



RADIO TEST REPORT

Test Report No.: 32JE0056-SH-03-A

Applicant : Sony Corporation
Type of Equipment : Digital Media Player
Model No. : NWZ-F804
FCC ID : AK8NWZF800
Test regulation : FCC Part15 Subpart C: 2012
Test result : Complied

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

Date of test: June 6 to 11, 2012

Tested by: 

Akio Hayashi
Engineer of WiSE Japan,
UL Verification Service

Approved by : 

Toyokazu Imamura
Leader of EMC Service,
UL Verification Service

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 There is no testing item of "Non-accreditation".



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13-EM-F0429

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SECTION 1: Customer information

Company Name : Sony Corporation
Address : Shinagawa INTERCITY C Tower 2-15-3, Konan Minato-ku, Tokyo, Japan
Telephone Number : +81-3-5769-5640
Facsimile Number : +81-3-5769-5901
Contact Person : Shinichi Maru

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

2.1 Identification of E.U.T.

Type of Equipment : Digital Media Player
Model Number : NWZ-F804
Serial Number : Refer to clause 4.2
Rating : DC3.7V
Country of Mass-production : Malaysia
Condition of EUT : Engineering prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample : June 6, 2012
Modification of EUT : No modification by the test lab.

2.2 Product description

Model: NWZ-F804 (referred to as the EUT in this report) is a Digital Media Player.

The EUT has some derived models:

| | NWZ-F804 (EUT) | NWZ-F805 | NWZ-F806 |
|-------------|----------------|----------|----------|
| NAND memory | 8GB | 16GB | 32GB |

Clock frequency(ies) in the system : 22.5792MHz (Audio), 26MHz (CPU), 32.768kHz (RTC), 26MHz (GPS), 26MHz (Wifi), 26MHz (Bluetooth)

<Radio part>

Equipment type : Transceiver
Frequency of operation : 2412-2462MHz
Bandwidth / Channel spacing : 20MHz & 5MHz
Type of modulation : DSSS: CCK,DQPSK, DBPSK, OFDM: 64QAM, 16QAM, QPSK, BPSK
Antenna type : Chip
Antenna connector type : None
Antenna gain : 0.9dBi
ITU code : D1D, G1D
Operation temperature range : +5 to +35 deg.C.

* For Bluetooth part, Refer to the test report: 32JE0056-SH-03-B.

FCC 15.31 (e)

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

FCC 15.203

Since the antenna used is a type of chip component and is permanently mounted by soldering on a printed circuit board in the equipment, it is impossible for end users to replace it without assistance of professionals. Therefore, the equipment complies with the requirement.

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SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : FCC Part 15 Subpart C: 2012, final revised on May 17, 2012 and effective June 18, 2012
 Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
 Section 15.207 Conducted limits
 Section 15.209 Radiated emission limits, general requirements
 Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz,
 and 5725-5850MHz

*The revision on May 17, 2012 does not affect the test specification applied to the EUT.

The EUT complies with FCC Part 15 Subpart B. Refer to the test report: 32JE0056-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 | 22.2dB Freq.: 0.15000MHz Phase: N Detection: Quasi-Peak Mode: Tx 2462MHz, IEEE 802.11g | Complied |
| 6dB bandwidth | ANSI C63.4:2009 13. Measurement of intentional radiators | FCC 15.247 (a)(2) & 15.209 | Conducted | N/A | * See data | Complied |
| Maximum peak output power | ANSI C63.4:2009 13. Measurement of intentional radiators | FCC 15.247 (b)(3) & 15.209 | Radiated | 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 | 4.0dB Freq.: 2390.000MHz Detector: Average Polarization: Vertical Mode: Tx 2412MHz, IEEE 802.11g | Complied |
| Power density | ANSI C63.4:2009 13. Measurement of intentional radiators | FCC 15.247 (e) & 15.209 | Radiated | N/A | * See data | Complied |

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

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

3.3 Addition to standard

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

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

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

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3.4 Uncertainty

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

| Item | Frequency range | No.1 SAC ^{*1} /SR ^{*2} (±) | No.2 SAC/SR (±) | No.3 SAC/SR (±) |
|-------------------------------------------------|-----------------|-------------------------------------------------|--------------------|--------------------|
| Conducted emission (AC Mains) AMN/LISN | 9kHz-150kHz | 4.0 dB | 4.0 dB | 3.9 dB |
| | 150kHz-30MHz | 3.6 dB | 3.6 dB | 3.6 dB |
| Radiated emission (Measurement distance: 3m) | 9kHz-30MHz | 3.7 dB | 3.7 dB | 3.6 dB |
| | 30MHz-300MHz | 4.9 dB | 5.1 dB | 5.0 dB |
| | 300MHz-1GHz | 5.0 dB | 5.2 dB | 5.0 dB |
| | 1GHz-15GHz | 4.8 dB | 4.8 dB | 4.9 dB |
| Radiated emission (Measurement distance: 1m) | 15GHz-18GHz | 5.6 dB | 5.6 dB | 5.6 dB |
| | 18GHz-40GHz | 4.8 dB | 4.3 dB | 4.4 dB |

*1: SAC=Semi-Anechoic Chamber

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

Conducted emission test

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

Radiated emission test

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

Antenna port conducted test

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

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

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

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

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

3.5 Test location

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JAB Accreditation No. : RTL02610

| | FCC Registration No. | IC Registration No. | Width x Depth x Height (m) | Size of reference ground plane (m) / horizontal conducting plane | Maximum measurement distance |
|----------------------------------------------------------------|----------------------------|---------------------------|-------------------------------|---------------------------------------------------------------------------|------------------------------------|
| <input type="checkbox"/> No.1 Semi-anechoic chamber | 697847 | 2973D-1 | 20.6 x 11.3 x 7.65 | 20.6 x 11.3 | 10m |
| <input checked="" 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**

| Test item | Mode | Tested frequency | Power setting *1) | Worst data rate *2) |
|---------------------------------------------------------|------------------------------|---------------------------|-------------------|---------------------|
| Conducted emission & Radiated emission (below 1GHz) *3) | Transmitting IEEE 802.11g | 2462MHz | 15 | 36Mbps, PN9 |
| Other items | Transmitting IEEE 802.11b | 2412MHz, 2437MHz, 2462MHz | 15 | 1Mbps, PN9 |
| | Transmitting IEEE 802.11g | 2412MHz, 2437MHz, 2462MHz | 15 | 36Mbps, PN9 |
| | Transmitting IEEE 802.11n-20 | 2412MHz, 2437MHz, 2462MHz | 12 | MCS3, PN9 |

*1) Test software: athtestcmd ver.3.2, Device driver: adb driver ver.1.0.29

*2) The worst condition was determined based on the test result of Maximum Peak Output Power. Other data rates used for preliminary test were set to the following setting specified by the customer.

*3) Test operating mode was determined as follows according to "Section 1 of 6 802.11 a/b/g/n testing- Managing Complex Regulatory Approvals - "of TCB Council Workshop October 2009.

Specification of power setting:

| Mode | Data rate | Power setting |
|-----------------|-----------------|---------------|
| IEEE 802.11b | 1Mbps | 15 |
| | 2Mbps | 15 |
| | 5.5Mbps | 15 |
| | 11Mbps | 15 |
| IEEE 802.11g | 6Mbps | 15 |
| | 9Mbps | 15 |
| | 12Mbps | 15 |
| | 18Mbps | 15 |
| | 24Mbps | 15 |
| | 36Mbps | 15 |
| | 48Mbps | 14 |
| 54Mbps | 13 | |
| IEEE 802.11n-20 | MCS0 (6.5Mbps) | 10 |
| | MCS1 (13Mbps) | 11 |
| | MCS2 (19.5Mbps) | 10 |
| | MCS3 (26Mbps) | 12 |
| | MCS4 (39Mbps) | 11 |
| | MCS5 (52Mbps) | 11 |
| | MCS6 (58.5Mbps) | 10 |
| MCS7 (65Mbps) | 10 | |

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

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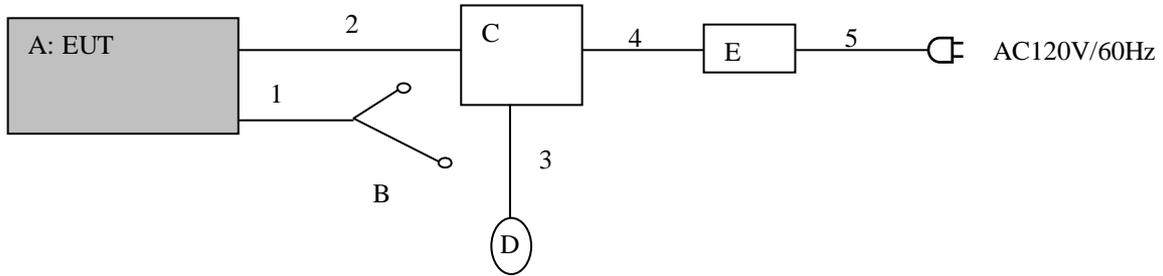
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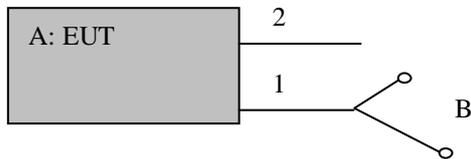
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4.2 Configuration and peripherals

4.2.1 Conducted emission test



4.2.2 Other test



* Test data was taken under worst case conditions.

Description of EUT and support equipment

| No. | Item | Model number | Serial number | Manufacturer | Remarks |
|-----|----------------------|------------------|---------------|--------------|---------|
| A | Digital Media Player | NWZ-F804 | *1) | SONY | - |
| B | Headphones | MDR-EX0300 | - | SONY | - |
| C | Laptop PC | HP ProBook 4420s | CNF1062V3N | HP | - |
| D | Mouse | MO28UOL | 23-453859 | lenovo | - |
| E | AC adapter | PA-1650-32HT | PPP009L-E | HP | - |

*1) Conducted / Radiated emission: 2000196, Other test: 2000192

List of cables used

| No. | Cable Name | Length (m) | Shield | | Remark |
|-----|------------------------------|------------|------------|------------|--------|
| | | | Cable | Connector | |
| 1 | Headphones | 1.5 | Unshielded | Unshielded | - |
| 2 | WM-PORT Jack: USB conversion | 1.0 | Shielded | Shielded | - |
| 3 | USB | 1.8 | Shielded | Shielded | - |
| 4 | DC | 1.8 | Unshielded | Unshielded | - |
| 5 | AC | 1.7 | Unshielded | Unshielded | - |

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SECTION 5: Conducted emission

5.1 Operating environment

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

5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 0.8m above the conducting ground plane. The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals was aligned and was flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from LISN and excess AC cable was bundled in center. I/O cables that were connected to the peripherals were bundled in center. They were folded back and for the forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN to the input power source. All unused 50ohm connectors of the LISN were resistively terminated in 50ohm when not connected to the measuring equipment. Photographs of the set up are shown in APPENDIX 3.

5.3 Test conditions

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

5.4 Test procedure

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT via Host device within a Shielded room. The Host device was connected to a Line Impedance Stabilization Network (LISN). An overview sweep with peak detection has been performed. The measurements had been performed with a quasi-peak detector and if required, an average detector. The conducted emission measurements were made with the following detection of the test receiver.

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

5.5 Results

Summary of the test results : Pass
Refer to APPENDIX 1

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 (Radiated)

7.1 Operating environment

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

7.2 Test configuration

EUT was placed on a urethane platform of nominal size, 0.5m by 0.5m, raised 0.8m above the conducting ground plane. Photographs of the set up are shown in APPENDIX 3.

7.3 Test conditions

Bandwidth of the Power Sensor : 50MHz
Detection type : Peak/Average

7.4 Test procedure

The Maximum peak output power has been measured on a semi-anechoic chamber with a ground plane and at a distance of 3m. Measurements were performed with Power Meter and Power Sensor (50MHz Bandwidth) using 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 carrier level was confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Worst position:

| Antenna polarization \ Frequency | Carrier |
|----------------------------------|---------|
| Horizontal | Z |
| Vertical | Y |

7.5 Results

Summary of the test results : Pass
Refer to APPENDIX 1

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SECTION 8: Radiated emission

8.1 Operating environment

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

8.2 Test configuration

EUT was placed on a urethane platform of nominal size, 0.5m by 0.5m, raised 0.8m above the conducting ground plane. Photographs of the set up are shown in APPENDIX 3.

8.3 Test conditions

Frequency range : 30MHz to 25GHz
 Test distance : 3m (below 15GHz) / 1m (above 15GHz)
 EUT position : Table top

8.4 Test procedure

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

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

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

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

The test was performed with VBW 10Hz since the EUT had no intervals during which the transmitter was off (see APPENDIX).

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

Worst position:

| Frequency Antenna polarization | Carrier *1) | Spurious | | | |
|--------------------------------------|----------------|------------|---------|----------|----------|
| | | Below 1GHz | 1-15GHz | 15-18GHz | 15-25GHz |
| Horizontal | Z | Y | Y | Y | Y |
| Vertical | Y | Z | Z | Z | Z |

*1) including spurious emissions near carrier frequency

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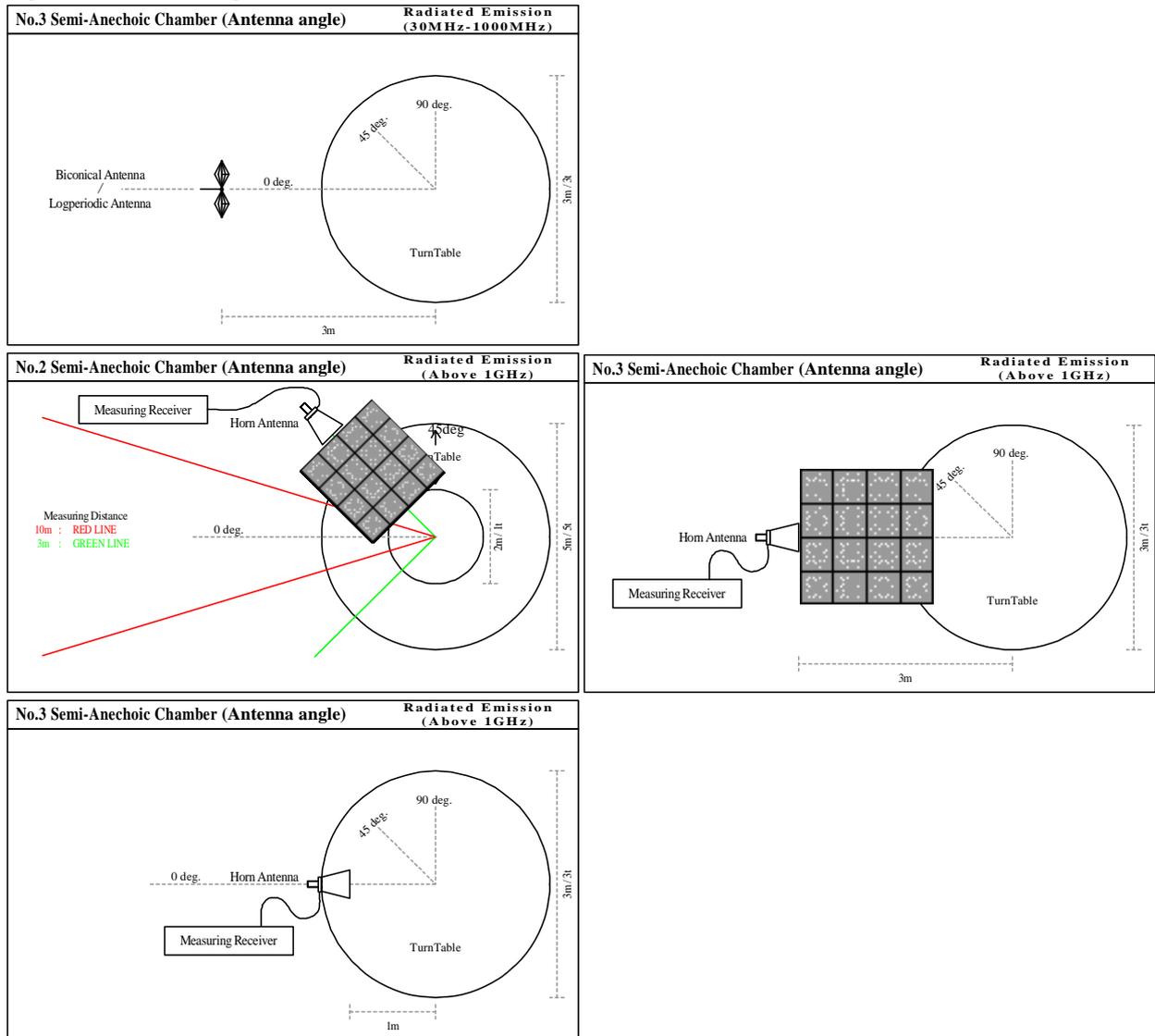
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Figure 1. Antenna angle



8.5 Band edge

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

8.6 Results

Summary of the test results : Pass *No noise was detected above the 5th order harmonics.
Refer to APPENDIX 1

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SECTION 9: Spurious emissions (Antenna port conducted)

Test procedure

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

Summary of the test results: Pass
Refer to APPENDIX 1

SECTION 10: Peak power density (Radiated)

Test procedure

EUT was placed on a urethane platform of nominal size, 0.5m by 0.5m, raised 0.8m above the conducting ground plane. Photographs of the set up are shown in APPENDIX 3.

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.

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

Worst position:

| Antenna polarization \ Frequency | Carrier |
|----------------------------------|---------|
| Horizontal | Z |
| Vertical | Y |

Summary of the test results: Pass
Refer to APPENDIX 1

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Contents of APPENDIXES

APPENDIX 1: Data of Radio tests

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

APPENDIX 2: Test instruments

Test instruments

APPENDIX 3: Photographs of test setup

Conducted emission
Radiated emission
Pre-check of worst position

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APPENDIX 1: Data of Radio tests

DATA OF CONDUCTED EMISSION TEST

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Date : 2012/06/11

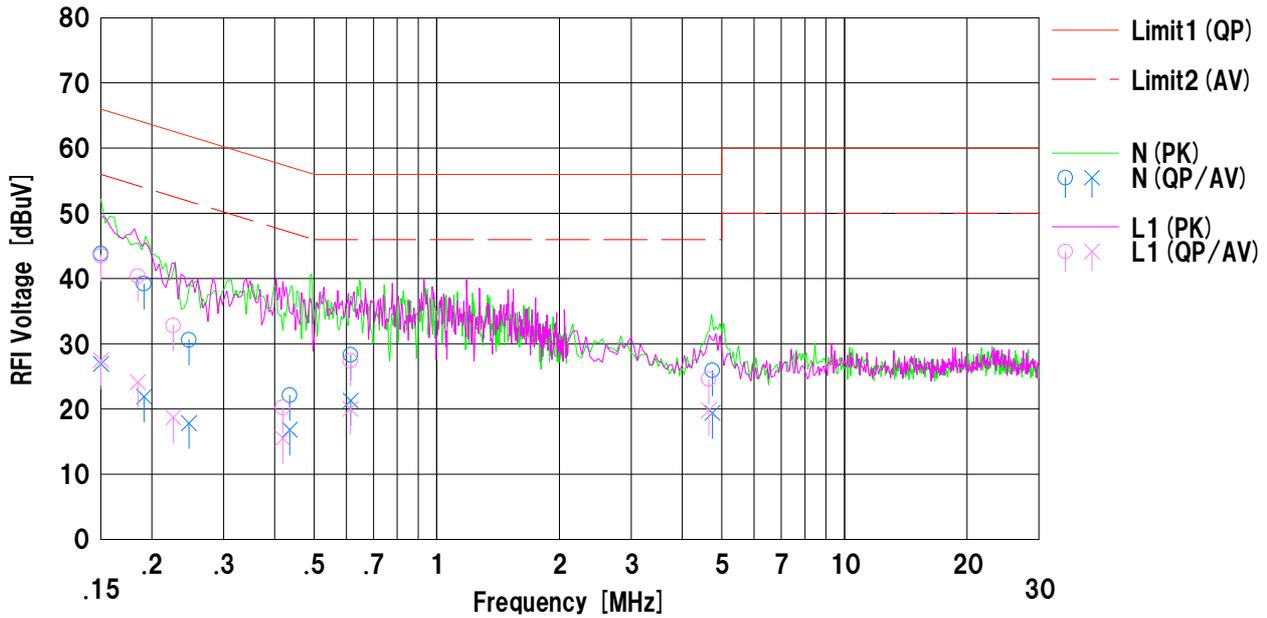
Company : Sony Corporation
Kind of EUT : Digital Media Player
Model No. : NWZ-F804
Serial No. : 2000196

Mode : IEEE802.11g, Tx 2462MHz
Report No. : 32JE0056-SH-03-A
Power : AC120V/60Hz
Temp./Humi. : 25deg.C / 60%RH

Remarks : -

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

Engineer : Shinichi Takano



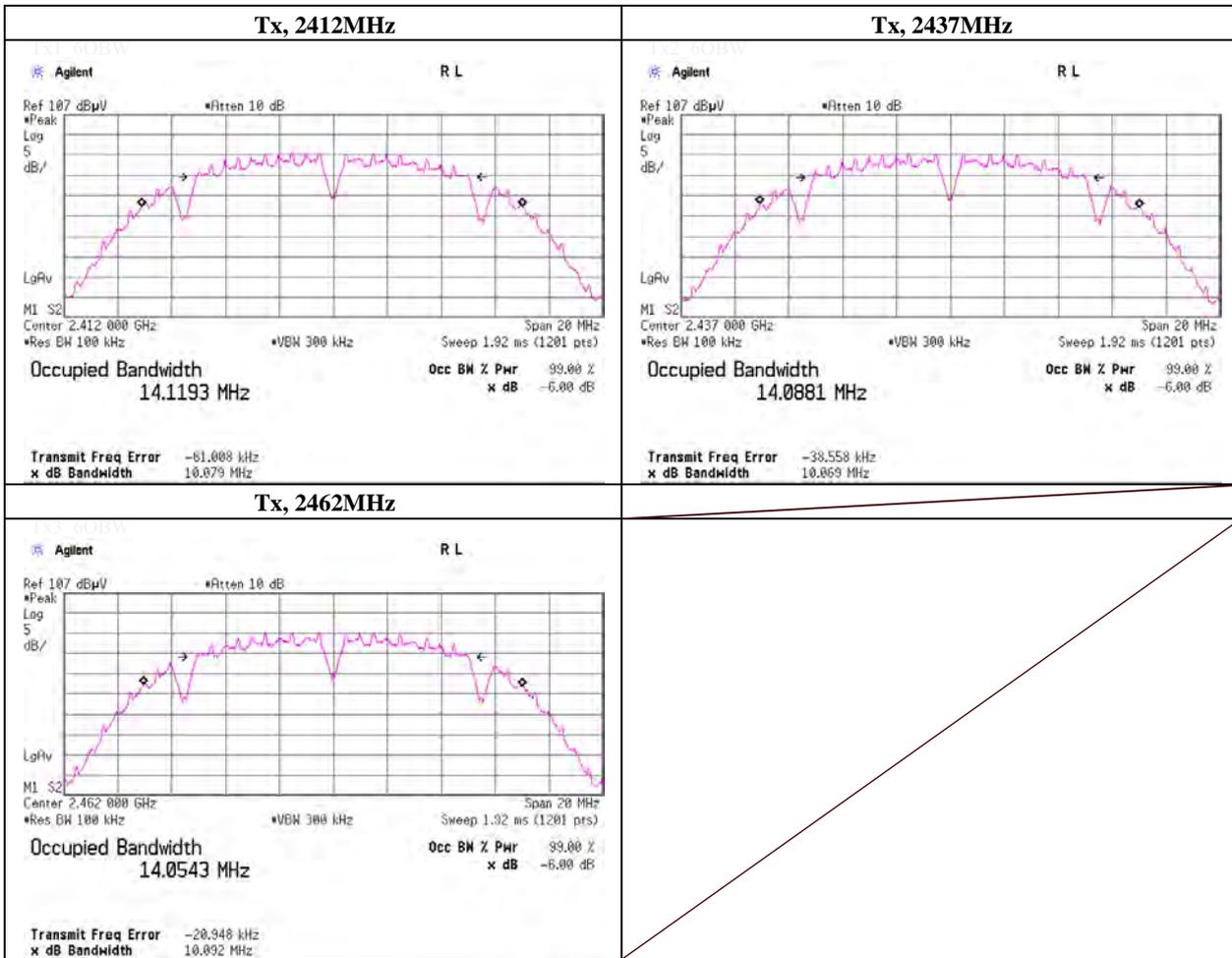
| No. | Freq. [MHz] | Reading | | C.Fac [dB] | Results | | Limit | | Margin | | Phase | Comment |
|-----|----------------|----------------|----------------|---------------|----------------|----------------|----------------|----------------|--------------|--------------|-------|---------|
| | | <QP> [dBuV] | <AV> [dBuV] | | <QP> [dBuV] | <AV> [dBuV] | <QP> [dBuV] | <AV> [dBuV] | <QP> [dB] | <AV> [dB] | | |
| 1 | 0.15000 | 31.1 | 14.2 | 12.7 | 43.8 | 26.9 | 66.0 | 56.0 | 22.2 | 29.1 | N | |
| 2 | 0.19128 | 26.5 | 9.2 | 12.7 | 39.2 | 21.9 | 63.9 | 53.9 | 24.7 | 32.0 | N | |
| 3 | 0.24640 | 17.9 | 5.1 | 12.7 | 30.6 | 17.8 | 61.8 | 51.8 | 31.2 | 34.0 | N | |
| 4 | 0.43602 | 9.4 | 4.1 | 12.7 | 22.1 | 16.8 | 57.1 | 47.1 | 35.0 | 30.3 | N | |
| 5 | 0.61440 | 15.6 | 8.6 | 12.7 | 28.3 | 21.3 | 56.0 | 46.0 | 27.7 | 24.7 | N | |
| 6 | 4.74608 | 13.0 | 6.5 | 12.9 | 25.9 | 19.4 | 56.0 | 46.0 | 30.1 | 26.6 | N | |
| 7 | 0.15000 | 30.8 | 14.8 | 12.7 | 43.5 | 27.5 | 66.0 | 56.0 | 22.5 | 28.5 | L1 | |
| 8 | 0.18476 | 27.7 | 11.4 | 12.7 | 40.4 | 24.1 | 64.2 | 54.2 | 23.8 | 30.1 | L1 | |
| 9 | 0.22555 | 20.1 | 6.0 | 12.7 | 32.8 | 18.7 | 62.6 | 52.6 | 29.8 | 33.9 | L1 | |
| 10 | 0.41885 | 7.5 | 2.8 | 12.7 | 20.2 | 15.5 | 57.4 | 47.4 | 37.2 | 31.9 | L1 | |
| 11 | 0.61403 | 14.7 | 7.3 | 12.7 | 27.4 | 20.0 | 56.0 | 46.0 | 28.6 | 26.0 | L1 | |
| 12 | 4.65012 | 11.7 | 6.9 | 12.9 | 24.6 | 19.8 | 56.0 | 46.0 | 31.4 | 26.2 | L1 | |

