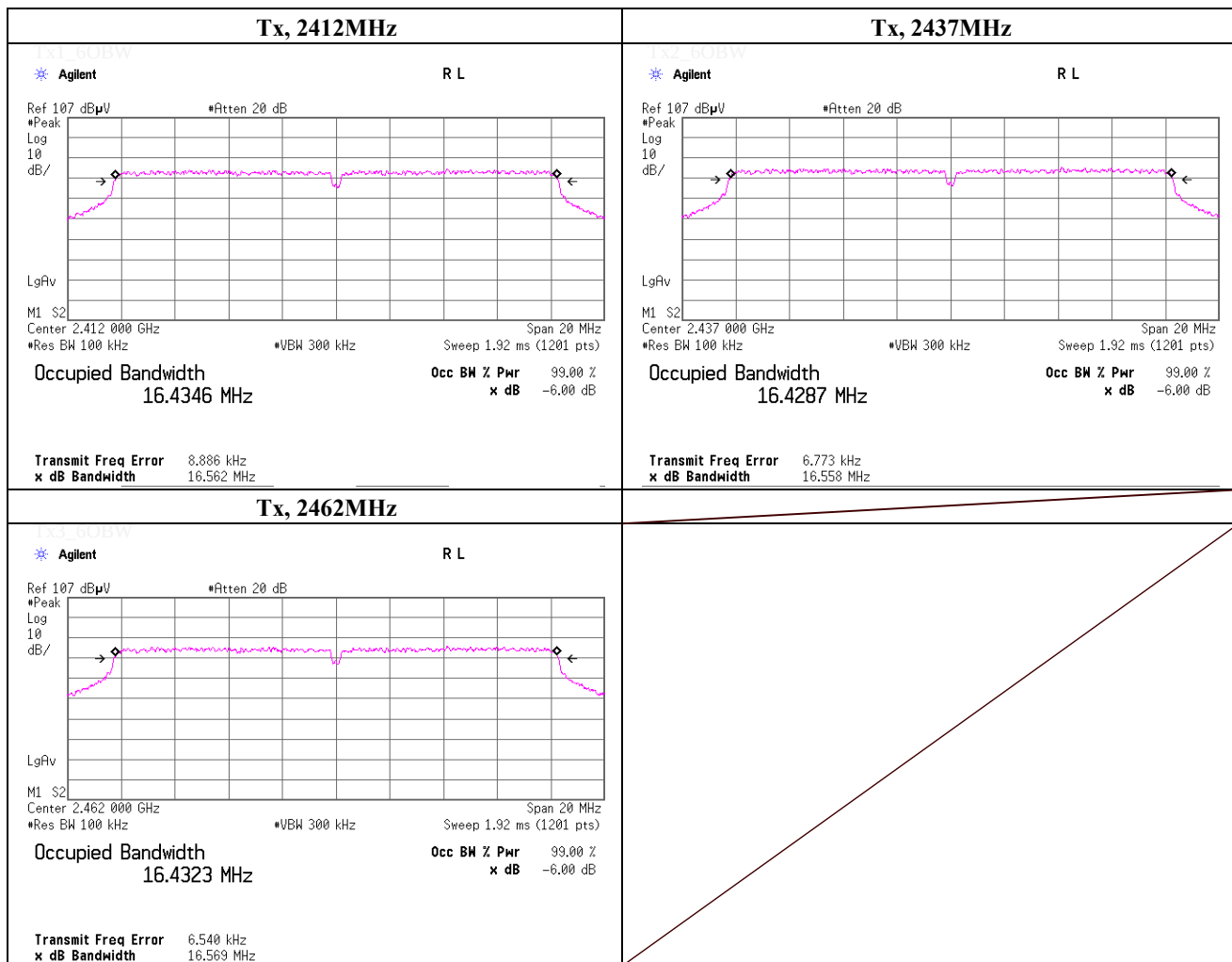
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-6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	August 3, 2012	
Temperature / Humidity	26deg.C , 49%RH	
Engineer	Shinichi Takano	
Mode	Tx, IEEE802.11g, PN9, worst data mode 6Mbps	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	16.562	> 0.500
2437.0000	16.558	> 0.500
2462.0000	16.570	> 0.500

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Peak Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date August 2, 2012
 Temperature / Humidity 25deg.C , 52%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	-5.12	0.44	20.22	15.54	35.81	30.00	1000	14.46
Mid	2437.0	-4.34	0.44	20.22	16.32	42.85	30.00	1000	13.68
High	2462.0	-4.08	0.45	20.22	16.59	45.60	30.00	1000	13.41

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	-4.34	0.44	20.22	16.32	42.85	30.00	1000	13.68
	2	2437.0	-4.37	0.44	20.22	16.29	42.56	30.00	1000	13.71
	5.5	2437.0	-4.96	0.44	20.22	15.70	37.15	30.00	1000	14.30
	11	2437.0	-4.52	0.44	20.22	16.14	41.11	30.00	1000	13.86

Worst

Reference data for SAR testing

(* AV: Average)

	Data rate	Freq.	P/M (AV) Reading	Cable Loss	Atten. Loss	Result	
	Data rate	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
	1	2437.0	-6.41	0.44	20.22	14.25	26.61
	2	2437.0	-6.43	0.44	20.22	14.23	26.49
	5.5	2437.0	-6.57	0.44	20.22	14.09	25.64
	11	2437.0	-6.54	0.44	20.22	14.12	25.82

Sample Calculation:

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

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Peak Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date August 2, 2012
 Temperature / Humidity 25deg.C , 52%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	-1.33	0.44	20.22	19.33	85.70	30.00	1000	10.67
Mid	2437.0	-0.64	0.44	20.22	20.02	100.46	30.00	1000	9.98
High	2462.0	-0.22	0.45	20.22	20.45	110.92	30.00	1000	9.55

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	-0.64	0.44	20.22	20.02	100.46	30.00	1000	9.98
	9	2437.0	-0.96	0.44	20.22	19.70	93.33	30.00	1000	10.30
	12	2437.0	-0.93	0.44	20.22	19.73	93.97	30.00	1000	10.27
	18	2437.0	-1.42	0.44	20.22	19.24	83.95	30.00	1000	10.76
	24	2437.0	-0.66	0.44	20.22	20.00	100.00	30.00	1000	10.00
	36	2437.0	-0.92	0.44	20.22	19.74	94.19	30.00	1000	10.26
	48	2437.0	-1.45	0.44	20.22	19.21	83.37	30.00	1000	10.79
	54	2437.0	-1.21	0.44	20.22	19.45	88.10	30.00	1000	10.55

Worst

Reference data for SAR testing

(* AV: Average)

	Data rate	Freq.	P/M (AV) Reading	Cable Loss	Atten. Loss	Result	
	Data rate	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
	6	2437.0	-10.37	0.44	20.22	10.29	10.69
	9	2437.0	-10.40	0.44	20.22	10.26	10.62
	12	2437.0	-10.42	0.44	20.22	10.24	10.57
	18	2437.0	-10.42	0.44	20.22	10.24	10.57
	24	2437.0	-10.62	0.44	20.22	10.04	10.09
	36	2437.0	-10.67	0.44	20.22	9.99	9.98
	48	2437.0	-10.63	0.44	20.22	10.03	10.07
	54	2437.0	-10.69	0.44	20.22	9.97	9.93

Sample Calculation:

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date August 16, 2012 August 17, 2012
 Temperature / Humidity 23 deg.C , 56%RH 25 deg.C , 68%RH
 Engineer Makoto Hosaka Makoto Hosaka
 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	47.0	28.5	24.5	41.4	58.6	73.9	15.3	131	106	VBW:10Hz
Hori.	4824.000	PK	51.4	31.9	6.8	41.2	48.9	73.9	25.0	100	74	
Hori.	7236.000	PK	47.3	36.6	8.5	41.4	51.0	73.9	22.9	100	0	
Hori.	12060.000	PK	47.2	40.1	10.7	39.4	58.6	73.9	15.3	100	0	
Hori.	2390.000	AV	34.6	28.5	24.5	41.4	46.2	53.9	7.7	131	106	
Hori.	4824.000	AV	45.5	31.9	6.8	41.2	43.0	53.9	10.9	100	74	
Hori.	7236.000	AV	35.8	36.6	8.5	41.4	39.5	53.9	14.4	100	0	
Hori.	12060.000	AV	34.5	40.1	10.7	39.4	45.9	53.9	8.0	100	0	
Vert.	2390.000	PK	48.8	28.5	24.5	41.4	60.4	73.9	13.5	130	18	VBW:10Hz
Vert.	4824.000	PK	50.3	31.9	6.8	41.2	47.8	73.9	26.1	116	0	
Vert.	7236.000	PK	47.9	36.6	8.5	41.4	51.6	73.9	22.3	100	0	
Vert.	12060.000	PK	46.7	40.1	10.7	39.4	58.1	73.9	15.8	100	0	
Vert.	2390.000	AV	34.7	28.5	24.5	41.4	46.3	53.9	7.6	130	18	
Vert.	4824.000	AV	43.0	31.9	6.8	41.2	40.5	53.9	13.4	116	0	
Vert.	7236.000	AV	35.8	36.6	8.5	41.4	39.5	53.9	14.4	100	0	
Vert.	12060.000	AV	34.6	40.1	10.7	39.4	46.0	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).

