



RADIO TEST REPORT

Test Report No. : 31AE0257-SH-03-A

Applicant : Sharp Corporation
Type of Equipment : Wireless LAN USB Adapter
Model No. : MX-EB13
FCC ID : APYMXEB13
Test regulation : FCC Part15 Subpart C: 2012
Test result : Complied

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

Date of test:

March 27 to April 6, 2012

Representative test engineer:

S. Takano

Shinichi Takano
Engineer of WiSE Japan,
UL Verification Service

Approved by :

G. Ishiwata

Go Ishiwata
Manager of WiSE Japan,
UL Verification Service

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



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13-EM-F0429

Original Test Report No.: 31AE0257-SH-03-A

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SECTION 1: Customer information

Company Name : Sharp Corporation
Address : 492 Minosho-cho, Yamatokoriyama-shi, Nara 639-1186, Japan
Telephone Number : +81-743-55-4075
Facsimile Number : +81-743-55-5843
Contact Person : Yasuji Yamauchi

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

Type of Equipment : Wireless LAN USB Adapter
Model No. : MX-EB13
Serial No. : Refer to 4.2 in this report.
Rating : DC5V
Receipt Date of Sample : March 26, 2012
Country of Mass-production : Japan
Condition of EUT : Production model
Modification of EUT : No modification by the test lab.

2.2 Product description

Model: MX-EB13 (referred to as the EUT in this report) is a Wireless LAN USB Adapter.

Clock frequency(ies) in the system : Oscillator: 40MHz, VCO: 3.216 to 3.296GHz

Radio specification

Equipment type : Transceiver
Frequency of operation : 2412-2462MHz
Bandwidth & channel spacing : Bandwidth:
20MHz (IEEE 802.11b, 11g, 11n-HT20) / 40MHz (IEEE 802.11n-HT40)
Channel spacing: 5MHz
Type of modulation : DSSS: CCK, DQPSK, DBPSK
OFDM: 64QAM, 16QAM, QPSK, BPSK
Antenna type : Monopole pattern
Antenna connector type : None
Antenna gain with cable loss : +0.5 dBi
ITU code : D1D, G1D
Operation temperature range : -10 to +60 deg.C.

FCC 15.31 (e)

The adapter provides the Wireless transmitter with stable power supply (DC3.3V), therefore, the equipment complies with the requirement.

FCC 15.203

The antenna is not removable from the EUT. Therefore, the equipment complies with the antenna 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 March 30, 2012 and effective April 30, 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 March 30, 2012 does not affect the test specification applied to the EUT.

The EUT complies with FCC Part 15 Subpart B. Refer to the test report 31AE0257-SH-03-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 | 12.1dB Freq.: 0.22390MHz Detector: Quasi-Peak Phase: L1 Mode: Tx 2437MHz, 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 | 3.0dB Freq.: 599.997MHz Detector: Quasi-Peak Polarization: Vertical Mode: Tx 2437MHz, IEEE 802.11g | 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 EMI 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 EMI 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 | 3.6 dB |
| Radiated emission (Measurement distance: 3m) | 9kHz-30MHz | 3.7 dB | 3.7 dB | 3.6 dB |
| | 30MHz-300MHz | 4.9 dB | 5.1 dB | 5.0 dB |
| | 300MHz-1GHz | 5.0 dB | 5.2 dB | 5.0 dB |
| | 1GHz-15GHz | 4.8 dB | 4.8 dB | 4.9 dB |
| Radiated emission (Measurement distance: 1m) | 15GHz-18GHz | 5.6 dB | 5.6 dB | 5.6 dB |
| | 18GHz-40GHz | 4.8 dB | 4.3 dB | 4.4 dB |

*1: SAC=Semi-Anechoic Chamber

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

Conducted emission test

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

Radiated emission test

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

Antenna port conducted test

Power measurement uncertainty above 1GHz for this test was: (±) 1.5dB

Spurious emission (Conducted) measurement (below 1GHz) uncertainty for this test was: (±) 1.7dB

Spurious emission (Conducted) measurement (1G-3GHz) uncertainty for this test was: (±) 2.3dB

Spurious emission (Conducted) measurement (3G-18GHz) uncertainty for this test was: (±) 3.0dB

Spurious emission (Conducted) measurement (18G-26.5GHz) uncertainty for this test was: (±) 2.9dB

Bandwidth measurement uncertainty for this test was: (±) 5.4%

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3.5 Test location

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JAB Accreditation No. : RTL02610

| | FCC Registration No. | IC Registration No. | Width x Depth x Height (m) | Size of reference ground plane (m) / horizontal conducting plane | Maximum measurement distance |
|--|----------------------------|---------------------------|-------------------------------|---|------------------------------------|
| <input type="checkbox"/> No.1 Semi-anechoic chamber | 697847 | 2973D-1 | 20.6 x 11.3 x 7.65 | 20.6 x 11.3 | 10m |
| <input type="checkbox"/> No.2 Semi-anechoic chamber | 697847 | 2973D-2 | 20.6 x 11.3 x 7.65 | 20.6 x 11.3 | 10m |
| <input checked="" type="checkbox"/> No.3 Semi-anechoic chamber | 697847 | 2973D-3 | 12.7 x 7.7 x 5.35 | 12.7 x 7.7 | 5m |
| <input type="checkbox"/> No.4 Full-anechoic chamber | - | - | 8.1 x 5.1 x 3.55 | 8.1 x 5.1 | - |
| <input type="checkbox"/> No.1 shielded room | - | - | 6.8 x 4.1 x 2.7 | 6.8 x 4.1 | - |
| <input type="checkbox"/> No.2 shielded room | - | - | 6.8 x 4.1 x 2.7 | 6.8 x 4.1 | - |
| <input checked="" type="checkbox"/> No.3 shielded room | - | - | 6.3 x 4.7 x 2.7 | 6.3 x 4.7 | - |
| <input type="checkbox"/> No.4 shielded room | - | - | 4.4 x 4.7 x 2.7 | 4.4 x 4.7 | - |
| <input checked="" type="checkbox"/> No.5 shielded room | - | - | 7.8 x 6.4 x 2.7 | 7.8 x 6.4 | - |
| <input type="checkbox"/> No.6 shielded room | - | - | 7.8 x 6.4 x 2.7 | 7.8 x 6.4 | - |

3.6 Test setup, Data of test & Test instruments

Refer to APPENDIX 1 to 3.

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SECTION 4: Operation of E.U.T. during testing**4.1 Operating mode**

The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

| Test item | Mode *1) | Tested frequency | Power setting *2) | Worst data rate *3) | Antenna *4) |
|---|------------------------------|--|--|---------------------|-------------|
| Conducted emission | Transmitting IEEE 802.11g | 2437MHz | "0A" | 6Mbps, PN9 | 1 |
| Radiated emission | Transmitting IEEE 802.11b | 2412MHz, 2437MHz, 2462MHz | ch1:"0C", ch6:"0A", ch11:"0A" | 1Mbps, PN9 | 1 |
| | Transmitting IEEE 802.11g | 2412MHz, 2437MHz, 2462MHz | ch1:"0C", ch6:"0A", ch11:"0A" | 6Mbps, PN9 | 1 |
| | Transmitting IEEE 802.11n-20 | 2412MHz, 2437MHz, 2462MHz | ch1:"0C", ch6:"0A", ch11:"0A" | MCS0, PN9 | 1 |
| | Transmitting IEEE 802.11n-40 | 2422MHz, 2427MHz, 2437MHz, 2447MHz, 2452MHz | ch3:"05", ch4:"0B", ch6:"0A", ch8:"0A", ch9:"04" | MCS0, PN9 | 1 |
| Other items | Transmitting IEEE 802.11b | 2412MHz, 2437MHz, 2462MHz | ch1:"18", ch6:"18", ch11:"18" | 1Mbps, PN9 | *5) |
| | Transmitting IEEE 802.11g | 2412MHz, 2437MHz, 2462MHz | ch1:"18", ch6:"18", ch11:"18" | 6Mbps, PN9 | *5) |
| | Transmitting IEEE 802.11n-20 | 2412MHz, 2437MHz, 2462MHz | ch1:"18", ch6:"18", ch11:"18" | MCS0, PN9 | *5) |
| | Transmitting IEEE 802.11n-40 | 2422MHz, 2437MHz, 2452MHz | ch3:"12", ch6:"18", ch9:"12" | MCS0, PN9 | *5) |
| *1) 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. *2) The power is controlled by the software: Ralink QA Test Program for 3x7x, Ver.1.5.2.0. Each sample has the different setting value although the target value of output power is the same. *3) The worst condition was determined based on the test result of Maximum Peak Output Power. *4) The EUT has 2 antennas. The antenna which outputs the higher power was determined based on the test result of Maximum Peak Output Power. *5) Antenna 1 was used except the test of Maximum Peak Output Power. | | | | | |

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

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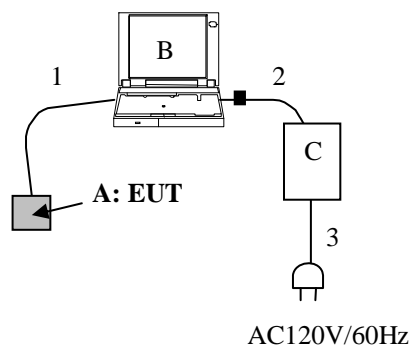
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4.2 Configuration and peripherals

■ : Ferrite core (Standard attachment)



* Test data was taken under worse case conditions.

Description of EUT and support equipment

| No. | Item | Model number | Serial number | Manufacturer | Remarks |
|-----|--------------------------|-------------------------|-------------------------|---------------------------|---------|
| A | Wireless LAN USB Adapter | MX-EB13 | *1) | FUJITSU COMPONENT LIMITED | EUT |
| B | Laptop computer | ThinkPad T43 (2668-D59) | L3YHTEL | IBM | - |
| C | AC adaptor | 92P1016 | 11S92P1016Z1ZAC665H6 Y9 | IBM | - |

*1) Conducted / Radiated emission: 000B5DC1CD15, Other test: 00E000DEF17B

List of cables used

| No. | Cable | Length (m) | Shield-Cable | Shield-Connector | Remarks |
|-----|-------|------------|--------------|------------------|---------|
| 1 | USB | 2.0 | Shielded | Shielded | - |
| 2 | DC | 1.8 | Unshielded | Unshielded | - |
| 3 | AC | 1.0 | Unshielded | Unshielded | - |

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

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SECTION 5: Conducted emission

5.1 Operating environment

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

5.2 Test configuration

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

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

The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals was aligned and was flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from LISN and excess AC cable was bundled in center.

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 PC within a shielded room.

The EUT was connected to a Line Impedance Stabilization Network (LISN) via PC.

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 detector of the test receiver.

Detector 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.

Summary of the test results: Pass

Refer to APPENDIX 1

SECTION 8: Spurious emission (Antenna port conducted)

Test procedure

The spurious emission 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

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SECTION 9: Radiated emission

9.1 Operating environment

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

9.2 Test configuration

EUT was placed on a styrofoam platform of nominal size, 0.5m by 0.5m, raised 0.8m above the conducting ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. Photographs of the set up are shown in APPENDIX 3.

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). 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 and spectrum analyzer.

| 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 and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

| | Carrier | Spurious | | |
|------------|---------|------------|---------|----------|
| | | Below 1GHz | 1-18GHz | 18-25GHz |
| Horizontal | X | Y | X | X |
| Vertical | Z | Z | Z | Z |

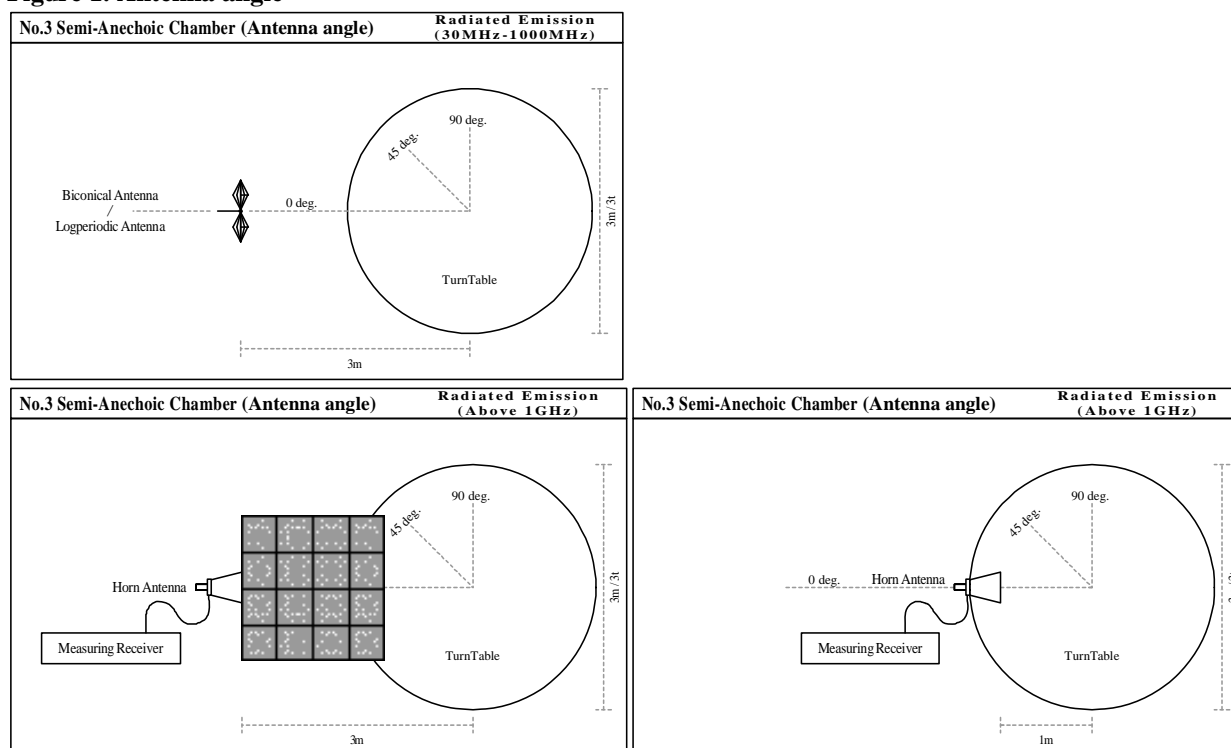
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Figure 1. Antenna angle

9.5 Band edge

Band edge level at 2400MHz is less than 20dB of peak point of the carrier. Band edge level at 2390MHz and 2483.5MHz is below the limits of FCC 15.209. Refer to the data.

9.6 Results

Summary of the test results : Pass *No noise was detected above the 6th order harmonics.
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: Test data

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 the worst position

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APPENDIX 1: Data of Radio tests

DATA OF CONDUCTED EMISSION TEST

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Date : 2012/04/06

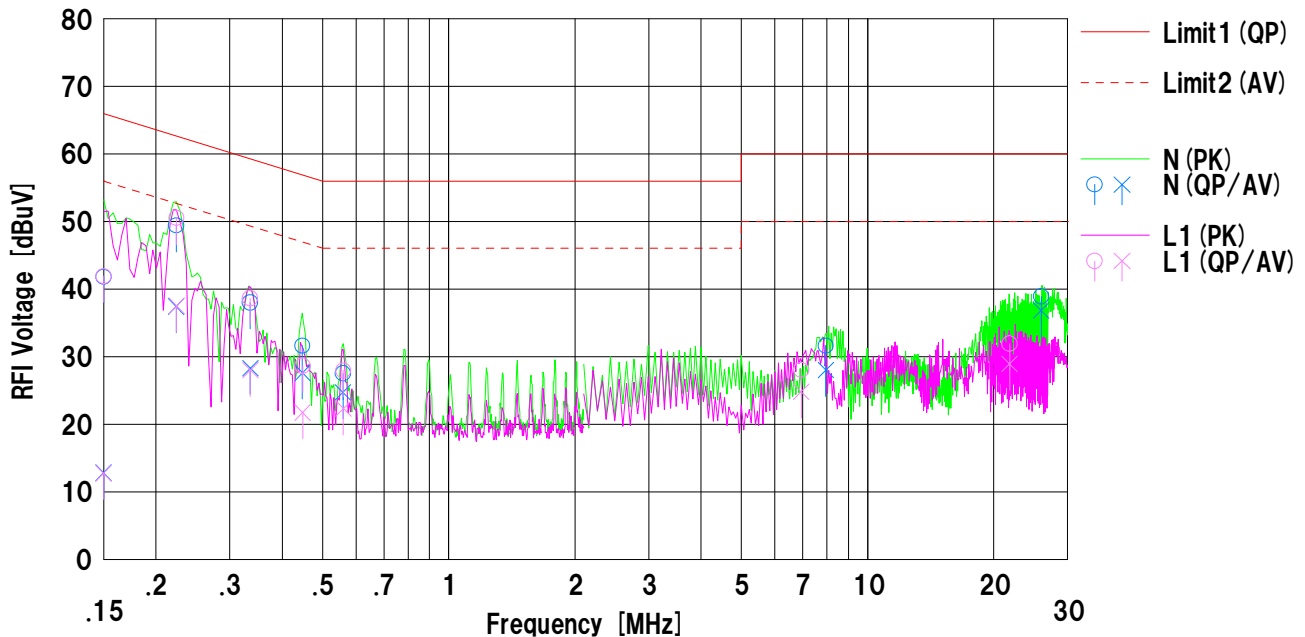
Company : Sharp Corporation
Kind of EUT : Wireless LAN USB Adapter
Model No. : MX-EB13
Serial No. : 000B5DC1CD15

Mode : Tx 11g 2437MHz
Report No. : 31AE0257-SH-03
Power : DC5V (Host PC: AC120V / 60Hz)
Temp./Humi. : 25deg.C. / 32%RH

Remarks : -

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

Engineer : Akio Hayashi



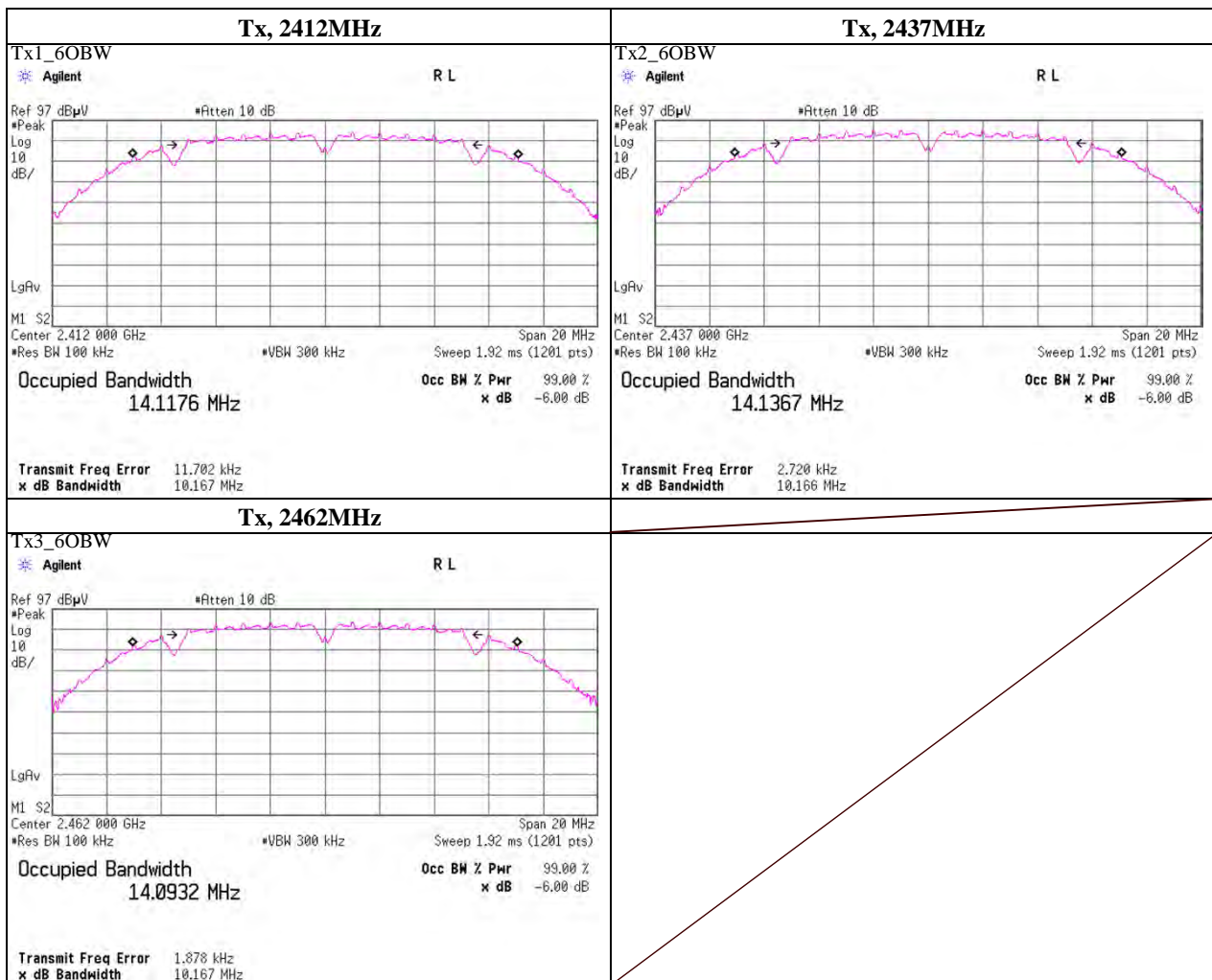
| No. | Freq. [MHz] | Reading | | C.Fac [dB] | Results | | Limit | | Margin | | Phase | Comment |
|-----|----------------|----------------|----------------|---------------|----------------|----------------|----------------|----------------|--------------|--------------|-------|---------|
| | | <QP> [dBuV] | <AV> [dBuV] | | <QP> [dBuV] | <AV> [dBuV] | <QP> [dBuV] | <AV> [dBuV] | <QP> [dB] | <AV> [dB] | | |
| 1 | 0.15000 | 29.1 | 0.1 | 12.7 | 41.8 | 12.8 | 66.0 | 56.0 | 24.2 | 43.2 | N | |
| 2 | 0.22360 | 36.8 | 24.8 | 12.6 | 49.4 | 37.4 | 62.6 | 52.6 | 13.2 | 15.2 | N | |
| 3 | 0.33572 | 25.3 | 15.6 | 12.7 | 38.0 | 28.3 | 59.3 | 49.3 | 21.3 | 21.0 | N | |
| 4 | 0.44747 | 18.9 | 14.9 | 12.7 | 31.6 | 27.6 | 56.9 | 46.9 | 25.3 | 19.3 | N | |
| 5 | 0.55918 | 14.8 | 12.0 | 12.7 | 27.5 | 24.7 | 56.0 | 46.0 | 28.5 | 21.3 | N | |
| 6 | 7.94725 | 18.6 | 15.0 | 13.0 | 31.6 | 28.0 | 60.0 | 50.0 | 28.4 | 22.0 | N | |
| 7 | 25.96580 | 25.1 | 23.0 | 13.8 | 38.9 | 36.8 | 60.0 | 50.0 | 21.1 | 13.2 | N | |
| 8 | 0.15000 | 29.2 | 0.0 | 12.7 | 41.9 | 12.7 | 66.0 | 56.0 | 24.1 | 43.3 | L1 | |
| 9 | 0.22390 | 37.9 | 24.9 | 12.6 | 50.5 | 37.5 | 62.6 | 52.6 | 12.1 | 15.1 | L1 | |
| 10 | 0.33570 | 25.9 | 15.3 | 12.7 | 38.6 | 28.0 | 59.3 | 49.3 | 20.7 | 21.3 | L1 | |
| 11 | 0.44780 | 15.9 | 9.0 | 12.7 | 28.6 | 21.7 | 56.9 | 46.9 | 28.3 | 25.2 | L1 | |
| 12 | 0.55960 | 15.2 | 9.6 | 12.7 | 27.9 | 22.3 | 56.0 | 46.0 | 28.1 | 23.7 | L1 | |
| 13 | 6.93960 | 15.0 | 11.8 | 13.0 | 28.0 | 24.8 | 60.0 | 50.0 | 32.0 | 25.2 | L1 | |
| 14 | 21.82480 | 18.3 | 15.3 | 13.6 | 31.9 | 28.9 | 60.0 | 50.0 | 28.1 | 21.1 | L1 | |

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

-6dB Bandwidth

| | | |
|------------------------|---|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date | March 29, 2012 | |
| Temperature / Humidity | 23deg.C , 28% RH | |
| Engineer | Shinichi Takano | |
| Mode | Tx, IEEE802.11b, PN9, worst antenna port 1, worst data mode 1Mbps | |

| Freq. [MHz] | -6dB Bandwidth [MHz] | Limit [MHz] |
|----------------|-------------------------|----------------|
| 2412.0000 | 10.167 | > 0.500 |
| 2437.0000 | 10.166 | > 0.500 |
| 2462.0000 | 10.167 | > 0.500 |



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Shonan EMC Lab.