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

-6dB Bandwidth

| | | |
|------------------------|---------------------------------------------|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date | June 7, 2012 | |
| Temperature / Humidity | 27deg.C , 53%RH | |
| Engineer | Kenichi Adachi | |
| Mode | Tx, IEEE802.11b, PN9, worst data mode 1Mbps | |

| Freq. [MHz] | -6dB Bandwidth [MHz] | Limit [MHz] |
|----------------|-------------------------|----------------|
| 2412.0000 | 10.079 | > 0.500 |
| 2437.0000 | 10.069 | > 0.500 |
| 2462.0000 | 10.092 | > 0.500 |



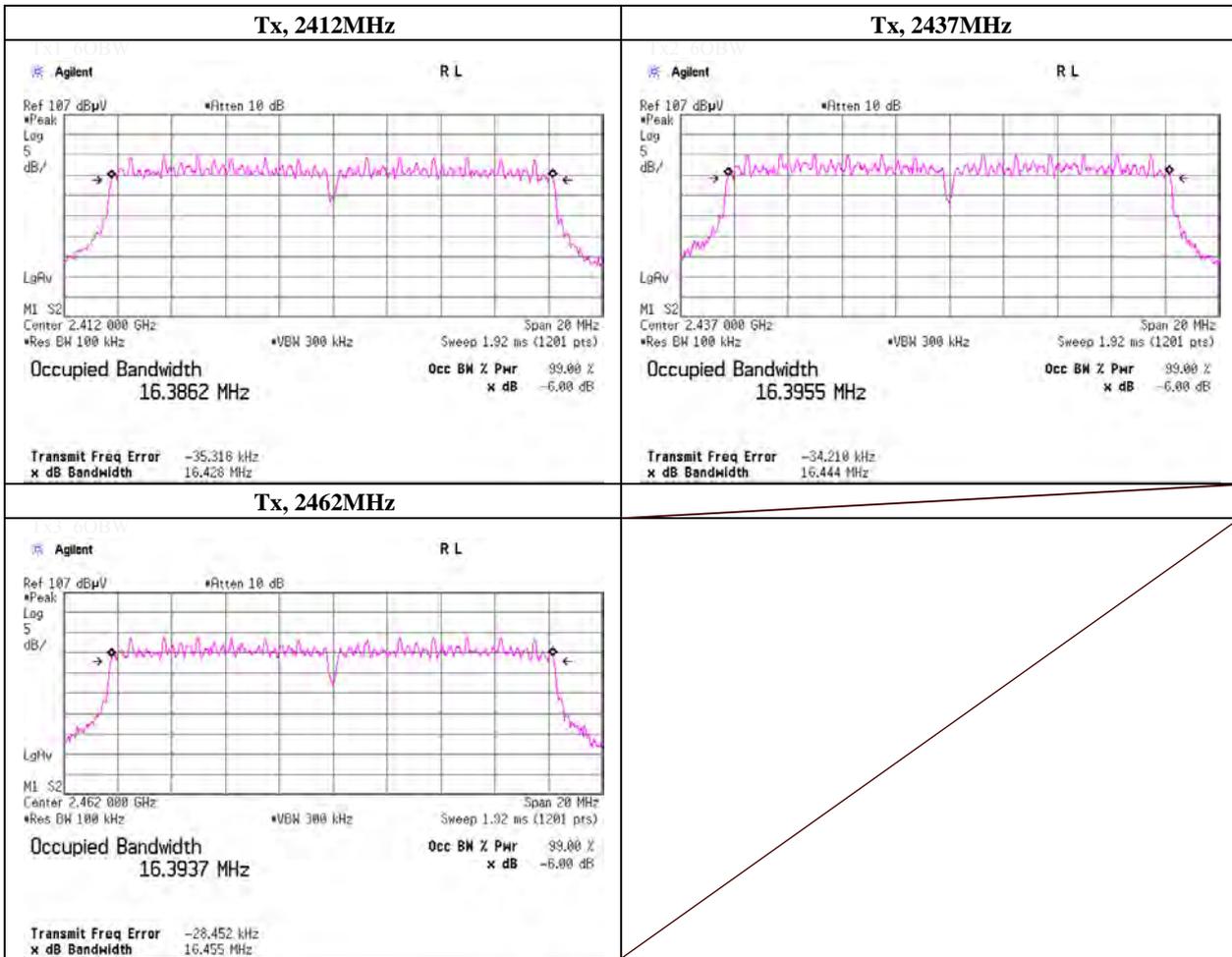
UL Japan, Inc.
Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
 Telephone : +81 463 50 6400
 Facsimile : +81 463 50 6401

-6dB Bandwidth

| | | |
|------------------------|----------------------------------------------|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date | June 7, 2012 | |
| Temperature / Humidity | 27deg.C , 53%RH | |
| Engineer | Kenichi Adachi | |
| Mode | Tx, IEEE802.11g, PN9, worst data mode 36Mbps | |

| Freq. [MHz] | -6dB Bandwidth [MHz] | Limit [MHz] |
|----------------|-------------------------|----------------|
| 2412.0000 | 16.428 | > 0.500 |
| 2437.0000 | 16.444 | > 0.500 |
| 2462.0000 | 16.455 | > 0.500 |



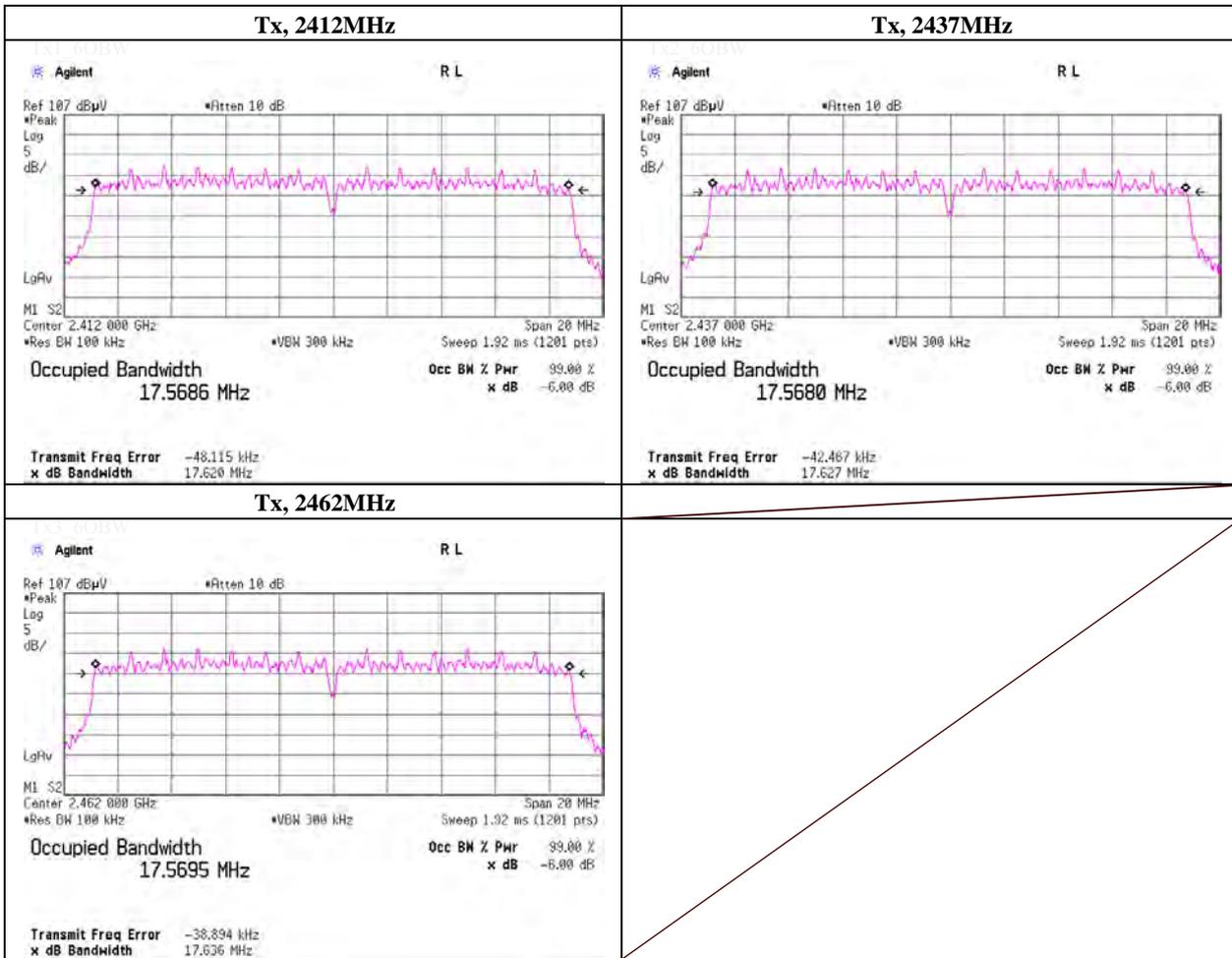
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-6dB Bandwidth

| | | |
|------------------------|-----------------------------------------------------|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date | June 7, 2012 | |
| Temperature / Humidity | 27deg.C , 53%RH | |
| Engineer | Kenichi Adachi | |
| Mode | Tx, IEEE802.11n (HT20), PN9, worst data mode 3(MCS) | |

| Freq. [MHz] | -6dB Bandwidth [MHz] | Limit [MHz] |
|----------------|-------------------------|----------------|
| 2412.0000 | 17.620 | > 0.500 |
| 2437.0000 | 17.627 | > 0.500 |
| 2462.0000 | 17.636 | > 0.500 |



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Peak / Average Output Power (Radiated)

Test place UL Japan, Inc. Shonan EMC Lab.
 Date June 6, 2012
 Temperature / Humidity 26deg.C , 53%RH
 Engineer Tatsuya Arai
 Mode Tx, IEEE802.11b, PN9,

No3 Semi-Anechoic Chamber

worst data mode : 1 Mbps
 Test Distance: 3 m
 EUT Antenna Gain: 1.230 (= 0.90dB)

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

| Ch | Freq. [MHz] | P/M (Peak) Reading [dBuV] | | Ant Factor [dB/m] | Att+Cable Loss [dB] | Amp Gain [dB] | Result 1:*1 [dBuV] | | Result 2:*2 | | | | Limit | | Margin | |
|------|----------------|------------------------------|--------|----------------------|------------------------|------------------|-----------------------|--------|-------------|-------|-------|-------|-------|------|--------------|-------|
| | | HOR | VER | | | | HOR | VER | HOR | VER | [dBm] | [mW] | HOR | VER | | |
| | | [dBm] | [mW] | | | | [dBm] | [mW] | [dBm] | [mW] | [dB] | [dB] | | | | |
| Low | 2412.0 | 106.31 | 105.99 | 27.29 | 14.14 | 41.12 | 106.62 | 106.30 | 10.49 | 11.20 | 10.17 | 10.40 | 30.00 | 1000 | 19.51 | 19.83 |
| Mid | 2437.0 | 106.22 | 105.82 | 27.36 | 14.16 | 41.12 | 106.62 | 106.22 | 10.49 | 11.20 | 10.09 | 10.21 | 30.00 | 1000 | 19.51 | 19.91 |
| High | 2462.0 | 106.38 | 106.02 | 27.43 | 14.19 | 41.11 | 106.89 | 106.53 | 10.76 | 11.92 | 10.40 | 10.97 | 30.00 | 1000 | 19.24 | 19.60 |

Worst

Sample Calculation:

*1: Result 1=>Reading+Antenna Factor+Cable Loss+Atten.Loss-Amp Gain

*2: Result 2=>P=(ED)²/30G, E=Result1, D=3m, G=1.230

worst data mode : 1 Mbps
 Test Distance: 3 m
 EUT Antenna Gain: 1.230 (= 0.90dB)

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

| Ch | Freq. [MHz] | P/M (Average) Reading [dBuV] | | Ant Factor [dB/m] | Att+Cable Loss [dB] | Amp Gain [dB] | Result 1:*1 [dBuV] | | Result 2:*2 | | | | Limit | | Margin | |
|------|----------------|---------------------------------|--------|----------------------|------------------------|------------------|-----------------------|--------|-------------|------|-------|------|-------|------|--------------|-------|
| | | HOR | VER | | | | HOR | VER | HOR | VER | [dBm] | [mW] | HOR | VER | | |
| | | [dBm] | [mW] | | | | [dBm] | [mW] | [dBm] | [mW] | [dB] | [dB] | | | | |
| Low | 2412.0 | 104.19 | 103.83 | 27.29 | 14.14 | 41.12 | 104.50 | 104.14 | 8.37 | 6.87 | 8.01 | 6.33 | 30.00 | 1000 | 21.63 | 21.99 |
| Mid | 2437.0 | 103.87 | 103.47 | 27.36 | 14.16 | 41.12 | 104.27 | 103.87 | 8.14 | 6.52 | 7.74 | 5.94 | 30.00 | 1000 | 21.86 | 22.26 |
| High | 2462.0 | 104.27 | 103.90 | 27.43 | 14.19 | 41.11 | 104.78 | 104.41 | 8.65 | 7.33 | 8.28 | 6.73 | 30.00 | 1000 | 21.35 | 21.72 |

Worst

Sample Calculation:

*1: Result 1=>Reading+Antenna Factor+Cable Loss+Atten.Loss-Amp Gain

*2: Result 2=>P=(ED)²/30G, E=Result1, D=3m, G=1.230

[Peak Pre check]

| Data rate | Freq. | P/M (Peak) Reading [dBuV] | | Ant Factor [dB] | Att+Cable Loss [dB] | Amp Gain [dB] | Result 1:*1 [dBuV] | | Result 2:*2 | | Limit | | Margin |
|-----------|--------|------------------------------|-----|--------------------|------------------------|------------------|-----------------------|-------|-------------|-------|-------|-------|--------|
| [Mbps] | [MHz] | HOR | VER | | | | [dBm] | [mW] | [dBm] | [mW] | [dB] | | |
| 1 | 2437.0 | 106.22 | | 27.36 | 14.16 | 41.12 | 106.62 | 10.49 | 11.20 | 30.00 | 1000 | 19.51 | |
| 2 | 2437.0 | 106.14 | | 27.36 | 14.16 | 41.12 | 106.54 | 10.41 | 10.99 | 30.00 | 1000 | 19.59 | |
| 5.5 | 2437.0 | 106.13 | | 27.36 | 14.16 | 41.12 | 106.53 | 10.40 | 10.97 | 30.00 | 1000 | 19.60 | |
| 11 | 2437.0 | 106.20 | | 27.36 | 14.16 | 41.12 | 106.60 | 10.47 | 11.15 | 30.00 | 1000 | 19.53 | |

Worst

Sample Calculation:

*1: Result 1=>Reading+Antenna Factor+Cable Loss+Atten.Loss-Amp Gain

*2: Result 2=>P=(ED)²/30G, E=Result1, D=3m, G=1.230

*3: Signal levels were compared at polarizations of horizontal and vertical, and pre-check measurement was performed at the polarization in which the level was greater.

[Average Pre check]

| Data rate | Freq. | P/M (Average) Reading [dBuV] | | Ant Factor [dB] | Att+Cable Loss [dB] | Amp Gain [dB] | Result 1:*1 [dBuV] | | Result 2:*2 | | Limit | | Margin |
|-----------|--------|---------------------------------|-----|--------------------|------------------------|------------------|-----------------------|------|-------------|-------|-------|-------|--------|
| - | [MHz] | HOR | VER | | | | [dBm] | [mW] | [dBm] | [mW] | [dB] | | |
| 1 | 2437.0 | 103.87 | | 27.36 | 14.16 | 41.12 | 104.27 | 8.14 | 6.52 | 30.00 | 1000 | 21.86 | |
| 2 | 2437.0 | 103.85 | | 27.36 | 14.16 | 41.12 | 104.25 | 8.12 | 6.49 | 30.00 | 1000 | 21.88 | |
| 5.5 | 2437.0 | 103.84 | | 27.36 | 14.16 | 41.12 | 104.24 | 8.11 | 6.47 | 30.00 | 1000 | 21.89 | |
| 11 | 2437.0 | 103.82 | | 27.36 | 14.16 | 41.12 | 104.22 | 8.09 | 6.44 | 30.00 | 1000 | 21.91 | |

Worst

Sample Calculation:

*1: Result 1=>Reading+Antenna Factor+Cable Loss+Atten.Loss-Amp Gain

*2: Result 2=>P=(ED)²/30G, E=Result1, D=3m, G=1.230

*3: Signal levels were compared at polarizations of horizontal and vertical, and pre-check measurement was performed at the polarization in which the level was greater.

Peak / Average Output Power (Radiated)

Test place UL Japan, Inc. Shonan EMC Lab.
 Date June 6, 2012
 Temperature / Humidity 26deg.C , 53%RH
 Engineer Tatsuya Arai
 Mode Tx, IEEE802.11g, PN9,

No3 Semi-Anechoic Chamber

worst data mode : 36 Mbps
 Test Distance: 3 m
 EUT Antenna Gain: 1.230 (= 0.90dBi)

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

| Ch | Freq. [MHz] | P/M (Peak) Reading | | Ant Factor [dB/m] | Att+Cable Loss [dB] | Amp Gain [dB] | Result 1:*1 | | Result 2:*2 | | | | Limit | | Margin | |
|------|----------------|-----------------------|--------|-------------------------|---------------------------|---------------------|---------------|--------|-------------|-------|-------|-------|-------|------|--------------|-------|
| | | HOR | VER | | | | HOR | VER | HOR | VER | [dBm] | [mW] | HOR | VER | | |
| | | [dBuV] | [dBuV] | | | | | | | | | | | | [dBm] | [mW] |
| Low | 2412.0 | 111.69 | 111.24 | 27.29 | 14.14 | 41.12 | 112.00 | 111.55 | 15.87 | 38.65 | 15.42 | 34.84 | 30.00 | 1000 | 14.13 | 14.58 |
| Mid | 2437.0 | 111.43 | 110.93 | 27.36 | 14.16 | 41.12 | 111.83 | 111.33 | 15.70 | 37.16 | 15.20 | 33.12 | 30.00 | 1000 | 14.30 | 14.80 |
| High | 2462.0 | 113.12 | 112.85 | 27.43 | 14.19 | 41.11 | 113.63 | 113.36 | 17.50 | 56.25 | 17.23 | 52.86 | 30.00 | 1000 | 12.50 | 12.77 |

Worst

Sample Calculation:

*1: Result 1=>Reading+Antenna Factor+Cable Loss+Atten.Loss-Amp Gain

*2: Result 2=>P=(ED)²/30G, E=Result1, D=3m, G=1.230

worst data mode : 6 Mbps
 Test Distance: 3 m
 EUT Antenna Gain: 1.230 (= 0.90dBi)

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

| Ch | Freq. [MHz] | P/M (Average) Reading | | Ant Factor [dB/m] | Att+Cable Loss [dB] | Amp Gain [dB] | Result 1:*1 | | Result 2:*2 | | | | Limit | | Margin | |
|------|----------------|--------------------------|--------|-------------------------|---------------------------|---------------------|---------------|--------|-------------|------|------|------|-------|------|--------------|-------|
| | | HOR | VER | | | | HOR | VER | HOR | VER | HOR | VER | [dBm] | [mW] | HOR | VER |
| | | [dBuV] | [dBuV] | | | | | | | | | | | | | |
| Low | 2412.0 | 103.68 | 103.24 | 27.29 | 14.14 | 41.12 | 103.99 | 103.55 | 7.86 | 6.11 | 7.42 | 5.52 | 30.00 | 1000 | 22.14 | 22.58 |
| Mid | 2437.0 | 103.29 | 102.79 | 27.36 | 14.16 | 41.12 | 103.69 | 103.19 | 7.56 | 5.70 | 7.06 | 5.08 | 30.00 | 1000 | 22.44 | 22.94 |
| High | 2462.0 | 105.05 | 104.64 | 27.43 | 14.19 | 41.11 | 105.56 | 105.15 | 9.43 | 8.77 | 9.02 | 7.98 | 30.00 | 1000 | 20.57 | 20.98 |

Worst

Sample Calculation:

*1: Result 1=>Reading+Antenna Factor+Cable Loss+Atten.Loss-Amp Gain

*2: Result 2=>P=(ED)²/30G, E=Result1, D=3m, G=1.230

[Peak Pre check]

| Data rate [Mbps] | Freq. [MHz] | P/M (Peak) Hor | | Ant Factor [dB] | Att+Cable Loss [dB] | Amp Gain [dB] | Result 1:*1 | | Result 2:*2 | | Limit | | Margin Hor [dB] |
|---------------------|----------------|-------------------|--------|-----------------------|---------------------------|---------------------|---------------|--------|-------------|-------|-------|-------|-----------------------|
| | | [dBuV] | [dBuV] | | | | [dBuV] | [dBuV] | [dBm] | [mW] | [dBm] | [mW] | |
| 6 | 2437.0 | 111.07 | | 27.36 | 14.16 | 41.12 | 111.47 | 15.34 | 34.21 | 30.00 | 1000 | 14.66 | |
| 9 | 2437.0 | 110.92 | | 27.36 | 14.16 | 41.12 | 111.32 | 15.19 | 33.05 | 30.00 | 1000 | 14.81 | |
| 12 | 2437.0 | 110.88 | | 27.36 | 14.16 | 41.12 | 111.28 | 15.15 | 32.74 | 30.00 | 1000 | 14.85 | |
| 18 | 2437.0 | 110.72 | | 27.36 | 14.16 | 41.12 | 111.12 | 14.99 | 31.56 | 30.00 | 1000 | 15.01 | |
| 24 | 2437.0 | 111.31 | | 27.36 | 14.16 | 41.12 | 111.71 | 15.58 | 36.15 | 30.00 | 1000 | 14.42 | |
| 36 | 2437.0 | 111.43 | | 27.36 | 14.16 | 41.12 | 111.83 | 15.70 | 37.16 | 30.00 | 1000 | 14.30 | |
| 48 | 2437.0 | 111.08 | | 27.36 | 14.16 | 41.12 | 111.48 | 15.35 | 34.29 | 30.00 | 1000 | 14.65 | |
| 54 | 2437.0 | 110.36 | | 27.36 | 14.16 | 41.12 | 110.76 | 14.63 | 29.05 | 30.00 | 1000 | 15.37 | |

Worst

Sample Calculation:

*1: Result 1=>Reading+Antenna Factor+Cable Loss+Atten.Loss-Amp Gain

*2: Result 2=>P=(ED)²/30G, E=Result1, D=3m, G=1.230

*3: Signal levels were compared at polarizations of horizontal and vertical, and pre-check measurement was performed at the polarization in which the level was greater.

[Average Pre check]

| Data rate - | Freq. [MHz] | P/M (Average) Hor | | Ant Factor [dB] | Att+Cable Loss [dB] | Amp Gain [dB] | Result 1:*1 | | Result 2:*2 | | Limit | | Margin Hor [dB] |
|----------------|----------------|----------------------|--------|-----------------------|---------------------------|---------------------|---------------|--------|-------------|-------|-------|-------|-----------------------|
| | | [dBuV] | [dBuV] | | | | [dBuV] | [dBuV] | [dBm] | [mW] | [dBm] | [mW] | |
| 6 | 2437.0 | 103.29 | | 27.36 | 14.16 | 41.12 | 103.69 | 7.56 | 5.70 | 30.00 | 1000 | 22.44 | |
| 9 | 2437.0 | 103.25 | | 27.36 | 14.16 | 41.12 | 103.65 | 7.52 | 5.65 | 30.00 | 1000 | 22.48 | |
| 12 | 2437.0 | 103.24 | | 27.36 | 14.16 | 41.12 | 103.64 | 7.51 | 5.64 | 30.00 | 1000 | 22.49 | |
| 18 | 2437.0 | 103.21 | | 27.36 | 14.16 | 41.12 | 103.61 | 7.48 | 5.60 | 30.00 | 1000 | 22.52 | |
| 24 | 2437.0 | 103.19 | | 27.36 | 14.16 | 41.12 | 103.59 | 7.46 | 5.57 | 30.00 | 1000 | 22.54 | |
| 36 | 2437.0 | 103.16 | | 27.36 | 14.16 | 41.12 | 103.56 | 7.43 | 5.54 | 30.00 | 1000 | 22.57 | |
| 48 | 2437.0 | 102.22 | | 27.36 | 14.16 | 41.12 | 102.62 | 6.49 | 4.46 | 30.00 | 1000 | 23.51 | |
| 54 | 2437.0 | 100.85 | | 27.36 | 14.16 | 41.12 | 101.25 | 5.12 | 3.25 | 30.00 | 1000 | 24.88 | |

Worst

Sample Calculation:

*1: Result 1=>Reading+Antenna Factor+Cable Loss+Atten.Loss-Amp Gain

*2: Result 2=>P=(ED)²/30G, E=Result1, D=3m, G=1.230

*3: Signal levels were compared at polarizations of horizontal and vertical, and pre-check measurement was performed at the polarization in which the level was greater.

