




RADIO TEST REPORT

Test Report No.: 32GE0206-SH-01-A

Applicant : Ricoh Company, Ltd.
Type of Equipment : Option(s) for Radiocommunications
Model No. : R-CMN-851
FCC ID : BBP-WLCMN01
Test regulation : FCC Part15 Subpart C: 2012
Test result : Complied

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Date of test: July 27 to September 17, 2012

Tested by: 
Hikaru Shirasawa
Engineer of WiSE Japan,
UL Verification Service

Approved by : 
Go Ishiwata
Manager of WiSE Japan,
UL Verification Service

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13-EM-F0429

Contents

| | <u>Page</u> |
|--|--------------------|
| SECTION 1: Customer information | 4 |
| SECTION 2: Equipment under test (E.U.T.) | 4 |
| SECTION 3: Test specification, procedures & results | 6 |
| SECTION 4: Operation of E.U.T. during testing..... | 9 |
| SECTION 5: Conducted emission | 11 |
| SECTION 6: Radiated emission | 12 |
| SECTION 7: Out of band emissions (Antenna port conducted) | 14 |
| SECTION 8: 6dB bandwidth & Occupied bandwidth (99%) | 14 |
| SECTION 9: Maximum peak output power | 14 |
| SECTION 10: Peak power density..... | 14 |
| Contents of APPENDIXES..... | 15 |
| APPENDIX 1: Data of Radio tests..... | 16 |
| APPENDIX 2: Test instruments | 116 |
| APPENDIX 3: Photographs of test setup | 117 |

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SECTION 1: Customer information

Company Name : Ricoh Company, Ltd.
Address : 810, Shimoimaizumi Ebina-Shi Kanagawa 24300460
Telephone Number : +81-46-292-3871
Contact Person : Seiji Nakamura

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

2.1 Identification of E.U.T.

Type of Equipment : Option(s) for Radiocommunications
Model Number : R-CMN-851
Serial Number : Refer to 4.2 in this report.
Rating : DC3.3V
Country of Mass-production : Japan
Condition of EUT : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample : July 24, 2012
Modification of EUT : No modification by the test lab.

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2.2 Product description

Model: R-CMN-851 (referred to as the EUT in this report) is Option(s) for Radiocommunications.

Clock frequency(ies) in the system : 40MHz

<Radio part>

Equipment type : Transceiver
Frequency of operation *1) : 2.4GHz: 2412-2462MHz (IEEE 802.11b, 11g, 11n-HT20)
2422-2452MHz (IEEE 802.11n-HT40)
W52: 5180-5240MHz (IEEE 802.11a, 11n-HT20)
5190-5230MHz (IEEE 802.11n-HT40)
W53: 5260-5320MHz (IEEE 802.11a, 11n-HT20)
5270-5310MHz (IEEE 802.11n-HT40)
W56: 5500-5700MHz (IEEE 802.11a, 11n-HT20)
5510-5670MHz (IEEE 802.11n-HT40)
Bandwidth : 20MHz (IEEE 802.11a/b/g/n), 40MHz (IEEE 802.11n)
Channel spacing : 5MHz (2.4GHz), 20MHz (5GHz)
Type of modulation : DSSS (IEEE 802.11b), OFDM (IEEE 802.11a/g/n)
ITU code : D1D, G1D
Operation temperature range : 0 to +50 deg.C

*1) Refer to the test report 32GE0206-SH-01-B/C for FCC 15.407.

Antenna list:

| | | |
|------------------------------|---|---|
| Model No. | ANT1431-161C/M-AB-58 | ANT1468 |
| Antenna type (quantity) | Inverted F (x2) | Dipole (x2) |
| Antenna connector type | U.FL-LP | U.FL-LP |
| Antenna gain with cable loss | 2.4GHz: 1.72dBi W52/W53: 5.18dBi, W56: 4.02dBi | 2.4GHz: 0.61dBi W52/W53: 0.97dBi, W56: 1.55dBi |

FCC 15.31 (e) / 212

The host device provides stable voltage (DC3.3V) constantly to the EUT regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC 15.203 / 212

The EUT has a unique coupling/antenna connector (U.FL-LP). 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 August 13, 2012 and effective September 12, 2012
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.209 Radiated emission limits, general requirements
Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz,
and 5725-5850MHz

* The revision on August 13, 2012 does not affect the test specification applied to the EUT.

The EUT will be tested for compliance with FCC Part 15 Subpart B by the customer.

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 | 6.0dB Freq.: 0.18135MHz Detector: Average Phase: N Mode: Tx 2412MHz, IEEE 802.11n-20 Antenna: ANT1468 | Complied |
| 6dB bandwidth | ANSI C63.4:2009 13. Measurement of intentional radiators | FCC 15.247 (a)(2) | Conducted | N/A | * See data | Complied |
| Maximum peak output power | ANSI C63.4:2009 13. Measurement of intentional radiators | FCC 15.247 (b)(3) | Conducted | N/A | | Complied |
| Out of band 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 | 0.3dB Freq.: 2483.500MHz Detector: Peak Polarization: Horizontal Mode: Tx 2462MHz, IEEE 802.11g Antenna: ANT1431-161C/M-AB-58 | Complied |
| Power density | ANSI C63.4:2009 13. Measurement of intentional radiators | FCC 15.247 (e) | Conducted | N/A | * See data | Complied |

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

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) LISN | 150kHz-30MHz | 3.6 dB | 3.6 dB | 3.5 dB |
| Radiated emission (Measurement distance: 3m) | 9kHz-30MHz | 3.7 dB | 3.7 dB | 3.6 dB |
| | 30MHz-300MHz | 4.9 dB | 5.1 dB | 4.9 dB |
| | 300MHz-1GHz | 5.0 dB | 5.2 dB | 4.9 dB |
| | 1GHz-15GHz | 4.8 dB | 4.8 dB | 4.9 dB |
| Radiated emission (Measurement distance: 1m) | 15GHz-18GHz | 5.6 dB | 5.6 dB | 5.6 dB |
| | 18GHz-40GHz | 4.6 dB | 4.3 dB | 4.4 dB |

*1: SAC=Semi-Anechoic Chamber

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

Conducted emission test

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

Radiated emission test

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

Antenna port conducted test

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

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

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

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

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

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

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3.5 Test location

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JAB Accreditation No. : RTL02610

| | FCC Registration No. | IC Registration No. | Width x Depth x Height (m) | Size of reference ground plane (m) / horizontal conducting plane | Maximum measurement distance |
|--|----------------------------|---------------------------|-------------------------------|---|------------------------------------|
| <input type="checkbox"/> No.1 semi-anechoic chamber | 697847 | 2973D-1 | 20.6 x 11.3 x 7.65 | 20.6 x 11.3 | 10m |
| <input type="checkbox"/> No.2 semi-anechoic chamber | 697847 | 2973D-2 | 20.6 x 11.3 x 7.65 | 20.6 x 11.3 | 10m |
| <input checked="" type="checkbox"/> No.3 semi-anechoic chamber | 697847 | 2973D-3 | 12.7 x 7.7 x 5.35 | 12.7 x 7.7 | 5m |
| <input type="checkbox"/> No.4 semi-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 checked="" 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 EMI & Test instruments

Refer to APPENDIX 3 to 3.

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SECTION 4: Operation of E.U.T. during testing

4.1 Operating mode

| Test item | Mode | Tested frequency | Worst data rate *1) |
|---|------------------------------|------------------------------|--|
| Conducted emission Radiated emission (below 1GHz) *2) | Transmitting IEEE 802.11n-20 | 2412MHz | Transmitting simultaneously (MIMO): MCS8, PN9 |
| Other items | Transmitting IEEE 802.11b | 2412MHz, 2437MHz, 2462MHz | 1Mbps, PN9 |
| | Transmitting IEEE 802.11g | 2412MHz, 2437MHz, 2462MHz | 6Mbps, PN9 |
| | Transmitting IEEE 802.11n-20 | 2412MHz, 2437MHz, 2462MHz | Transmitting simultaneously (MIMO): MCS8, PN9 Transmitting respectively (SISO): MCS0, PN9 |
| | Transmitting IEEE 802.11n-40 | 2422MHz, 2437MHz, 2452MHz | Transmitting simultaneously (MIMO): MCS8, PN9 Transmitting respectively (SISO): MCS0, PN9 |

*1) The worst condition was determined based on the test result of Maximum Peak Output Power.

*2) 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.