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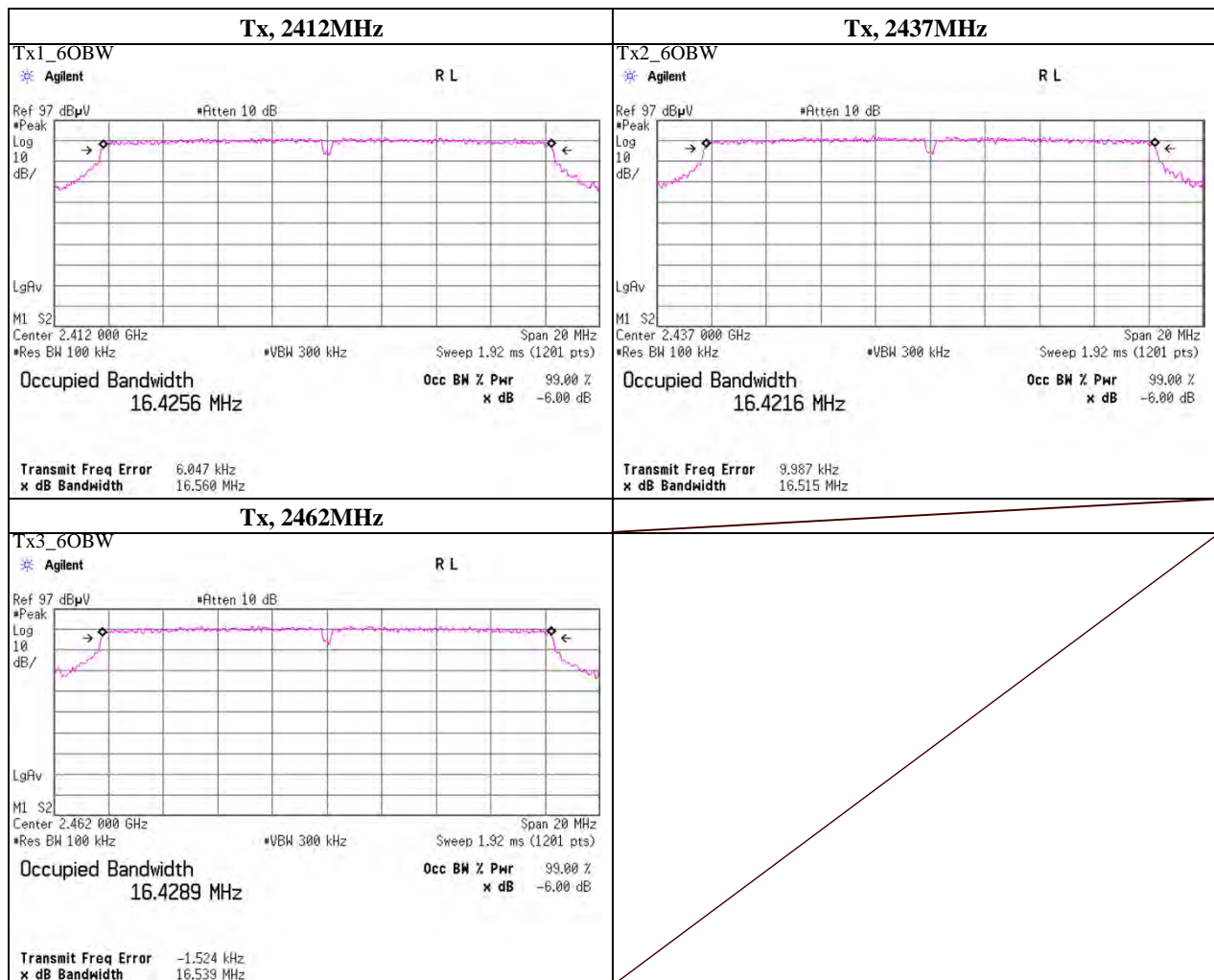
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-6dB Bandwidth

| | | |
|------------------------|---|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date | March 29, 2012 | |
| Temperature / Humidity | 23deg.C , 28% RH | |
| Engineer | Shinichi Takano | |
| Mode | Tx, IEEE802.11g, PN9, worst antenna port 1, worst data mode 6Mbps | |

| Freq. [MHz] | -6dB Bandwidth [MHz] | Limit [MHz] |
|----------------|-------------------------|----------------|
| 2412.0000 | 16.560 | > 0.500 |
| 2437.0000 | 16.515 | > 0.500 |
| 2462.0000 | 16.539 | > 0.500 |



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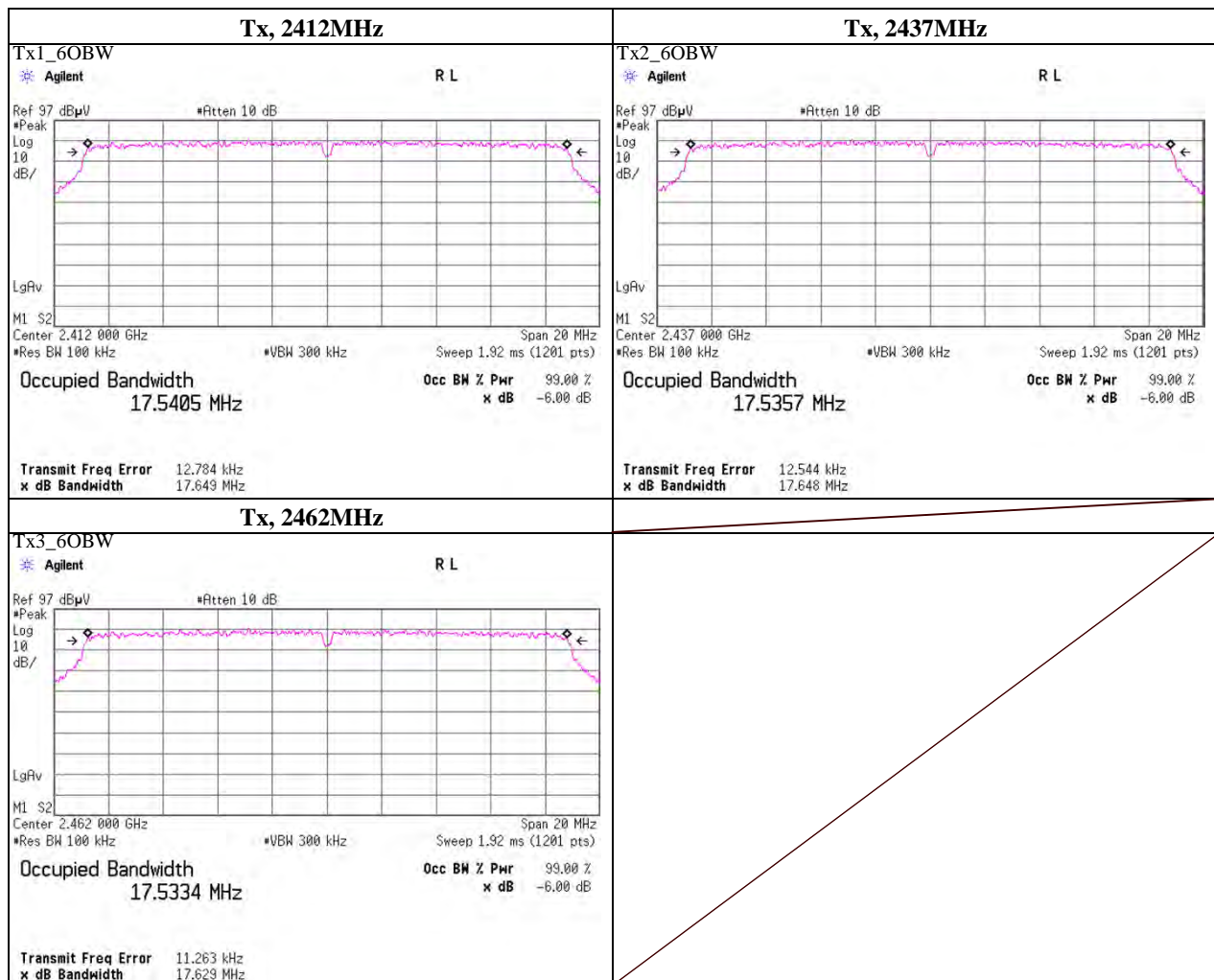
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Facsimile : +81 463 50 6401

-6dB Bandwidth

| | | |
|------------------------|---|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date | March 29, 2012 | |
| Temperature / Humidity | 23deg.C , 28% RH | |
| Engineer | Shinichi Takano | |
| Mode | Tx, IEEE802.11n-20HT, PN9, worst antenna port 1, worst data mode 0(MCS) | |

| Freq. [MHz] | -6dB Bandwidth [MHz] | Limit [MHz] |
|----------------|-------------------------|----------------|
| 2412.0000 | 17.649 | > 0.500 |
| 2437.0000 | 17.648 | > 0.500 |
| 2462.0000 | 17.629 | > 0.500 |

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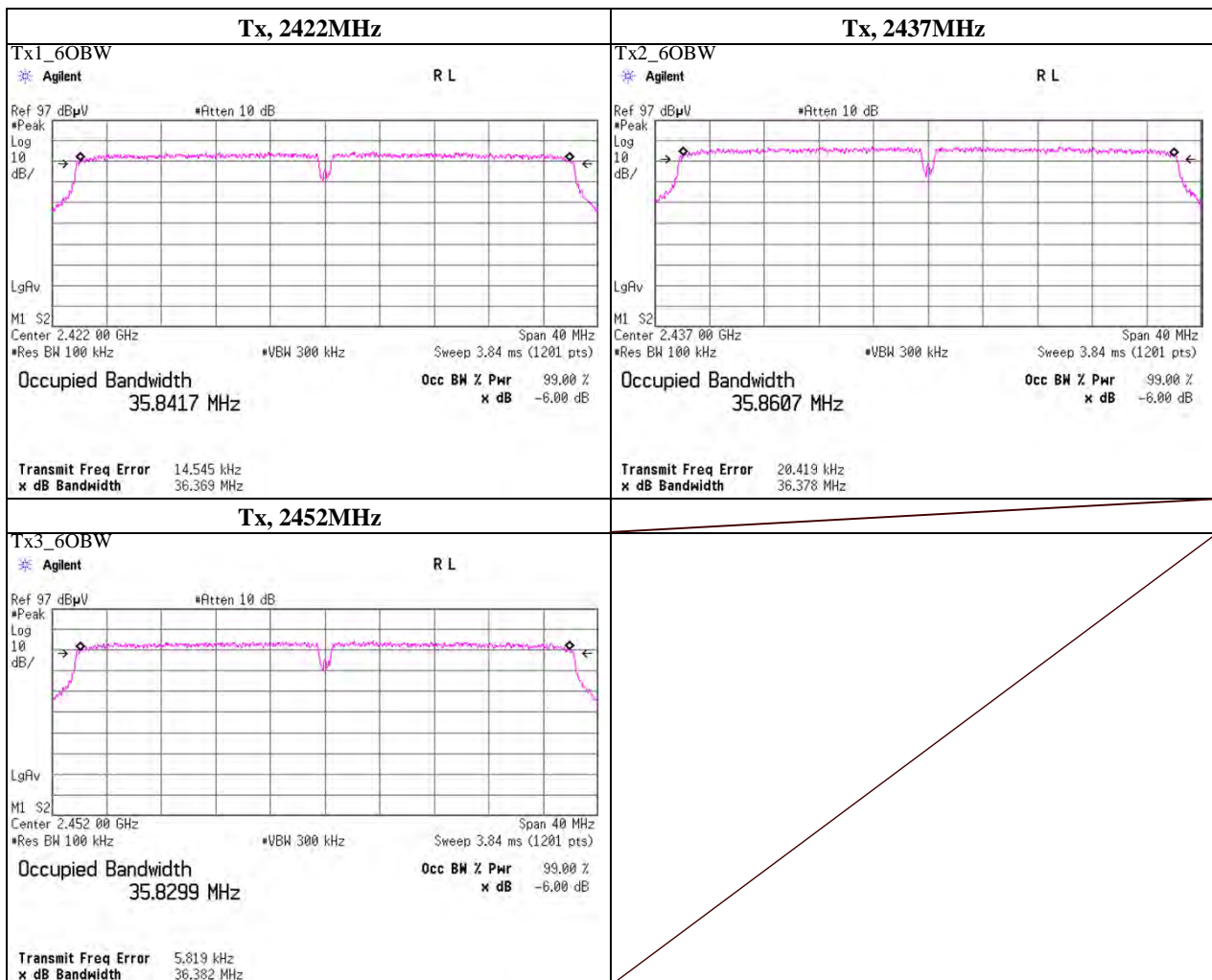
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Facsimile : +81 463 50 6401

-6dB Bandwidth

| | | |
|------------------------|---|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date | March 29, 2012 | |
| Temperature / Humidity | 23deg.C , 28% RH | |
| Engineer | Shinichi Takano | |
| Mode | Tx, IEEE802.11n-40HT, PN9, worst antenna port 1, worst data mode 0(MCS) | |

| Freq. [MHz] | -6dB Bandwidth [MHz] | Limit [MHz] |
|----------------|-------------------------|----------------|
| 2422.0000 | 36.369 | > 0.500 |
| 2437.0000 | 36.378 | > 0.500 |
| 2452.0000 | 36.382 | > 0.500 |

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Peak Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date March 27, 2012
 Temperature / Humidity 24deg.C , 32%RH
 Engineer Shinichi Takano
 Mode Tx, IEEE802.11b, PN9, worst antenna : 1 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 | -2.05 | 0.64 | 20.22 | 18.81 | 76.03 | 30.00 | 1000 | 11.19 |
| Mid | 2437.0 | -1.97 | 0.65 | 20.22 | 18.90 | 77.62 | 30.00 | 1000 | 11.10 |
| High | 2462.0 | -2.26 | 0.65 | 20.22 | 18.61 | 72.61 | 30.00 | 1000 | 11.39 |

Sample Calculation:

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

[Pre check]

Antenna 1

| | Data rate [Mbps] | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] | |
|---|---------------------|----------------|--------------------------------|-----------------------|------------------------|--------------|-------|-------|------|----------------|--------------|
| | | | | | | [dBm] | [mW] | [dBm] | [mW] | | |
| 1 | 1 | 2437.0 | -1.97 | 0.65 | 20.22 | 18.90 | 77.62 | 30.00 | 1000 | 11.10 | Worst |
| 1 | 2 | 2437.0 | -2.04 | 0.65 | 20.22 | 18.83 | 76.38 | 30.00 | 1000 | 11.17 | |
| 1 | 6 | 2437.0 | -2.61 | 0.65 | 20.22 | 18.26 | 66.99 | 30.00 | 1000 | 11.74 | |
| 1 | 11 | 2437.0 | -2.07 | 0.65 | 20.22 | 18.80 | 75.86 | 30.00 | 1000 | 11.20 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Antenna 2

| | Data rate [Mbps] | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|---|---------------------|----------------|--------------------------------|-----------------------|------------------------|--------|-------|-------|------|----------------|
| | | | | | | [dBm] | [mW] | [dBm] | [mW] | |
| 2 | 1 | 2437.0 | -2.12 | 0.65 | 20.22 | 18.75 | 74.99 | 30.00 | 1000 | 11.25 |
| 2 | 2 | 2437.0 | -2.16 | 0.65 | 20.22 | 18.71 | 74.30 | 30.00 | 1000 | 11.29 |
| 2 | 6 | 2437.0 | -2.72 | 0.65 | 20.22 | 18.15 | 65.31 | 30.00 | 1000 | 11.85 |
| 2 | 11 | 2437.0 | -2.26 | 0.65 | 20.22 | 18.61 | 72.61 | 30.00 | 1000 | 11.39 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

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 March 27, 2012
 Temperature / Humidity 24deg.C , 32%RH
 Engineer Shinichi Takano
 Mode Tx, IEEE802.11g, PN9, worst antenna : 1 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 | 1.43 | 0.64 | 20.22 | 22.29 | 169.43 | 30.00 | 1000 | 7.71 |
| Mid | 2437.0 | 1.58 | 0.65 | 20.22 | 22.45 | 175.79 | 30.00 | 1000 | 7.55 |
| High | 2462.0 | 1.41 | 0.65 | 20.22 | 22.28 | 169.04 | 30.00 | 1000 | 7.72 |

Sample Calculation:

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

[Pre check]**Antenna 1**

| | Data rate [Mbps] | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|---|---------------------|----------------|--------------------------------|-----------------------|------------------------|--------------|--------|-------|------|----------------|
| | | | | | | [dBm] | [mW] | [dBm] | [mW] | |
| 1 | 6 | 2437.0 | 1.58 | 0.65 | 20.22 | 22.45 | 175.79 | 30.00 | 1000 | 7.55 |
| 1 | 9 | 2437.0 | 1.37 | 0.65 | 20.22 | 22.24 | 167.49 | 30.00 | 1000 | 7.76 |
| 1 | 12 | 2437.0 | 1.43 | 0.65 | 20.22 | 22.30 | 169.82 | 30.00 | 1000 | 7.70 |
| 1 | 18 | 2437.0 | 1.19 | 0.65 | 20.22 | 22.06 | 160.69 | 30.00 | 1000 | 7.94 |
| 1 | 24 | 2437.0 | 1.21 | 0.65 | 20.22 | 22.08 | 161.44 | 30.00 | 1000 | 7.92 |
| 1 | 36 | 2437.0 | 1.16 | 0.65 | 20.22 | 22.03 | 159.59 | 30.00 | 1000 | 7.97 |
| 1 | 48 | 2437.0 | 1.12 | 0.65 | 20.22 | 21.99 | 158.12 | 30.00 | 1000 | 8.01 |
| 1 | 54 | 2437.0 | 1.20 | 0.65 | 20.22 | 22.07 | 161.06 | 30.00 | 1000 | 7.93 |

Worst**Antenna 2**

| | Data rate [Mbps] | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|---|---------------------|----------------|--------------------------------|-----------------------|------------------------|--------|--------|-------|------|----------------|
| | | | | | | [dBm] | [mW] | [dBm] | [mW] | |
| 2 | 6 | 2437.0 | 1.46 | 0.65 | 20.22 | 22.33 | 171.00 | 30.00 | 1000 | 7.67 |
| 2 | 9 | 2437.0 | 1.31 | 0.65 | 20.22 | 22.18 | 165.20 | 30.00 | 1000 | 7.82 |
| 2 | 12 | 2437.0 | 1.33 | 0.65 | 20.22 | 22.20 | 165.96 | 30.00 | 1000 | 7.80 |
| 2 | 18 | 2437.0 | 1.14 | 0.65 | 20.22 | 22.01 | 158.85 | 30.00 | 1000 | 7.99 |
| 2 | 24 | 2437.0 | 1.21 | 0.65 | 20.22 | 22.08 | 161.44 | 30.00 | 1000 | 7.92 |
| 2 | 36 | 2437.0 | 1.11 | 0.65 | 20.22 | 21.98 | 157.76 | 30.00 | 1000 | 8.02 |
| 2 | 48 | 2437.0 | 1.09 | 0.65 | 20.22 | 21.96 | 157.04 | 30.00 | 1000 | 8.04 |
| 2 | 54 | 2437.0 | 1.11 | 0.65 | 20.22 | 21.98 | 157.76 | 30.00 | 1000 | 8.02 |

Sample Calculation:

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

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 Facsimile : +81 463 50 6401

Peak Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date March 27, 2012
 Temperature / Humidity 24deg.C , 32%RH
 Engineer Shinichi Takano
 Mode Tx, IEEE802.11n-20HT, PN9, worst antenna : 1 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 | 1.32 | 0.64 | 20.22 | 22.18 | 165.20 | 30.00 | 1000 | 7.82 |
| Mid | 2437.0 | 1.34 | 0.65 | 20.22 | 22.21 | 166.34 | 30.00 | 1000 | 7.79 |
| High | 2462.0 | 1.23 | 0.65 | 20.22 | 22.10 | 162.18 | 30.00 | 1000 | 7.90 |

Sample Calculation:

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

[Pre check]

Antenna 1

| | Mode (MCS) | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|---|---------------|----------------|--------------------------------|-----------------------|------------------------|--------------|--------|-------|------|----------------|
| | | | | | | [dBm] | [mW] | [dBm] | [mW] | [dB] |
| 1 | 0 | 2437.0 | 1.34 | 0.65 | 20.22 | 22.21 | 166.34 | 30.00 | 1000 | 7.79 |
| 1 | 1 | 2437.0 | 1.17 | 0.65 | 20.22 | 22.04 | 159.96 | 30.00 | 1000 | 7.96 |
| 1 | 2 | 2437.0 | 1.23 | 0.65 | 20.22 | 22.10 | 162.18 | 30.00 | 1000 | 7.90 |
| 1 | 3 | 2437.0 | 1.27 | 0.65 | 20.22 | 22.14 | 163.68 | 30.00 | 1000 | 7.86 |
| 1 | 4 | 2437.0 | 0.54 | 0.65 | 20.22 | 21.41 | 138.36 | 30.00 | 1000 | 8.59 |
| 1 | 5 | 2437.0 | 0.49 | 0.65 | 20.22 | 21.36 | 136.77 | 30.00 | 1000 | 8.64 |
| 1 | 6 | 2437.0 | 0.71 | 0.65 | 20.22 | 21.58 | 143.88 | 30.00 | 1000 | 8.42 |
| 1 | 7 | 2437.0 | 0.65 | 0.65 | 20.22 | 21.52 | 141.91 | 30.00 | 1000 | 8.48 |

Worst

Antenna 2

| | Mode (MCS) | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|---|---------------|----------------|--------------------------------|-----------------------|------------------------|--------|--------|-------|------|----------------|
| | | | | | | [dBm] | [mW] | [dBm] | [mW] | [dB] |
| 2 | 0 | 2437.0 | 1.28 | 0.65 | 20.22 | 22.15 | 164.06 | 30.00 | 1000 | 7.85 |
| 2 | 1 | 2437.0 | 1.11 | 0.65 | 20.22 | 21.98 | 157.76 | 30.00 | 1000 | 8.02 |
| 2 | 2 | 2437.0 | 1.22 | 0.65 | 20.22 | 22.09 | 161.81 | 30.00 | 1000 | 7.91 |
| 2 | 3 | 2437.0 | 1.16 | 0.65 | 20.22 | 22.03 | 159.59 | 30.00 | 1000 | 7.97 |
| 2 | 4 | 2437.0 | 0.49 | 0.65 | 20.22 | 21.36 | 136.77 | 30.00 | 1000 | 8.64 |
| 2 | 5 | 2437.0 | 0.46 | 0.65 | 20.22 | 21.33 | 135.83 | 30.00 | 1000 | 8.67 |
| 2 | 6 | 2437.0 | 0.65 | 0.65 | 20.22 | 21.52 | 141.91 | 30.00 | 1000 | 8.48 |
| 2 | 7 | 2437.0 | 0.61 | 0.65 | 20.22 | 21.48 | 140.60 | 30.00 | 1000 | 8.52 |

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 March 27, 2012
 Temperature / Humidity 24deg.C , 32%RH
 Engineer Shinichi Takano
 Mode Tx, IEEE802.11n-40HT, PN9, worst antenna : 1 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 | 2422.0 | -0.05 | 0.65 | 20.22 | 20.82 | 120.78 | 30.00 | 1000 | 9.18 |
| Mid | 2437.0 | 1.26 | 0.65 | 20.22 | 22.13 | 163.31 | 30.00 | 1000 | 7.87 |
| High | 2452.0 | -0.10 | 0.65 | 20.22 | 20.77 | 119.40 | 30.00 | 1000 | 9.23 |

Sample Calculation:

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

[Pre check]

Antenna 1

| | Mode (MCS) | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|---|---------------|----------------|--------------------------------|-----------------------|------------------------|--------------|--------|-------|------|----------------|
| | | | | | | [dBm] | [mW] | [dBm] | [mW] | [dB] |
| 1 | 0 | 2437.0 | 1.26 | 0.65 | 20.22 | 22.13 | 163.31 | 30.00 | 1000 | 7.87 |
| 1 | 1 | 2437.0 | 1.16 | 0.65 | 20.22 | 22.03 | 159.59 | 30.00 | 1000 | 7.97 |
| 1 | 2 | 2437.0 | 1.14 | 0.65 | 20.22 | 22.01 | 158.85 | 30.00 | 1000 | 7.99 |
| 1 | 3 | 2437.0 | 1.18 | 0.65 | 20.22 | 22.05 | 160.32 | 30.00 | 1000 | 7.95 |
| 1 | 4 | 2437.0 | 0.64 | 0.65 | 20.22 | 21.51 | 141.58 | 30.00 | 1000 | 8.49 |
| 1 | 5 | 2437.0 | 0.71 | 0.65 | 20.22 | 21.58 | 143.88 | 30.00 | 1000 | 8.42 |
| 1 | 6 | 2437.0 | 0.77 | 0.65 | 20.22 | 21.64 | 145.88 | 30.00 | 1000 | 8.36 |
| 1 | 7 | 2437.0 | 0.53 | 0.65 | 20.22 | 21.40 | 138.04 | 30.00 | 1000 | 8.60 |

Worst

Antenna 2

| | Mode (MCS) | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|---|---------------|----------------|--------------------------------|-----------------------|------------------------|--------|--------|-------|------|----------------|
| | | | | | | [dBm] | [mW] | [dBm] | [mW] | [dB] |
| 2 | 0 | 2437.0 | 1.16 | 0.65 | 20.22 | 22.03 | 159.59 | 30.00 | 1000 | 7.97 |
| 2 | 1 | 2437.0 | 1.12 | 0.65 | 20.22 | 21.99 | 158.12 | 30.00 | 1000 | 8.01 |
| 2 | 2 | 2437.0 | 1.09 | 0.65 | 20.22 | 21.96 | 157.04 | 30.00 | 1000 | 8.04 |
| 2 | 3 | 2437.0 | 1.06 | 0.65 | 20.22 | 21.93 | 155.96 | 30.00 | 1000 | 8.07 |
| 2 | 4 | 2437.0 | 0.53 | 0.65 | 20.22 | 21.40 | 138.04 | 30.00 | 1000 | 8.60 |
| 2 | 5 | 2437.0 | 0.57 | 0.65 | 20.22 | 21.44 | 139.32 | 30.00 | 1000 | 8.56 |
| 2 | 6 | 2437.0 | 0.62 | 0.65 | 20.22 | 21.49 | 140.93 | 30.00 | 1000 | 8.51 |
| 2 | 7 | 2437.0 | 0.48 | 0.65 | 20.22 | 21.35 | 136.46 | 30.00 | 1000 | 8.65 |

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 March 30, 2012 April 5, 2012 April 6, 2012
 Temperature / Humidity 24 deg.C , 26%RH 24 deg.C , 33%RH 25 deg.C , 33%RH
 Engineer Shinichi Takano Tatsuya Arai Akio Hayashi
 Mode Tx, 2412 MHz
 Tx, IEEE802.11b, PN9, worst antenna port 1, 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 | 65.5 | 27.2 | 13.8 | 41.1 | 65.4 | 73.9 | 8.5 | 100 | 123 | PK:VBW 3MHz AV:VBW 10Hz |
| Hori. | 4824.000 | PK | 47.8 | 31.1 | 5.9 | 41.0 | 43.8 | 73.9 | 30.1 | 100 | 119 | |
| Hori. | 7236.000 | PK | 47.9 | 36.6 | 7.4 | 41.3 | 50.6 | 73.9 | 23.3 | 100 | 0 | |
| Hori. | 9648.000 | PK | 43.7 | 38.2 | 8.6 | 38.8 | 51.7 | 73.9 | 22.2 | 100 | 0 | |
| Hori. | 12060.000 | PK | 44.7 | 39.3 | 10.2 | 39.2 | 55.0 | 73.9 | 18.9 | 100 | 0 | |
| Hori. | 2390.000 | AV | 42.0 | 27.2 | 13.8 | 41.1 | 41.9 | 53.9 | 12.0 | 100 | 123 | |
| Hori. | 4824.000 | AV | 39.5 | 31.1 | 5.9 | 41.0 | 35.5 | 53.9 | 18.4 | 100 | 119 | |
| Hori. | 7236.000 | AV | 36.4 | 36.6 | 7.4 | 41.3 | 39.1 | 53.9 | 14.8 | 100 | 0 | |
| Hori. | 9648.000 | AV | 32.9 | 38.2 | 8.6 | 38.8 | 40.9 | 53.9 | 13.0 | 100 | 0 | |
| Hori. | 12060.000 | AV | 34.0 | 39.3 | 10.2 | 39.2 | 44.3 | 53.9 | 9.6 | 100 | 0 | |
| Vert. | 2390.000 | PK | 64.4 | 27.2 | 13.8 | 41.1 | 64.3 | 73.9 | 9.6 | 100 | 101 | |
| Vert. | 4824.000 | PK | 48.1 | 31.1 | 5.9 | 41.0 | 44.1 | 73.9 | 29.8 | 100 | 121 | |
| Vert. | 7236.000 | PK | 46.4 | 36.6 | 7.4 | 41.3 | 49.1 | 73.9 | 24.8 | 100 | 0 | |
| Vert. | 9648.000 | PK | 44.6 | 38.2 | 8.6 | 38.8 | 52.6 | 73.9 | 21.3 | 100 | 0 | |
| Vert. | 12060.000 | PK | 45.7 | 39.3 | 10.2 | 39.2 | 56.0 | 73.9 | 17.9 | 100 | 0 | |
| Vert. | 2390.000 | AV | 38.0 | 27.2 | 13.8 | 41.1 | 37.9 | 53.9 | 16.0 | 100 | 101 | |
| Vert. | 4824.000 | AV | 38.8 | 31.1 | 5.9 | 41.0 | 34.8 | 53.9 | 19.1 | 100 | 121 | |
| Vert. | 7236.000 | AV | 36.2 | 36.6 | 7.4 | 41.3 | 38.9 | 53.9 | 15.0 | 100 | 0 | |
| Vert. | 9648.000 | AV | 32.8 | 38.2 | 8.6 | 38.8 | 40.8 | 53.9 | 13.1 | 100 | 0 | |
| Vert. | 12060.000 | AV | 33.5 | 39.3 | 10.2 | 39.2 | 43.8 | 53.9 | 10.1 | 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).