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 Facsimile : +81 463 50 6401

Peak / Average Output Power (Radiated)

Test place UL Japan, Inc. Shonan EMC Lab. No3 Semi-Anechoic Chamber
 Date June 6, 2012
 Temperature / Humidity 26deg.C , 53%RH
 Engineer Tatsuya Arai
 Mode Tx, IEEE802.11n, PN9,

worst data mode : 3 MCS
 Test Distance: 3 m
 EUT Antenna Gain: 1.230 (=0.90dBi)

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

| Ch | Freq. [MHz] | P/M (Peak) Reading | | Ant Factor [dB/m] | Att+Cable Loss [dB] | Amp Gain [dB] | Result 1:*1 | | Result 2:*2 | | | | Limit | | Margin | |
|------|----------------|-----------------------|--------|-------------------------|---------------------------|---------------------|---------------|--------|-------------|-------|-------|-------|-------|------|--------------|-------|
| | | HOR | VER | | | | HOR | VER | HOR | VER | [dBm] | [mW] | HOR | VER | | |
| | | [dBuV] | [dBuV] | | | | | | | | | | | | [dBm] | [mW] |
| Low | 2412.0 | 109.81 | 109.46 | 27.29 | 14.14 | 41.12 | 110.12 | 109.77 | 13.99 | 25.07 | 13.64 | 23.13 | 30.00 | 1000 | 16.01 | 16.36 |
| Mid | 2437.0 | 109.37 | 108.87 | 27.36 | 14.16 | 41.12 | 109.77 | 109.27 | 13.64 | 23.13 | 13.14 | 20.61 | 30.00 | 1000 | 16.36 | 16.86 |
| High | 2462.0 | 110.87 | 110.48 | 27.43 | 14.19 | 41.11 | 111.38 | 110.99 | 15.25 | 33.51 | 14.86 | 30.63 | 30.00 | 1000 | 14.75 | 15.14 |

Worst

Sample Calculation:

*1: Result 1=>Reading+Antenna Factor+Cable Loss+Atten.Loss-Amp Gain
 *2: Result 2=>P=(ED)²/30G, E=Result1, D=3m, G=1.230

worst data mode : 3 MCS
 Test Distance: 3 m
 EUT Antenna Gain: 1.230 (=0.90dBi)

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

| Ch | Freq. [MHz] | P/M (Average) Reading | | Ant Factor [dB/m] | Att+Cable Loss [dB] | Amp Gain [dB] | Result 1:*1 | | Result 2:*2 | | | | Limit | | Margin | |
|------|----------------|--------------------------|--------|-------------------------|---------------------------|---------------------|---------------|--------|-------------|------|------|------|-------|------|--------------|-------|
| | | HOR | VER | | | | HOR | VER | HOR | VER | HOR | VER | HOR | VER | | |
| | | [dBuV] | [dBuV] | | | | | | | | | | | | [dBm] | [mW] |
| Low | 2412.0 | 101.12 | 100.80 | 27.29 | 14.14 | 41.12 | 101.43 | 101.11 | 5.30 | 3.39 | 4.98 | 3.15 | 30.00 | 1000 | 24.70 | 25.02 |
| Mid | 2437.0 | 100.56 | 100.06 | 27.36 | 14.16 | 41.12 | 100.96 | 100.46 | 4.83 | 3.04 | 4.33 | 2.71 | 30.00 | 1000 | 25.17 | 25.67 |
| High | 2462.0 | 101.61 | 101.29 | 27.43 | 14.19 | 41.11 | 102.12 | 101.80 | 5.99 | 3.97 | 5.67 | 3.69 | 30.00 | 1000 | 24.01 | 24.33 |

Worst

Sample Calculation:

*1: Result 1=>Reading+Antenna Factor+Cable Loss+Atten.Loss-Amp Gain
 *2: Result 2=>P=(ED)²/30G, E=Result1, D=3m, G=1.230

[Peak Pre check]

| Data rate [MCS] | Freq. [MHz] | P/M (Peak) Hor | | Ant Factor [dB] | Att+Cable Loss [dB] | Amp Gain [dB] | Result 1:*1 | | Result 2:*2 | | Limit | | Margin Hor [dB] |
|--------------------|----------------|-------------------|--------|-----------------------|---------------------------|---------------------|---------------|-------|-------------|-------|-------|-------|-----------------------|
| | | [dBuV] | [dBuV] | | | | [dBuV] | [mW] | [dBm] | [mW] | [dBm] | [mW] | |
| 0 | 2437.0 | 108.00 | 108.00 | 27.36 | 14.16 | 41.12 | 108.40 | 12.27 | 16.87 | 30.00 | 1000 | 17.73 | |
| 1 | 2437.0 | 108.56 | 108.56 | 27.36 | 14.16 | 41.12 | 108.96 | 12.83 | 19.19 | 30.00 | 1000 | 17.17 | |
| 2 | 2437.0 | 108.27 | 108.27 | 27.36 | 14.16 | 41.12 | 108.67 | 12.54 | 17.95 | 30.00 | 1000 | 17.46 | |
| 3 | 2437.0 | 109.37 | 109.37 | 27.36 | 14.16 | 41.12 | 109.77 | 13.64 | 23.13 | 30.00 | 1000 | 16.36 | |
| 4 | 2437.0 | 108.87 | 108.87 | 27.36 | 14.16 | 41.12 | 109.27 | 13.14 | 20.61 | 30.00 | 1000 | 16.86 | |
| 5 | 2437.0 | 108.88 | 108.88 | 27.36 | 14.16 | 41.12 | 109.28 | 13.15 | 20.66 | 30.00 | 1000 | 16.85 | |
| 6 | 2437.0 | 108.40 | 108.40 | 27.36 | 14.16 | 41.12 | 108.80 | 12.67 | 18.50 | 30.00 | 1000 | 17.33 | |
| 7 | 2437.0 | 108.10 | 108.10 | 27.36 | 14.16 | 41.12 | 108.50 | 12.37 | 17.26 | 30.00 | 1000 | 17.63 | |

Worst

Sample Calculation:

*1: Result 1=>Reading+Antenna Factor+Cable Loss+Atten.Loss-Amp Gain
 *2: Result 2=>P=(ED)²/30G, E=Result1, D=3m, G=1.230
 *3: Signal levels were compared at polarizations of horizontal and vertical, and pre-check measurement was performed at the polarization in which the level was greater.

[Average Pre check]

| Data rate [MCS] | Freq. [MHz] | P/M (Average) Hor | | Ant Factor [dB] | Att+Cable Loss [dB] | Amp Gain [dB] | Result 1:*1 | | Result 2:*2 | | Limit | | Margin Hor [dB] |
|--------------------|----------------|----------------------|--------|-----------------------|---------------------------|---------------------|---------------|------|-------------|-------|-------|-------|-----------------------|
| | | [dBuV] | [dBuV] | | | | [dBuV] | [mW] | [dBm] | [mW] | [dBm] | [mW] | |
| 0 | 2437.0 | 99.15 | 99.15 | 27.36 | 14.16 | 41.12 | 99.55 | 3.42 | 2.20 | 30.00 | 1000 | 26.58 | |
| 1 | 2437.0 | 100.11 | 100.11 | 27.36 | 14.16 | 41.12 | 100.51 | 4.38 | 2.74 | 30.00 | 1000 | 25.62 | |
| 2 | 2437.0 | 99.10 | 99.10 | 27.36 | 14.16 | 41.12 | 99.50 | 3.37 | 2.17 | 30.00 | 1000 | 26.63 | |
| 3 | 2437.0 | 100.56 | 100.56 | 27.36 | 14.16 | 41.12 | 100.96 | 4.83 | 3.04 | 30.00 | 1000 | 25.17 | |
| 4 | 2437.0 | 99.55 | 99.55 | 27.36 | 14.16 | 41.12 | 99.95 | 3.82 | 2.41 | 30.00 | 1000 | 26.18 | |
| 5 | 2437.0 | 99.39 | 99.39 | 27.36 | 14.16 | 41.12 | 99.79 | 3.66 | 2.32 | 30.00 | 1000 | 26.34 | |
| 6 | 2437.0 | 98.59 | 98.59 | 27.36 | 14.16 | 41.12 | 98.99 | 2.86 | 1.93 | 30.00 | 1000 | 27.14 | |
| 7 | 2437.0 | 98.28 | 98.28 | 27.36 | 14.16 | 41.12 | 98.68 | 2.55 | 1.80 | 30.00 | 1000 | 27.45 | |

Worst

Sample Calculation:

*1: Result 1=>Reading+Antenna Factor+Cable Loss+Atten.Loss-Amp Gain
 *2: Result 2=>P=(ED)²/30G, E=Result1, D=3m, G=1.230
 *3: Signal levels were compared at polarizations of horizontal and vertical, and pre-check measurement was performed at the polarization in which the level was greater.

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.2 and No.3 Semi Anechoic Chamber
 Date June 9, 2012 June 10, 2012
 Temperature / Humidity 24 deg.C , 58%RH 25 deg.C , 60%RH
 Engineer Akio Hayashi Shinichi Takano
 Mode Tx, 2412 MHz
 Tx, IEEE802.11b, PN9, worst data mode 1Mbps

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|-----------------|----------------------------|
| Hori. | 2387.100 | PK | 43.5 | 27.2 | 14.0 | 38.2 | 46.5 | 73.9 | 27.4 | 100 | 163 | PK:VBW 3MHz AV:VBW 10Hz |
| Hori. | 2390.000 | PK | 45.0 | 27.2 | 14.1 | 38.2 | 48.1 | 73.9 | 25.8 | 100 | 163 | |
| Hori. | 4824.000 | PK | 44.4 | 31.2 | 6.6 | 37.0 | 45.2 | 73.9 | 28.7 | 104 | 192 | |
| Hori. | 7236.000 | PK | 44.3 | 36.5 | 8.0 | 39.0 | 49.8 | 73.9 | 24.1 | 100 | 0 | |
| Hori. | 9648.000 | PK | 42.3 | 38.4 | 9.2 | 37.2 | 52.7 | 73.9 | 21.2 | 100 | 188 | |
| Hori. | 12060.000 | PK | 42.4 | 39.3 | 10.5 | 37.9 | 54.3 | 73.9 | 19.6 | 100 | 0 | |
| Hori. | 2387.100 | AV | 32.5 | 27.2 | 14.0 | 38.2 | 35.5 | 53.9 | 18.4 | 100 | 163 | |
| Hori. | 2390.000 | AV | 31.7 | 27.2 | 14.1 | 38.2 | 34.8 | 53.9 | 19.1 | 100 | 163 | |
| Hori. | 4824.000 | AV | 36.3 | 31.2 | 6.6 | 37.0 | 37.1 | 53.9 | 16.8 | 104 | 192 | |
| Hori. | 7236.000 | AV | 32.8 | 36.5 | 8.0 | 39.0 | 38.3 | 53.9 | 15.6 | 100 | 0 | |
| Hori. | 9648.000 | AV | 31.7 | 38.4 | 9.2 | 37.2 | 42.1 | 53.9 | 11.8 | 100 | 188 | |
| Hori. | 12060.000 | AV | 31.1 | 39.3 | 10.5 | 37.9 | 43.0 | 53.9 | 10.9 | 100 | 0 | |
| Vert. | 2387.100 | PK | 44.3 | 27.2 | 14.0 | 38.2 | 47.3 | 73.9 | 26.6 | 129 | 170 | |
| Vert. | 2390.000 | PK | 44.5 | 27.2 | 14.1 | 38.2 | 47.6 | 73.9 | 26.3 | 129 | 170 | |
| Vert. | 4824.000 | PK | 45.1 | 31.2 | 6.6 | 37.0 | 45.9 | 73.9 | 28.0 | 100 | 228 | |
| Vert. | 7236.000 | PK | 43.9 | 36.5 | 8.0 | 39.0 | 49.4 | 73.9 | 24.5 | 100 | 0 | |
| Vert. | 9648.000 | PK | 42.7 | 38.4 | 9.2 | 37.2 | 53.1 | 73.9 | 20.8 | 152 | 221 | |
| Vert. | 12060.000 | PK | 42.7 | 39.3 | 10.5 | 37.9 | 54.6 | 73.9 | 19.3 | 100 | 0 | |
| Vert. | 2387.100 | AV | 33.7 | 27.2 | 14.0 | 38.2 | 36.7 | 53.9 | 17.2 | 129 | 170 | |
| Vert. | 2390.000 | AV | 32.6 | 27.2 | 14.1 | 38.2 | 35.7 | 53.9 | 18.2 | 129 | 170 | |
| Vert. | 4824.000 | AV | 39.5 | 31.2 | 6.6 | 37.0 | 40.3 | 53.9 | 13.6 | 100 | 228 | |
| Vert. | 7236.000 | AV | 32.3 | 36.5 | 8.0 | 39.0 | 37.8 | 53.9 | 16.1 | 100 | 0 | |
| Vert. | 9648.000 | AV | 31.8 | 38.4 | 9.2 | 37.2 | 42.2 | 53.9 | 11.7 | 152 | 221 | |
| Vert. | 12060.000 | AV | 31.1 | 39.3 | 10.5 | 37.9 | 43.0 | 53.9 | 10.9 | 100 | 0 | |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - 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 | 86.3 | 27.3 | 14.1 | 38.2 | 89.5 | - | - | Carrier |
| Hori. | 2397.000 | PK | 52.6 | 27.2 | 14.1 | 38.2 | 55.7 | 69.5 | 13.8 | |
| Hori. | 2400.000 | PK | 39.1 | 27.3 | 14.1 | 38.2 | 42.3 | 69.5 | 27.2 | |
| Vert. | 2412.000 | PK | 89.5 | 27.3 | 14.1 | 38.2 | 92.7 | - | - | Carrier |
| Vert. | 2397.000 | PK | 54.7 | 27.2 | 14.1 | 38.2 | 57.8 | 72.7 | 14.9 | |
| Vert. | 2400.000 | PK | 41.6 | 27.3 | 14.1 | 38.2 | 44.8 | 72.7 | 27.9 | |

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

Although the carrier level seems to differ with the level at the measurement of peak output power, that is caused by the difference of test instrument; i.e. Peak power meter (BW:50MHz) and Spectrum analyzer (RBW:100kHz).

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.2 and No.3 Semi Anechoic Chamber
 Date June 9, 2012 June 10, 2012
 Temperature / Humidity 24 deg.C , 58%RH 25 deg.C , 60%RH
 Engineer Akio Hayashi Shinichi Takano
 Mode Tx, 2437 MHz
 Tx, IEEE802.11b, PN9, worst data mode 1Mbps

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|-----------------|----------------------------|
| Hori. | 4874.000 | PK | 44.7 | 31.3 | 6.6 | 36.9 | 45.7 | 73.9 | 28.2 | 100 | 159 | PK:VBW 3MHz AV:VBW 10Hz |
| Hori. | 7311.000 | PK | 43.8 | 36.7 | 8.2 | 39.0 | 49.7 | 73.9 | 24.2 | 100 | 0 | |
| Hori. | 9748.000 | PK | 42.9 | 38.6 | 9.3 | 37.2 | 53.6 | 73.9 | 20.3 | 100 | 184 | |
| Hori. | 12185.000 | PK | 42.7 | 39.4 | 10.5 | 37.7 | 54.9 | 73.9 | 19.0 | 100 | 0 | |
| Hori. | 4874.000 | AV | 36.4 | 31.3 | 6.6 | 36.9 | 37.4 | 53.9 | 16.5 | 100 | 159 | |
| Hori. | 7311.000 | AV | 32.6 | 36.7 | 8.2 | 39.0 | 38.5 | 53.9 | 15.4 | 100 | 0 | |
| Hori. | 9748.000 | AV | 32.5 | 38.6 | 9.3 | 37.2 | 43.2 | 53.9 | 10.7 | 100 | 184 | |
| Hori. | 12185.000 | AV | 30.6 | 39.4 | 10.5 | 37.7 | 42.8 | 53.9 | 11.1 | 100 | 0 | |
| Vert. | 4874.000 | PK | 44.3 | 31.3 | 6.6 | 36.9 | 45.3 | 73.9 | 28.6 | 100 | 238 | |
| Vert. | 7311.000 | PK | 43.8 | 36.7 | 8.2 | 39.0 | 49.7 | 73.9 | 24.2 | 100 | 0 | |
| Vert. | 9748.000 | PK | 42.1 | 38.6 | 9.3 | 37.2 | 52.8 | 73.9 | 21.1 | 148 | 217 | |
| Vert. | 12185.000 | PK | 42.5 | 39.4 | 10.5 | 37.7 | 54.7 | 73.9 | 19.2 | 100 | 0 | |
| Vert. | 4874.000 | AV | 37.0 | 31.3 | 6.6 | 36.9 | 38.0 | 53.9 | 15.9 | 100 | 238 | |
| Vert. | 7311.000 | AV | 32.5 | 36.7 | 8.2 | 39.0 | 38.4 | 53.9 | 15.5 | 100 | 0 | |
| Vert. | 9748.000 | AV | 32.2 | 38.6 | 9.3 | 37.2 | 42.9 | 53.9 | 11.0 | 148 | 217 | |
| Vert. | 12185.000 | AV | 30.7 | 39.4 | 10.5 | 37.7 | 42.9 | 53.9 | 11.0 | 100 | 0 | |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - 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.2 and No.3 Semi Anechoic Chamber
 Date June 9, 2012 June 10, 2012
 Temperature / Humidity 24 deg.C , 58%RH 25 deg.C , 60%RH
 Engineer Akio Hayashi Shinichi Takano
 Mode Tx, 2462 MHz
 Tx, IEEE802.11b, PN9, worst data mode 1Mbps

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|--------------|----------------------------|
| Hori. | 2483.500 | PK | 45.1 | 27.5 | 14.1 | 38.1 | 48.6 | 73.9 | 25.3 | 100 | 195 | PK:VBW 3MHz AV:VBW 10Hz |
| Hori. | 2487.525 | PK | 44.1 | 27.5 | 14.1 | 38.1 | 47.6 | 73.9 | 26.3 | 100 | 195 | |
| Hori. | 3283.000 | PK | 41.2 | 28.8 | 5.4 | 37.9 | 37.5 | 73.9 | 36.4 | 100 | 0 | |
| Hori. | 4924.000 | PK | 45.9 | 31.5 | 6.6 | 36.9 | 47.1 | 73.9 | 26.8 | 100 | 205 | |
| Hori. | 7386.000 | PK | 44.5 | 36.9 | 8.3 | 39.0 | 50.7 | 73.9 | 23.2 | 100 | 0 | |
| Hori. | 9848.000 | PK | 43.6 | 38.8 | 9.3 | 37.2 | 54.5 | 73.9 | 19.4 | 100 | 172 | |
| Hori. | 12310.000 | PK | 42.0 | 39.4 | 10.7 | 37.6 | 54.5 | 73.9 | 19.4 | 100 | 0 | |
| Hori. | 2483.500 | AV | 34.0 | 27.5 | 14.1 | 38.1 | 37.5 | 53.9 | 16.4 | 100 | 195 | |
| Hori. | 2487.525 | AV | 33.8 | 27.5 | 14.1 | 38.1 | 37.3 | 53.9 | 16.6 | 100 | 195 | |
| Hori. | 3283.000 | AV | 31.0 | 28.8 | 5.4 | 37.9 | 27.3 | 53.9 | 26.6 | 100 | 0 | |
| Hori. | 4924.000 | AV | 40.4 | 31.5 | 6.6 | 36.9 | 41.6 | 53.9 | 12.3 | 100 | 205 | |
| Hori. | 7386.000 | AV | 32.9 | 36.9 | 8.3 | 39.0 | 39.1 | 53.9 | 14.8 | 100 | 0 | |
| Hori. | 9848.000 | AV | 34.2 | 38.8 | 9.3 | 37.2 | 45.1 | 53.9 | 8.8 | 100 | 172 | |
| Hori. | 12310.000 | AV | 30.6 | 39.4 | 10.7 | 37.6 | 43.1 | 53.9 | 10.8 | 100 | 0 | |
| Vert. | 2483.500 | PK | 45.6 | 27.5 | 14.1 | 38.1 | 49.1 | 73.9 | 24.8 | 100 | 186 | |
| Vert. | 2487.525 | PK | 44.4 | 27.5 | 14.1 | 38.1 | 47.9 | 73.9 | 26.0 | 100 | 186 | |
| Vert. | 3283.000 | PK | 42.1 | 28.8 | 5.4 | 37.9 | 38.4 | 73.9 | 35.5 | 100 | 0 | |
| Vert. | 4924.000 | PK | 43.0 | 31.5 | 6.6 | 36.9 | 44.2 | 73.9 | 29.7 | 100 | 244 | |
| Vert. | 7386.000 | PK | 44.2 | 36.9 | 8.3 | 39.0 | 50.4 | 73.9 | 23.5 | 100 | 0 | |
| Vert. | 9848.000 | PK | 43.7 | 38.8 | 9.3 | 37.2 | 54.6 | 73.9 | 19.3 | 151 | 212 | |
| Vert. | 12310.000 | PK | 42.8 | 39.4 | 10.7 | 37.6 | 55.3 | 73.9 | 18.6 | 100 | 0 | |
| Vert. | 2483.500 | AV | 33.5 | 27.5 | 14.1 | 38.1 | 37.0 | 53.9 | 16.9 | 100 | 186 | |
| Vert. | 2487.525 | AV | 33.4 | 27.5 | 14.1 | 38.1 | 36.9 | 53.9 | 17.0 | 100 | 186 | |
| Vert. | 3283.000 | AV | 31.0 | 28.8 | 5.4 | 37.9 | 27.3 | 53.9 | 26.6 | 100 | 0 | |
| Vert. | 4924.000 | AV | 35.3 | 31.5 | 6.6 | 36.9 | 36.5 | 53.9 | 17.4 | 100 | 244 | |
| Vert. | 7386.000 | AV | 32.9 | 36.9 | 8.3 | 39.0 | 39.1 | 53.9 | 14.8 | 100 | 0 | |
| Vert. | 9848.000 | AV | 34.0 | 38.8 | 9.3 | 37.2 | 44.9 | 53.9 | 9.0 | 151 | 212 | |
| Vert. | 12310.000 | AV | 30.6 | 39.4 | 10.7 | 37.6 | 43.1 | 53.9 | 10.8 | 100 | 0 | |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - 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.2 and No.3 Semi Anechoic Chamber
 Date June 9, 2012 June 10, 2012
 Temperature / Humidity 24 deg.C , 58%RH 25 deg.C , 60%RH
 Engineer Akio Hayashi Shinichi Takano
 Mode Tx, 2412 MHz
 Tx, IEEE802.11g, PN9, worst data mode 36Mbps

(* 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 | 63.5 | 27.2 | 14.1 | 38.2 | 66.6 | 73.9 | 7.3 | 100 | 182 | PK:VBW 3MHz |
| Hori. | 4824.000 | PK | 43.8 | 31.2 | 6.6 | 37.0 | 44.6 | 73.9 | 29.3 | 100 | 201 | AV:VBW 10Hz |
| Hori. | 7236.000 | PK | 45.8 | 36.5 | 8.0 | 39.0 | 51.3 | 73.9 | 22.6 | 147 | 102 | |
| Hori. | 9648.000 | PK | 43.6 | 38.4 | 9.2 | 37.2 | 54.0 | 73.9 | 19.9 | 100 | 183 | |
| Hori. | 12060.000 | PK | 41.2 | 39.3 | 10.5 | 37.9 | 53.1 | 73.9 | 20.8 | 100 | 0 | |
| Hori. | 2390.000 | AV | 45.7 | 27.2 | 14.1 | 38.2 | 48.8 | 53.9 | 5.1 | 100 | 182 | |
| Hori. | 4824.000 | AV | 32.4 | 31.2 | 6.6 | 37.0 | 33.2 | 53.9 | 20.7 | 100 | 201 | |
| Hori. | 7236.000 | AV | 34.7 | 36.5 | 8.0 | 39.0 | 40.2 | 53.9 | 13.7 | 147 | 102 | |
| Hori. | 9648.000 | AV | 32.4 | 38.4 | 9.2 | 37.2 | 42.8 | 53.9 | 11.1 | 100 | 183 | |
| Hori. | 12060.000 | AV | 31.2 | 39.3 | 10.5 | 37.9 | 43.1 | 53.9 | 10.8 | 100 | 0 | |
| Vert. | 2390.000 | PK | 64.5 | 27.2 | 14.1 | 38.2 | 67.6 | 73.9 | 6.3 | 100 | 181 | |
| Vert. | 4824.000 | PK | 43.2 | 31.2 | 6.6 | 37.0 | 44.0 | 73.9 | 29.9 | 100 | 238 | |
| Vert. | 7236.000 | PK | 47.2 | 36.5 | 8.0 | 39.0 | 52.7 | 73.9 | 21.2 | 137 | 189 | |
| Vert. | 9648.000 | PK | 43.4 | 38.4 | 9.2 | 37.2 | 53.8 | 73.9 | 20.1 | 100 | 173 | |
| Vert. | 12060.000 | PK | 42.3 | 39.3 | 10.5 | 37.9 | 54.2 | 73.9 | 19.7 | 100 | 0 | |
| Vert. | 2390.000 | AV | 46.8 | 27.2 | 14.1 | 38.2 | 49.9 | 53.9 | 4.0 | 100 | 181 | |
| Vert. | 4824.000 | AV | 32.2 | 31.2 | 6.6 | 37.0 | 33.0 | 53.9 | 20.9 | 100 | 238 | |
| Vert. | 7236.000 | AV | 35.5 | 36.5 | 8.0 | 39.0 | 41.0 | 53.9 | 12.9 | 137 | 189 | |
| Vert. | 9648.000 | AV | 32.0 | 38.4 | 9.2 | 37.2 | 42.4 | 53.9 | 11.5 | 100 | 173 | |
| Vert. | 12060.000 | AV | 31.1 | 39.3 | 10.5 | 37.9 | 43.0 | 53.9 | 10.9 | 100 | 0 | |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - 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 | 87.9 | 27.3 | 14.1 | 38.2 | 91.1 | - | - | Carrier |
| Hori. | 2394.454 | PK | 62.8 | 27.2 | 14.1 | 38.2 | 65.9 | 71.1 | 5.2 | |
| Hori. | 2400.000 | PK | 61.2 | 27.3 | 14.1 | 38.2 | 64.4 | 71.1 | 6.7 | |
| Vert. | 2412.000 | PK | 90.3 | 27.3 | 14.1 | 38.2 | 93.5 | - | - | Carrier |
| Vert. | 2394.454 | PK | 63.2 | 27.2 | 14.1 | 38.2 | 66.3 | 73.5 | 7.2 | |
| Vert. | 2400.000 | PK | 62.1 | 27.3 | 14.1 | 38.2 | 65.3 | 73.5 | 8.2 | |

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

Although the carrier level seems to differ with the level at the measurement of peak output power, that is caused by the difference of test instrument; i.e. Peak power meter (BW:50MHz) and Spectrum analyzer (RBW:100kHz).