* Power setting: Fixed, Software used for the test: ART v0.9 b34

| Test item | Used antenna (port) *3) *4) | Operation |
|--|---|---|
| Maximum peak output power | - (Antenna port 1, 2) | Transmitting respectively (SISO) |
| Transmitting IEEE 802.11b Transmitting IEEE 802.11g | | |
| Transmitting IEEE 802.11n-20 Transmitting IEEE 802.11n-40 | - (Antenna port 1, 2) | Transmitting respectively (SISO) Transmitting simultaneously (MIMO) |
| Radiated emission (above 1GHz) | ANT1431-161C/M-AB-58 (Antenna 1) ANT1468 (Antenna 1) | Transmitting respectively (SISO) |
| Transmitting IEEE 802.11b Transmitting IEEE 802.11g | | |
| Transmitting IEEE 802.11n-20 Transmitting IEEE 802.11n-40 | ANT1431-161C/M-AB-58 (Antenna 1, 2) ANT1468 (Antenna 1, 2) | Transmitting simultaneously (MIMO) |
| Conducted emission, Radiated emission (below 1GHz) Transmitting IEEE 802.11n-20 | ANT1431-161C/M-AB-58 (Antenna 1, 2) ANT1468 (Antenna 1, 2) | Transmitting simultaneously (MIMO) |
| Power density | - (Antenna port 1) | Transmitting respectively (SISO) |
| Transmitting IEEE 802.11b Transmitting IEEE 802.11g | | |
| Transmitting IEEE 802.11n-20 Transmitting IEEE 802.11n-40 | - (Antenna port 1, 2) | Transmitting respectively (SISO) Transmitting simultaneously (MIMO) |
| Other than above Transmitting IEEE 802.11b Transmitting IEEE 802.11g Transmitting IEEE 802.11n-20 Transmitting IEEE 802.11n-40 | - (Antenna port 1) | Transmitting respectively (SISO) |

*3) The worse antenna port was determined based on the test result of Maximum Peak Output Power.

*4) As this module has MIMO mode for only MSC8~MSC15, we need not to consider array gains.

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

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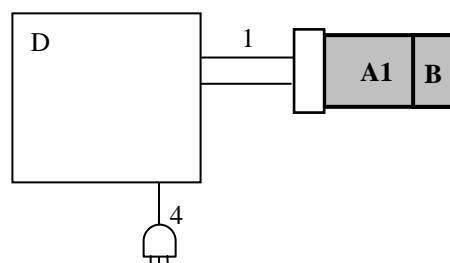
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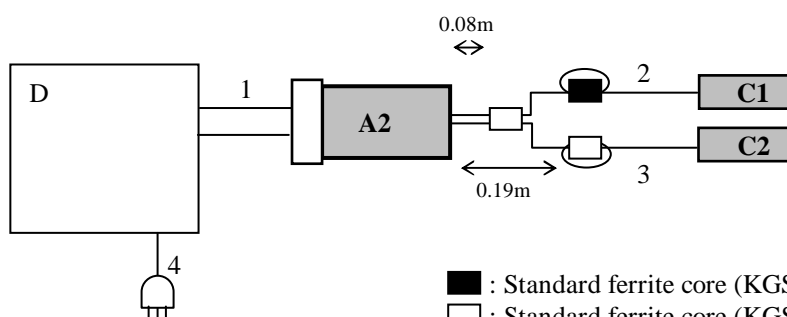
4.2 Configuration and peripherals

Antenna: ANT1431-161C/M-AB-58



AC120V/60Hz
Single phase with PE

Antenna: ANT1468



AC120V/60Hz
Single phase with PE

* Test data was taken under worst case conditions.

Description of EUT and support equipment

| No. | Item | Model number | Serial number | Manufacturer | Remarks |
|-----|-----------------------------------|----------------------|---------------|-----------------|---------|
| A1 | Option(s) for Radiocommunications | R-CMN-851 | 206S0034 | Ricoh | EUT |
| A2 | | | 206S0048 | | |
| B | Antenna | ANT1431-161C/M-AB-58 | - | NISSEI ELECTRIC | EUT |
| C1 | Antenna | ANT1468 | - | NISSEI ELECTRIC | EUT |
| C2 | Antenna | ANT1468 | - | NISSEI ELECTRIC | EUT |
| D | Desktop PC | dc7800 | JPA831010C | hp | - |

List of cables used

| No. | Cable Name | Length (m) | Shield | | Remarks |
|-----|------------|------------|------------|------------|---------|
| | | | Cable | Connector | |
| 1 | Flat | 0.15 | Unshielded | Unshielded | - |
| 2 | Antenna | 0.87 | Shielded | Shielded | - |
| 3 | Antenna | 0.87 | Shielded | Shielded | - |
| 4 | AC | 2.1 | 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.

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 EUT was connected to a Line Impedance Stabilization Network (LISN) via host device.

An overview sweep with peak detection has been performed.

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

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

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

5.5 Results

Summary of the test results : Pass
Refer to APPENDIX 1

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SECTION 6: Radiated emission

6.1 Operating environment

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

6.2 Test configuration

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

6.3 Test conditions

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

6.4 Test procedure

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

The radiated emission measurements were made with the following detection.

| Frequency | 30-1000MHz | 1-25GHz | | 20dBc |
|----------------|------------|------------------------|-----------------------|----------------------------|
| Detection type | Quasi-Peak | Peak | Average *1) | Peak |
| IF Bandwidth | 120kHz | RBW: 1MHz VBW: 3MHz | RBW: 1MHz VBW: *2) | RBW: 100kHz VBW: 300kHz |

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

*2) Refer to the VBW (Average) calculation sheet in APPENDIX 1.

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.

Combinations of the worst case

| Subject | Antenna polarization | Carrier (Band edge) | Spurious | |
|---|----------------------|---------------------|------------|------------|
| | | | Below 1GHz | Above 1GHz |
| Antenna type of the EUT: ANT1431-161C/M-AB-58 | | | | |
| Module & Antenna | Horizontal | X | X | X |
| Module & Antenna | Vertical | Y | Y | Y |
| Antenna type of the EUT: ANT1468 | | | | |
| Module | Horizontal | Y | Y | Y |
| Antenna 1 | | Z | Z | Z |
| Antenna 2 | | X | X | X |
| Module | Vertical | X | X | X |
| Antenna 1 | | Y | Y | Y |
| Antenna 2 | | Y | Y | Y |

* The definition of the axis was listed in a 'Pre-check of the worst position' in APPENDIX.

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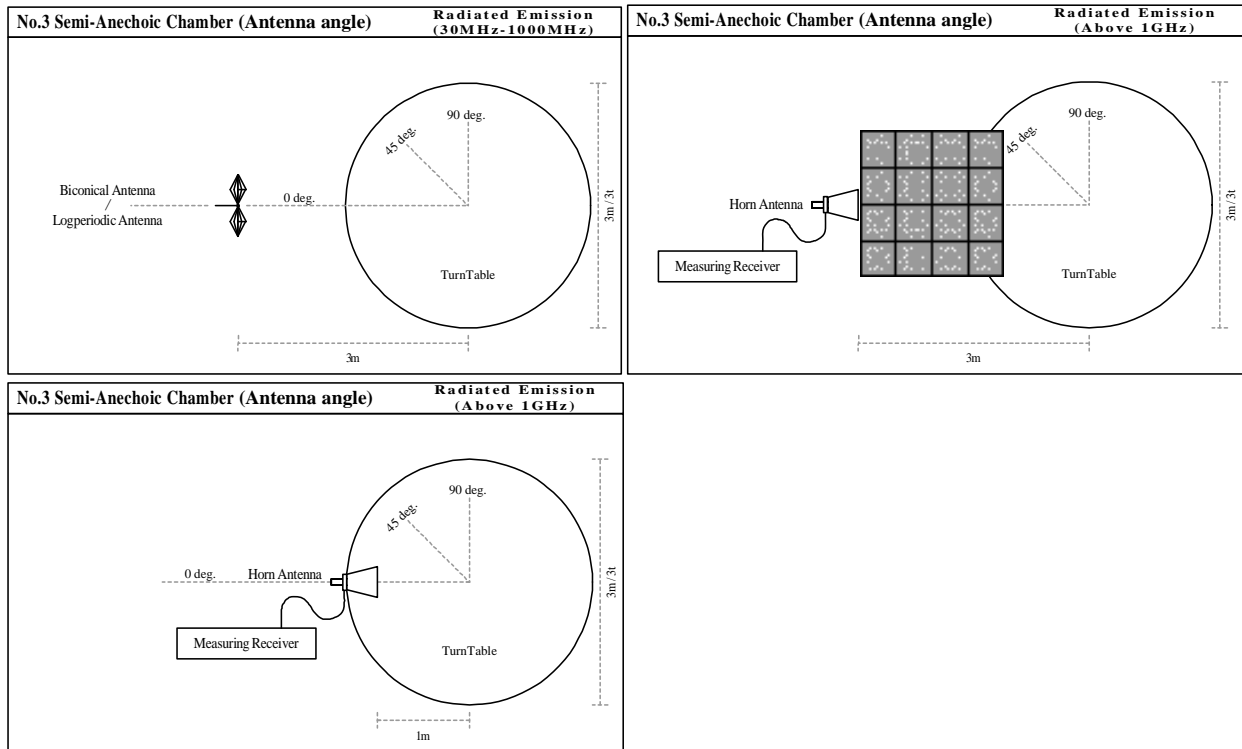
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Figure 1. Antenna angle



6.5 Band edge

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

6.6 Results

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

Refer to APPENDIX 1

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SECTION 7: Out of band emissions (Antenna port conducted)

Test procedure

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

Summary of the test results: Pass

Refer to APPENDIX 1

SECTION 8: 6dB bandwidth & Occupied bandwidth (99%)

Test procedure

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

Summary of the test results: Pass

Refer to APPENDIX 1

SECTION 9: Maximum peak output power

Test procedure

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

Summary of the test results: Pass

Refer to APPENDIX 1

SECTION 10: Peak power density

Test procedure

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

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

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

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

Summary of the test results: Pass

Refer to APPENDIX 1

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Contents of APPENDIXES

APPENDIX 1: Data of Radio tests

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

APPENDIX 2: Test instruments

Test instruments

APPENDIX 3: Photographs of test setup

Conducted emission
Radiated emission
Pre-check of worst position

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APPENDIX 1: Data of Radio tests