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 | 94.8 | 27.3 | 13.8 | 41.1 | 94.8 | - | - | Carrier |
| Hori. | 2397.913 | PK | 57.8 | 27.3 | 13.8 | 41.1 | 57.8 | 74.8 | 17.0 | |
| Hori. | 2400.000 | PK | 56.1 | 27.3 | 13.8 | 41.1 | 56.1 | 74.8 | 18.7 | |
| Vert. | 2412.000 | PK | 94.0 | 27.3 | 13.8 | 41.1 | 94.0 | - | - | Carrier |
| Vert. | 2397.004 | PK | 58.3 | 27.3 | 13.8 | 41.1 | 58.3 | 74.0 | 15.7 | |
| Vert. | 2400.000 | PK | 54.0 | 27.3 | 13.8 | 41.1 | 54.0 | 74.0 | 20.0 | |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

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

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date March 30, 2012 April 5, 2012 April 6, 2012
 Temperature / Humidity 24 deg.C , 26%RH 24 deg.C , 33%RH 25 deg.C , 33%RH
 Engineer Shinichi Takano Tatsuya Arai Akio Hayashi
 Mode Tx, 2437 MHz
 Tx, IEEE802.11b, PN9, worst antenna port 1, worst data mode 1Mbps

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|-----------------|-------------|
| Hori. | 4874.000 | PK | 48.9 | 31.2 | 5.9 | 41.0 | 45.0 | 73.9 | 28.9 | 100 | 117 | PK:VBW 3MHz |
| Hori. | 7311.000 | PK | 46.1 | 36.7 | 7.5 | 41.4 | 48.9 | 73.9 | 25.0 | 100 | 0 | AV:VBW 10Hz |
| Hori. | 9748.000 | PK | 43.6 | 38.5 | 8.6 | 38.8 | 51.9 | 73.9 | 22.0 | 100 | 0 | |
| Hori. | 12185.000 | PK | 44.7 | 39.3 | 10.2 | 39.2 | 55.0 | 73.9 | 18.9 | 100 | 0 | |
| Hori. | 4874.000 | AV | 40.4 | 31.2 | 5.9 | 41.0 | 36.5 | 53.9 | 17.4 | 100 | 117 | |
| Hori. | 7311.000 | AV | 36.3 | 36.7 | 7.5 | 41.4 | 39.1 | 53.9 | 14.8 | 100 | 0 | |
| Hori. | 9748.000 | AV | 33.1 | 38.5 | 8.6 | 38.8 | 41.4 | 53.9 | 12.5 | 100 | 0 | |
| Hori. | 12185.000 | AV | 34.0 | 39.3 | 10.2 | 39.2 | 44.3 | 53.9 | 9.6 | 100 | 0 | |
| Vert. | 4874.000 | PK | 48.5 | 31.2 | 5.9 | 41.0 | 44.6 | 73.9 | 29.3 | 103 | 158 | |
| Vert. | 7311.000 | PK | 47.1 | 36.7 | 7.5 | 41.4 | 49.9 | 73.9 | 24.0 | 100 | 0 | |
| Vert. | 9748.000 | PK | 43.7 | 38.5 | 8.6 | 38.8 | 52.0 | 73.9 | 21.9 | 100 | 0 | |
| Vert. | 12185.000 | PK | 43.1 | 39.3 | 10.2 | 39.2 | 53.4 | 73.9 | 20.5 | 100 | 0 | |
| Vert. | 4874.000 | AV | 41.1 | 31.2 | 5.9 | 41.0 | 37.2 | 53.9 | 16.7 | 103 | 158 | |
| Vert. | 7311.000 | AV | 36.2 | 36.7 | 7.5 | 41.4 | 39.0 | 53.9 | 14.9 | 100 | 0 | |
| Vert. | 9748.000 | AV | 33.0 | 38.5 | 8.6 | 38.8 | 41.3 | 53.9 | 12.6 | 100 | 0 | |
| Vert. | 12185.000 | AV | 33.7 | 39.3 | 10.2 | 39.2 | 44.0 | 53.9 | 9.9 | 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).

Radiated Emission

| | | | |
|------------------------|---|----------------------------|------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.3 Semi Anechoic Chamber | |
| Date | March 30, 2012 | April 5, 2012 | April 6, 2012 |
| Temperature / Humidity | 24 deg.C , 26%RH | 24 deg.C , 33%RH | 25 deg.C , 33%RH |
| Engineer | Shinichi Takano | Tatsuya Arai | Akio Hayashi |
| Mode | Tx, 2462 MHz | | |
| | Tx, IEEE802.11b, PN9, worst antenna port 1, 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 | 60.8 | 27.5 | 13.8 | 41.1 | 61.0 | 73.9 | 12.9 | 100 | 209 | PK:VBW 3MHz AV:VBW 10Hz |
| Hori. | 4924.000 | PK | 50.0 | 31.3 | 5.9 | 40.9 | 46.3 | 73.9 | 27.6 | 114 | 236 | |
| Hori. | 7386.000 | PK | 48.2 | 36.9 | 7.5 | 41.4 | 51.2 | 73.9 | 22.7 | 100 | 0 | |
| Hori. | 9848.000 | PK | 44.0 | 38.7 | 8.6 | 38.8 | 52.5 | 73.9 | 21.4 | 100 | 0 | |
| Hori. | 12310.000 | PK | 44.5 | 39.4 | 10.2 | 39.2 | 54.9 | 73.9 | 19.0 | 100 | 0 | |
| Hori. | 2483.500 | AV | 39.6 | 27.5 | 13.8 | 41.1 | 39.8 | 53.9 | 14.1 | 100 | 209 | |
| Hori. | 4924.000 | AV | 43.4 | 31.3 | 5.9 | 40.9 | 39.7 | 53.9 | 14.2 | 114 | 236 | |
| Hori. | 7386.000 | AV | 36.6 | 36.9 | 7.5 | 41.4 | 39.6 | 53.9 | 14.3 | 100 | 0 | |
| Hori. | 9848.000 | AV | 33.3 | 38.7 | 8.6 | 38.8 | 41.8 | 53.9 | 12.1 | 100 | 0 | |
| Hori. | 12310.000 | AV | 33.7 | 39.4 | 10.2 | 39.2 | 44.1 | 53.9 | 9.8 | 100 | 0 | |
| Vert. | 2483.500 | PK | 62.7 | 27.5 | 13.8 | 41.1 | 62.9 | 73.9 | 11.0 | 100 | 104 | |
| Vert. | 4924.000 | PK | 49.5 | 31.3 | 5.9 | 40.9 | 45.8 | 73.9 | 28.1 | 100 | 133 | |
| Vert. | 7386.000 | PK | 46.8 | 36.9 | 7.5 | 41.4 | 49.8 | 73.9 | 24.1 | 100 | 0 | |
| Vert. | 9848.000 | PK | 44.2 | 38.7 | 8.6 | 38.8 | 52.7 | 73.9 | 21.2 | 100 | 0 | |
| Vert. | 12310.000 | PK | 43.9 | 39.4 | 10.2 | 39.2 | 54.3 | 73.9 | 19.6 | 100 | 0 | |
| Vert. | 2483.500 | AV | 39.3 | 27.5 | 13.8 | 41.1 | 39.5 | 53.9 | 14.4 | 100 | 104 | |
| Vert. | 4924.000 | AV | 42.6 | 31.3 | 5.9 | 40.9 | 38.9 | 53.9 | 15.0 | 100 | 133 | |
| Vert. | 7386.000 | AV | 36.7 | 36.9 | 7.5 | 41.4 | 39.7 | 53.9 | 14.2 | 100 | 0 | |
| Vert. | 9848.000 | AV | 33.6 | 38.7 | 8.6 | 38.8 | 42.1 | 53.9 | 11.8 | 100 | 0 | |
| Vert. | 12310.000 | AV | 33.8 | 39.4 | 10.2 | 39.2 | 44.2 | 53.9 | 9.7 | 100 | 0 | |

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

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date March 30, 2012 April 5, 2012 April 6, 2012
 Temperature / Humidity 24 deg.C , 26%RH 24 deg.C , 33%RH 25 deg.C , 33%RH
 Engineer Shinichi Takano Tatsuya Arai Akio Hayashi
 Mode Tx, 2412 MHz
 Tx, IEEE802.11g, PN9, worst antenna port 1, 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. | 2359.702 | PK | 59.1 | 27.2 | 13.7 | 41.1 | 58.9 | 73.9 | 15.0 | 100 | 124 | PK:VBW 3MHz AV:VBW 10Hz |
| Hori. | 2390.000 | PK | 67.3 | 27.2 | 13.8 | 41.1 | 67.2 | 73.9 | 6.7 | 100 | 123 | |
| Hori. | 2464.284 | PK | 57.7 | 27.4 | 13.8 | 41.1 | 57.8 | 73.9 | 16.1 | 100 | 124 | |
| Hori. | 4824.000 | PK | 46.8 | 31.1 | 5.9 | 41.0 | 42.8 | 73.9 | 31.1 | 100 | 237 | |
| Hori. | 7236.000 | PK | 47.3 | 36.6 | 7.4 | 41.3 | 50.0 | 73.9 | 23.9 | 100 | 0 | |
| Hori. | 9648.000 | PK | 42.9 | 38.2 | 8.6 | 38.8 | 50.9 | 73.9 | 23.0 | 100 | 0 | |
| Hori. | 12060.000 | PK | 45.1 | 39.3 | 10.2 | 39.2 | 55.4 | 73.9 | 18.5 | 100 | 0 | |
| Hori. | 2359.702 | AV | 42.4 | 27.2 | 13.7 | 41.1 | 42.2 | 53.9 | 11.7 | 100 | 124 | |
| Hori. | 2390.000 | AV | 49.4 | 27.2 | 13.8 | 41.1 | 49.3 | 53.9 | 4.6 | 100 | 123 | |
| Hori. | 2464.284 | AV | 40.5 | 27.4 | 13.8 | 41.1 | 40.6 | 53.9 | 13.3 | 100 | 124 | |
| Hori. | 4824.000 | AV | 36.2 | 31.1 | 5.9 | 41.0 | 32.2 | 53.9 | 21.7 | 100 | 237 | |
| Hori. | 7236.000 | AV | 36.3 | 36.6 | 7.4 | 41.3 | 39.0 | 53.9 | 14.9 | 100 | 0 | |
| Hori. | 9648.000 | AV | 32.9 | 38.2 | 8.6 | 38.8 | 40.9 | 53.9 | 13.0 | 100 | 0 | |
| Hori. | 12060.000 | AV | 34.0 | 39.3 | 10.2 | 39.2 | 44.3 | 53.9 | 9.6 | 100 | 0 | |
| Vert. | 2359.810 | PK | 50.8 | 27.2 | 13.7 | 41.1 | 50.6 | 73.9 | 23.3 | 124 | 105 | |
| Vert. | 2390.000 | PK | 68.0 | 27.2 | 13.8 | 41.1 | 67.9 | 73.9 | 6.0 | 100 | 99 | |
| Vert. | 2464.289 | PK | 49.6 | 27.4 | 13.8 | 41.1 | 49.7 | 73.9 | 24.2 | 124 | 105 | |
| Vert. | 4824.000 | PK | 46.0 | 31.1 | 5.9 | 41.0 | 42.0 | 73.9 | 31.9 | 100 | 0 | |
| Vert. | 7236.000 | PK | 46.8 | 36.6 | 7.4 | 41.3 | 49.5 | 73.9 | 24.4 | 100 | 0 | |
| Vert. | 9648.000 | PK | 45.0 | 38.2 | 8.6 | 38.8 | 53.0 | 73.9 | 20.9 | 100 | 0 | |
| Vert. | 12060.000 | PK | 45.4 | 39.3 | 10.2 | 39.2 | 55.7 | 73.9 | 18.2 | 100 | 0 | |
| Vert. | 2359.810 | AV | 42.2 | 27.2 | 13.7 | 41.1 | 42.0 | 53.9 | 11.9 | 124 | 105 | |
| Vert. | 2390.000 | AV | 48.2 | 27.2 | 13.8 | 41.1 | 48.1 | 53.9 | 5.8 | 100 | 99 | |
| Vert. | 2464.289 | AV | 40.6 | 27.4 | 13.8 | 41.1 | 40.7 | 53.9 | 13.2 | 124 | 105 | |
| Vert. | 4824.000 | AV | 36.5 | 31.1 | 5.9 | 41.0 | 32.5 | 53.9 | 21.4 | 100 | 0 | |
| Vert. | 7236.000 | AV | 36.9 | 36.6 | 7.4 | 41.3 | 39.6 | 53.9 | 14.3 | 100 | 0 | |
| Vert. | 9648.000 | AV | 33.9 | 38.2 | 8.6 | 38.8 | 41.9 | 53.9 | 12.0 | 100 | 0 | |
| Vert. | 12060.000 | AV | 35.4 | 39.3 | 10.2 | 39.2 | 45.7 | 53.9 | 8.2 | 100 | 0 | |

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

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

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 | 92.1 | 27.3 | 13.8 | 41.1 | 92.1 | - | - | Carrier |
| Hori. | 2400.000 | PK | 66.5 | 27.3 | 13.8 | 41.1 | 66.5 | 72.1 | 5.6 | |
| Vert. | 2412.000 | PK | 94.1 | 27.3 | 13.8 | 41.1 | 94.1 | - | - | Carrier |
| Vert. | 2400.000 | PK | 64.8 | 27.3 | 13.8 | 41.1 | 64.8 | 74.1 | 9.3 | |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date March 30, 2012 April 5, 2012 April 6, 2012
 Temperature / Humidity 24 deg.C , 26%RH 24 deg.C , 33%RH 25 deg.C , 33%RH
 Engineer Shinichi Takanc Tatsuya Arai Akio Hayashi
 Mode Tx, 2437 MHz
 Tx, IEEE802.11g, PN9, worst antenna port 1, 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. | 479.996 | QP | 36.6 | 17.5 | 9.5 | 31.9 | 31.7 | 46.0 | 14.3 | 100 | 188 | PK:VBW 3MHz AV:VBW 10Hz |
| Hori. | 839.991 | QP | 39.1 | 21.7 | 10.5 | 31.4 | 39.9 | 46.0 | 6.1 | 117 | 152 | |
| Hori. | 959.999 | QP | 37.1 | 23.0 | 10.9 | 30.5 | 40.5 | 46.0 | 5.5 | 100 | 160 | |
| Hori. | 2384.782 | PK | 59.8 | 27.2 | 13.8 | 41.1 | 59.7 | 73.9 | 14.2 | 100 | 123 | |
| Hori. | 2489.307 | PK | 56.7 | 27.5 | 13.8 | 41.1 | 56.9 | 73.9 | 17.0 | 100 | 123 | |
| Hori. | 4874.000 | PK | 47.6 | 31.2 | 5.9 | 41.0 | 43.7 | 73.9 | 30.2 | 100 | 230 | |
| Hori. | 7311.000 | PK | 45.9 | 36.7 | 7.5 | 41.4 | 48.7 | 73.9 | 25.2 | 100 | 0 | |
| Hori. | 9748.000 | PK | 43.2 | 38.5 | 8.6 | 38.8 | 51.5 | 73.9 | 22.4 | 100 | 0 | |
| Hori. | 12185.000 | PK | 43.5 | 39.3 | 10.2 | 39.2 | 53.8 | 73.9 | 20.1 | 100 | 0 | |
| Hori. | 2384.782 | AV | 43.8 | 27.2 | 13.8 | 41.1 | 43.7 | 53.9 | 10.2 | 100 | 123 | |
| Hori. | 2489.307 | AV | 39.2 | 27.5 | 13.8 | 41.1 | 39.4 | 53.9 | 14.5 | 100 | 123 | |
| Hori. | 4874.000 | AV | 36.5 | 31.2 | 5.9 | 41.0 | 32.6 | 53.9 | 21.3 | 100 | 230 | |
| Hori. | 7311.000 | AV | 35.5 | 36.7 | 7.5 | 41.4 | 38.3 | 53.9 | 15.6 | 100 | 0 | |
| Hori. | 9748.000 | AV | 32.4 | 38.5 | 8.6 | 38.8 | 40.7 | 53.9 | 13.2 | 100 | 0 | |
| Hori. | 12185.000 | AV | 33.4 | 39.3 | 10.2 | 39.2 | 43.7 | 53.9 | 10.2 | 100 | 0 | |
| Vert. | 40.82 | QP | 43.9 | 13.8 | 6.7 | 32.1 | 32.3 | 40.0 | 7.7 | 100 | 239 | |
| Vert. | 199.998 | QP | 36.2 | 16.0 | 7.9 | 32.0 | 28.1 | 43.5 | 15.4 | 100 | 262 | |
| Vert. | 479.996 | QP | 39.1 | 17.5 | 9.5 | 31.9 | 34.2 | 46.0 | 11.8 | 122 | 358 | |
| Vert. | 599.997 | QP | 46.1 | 19.0 | 9.8 | 31.9 | 43.0 | 46.0 | 3.0 | 100 | 82 | |
| Vert. | 2384.780 | PK | 51.4 | 27.2 | 13.8 | 41.1 | 51.3 | 73.9 | 22.6 | 100 | 103 | |
| Vert. | 2489.247 | PK | 48.2 | 27.5 | 13.8 | 41.1 | 48.4 | 73.9 | 25.5 | 100 | 103 | |
| Vert. | 4874.000 | PK | 46.3 | 31.2 | 5.9 | 41.0 | 42.4 | 73.9 | 31.5 | 100 | 0 | |
| Vert. | 7311.000 | PK | 46.4 | 36.7 | 7.5 | 41.4 | 49.2 | 73.9 | 24.7 | 100 | 0 | |
| Vert. | 9748.000 | PK | 43.7 | 38.5 | 8.6 | 38.8 | 52.0 | 73.9 | 21.9 | 100 | 0 | |
| Vert. | 12185.000 | PK | 44.6 | 39.3 | 10.2 | 39.2 | 54.9 | 73.9 | 19.0 | 100 | 0 | |
| Vert. | 2384.780 | AV | 42.3 | 27.2 | 13.8 | 41.1 | 42.2 | 53.9 | 11.7 | 100 | 103 | |
| Vert. | 2489.247 | AV | 39.2 | 27.5 | 13.8 | 41.1 | 39.4 | 53.9 | 14.5 | 100 | 103 | |
| Vert. | 4874.000 | AV | 35.9 | 31.2 | 5.9 | 41.0 | 32.0 | 53.9 | 21.9 | 100 | 0 | |
| Vert. | 7311.000 | AV | 36.4 | 36.7 | 7.5 | 41.4 | 39.2 | 53.9 | 14.7 | 100 | 0 | |
| Vert. | 9748.000 | AV | 34.2 | 38.5 | 8.6 | 38.8 | 42.5 | 53.9 | 11.4 | 100 | 0 | |
| Vert. | 12185.000 | AV | 34.8 | 39.3 | 10.2 | 39.2 | 45.1 | 53.9 | 8.8 | 100 | 0 | |

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

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

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Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date March 30, 2012 April 5, 2012 April 6, 2012
 Temperature / Humidity 24 deg.C , 26%RH 24 deg.C , 33%RH 25 deg.C , 33%RH
 Engineer Shinichi Takanc Tatsuya Arai Akio Hayashi
 Mode Tx, 2462 MHz
 Tx, IEEE802.11g, PN9, worst antenna port 1, 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. | 2409.782 | PK | 61.9 | 27.3 | 13.8 | 41.1 | 61.9 | 73.9 | 12.0 | 100 | 125 | PK:VBW 3MHz AV:VBW 10Hz |
| Hori. | 2483.500 | PK | 66.0 | 27.5 | 13.8 | 41.1 | 66.2 | 73.9 | 7.7 | 100 | 214 | |
| Hori. | 2514.188 | PK | 51.9 | 27.6 | 14.0 | 41.1 | 52.4 | 73.9 | 21.5 | 100 | 125 | |
| Hori. | 4924.000 | PK | 47.5 | 31.3 | 5.9 | 40.9 | 43.8 | 73.9 | 30.1 | 100 | 148 | |
| Hori. | 7386.000 | PK | 46.8 | 36.9 | 7.5 | 41.4 | 49.8 | 73.9 | 24.1 | 100 | 0 | |
| Hori. | 9848.000 | PK | 43.4 | 38.7 | 8.6 | 38.8 | 51.9 | 73.9 | 22.0 | 100 | 0 | |
| Hori. | 12310.000 | PK | 43.9 | 39.4 | 10.2 | 39.2 | 54.3 | 73.9 | 19.6 | 100 | 0 | |
| Hori. | 2409.782 | AV | 43.2 | 27.3 | 13.8 | 41.1 | 43.2 | 53.9 | 10.7 | 100 | 125 | |
| Hori. | 2483.500 | AV | 47.0 | 27.5 | 13.8 | 41.1 | 47.2 | 53.9 | 6.7 | 100 | 214 | |
| Hori. | 2514.188 | AV | 37.9 | 27.6 | 14.0 | 41.1 | 38.4 | 53.9 | 15.5 | 100 | 125 | |
| Hori. | 4924.000 | AV | 36.9 | 31.3 | 5.9 | 40.9 | 33.2 | 53.9 | 20.7 | 100 | 148 | |
| Hori. | 7386.000 | AV | 36.6 | 36.9 | 7.5 | 41.4 | 39.6 | 53.9 | 14.3 | 100 | 0 | |
| Hori. | 9848.000 | AV | 33.3 | 38.7 | 8.6 | 38.8 | 41.8 | 53.9 | 12.1 | 100 | 0 | |
| Hori. | 12310.000 | AV | 33.7 | 39.4 | 10.2 | 39.2 | 44.1 | 53.9 | 9.8 | 100 | 0 | |
| Vert. | 2409.840 | PK | 51.4 | 27.3 | 13.8 | 41.1 | 51.4 | 73.9 | 22.5 | 100 | 108 | |
| Vert. | 2483.500 | PK | 66.7 | 27.5 | 13.8 | 41.1 | 66.9 | 73.9 | 7.0 | 100 | 96 | |
| Vert. | 2514.293 | PK | 47.9 | 27.6 | 14.0 | 41.1 | 48.4 | 73.9 | 25.5 | 100 | 108 | |
| Vert. | 4924.000 | PK | 46.3 | 31.3 | 5.9 | 40.9 | 42.6 | 73.9 | 31.3 | 100 | 0 | |
| Vert. | 7386.000 | PK | 47.0 | 36.9 | 7.5 | 41.4 | 50.0 | 73.9 | 23.9 | 100 | 0 | |
| Vert. | 9848.000 | PK | 44.3 | 38.7 | 8.6 | 38.8 | 52.8 | 73.9 | 21.1 | 100 | 0 | |
| Vert. | 12310.000 | PK | 44.4 | 39.4 | 10.2 | 39.2 | 54.8 | 73.9 | 19.1 | 100 | 0 | |
| Vert. | 2409.840 | AV | 42.3 | 27.3 | 13.8 | 41.1 | 42.3 | 53.9 | 11.6 | 100 | 108 | |
| Vert. | 2483.500 | AV | 46.1 | 27.5 | 13.8 | 41.1 | 46.3 | 53.9 | 7.6 | 100 | 96 | |
| Vert. | 2514.293 | AV | 38.3 | 27.6 | 14.0 | 41.1 | 38.8 | 53.9 | 15.1 | 100 | 108 | |
| Vert. | 4924.000 | AV | 36.4 | 31.3 | 5.9 | 40.9 | 32.7 | 53.9 | 21.2 | 100 | 0 | |
| Vert. | 7386.000 | AV | 36.6 | 36.9 | 7.5 | 41.4 | 39.6 | 53.9 | 14.3 | 100 | 0 | |
| Vert. | 9848.000 | AV | 34.0 | 38.7 | 8.6 | 38.8 | 42.5 | 53.9 | 11.4 | 100 | 0 | |
| Vert. | 12310.000 | AV | 34.2 | 39.4 | 10.2 | 39.2 | 44.6 | 53.9 | 9.3 | 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).

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Facsimile : +81 463 50 6401

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date March 30, 2012 April 5, 2012 April 6, 2012
 Temperature / Humidity 24 deg.C , 26%RH 24 deg.C , 33%RH 25 deg.C , 33%RH
 Engineer Shinichi Takano Tatsuya Arai Akio Hayashi
 Mode Tx, 2412 MHz
 Tx, IEEE802.11n-20HT, PN9, worst antenna port 1, 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. | 2360.350 | PK | 51.8 | 27.2 | 13.7 | 41.1 | 51.6 | 73.9 | 22.3 | 100 | 202 | PK:VBW 3MHz AV:VBW 10Hz |
| Hori. | 2390.000 | PK | 68.6 | 27.2 | 13.8 | 41.1 | 68.5 | 73.9 | 5.4 | 100 | 129 | |
| Hori. | 2463.725 | PK | 51.1 | 27.4 | 13.8 | 41.1 | 51.2 | 73.9 | 22.7 | 100 | 202 | |
| Hori. | 4824.000 | PK | 46.1 | 31.1 | 5.9 | 41.0 | 42.1 | 73.9 | 31.8 | 100 | 0 | |
| Hori. | 7236.000 | PK | 46.8 | 36.6 | 7.4 | 41.3 | 49.5 | 73.9 | 24.4 | 100 | 0 | |
| Hori. | 9648.000 | PK | 43.9 | 38.2 | 8.6 | 38.8 | 51.9 | 73.9 | 22.0 | 100 | 0 | |
| Hori. | 12060.000 | PK | 45.4 | 39.3 | 10.2 | 39.2 | 55.7 | 73.9 | 18.2 | 100 | 0 | |
| Hori. | 2360.350 | AV | 42.3 | 27.2 | 13.7 | 41.1 | 42.1 | 53.9 | 11.8 | 100 | 202 | |
| Hori. | 2390.000 | AV | 50.4 | 27.2 | 13.8 | 41.1 | 50.3 | 53.9 | 3.6 | 100 | 129 | |
| Hori. | 2463.725 | AV | 42.3 | 27.4 | 13.8 | 41.1 | 42.4 | 53.9 | 11.5 | 100 | 202 | |
| Hori. | 4824.000 | AV | 36.1 | 31.1 | 5.9 | 41.0 | 32.1 | 53.9 | 21.8 | 100 | 0 | |
| Hori. | 7236.000 | AV | 37.0 | 36.6 | 7.4 | 41.3 | 39.7 | 53.9 | 14.2 | 100 | 0 | |
| Hori. | 9648.000 | AV | 34.1 | 38.2 | 8.6 | 38.8 | 42.1 | 53.9 | 11.8 | 100 | 0 | |
| Hori. | 12060.000 | AV | 35.5 | 39.3 | 10.2 | 39.2 | 45.8 | 53.9 | 8.1 | 100 | 0 | |
| Vert. | 2360.285 | PK | 51.3 | 27.2 | 13.7 | 41.1 | 51.1 | 73.9 | 22.8 | 100 | 69 | |
| Vert. | 2390.000 | PK | 69.0 | 27.2 | 13.8 | 41.1 | 68.9 | 73.9 | 5.0 | 100 | 102 | |
| Vert. | 2463.704 | PK | 49.1 | 27.4 | 13.8 | 41.1 | 49.2 | 73.9 | 24.7 | 100 | 69 | |
| Vert. | 4824.000 | PK | 46.4 | 31.1 | 5.9 | 41.0 | 42.4 | 73.9 | 31.5 | 100 | 0 | |
| Vert. | 7236.000 | PK | 47.0 | 36.6 | 7.4 | 41.3 | 49.7 | 73.9 | 24.2 | 100 | 0 | |
| Vert. | 9648.000 | PK | 43.2 | 38.2 | 8.6 | 38.8 | 51.2 | 73.9 | 22.7 | 100 | 0 | |
| Vert. | 12060.000 | PK | 45.4 | 39.3 | 10.2 | 39.2 | 55.7 | 73.9 | 18.2 | 100 | 0 | |
| Vert. | 2360.285 | AV | 42.8 | 27.2 | 13.7 | 41.1 | 42.6 | 53.9 | 11.3 | 100 | 69 | |
| Vert. | 2390.000 | AV | 49.2 | 27.2 | 13.8 | 41.1 | 49.1 | 53.9 | 4.8 | 100 | 102 | |
| Vert. | 2463.704 | AV | 40.2 | 27.4 | 13.8 | 41.1 | 40.3 | 53.9 | 13.6 | 100 | 69 | |
| Vert. | 4824.000 | AV | 36.2 | 31.1 | 5.9 | 41.0 | 32.2 | 53.9 | 21.7 | 100 | 0 | |
| Vert. | 7236.000 | AV | 37.0 | 36.6 | 7.4 | 41.3 | 39.7 | 53.9 | 14.2 | 100 | 0 | |
| Vert. | 9648.000 | AV | 34.2 | 38.2 | 8.6 | 38.8 | 42.2 | 53.9 | 11.7 | 100 | 0 | |
| Vert. | 12060.000 | AV | 35.5 | 39.3 | 10.2 | 39.2 | 45.8 | 53.9 | 8.1 | 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).