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.2 and No.3 Semi Anechoic Chamber
 Date June 9, 2012 June 10, 2012
 Temperature / Humidity 24 deg.C , 58%RH 25 deg.C , 60%RH
 Engineer Akio Hayashi Shinichi Takano
 Mode Tx, 2437 MHz
 Tx, IEEE802.11g, PN9, worst data mode 36Mbps

(* 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 | 44.3 | 31.3 | 6.6 | 36.9 | 45.3 | 73.9 | 28.6 | 100 | 202 | PK:VBW 3MHz |
| Hori. | 7311.000 | PK | 46.4 | 36.7 | 8.2 | 39.0 | 52.3 | 73.9 | 21.6 | 140 | 99 | AV:VBW 10Hz |
| Hori. | 9748.000 | PK | 46.7 | 38.6 | 9.3 | 37.2 | 57.4 | 73.9 | 16.5 | 100 | 174 | |
| Hori. | 12185.000 | PK | 42.3 | 39.4 | 10.5 | 37.7 | 54.5 | 73.9 | 19.4 | 100 | 0 | |
| Hori. | 4874.000 | AV | 33.0 | 31.3 | 6.6 | 36.9 | 34.0 | 53.9 | 19.9 | 100 | 202 | |
| Hori. | 7311.000 | AV | 35.1 | 36.7 | 8.2 | 39.0 | 41.0 | 53.9 | 12.9 | 140 | 99 | |
| Hori. | 9748.000 | AV | 33.4 | 38.6 | 9.3 | 37.2 | 44.1 | 53.9 | 9.8 | 100 | 174 | |
| Hori. | 12185.000 | AV | 30.7 | 39.4 | 10.5 | 37.7 | 42.9 | 53.9 | 11.0 | 100 | 0 | |
| Vert. | 4874.000 | PK | 42.8 | 31.3 | 6.6 | 36.9 | 43.8 | 73.9 | 30.1 | 100 | 236 | |
| Vert. | 7311.000 | PK | 47.3 | 36.7 | 8.2 | 39.0 | 53.2 | 73.9 | 20.7 | 138 | 187 | |
| Vert. | 9748.000 | PK | 45.8 | 38.6 | 9.3 | 37.2 | 56.5 | 73.9 | 17.4 | 140 | 208 | |
| Vert. | 12185.000 | PK | 42.2 | 39.4 | 10.5 | 37.7 | 54.4 | 73.9 | 19.5 | 100 | 0 | |
| Vert. | 4874.000 | AV | 32.5 | 31.3 | 6.6 | 36.9 | 33.5 | 53.9 | 20.4 | 100 | 236 | |
| Vert. | 7311.000 | AV | 34.9 | 36.7 | 8.2 | 39.0 | 40.8 | 53.9 | 13.1 | 138 | 187 | |
| Vert. | 9748.000 | AV | 32.9 | 38.6 | 9.3 | 37.2 | 43.6 | 53.9 | 10.3 | 140 | 208 | |
| Vert. | 12185.000 | AV | 30.8 | 39.4 | 10.5 | 37.7 | 43.0 | 53.9 | 10.9 | 100 | 0 | |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - 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.2 and No.3 Semi Anechoic Chamber
 Date June 9, 2012 June 10, 2012 June 11, 2012
 Temperature / Humidity 24 deg.C , 58%RH 25 deg.C , 60%RH 24 deg.C , 65%RH
 Engineer Akio Hayashi Shinichi Takano Shinichi Takano
 Mode Tx, 2462 MHz
 Tx, IEEE802.11g, PN9, worst data mode 36Mbps

(* 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. | 158.051 | QP | 37.9 | 15.1 | 7.8 | 32.1 | 28.7 | 43.5 | 14.8 | 201 | 226 | PK:VBW 3MHz AV:VBW 10Hz |
| Hori. | 497.200 | QP | 21.3 | 17.7 | 9.4 | 32.0 | 16.4 | 46.0 | 29.6 | 100 | 0 | |
| Hori. | 526.156 | QP | 23.7 | 18.1 | 9.5 | 32.0 | 19.3 | 46.0 | 26.7 | 100 | 311 | |
| Hori. | 871.862 | QP | 24.8 | 22.1 | 10.6 | 31.2 | 26.3 | 46.0 | 19.7 | 152 | 329 | |
| Hori. | 2483.500 | PK | 60.0 | 27.5 | 14.1 | 38.1 | 63.5 | 73.9 | 10.4 | 100 | 208 | |
| Hori. | 4924.000 | PK | 43.1 | 31.5 | 6.6 | 36.9 | 44.3 | 73.9 | 29.6 | 100 | 206 | |
| Hori. | 7386.000 | PK | 46.2 | 36.9 | 8.3 | 39.0 | 52.4 | 73.9 | 21.5 | 151 | 98 | |
| Hori. | 9848.000 | PK | 46.4 | 38.8 | 9.3 | 37.2 | 57.3 | 73.9 | 16.6 | 100 | 174 | |
| Hori. | 12310.000 | PK | 41.4 | 39.4 | 10.7 | 37.6 | 53.9 | 73.9 | 20.0 | 100 | 0 | |
| Hori. | 2483.500 | AV | 43.3 | 27.5 | 14.1 | 38.1 | 46.8 | 53.9 | 7.1 | 100 | 208 | |
| Hori. | 4924.000 | AV | 31.6 | 31.5 | 6.6 | 36.9 | 32.8 | 53.9 | 21.1 | 100 | 206 | |
| Hori. | 7386.000 | AV | 34.2 | 36.9 | 8.3 | 39.0 | 40.4 | 53.9 | 13.5 | 151 | 98 | |
| Hori. | 9848.000 | AV | 34.1 | 38.8 | 9.3 | 37.2 | 45.0 | 53.9 | 8.9 | 100 | 174 | |
| Hori. | 12310.000 | AV | 30.5 | 39.4 | 10.7 | 37.6 | 43.0 | 53.9 | 10.9 | 100 | 0 | |
| Vert. | 158.056 | QP | 30.4 | 15.1 | 7.8 | 32.1 | 21.2 | 43.5 | 22.3 | 100 | 324 | |
| Vert. | 497.200 | QP | 22.1 | 17.7 | 9.4 | 32.0 | 17.2 | 46.0 | 28.8 | 100 | 0 | |
| Vert. | 873.980 | QP | 24.9 | 22.1 | 10.6 | 31.2 | 26.4 | 46.0 | 19.6 | 100 | 279 | |
| Vert. | 2483.500 | PK | 61.1 | 27.5 | 14.1 | 38.1 | 64.6 | 73.9 | 9.3 | 100 | 203 | |
| Vert. | 4924.000 | PK | 41.7 | 31.5 | 6.6 | 36.9 | 42.9 | 73.9 | 31.0 | 100 | 81 | |
| Vert. | 7386.000 | PK | 45.3 | 36.9 | 8.3 | 39.0 | 51.5 | 73.9 | 22.4 | 100 | 168 | |
| Vert. | 9848.000 | PK | 46.5 | 38.8 | 9.3 | 37.2 | 57.4 | 73.9 | 16.5 | 158 | 211 | |
| Vert. | 12310.000 | PK | 42.1 | 39.4 | 10.7 | 37.6 | 54.6 | 73.9 | 19.3 | 100 | 0 | |
| Vert. | 2483.500 | AV | 44.8 | 27.5 | 14.1 | 38.1 | 48.3 | 53.9 | 5.6 | 100 | 203 | |
| Vert. | 4924.000 | AV | 31.2 | 31.5 | 6.6 | 36.9 | 32.4 | 53.9 | 21.5 | 100 | 81 | |
| Vert. | 7386.000 | AV | 33.9 | 36.9 | 8.3 | 39.0 | 40.1 | 53.9 | 13.8 | 100 | 168 | |
| Vert. | 9848.000 | AV | 33.5 | 38.8 | 9.3 | 37.2 | 44.4 | 53.9 | 9.5 | 158 | 211 | |
| Vert. | 12310.000 | AV | 30.6 | 39.4 | 10.7 | 37.6 | 43.1 | 53.9 | 10.8 | 100 | 0 | |

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

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

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Shonan EMC Lab.
 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.2 and No.3 Semi Anechoic Chamber
 Date June 9, 2012 June 10, 2012
 Temperature / Humidity 24 deg.C , 58%RH 25 deg.C , 60%RH
 Engineer Akio Hayashi Shinichi Takano
 Mode Tx, 2412 MHz
 Tx, IEEE802.11n (HT20), PN9, worst data mode 3(MCS)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|--------------|----------------------------|
| Hori. | 2390.000 | PK | 56.7 | 27.2 | 14.1 | 38.2 | 59.8 | 73.9 | 14.1 | 100 | 198 | PK:VBW 3MHz AV:VBW 10Hz |
| Hori. | 4824.000 | PK | 42.6 | 31.2 | 6.6 | 37.0 | 43.4 | 73.9 | 30.5 | 100 | 159 | |
| Hori. | 7236.000 | PK | 43.4 | 36.5 | 8.0 | 39.0 | 48.9 | 73.9 | 25.0 | 100 | 0 | |
| Hori. | 9648.000 | PK | 42.5 | 38.4 | 9.2 | 37.2 | 52.9 | 73.9 | 21.0 | 100 | 0 | |
| Hori. | 12060.000 | PK | 41.7 | 39.3 | 10.5 | 37.9 | 53.6 | 73.9 | 20.3 | 100 | 0 | |
| Hori. | 2390.000 | AV | 42.2 | 27.2 | 14.1 | 38.2 | 45.3 | 53.9 | 8.6 | 100 | 198 | |
| Hori. | 4824.000 | AV | 31.7 | 31.2 | 6.6 | 37.0 | 32.5 | 53.9 | 21.4 | 100 | 159 | |
| Hori. | 7236.000 | AV | 32.5 | 36.5 | 8.0 | 39.0 | 38.0 | 53.9 | 15.9 | 100 | 0 | |
| Hori. | 9648.000 | AV | 30.7 | 38.4 | 9.2 | 37.2 | 41.1 | 53.9 | 12.8 | 100 | 0 | |
| Hori. | 12060.000 | AV | 31.1 | 39.3 | 10.5 | 37.9 | 43.0 | 53.9 | 10.9 | 100 | 0 | |
| Vert. | 2390.000 | PK | 56.8 | 27.2 | 14.1 | 38.2 | 59.9 | 73.9 | 14.0 | 100 | 182 | |
| Vert. | 4824.000 | PK | 42.2 | 31.2 | 6.6 | 37.0 | 43.0 | 73.9 | 30.9 | 100 | 248 | |
| Vert. | 7236.000 | PK | 43.4 | 36.5 | 8.0 | 39.0 | 48.9 | 73.9 | 25.0 | 100 | 0 | |
| Vert. | 9648.000 | PK | 41.7 | 38.4 | 9.2 | 37.2 | 52.1 | 73.9 | 21.8 | 100 | 0 | |
| Vert. | 12060.000 | PK | 41.6 | 39.3 | 10.5 | 37.9 | 53.5 | 73.9 | 20.4 | 100 | 0 | |
| Vert. | 2390.000 | AV | 42.5 | 27.2 | 14.1 | 38.2 | 45.6 | 53.9 | 8.3 | 100 | 182 | |
| Vert. | 4824.000 | AV | 31.5 | 31.2 | 6.6 | 37.0 | 32.3 | 53.9 | 21.6 | 100 | 248 | |
| Vert. | 7236.000 | AV | 32.4 | 36.5 | 8.0 | 39.0 | 37.9 | 53.9 | 16.0 | 100 | 0 | |
| Vert. | 9648.000 | AV | 30.7 | 38.4 | 9.2 | 37.2 | 41.1 | 53.9 | 12.8 | 100 | 0 | |
| Vert. | 12060.000 | AV | 31.2 | 39.3 | 10.5 | 37.9 | 43.1 | 53.9 | 10.8 | 100 | 0 | |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - 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 | 86.5 | 27.3 | 14.1 | 38.2 | 89.7 | - | - | Carrier |
| Hori. | 2397.306 | PK | 55.9 | 27.2 | 14.1 | 38.2 | 59.0 | 69.7 | 10.7 | |
| Hori. | 2400.000 | PK | 56.4 | 27.3 | 14.1 | 38.2 | 59.6 | 69.7 | 10.1 | |
| Vert. | 2412.000 | PK | 87.8 | 27.3 | 14.1 | 38.2 | 91.0 | - | - | Carrier |
| Vert. | 2397.306 | PK | 56.9 | 27.2 | 14.1 | 38.2 | 60.0 | 71.0 | 11.0 | |
| Vert. | 2400.000 | PK | 57.6 | 27.3 | 14.1 | 38.2 | 60.8 | 71.0 | 10.2 | |

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

Although the carrier level seems to differ with the level at the measurement of peak output power, that is caused by the difference of test instrument; i.e. Peak power meter (BW:50MHz) and Spectrum analyzer (RBW:100kHz).

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.2 and No.3 Semi Anechoic Chamber
 Date June 9, 2012 June 10, 2012
 Temperature / Humidity 24 deg.C , 58%RH 25 deg.C , 60%RH
 Engineer Akio Hayashi Shinichi Takano
 Mode Tx, 2437 MHz
 Tx, IEEE802.11n (HT20), PN9, worst data mode 3(MCS)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|-----------------|----------------------------|
| Hori. | 4874.000 | PK | 43.0 | 31.3 | 6.6 | 36.9 | 44.0 | 73.9 | 29.9 | 100 | 165 | PK:VBW 3MHz AV:VBW 10Hz |
| Hori. | 7311.000 | PK | 44.4 | 36.7 | 8.2 | 39.0 | 50.3 | 73.9 | 23.6 | 100 | 0 | |
| Hori. | 9748.000 | PK | 41.4 | 38.6 | 9.3 | 37.2 | 52.1 | 73.9 | 21.8 | 100 | 186 | |
| Hori. | 12185.000 | PK | 41.2 | 39.4 | 10.5 | 37.7 | 53.4 | 73.9 | 20.5 | 100 | 0 | |
| Hori. | 4874.000 | AV | 31.0 | 31.3 | 6.6 | 36.9 | 32.0 | 53.9 | 21.9 | 100 | 165 | |
| Hori. | 7311.000 | AV | 32.5 | 36.7 | 8.2 | 39.0 | 38.4 | 53.9 | 15.5 | 100 | 0 | |
| Hori. | 9748.000 | AV | 31.1 | 38.6 | 9.3 | 37.2 | 41.8 | 53.9 | 12.1 | 100 | 186 | |
| Hori. | 12185.000 | AV | 30.7 | 39.4 | 10.5 | 37.7 | 42.9 | 53.9 | 11.0 | 100 | 0 | |
| Vert. | 4874.000 | PK | 42.3 | 31.3 | 6.6 | 36.9 | 43.3 | 73.9 | 30.6 | 100 | 228 | |
| Vert. | 7311.000 | PK | 43.4 | 36.7 | 8.2 | 39.0 | 49.3 | 73.9 | 24.6 | 100 | 0 | |
| Vert. | 9748.000 | PK | 42.7 | 38.6 | 9.3 | 37.2 | 53.4 | 73.9 | 20.5 | 139 | 214 | |
| Vert. | 12185.000 | PK | 42.1 | 39.4 | 10.5 | 37.7 | 54.3 | 73.9 | 19.6 | 100 | 0 | |
| Vert. | 4874.000 | AV | 31.1 | 31.3 | 6.6 | 36.9 | 32.1 | 53.9 | 21.8 | 100 | 228 | |
| Vert. | 7311.000 | AV | 32.4 | 36.7 | 8.2 | 39.0 | 38.3 | 53.9 | 15.6 | 100 | 0 | |
| Vert. | 9748.000 | AV | 31.1 | 38.6 | 9.3 | 37.2 | 41.8 | 53.9 | 12.1 | 139 | 214 | |
| Vert. | 12185.000 | AV | 30.7 | 39.4 | 10.5 | 37.7 | 42.9 | 53.9 | 11.0 | 100 | 0 | |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - 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.2 and No.3 Semi Anechoic Chamber
 Date June 9, 2012 June 10, 2012
 Temperature / Humidity 24 deg.C , 58%RH 25 deg.C , 60%RH
 Engineer Akio Hayashi Shinichi Takano
 Mode Tx, 2462 MHz
 Tx, IEEE802.11n (HT20), PN9, worst data mode 3(MCS)

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

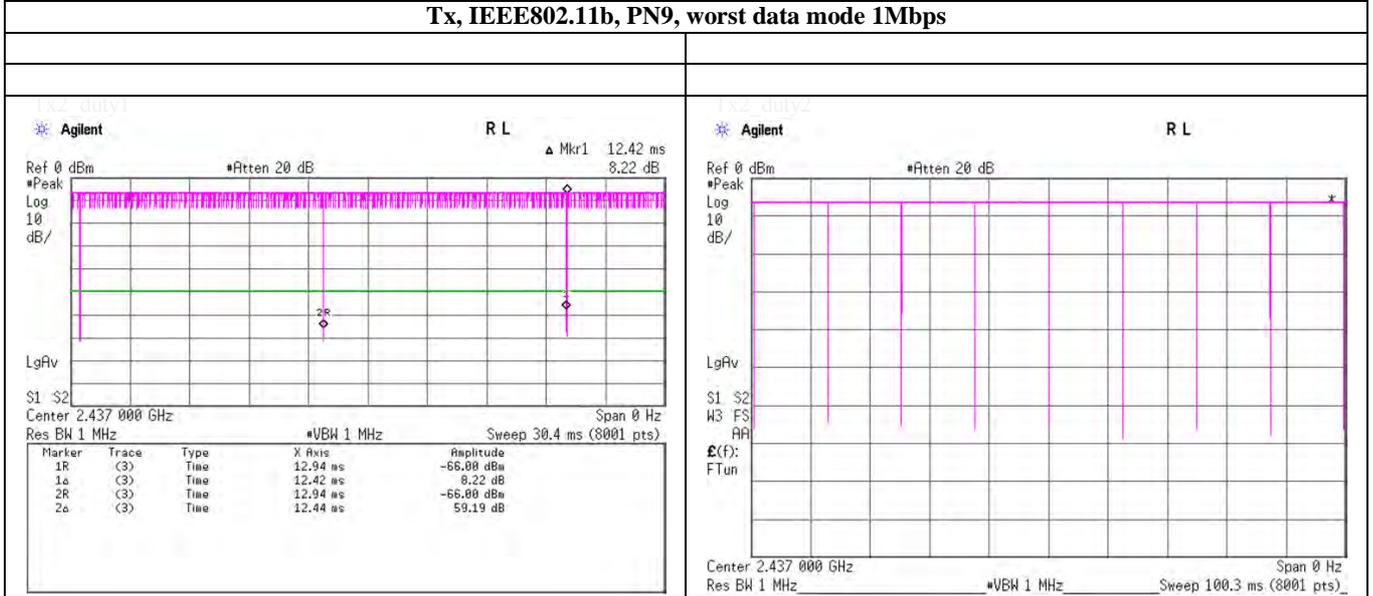
| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|--------------|-------------|
| Hori. | 2483.500 | PK | 56.8 | 27.5 | 14.1 | 38.1 | 60.3 | 73.9 | 13.6 | 100 | 193 | PK:VBW 3MHz |
| Hori. | 4924.000 | PK | 42.1 | 31.5 | 6.6 | 36.9 | 43.3 | 73.9 | 30.6 | 100 | 164 | AV:VBW 10Hz |
| Hori. | 7386.000 | PK | 43.7 | 36.9 | 8.3 | 39.0 | 49.9 | 73.9 | 24.0 | 100 | 0 | |
| Hori. | 9848.000 | PK | 42.1 | 38.8 | 9.3 | 37.2 | 53.0 | 73.9 | 20.9 | 100 | 185 | |
| Hori. | 12310.000 | PK | 41.0 | 39.4 | 10.7 | 37.6 | 53.5 | 73.9 | 20.4 | 100 | 0 | |
| Hori. | 2483.500 | AV | 43.2 | 27.5 | 14.1 | 38.1 | 46.7 | 53.9 | 7.2 | 100 | 193 | |
| Hori. | 4924.000 | AV | 30.7 | 31.5 | 6.6 | 36.9 | 31.9 | 53.9 | 22.0 | 100 | 164 | |
| Hori. | 7386.000 | AV | 32.6 | 36.9 | 8.3 | 39.0 | 38.8 | 53.9 | 15.1 | 100 | 0 | |
| Hori. | 9848.000 | AV | 31.4 | 38.8 | 9.3 | 37.2 | 42.3 | 53.9 | 11.6 | 100 | 185 | |
| Hori. | 12310.000 | AV | 30.4 | 39.4 | 10.7 | 37.6 | 42.9 | 53.9 | 11.0 | 100 | 0 | |
| Vert. | 2483.500 | PK | 56.1 | 27.5 | 14.1 | 38.1 | 59.6 | 73.9 | 14.3 | 100 | 220 | |
| Vert. | 4924.000 | PK | 41.8 | 31.5 | 6.6 | 36.9 | 43.0 | 73.9 | 30.9 | 100 | 241 | |
| Vert. | 7386.000 | PK | 43.3 | 36.9 | 8.3 | 39.0 | 49.5 | 73.9 | 24.4 | 100 | 0 | |
| Vert. | 9848.000 | PK | 42.3 | 38.8 | 9.3 | 37.2 | 53.2 | 73.9 | 20.7 | 100 | 213 | |
| Vert. | 12310.000 | PK | 42.1 | 39.4 | 10.7 | 37.6 | 54.6 | 73.9 | 19.3 | 100 | 0 | |
| Vert. | 2483.500 | AV | 42.5 | 27.5 | 14.1 | 38.1 | 46.0 | 53.9 | 7.9 | 100 | 220 | |
| Vert. | 4924.000 | AV | 30.8 | 31.5 | 6.6 | 36.9 | 32.0 | 53.9 | 21.9 | 100 | 241 | |
| Vert. | 7386.000 | AV | 32.6 | 36.9 | 8.3 | 39.0 | 38.8 | 53.9 | 15.1 | 100 | 0 | |
| Vert. | 9848.000 | AV | 31.3 | 38.8 | 9.3 | 37.2 | 42.2 | 53.9 | 11.7 | 100 | 213 | |
| Vert. | 12310.000 | AV | 30.5 | 39.4 | 10.7 | 37.6 | 43.0 | 53.9 | 10.9 | 100 | 0 | |