DATA OF CONDUCTED EMISSION TEST

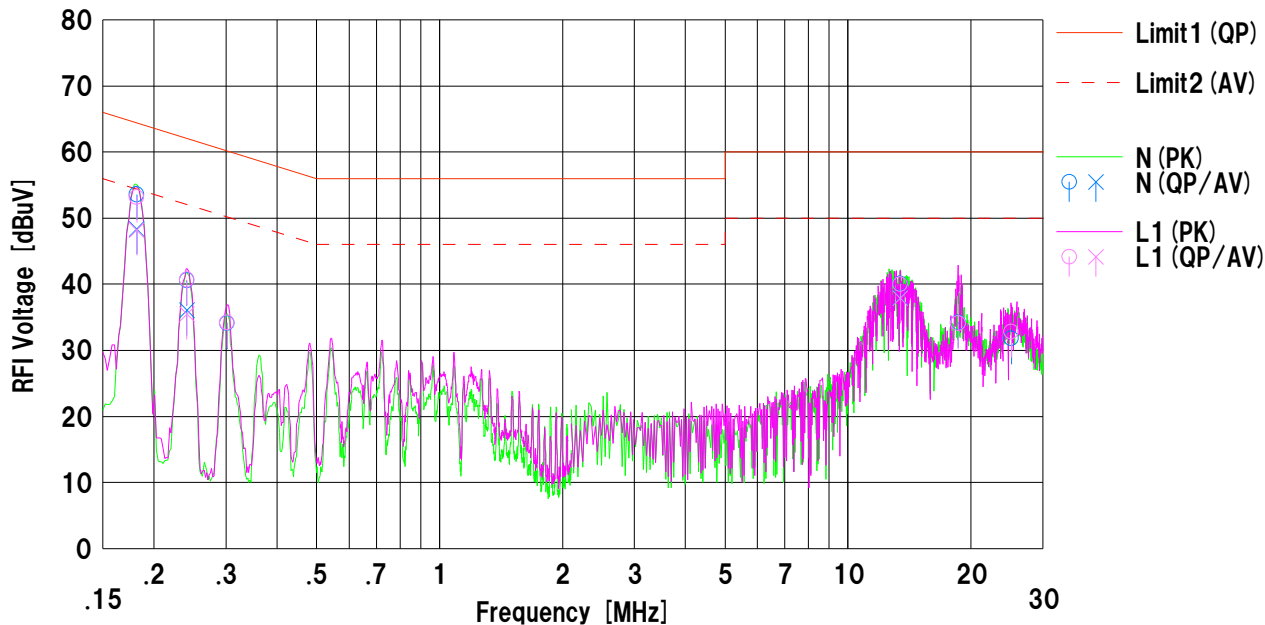
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2012/09/17

Mode : Tx 11n20-HT 2412MHz
Report No. : 32GE0206-SH-01-A
Power : DC3.3V (Host: AC 120V/60Hz)
Temp./Humi. : 26deg.C. / 68%RH

Remarks : ANT1468

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

Engineer : Makoto Hosaka



| 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 | 0.18135 | 40.9 | 35.7 | 12.7 | 53.6 | 48.4 | 64.4 | 54.4 | 10.8 | 6.0 | N | |
| 2 | 0.24071 | 27.9 | 23.4 | 12.7 | 40.6 | 36.1 | 62.0 | 52.0 | 21.4 | 15.9 | N | |
| 3 | 0.30201 | 21.4 | --- | 12.7 | 34.1 | --- | 60.1 | 50.1 | 26.0 | --- | N | |
| 4 | 13.44100 | 26.8 | 24.7 | 13.3 | 40.1 | 38.0 | 60.0 | 50.0 | 19.9 | 12.0 | N | |
| 5 | 18.62799 | 20.7 | --- | 13.5 | 34.2 | --- | 60.0 | 50.0 | 25.8 | --- | N | |
| 6 | 25.13703 | 18.1 | --- | 13.7 | 31.8 | --- | 60.0 | 50.0 | 28.2 | --- | N | |
| 7 | 0.18135 | 40.5 | 35.5 | 12.7 | 53.2 | 48.2 | 64.4 | 54.4 | 11.2 | 6.2 | L1 | |
| 8 | 0.24071 | 28.0 | 22.8 | 12.7 | 40.7 | 35.5 | 62.0 | 52.0 | 21.3 | 16.5 | L1 | |
| 9 | 0.30201 | 21.5 | --- | 12.7 | 34.2 | --- | 60.1 | 50.1 | 25.9 | --- | L1 | |
| 10 | 13.44100 | 26.7 | 24.6 | 13.3 | 40.0 | 37.9 | 60.0 | 50.0 | 20.0 | 12.1 | L1 | |
| 11 | 18.62799 | 20.6 | --- | 13.5 | 34.1 | --- | 60.0 | 50.0 | 25.9 | --- | L1 | |
| 12 | 25.13703 | 19.1 | --- | 13.7 | 32.8 | --- | 60.0 | 50.0 | 27.2 | --- | L1 | |

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

DATA OF CONDUCTED EMISSION TEST

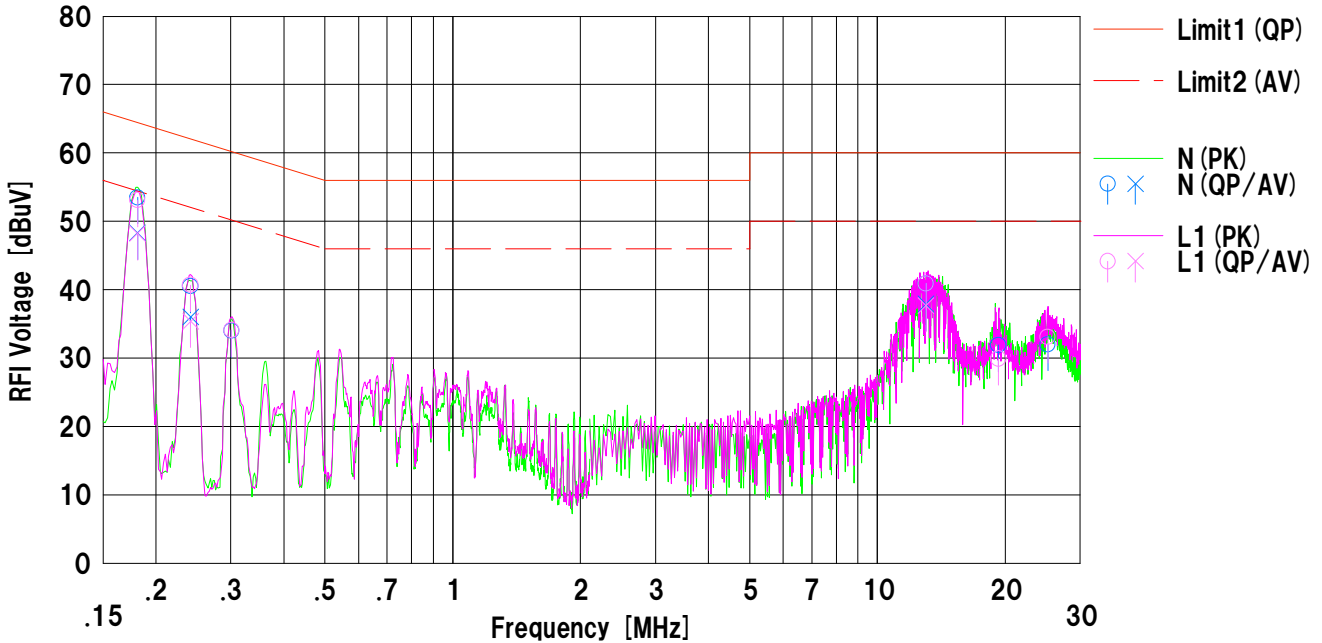
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2012/09/17

Mode : Tx 11n20-HT 2412MHz
 Report No. : 32GE0206-SH-01-A
 Power : DC3.3V (Host: AC 120V/60Hz)
 Temp./Humi. : 26deg.C. / 68%RH