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 | 92.2 | 27.3 | 13.8 | 41.1 | 92.2 | - | - | Carrier |
| Hori. | 2398.880 | PK | 62.9 | 27.3 | 13.8 | 41.1 | 62.9 | 72.2 | 9.3 | |
| Hori. | 2400.000 | PK | 60.5 | 27.3 | 13.8 | 41.1 | 60.5 | 72.2 | 11.7 | |
| Vert. | 2412.000 | PK | 93.3 | 27.3 | 13.8 | 41.1 | 93.3 | - | - | Carrier |
| Vert. | 2399.820 | PK | 62.0 | 27.3 | 13.8 | 41.1 | 62.0 | 73.3 | 11.3 | |
| Vert. | 2400.000 | PK | 61.8 | 27.3 | 13.8 | 41.1 | 61.8 | 73.3 | 11.5 | |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date March 30, 2012 April 5, 2012 April 6, 2012
 Temperature / Humidity 24 deg.C , 26%RH 24 deg.C , 33%RH 25 deg.C , 33%RH
 Engineer Shinichi Takano Tatsuya Arai Akio Hayashi
 Mode Tx, 2437 MHz
 Tx, IEEE802.11n-20HT, PN9, worst antenna port 1, 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. | 2385.250 | PK | 51.5 | 27.2 | 13.8 | 41.1 | 51.4 | 73.9 | 22.5 | 100 | 203 | PK:VBW 3MHz |
| Hori. | 2488.690 | PK | 49.8 | 27.5 | 13.8 | 41.1 | 50.0 | 73.9 | 23.9 | 100 | 203 | AV:VBW 10Hz |
| Hori. | 4874.000 | PK | 45.7 | 31.2 | 5.9 | 41.0 | 41.8 | 73.9 | 32.1 | 100 | 0 | |
| Hori. | 7311.000 | PK | 46.8 | 36.7 | 7.5 | 41.4 | 49.6 | 73.9 | 24.3 | 100 | 0 | |
| Hori. | 9748.000 | PK | 43.9 | 38.5 | 8.6 | 38.8 | 52.2 | 73.9 | 21.7 | 100 | 0 | |
| Hori. | 12185.000 | PK | 45.0 | 39.3 | 10.2 | 39.2 | 55.3 | 73.9 | 18.6 | 100 | 0 | |
| Hori. | 2385.250 | AV | 42.9 | 27.2 | 13.8 | 41.1 | 42.8 | 53.9 | 11.1 | 100 | 203 | |
| Hori. | 2488.690 | AV | 40.8 | 27.5 | 13.8 | 41.1 | 41.0 | 53.9 | 12.9 | 100 | 203 | |
| Hori. | 4874.000 | AV | 35.8 | 31.2 | 5.9 | 41.0 | 31.9 | 53.9 | 22.0 | 100 | 0 | |
| Hori. | 7311.000 | AV | 36.4 | 36.7 | 7.5 | 41.4 | 39.2 | 53.9 | 14.7 | 100 | 0 | |
| Hori. | 9748.000 | AV | 34.2 | 38.5 | 8.6 | 38.8 | 42.5 | 53.9 | 11.4 | 100 | 0 | |
| Hori. | 12185.000 | AV | 34.9 | 39.3 | 10.2 | 39.2 | 45.2 | 53.9 | 8.7 | 100 | 0 | |
| Vert. | 2385.285 | PK | 50.2 | 27.2 | 13.8 | 41.1 | 50.1 | 73.9 | 23.8 | 100 | 90 | |
| Vert. | 2488.710 | PK | 49.2 | 27.5 | 13.8 | 41.1 | 49.4 | 73.9 | 24.5 | 100 | 90 | |
| Vert. | 4874.000 | PK | 45.4 | 31.2 | 5.9 | 41.0 | 41.5 | 73.9 | 32.4 | 100 | 0 | |
| Vert. | 7311.000 | PK | 46.2 | 36.7 | 7.5 | 41.4 | 49.0 | 73.9 | 24.9 | 100 | 0 | |
| Vert. | 9748.000 | PK | 44.0 | 38.5 | 8.6 | 38.8 | 52.3 | 73.9 | 21.6 | 100 | 0 | |
| Vert. | 12185.000 | PK | 44.5 | 39.3 | 10.2 | 39.2 | 54.8 | 73.9 | 19.1 | 100 | 0 | |
| Vert. | 2385.285 | AV | 41.5 | 27.2 | 13.8 | 41.1 | 41.4 | 53.9 | 12.5 | 100 | 90 | |
| Vert. | 2488.710 | AV | 39.7 | 27.5 | 13.8 | 41.1 | 39.9 | 53.9 | 14.0 | 100 | 90 | |
| Vert. | 4874.000 | AV | 36.0 | 31.2 | 5.9 | 41.0 | 32.1 | 53.9 | 21.8 | 100 | 0 | |
| Vert. | 7311.000 | AV | 36.4 | 36.7 | 7.5 | 41.4 | 39.2 | 53.9 | 14.7 | 100 | 0 | |
| Vert. | 9748.000 | AV | 34.2 | 38.5 | 8.6 | 38.8 | 42.5 | 53.9 | 11.4 | 100 | 0 | |
| Vert. | 12185.000 | AV | 34.8 | 39.3 | 10.2 | 39.2 | 45.1 | 53.9 | 8.8 | 100 | 0 | |

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

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

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date March 30, 2012 April 5, 2012 April 6, 2012
 Temperature / Humidity 24 deg.C , 26%RH 24 deg.C , 33%RH 25 deg.C , 33%RH
 Engineer Shinichi Takano Tatsuya Arai Akio Hayashi
 Mode Tx, 2462 MHz
 Tx, IEEE802.11n-20HT, PN9, worst antenna port 1, 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. | 2410.300 | PK | 51.8 | 27.3 | 13.8 | 41.1 | 51.8 | 73.9 | 22.1 | 100 | 206 | PK:VBW 3MHz |
| Hori. | 2483.500 | PK | 67.1 | 27.5 | 13.8 | 41.1 | 67.3 | 73.9 | 6.6 | 100 | 211 | AV:VBW 10Hz |
| Hori. | 2513.760 | PK | 50.3 | 27.6 | 14.0 | 41.1 | 50.8 | 73.9 | 23.1 | 100 | 206 | |
| Hori. | 4924.000 | PK | 46.5 | 31.3 | 5.9 | 40.9 | 42.8 | 73.9 | 31.1 | 100 | 230 | |
| Hori. | 7386.000 | PK | 46.7 | 36.9 | 7.5 | 41.4 | 49.7 | 73.9 | 24.2 | 100 | 0 | |
| Hori. | 9848.000 | PK | 45.3 | 38.7 | 8.6 | 38.8 | 53.8 | 73.9 | 20.1 | 100 | 0 | |
| Hori. | 12310.000 | PK | 44.1 | 39.4 | 10.2 | 39.2 | 54.5 | 73.9 | 19.4 | 100 | 0 | |
| Hori. | 2410.300 | AV | 43.3 | 27.3 | 13.8 | 41.1 | 43.3 | 53.9 | 10.6 | 100 | 206 | |
| Hori. | 2483.500 | AV | 47.2 | 27.5 | 13.8 | 41.1 | 47.4 | 53.9 | 6.5 | 100 | 211 | |
| Hori. | 2513.760 | AV | 41.8 | 27.6 | 14.0 | 41.1 | 42.3 | 53.9 | 11.6 | 100 | 206 | |
| Hori. | 4924.000 | AV | 36.7 | 31.3 | 5.9 | 40.9 | 33.0 | 53.9 | 20.9 | 100 | 230 | |
| Hori. | 7386.000 | AV | 36.6 | 36.9 | 7.5 | 41.4 | 39.6 | 53.9 | 14.3 | 100 | 0 | |
| Hori. | 9848.000 | AV | 34.0 | 38.7 | 8.6 | 38.8 | 42.5 | 53.9 | 11.4 | 100 | 0 | |
| Hori. | 12310.000 | AV | 34.2 | 39.4 | 10.2 | 39.2 | 44.6 | 53.9 | 9.3 | 100 | 0 | |
| Vert. | 2410.285 | PK | 51.8 | 27.3 | 13.8 | 41.1 | 51.8 | 73.9 | 22.1 | 100 | 90 | |
| Vert. | 2483.500 | PK | 66.5 | 27.5 | 13.8 | 41.1 | 66.7 | 73.9 | 7.2 | 100 | 101 | |
| Vert. | 2513.765 | PK | 49.1 | 27.6 | 14.0 | 41.1 | 49.6 | 73.9 | 24.3 | 100 | 90 | |
| Vert. | 4924.000 | PK | 47.5 | 31.3 | 5.9 | 40.9 | 43.8 | 73.9 | 30.1 | 100 | 0 | |
| Vert. | 7386.000 | PK | 48.3 | 36.9 | 7.5 | 41.4 | 51.3 | 73.9 | 22.6 | 100 | 0 | |
| Vert. | 9848.000 | PK | 44.3 | 38.7 | 8.6 | 38.8 | 52.8 | 73.9 | 21.1 | 100 | 0 | |
| Vert. | 12310.000 | PK | 43.8 | 39.4 | 10.2 | 39.2 | 54.2 | 73.9 | 19.7 | 100 | 0 | |
| Vert. | 2410.285 | AV | 42.0 | 27.3 | 13.8 | 41.1 | 42.0 | 53.9 | 11.9 | 100 | 90 | |
| Vert. | 2483.500 | AV | 46.5 | 27.5 | 13.8 | 41.1 | 46.7 | 53.9 | 7.2 | 100 | 101 | |
| Vert. | 2513.765 | AV | 39.1 | 27.6 | 14.0 | 41.1 | 39.6 | 53.9 | 14.3 | 100 | 90 | |
| Vert. | 4924.000 | AV | 36.0 | 31.3 | 5.9 | 40.9 | 32.3 | 53.9 | 21.6 | 100 | 0 | |
| Vert. | 7386.000 | AV | 36.6 | 36.9 | 7.5 | 41.4 | 39.6 | 53.9 | 14.3 | 100 | 0 | |
| Vert. | 9848.000 | AV | 34.0 | 38.7 | 8.6 | 38.8 | 42.5 | 53.9 | 11.4 | 100 | 0 | |
| Vert. | 12310.000 | AV | 34.3 | 39.4 | 10.2 | 39.2 | 44.7 | 53.9 | 9.2 | 100 | 0 | |

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

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

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date March 30, 2012 April 5, 2012 April 6, 2012
Temperature / Humidity 24 deg.C , 26%RH 24 deg.C , 33%RH 25 deg.C , 33%RH
Engineer Shinichi Takano Tatsuya Arai Akio Hayashi
Mode Tx, 2422 MHz
 Tx, IEEE802.11n-40HT, PN9, worst antenna port 1, 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. | 2318.790 | PK | 47.5 | 27.0 | 13.7 | 41.1 | 47.1 | 73.9 | 26.8 | 100 | 201 | PK:VBW 3MHz AV:VBW 10Hz |
| Hori. | 2390.000 | PK | 65.0 | 27.2 | 13.8 | 41.1 | 64.9 | 73.9 | 9.0 | 100 | 126 | |
| Hori. | 2524.880 | PK | 47.6 | 27.6 | 14.0 | 41.1 | 48.1 | 73.9 | 25.8 | 100 | 201 | |
| Hori. | 4844.000 | PK | 46.5 | 31.1 | 5.9 | 41.0 | 42.5 | 73.9 | 31.4 | 100 | 0 | |
| Hori. | 7266.000 | PK | 46.3 | 36.6 | 7.4 | 41.3 | 49.0 | 73.9 | 24.9 | 100 | 0 | |
| Hori. | 9688.000 | PK | 43.6 | 38.3 | 8.6 | 38.8 | 51.7 | 73.9 | 22.2 | 100 | 0 | |
| Hori. | 12110.000 | PK | 45.2 | 39.3 | 10.1 | 39.2 | 55.4 | 73.9 | 18.5 | 100 | 0 | |
| Hori. | 2318.790 | AV | 36.6 | 27.0 | 13.7 | 41.1 | 36.2 | 53.9 | 17.7 | 100 | 201 | |
| Hori. | 2390.000 | AV | 50.7 | 27.2 | 13.8 | 41.1 | 50.6 | 53.9 | 3.3 | 100 | 126 | |
| Hori. | 2524.880 | AV | 37.6 | 27.6 | 14.0 | 41.1 | 38.1 | 53.9 | 15.8 | 100 | 201 | |
| Hori. | 4844.000 | AV | 36.0 | 31.1 | 5.9 | 41.0 | 32.0 | 53.9 | 21.9 | 100 | 0 | |
| Hori. | 7266.000 | AV | 36.9 | 36.6 | 7.4 | 41.3 | 39.6 | 53.9 | 14.3 | 100 | 0 | |
| Hori. | 9688.000 | AV | 34.2 | 38.3 | 8.6 | 38.8 | 42.3 | 53.9 | 11.6 | 100 | 0 | |
| Hori. | 12110.000 | AV | 35.1 | 39.3 | 10.1 | 39.2 | 45.3 | 53.9 | 8.6 | 100 | 0 | |
| Vert. | 2319.200 | PK | 47.2 | 27.0 | 13.7 | 41.1 | 46.8 | 73.9 | 27.1 | 100 | 103 | |
| Vert. | 2390.000 | PK | 63.2 | 27.2 | 13.8 | 41.1 | 63.1 | 73.9 | 10.8 | 100 | 99 | |
| Vert. | 2524.515 | PK | 47.4 | 27.6 | 14.0 | 41.1 | 47.9 | 73.9 | 26.0 | 100 | 103 | |
| Vert. | 4844.000 | PK | 45.7 | 31.1 | 5.9 | 41.0 | 41.7 | 73.9 | 32.2 | 100 | 0 | |
| Vert. | 7266.000 | PK | 46.6 | 36.6 | 7.4 | 41.3 | 49.3 | 73.9 | 24.6 | 100 | 0 | |
| Vert. | 9688.000 | PK | 44.0 | 38.3 | 8.6 | 38.8 | 52.1 | 73.9 | 21.8 | 100 | 0 | |
| Vert. | 12110.000 | PK | 44.4 | 39.3 | 10.1 | 39.2 | 54.6 | 73.9 | 19.3 | 100 | 0 | |
| Vert. | 2319.200 | AV | 37.1 | 27.0 | 13.7 | 41.1 | 36.7 | 53.9 | 17.2 | 100 | 103 | |
| Vert. | 2390.000 | AV | 48.4 | 27.2 | 13.8 | 41.1 | 48.3 | 53.9 | 5.6 | 100 | 99 | |
| Vert. | 2524.515 | AV | 36.4 | 27.6 | 14.0 | 41.1 | 36.9 | 53.9 | 17.0 | 100 | 103 | |
| Vert. | 4844.000 | AV | 36.0 | 31.1 | 5.9 | 41.0 | 32.0 | 53.9 | 21.9 | 100 | 0 | |
| Vert. | 7266.000 | AV | 37.0 | 36.6 | 7.4 | 41.3 | 39.7 | 53.9 | 14.2 | 100 | 0 | |
| Vert. | 9688.000 | AV | 34.2 | 38.3 | 8.6 | 38.8 | 42.3 | 53.9 | 11.6 | 100 | 0 | |
| Vert. | 12110.000 | AV | 35.2 | 39.3 | 10.1 | 39.2 | 45.4 | 53.9 | 8.5 | 100 | 0 | |

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

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

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. | 2422.000 | PK | 84.6 | 27.3 | 13.8 | 41.1 | 84.6 | - | - | Carrier |
| Hori. | 2397.913 | PK | 57.4 | 27.3 | 13.8 | 41.1 | 57.4 | 64.6 | 7.2 | |
| Hori. | 2400.000 | PK | 56.8 | 27.3 | 13.8 | 41.1 | 56.8 | 64.6 | 7.8 | |
| Vert. | 2422.000 | PK | 83.1 | 27.3 | 13.8 | 41.1 | 83.1 | - | - | Carrier |
| Vert. | 2397.913 | PK | 56.3 | 27.3 | 13.8 | 41.1 | 56.3 | 63.1 | 6.8 | |
| Vert. | 2400.000 | PK | 55.2 | 27.3 | 13.8 | 41.1 | 55.2 | 63.1 | 7.9 | |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

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

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date March 30, 2012 April 5, 2012 April 6, 2012
 Temperature / Humidity 24 deg.C , 26%RH 24 deg.C , 33%RH 25 deg.C , 33%RH
 Engineer Shinichi Takano Tatsuya Arai Akio Hayashi
 Mode Tx, 2427 MHz
 Tx, IEEE802.11n-40HT, PN9, worst antenna port 1, 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 | 63.3 | 27.2 | 13.8 | 41.1 | 63.2 | 73.9 | 10.7 | 100 | 202 | PK:VBW 3MHz AV:VBW 10Hz |
| Hori. | 4854.000 | PK | 45.2 | 31.2 | 5.9 | 41.0 | 41.3 | 73.9 | 32.6 | 100 | 0 | |
| Hori. | 7281.000 | PK | 47.1 | 36.7 | 7.4 | 41.4 | 49.8 | 73.9 | 24.1 | 100 | 0 | |
| Hori. | 9708.000 | PK | 44.2 | 38.4 | 8.6 | 38.8 | 52.4 | 73.9 | 21.5 | 100 | 0 | |
| Hori. | 12135.000 | PK | 43.8 | 39.3 | 10.1 | 39.2 | 54.0 | 73.9 | 19.9 | 100 | 0 | |
| Hori. | 2390.000 | AV | 50.6 | 27.2 | 13.8 | 41.1 | 50.5 | 53.9 | 3.4 | 100 | 202 | |
| Hori. | 4854.000 | AV | 35.9 | 31.2 | 5.9 | 41.0 | 32.0 | 53.9 | 21.9 | 100 | 0 | |
| Hori. | 7281.000 | AV | 36.8 | 36.7 | 7.4 | 41.4 | 39.5 | 53.9 | 14.4 | 100 | 0 | |
| Hori. | 9708.000 | AV | 34.1 | 38.4 | 8.6 | 38.8 | 42.3 | 53.9 | 11.6 | 100 | 0 | |
| Hori. | 12135.000 | AV | 34.5 | 39.3 | 10.1 | 39.2 | 44.7 | 53.9 | 9.2 | 100 | 0 | |
| Vert. | 2390.000 | PK | 61.7 | 27.2 | 13.8 | 41.1 | 61.6 | 73.9 | 12.3 | 123 | 107 | |
| Vert. | 4854.000 | PK | 45.7 | 31.2 | 5.9 | 41.0 | 41.8 | 73.9 | 32.1 | 100 | 0 | |
| Vert. | 7281.000 | PK | 46.9 | 36.7 | 7.4 | 41.4 | 49.6 | 73.9 | 24.3 | 100 | 0 | |
| Vert. | 9708.000 | PK | 43.9 | 38.4 | 8.6 | 38.8 | 52.1 | 73.9 | 21.8 | 100 | 0 | |
| Vert. | 12135.000 | PK | 44.4 | 39.3 | 10.1 | 39.2 | 54.6 | 73.9 | 19.3 | 100 | 0 | |
| Vert. | 2390.000 | AV | 48.9 | 27.2 | 13.8 | 41.1 | 48.8 | 53.9 | 5.1 | 123 | 107 | |
| Vert. | 4854.000 | AV | 35.9 | 31.2 | 5.9 | 41.0 | 32.0 | 53.9 | 21.9 | 100 | 0 | |
| Vert. | 7281.000 | AV | 36.8 | 36.7 | 7.4 | 41.4 | 39.5 | 53.9 | 14.4 | 100 | 0 | |
| Vert. | 9708.000 | AV | 34.2 | 38.4 | 8.6 | 38.8 | 42.4 | 53.9 | 11.5 | 100 | 0 | |
| Vert. | 12135.000 | AV | 34.5 | 39.3 | 10.1 | 39.2 | 44.7 | 53.9 | 9.2 | 100 | 0 | |

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

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

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. | 2427.000 | PK | 87.4 | 27.3 | 13.8 | 41.1 | 87.4 | - | - | Carrier |
| Hori. | 2400.000 | PK | 54.8 | 27.3 | 13.8 | 41.1 | 54.8 | 67.4 | 12.6 | |
| Vert. | 2427.000 | PK | 85.3 | 27.3 | 13.8 | 41.1 | 85.3 | - | - | Carrier |
| Vert. | 2400.000 | PK | 53.3 | 27.3 | 13.8 | 41.1 | 53.3 | 65.3 | 12.0 | |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

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Radiated Emission

| | | | |
|------------------------|---|----------------------------|------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.3 Semi Anechoic Chamber | |
| Date | March 30, 2012 | April 5, 2012 | April 6, 2012 |
| Temperature / Humidity | 24 deg.C , 26%RH | 24 deg.C , 33%RH | 25 deg.C , 33%RH |
| Engineer | Shinichi Takano | Tatsuya Arai | Akio Hayashi |
| Mode | Tx, 2437 MHz | | |
| | Tx, IEEE802.11n-40HT, PN9, worst antenna port 1, 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. | 2334.305 | PK | 47.5 | 27.1 | 13.7 | 41.1 | 47.2 | 73.9 | 26.7 | 100 | 202 | PK:VBW 3MHz AV:VBW 10Hz |
| Hori. | 2539.695 | PK | 48.9 | 27.6 | 14.0 | 41.1 | 49.4 | 73.9 | 24.5 | 100 | 202 | |
| Hori. | 4874.000 | PK | 45.9 | 31.2 | 5.9 | 41.0 | 42.0 | 73.9 | 31.9 | 100 | 0 | |
| Hori. | 7311.000 | PK | 46.8 | 36.7 | 7.5 | 41.4 | 49.6 | 73.9 | 24.3 | 100 | 0 | |
| Hori. | 9748.000 | PK | 44.2 | 38.5 | 8.6 | 38.8 | 52.5 | 73.9 | 21.4 | 100 | 0 | |
| Hori. | 12185.000 | PK | 45.0 | 39.3 | 10.2 | 39.2 | 55.3 | 73.9 | 18.6 | 100 | 0 | |
| Hori. | 2334.305 | AV | 37.8 | 27.1 | 13.7 | 41.1 | 37.5 | 53.9 | 16.4 | 100 | 202 | |
| Hori. | 2539.695 | AV | 38.9 | 27.6 | 14.0 | 41.1 | 39.4 | 53.9 | 14.5 | 100 | 202 | |
| Hori. | 4874.000 | AV | 36.0 | 31.2 | 5.9 | 41.0 | 32.1 | 53.9 | 21.8 | 100 | 0 | |
| Hori. | 7311.000 | AV | 36.4 | 36.7 | 7.5 | 41.4 | 39.2 | 53.9 | 14.7 | 100 | 0 | |
| Hori. | 9748.000 | AV | 34.2 | 38.5 | 8.6 | 38.8 | 42.5 | 53.9 | 11.4 | 100 | 0 | |
| Hori. | 12185.000 | AV | 34.7 | 39.3 | 10.2 | 39.2 | 45.0 | 53.9 | 8.9 | 100 | 0 | |
| Vert. | 2334.080 | PK | 47.8 | 27.1 | 13.7 | 41.1 | 47.5 | 73.9 | 26.4 | 100 | 107 | |
| Vert. | 2540.315 | PK | 46.6 | 27.6 | 14.0 | 41.1 | 47.1 | 73.9 | 26.8 | 100 | 107 | |
| Vert. | 4874.000 | PK | 45.9 | 31.2 | 5.9 | 41.0 | 42.0 | 73.9 | 31.9 | 100 | 0 | |
| Vert. | 7311.000 | PK | 46.6 | 36.7 | 7.5 | 41.4 | 49.4 | 73.9 | 24.5 | 100 | 0 | |
| Vert. | 9748.000 | PK | 44.0 | 38.5 | 8.6 | 38.8 | 52.3 | 73.9 | 21.6 | 100 | 0 | |
| Vert. | 12185.000 | PK | 44.5 | 39.3 | 10.2 | 39.2 | 54.8 | 73.9 | 19.1 | 100 | 0 | |
| Vert. | 2334.080 | AV | 38.4 | 27.1 | 13.7 | 41.1 | 38.1 | 53.9 | 15.8 | 100 | 107 | |
| Vert. | 2540.315 | AV | 36.4 | 27.6 | 14.0 | 41.1 | 36.9 | 53.9 | 17.0 | 100 | 107 | |
| Vert. | 4874.000 | AV | 35.9 | 31.2 | 5.9 | 41.0 | 32.0 | 53.9 | 21.9 | 100 | 0 | |
| Vert. | 7311.000 | AV | 36.4 | 36.7 | 7.5 | 41.4 | 39.2 | 53.9 | 14.7 | 100 | 0 | |
| Vert. | 9748.000 | AV | 34.2 | 38.5 | 8.6 | 38.8 | 42.5 | 53.9 | 11.4 | 100 | 0 | |
| Vert. | 12185.000 | AV | 34.8 | 39.3 | 10.2 | 39.2 | 45.1 | 53.9 | 8.8 | 100 | 0 | |

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

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date March 30, 2012 April 5, 2012 April 6, 2012
 Temperature / Humidity 24 deg.C , 26%RH 24 deg.C , 33%RH 25 deg.C , 33%RH
 Engineer Shinichi Takano Tatsuya Arai Akio Hayashi
 Mode Tx, 2447 MHz
 Tx, IEEE802.11n-40HT, PN9, worst antenna port 1, 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 | 60.3 | 27.5 | 13.8 | 41.1 | 60.5 | 73.9 | 13.4 | 100 | 202 | PK:VBW 3MHz |
| Hori. | 4894.000 | PK | 46.2 | 31.3 | 5.9 | 40.9 | 42.5 | 73.9 | 31.4 | 100 | 0 | AV:VBW 10Hz |
| Hori. | 7341.000 | PK | 46.0 | 36.8 | 7.5 | 41.4 | 48.9 | 73.9 | 25.0 | 100 | 0 | |
| Hori. | 9788.000 | PK | 44.9 | 38.5 | 8.6 | 38.8 | 53.2 | 73.9 | 20.7 | 100 | 0 | |
| Hori. | 12235.000 | PK | 44.2 | 39.3 | 10.2 | 39.2 | 54.5 | 73.9 | 19.4 | 100 | 0 | |
| Hori. | 2483.500 | AV | 46.6 | 27.5 | 13.8 | 41.1 | 46.8 | 53.9 | 7.1 | 100 | 202 | |
| Hori. | 4894.000 | AV | 36.2 | 31.3 | 5.9 | 40.9 | 32.5 | 53.9 | 21.4 | 100 | 0 | |
| Hori. | 7341.000 | AV | 36.6 | 36.8 | 7.5 | 41.4 | 39.5 | 53.9 | 14.4 | 100 | 0 | |
| Hori. | 9788.000 | AV | 34.0 | 38.5 | 8.6 | 38.8 | 42.3 | 53.9 | 11.6 | 100 | 0 | |
| Hori. | 12235.000 | AV | 34.5 | 39.3 | 10.2 | 39.2 | 44.8 | 53.9 | 9.1 | 100 | 0 | |
| Vert. | 2483.500 | PK | 58.9 | 27.5 | 13.8 | 41.1 | 59.1 | 73.9 | 14.8 | 100 | 95 | |
| Vert. | 4894.000 | PK | 45.7 | 31.3 | 5.9 | 40.9 | 42.0 | 73.9 | 31.9 | 100 | 0 | |
| Vert. | 7341.000 | PK | 46.7 | 36.8 | 7.5 | 41.4 | 49.6 | 73.9 | 24.3 | 100 | 0 | |
| Vert. | 9788.000 | PK | 45.0 | 38.5 | 8.6 | 38.8 | 53.3 | 73.9 | 20.6 | 100 | 0 | |
| Vert. | 12235.000 | PK | 44.0 | 39.3 | 10.2 | 39.2 | 54.3 | 73.9 | 19.6 | 100 | 0 | |
| Vert. | 2483.500 | AV | 45.1 | 27.5 | 13.8 | 41.1 | 45.3 | 53.9 | 8.6 | 100 | 95 | |
| Vert. | 4894.000 | AV | 36.0 | 31.3 | 5.9 | 40.9 | 32.3 | 53.9 | 21.6 | 100 | 0 | |
| Vert. | 7341.000 | AV | 36.6 | 36.8 | 7.5 | 41.4 | 39.5 | 53.9 | 14.4 | 100 | 0 | |
| Vert. | 9788.000 | AV | 34.1 | 38.5 | 8.6 | 38.8 | 42.4 | 53.9 | 11.5 | 100 | 0 | |
| Vert. | 12235.000 | AV | 34.6 | 39.3 | 10.2 | 39.2 | 44.9 | 53.9 | 9.0 | 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).