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

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

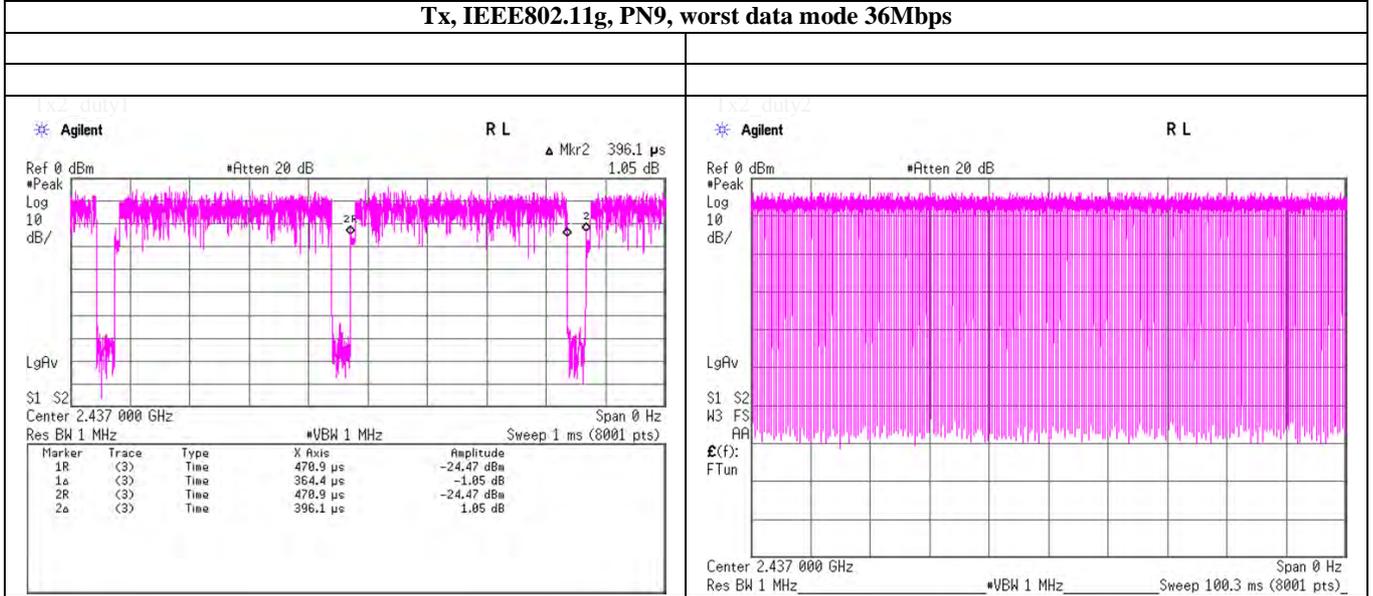
UL Japan, Inc.
Shonan EMC Lab.
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Burst Rate Confirmation



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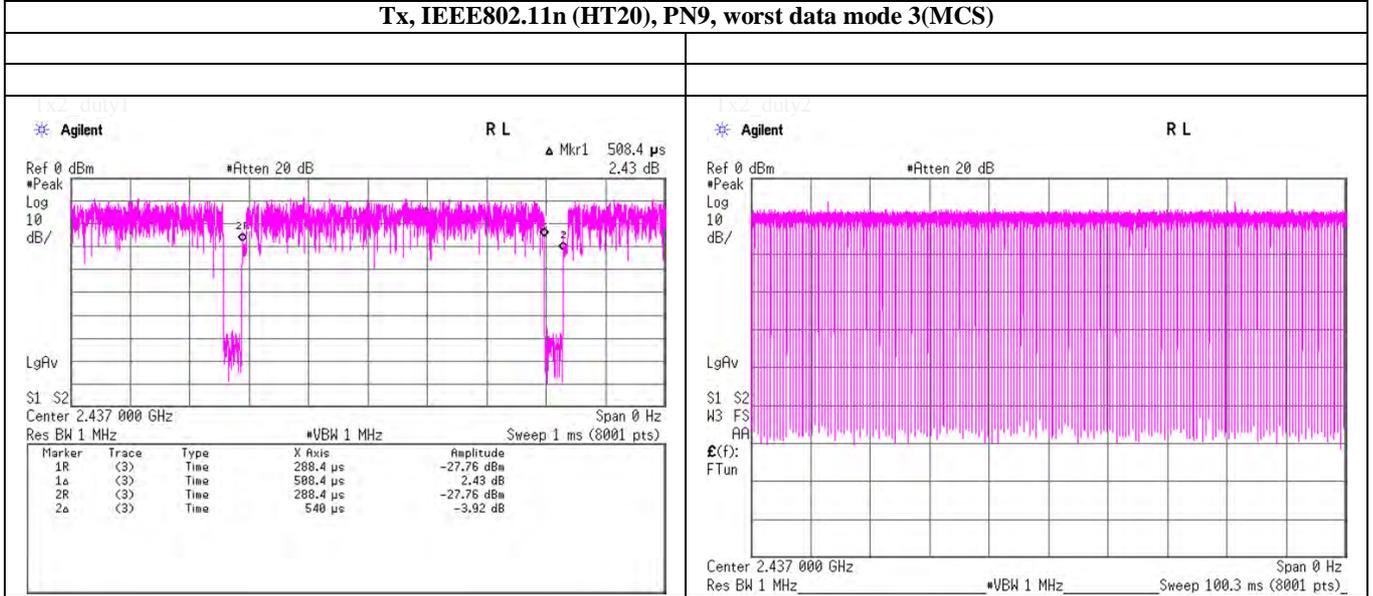
Burst Rate Confirmation



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Burst Rate Confirmation

Tx, IEEE802.11n (HT20), PN9, worst data mode 3(MCS)



UL Japan, Inc.

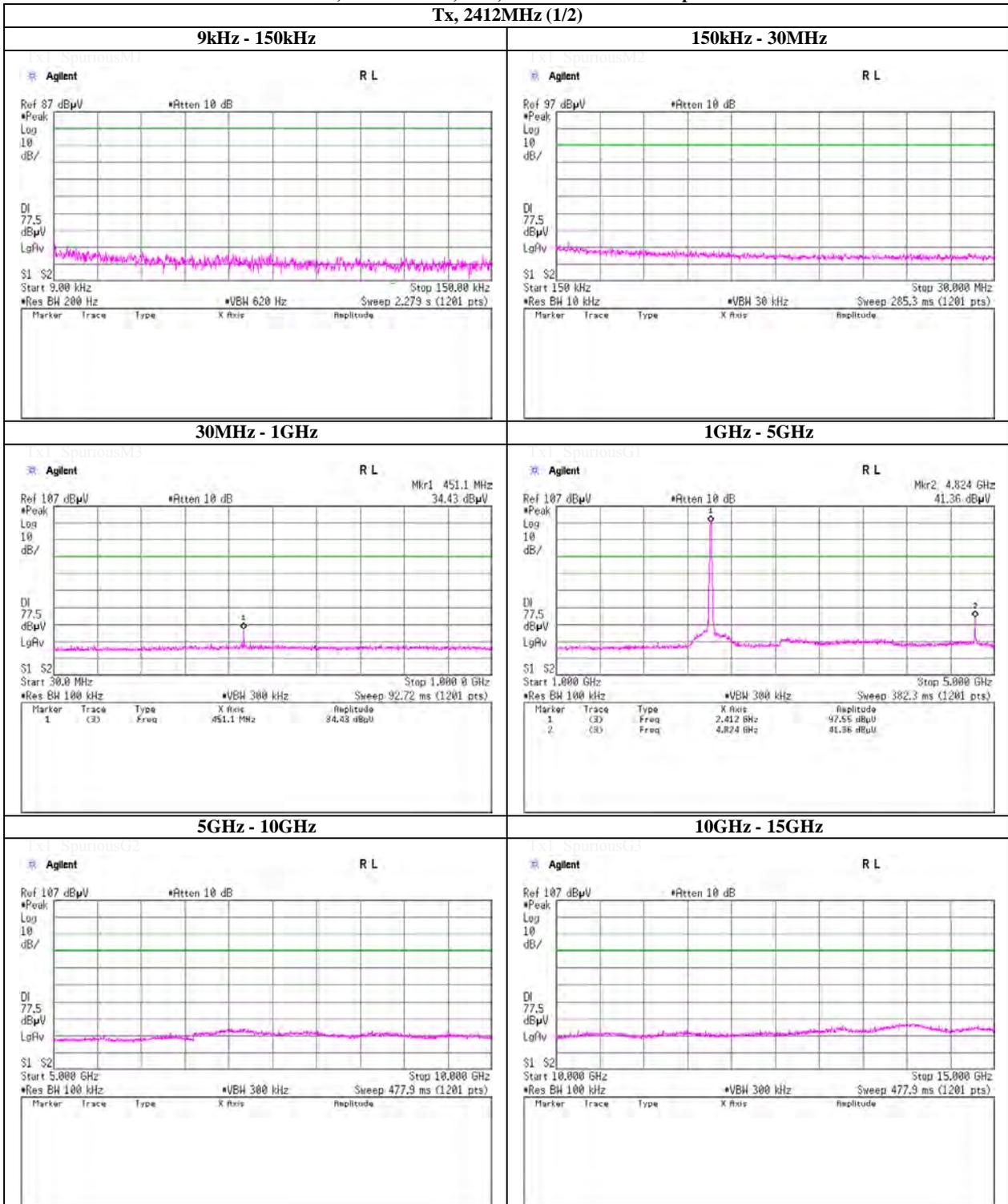
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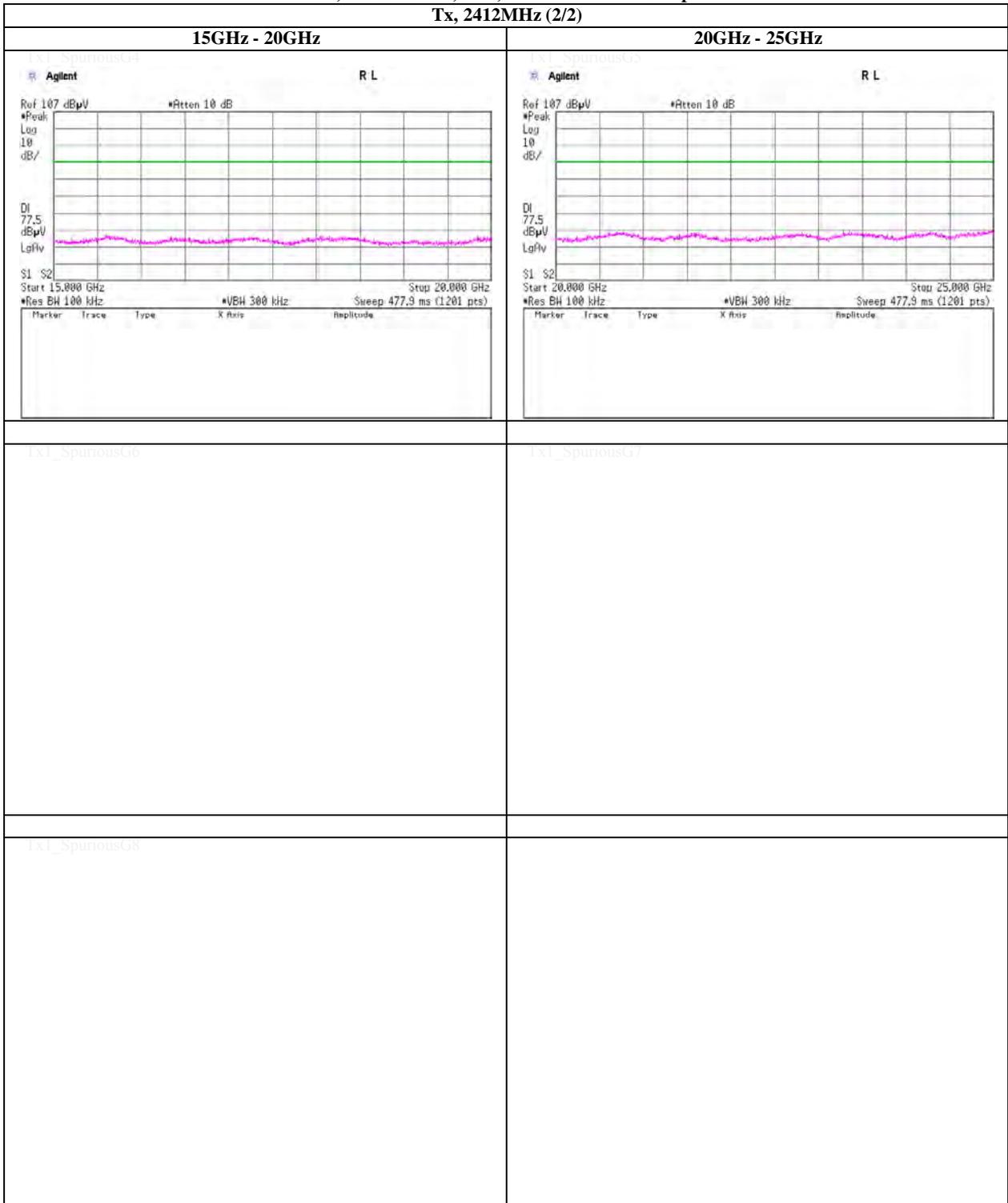
Spurious emission (Conducted)
Tx, IEEE802.11b, PN9, worst data mode 1Mbps



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

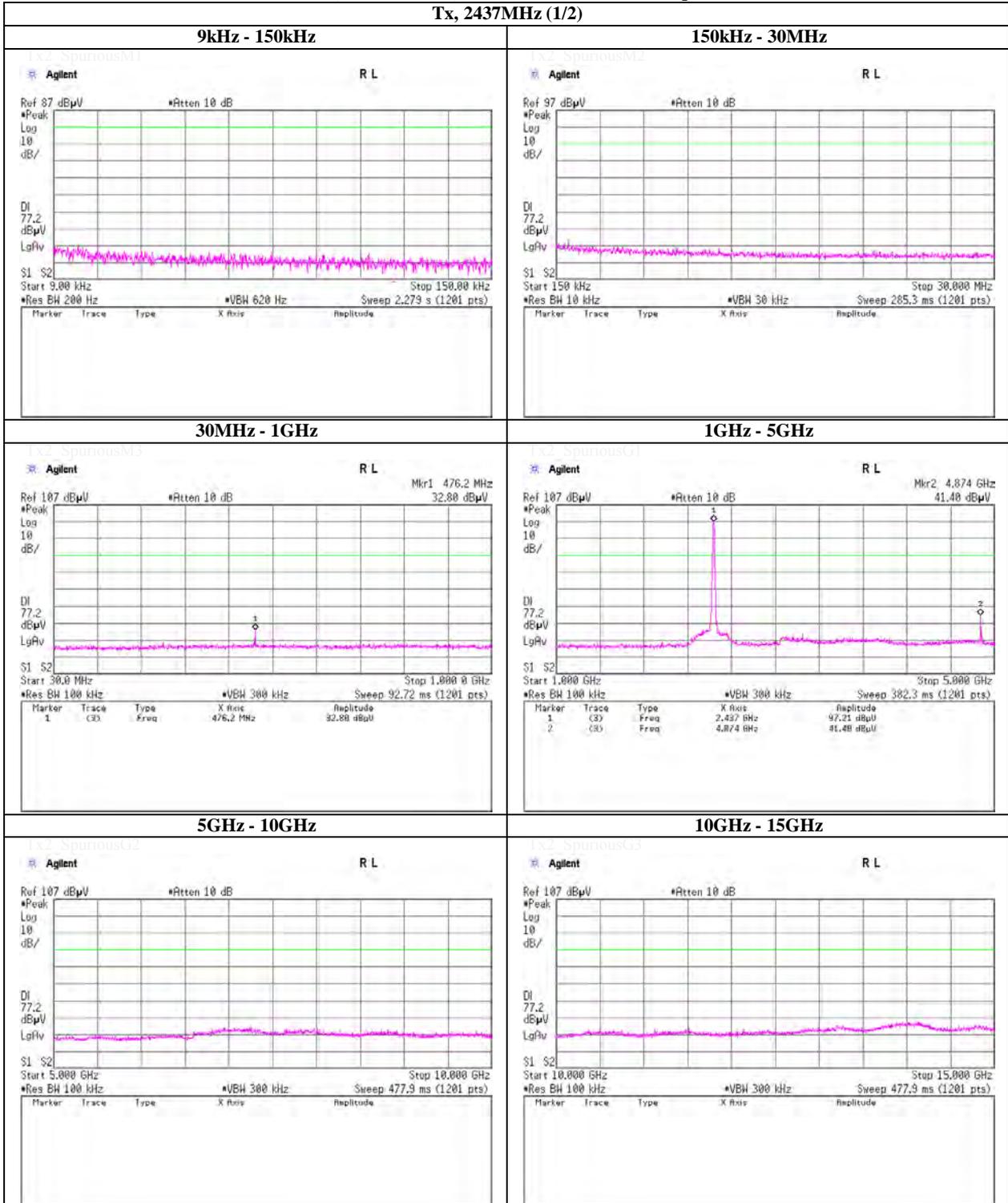
Tx, 2412MHz (2/2)



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

Tx, 2437MHz (1/2)



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

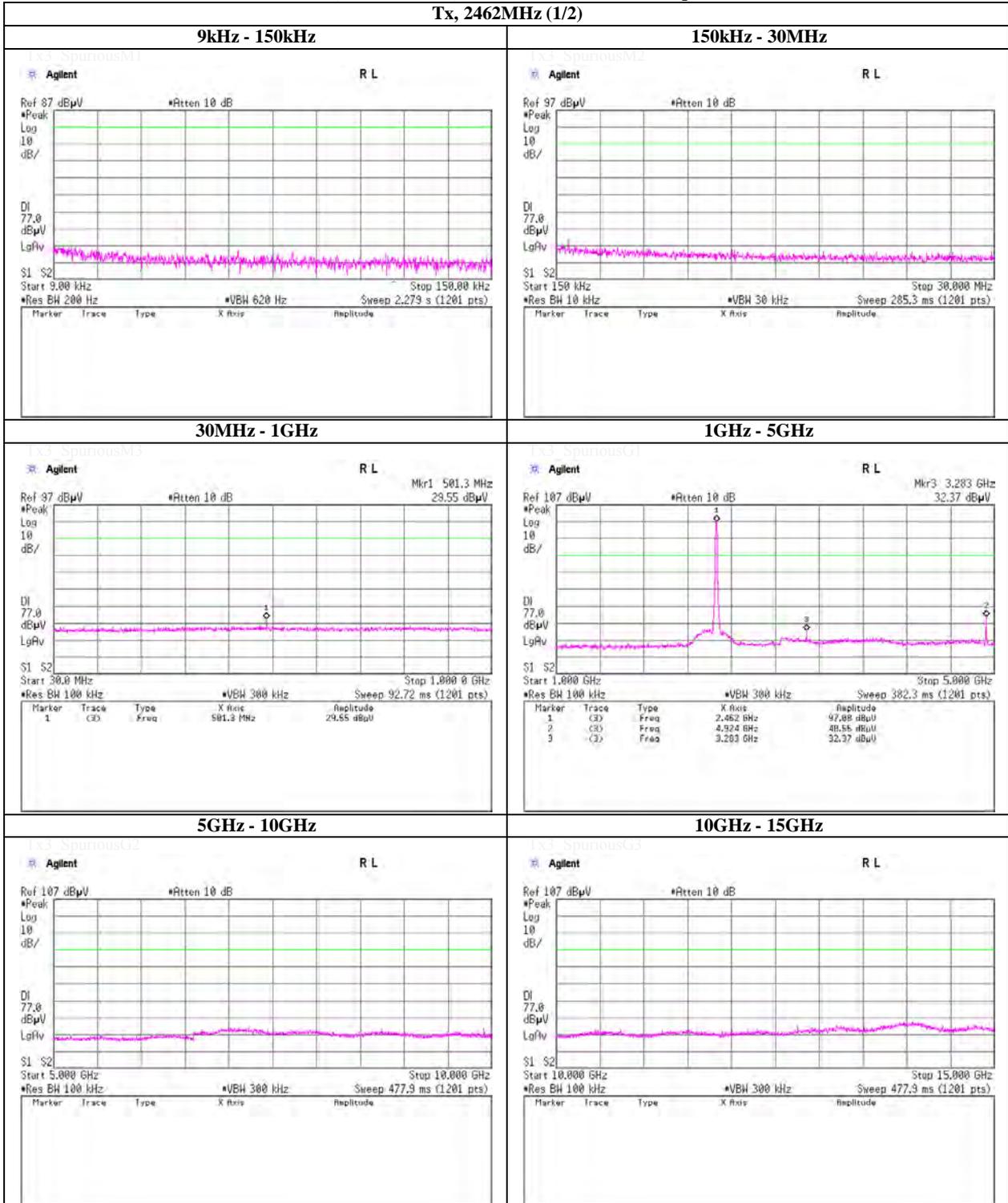
Tx, 2437MHz (2/2)



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

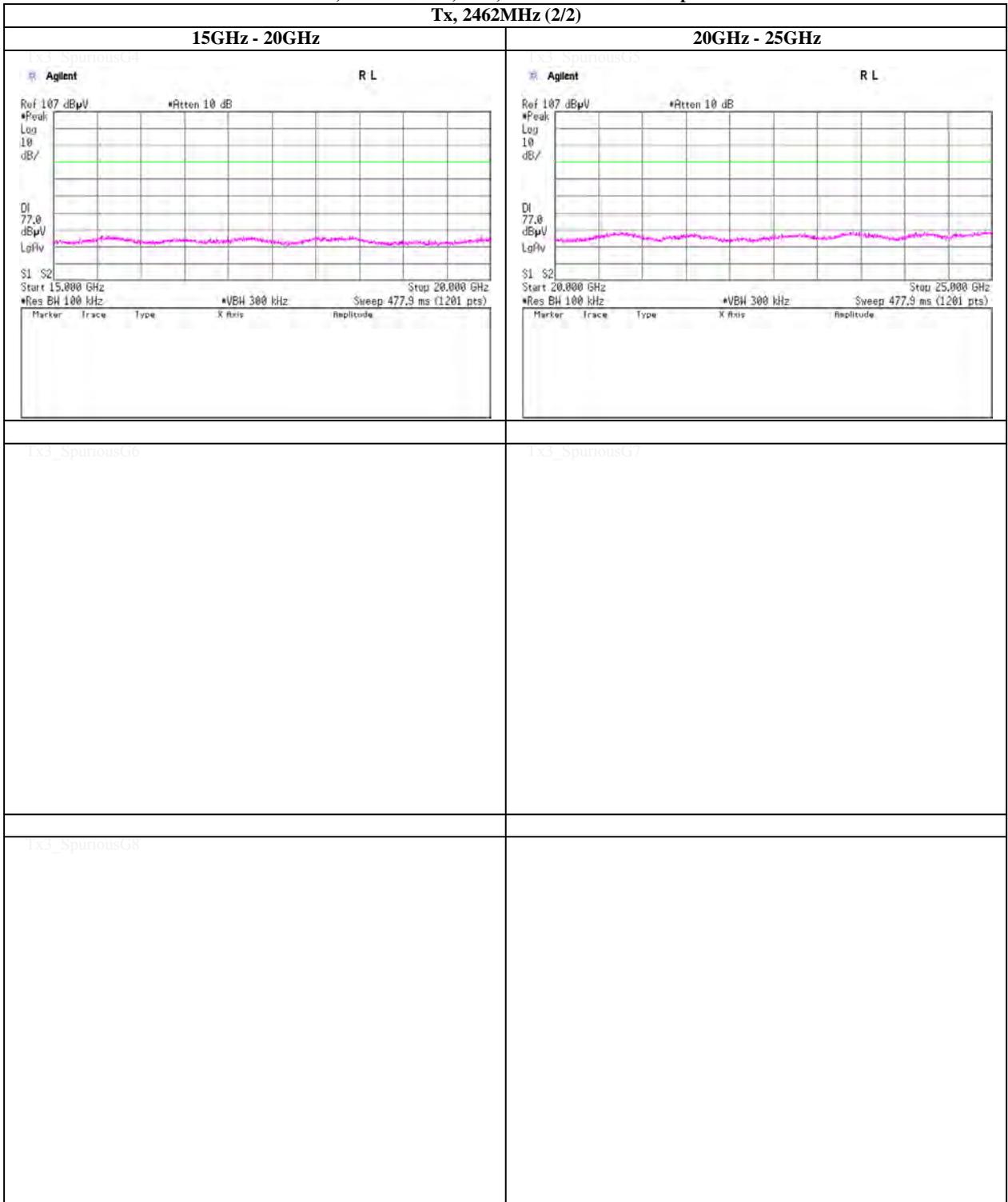
Tx, 2462MHz (1/2)