Remarks : ANT1431-161C/M-AB-58

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

Engineer : Makoto Hosaka



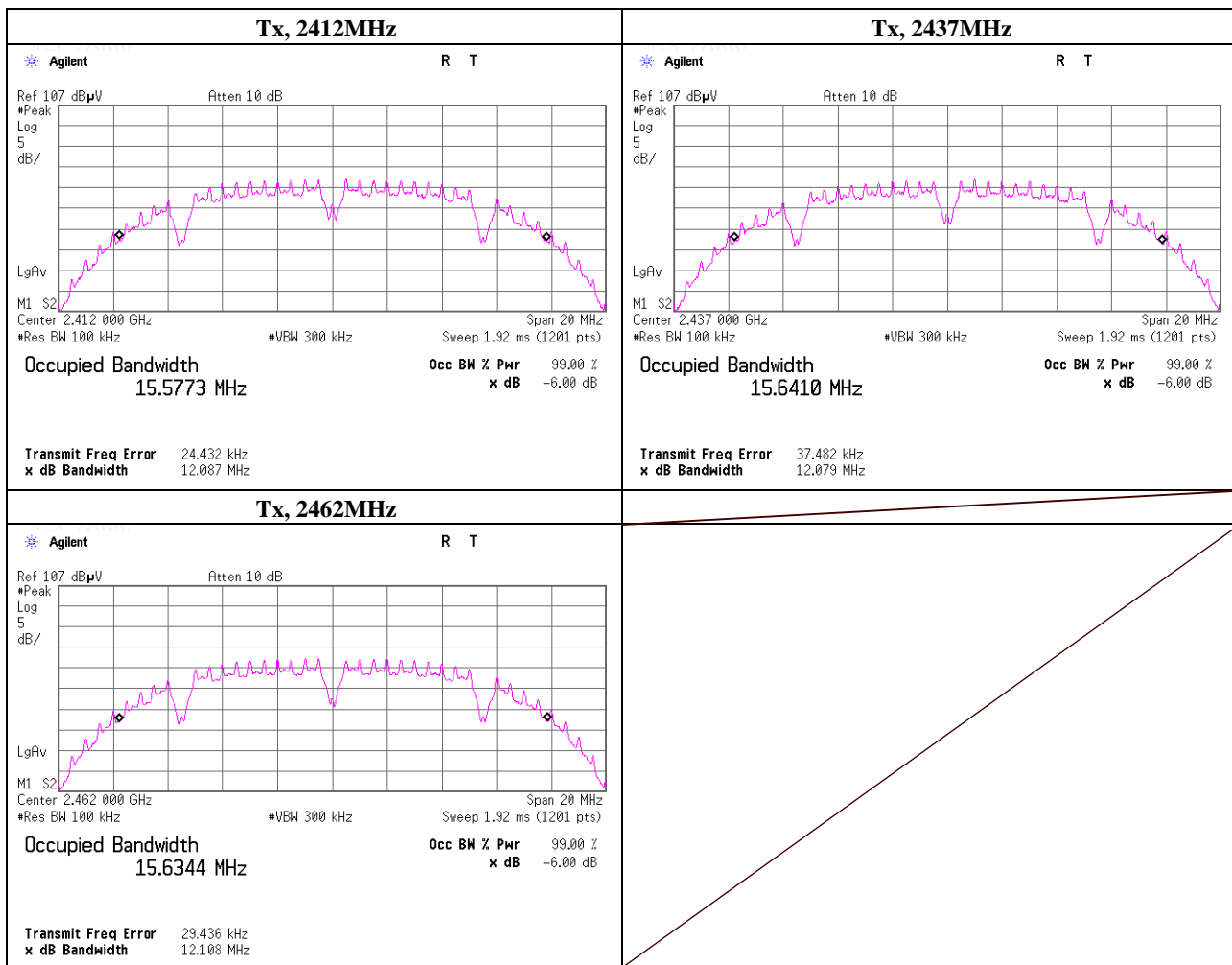
| No. | Freq. [MHz] | Reading | | C.Fac [dB] | Results | | Limit | | Margin | | Phase | Comment |
|-----|----------------|----------------|----------------|---------------|----------------|----------------|----------------|----------------|--------------|--------------|-------|---------|
| | | <QP> [dBuV] | <AV> [dBuV] | | <QP> [dBuV] | <AV> [dBuV] | <QP> [dBuV] | <AV> [dBuV] | <QP> [dB] | <AV> [dB] | | |
| 1 | 0.18115 | 40.8 | 35.6 | 12.7 | 53.5 | 48.3 | 64.4 | 54.4 | 10.9 | 6.1 | N | |
| 2 | 0.24140 | 27.8 | 23.3 | 12.7 | 40.5 | 36.0 | 62.0 | 52.0 | 21.5 | 16.0 | N | |
| 3 | 0.30144 | 21.3 | --- | 12.7 | 34.0 | --- | 60.2 | 50.2 | 26.2 | --- | N | |
| 4 | 13.01910 | 27.6 | 24.6 | 13.3 | 40.9 | 37.9 | 60.0 | 50.0 | 19.1 | 12.1 | N | |
| 5 | 19.29323 | 18.3 | --- | 13.6 | 31.9 | --- | 60.0 | 50.0 | 28.1 | --- | N | |
| 6 | 25.19581 | 18.3 | --- | 13.7 | 32.0 | --- | 60.0 | 50.0 | 28.0 | --- | N | |
| 7 | 0.18115 | 40.4 | 35.5 | 12.7 | 53.1 | 48.2 | 64.4 | 54.4 | 11.3 | 6.2 | L1 | |
| 8 | 0.24140 | 28.0 | 22.7 | 12.7 | 40.7 | 35.4 | 62.0 | 52.0 | 21.3 | 16.6 | L1 | |
| 9 | 0.30144 | 21.4 | --- | 12.7 | 34.1 | --- | 60.2 | 50.2 | 26.1 | --- | L1 | |
| 10 | 13.01910 | 27.6 | 24.4 | 13.3 | 40.9 | 37.7 | 60.0 | 50.0 | 19.1 | 12.3 | L1 | |
| 11 | 19.29323 | 16.3 | --- | 13.6 | 29.9 | --- | 60.0 | 50.0 | 30.1 | --- | L1 | |
| 12 | 25.19581 | 19.4 | --- | 13.7 | 33.1 | --- | 60.0 | 50.0 | 26.9 | --- | 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.6 Shielded Room |
| Date | July 27, 2012 | |
| Temperature / Humidity | 21deg.C , 57%RH | |
| Engineer | Hikaru Shirasawa | |
| Mode | Tx, IEEE802.11b, PN9, worst antenna port 1, worst data mode 1Mbps | |

| Freq. [MHz] | -6dB Bandwidth [MHz] | Limit [MHz] |
|----------------|-------------------------|----------------|
| 2412.0000 | 12.087 | > 0.500 |
| 2437.0000 | 12.079 | > 0.500 |
| 2462.0000 | 12.108 | > 0.500 |



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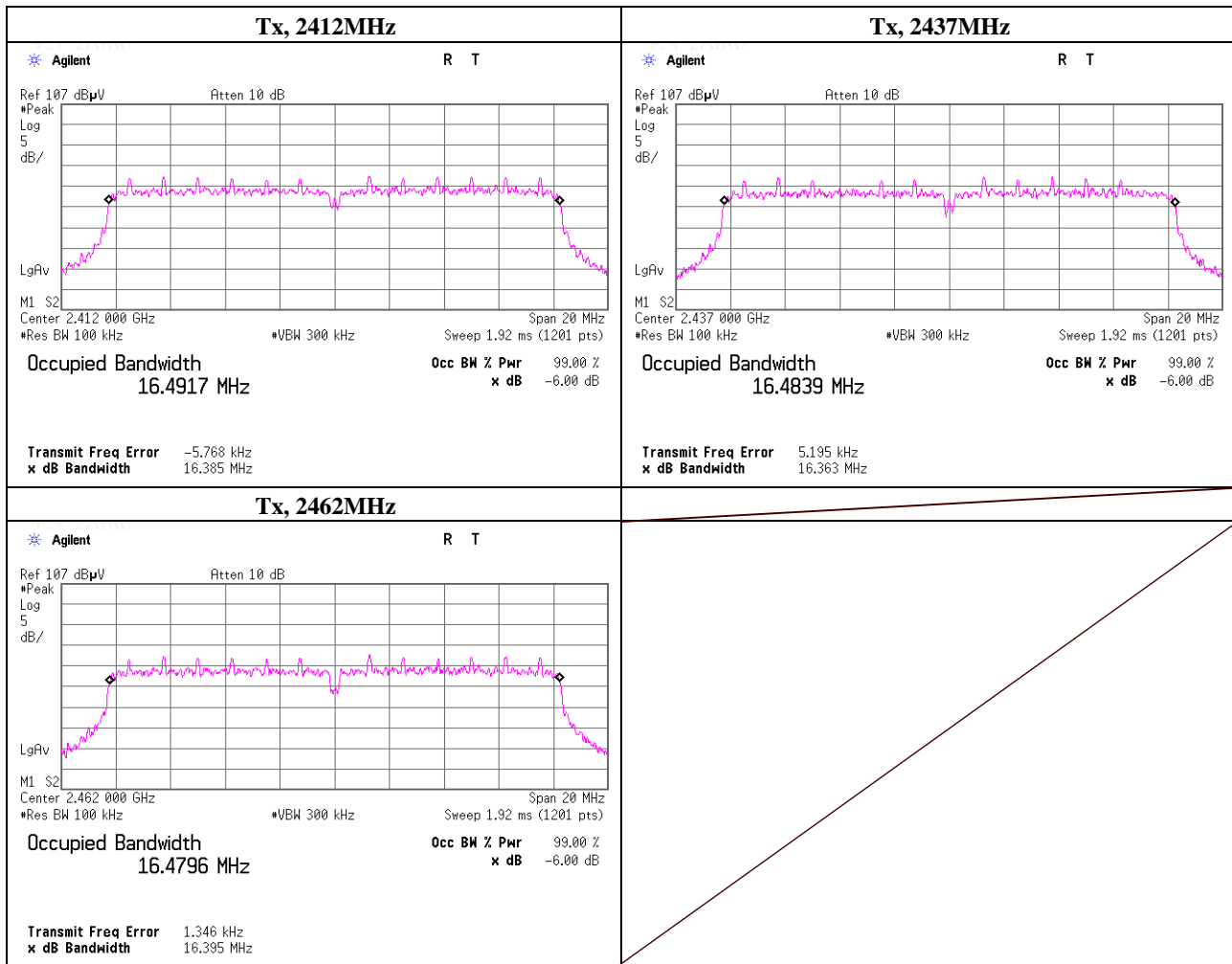
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