Radiated Emission

| | | | |
|------------------------|---|----------------------------|------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.3 Semi Anechoic Chamber | |
| Date | March 30, 2012 | April 5, 2012 | April 6, 2012 |
| Temperature / Humidity | 24 deg.C , 26%RH | 24 deg.C , 33%RH | 25 deg.C , 33%RH |
| Engineer | Shinichi Takano | Tatsuya Arai | Akio Hayashi |
| Mode | Tx, 2452 MHz | | |
| | Tx, IEEE802.11n-40HT, PN9, worst antenna port 1, 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. | 2349.010 | PK | 48.9 | 27.1 | 13.7 | 41.1 | 48.6 | 73.9 | 25.3 | 100 | 202 | PK:VBW 3MHz AV:VBW 10Hz |
| Hori. | 2483.500 | PK | 60.8 | 27.5 | 13.8 | 41.1 | 61.0 | 73.9 | 12.9 | 100 | 208 | |
| Hori. | 2554.860 | PK | 49.6 | 27.7 | 14.0 | 41.1 | 50.2 | 73.9 | 23.7 | 100 | 202 | |
| Hori. | 4904.000 | PK | 48.6 | 31.3 | 5.9 | 40.9 | 44.9 | 73.9 | 29.0 | 100 | 0 | |
| Hori. | 7356.000 | PK | 48.6 | 36.8 | 7.5 | 41.4 | 51.5 | 73.9 | 22.4 | 100 | 0 | |
| Hori. | 9808.000 | PK | 45.7 | 38.6 | 8.7 | 38.8 | 54.2 | 73.9 | 19.7 | 100 | 0 | |
| Hori. | 12260.000 | PK | 45.4 | 39.3 | 10.2 | 39.2 | 55.7 | 73.9 | 18.2 | 100 | 0 | |
| Hori. | 2349.010 | AV | 39.0 | 27.1 | 13.7 | 41.1 | 38.7 | 53.9 | 15.2 | 100 | 202 | |
| Hori. | 2483.500 | AV | 46.2 | 27.5 | 13.8 | 41.1 | 46.4 | 53.9 | 7.5 | 100 | 208 | |
| Hori. | 2554.860 | AV | 39.0 | 27.7 | 14.0 | 41.1 | 39.6 | 53.9 | 14.3 | 100 | 202 | |
| Hori. | 4904.000 | AV | 37.6 | 31.3 | 5.9 | 40.9 | 33.9 | 53.9 | 20.0 | 100 | 0 | |
| Hori. | 7356.000 | AV | 38.3 | 36.8 | 7.5 | 41.4 | 41.2 | 53.9 | 12.7 | 100 | 0 | |
| Hori. | 9808.000 | AV | 35.5 | 38.6 | 8.7 | 38.8 | 44.0 | 53.9 | 9.9 | 100 | 0 | |
| Hori. | 12260.000 | AV | 35.8 | 39.3 | 10.2 | 39.2 | 46.1 | 53.9 | 7.8 | 100 | 0 | |
| Vert. | 2349.240 | PK | 47.0 | 27.1 | 13.7 | 41.1 | 46.7 | 73.9 | 27.2 | 100 | 87 | |
| Vert. | 2483.500 | PK | 61.4 | 27.5 | 13.8 | 41.1 | 61.6 | 73.9 | 12.3 | 100 | 93 | |
| Vert. | 2554.465 | PK | 46.1 | 27.7 | 14.0 | 41.1 | 46.7 | 73.9 | 27.2 | 100 | 87 | |
| Vert. | 4904.000 | PK | 46.5 | 31.3 | 5.9 | 40.9 | 42.8 | 73.9 | 31.1 | 100 | 0 | |
| Vert. | 7356.000 | PK | 47.5 | 36.8 | 7.5 | 41.4 | 50.4 | 73.9 | 23.5 | 100 | 0 | |
| Vert. | 9808.000 | PK | 43.9 | 38.6 | 8.7 | 38.8 | 52.4 | 73.9 | 21.5 | 100 | 0 | |
| Vert. | 12260.000 | PK | 44.7 | 39.3 | 10.2 | 39.2 | 55.0 | 73.9 | 18.9 | 100 | 0 | |
| Vert. | 2349.240 | AV | 36.9 | 27.1 | 13.7 | 41.1 | 36.6 | 53.9 | 17.3 | 100 | 87 | |
| Vert. | 2483.500 | AV | 45.8 | 27.5 | 13.8 | 41.1 | 46.0 | 53.9 | 7.9 | 100 | 93 | |
| Vert. | 2554.465 | AV | 35.8 | 27.7 | 14.0 | 41.1 | 36.4 | 53.9 | 17.5 | 100 | 87 | |
| Vert. | 4904.000 | AV | 35.8 | 31.3 | 5.9 | 40.9 | 32.1 | 53.9 | 21.8 | 100 | 0 | |
| Vert. | 7356.000 | AV | 36.6 | 36.8 | 7.5 | 41.4 | 39.5 | 53.9 | 14.4 | 100 | 0 | |
| Vert. | 9808.000 | AV | 33.8 | 38.6 | 8.7 | 38.8 | 42.3 | 53.9 | 11.6 | 100 | 0 | |
| Vert. | 12260.000 | AV | 34.3 | 39.3 | 10.2 | 39.2 | 44.6 | 53.9 | 9.3 | 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).

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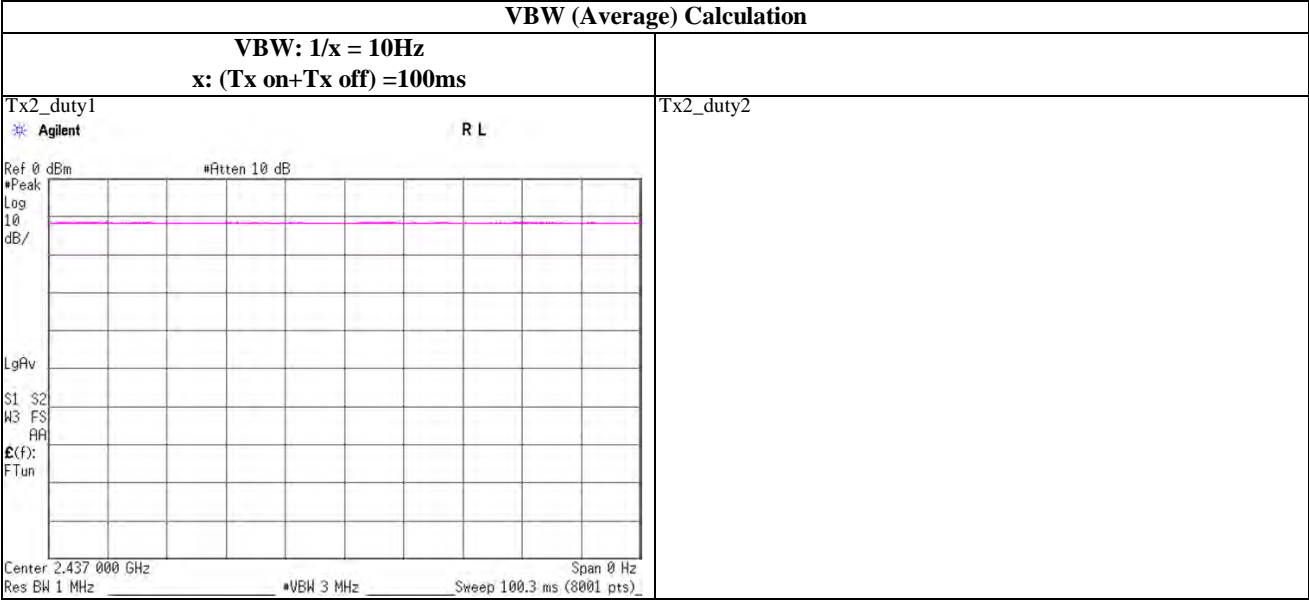
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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VBW(Average) Calculation chart

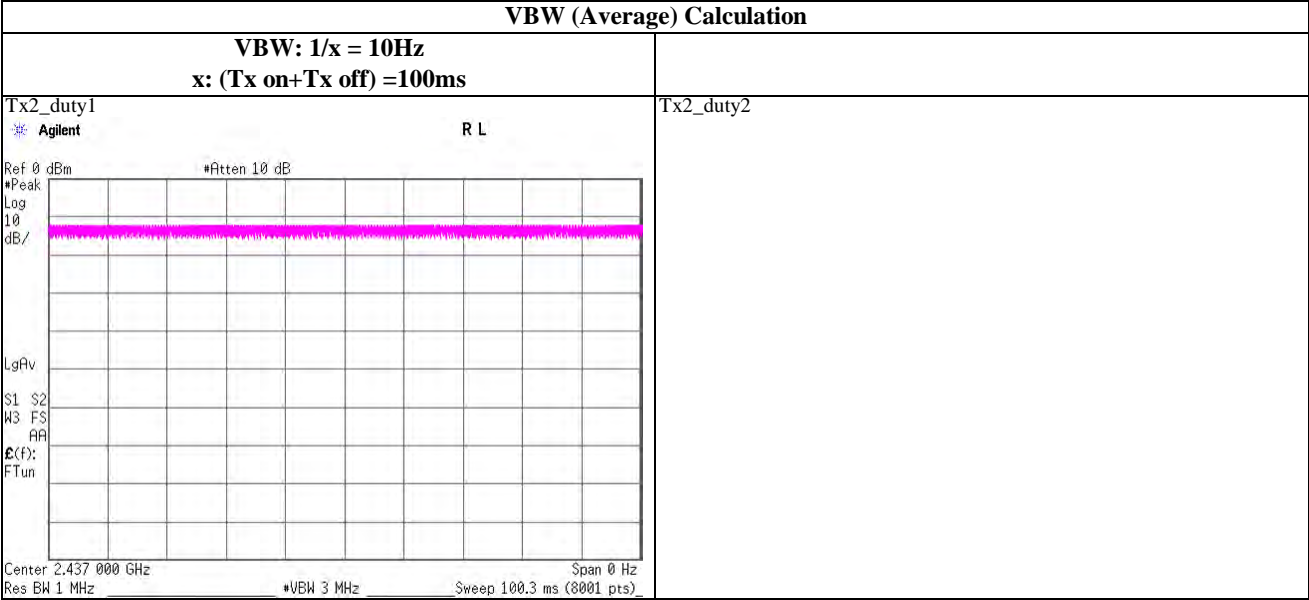
Tx, IEEE802.11b, PN9, worst antenna port 1, worst data mode 1Mbps



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VBW(Average) Calculation chart

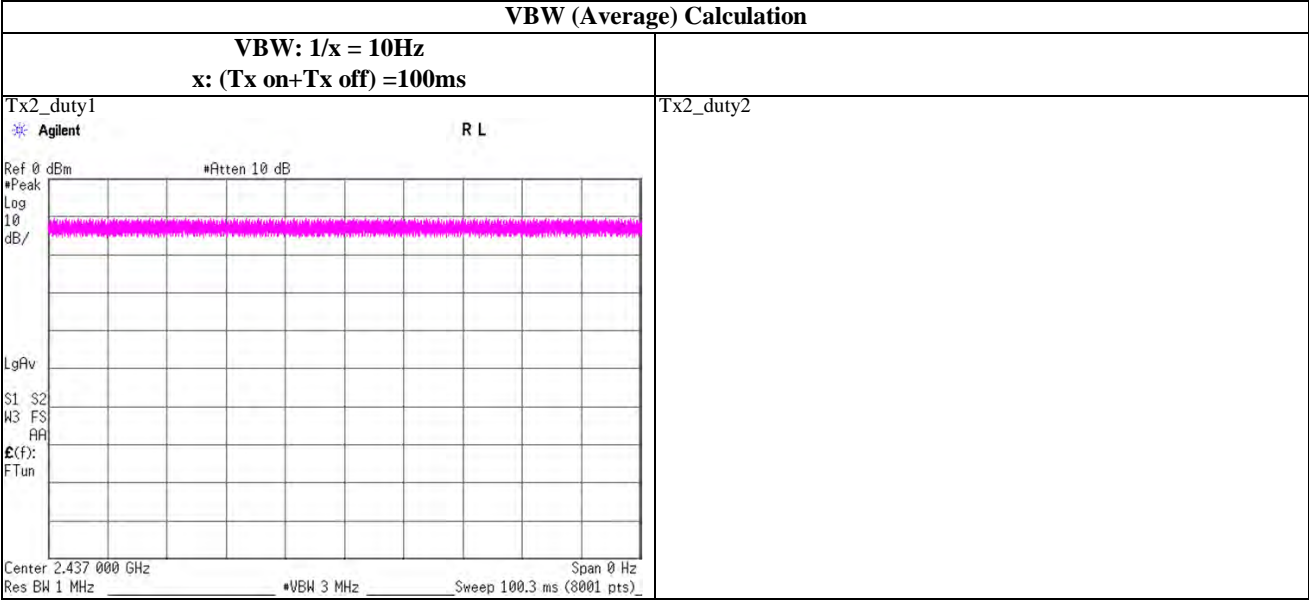
Tx, IEEE802.11g, PN9, worst antenna port 1, worst data mode 6Mbps



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VBW(Average) Calculation chart

Tx, IEEE802.11n-20HT, PN9, worst antenna port 1, worst data mode 0(MCS)



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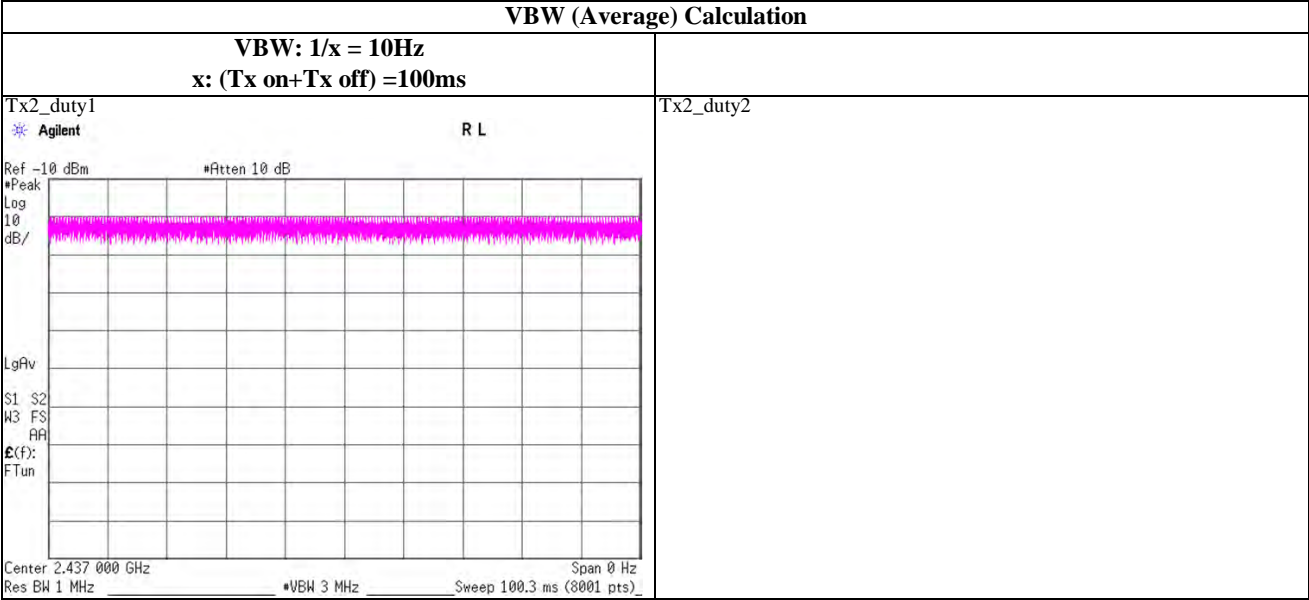
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VBW(Average) Calculation chart

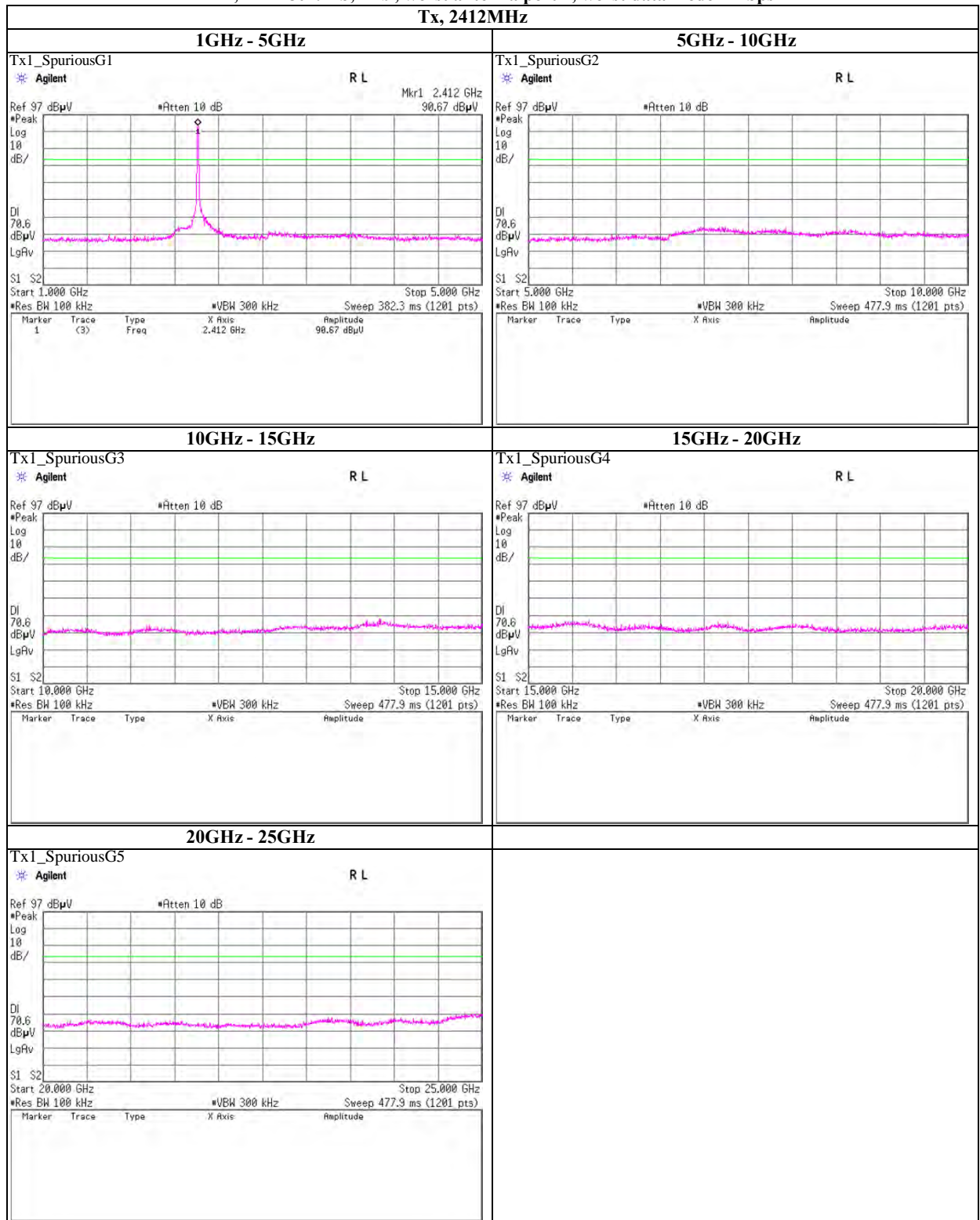
Tx, IEEE802.11n-40HT, PN9, worst antenna port 1, worst data mode 0(MCS)



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Spurious emission (Conducted)

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



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Shonan EMC Lab.

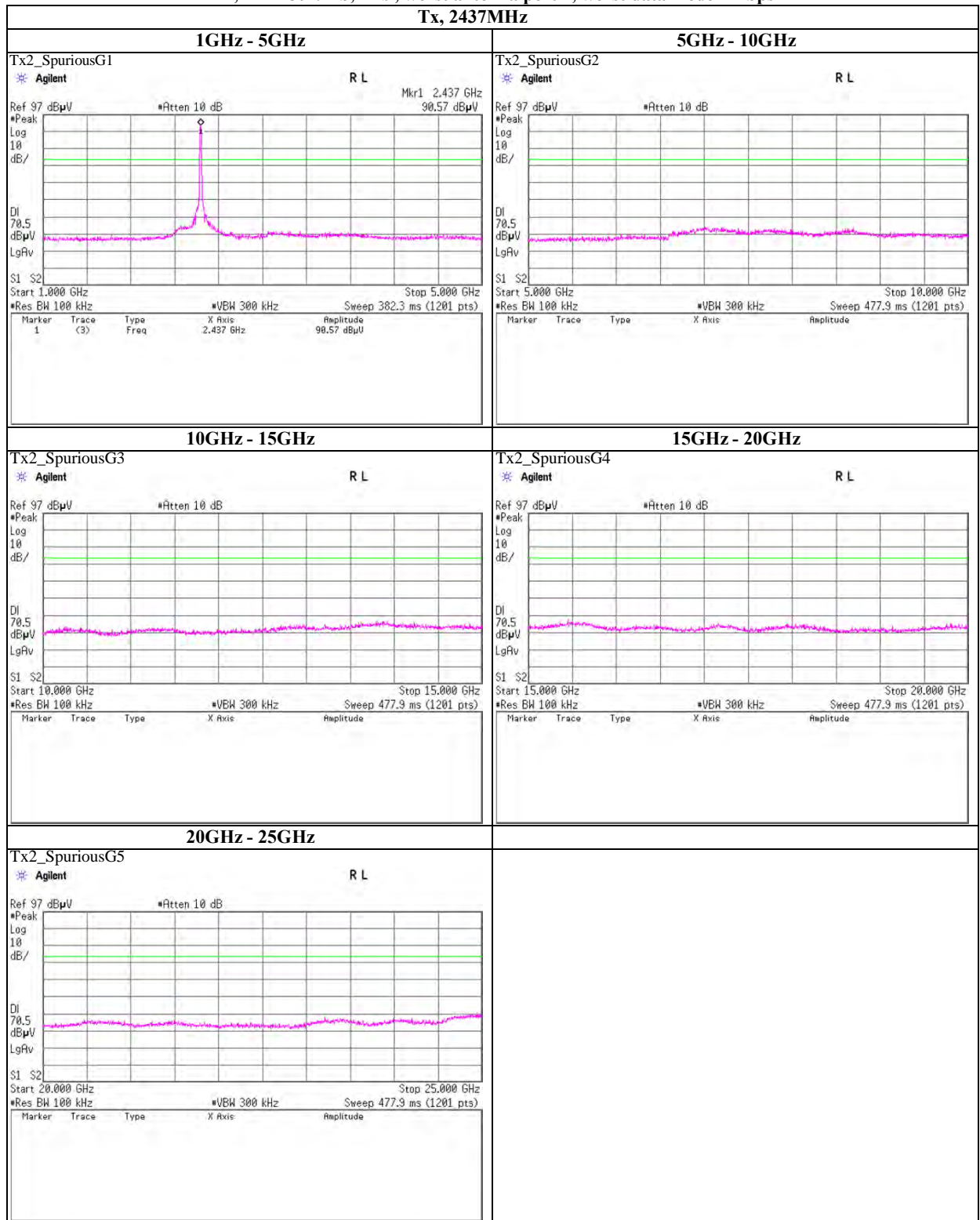
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Spurious emission (Conducted)

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



UL Japan, Inc.

Shonan EMC Lab.

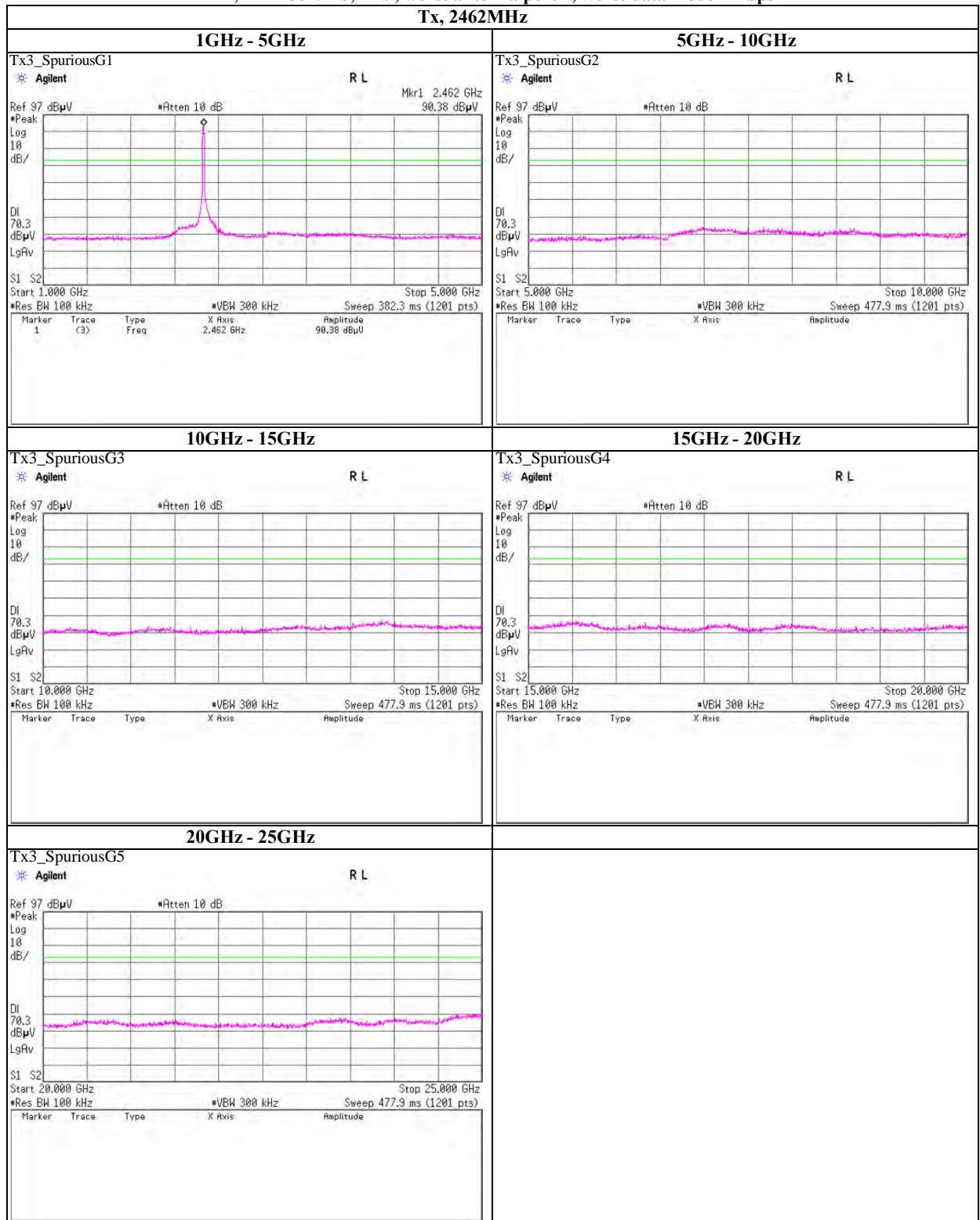
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Spurious emission (Conducted)

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



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Shonan EMC Lab.