Distance factor : 15GHz -40GHz : $20\log(3.0\text{m}/1.0\text{m})= 9.5\text{dB}$ **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	85.8	28.6	24.5	41.4	97.5	-	-	Carrier
Hori.	2398.500	PK	42.3	28.5	24.5	41.4	53.9	77.5	23.6	
Hori.	2400.000	PK	40.1	28.5	24.5	41.4	51.7	77.5	25.8	
Hori.	9648.000	PK	45.3	39.1	9.4	38.9	54.9	77.5	22.6	
Vert.	2412.000	PK	85.3	28.6	24.5	41.4	97.0	-	-	Carrier
Vert.	2398.500	PK	42.1	28.5	24.5	41.4	53.7	77.0	23.3	
Vert.	2400.000	PK	40.0	28.5	24.5	41.4	51.6	77.0	25.4	
Vert.	9648.000	PK	44.9	39.1	9.4	38.9	54.5	77.0	22.5	

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

Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi Anechoic Chamber
Date	August 16, 2012	August 17, 2012
Temperature / Humidity	23 deg.C , 56%RH	25 deg.C , 68%RH
Engineer	Makoto Hosaka	Makoto Hosaka
Mode	Tx, 2437 MHz	
	Tx, IEEE802.11b, PN9, worst data mode 1Mbps	

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

[illegible]
$$\text{Result} = \text{Reading} + \text{Ant Factor} + \text{Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz))} - \text{Gain(Amplifier)}$$

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

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

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

20dBc Data Sheet (V _{DD} 1.00V, V _{DD} 0.90V)										
Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remarks
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	2437.000	PK	86.8	28.7	24.5	41.4	98.6	-	-	Carrier
Hori.	9748.000	PK	47.9	39.2	9.5	38.9	57.7	78.6	20.9	
Vert.	2437.000	PK	86.8	28.7	24.5	41.4	98.6	-	-	Carrier
Vert.	9748.000	PK	48.1	39.2	9.5	38.9	57.9	78.6	20.7	

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

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi Anechoic Chamber
Date	August 16, 2012	August 17, 2012
Temperature / Humidity	23 deg.C , 56%RH	25 deg.C , 68%RH
Engineer	Makoto Hosaka	Makoto Hosaka
Mode	Tx, 2462 MHz	
	Tx, IEEE802.11b, PN9, worst data mode 1Mbps	

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

[illegible]
$$\text{Result} = \text{Reading} + \text{Ant Factor} + \text{Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz))} - \text{Gain(Amplifier)}$$

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

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

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

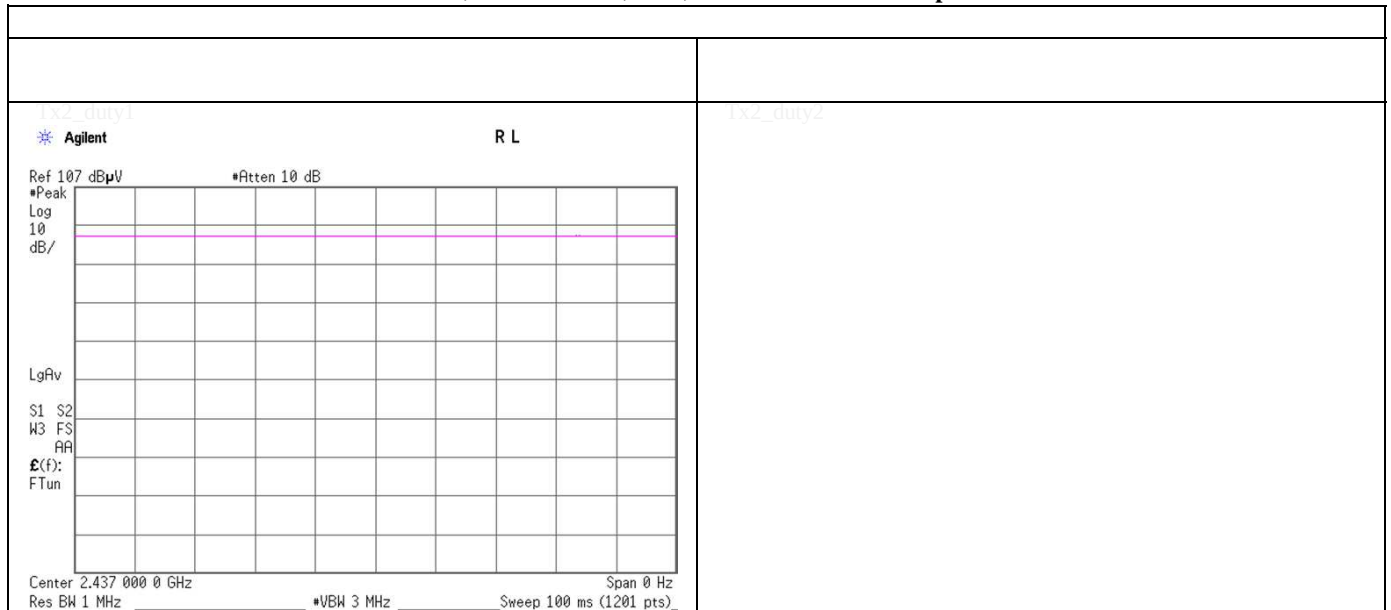
20dBc Data Sheet (RBW 100kHz, VBW 500kHz)										
Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remarks
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	2462.000	PK	87.6	28.8	24.5	41.4	99.5	-	-	Carrier
Hori.	9848.000	PK	47.2	39.2	9.5	38.9	57.0	79.5	22.5	
Vert.	2462.000	PK	87.5	28.8	24.5	41.4	99.4	-	-	Carrier
Vert.	9848.000	PK	47.6	39.2	9.5	38.9	57.4	79.4	22.0	

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

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Burst rate confirmation

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



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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date August 16, 2012 August 17, 2012
 Temperature / Humidity 23 deg.C , 56%RH 25 deg.C , 68%RH
 Engineer Makoto Hosaka Makoto Hosaka
 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	48.0	28.5	24.5	41.4	59.6	73.9	14.3	100	110	
Hori.	4824.000	PK	47.1	31.9	6.8	41.2	44.6	73.9	29.3	100	0	
Hori.	7236.000	PK	48.2	36.6	8.5	41.4	51.9	73.9	22.0	100	0	
Hori.	12060.000	PK	47.6	40.1	10.7	39.4	59.0	73.9	14.9	100	0	
Hori.	2390.000	AV	34.8	28.5	24.5	41.4	46.4	53.9	7.5	100	110	VBW:10Hz
Hori.	4824.000	AV	34.8	31.9	6.8	41.2	32.3	53.9	21.6	100	0	VBW:10Hz
Hori.	7236.000	AV	35.6	36.6	8.5	41.4	39.3	53.9	14.6	100	0	VBW:10Hz
Hori.	12060.000	AV	34.7	40.1	10.7	39.4	46.1	53.9	7.8	100	0	VBW:10Hz
Vert.	2390.000	PK	47.4	28.5	24.5	41.4	59.0	73.9	14.9	100	11	
Vert.	4824.000	PK	47.6	31.9	6.8	41.2	45.1	73.9	28.8	100	0	
Vert.	7236.000	PK	48.4	36.6	8.5	41.4	52.1	73.9	21.8	100	0	
Vert.	12060.000	PK	46.9	40.1	10.7	39.4	58.3	73.9	15.6	100	0	
Vert.	2390.000	AV	34.8	28.5	24.5	41.4	46.4	53.9	7.5	100	11	VBW:10Hz
Vert.	4824.000	AV	34.7	31.9	6.8	41.2	32.2	53.9	21.7	100	0	VBW:10Hz
Vert.	7236.000	AV	35.7	36.6	8.5	41.4	39.4	53.9	14.5	100	0	VBW:10Hz
Vert.	12060.000	AV	34.6	40.1	10.7	39.4	46.0	53.9	7.9	100	0	VBW:10Hz

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

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

Distance factor : 15GHz -40GHz : $20\log(3.0\text{m}/1.0\text{m}) = 9.5\text{dB}$ **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	78.4	28.6	24.5	41.4	90.1	-	-	Carrier
Hori.	2400.000	PK	46.1	28.5	24.5	41.4	57.7	70.1	12.4	
Hori.	9648.000	PK	45.6	39.1	9.4	38.9	55.2	70.1	14.9	
Vert.	2412.000	PK	78.3	28.6	24.5	41.4	90.0	-	-	Carrier
Vert.	2400.000	PK	46.0	28.5	24.5	41.4	57.6	70.0	12.4	
Vert.	9648.000	PK	45.4	39.1	9.4	38.9	55.0	70.0	15.0	

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

Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi Anechoic Chamber
Date	August 16, 2012	August 17, 2012
Temperature / Humidity	23 deg.C , 56%RH	25 deg.C , 68%RH
Engineer	Makoto Hosaka	Makoto Hosaka
Mode	Tx, 2437 MHz	
	Tx, IEEE802.11g, PN9, worst data mode 6Mbps	

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

[illegible]
$$\text{Result} = \text{Reading} + \text{Ant Factor} + \text{Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz))} - \text{Gain(Amplifier)}$$

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

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

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

20dBc Data Sheet (RBW 100kHz, VBW 500kHz)										
Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remarks
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	2437.000	PK	79.3	28.7	24.5	41.4	91.1	-	-	Carrier
Hori.	9748.000	PK	45.2	39.2	9.5	38.9	55.0	71.1	16.1	
Vert.	2437.000	PK	79.8	28.7	24.5	41.4	91.6	-	-	Carrier
Vert.	9748.000	PK	45.3	39.2	9.5	38.9	55.1	71.6	16.5	