-6dB Bandwidth

| | | |
|------------------------|---|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.6 Shielded Room |
| Date | July 27, 2012 | |
| Temperature / Humidity | 21deg.C , 57%RH | |
| Engineer | Hikaru Shirasawa | |
| Mode | Tx, IEEE802.11g, PN9, worst antenna port 1, worst data mode 6Mbps | |

| Freq. [MHz] | -6dB Bandwidth [MHz] | Limit [MHz] |
|----------------|-------------------------|----------------|
| 2412.0000 | 16.385 | > 0.500 |
| 2437.0000 | 16.363 | > 0.500 |
| 2462.0000 | 16.395 | > 0.500 |



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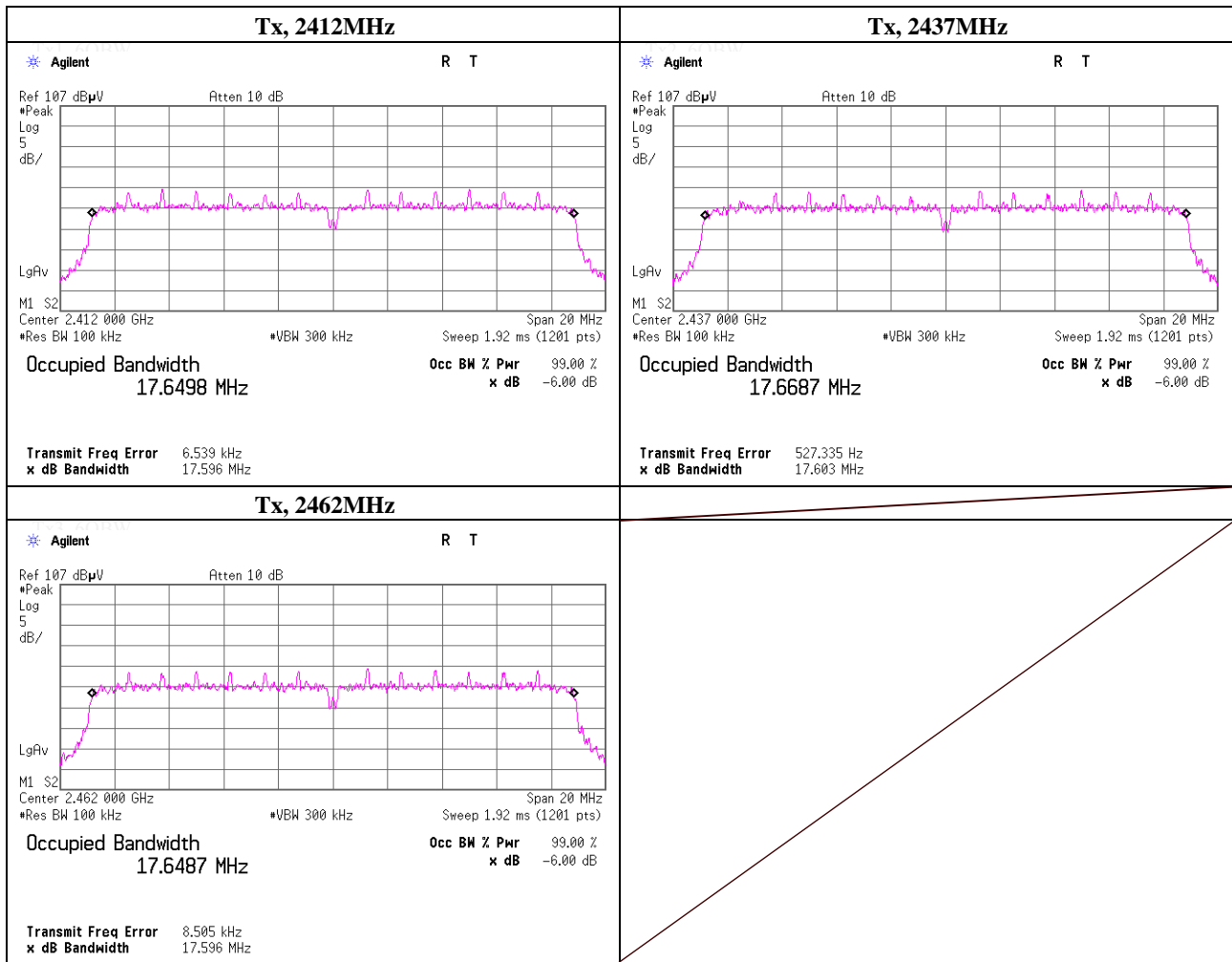
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

-6dB Bandwidth

| | | |
|------------------------|--|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.6 Shielded Room |
| Date | July 27, 2012 | |
| Temperature / Humidity | 21deg.C , 57%RH | |
| Engineer | Hikaru Shirasawa | |
| Mode | Tx, IEEE802.11n (HT20), PN9, worst antenna port 1 , worst data mode 0(MCS) | |

| Freq. [MHz] | -6dB Bandwidth [MHz] | Limit [MHz] |
|----------------|-------------------------|----------------|
| 2412.0000 | 17.596 | > 0.500 |
| 2437.0000 | 17.603 | > 0.500 |
| 2462.0000 | 17.596 | > 0.500 |



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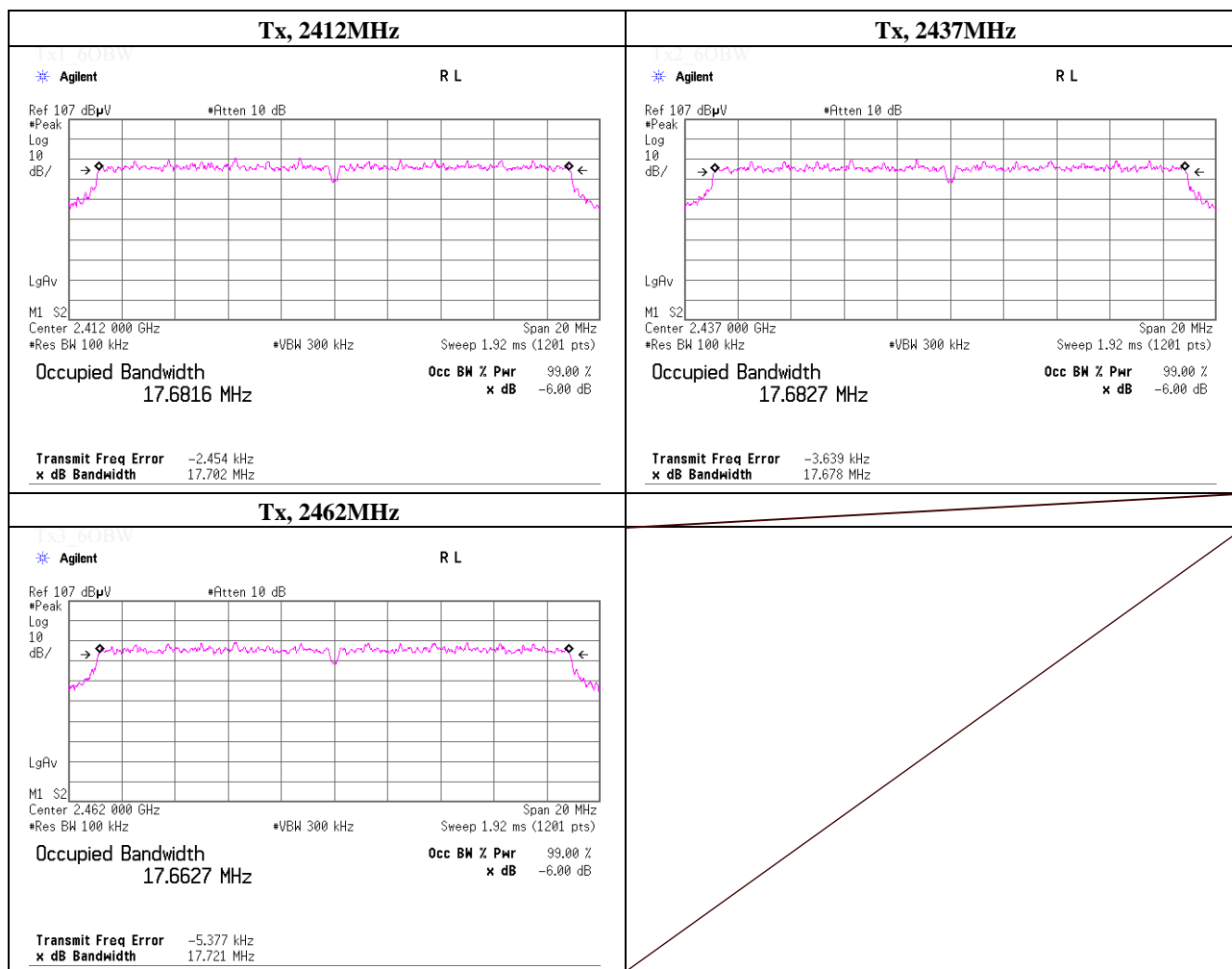
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