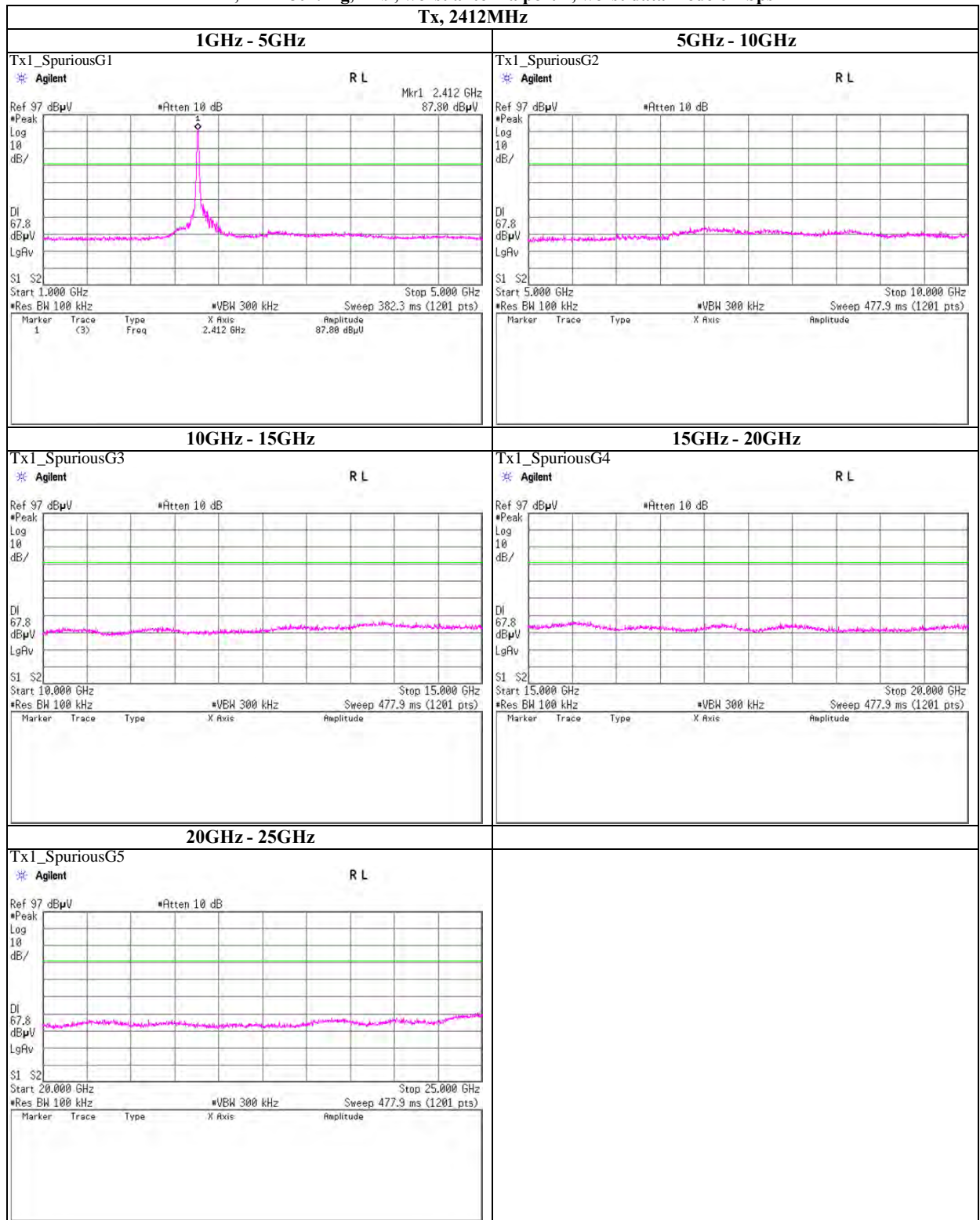
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Spurious emission (Conducted)

Tx, IEEE802.11g, PN9, worst antenna port 1, worst data mode 6Mbps



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Spurious emission (Conducted)

Tx, IEEE802.11g, PN9, worst antenna port 1, worst data mode 6Mbps

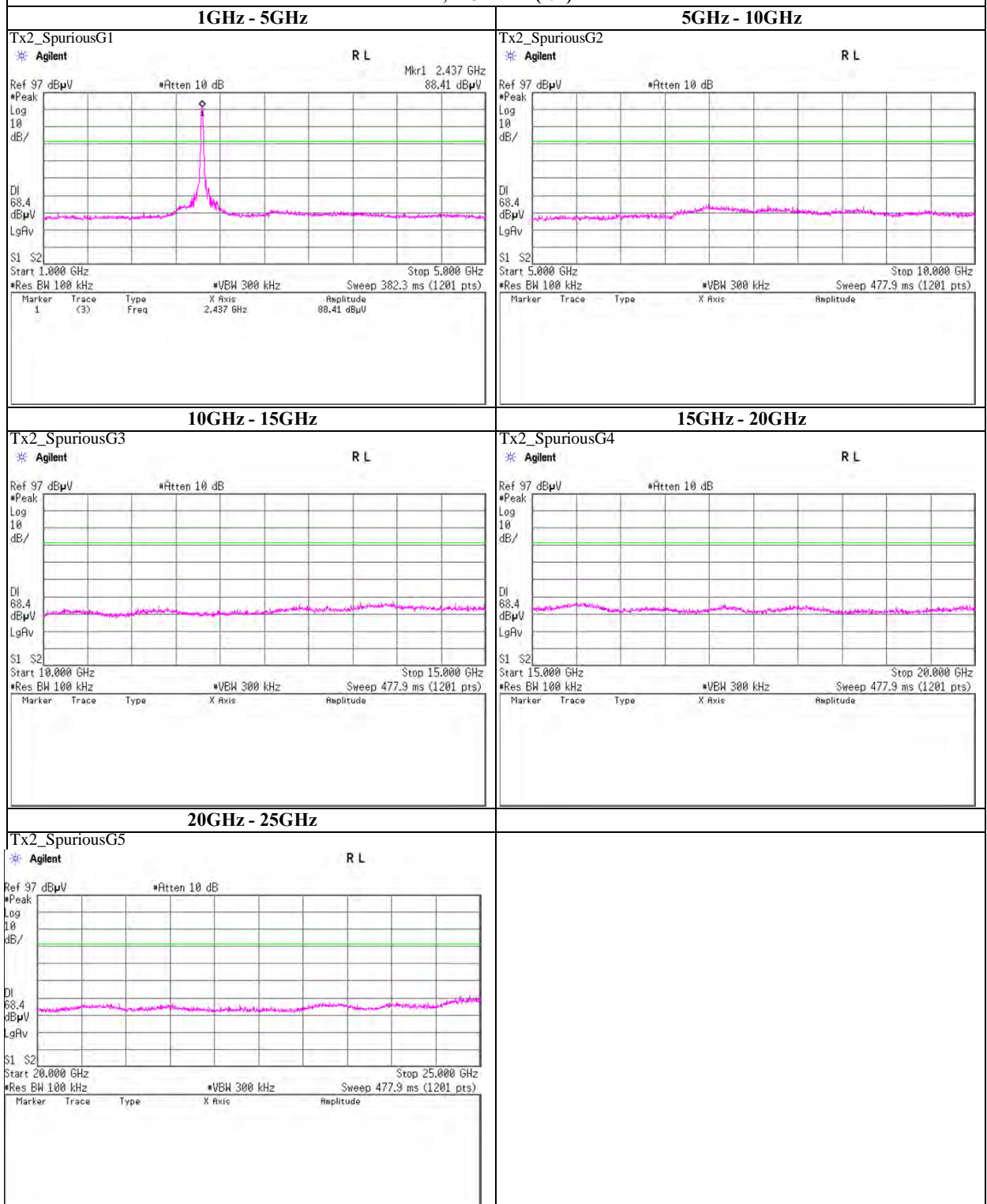
Tx, 2437MHz (1/2)



Spurious emission (Conducted)

Tx, IEEE802.11g, PN9, worst antenna port 1, worst data mode 6Mbps

Tx, 2437MHz (2/2)



UL Japan, Inc.

Shonan EMC Lab.

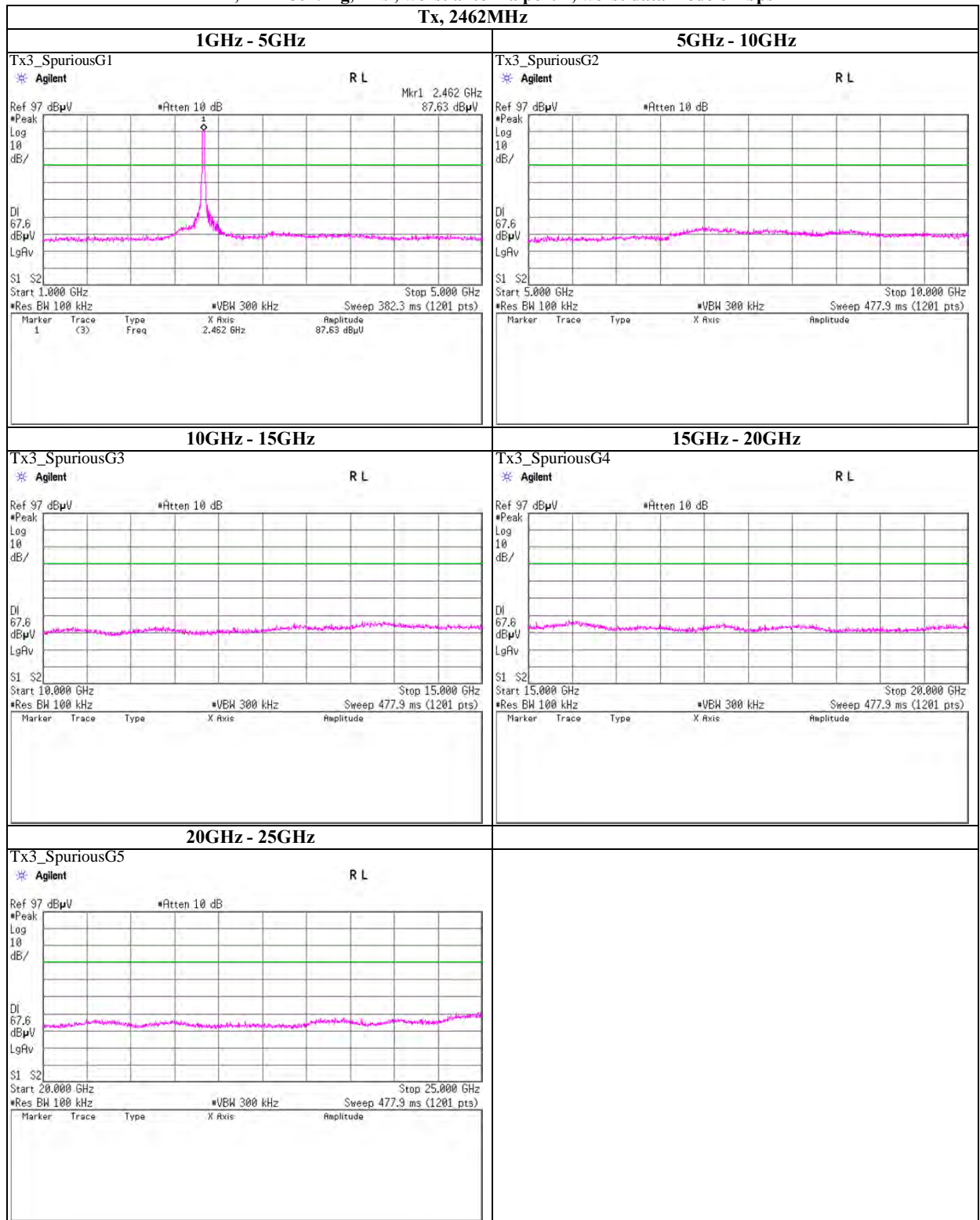
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Spurious emission (Conducted)

Tx, IEEE802.11g, PN9, worst antenna port 1, worst data mode 6Mbps



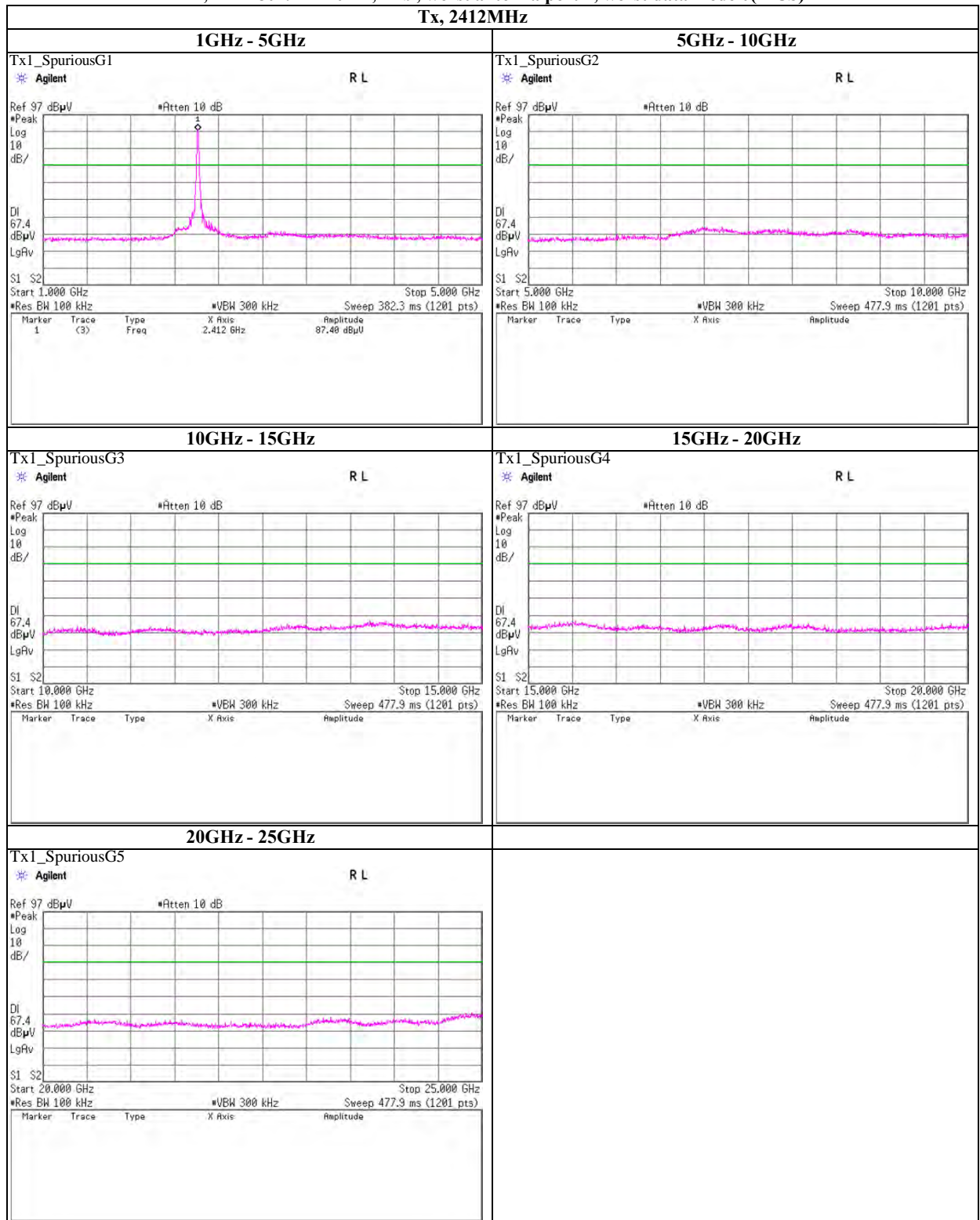
UL Japan, Inc.

Shonan EMC Lab.

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Telephone : +81 463 50 6400

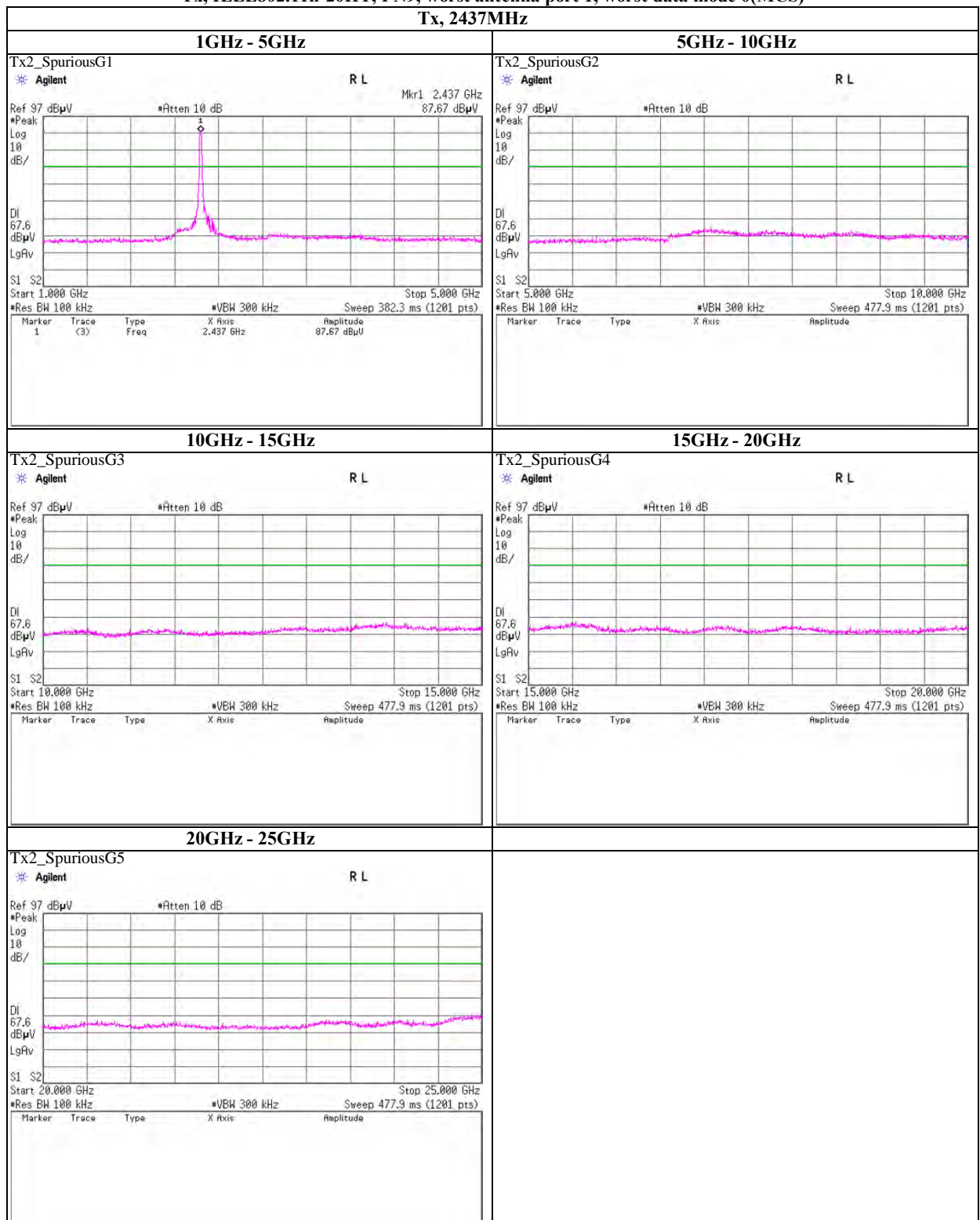
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Spurious emission (Conducted)**Tx, IEEE802.11n-20HT, PN9, worst antenna port 1, worst data mode 0(MCS)****UL Japan, Inc.****Shonan EMC Lab.**

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Telephone : +81 463 50 6400

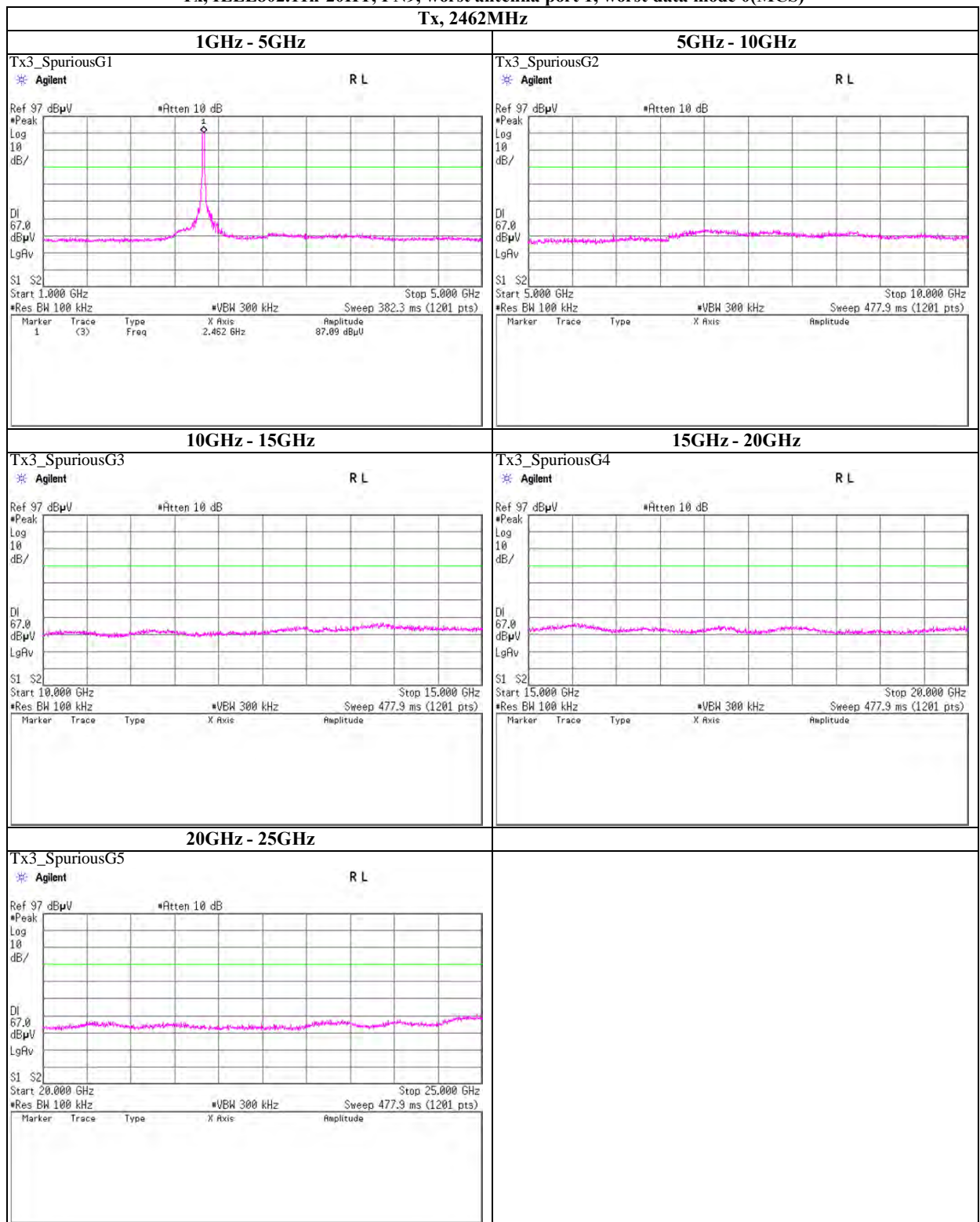
Facsimile : +81 463 50 6401

Spurious emission (Conducted)**Tx, IEEE802.11n-20HT, PN9, worst antenna port 1, worst data mode 0(MCS)****UL Japan, Inc.****Shonan EMC Lab.**

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Telephone : +81 463 50 6400

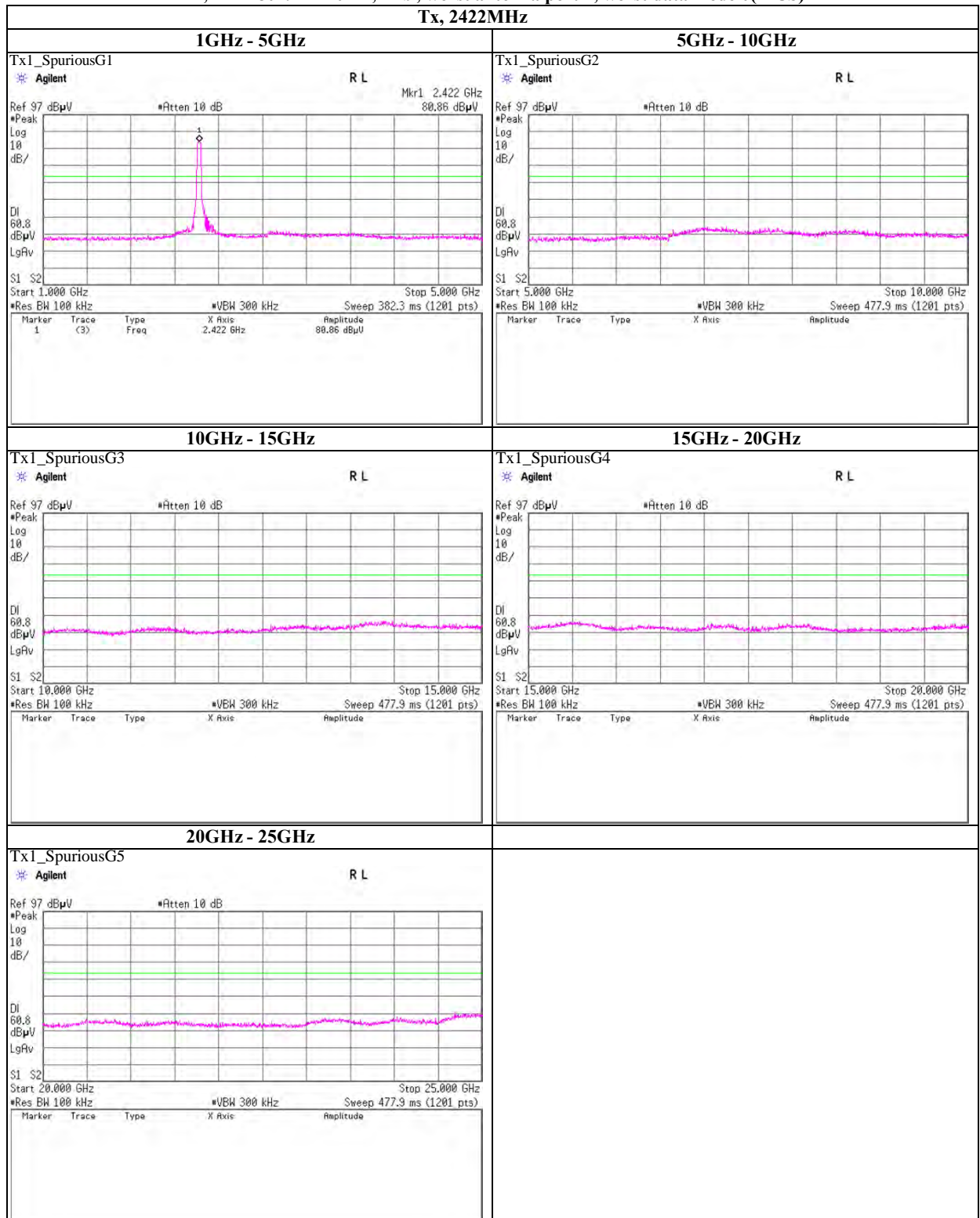
Facsimile : +81 463 50 6401

Spurious emission (Conducted)**Tx, IEEE802.11n-20HT, PN9, worst antenna port 1, worst data mode 0(MCS)****UL Japan, Inc.****Shonan EMC Lab.**