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date August 16, 2012 August 17, 2012
 Temperature / Humidity 23 deg.C , 56%RH 25 deg.C , 68%RH
 Engineer Makoto Hosaka Makoto Hosaka
 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.	545.999	QP	41.2	18.3	9.6	32.0	37.1	46.0	8.9	176	188	Y-axis VBW:10Hz VBW:10Hz VBW:10Hz VBW:10Hz
Hori.	2483.500	PK	47.4	28.9	24.6	41.4	59.5	73.9	14.4	100	109	
Hori.	4924.000	PK	48.0	32.2	6.9	41.0	46.1	73.9	27.8	100	68	
Hori.	7386.000	PK	48.0	36.8	8.7	41.5	52.0	73.9	21.9	100	0	
Hori.	12310.000	PK	44.5	40.2	10.8	39.3	56.2	73.9	17.7	100	0	
Hori.	2483.500	AV	35.2	28.9	24.6	41.4	47.3	53.9	6.6	100	109	
Hori.	4924.000	AV	35.5	32.2	6.9	41.0	33.6	53.9	20.3	100	68	
Hori.	7386.000	AV	34.7	36.8	8.7	41.5	38.7	53.9	15.2	100	0	
Hori.	12310.000	AV	31.7	40.2	10.8	39.3	43.4	53.9	10.5	100	0	
Vert.	49.383	QP	36.8	11.3	6.8	32.2	22.7	40.0	17.3	100	192	Cradle Cradle Cradle Cradle X-axis VBW:10Hz VBW:10Hz VBW:10Hz VBW:10Hz
Vert.	87.849	QP	46.0	7.3	7.5	32.2	28.6	40.0	11.4	100	299	
Vert.	91.136	QP	47.0	7.9	7.5	32.2	30.2	43.5	13.3	100	299	
Vert.	102.082	QP	46.9	10.0	7.2	32.1	32.0	43.5	11.5	100	216	
Vert.	545.999	QP	41.2	18.3	9.6	32.0	37.1	46.0	8.9	100	172	
Vert.	2483.500	PK	48.2	28.9	24.6	41.4	60.3	73.9	13.6	100	69	
Vert.	4924.000	PK	47.6	32.2	6.9	41.0	45.7	73.9	28.2	100	0	
Vert.	7386.000	PK	47.0	36.8	8.7	41.5	51.0	73.9	22.9	100	0	
Vert.	12310.000	PK	44.4	40.2	10.8	39.3	56.1	73.9	17.8	100	0	
Vert.	2483.500	AV	35.1	28.9	24.6	41.4	47.2	53.9	6.7	100	69	
Vert.	4924.000	AV	35.2	32.2	6.9	41.0	33.3	53.9	20.6	100	0	
Vert.	7386.000	AV	35.0	36.8	8.7	41.5	39.0	53.9	14.9	100	0	
Vert.	12310.000	AV	31.9	40.2	10.8	39.3	43.6	53.9	10.3	100	0	

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

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

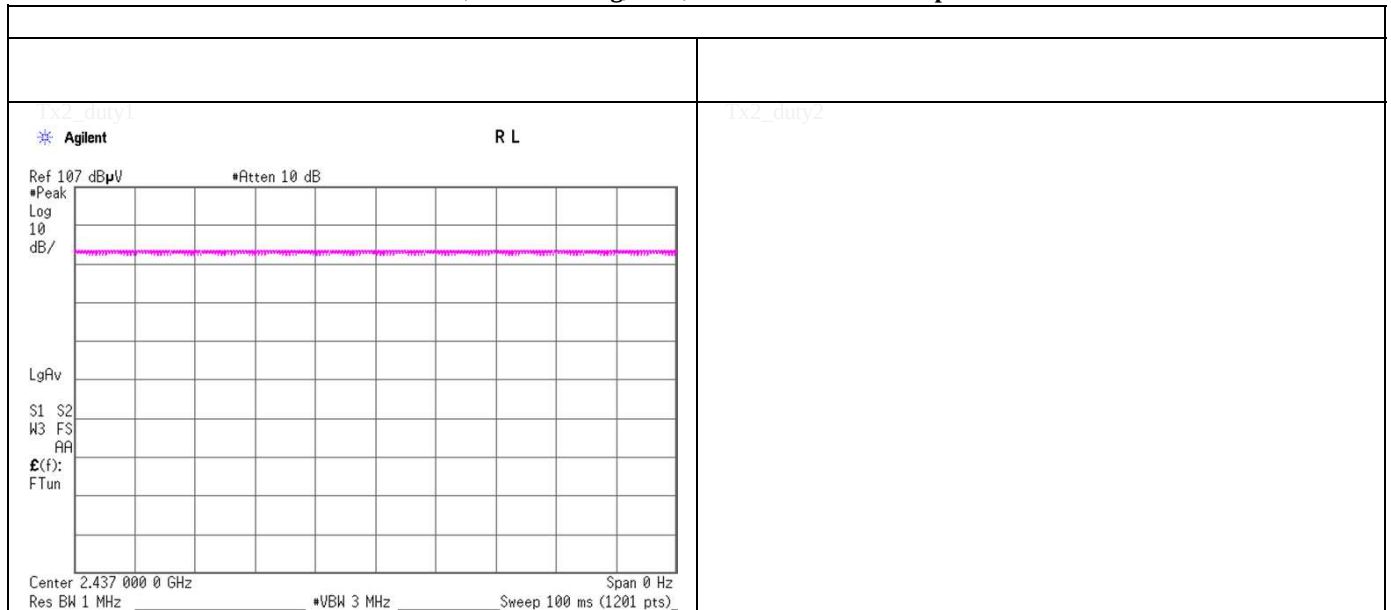
Distance factor : 15GHz -40GHz : $20\log(3.0\text{m}/1.0\text{m}) = 9.5\text{dB}$ **20dBc Data Sheet (RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2462.000	PK	79.9	28.8	24.5	41.4	91.8	-	-	Carrier
Hori.	9848.000	PK	44.4	39.2	9.5	38.9	54.2	71.8	17.6	
Vert.	2462.000	PK	79.7	28.8	24.5	41.4	91.6	-	-	Carrier
Vert.	9848.000	PK	44.1	39.2	9.5	38.9	53.9	71.6	17.7	

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

Burst rate confirmation

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



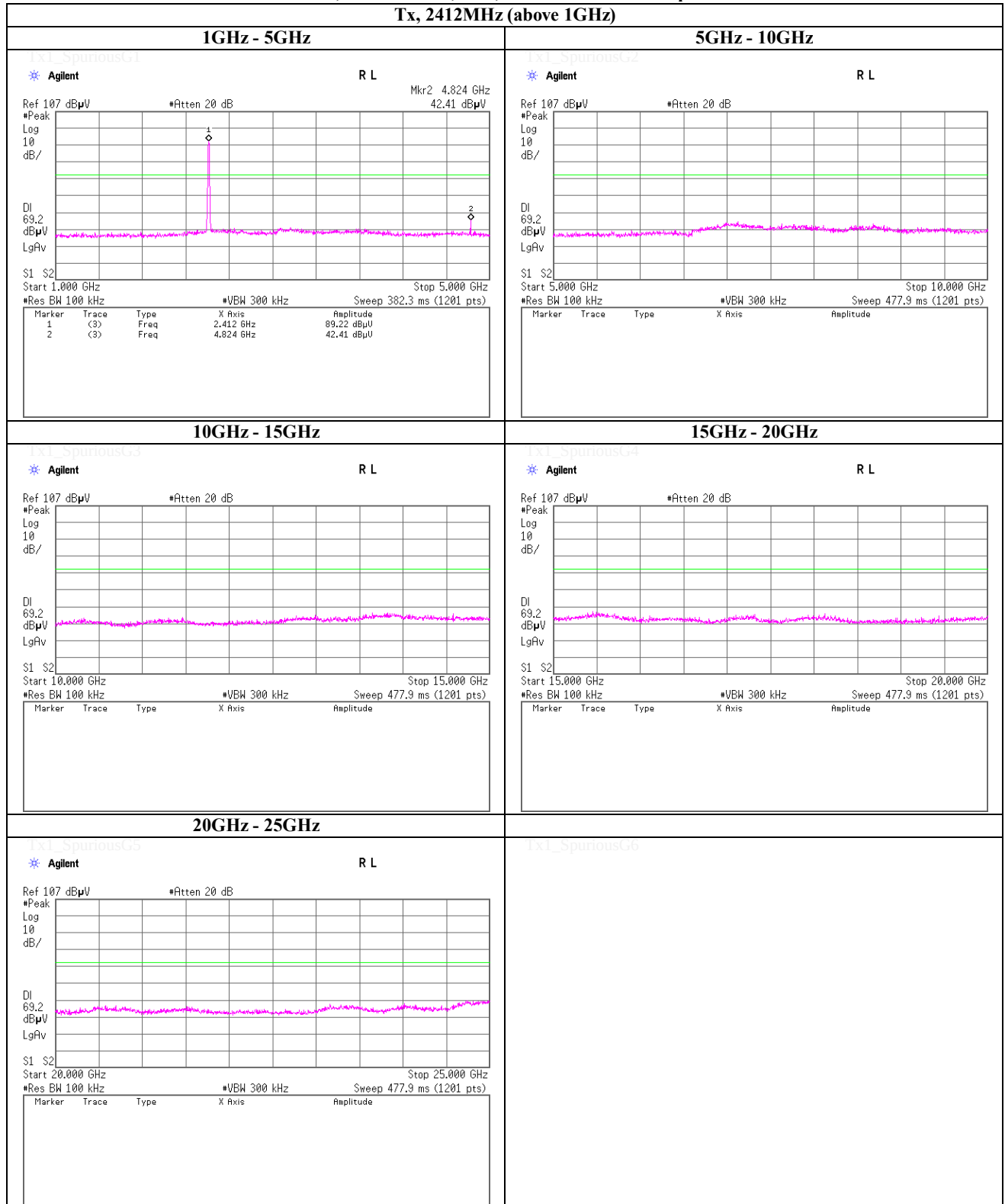
UL Japan, Inc.