-6dB Bandwidth

| | | |
|------------------------|---|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date | August 2, 2012 | |
| Temperature / Humidity | 25deg.C , 54%RH | |
| Engineer | Hikaru Shirasawa | |
| Mode | Tx, IEEE802.11n (HT20), PN9, worst antenna port 1, worst data mode 8(MCS) | |

| Freq. [MHz] | -6dB Bandwidth [MHz] | Limit [MHz] |
|----------------|-------------------------|----------------|
| 2412.0000 | 17.702 | > 0.500 |
| 2437.0000 | 17.678 | > 0.500 |
| 2462.0000 | 17.721 | > 0.500 |



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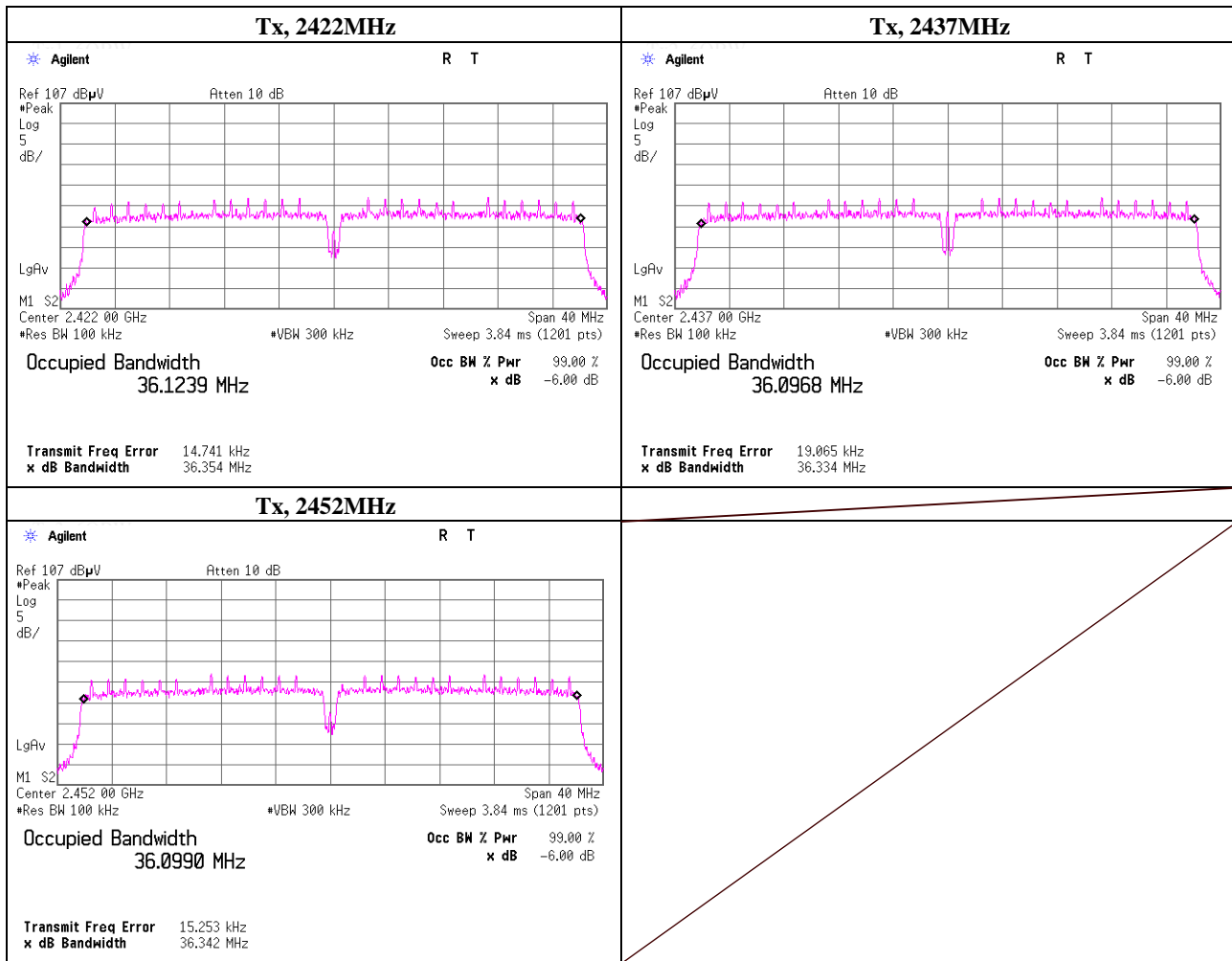
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

-6dB Bandwidth

| | | |
|------------------------|---|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.6 Shielded Room |
| Date | July 27, 2012 | |
| Temperature / Humidity | 21deg.C , 57%RH | |
| Engineer | Hikaru Shirasawa | |
| Mode | Tx, IEEE802.11n (HT40), PN9, worst antenna port 1, worst data mode 0(MCS) | |

| Freq. [MHz] | -6dB Bandwidth [MHz] | Limit [MHz] |
|----------------|-------------------------|----------------|
| 2422.0000 | 36.354 | > 0.500 |
| 2437.0000 | 36.334 | > 0.500 |
| 2452.0000 | 36.342 | > 0.500 |



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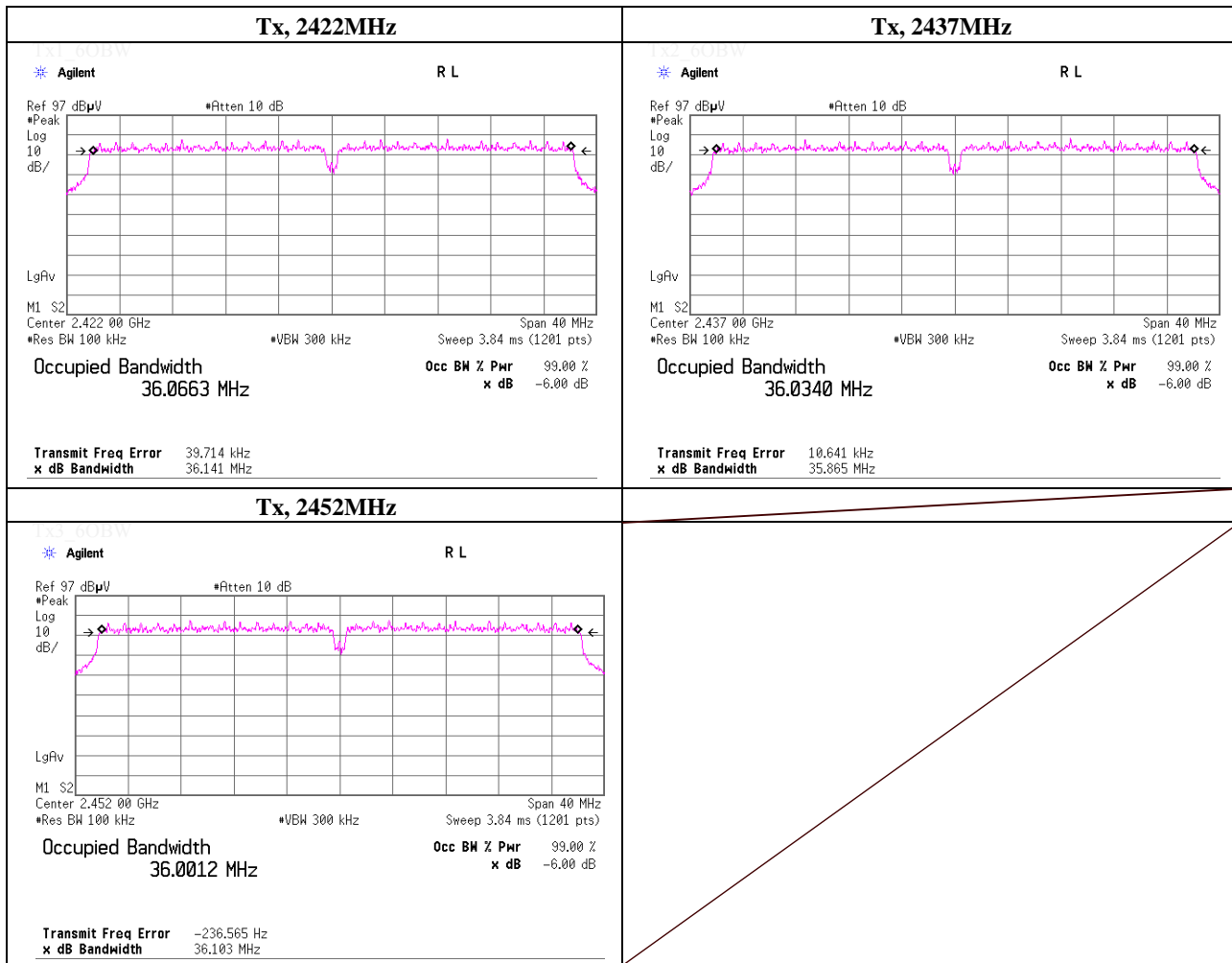
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Facsimile : +81 463 50 6401