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

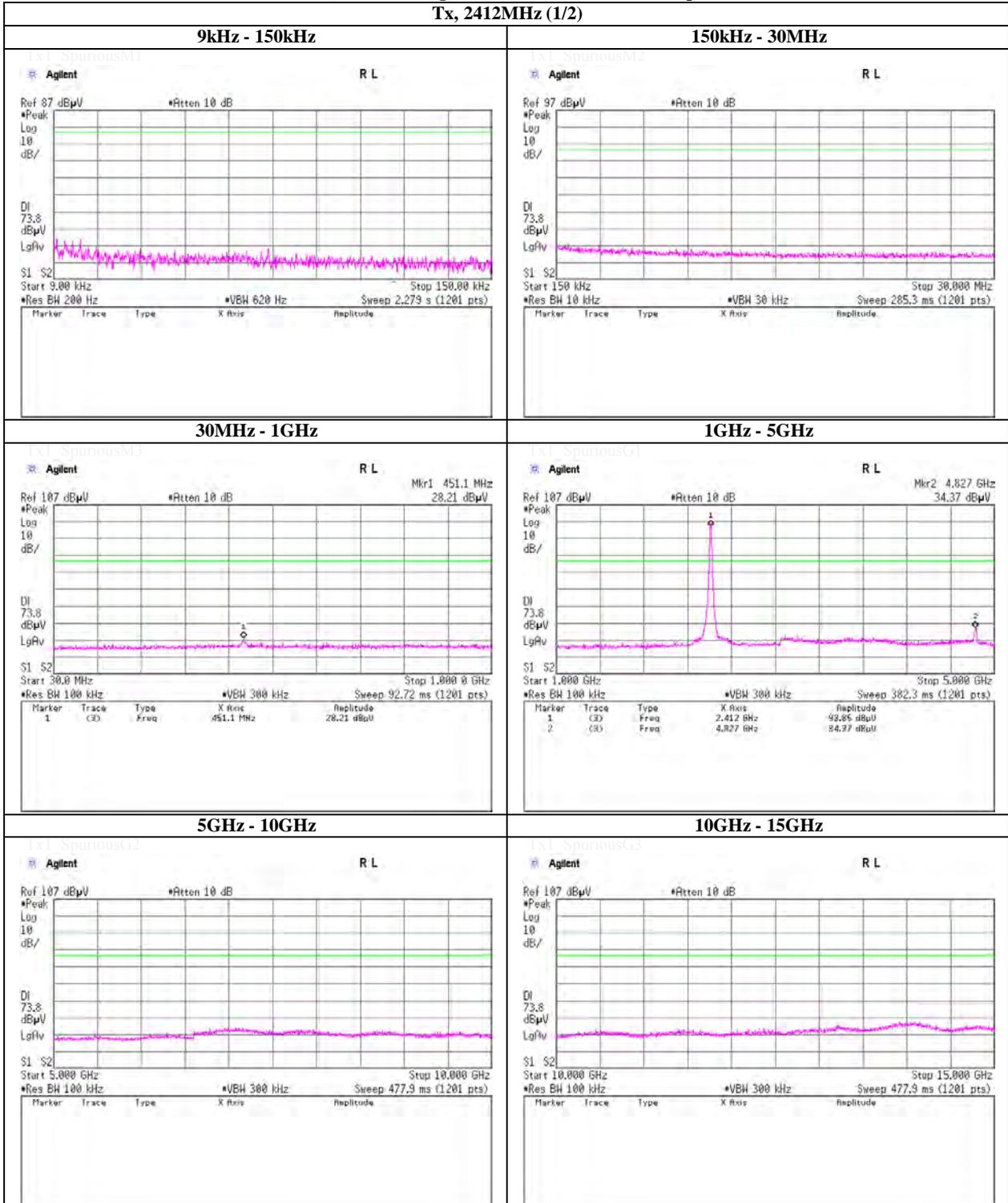
Tx, 2462MHz (2/2)



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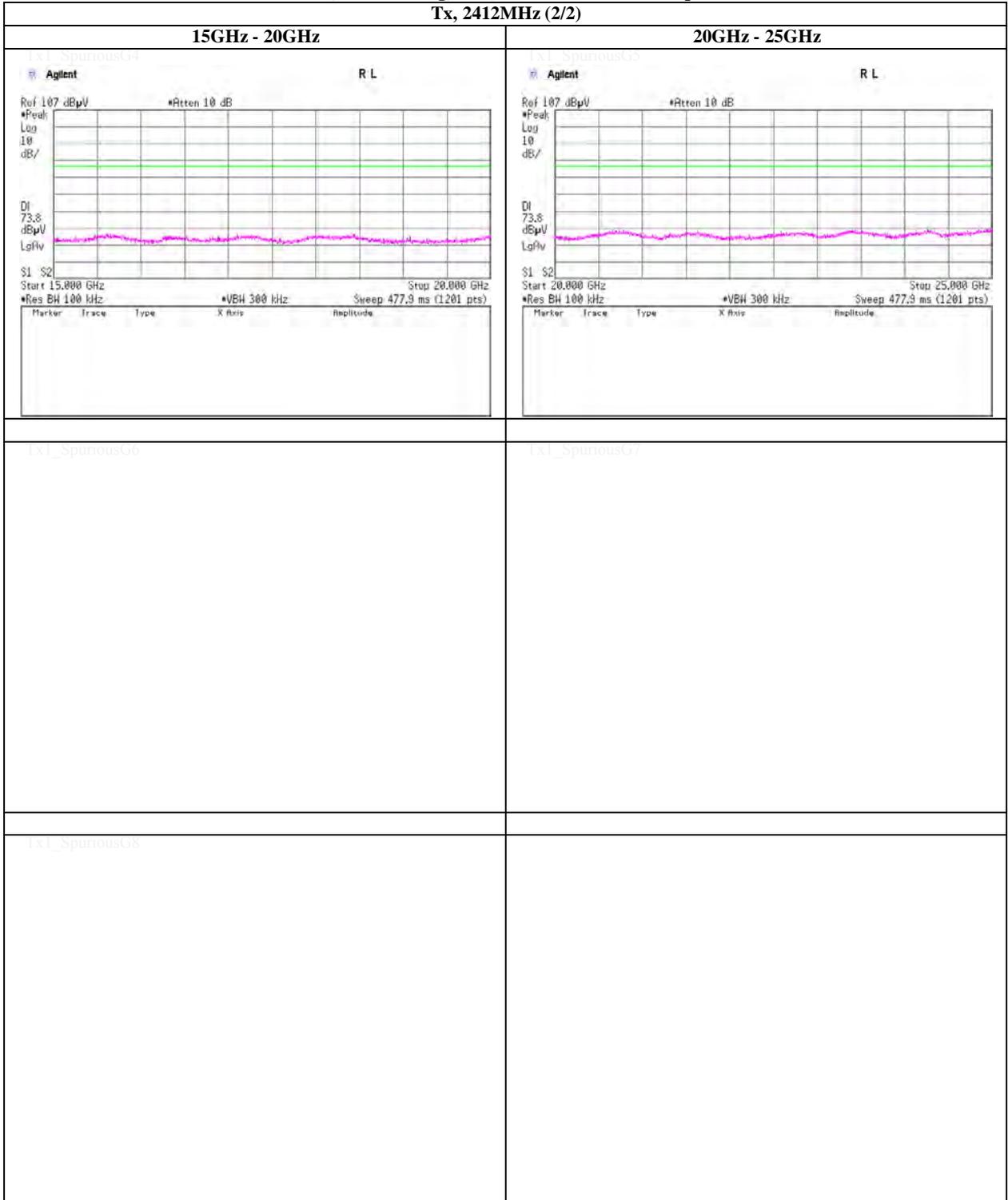
Spurious emission (Conducted)
Tx, IEEE802.11g, PN9, worst data mode 36Mbps

Tx, 2412MHz (1/2)



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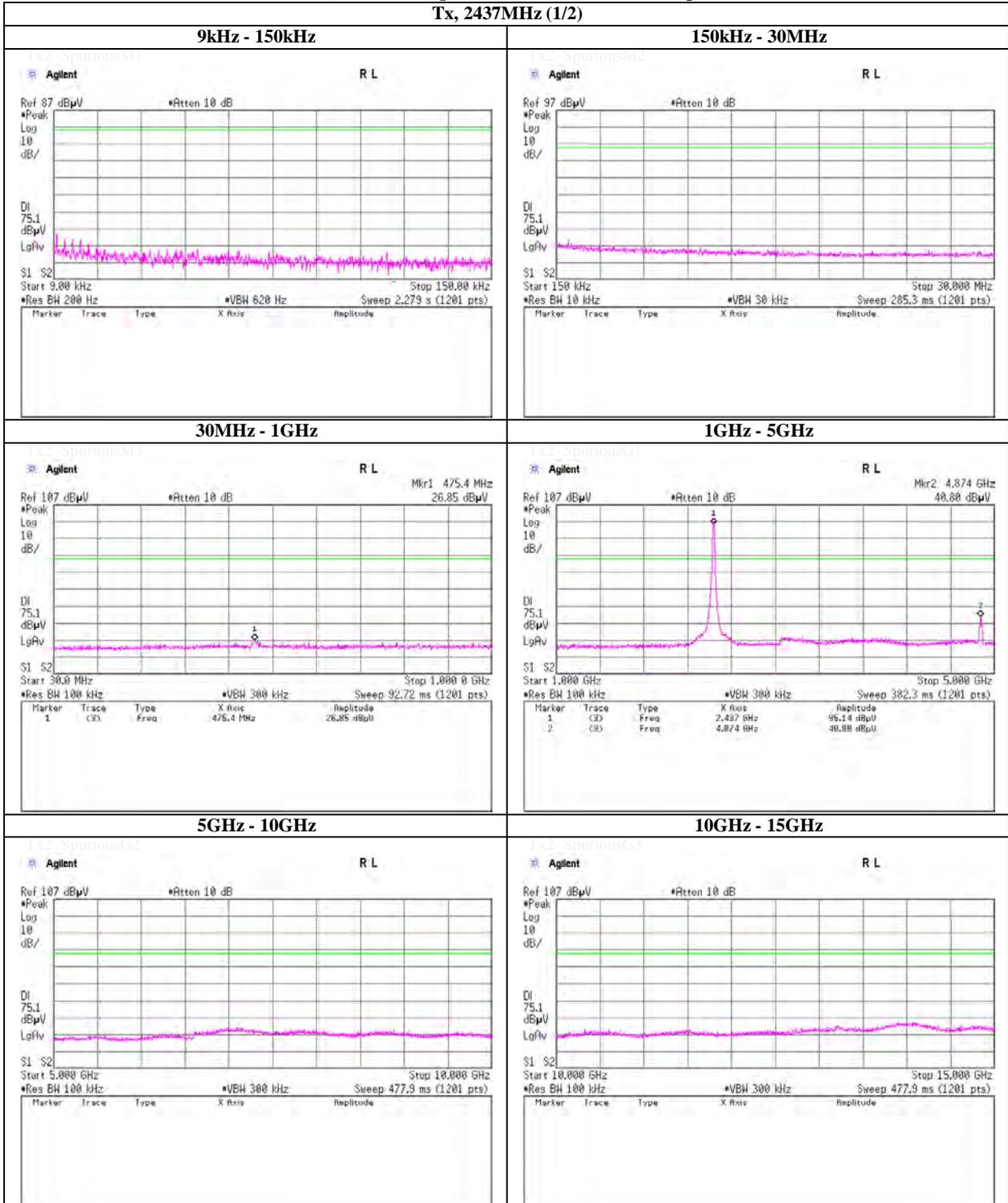
Spurious emission (Conducted)
Tx, IEEE802.11g, PN9, worst data mode 36Mbps
Tx, 2412MHz (2/2)



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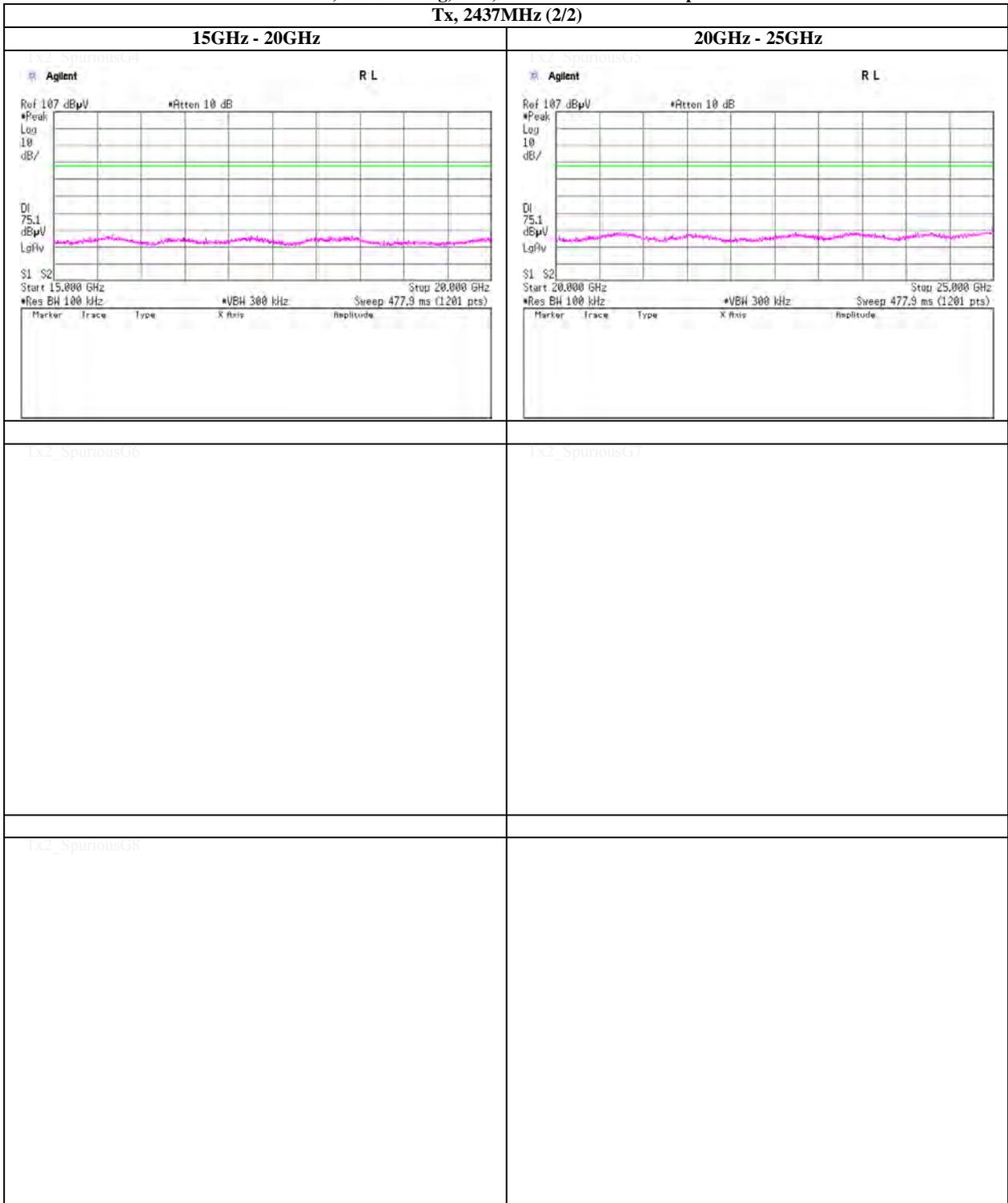
Spurious emission (Conducted)
 Tx, IEEE802.11g, PN9, worst data mode 36Mbps

Tx, 2437MHz (1/2)



UL Japan, Inc.
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 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
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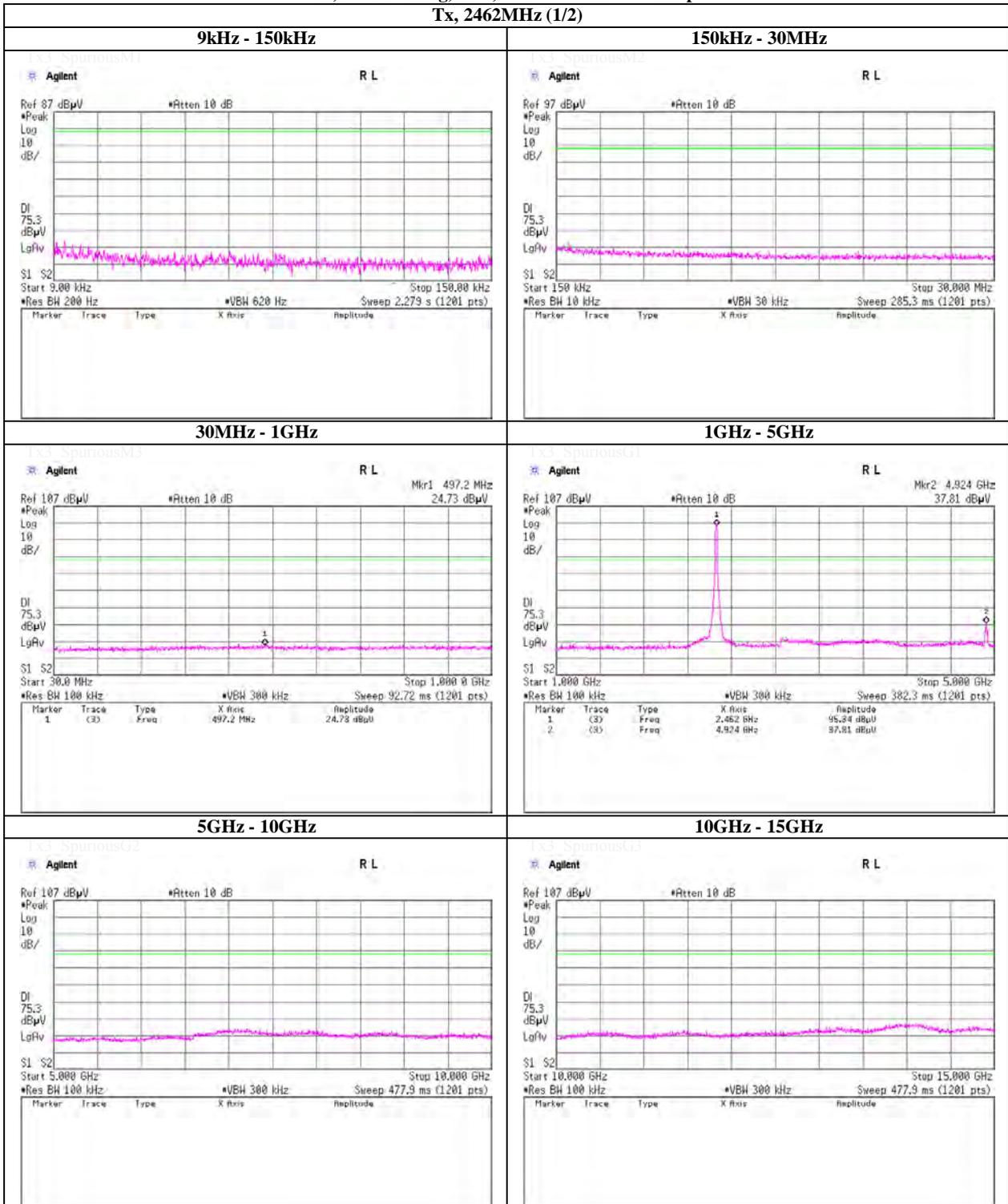
Spurious emission (Conducted)
Tx, IEEE802.11g, PN9, worst data mode 36Mbps
Tx, 2437MHz (2/2)



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Spurious emission (Conducted)
 Tx, IEEE802.11g, PN9, worst data mode 36Mbps

Tx, 2462MHz (1/2)



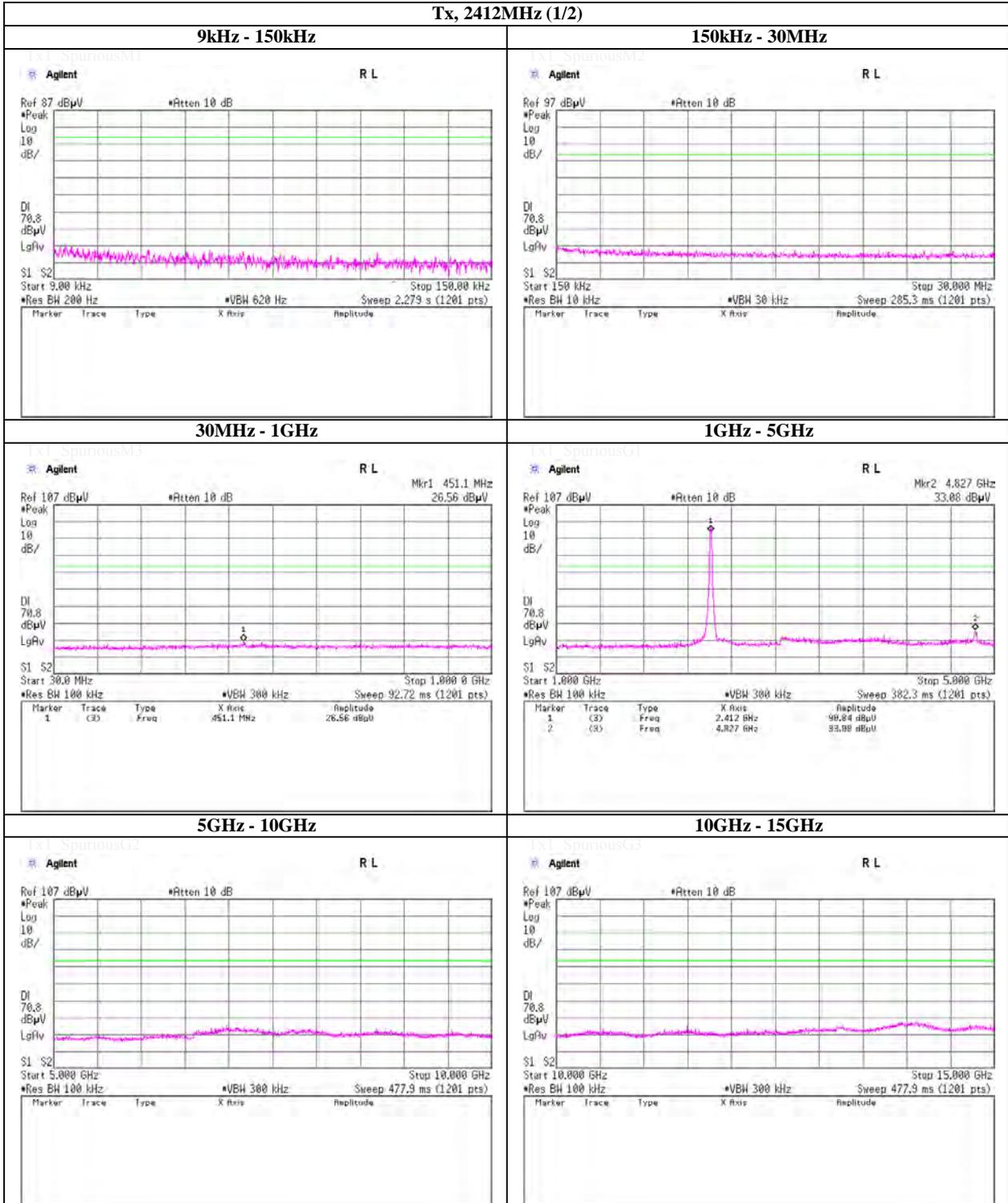
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Shonan EMC Lab.
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 Telephone : +81 463 50 6400
 Facsimile : +81 463 50 6401

Spurious emission (Conducted)
Tx, IEEE802.11g, PN9, worst data mode 36Mbps
Tx, 2462MHz (2/2)



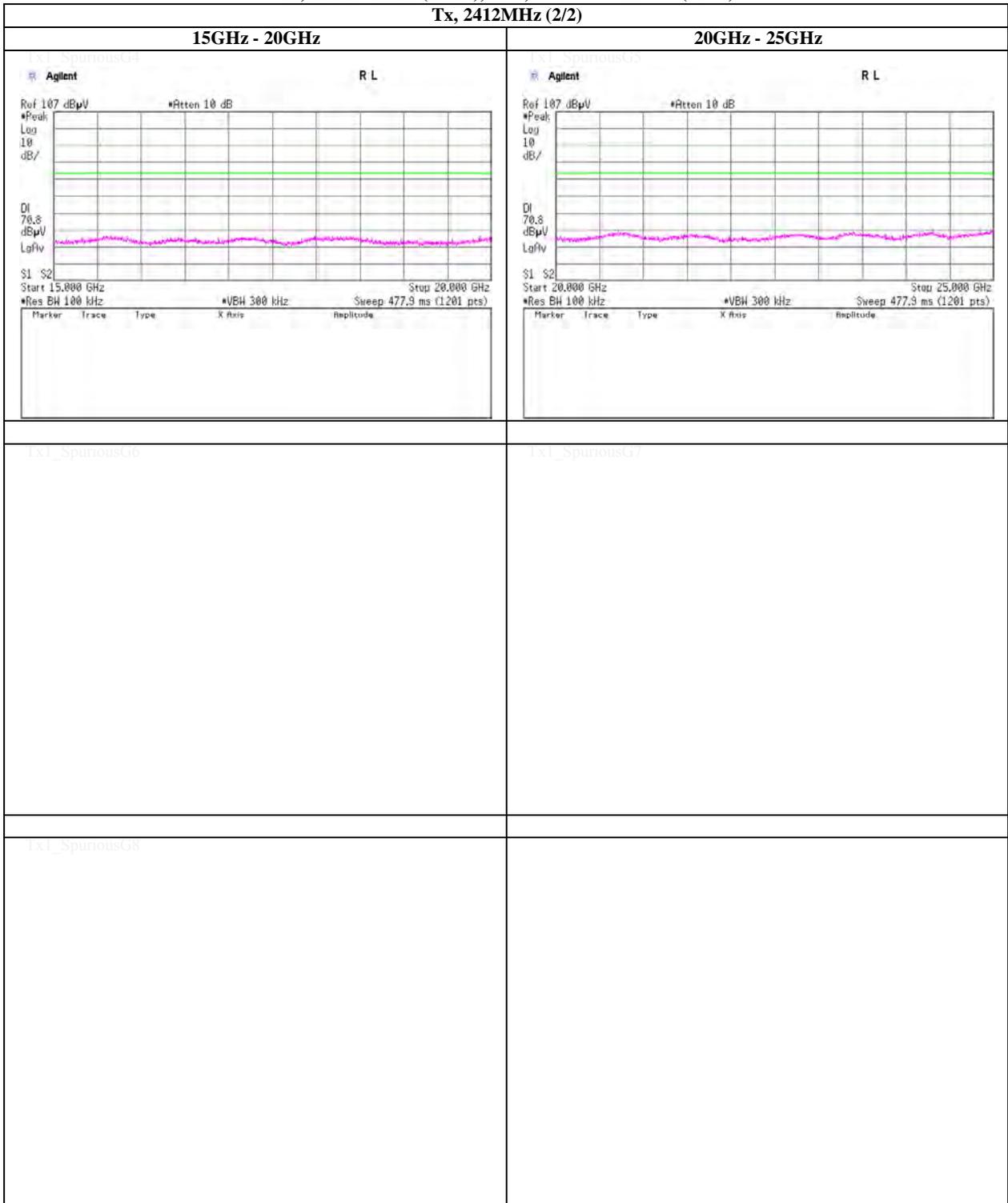
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Spurious emission (Conducted)
Tx, IEEE802.11n (HT20), PN9, worst data mode 3(MCS)
Tx, 2412MHz (1/2)