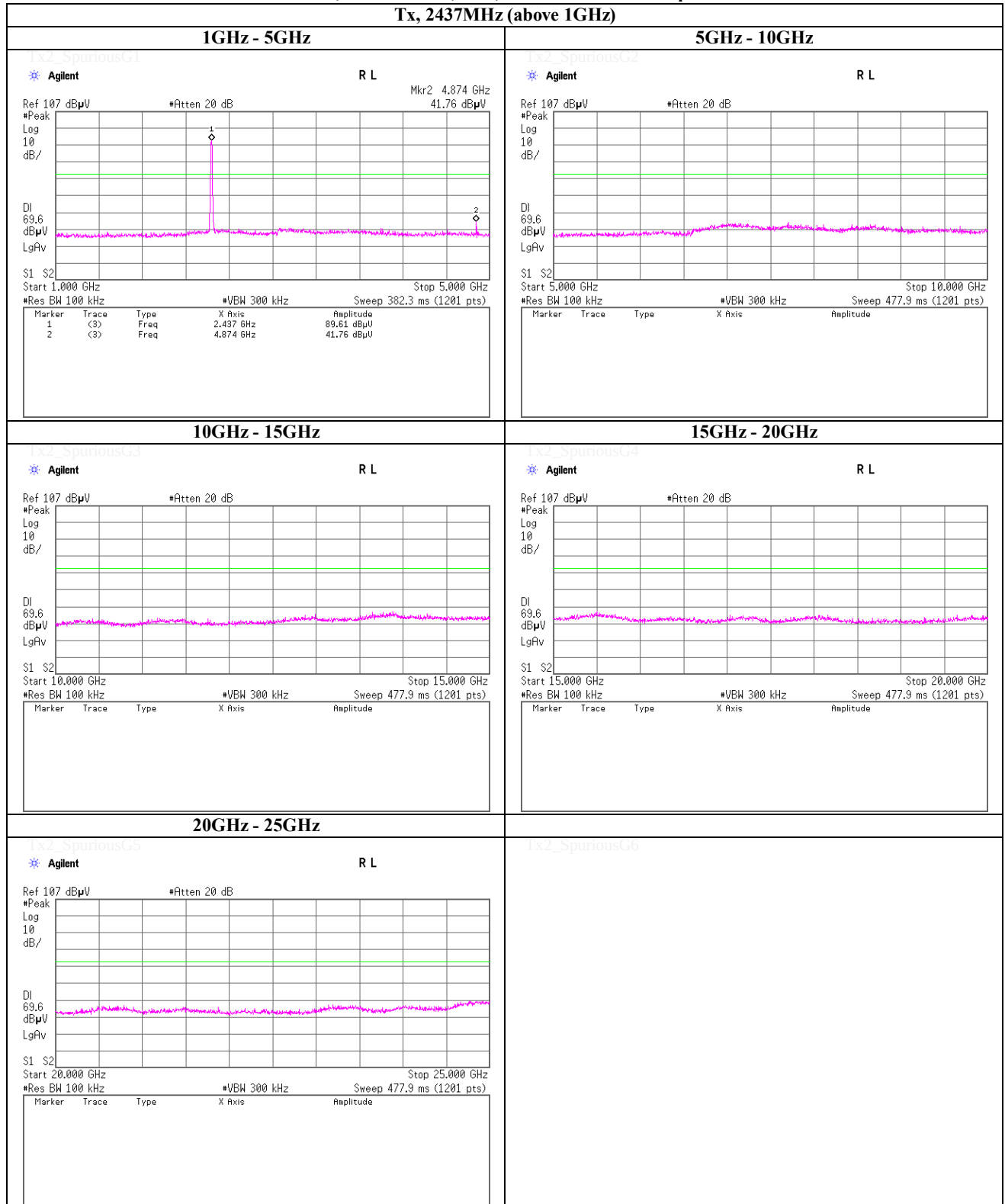
Shonan EMC Lab.

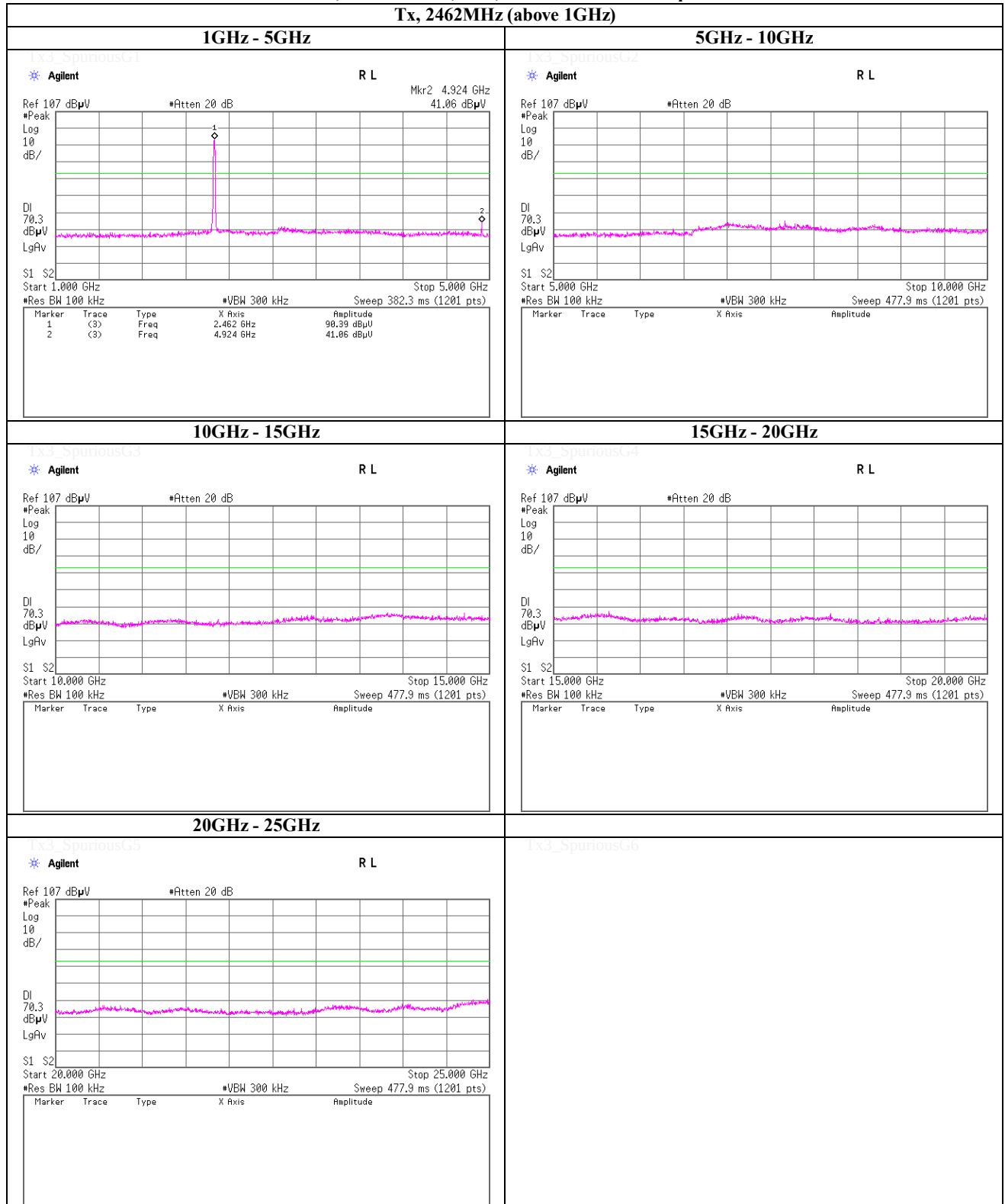
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