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Telephone : +81 463 50 6400

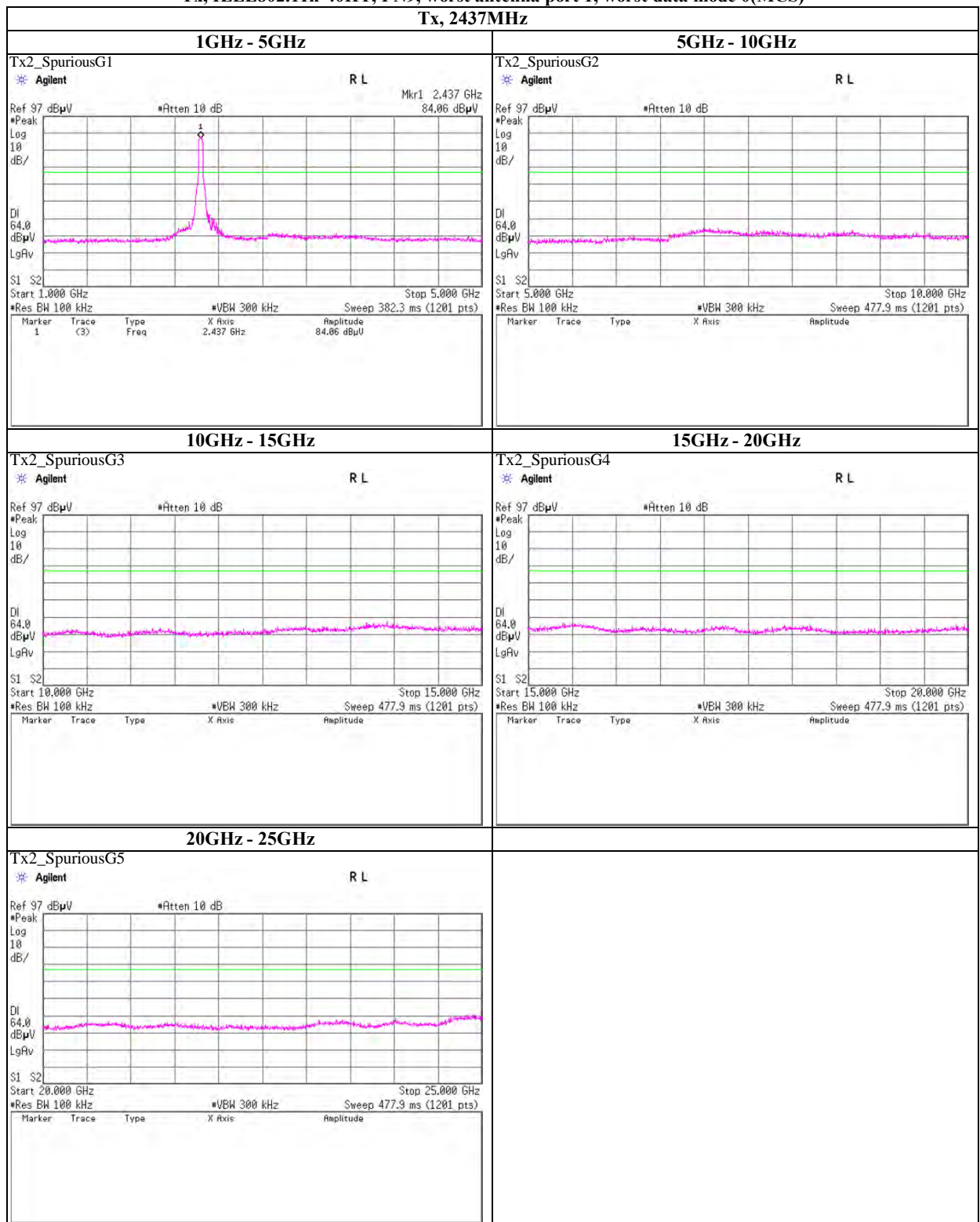
Facsimile : +81 463 50 6401

Spurious emission (Conducted)**Tx, IEEE802.11n-40HT, PN9, worst antenna port 1, worst data mode 0(MCS)****UL Japan, Inc.****Shonan EMC Lab.**

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Telephone : +81 463 50 6400

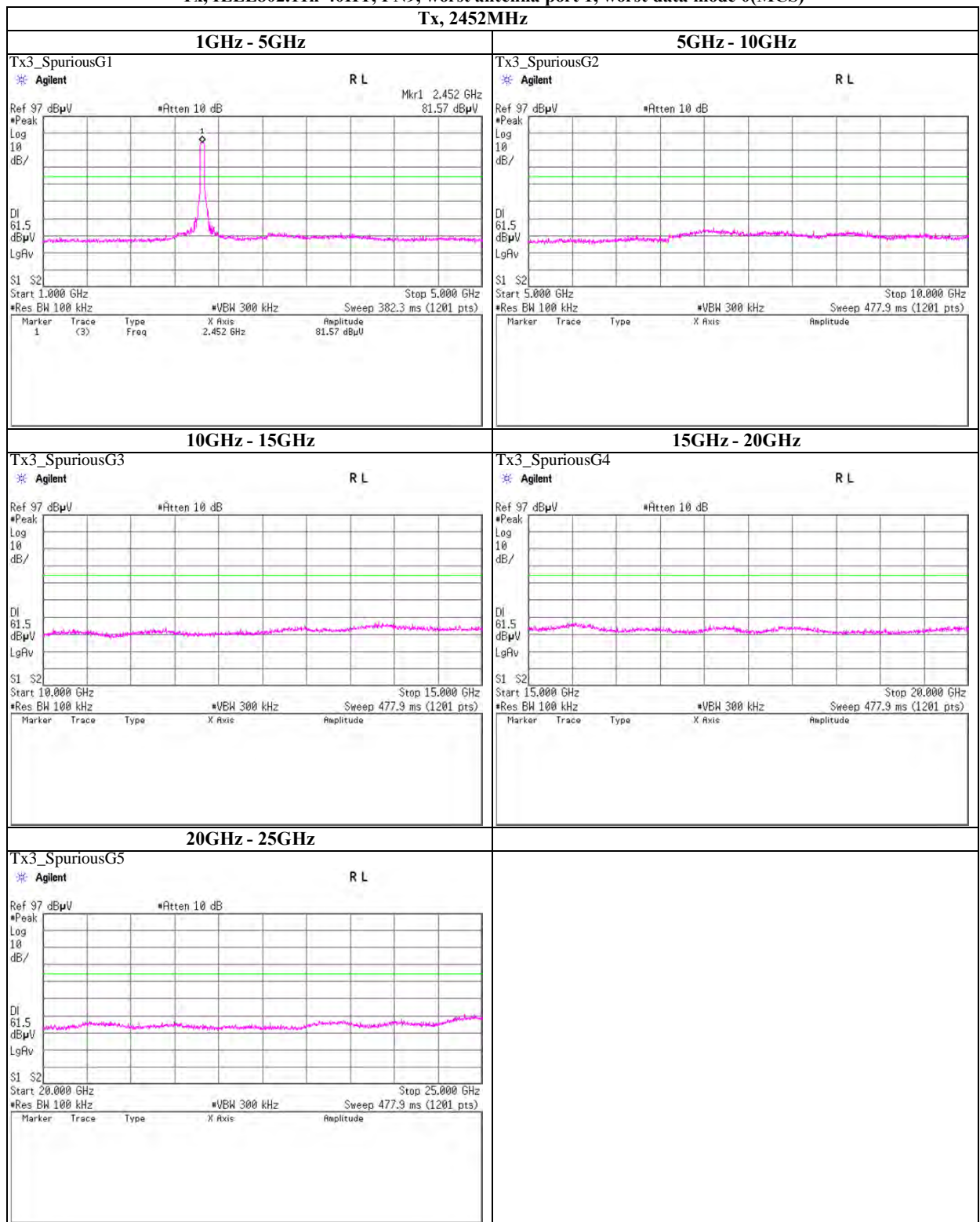
Facsimile : +81 463 50 6401

Spurious emission (Conducted)**Tx, IEEE802.11n-40HT, PN9, worst antenna port 1, worst data mode 0(MCS)****UL Japan, Inc.****Shonan EMC Lab.**

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Facsimile : +81 463 50 6401

Spurious emission (Conducted)**Tx, IEEE802.11n-40HT, PN9, worst antenna port 1, worst data mode 0(MCS)****UL Japan, Inc.****Shonan EMC Lab.**

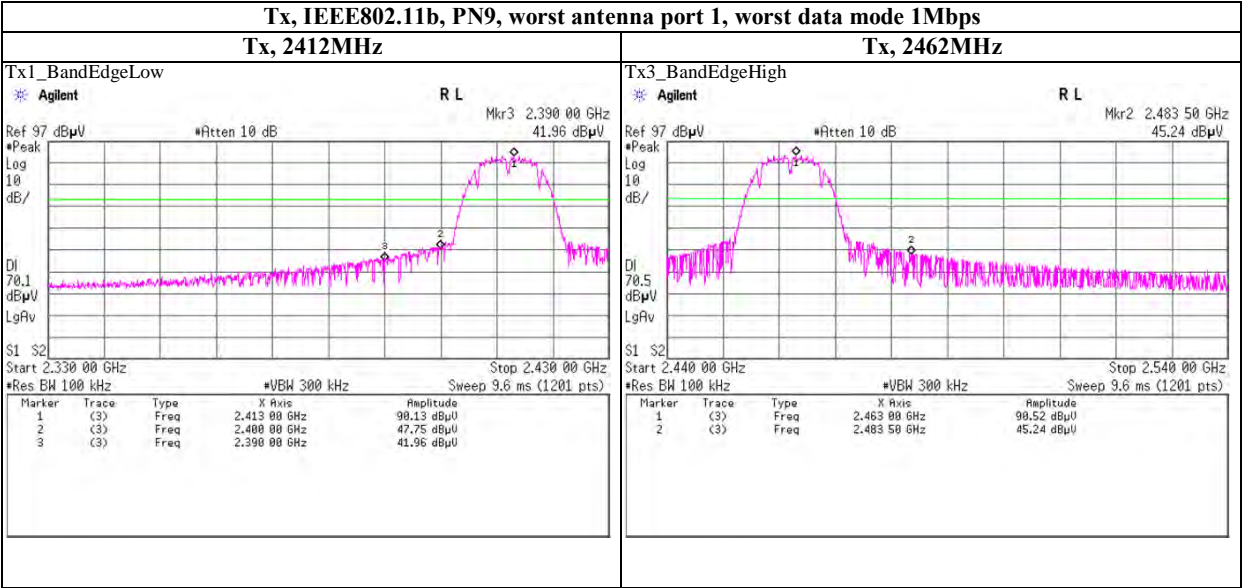
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

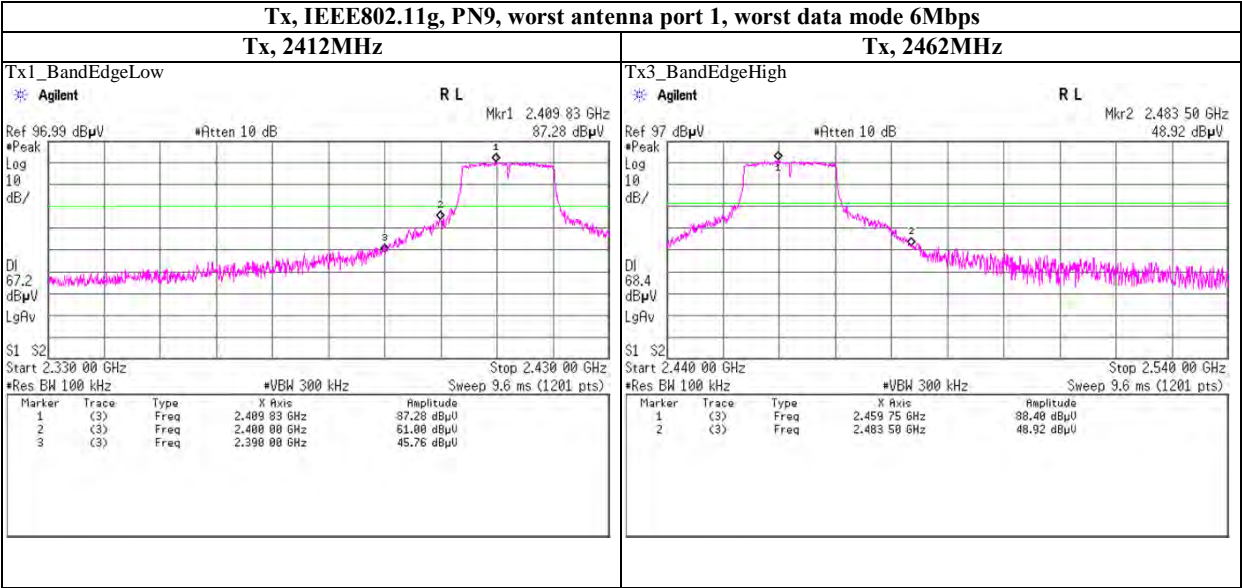
Spurious emission (Conducted)

Band Edge compliance



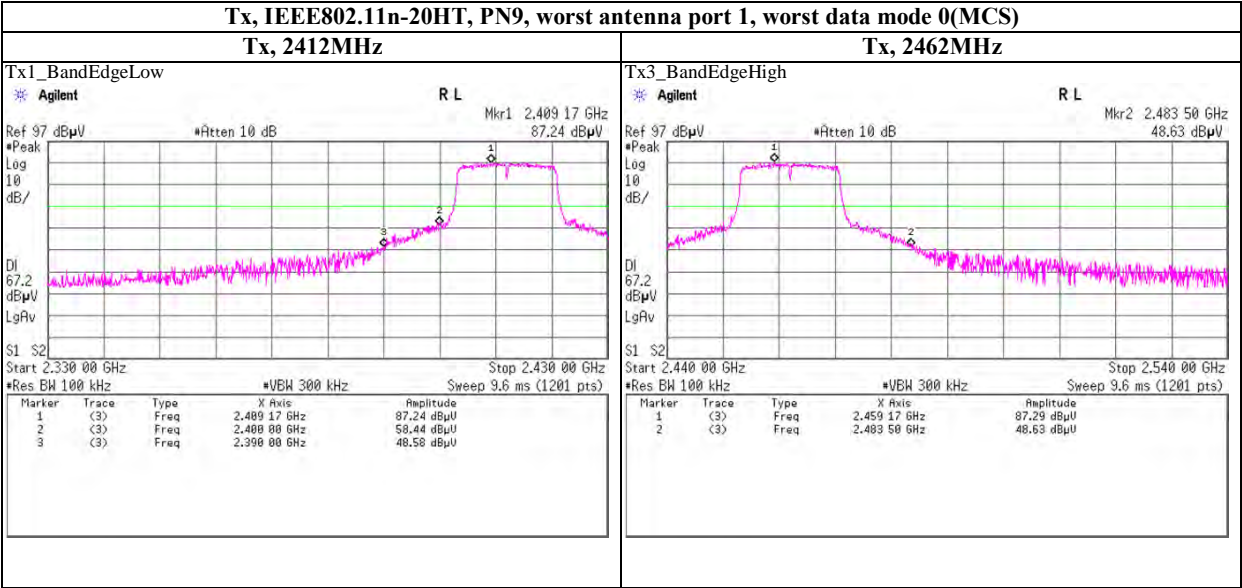
Spurious emission (Conducted)

Band Edge compliance



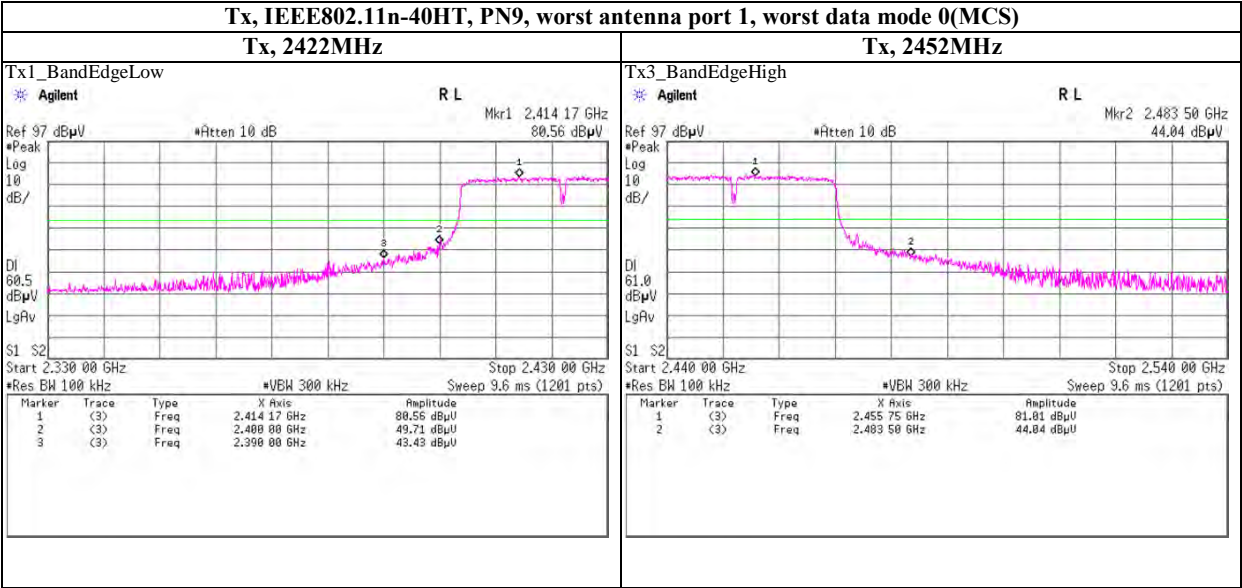
Spurious emission (Conducted)

Band Edge compliance



Spurious emission (Conducted)

Band Edge compliance



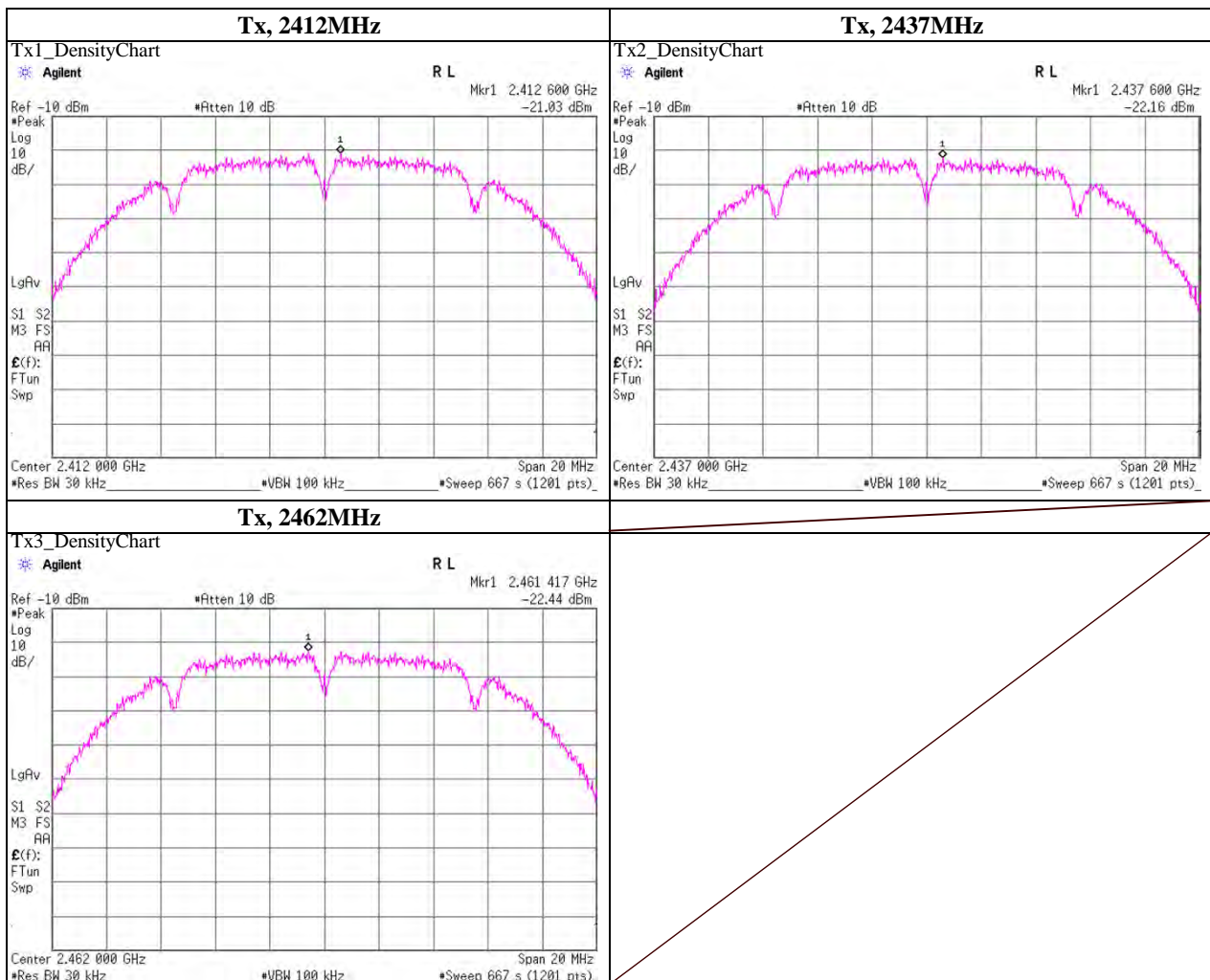
Power Density

| | | |
|------------------------|---|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date | March 29, 2012 | |
| Temperature / Humidity | 23deg.C , 28%RH | |
| Engineer | Shinichi Takano | |
| Mode | Tx, IEEE802.11b, PN9, worst antenna port 1, 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 | 2412.60 | -21.03 | 0.64 | 20.22 | -0.17 | 8.00 | 8.17 |
| 2437.0000 | 2437.60 | -22.16 | 0.65 | 20.22 | -1.29 | 8.00 | 9.29 |
| 2462.0000 | 2461.42 | -22.44 | 0.65 | 20.22 | -1.57 | 8.00 | 9.57 |

Sample Calculation:

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



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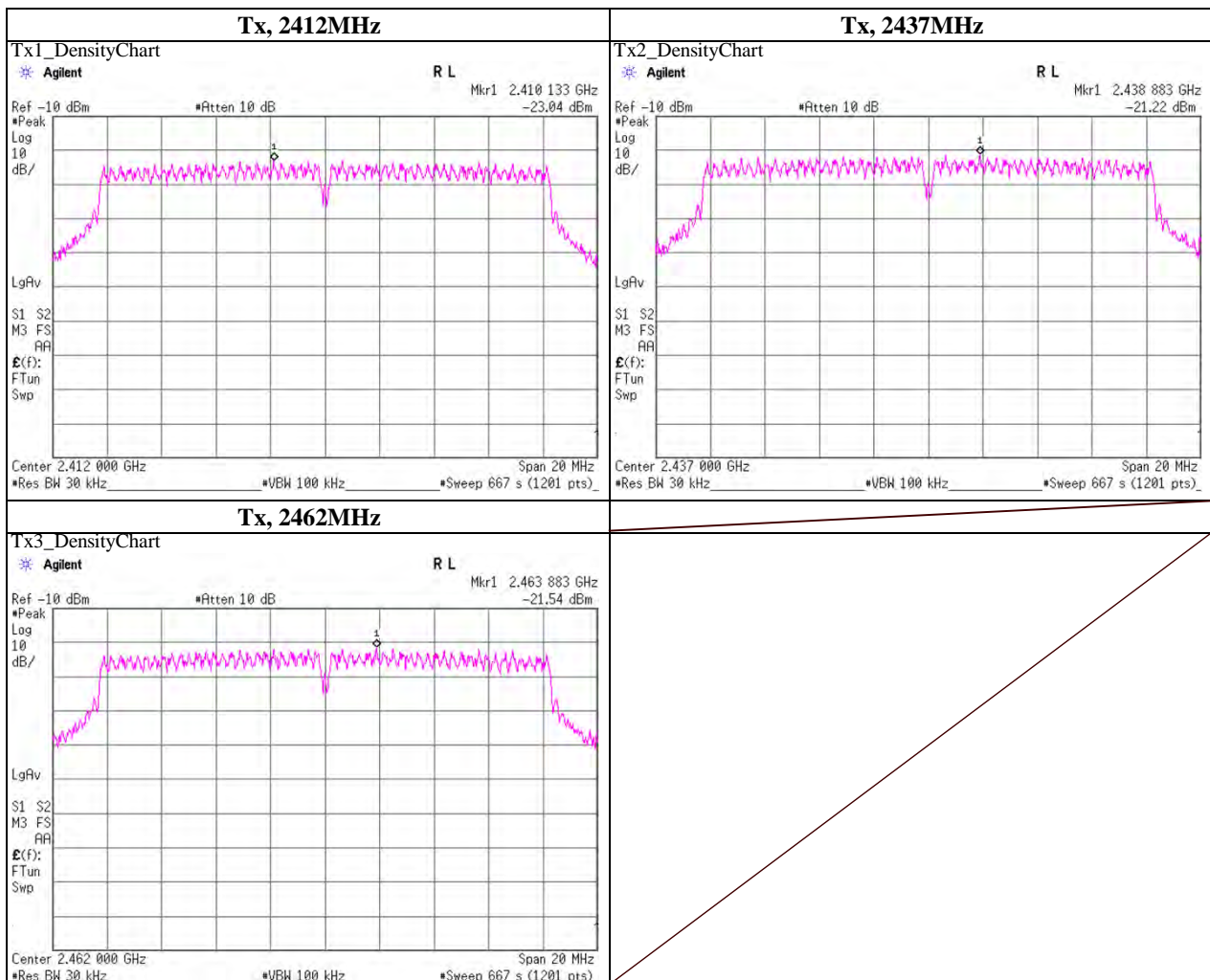
Power Density

| | | |
|------------------------|---|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date | March 29, 2012 | |
| Temperature / Humidity | 23deg.C , 28%RH | |
| Engineer | Shinichi Takano | |
| Mode | Tx, IEEE802.11g, PN9, worst antenna port 1, 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 | 2410.13 | -23.04 | 0.64 | 20.22 | -2.18 | 8.00 | 10.18 |
| 2437.0000 | 2438.88 | -21.22 | 0.65 | 20.22 | -0.35 | 8.00 | 8.35 |
| 2462.0000 | 2463.88 | -21.54 | 0.65 | 20.22 | -0.67 | 8.00 | 8.67 |

Sample Calculation:

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



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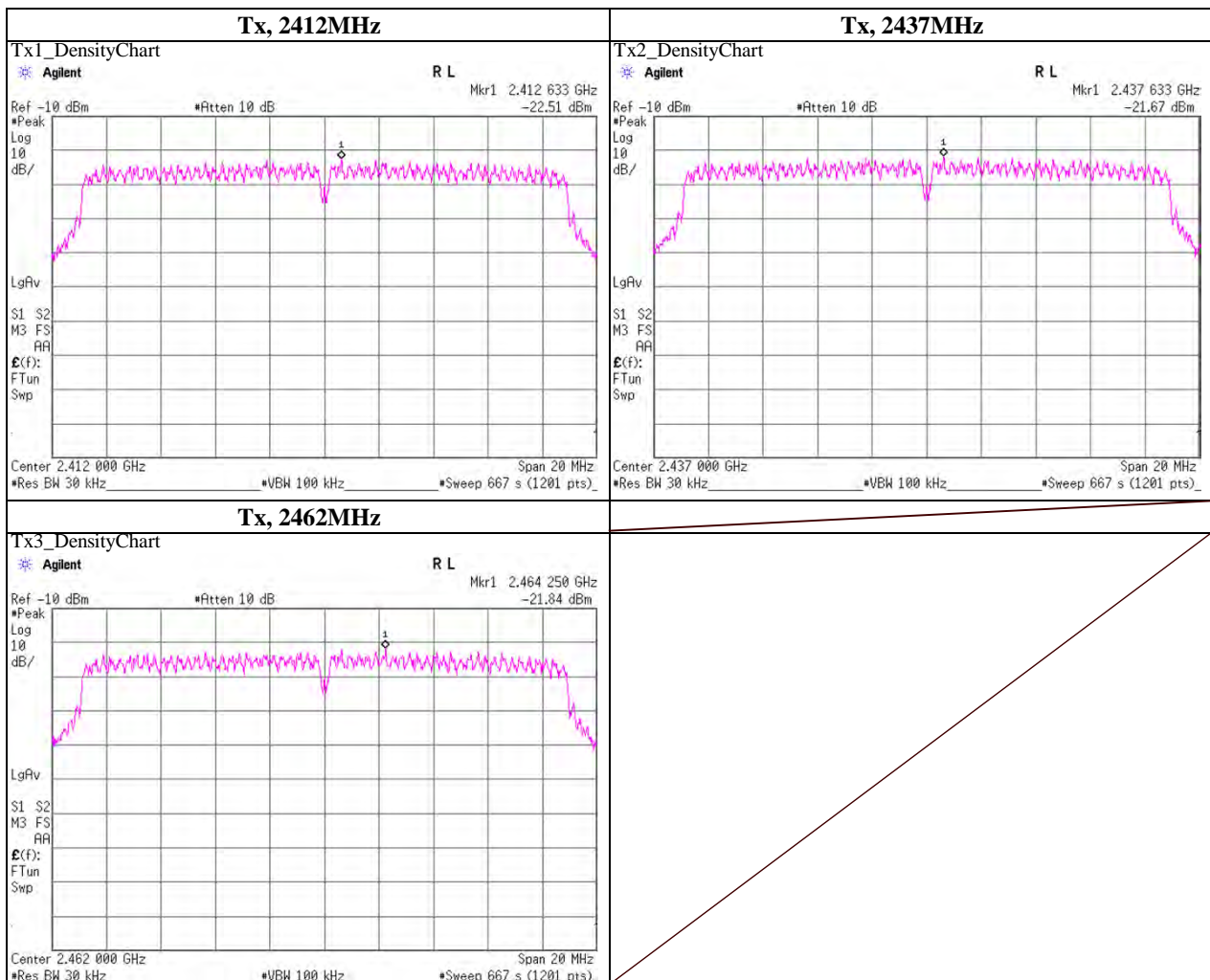
Power Density

| | | |
|------------------------|---|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date | March 29, 2012 | |
| Temperature / Humidity | 23deg.C , 28%RH | |
| Engineer | Shinichi Takano | |
| Mode | Tx, IEEE802.11n-20HT, PN9, worst antenna port 1, worst data mode 0(MCS) | |

| Ch. Freq. [MHz] | Freq. Reading [MHz] | Reading [dBm] | Cable Loss [dB] | Atten. [dB] | Result [dBm] | Limit [dBm] | Margin [dB] |
|--------------------|---------------------------|------------------|-----------------------|----------------|-----------------|----------------|----------------|
| 2412.0000 | 2412.63 | -22.51 | 0.64 | 20.22 | -1.65 | 8.00 | 9.65 |
| 2437.0000 | 2437.63 | -21.67 | 0.65 | 20.22 | -0.80 | 8.00 | 8.80 |
| 2462.0000 | 2464.25 | -21.84 | 0.65 | 20.22 | -0.97 | 8.00 | 8.97 |

Sample Calculation:

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



UL Japan, Inc.

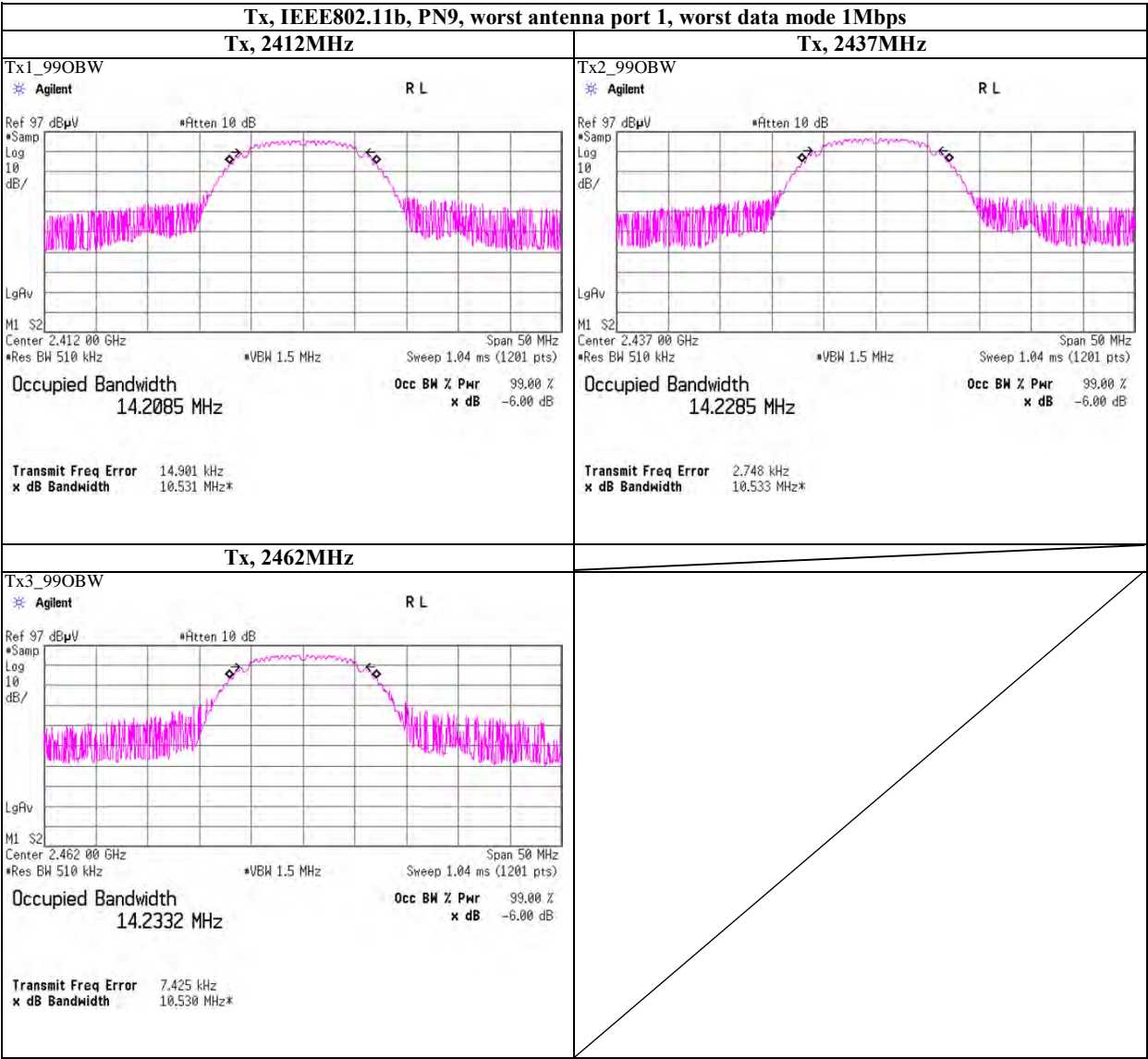
Shonan EMC Lab.

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99% Occupied Bandwidth



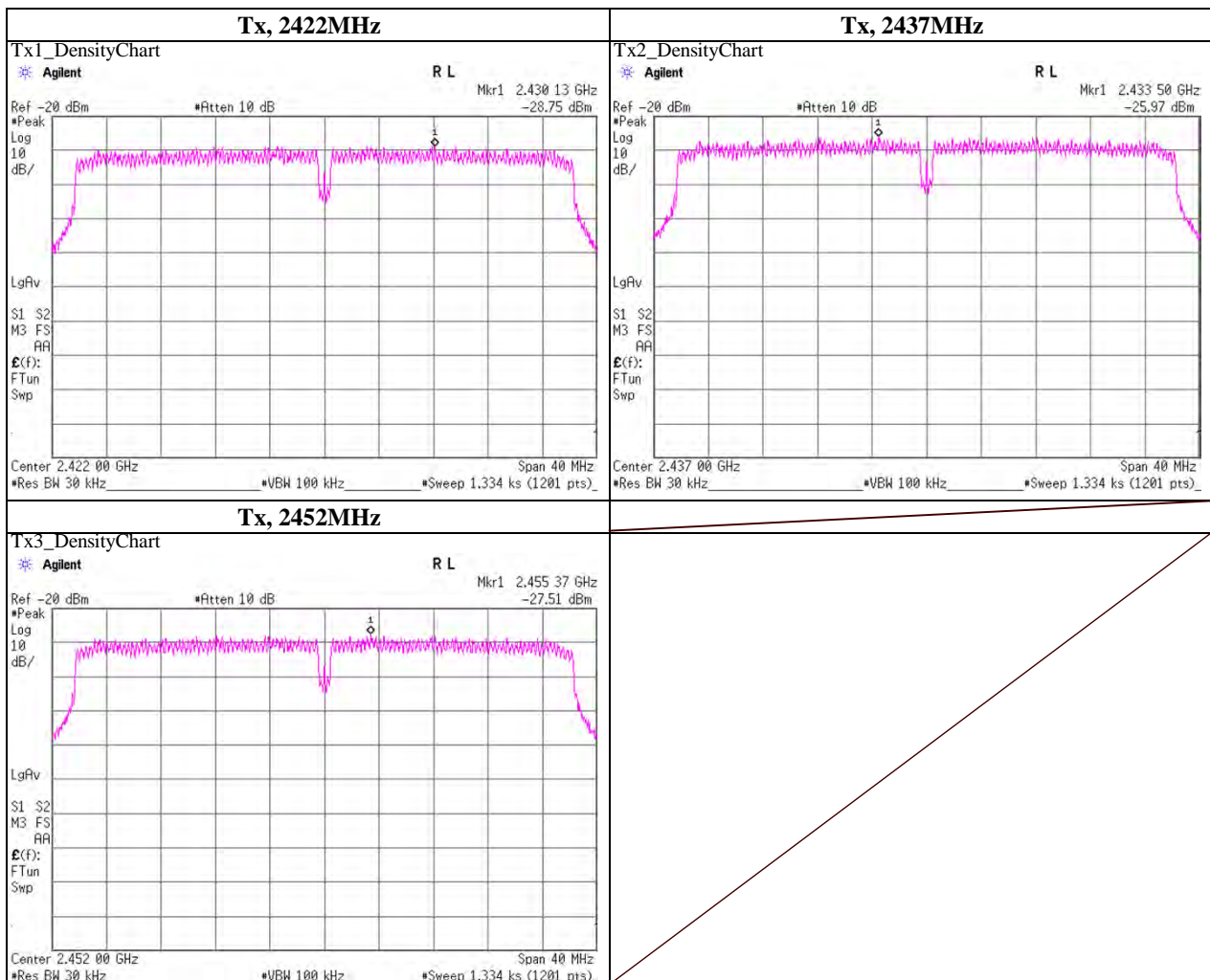
Power Density

| | | |
|------------------------|---|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date | March 29, 2012 | |
| Temperature / Humidity | 23deg.C , 28%RH | |
| Engineer | Shinichi Takano | |
| Mode | Tx, IEEE802.11n-40HT, PN9, worst antenna port 1, worst data mode 0(MCS) | |

| Ch. Freq. [MHz] | Freq. Reading [MHz] | Reading [dBm] | Cable Loss [dB] | Atten. [dB] | Result [dBm] | Limit [dBm] | Margin [dB] |
|--------------------|---------------------------|------------------|-----------------------|----------------|-----------------|----------------|----------------|
| 2422.0000 | 2430.13 | -28.75 | 0.65 | 20.22 | -7.88 | 8.00 | 15.88 |
| 2437.0000 | 2433.50 | -25.97 | 0.65 | 20.22 | -5.10 | 8.00 | 13.10 |
| 2452.0000 | 2455.37 | -27.51 | 0.65 | 20.22 | -6.64 | 8.00 | 14.64 |

Sample Calculation:

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



UL Japan, Inc.

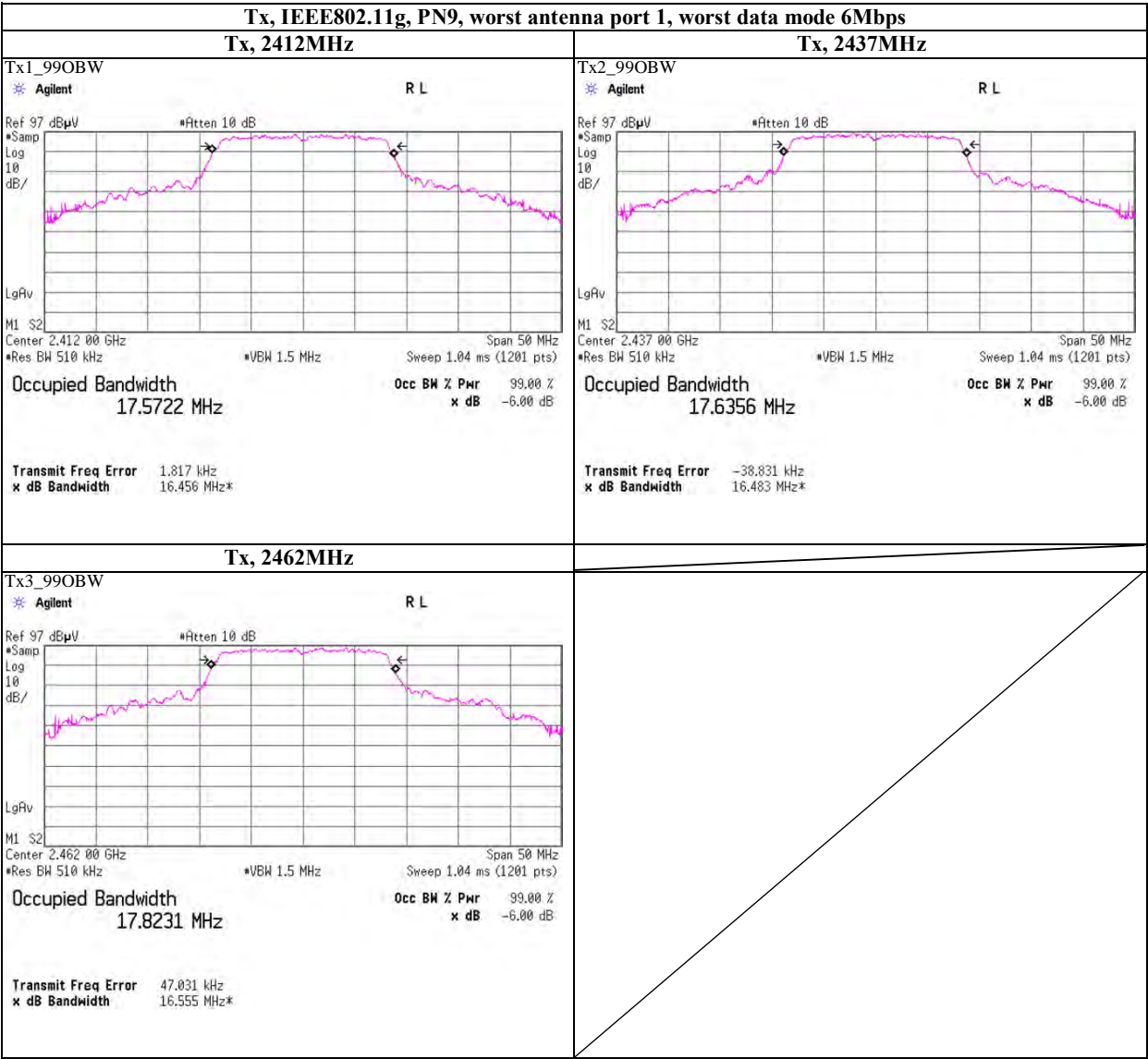
Shonan EMC Lab.

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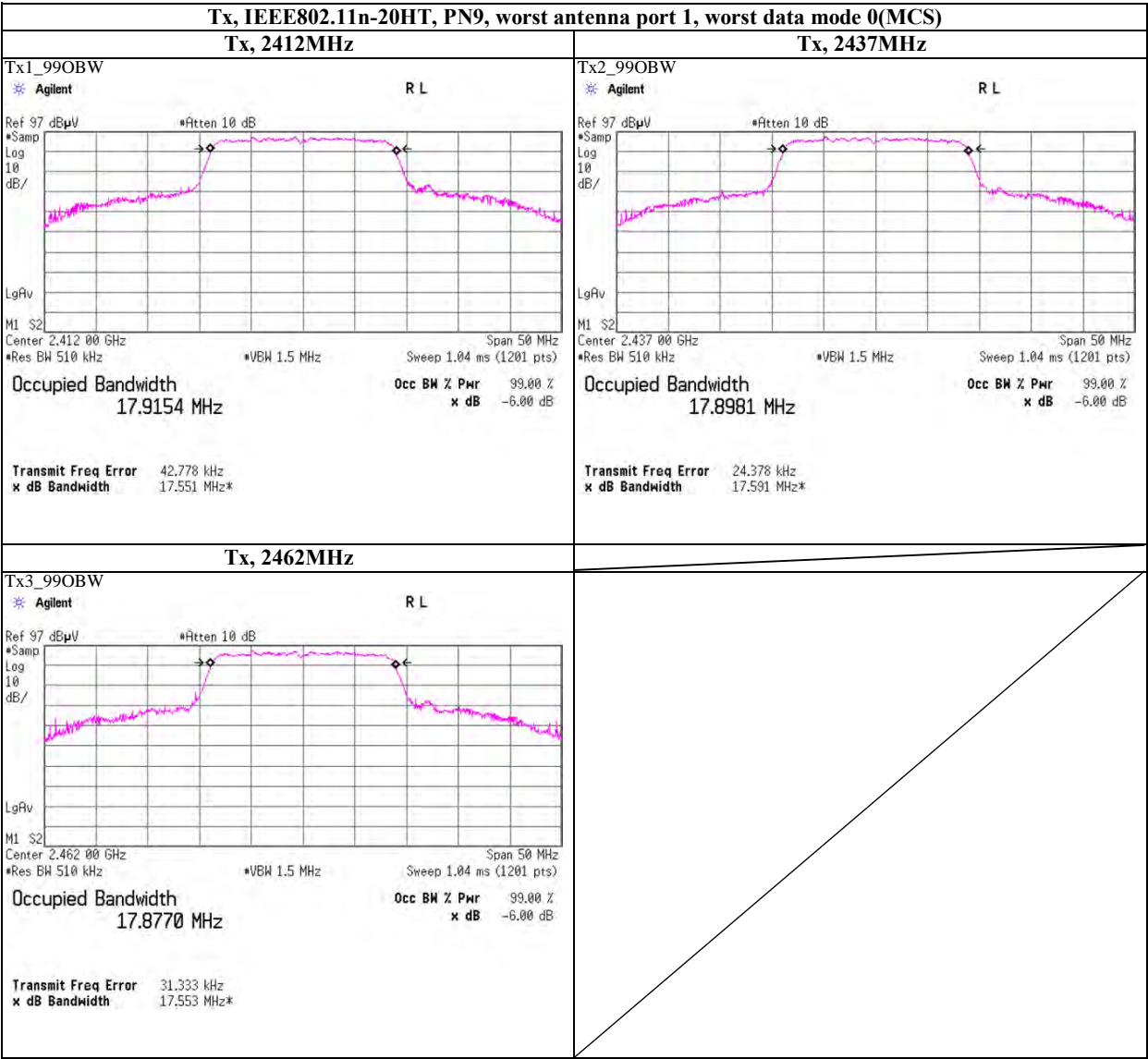
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

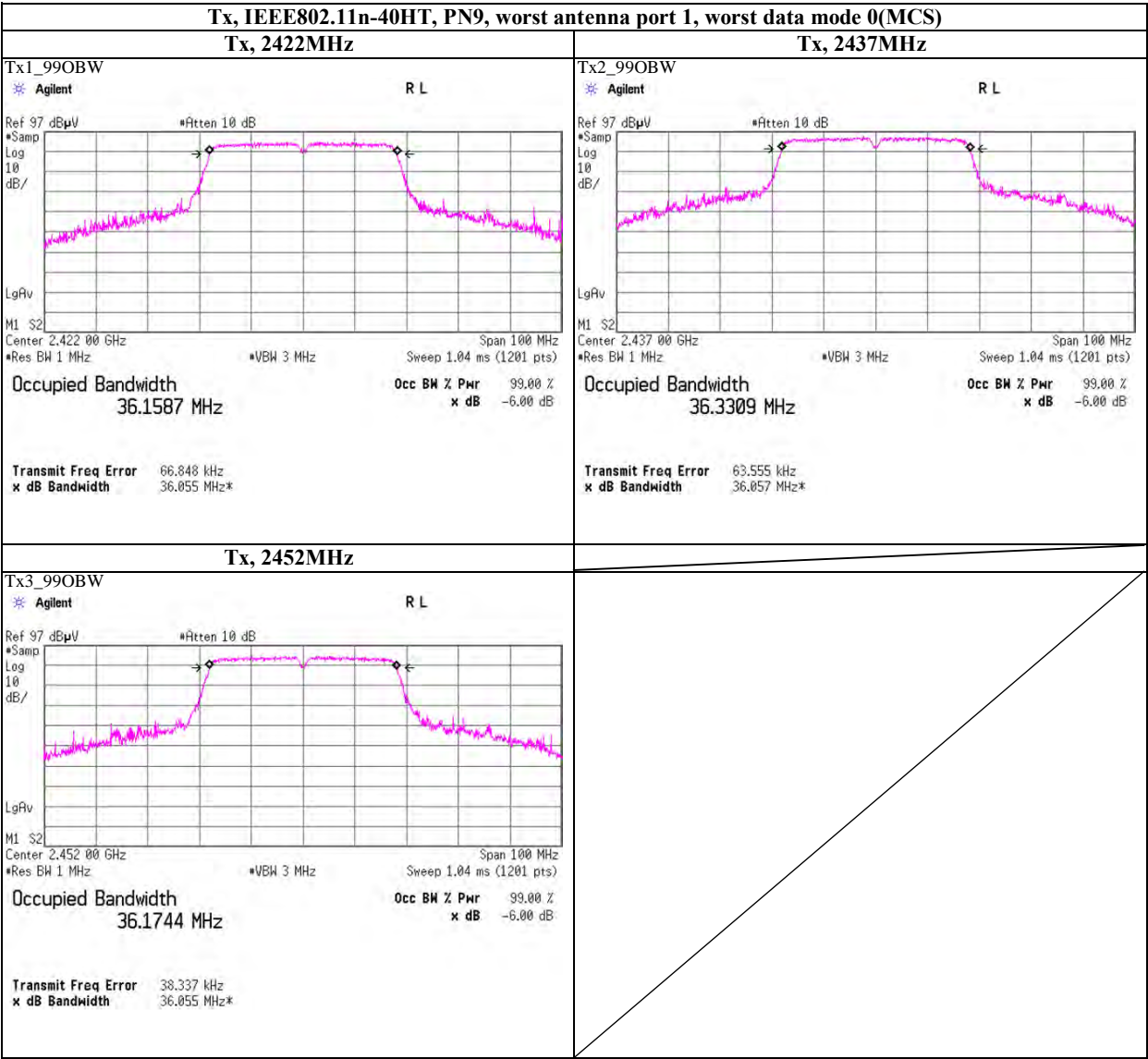
99% Occupied Bandwidth



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 | 2011/04/12 * 12 |
| SPSS-03 | Power sensor | Anritsu | MA2411B | 0917063 | AT | 2011/04/12 * 12 |
| SCC-G11 | Coaxial Cable | Suhner | SUCOFLEX 102 | 31595/2 | AT | 2012/03/12 * 12 |
| SAT20-05 | Attenuator | Weinschel Corp. | 54A-20 | Y5649 | AT | 2011/11/09 * 12 |
| KSA-08 | Spectrum Analyzer | Agilent | E4446A | MY46180525 | AT | 2012/02/16 * 12 |
| SOS-09 | Humidity Indicator | A&D | AD-5681 | 4061484 | AT | 2012/03/26 * 12 |
| SAF-06 | Pre Amplifier | TOYO Corporation | TPA0118-36 | 1440491 | RE | 2011/07/19 * 12 |
| SCC-G03 | Coaxial Cable | Suhner | SUCOFLEX 104A | 46499/4A | RE | 2011/04/28 * 12 |
| SCC-G23 | Coaxial Cable | Suhner | SUCOFLEX 104 | 297342/4 | RE | 2011/05/27 * 12 |
| SHA-03 | Horn Antenna | Schwarzbeck | BBHA9120D | 9120D-739 | RE | 2011/08/28 * 12 |
| SOS-05 | Humidity Indicator | A&D | AD-5681 | 4062518 | RE | 2012/02/06 * 12 |
| KSA-08 | Spectrum Analyzer | Agilent | E4446A | MY46180525 | RE | 2012/02/16 * 12 |
| SJM-10 | Measure | PROMART | SEN1935 | - | RE, CE | - |
| COTS-SEMI-1 | EMI Software | TSJ | TEPTO-DV(RE,CE, RFI,MF) | - | RE, CE | - |
| SAT10-06 | Attenuator | Agilent | 8493C-010 | 74865 | RE | 2011/12/27 * 12 |
| SFL-02 | Highpass Filter | MICRO-TRONICS | HPM50111 | 051 | RE | 2011/12/27 * 12 |
| SSA-02 | Spectrum Analyzer | Agilent | E4448A | MY48250106 | RE | 2012/03/16 * 12 |
| SHA-04 | Horn Antenna | ETS LINDGREN | 3160-09 | LM3640 | RE | 2012/03/30 * 12 |
| SAF-08 | Pre Amplifier | TOYO Corporation | HAP18-26W | 00000019 | RE | 2012/03/12 * 12 |
| SCC-G17 | Coaxial Cable | Suhner | SUCOFLEX 104A | 46291/4A | RE | 2012/03/12 * 12 |
| 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 | 2011/04/28 * 12 |
| SLA-03 | Logperiodic Antenna | Schwarzbeck | UHALP9108A | UHALP 9108-A 0901 | RE | 2011/10/23 * 12 |
| STR-06 | Test Receiver | Rohde & Schwarz | ESCI | 101259 | RE, CE | 2012/02/07 * 12 |
| SAEC-03(NSA) | Semi-Anechoic Chamber | TDK | SAEC-03(NSA) | 3 | RE | 2011/09/23 * 12 |
| SCC-C9/C10/SRSE-03 | Coaxial Cable&RF Selector | Suhner/Suhner/TOYO | RG223U/141PE/NS4906 | -/0901-271(RF Selector) | CE | 2011/04/28 * 12 |
| SLS-03 | LISN | Rohde & Schwarz | ENV216 | 100513 | 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 tests