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Spurious emission (Conducted)
Tx, IEEE802.11n (HT20), PN9, worst data mode 3(MCS)
Tx, 2412MHz (2/2)

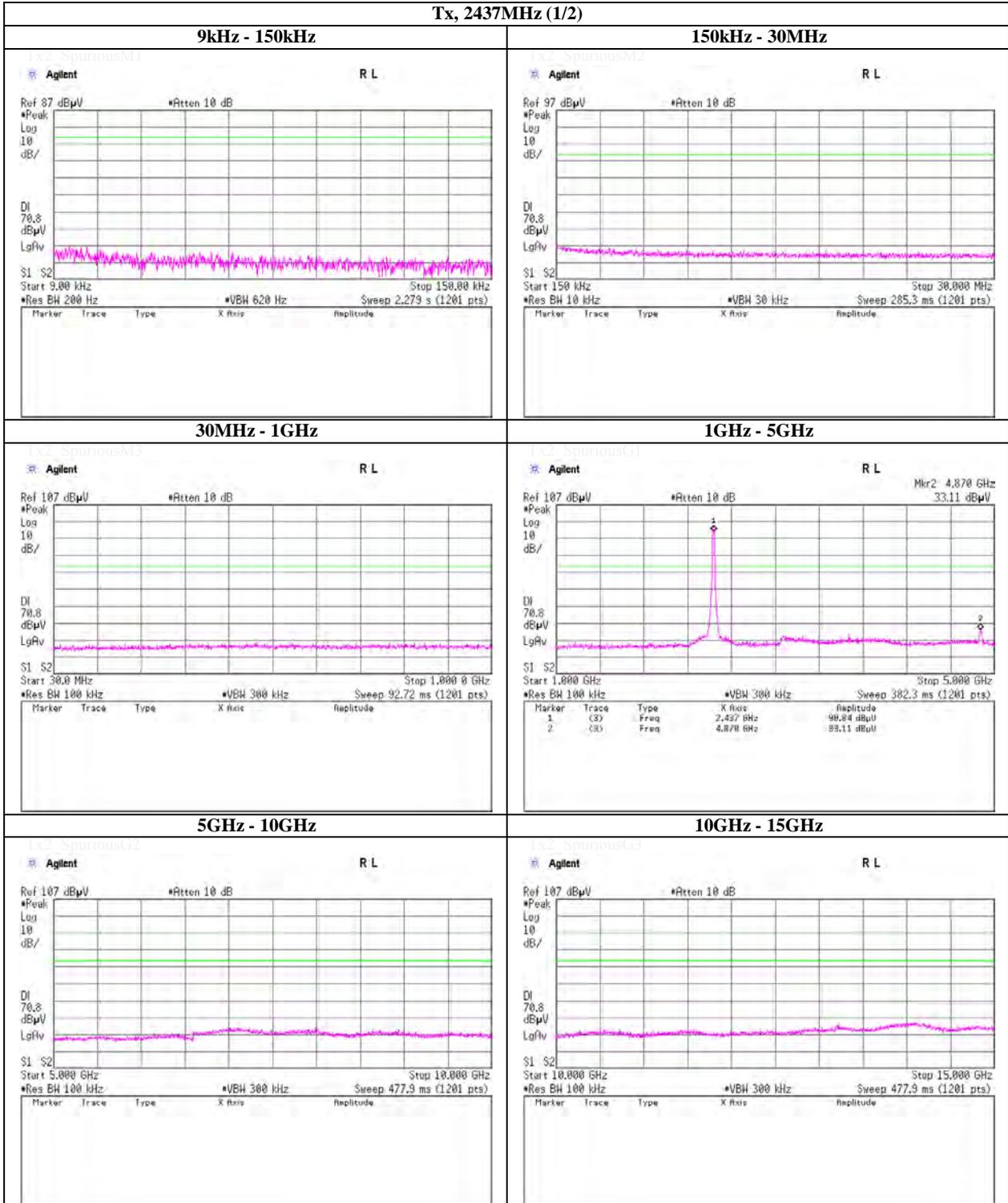


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Spurious emission (Conducted)

Tx, IEEE802.11n (HT20), PN9, worst data mode 3(MCS)

Tx, 2437MHz (1/2)



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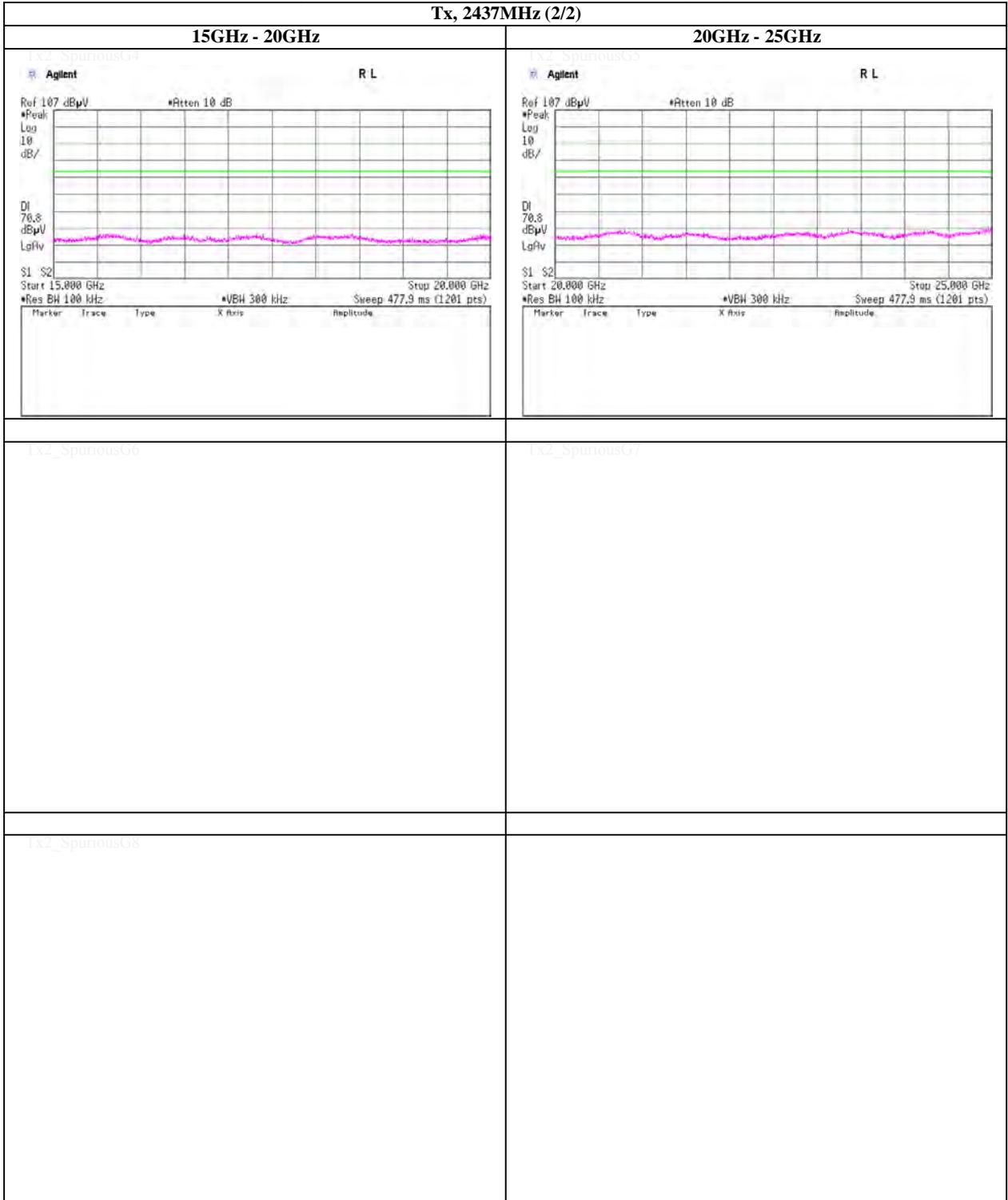
Telephone : +81 463 50 6400

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Spurious emission (Conducted)

Tx, IEEE802.11n (HT20), PN9, worst data mode 3(MCS)

Tx, 2437MHz (2/2)



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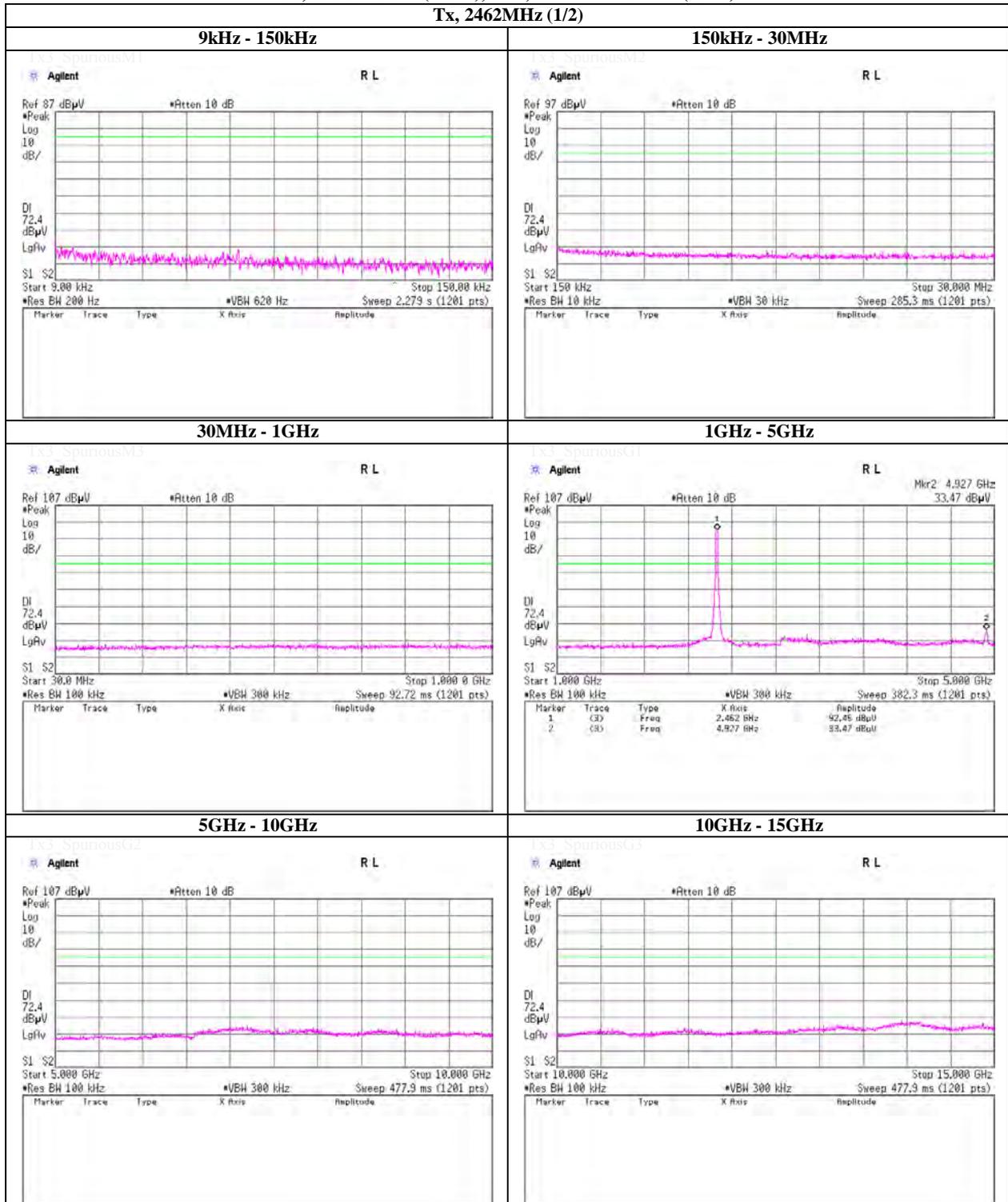
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)
 Tx, IEEE802.11n (HT20), PN9, worst data mode 3(MCS)

Tx, 2462MHz (1/2)

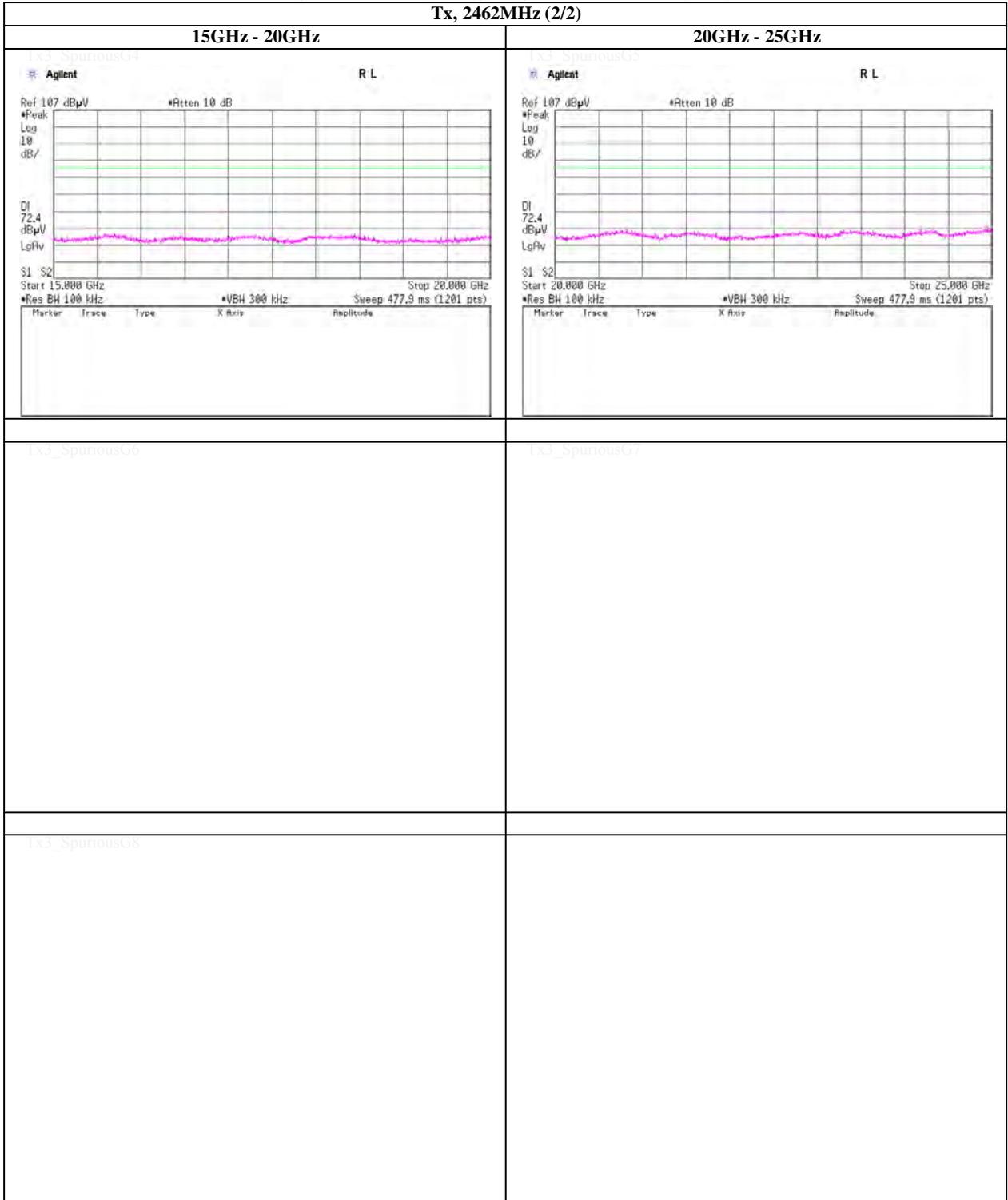


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Spurious emission (Conducted)

Tx, IEEE802.11n (HT20), PN9, worst data mode 3(MCS)

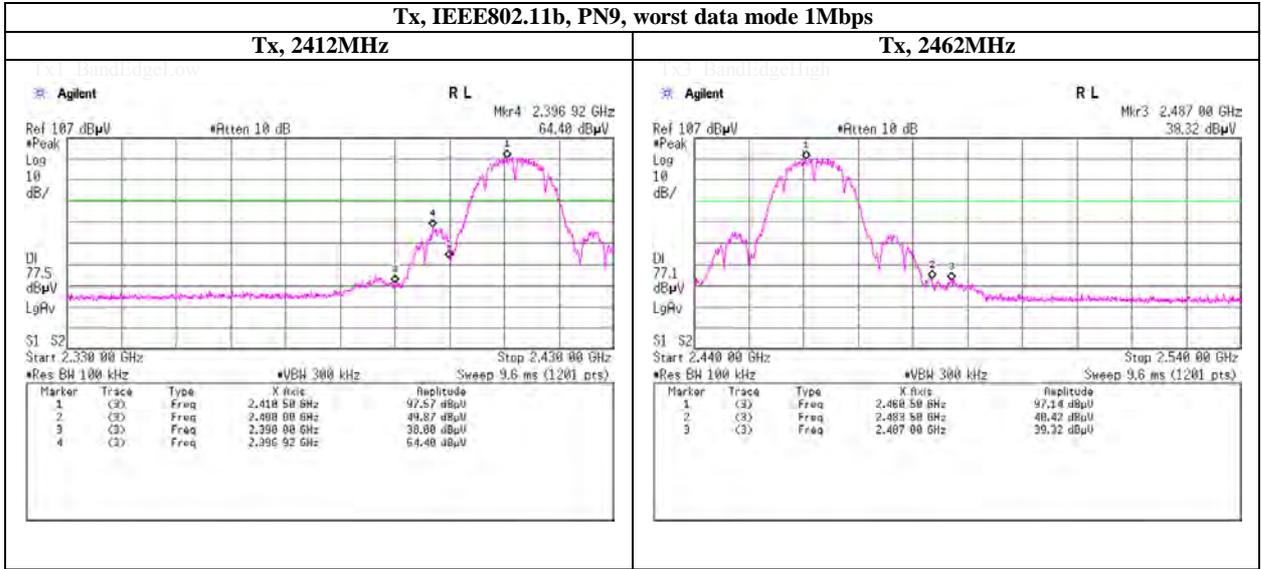
Tx, 2462MHz (2/2)



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Spurious emission (Conducted)

Band Edge compliance



UL Japan, Inc.

Shonan EMC Lab.

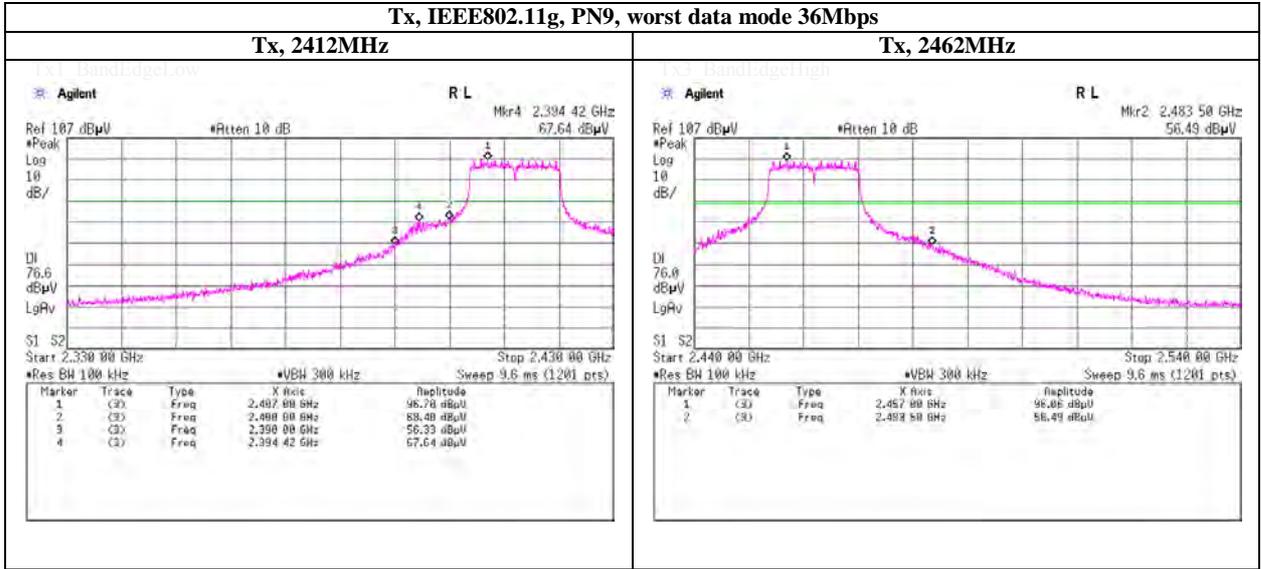
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Band Edge compliance



UL Japan, Inc.

Shonan EMC Lab.

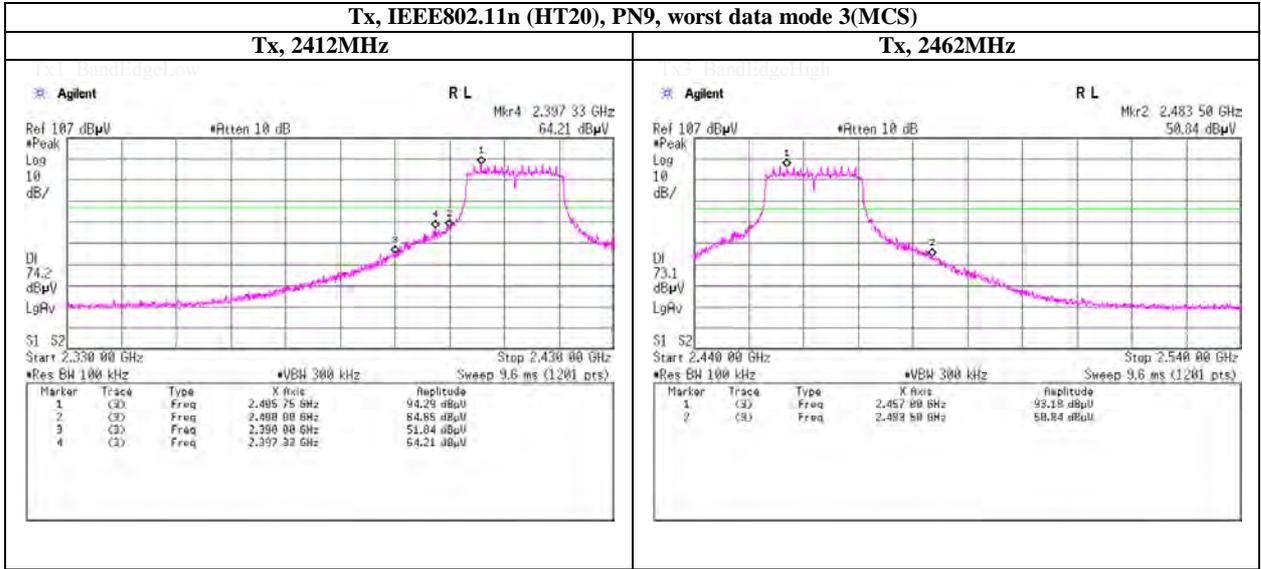
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Spurious emission (Conducted)

Band Edge compliance



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Power Density (Radiated)

| | | |
|------------------------|----------------------------------------|-----------------------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.3 Semi-Anechoic Chamber |
| Date | June 6, 2012 | |
| Temperature / Humidity | 26deg.C / 53%RH | |
| Engineer | Tatsuya Arai | Test Distance: 3 m |
| Mode | Tx, IEEE802.11b, worst data mode 1Mbps | EUT Antenna Gain: 0.90dBi (1.230) |
| | Worst axis = Z-axis, Horizontal, | |

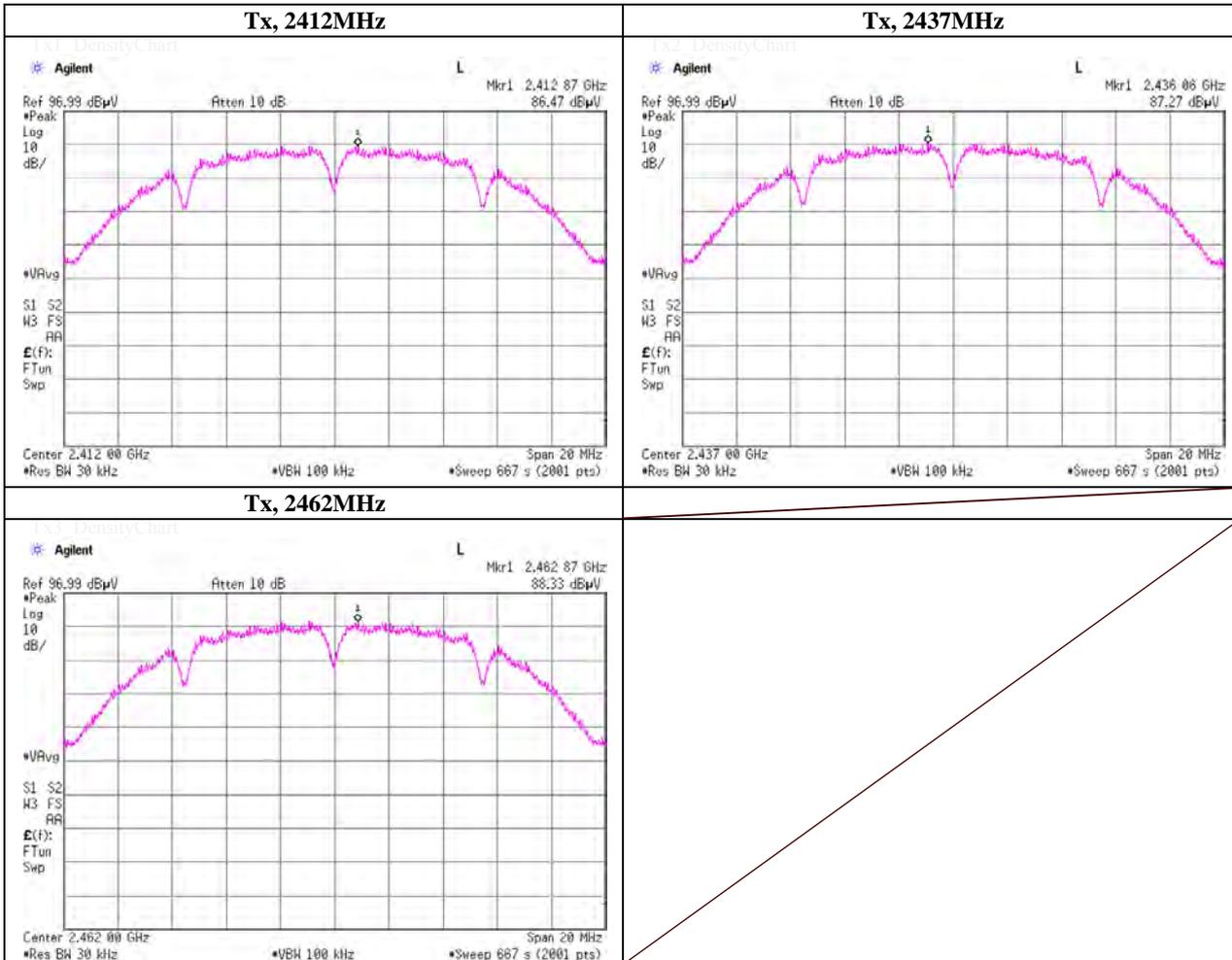
| Ch. Freq. [MHz] | Freq. Reading [MHz] | Reading [dBuV] | Ant. Factor [dB/m] | Cable, Atten. Loss [dB] | Pre Amp Gain [dB] | Result (3m) [dBuV/m] | Result (Tx) [dBm] | Limit [dBm] | Margin [dB] |
|--------------------|---------------------------|-------------------|--------------------------|-------------------------------|-------------------------|----------------------------|-------------------------|----------------|----------------|
| 2412.0000 | 2412.87 | 86.47 | 27.30 | 14.20 | 41.10 | 86.87 | -9.26 | 8.00 | 17.26 |
| 2437.0000 | 2436.06 | 87.27 | 27.40 | 14.20 | 41.10 | 87.77 | -8.36 | 8.00 | 16.36 |
| 2462.0000 | 2462.87 | 88.33 | 27.40 | 14.20 | 41.10 | 88.83 | -7.30 | 8.00 | 15.30 |

Sample Calculation:

*1: Result (3m) [dBuV/m] = Reading [dBuV] + Ant. Factor [dB/m] + Cable, Atten. Loss [dB] - Pre Amp Gain [dB]

*2: Result (Tx) [dBm] = (E x D) ^ 2 / (30 x G) , * E = (10 ^ (Result (3m) / 20)) / (10 ^ 6) , D = 3m , G = 1.23

*3: Signal levels were compared at polarizations of horizontal and vertical, and measurement was performed at the polarization in which the level was greater.