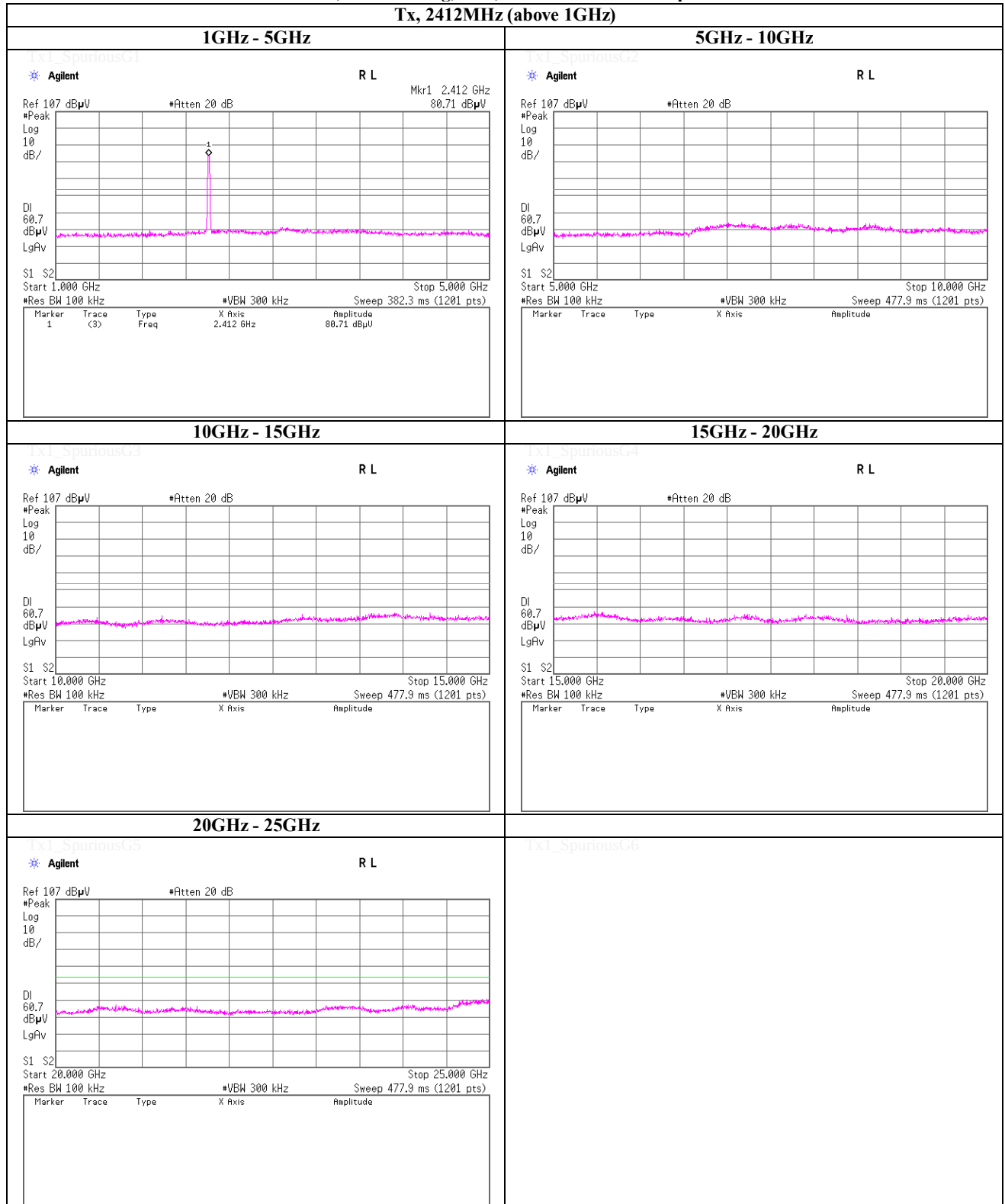
Telephone : +81 463 50 6400

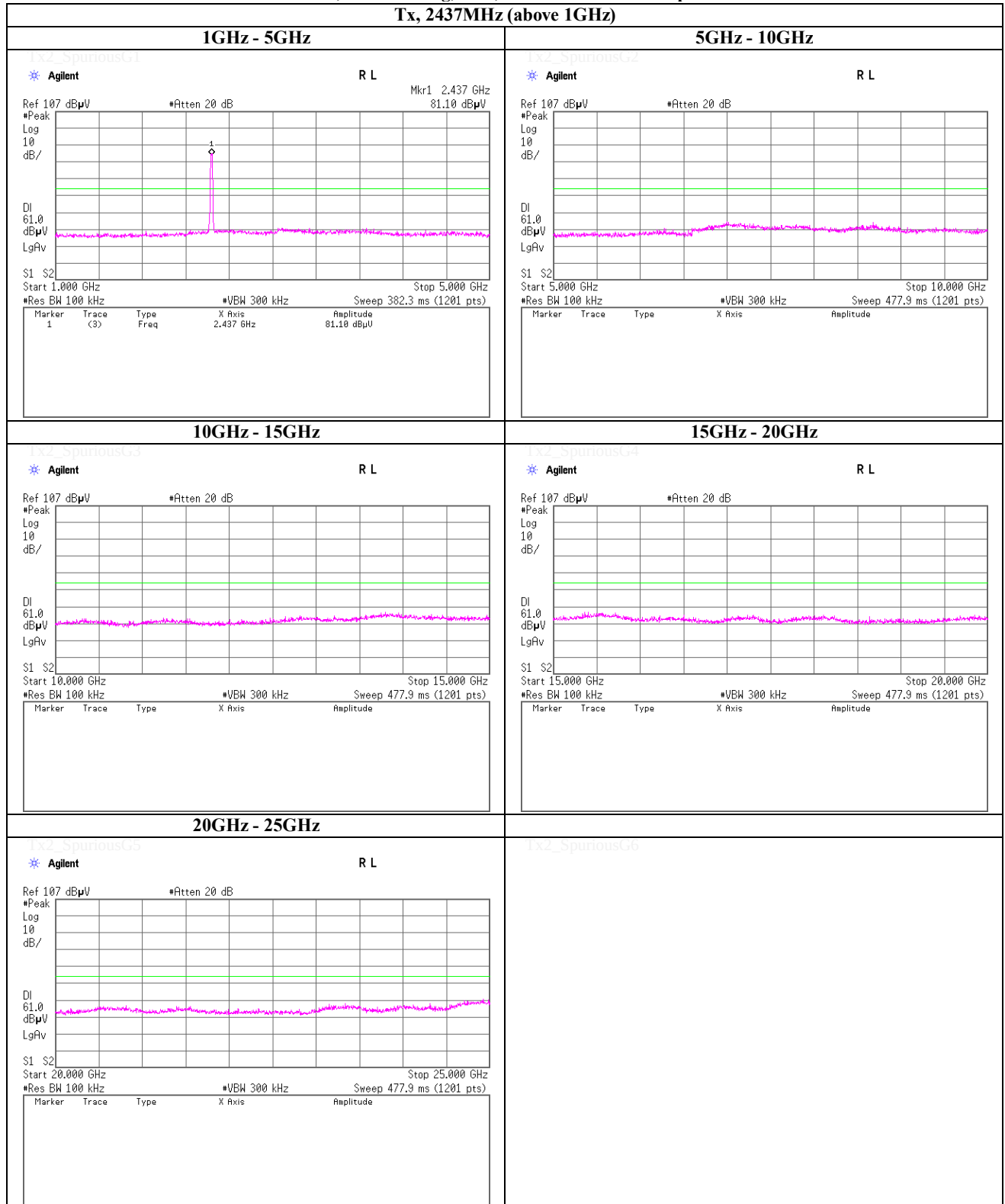
Facsimile : +81 463 50 6401

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**

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**

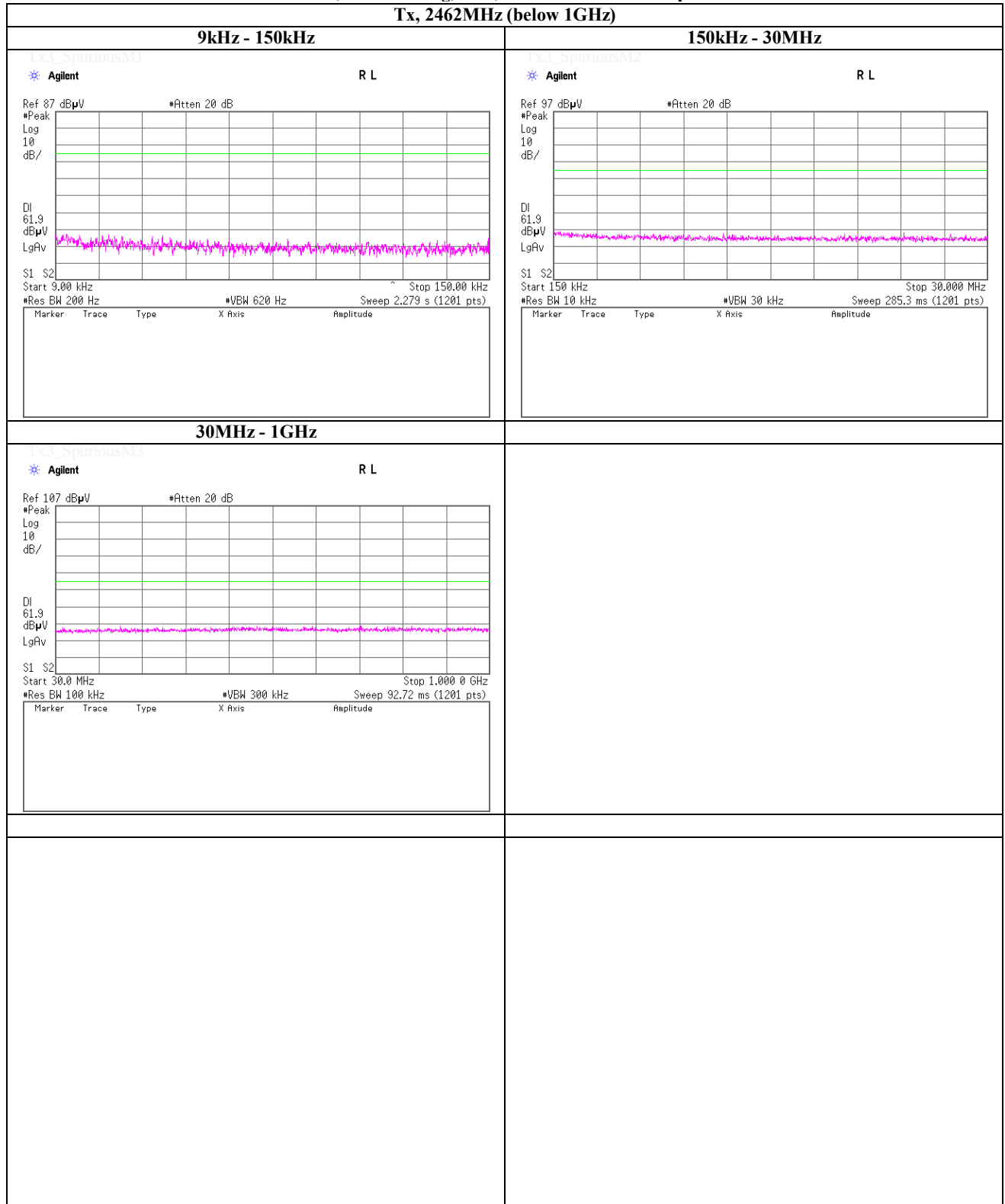
Spurious emission (Conducted)**Tx, IEEE802.11b, PN9, worst data mode 1Mbps****Tx, 2462MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.****1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN****Telephone : +81 463 50 6400****Facsimile : +81 463 50 6401**