-6dB Bandwidth

| | | |
|------------------------|--|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date | August 2, 2012 | |
| Temperature / Humidity | 25deg.C , 54%RH | |
| Engineer | Hikaru Shirasawa | |
| Mode | Tx, IEEE802.11n (HT40), PN9, worst antenna port 1 , worst data mode 8(MCS) | |

| Freq. [MHz] | -6dB Bandwidth [MHz] | Limit [MHz] |
|----------------|-------------------------|----------------|
| 2422.0000 | 36.141 | > 0.500 |
| 2437.0000 | 35.865 | > 0.500 |
| 2452.0000 | 36.103 | > 0.500 |



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Peak Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.6 Shielded Room
 Date July 27, 2012
 Temperature / Humidity 21deg.C , 57%RH
 Engineer Hikaru Shirasawa
 Mode Tx, IEEE802.11b, PN9, worst antenna : 1 worst data mode : 1 Mbps

(* P/M: Power Meter with power sensor, with gate trigger mode)

| Ch | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|------|----------------|--------------------------------|-----------------------|------------------------|--------|-------|-------|------|----------------|
| | | | | | [dBm] | [mW] | [dBm] | [mW] | |
| Low | 2412.0 | -5.30 | 1.48 | 20.25 | 16.43 | 43.95 | 30.00 | 1000 | 13.57 |
| Mid | 2437.0 | -5.51 | 1.48 | 20.25 | 16.22 | 41.88 | 30.00 | 1000 | 13.78 |
| High | 2462.0 | -5.48 | 1.49 | 20.25 | 16.26 | 42.27 | 30.00 | 1000 | 13.74 |

Sample Calculation:

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

[Pre check]**Antenna 2**

(* P/M: Power Meter with power sensor, with gate trigger mode)

| | Data rate [Mbps] | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|---|---------------------|----------------|--------------------------------|-----------------------|------------------------|--------|-------|-------|------|----------------|
| | | | | | | [dBm] | [mW] | [dBm] | [mW] | |
| 1 | 1 | 2412.0 | -5.42 | 1.48 | 20.25 | 16.31 | 42.76 | 30.00 | 1000 | 13.69 |
| 1 | 2 | 2412.0 | -5.47 | 1.48 | 20.25 | 16.26 | 42.27 | 30.00 | 1000 | 13.74 |
| 1 | 5.5 | 2412.0 | -5.54 | 1.48 | 20.25 | 16.19 | 41.59 | 30.00 | 1000 | 13.81 |
| 1 | 11 | 2412.0 | -5.53 | 1.48 | 20.25 | 16.20 | 41.69 | 30.00 | 1000 | 13.80 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Antenna 1

| | Data rate [Mbps] | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|---|---------------------|----------------|--------------------------------|-----------------------|------------------------|--------------|-------|-------|------|----------------|
| | | | | | | [dBm] | [mW] | [dBm] | [mW] | |
| 2 | 1 | 2412.0 | -5.32 | 1.48 | 20.25 | 16.41 | 43.75 | 30.00 | 1000 | 13.59 |
| 2 | 2 | 2412.0 | -5.37 | 1.48 | 20.25 | 16.36 | 43.25 | 30.00 | 1000 | 13.64 |
| 2 | 6 | 2412.0 | -5.42 | 1.48 | 20.25 | 16.31 | 42.76 | 30.00 | 1000 | 13.69 |
| 2 | 11 | 2412.0 | -5.39 | 1.48 | 20.25 | 16.34 | 43.05 | 30.00 | 1000 | 13.66 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Worst

Sample Calculation:

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

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Peak Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.6 Shielded Room
 Date July 27, 2012
 Temperature / Humidity 21deg.C , 57%RH
 Engineer Hikaru Shirasawa
 Mode Tx, IEEE802.11g, PN9, worst antenna : 1 worst data mode : 6 Mbps

(* P/M: Power Meter with power sensor, with gate trigger mode)

| Ch | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|------|----------------|--------------------------------|-----------------------|------------------------|--------|--------|-------|------|----------------|
| | | | | | [dBm] | [mW] | [dBm] | [mW] | |
| Low | 2412.0 | 1.98 | 1.48 | 20.25 | 23.71 | 234.96 | 30.00 | 1000 | 6.29 |
| Mid | 2437.0 | 1.72 | 1.48 | 20.25 | 23.45 | 221.31 | 30.00 | 1000 | 6.55 |
| High | 2462.0 | 1.63 | 1.49 | 20.25 | 23.37 | 217.27 | 30.00 | 1000 | 6.63 |

Sample Calculation:

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

[Pre check]**Antenna 2**

(* P/M: Power Meter with power sensor, with gate trigger mode)

| | Data rate [Mbps] | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|---|---------------------|----------------|--------------------------------|-----------------------|------------------------|--------|--------|-------|------|----------------|
| | | | | | | [dBm] | [mW] | [dBm] | [mW] | |
| 1 | 6 | 2412.0 | 1.98 | 1.48 | 20.25 | 23.71 | 234.96 | 30.00 | 1000 | 6.29 |
| 1 | 9 | 2412.0 | 1.95 | 1.48 | 20.25 | 23.68 | 233.35 | 30.00 | 1000 | 6.32 |
| 1 | 12 | 2412.0 | 1.72 | 1.48 | 20.25 | 23.45 | 221.31 | 30.00 | 1000 | 6.55 |
| 1 | 18 | 2412.0 | 1.70 | 1.48 | 20.25 | 23.43 | 220.29 | 30.00 | 1000 | 6.57 |
| 1 | 24 | 2412.0 | 1.81 | 1.48 | 20.25 | 23.54 | 225.94 | 30.00 | 1000 | 6.46 |
| 1 | 36 | 2412.0 | 1.78 | 1.48 | 20.25 | 23.51 | 224.39 | 30.00 | 1000 | 6.49 |
| 1 | 48 | 2412.0 | 1.49 | 1.48 | 20.25 | 23.22 | 209.89 | 30.00 | 1000 | 6.78 |
| 1 | 54 | 2412.0 | 1.65 | 1.48 | 20.25 | 23.38 | 217.77 | 30.00 | 1000 | 6.62 |

Antenna 1

| | Data rate [Mbps] | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|---|---------------------|----------------|--------------------------------|-----------------------|------------------------|--------------|--------|-------|------|----------------|
| | | | | | | [dBm] | [mW] | [dBm] | [mW] | |
| 2 | 6 | 2412.0 | 1.99 | 1.48 | 20.25 | 23.72 | 235.50 | 30.00 | 1000 | 6.28 |
| 2 | 9 | 2412.0 | 1.98 | 1.48 | 20.25 | 23.71 | 234.96 | 30.00 | 1000 | 6.29 |
| 2 | 12 | 2412.0 | 1.77 | 1.48 | 20.25 | 23.50 | 223.87 | 30.00 | 1000 | 6.50 |
| 2 | 18 | 2412.0 | 1.73 | 1.48 | 20.25 | 23.46 | 221.82 | 30.00 | 1000 | 6.54 |
| 2 | 24 | 2412.0 | 1.88 | 1.48 | 20.25 | 23.61 | 229.61 | 30.00 | 1000 | 6.39 |
| 2 | 36 | 2412.0 | 1.80 | 1.48 | 20.25 | 23.53 | 225.42 | 30.00 | 1000 | 6.47 |
| 2 | 48 | 2412.0 | 1.65 | 1.48 | 20.25 | 23.38 | 217.77 | 30.00 | 1000 | 6.62 |
| 2 | 54 | 2412.0 | 1.93 | 1.48 | 20.25 | 23.66 | 232.27 | 30.00 | 1000 | 6.34 |

Worst

Sample Calculation:

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

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Facsimile : +81 463 50 6401

Peak Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.6 Shielded Room
 Date July 27, 2012
 Temperature / Humidity 21deg.C , 57%RH
 Engineer Hikaru Shirasawa
 Mode Tx, IEEE802.11n (HT20), PN9, worst antenna : 1 worst data mode : 0 (MCS)

(* P/M: Power Meter with power sensor, with gate trigger mode)

| Ch | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|------|----------------|--------------------------------|-----------------------|------------------------|--------|--------|-------|------|----------------|
| | | | | | [dBm] | [mW] | [dBm] | [mW] | |
| Low | 2412.0 | 0.79 | 1.48 | 20.25 | 22.52 | 178.65 | 30.00 | 1000 | 7.48 |
| Mid | 2437.0 | 0.62 | 1.48 | 20.25 | 22.35 | 171.79 | 30.00 | 1000 | 7.65 |
| High | 2462.0 | 0.68 | 1.49 | 20.25 | 22.42 | 174.58 | 30.00 | 1000 | 7.58 |

Sample Calculation:

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

[Pre check]

Antenna 2

(* P/M: Power Meter with power sensor, with gate trigger mode)

| | Mode (MCS) | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|---|---------------|----------------|--------------------------------|-----------------------|------------------------|--------|--------|-------|------|----------------|
| | | | | | | [dBm] | [mW] | [dBm] | [mW] | |
| 1 | 0 | 2412.0 | 0.46 | 1.48 | 20.25 | 22.19 | 165.58 | 30.00 | 1000 | 7.81 |
| 1 | 1 | 2412.0 | 0.32 | 1.48 | 20.25 | 22.05 | 160.32 | 30.00 | 1000 | 7.95 |
| 1 | 2 | 2412.0 | 0.35 | 1.48 | 20.25 | 22.08 | 161.44 | 30.00 | 1000 | 7.92 |
| 1 | 3 | 2412.0 | 0.39 | 1.48 | 20.25 | 22.12 | 162.93 | 30.00 | 1000 | 7.88 |
| 1 | 4 | 2412.0 | 0.42 | 1.48 | 20.25 | 22.15 | 164.06 | 30.00 | 1000 | 7.85 |
| 1 | 5 | 2412.0 | 0.37 | 1.48 | 20.25 | 22.10 | 162.18 | 30.00 | 1000 | 7.90 |
| 1 | 6 | 2412.0 | 0.35 | 1.48 | 20.25 | 22.08 | 161.44 | 30.00 | 1000 | 7.92 |
| 1 | 7 | 2412.0 | -2.32 | 1.48 | 20.25 | 19.41 | 87.30 | 30.00 | 1000 | 10.59 |