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Power Density (Radiated)

| | | |
|----------------------------------|-----------------------------------------|-------------------------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.3 Semi-Anechoic Chamber |
| Date | June 6, 2012 | |
| Temperature / Humidity | 26deg.C / 53%RH | |
| Engineer | Tatsuya Arai | Test Distance: 3 m |
| Mode | Tx, IEEE802.11g, worst data mode 36Mbps | EUT Antenna Gain: 0.90dBi (1.230) |
| Worst axis = Z-axis, Horizontal, | | |

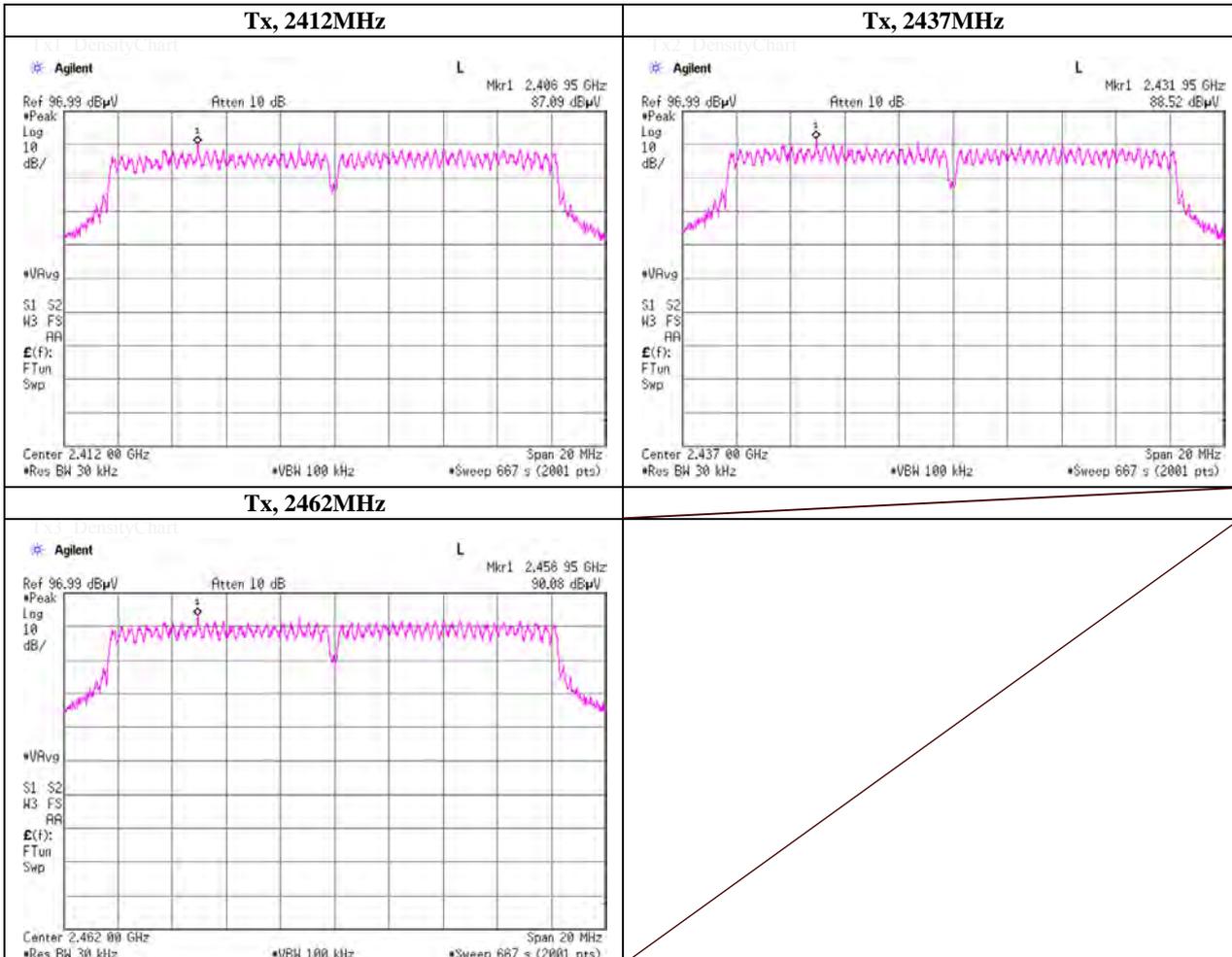
| Ch. Freq. [MHz] | Freq. Reading [MHz] | Reading [dBuV] | Ant. Factor [dB/m] | Cable, Atten. Loss [dB] | Pre Amp Gain [dB] | Result (3m) [dBuV/m] | Result (Tx) [dBm] | Limit [dBm] | Margin [dB] |
|--------------------|---------------------------|-------------------|--------------------------|-------------------------------|-------------------------|----------------------------|-------------------------|----------------|----------------|
| 2412.0000 | 2406.95 | 87.09 | 27.30 | 14.20 | 41.10 | 87.49 | -8.64 | 8.00 | 16.64 |
| 2437.0000 | 2431.95 | 88.52 | 27.40 | 14.20 | 41.10 | 89.02 | -7.11 | 8.00 | 15.11 |
| 2462.0000 | 2456.95 | 90.08 | 27.40 | 14.20 | 41.10 | 90.58 | -5.55 | 8.00 | 13.55 |

Sample Calculation:

*1: Result (3m) [dBuV/m] = Reading [dBuV] + Ant. Factor [dB/m] + Cable, Atten. Loss [dB] - Pre Amp Gain [dB]

*2: Result (Tx) [dBm] = (E x D) ^ 2 / (30 x G) , * E = (10 ^ (Result (3m) / 20)) / (10 ^ 6) , D = 3m , G = 1.23

*3: Signal levels were compared at polarizations of horizontal and vertical, and measurement was performed at the polarization in which the level was greater.



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Power Density (Radiated)

| | | |
|------------------------|---------------------------------------------|-----------------------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.3 Semi-Anechoic Chamber |
| Date | June 6, 2012 | |
| Temperature / Humidity | 26deg.C / 53%RH | |
| Engineer | Tatsuya Arai | Test Distance: 3 m |
| Mode | Tx, IEEE802.11n(HT20), worst data mode MCS3 | EUT Antenna Gain: 0.90dBi (1.230) |
| | Worst axis = Z-axis, Horizontal, | |

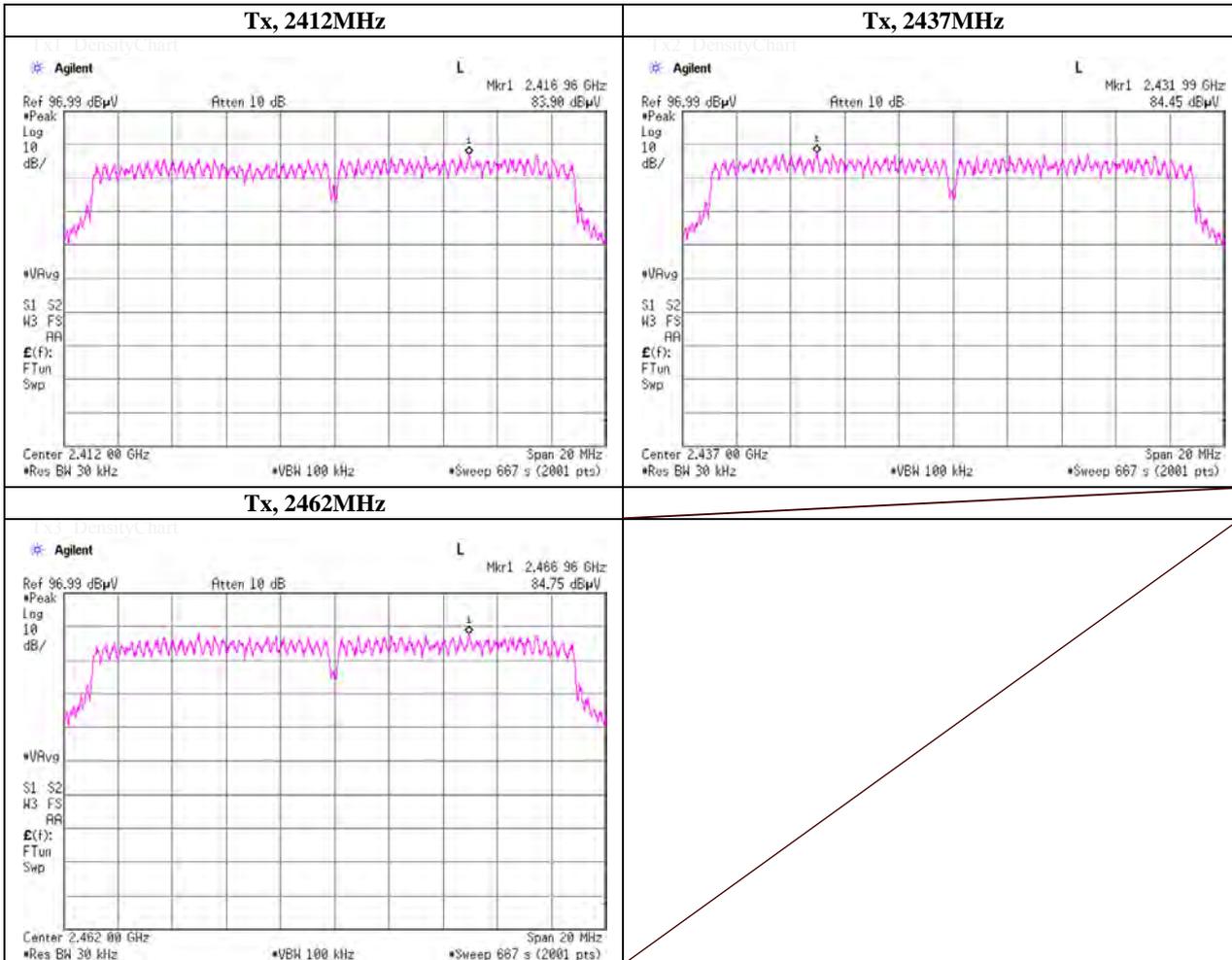
| Ch. Freq. [MHz] | Freq. Reading [MHz] | Reading [dBuV] | Ant. Factor [dB/m] | Cable, Atten. Loss [dB] | Pre Amp Gain [dB] | Result (3m) [dBuV/m] | Result (Tx) [dBm] | Limit [dBm] | Margin [dB] |
|--------------------|---------------------------|-------------------|--------------------------|-------------------------------|-------------------------|----------------------------|-------------------------|----------------|----------------|
| 2412.0000 | 2416.96 | 83.90 | 27.30 | 14.20 | 41.10 | 84.30 | -11.83 | 8.00 | 19.83 |
| 2437.0000 | 2431.99 | 84.45 | 27.40 | 14.20 | 41.10 | 84.95 | -11.18 | 8.00 | 19.18 |
| 2462.0000 | 2466.96 | 84.75 | 27.40 | 14.20 | 41.10 | 85.25 | -10.88 | 8.00 | 18.88 |

Sample Calculation:

*1: Result (3m) [dBuV/m] = Reading [dBuV] + Ant. Factor [dB/m] + Cable, Atten. Loss [dB] - Pre Amp Gain [dB]

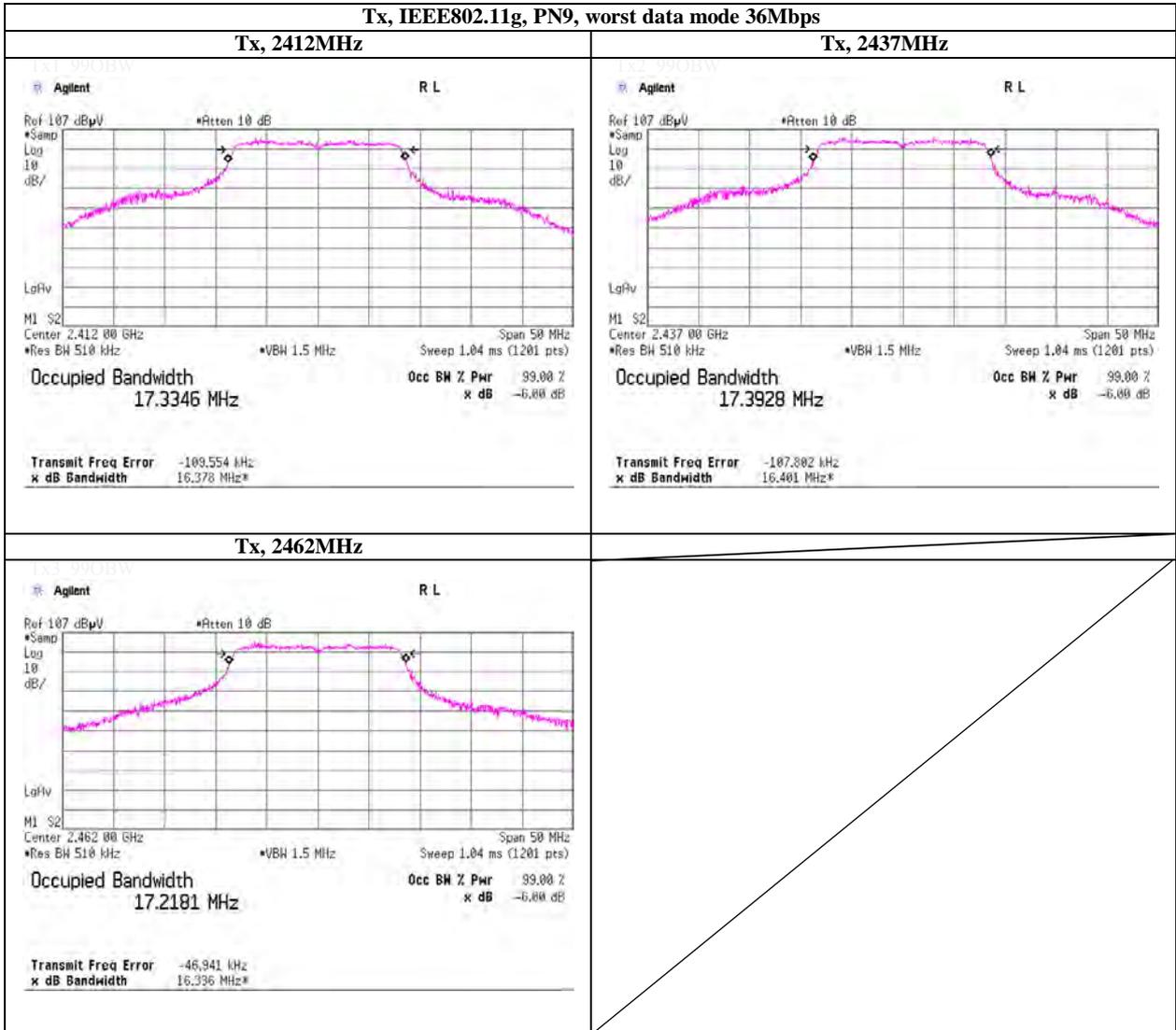
*2: Result (Tx) [dBm] = (E x D) ^ 2 / (30 x G) , * E = (10 ^ (Result (3m) / 20)) / (10 ^ 6) , D = 3m , G = 1.23

*3: Signal levels were compared at polarizations of horizontal and vertical, and measurement was performed at the polarization in which the level was greater.



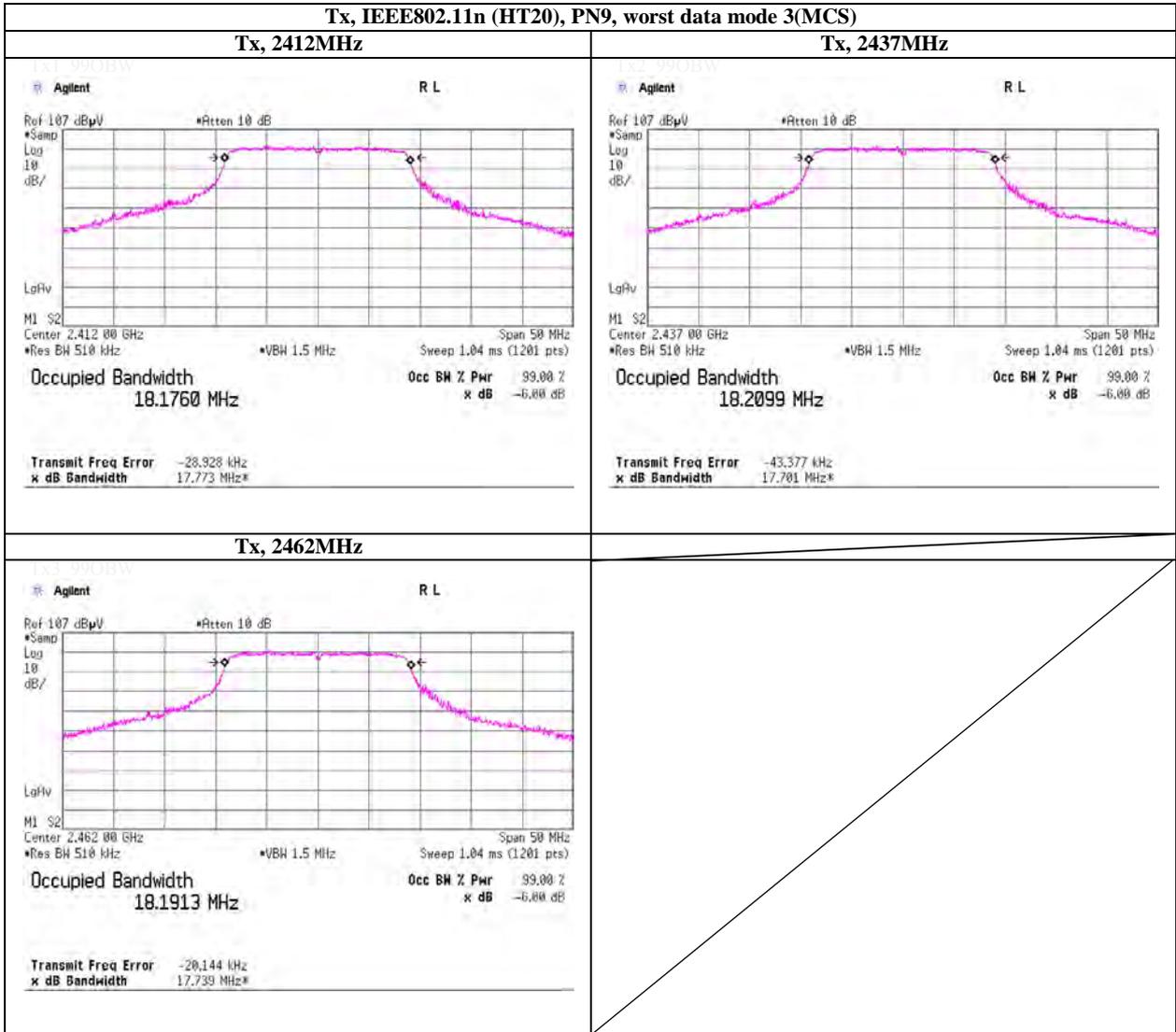
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99% Occupied Bandwidth



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99% Occupied Bandwidth



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APPENDIX 2
Test Instruments

EMI test equipment

| Control No. | Instrument | Manufacturer | Model No | Serial No | Test Item | Calibration Date * Interval(month) |
|--------------------------------|---------------------------|----------------------------------------------------|--------------------------------------------|-------------------------|-----------|------------------------------------|
| SPM-06 | Power Meter | Anritsu | ML2495A | 0850009 | RE | 2012/04/19 * 12 |
| SPSS-03 | Power sensor | Anritsu | MA2411B | 0917063 | RE | 2012/04/19 * 12 |
| SSA-03 | Spectrum Analyzer | Agilent | E4448A | MY48250152 | RE, AT | 2011/12/05 * 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 | 2012/04/10 * 12 |
| SCC-G23 | Coaxial Cable | Suhner | SUCOFLEX 104 | 297342/4 | RE | 2012/05/22 * 12 |
| 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 |
| 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 |
| SJM-10 | Measure | PROMART | SEN1935 | - | RE,CE | - |
| COTS-SEMI-1 | EMI Software | TSJ | TEPTO-DV(RE,CE, RFL,MF) | - | RE,CE | - |
| SAT10-08 | Attenuator | Weinschel | W54-10 | - | AT | 2012/03/12 * 12 |
| SCC-G12 | Coaxial Cable | Suhner | SUCOFLEX 102 | 30790/2 | AT | 2012/03/12 * 12 |
| SOS-09 | Humidity Indicator | A&D | AD-5681 | 4061484 | AT | 2012/03/26 * 12 |
| SAF-05 | Pre Amplifier | TOYO Corporation | TPA0118-36 | 1440490 | RE | 2012/03/12 * 12 |
| SCC-G02 | Coaxial Cable | Suhner | SUCOFLEX 104A | 46498/4A | RE | 2012/04/10 * 12 |
| SCC-G22 | Coaxial Cable | Suhner | SUCOFLEX 104 | 296199/4 | RE | 2012/05/22 * 12 |
| SHA-02 | Horn Antenna | Schwarzbeck | BBHA9120D | 9120D-726 | RE | 2011/08/28 * 12 |
| SOS-03 | Humidity Indicator | A&D | AD-5681 | 4063325 | RE | 2012/02/06 * 12 |
| SJM-02 | Measure | KOMELON | KMC-36 | - | RE | - |
| 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/Suhner/TOYO | 8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906 | -/0901-271(RF Selector) | RE | 2012/04/10 * 12 |
| SLA-03 | Logperiodic Antenna | Schwarzbeck | UHALP9108A | UHALP 9108-A 0901 | RE | 2011/10/23 * 12 |
| STR-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 | 2012/04/10 * 12 |
| SLS-05 | LISN | Rohde & Schwarz | ENV216 | 100516 | CE | 2012/02/23 * 12 |
| SOS-06 | Humidity Indicator | A&D | AD-5681 | 4062118 | CE | 2012/03/26 * 12 |
| SAT3-03 | Attenuator | JFW | 50HF-003N | - | CE | 2012/02/17 * 12 |
| | | | | | | |
| | | | | | | |

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

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

Test Item :

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