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**

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**

Spurious emission (Conducted)
Tx, IEEE802.11g, PN9, worst data mode 6Mbps

Tx, 2462MHz (below 1GHz)



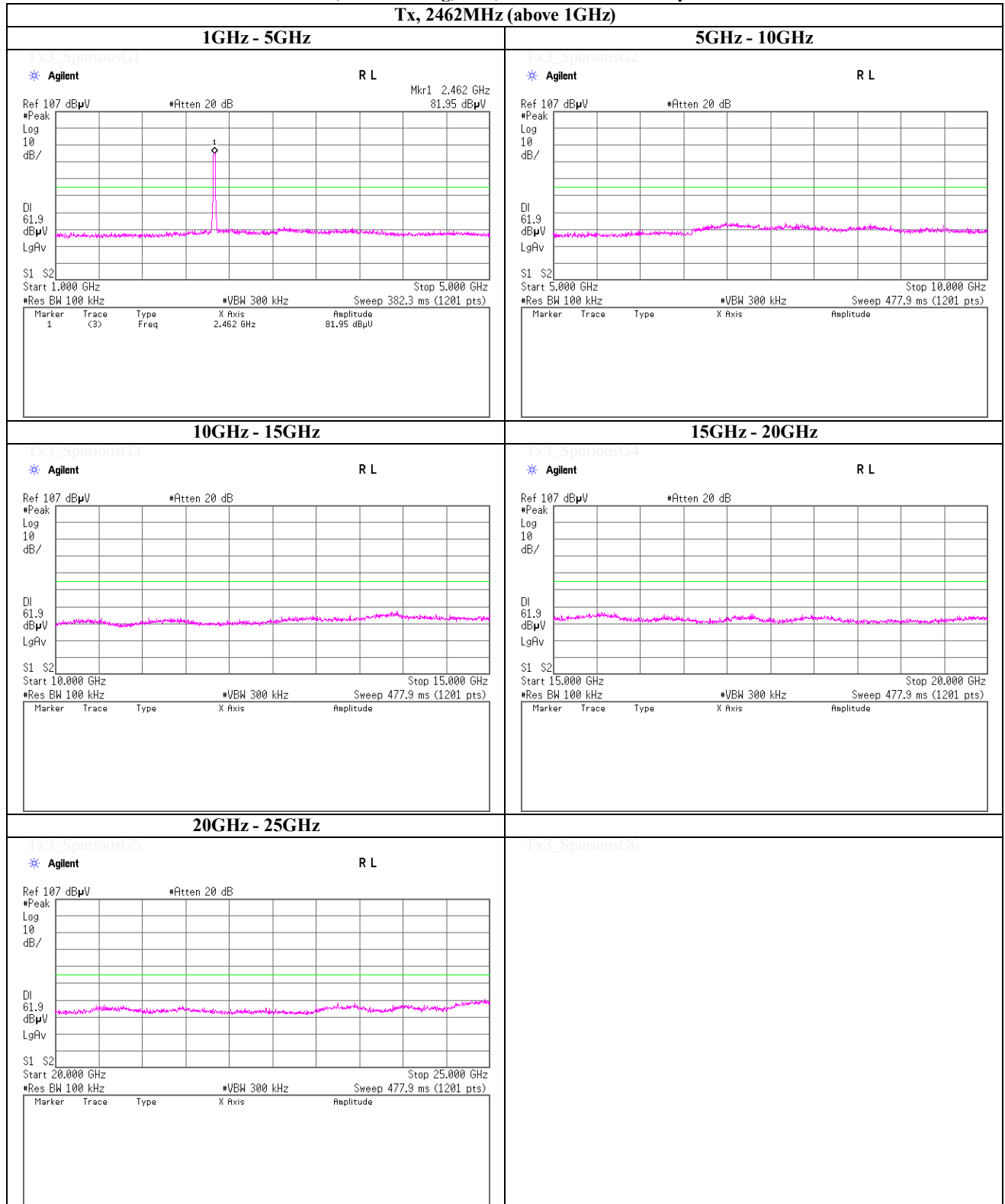
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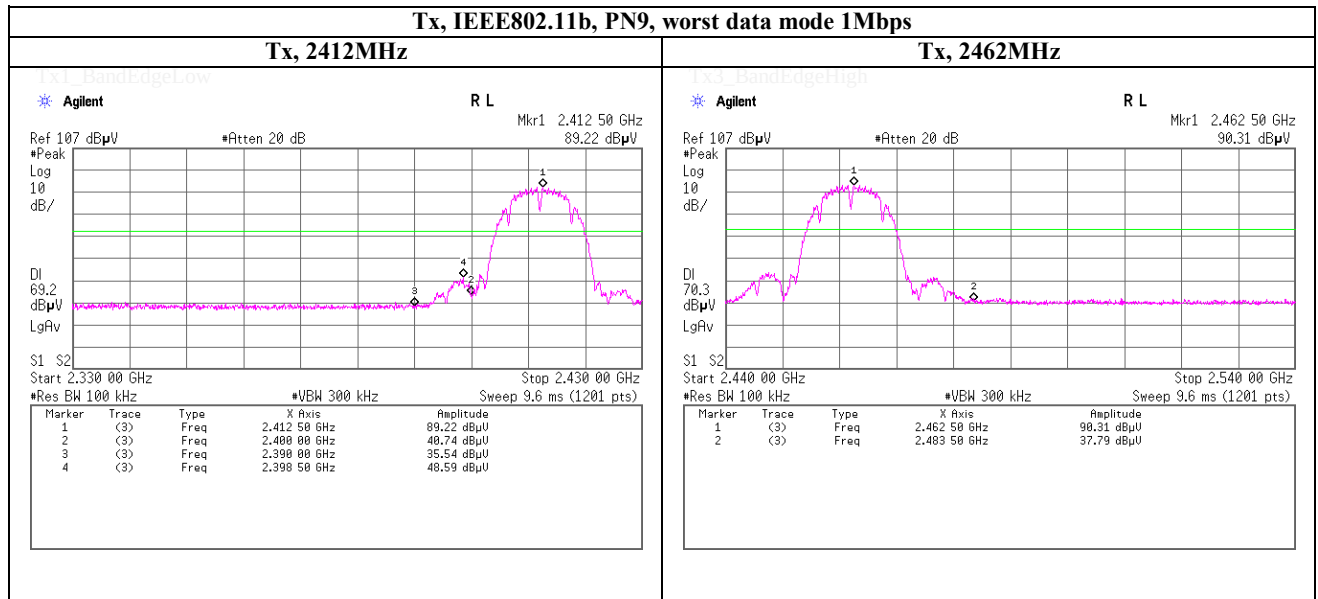
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

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

Spurious emission (Conducted)

Band Edge compliance



UL Japan, Inc.

Shonan EMC Lab.

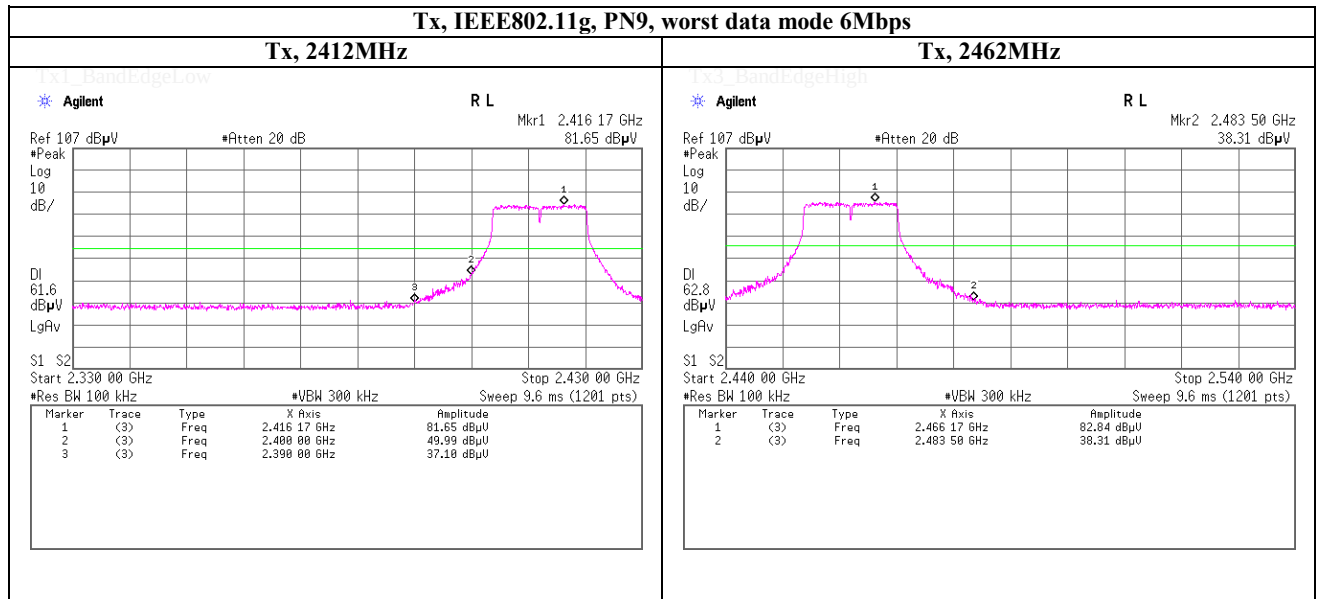
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Spurious emission (Conducted)

Band Edge compliance



UL Japan, Inc.

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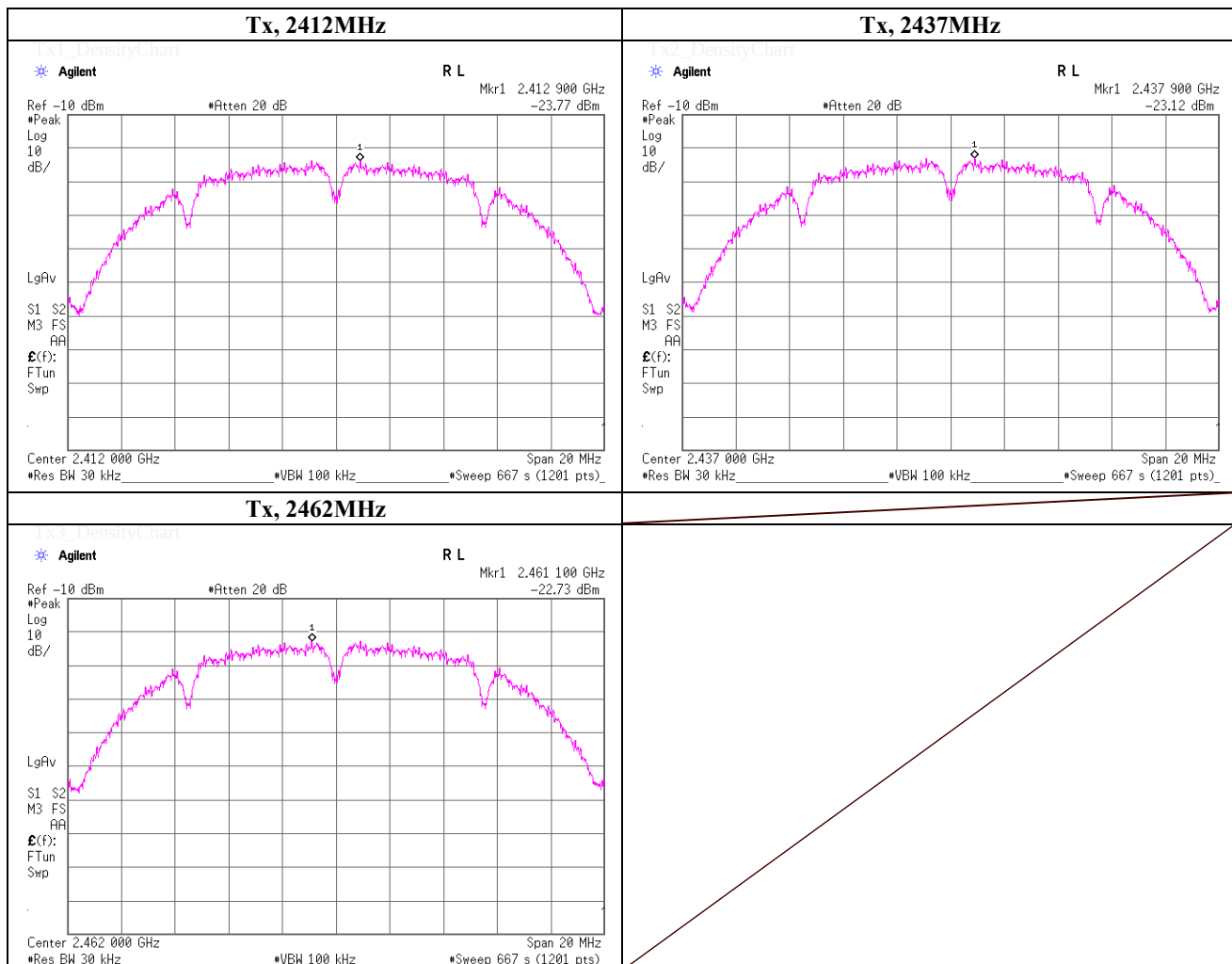
Power Density

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	August 3, 2012	
Temperature / Humidity	26deg.C , 49%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	2412.90	-23.77	0.44	20.22	-3.11	8.00	11.11
2437.0000	2437.90	-23.12	0.44	20.22	-2.46	8.00	10.46
2462.0000	2461.10	-22.73	0.45	20.22	-2.06	8.00	10.06

Sample Calculation:

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



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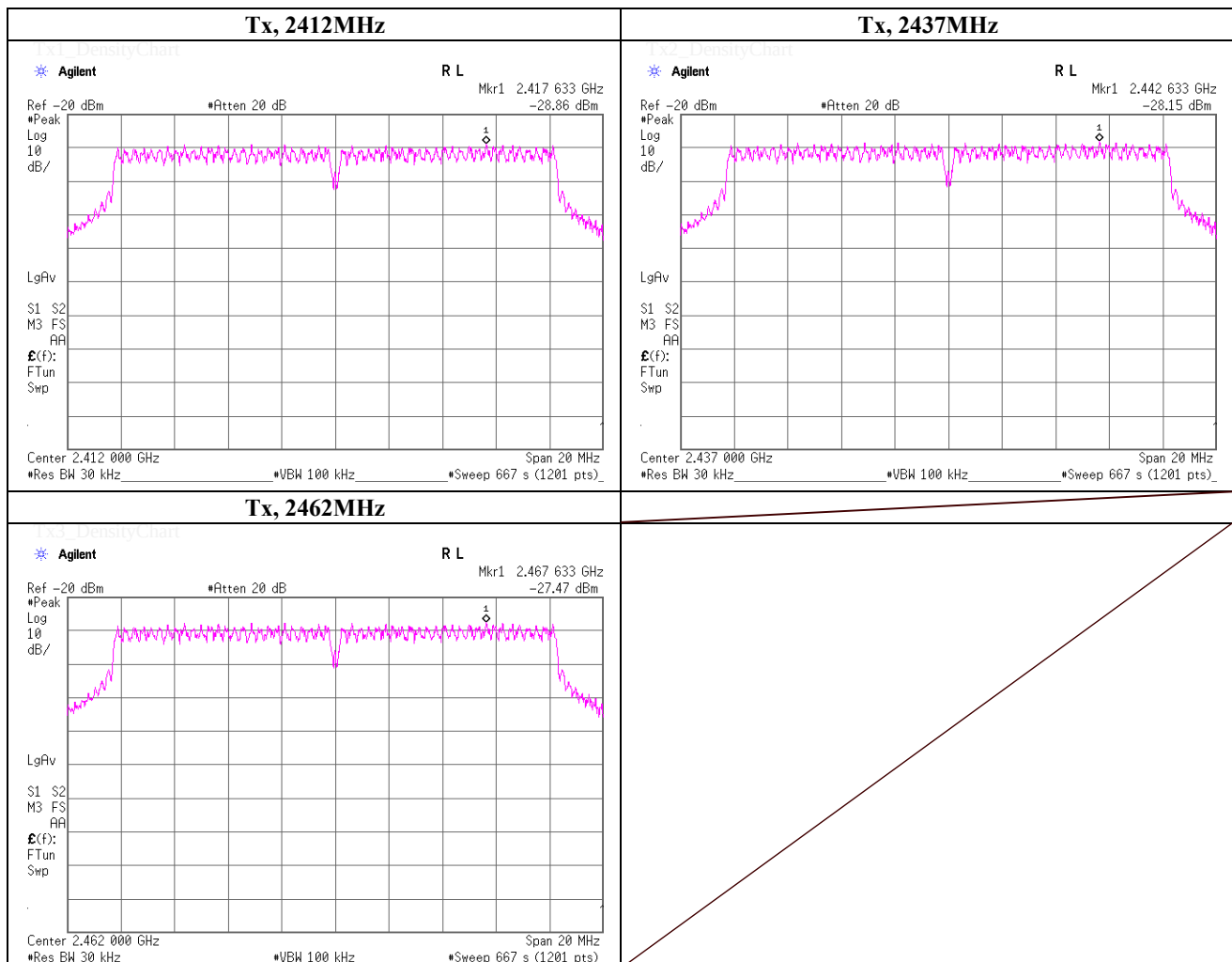
Power Density

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	August 3, 2012	
Temperature / Humidity	26deg.C , 49%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	2417.63	-28.86	0.44	20.22	-8.20	8.00	16.20
2437.0000	2442.63	-28.15	0.44	20.22	-7.49	8.00	15.49
2462.0000	2467.63	-27.47	0.45	20.22	-6.80	8.00	14.80

Sample Calculation:

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



UL Japan, Inc.

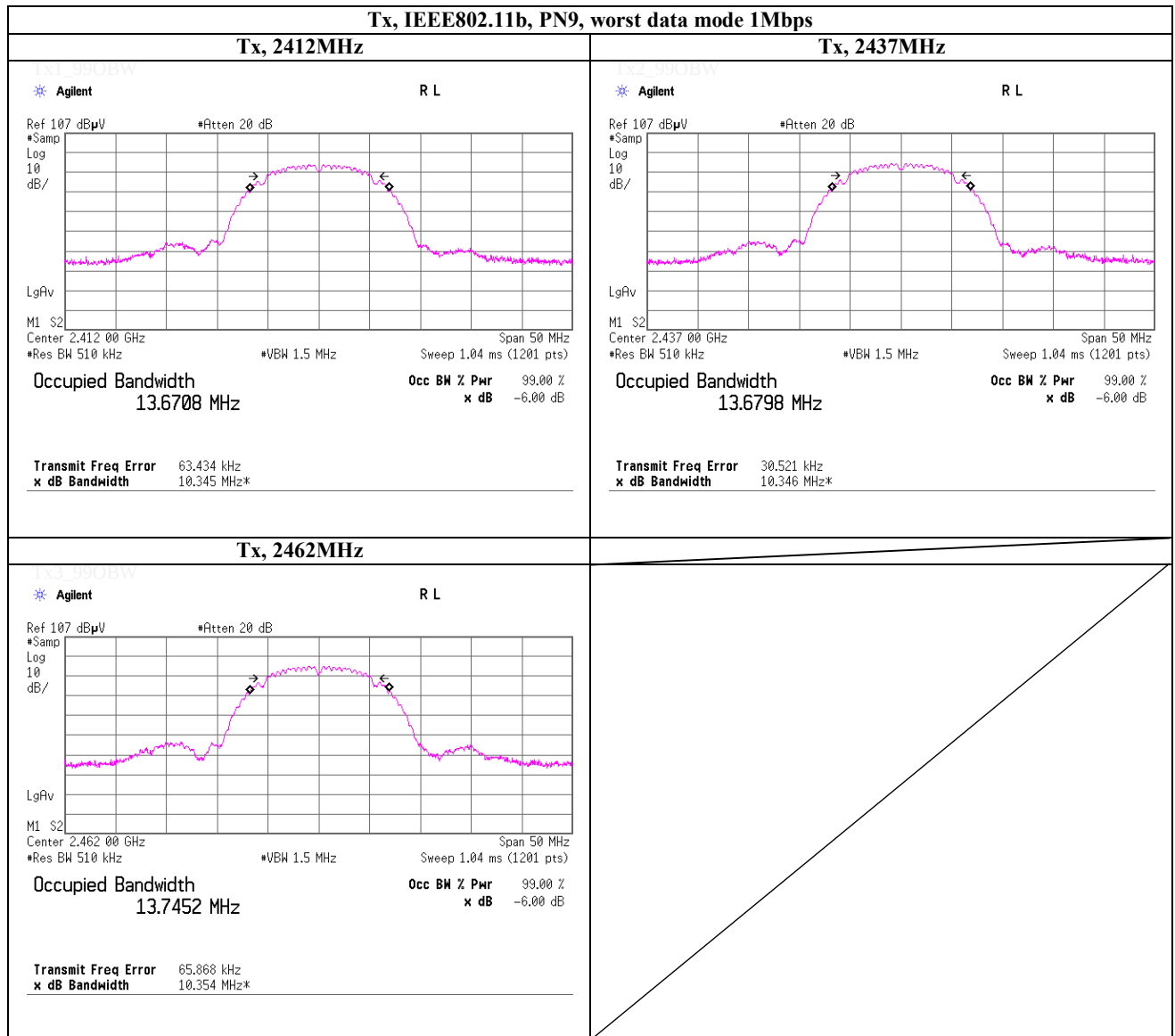
Shonan EMC Lab.

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99% Occupied Bandwidth



UL Japan, Inc.

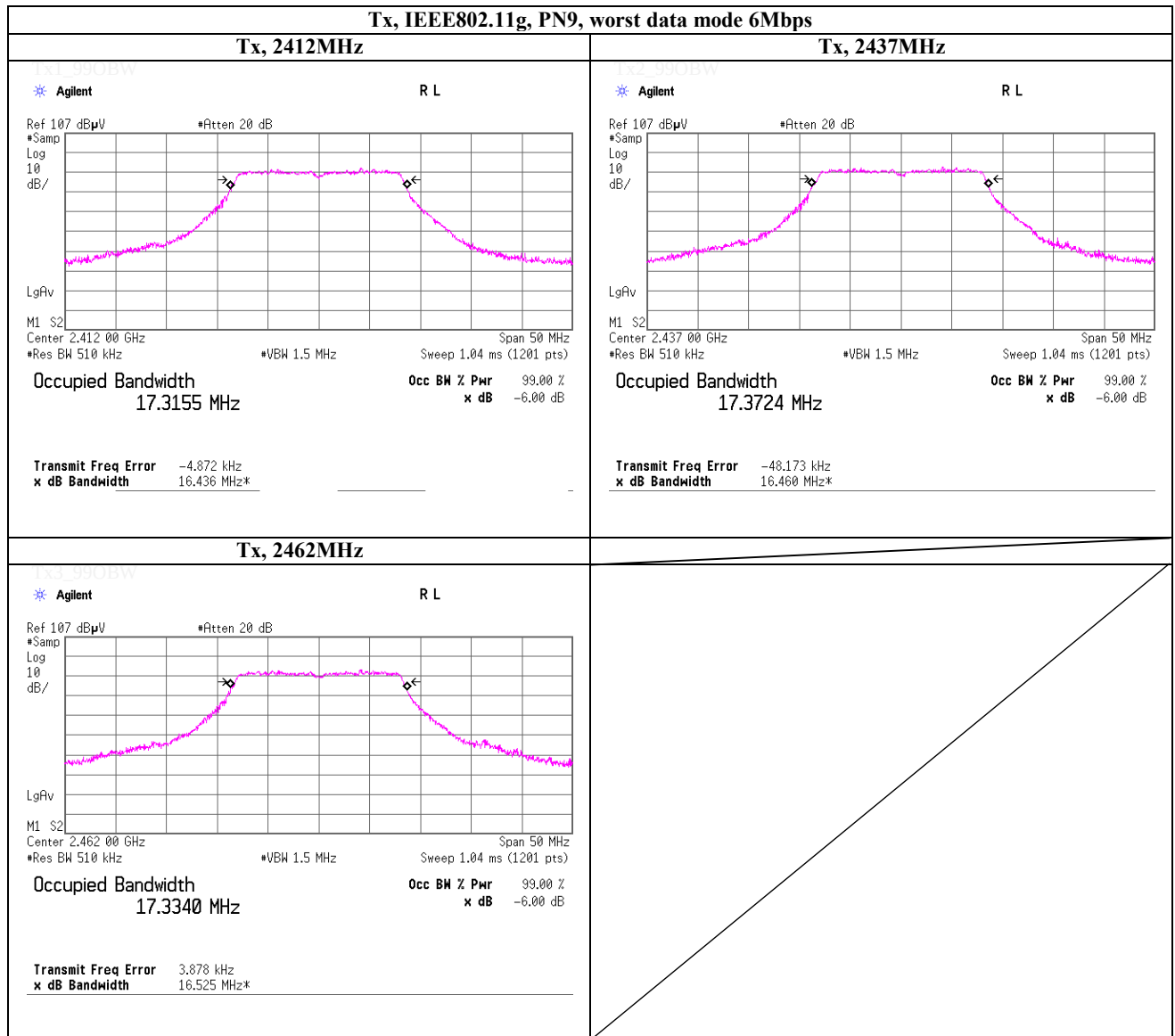
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99% Occupied Bandwidth



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APPENDIX 2

Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	AT	2012/02/16 * 12
SAT20-05	Attenuator	Weinschel Corp.	54A-20	Y5649	AT	2011/11/09 * 12
SCC-G11	Coaxial Cable	Suhner	SUCOFLEX 102	31595/2	AT	2012/03/12 * 12
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2012/04/19 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2012/04/19 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2012/03/26 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2011/09/23 * 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	2012/04/10 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2012/05/22 * 12
SHA-RS01	Horn Antenna	Schwarzbeck	BBHA9120D	770	RE	2011/08/11 * 12
SAT20-01	Attenuator(above1GHz)	Agilent	8493C-020	74889	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
SCC-G17	Coaxial Cable	Suhner	SUCOFLEX 104A	46291/4A	RE	2012/03/12 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2012/03/30 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2012/02/06 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2012/03/16 * 12
SJM-10	Measure	PROMART	SEN1935	-	RE/CE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFL,MF)	-	RE/CE	-
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2012/02/10 * 12
SAT6-03	Attenuator	JFW	50HF-006N	-	RE	2012/02/10 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2011/10/23 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	RE	2012/04/10 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2011/10/23 * 12
STR-03	Test Receiver	Rohde & Schwarz	ES140	100054/040	RE/CE	2012/06/14 * 12
SCC-C9/C10/SRSE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-271(RF Selector)	CE	2012/04/10 * 12
SLS-05	LISN	Rohde & Schwarz	ENV216	100516	CE	2012/02/23 * 12
SAT3-03	Attenuator	JFW	50HF-003N	-	CE	2012/02/17 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2012/03/26 * 12

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

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

Test Item :

CE: Conducted emission ,
 RE: Radiated emission ,
 AT: Antenna terminal conducted test