Antenna 1

| | Mode (MCS) | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|---|---------------|----------------|--------------------------------|-----------------------|------------------------|--------------|--------|-------|------|----------------|
| | | | | | | [dBm] | [mW] | [dBm] | [mW] | |
| 2 | 0 | 2412.0 | 0.70 | 1.48 | 20.25 | 22.43 | 174.98 | 30.00 | 1000 | 7.57 |
| 2 | 1 | 2412.0 | 0.47 | 1.48 | 20.25 | 22.20 | 165.96 | 30.00 | 1000 | 7.80 |
| 2 | 2 | 2412.0 | 0.65 | 1.48 | 20.25 | 22.38 | 172.98 | 30.00 | 1000 | 7.62 |
| 2 | 3 | 2412.0 | 0.54 | 1.48 | 20.25 | 22.27 | 168.66 | 30.00 | 1000 | 7.73 |
| 2 | 4 | 2412.0 | 0.57 | 1.48 | 20.25 | 22.30 | 169.82 | 30.00 | 1000 | 7.70 |
| 2 | 5 | 2412.0 | 0.50 | 1.48 | 20.25 | 22.23 | 167.11 | 30.00 | 1000 | 7.77 |
| 2 | 6 | 2412.0 | 0.40 | 1.48 | 20.25 | 22.13 | 163.31 | 30.00 | 1000 | 7.87 |
| 2 | 7 | 2412.0 | -2.02 | 1.48 | 20.25 | 19.71 | 93.54 | 30.00 | 1000 | 10.29 |

Worst

Sample Calculation:

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

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Peak Output Power (Conducted)

Test place: UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date: August 2, 2012
Temperature / Humidity: 25deg.C , 54%RH
Engineer: Hikaru Shirasawa
Mode: Tx, IEEE802.11n (HT20), PN9, worst data mode : 8 (MCS)

Antenna 1 + Antenna 2

| Ch | Freq. [MHz] | Result Ant 2 [mW] | Result Ant 1 [mW] | Result Ant 1 + Ant 2 | | Limit | | Margin [dB] |
|------|-------------|-------------------|-------------------|----------------------|--------|-------|------|-------------|
| | | | | [dBm] | [mW] | [dBm] | [mW] | |
| Low | 2412.0 | 173.78 | 177.83 | 25.46 | 351.61 | 30.00 | 1000 | 4.54 |
| Mid | 2437.0 | 159.22 | 177.01 | 25.27 | 336.23 | 30.00 | 1000 | 4.73 |
| High | 2462.0 | 165.20 | 172.19 | 25.28 | 337.38 | 30.00 | 1000 | 4.72 |

Antenna 2

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

| Ch | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|------|-------------|--------------------------|-----------------|------------------|--------|--------|-------|------|-------------|
| | | | | | [dBm] | [mW] | [dBm] | [mW] | |
| Low | 2412.0 | 0.67 | 1.48 | 20.25 | 22.40 | 173.78 | 30.00 | 1000 | 7.60 |
| Mid | 2437.0 | 0.29 | 1.48 | 20.25 | 22.02 | 159.22 | 30.00 | 1000 | 7.98 |
| High | 2462.0 | 0.44 | 1.49 | 20.25 | 22.18 | 165.20 | 30.00 | 1000 | 7.82 |

Antenna 1

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

| Ch | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|------|-------------|--------------------------|-----------------|------------------|--------|--------|-------|------|-------------|
| | | | | | [dBm] | [mW] | [dBm] | [mW] | |
| Low | 2412.0 | 0.77 | 1.48 | 20.25 | 22.50 | 177.83 | 30.00 | 1000 | 7.50 |
| Mid | 2437.0 | 0.75 | 1.48 | 20.25 | 22.48 | 177.01 | 30.00 | 1000 | 7.52 |
| High | 2462.0 | 0.62 | 1.49 | 20.25 | 22.36 | 172.19 | 30.00 | 1000 | 7.64 |

Sample Calculation:
Result = Reading + Cable Loss + Atten. Loss

[Pre check]

| Mode (MCS) | Freq. [MHz] | Reding Antenna 2 | | Reding Antenna 1 | | Result Antenna 1 + 2 | | Worst |
|------------|-------------|------------------|------|------------------|------|----------------------|------|-------|
| | | [dBm] | [mW] | [dBm] | [mW] | [dBm] | [mW] | |
| 8 | 2412.0 | 0.72 | 1.18 | 0.73 | 1.18 | 3.74 | 2.36 | |
| 9 | 2412.0 | 0.45 | 1.11 | 0.47 | 1.11 | 3.47 | 2.22 | |
| 10 | 2412.0 | 0.63 | 1.16 | 0.61 | 1.15 | 3.63 | 2.31 | |
| 11 | 2412.0 | 0.42 | 1.10 | 0.55 | 1.14 | 3.50 | 2.24 | |
| 12 | 2412.0 | 0.43 | 1.10 | 0.66 | 1.16 | 3.56 | 2.27 | |
| 13 | 2412.0 | 0.68 | 1.17 | 0.43 | 1.10 | 3.57 | 2.27 | |
| 14 | 2412.0 | 0.48 | 1.12 | 0.55 | 1.14 | 3.53 | 2.25 | |
| 15 | 2412.0 | -2.54 | 0.56 | -1.63 | 0.69 | 0.95 | 1.24 | |

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Peak Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.6 Shielded Room
 Date July 27, 2012
 Temperature / Humidity 21deg.C , 57%RH
 Engineer Hikaru Shirasawa
 Mode Tx, IEEE802.11n (HT40), PN9, worst antenna : 1 worst data mode : 0 (MCS)

(* P/M: Power Meter with power sensor, with gate trigger mode)

| Ch | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|------|----------------|--------------------------------|-----------------------|------------------------|--------|--------|-------|------|----------------|
| | | | | | [dBm] | [mW] | [dBm] | [mW] | |
| Low | 2422.0 | 1.27 | 1.48 | 20.25 | 23.00 | 199.53 | 30.00 | 1000 | 7.00 |
| Mid | 2437.0 | 1.28 | 1.48 | 20.25 | 23.01 | 199.99 | 30.00 | 1000 | 6.99 |
| High | 2452.0 | 1.16 | 1.48 | 20.25 | 22.89 | 194.54 | 30.00 | 1000 | 7.11 |

Sample Calculation:

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

[Pre check]

Antenna 2

(* P/M: Power Meter with power sensor, with gate trigger mode)

| | Mode (MCS) | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|---|---------------|----------------|--------------------------------|-----------------------|------------------------|--------|--------|-------|------|----------------|
| | | | | | | [dBm] | [mW] | [dBm] | [mW] | |
| 1 | 0 | 2422.0 | 0.92 | 1.48 | 20.25 | 22.65 | 184.08 | 30.00 | 1000 | 7.35 |
| 1 | 1 | 2422.0 | 0.59 | 1.48 | 20.25 | 22.32 | 170.61 | 30.00 | 1000 | 7.68 |
| 1 | 2 | 2422.0 | 0.27 | 1.48 | 20.25 | 22.00 | 158.49 | 30.00 | 1000 | 8.00 |
| 1 | 3 | 2422.0 | 0.54 | 1.48 | 20.25 | 22.27 | 168.66 | 30.00 | 1000 | 7.73 |
| 1 | 4 | 2422.0 | 0.58 | 1.48 | 20.25 | 22.31 | 170.22 | 30.00 | 1000 | 7.69 |
| 1 | 5 | 2422.0 | 0.78 | 1.48 | 20.25 | 22.51 | 178.24 | 30.00 | 1000 | 7.49 |
| 1 | 6 | 2422.0 | 0.54 | 1.48 | 20.25 | 22.27 | 168.66 | 30.00 | 1000 | 7.73 |
| 1 | 7 | 2422.0 | -2.11 | 1.48 | 20.25 | 19.62 | 91.62 | 30.00 | 1000 | 10.38 |

Antenna 1

| | Mode (MCS) | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|---|---------------|----------------|--------------------------------|-----------------------|------------------------|--------------|--------|-------|------|----------------|
| | | | | | | [dBm] | [mW] | [dBm] | [mW] | |
| 2 | 0 | 2422.0 | 1.15 | 1.48 | 20.25 | 22.88 | 194.09 | 30.00 | 1000 | 7.12 |
| 2 | 1 | 2422.0 | 0.52 | 1.48 | 20.25 | 22.25 | 167.88 | 30.00 | 1000 | 7.75 |
| 2 | 2 | 2422.0 | 0.35 | 1.48 | 20.25 | 22.08 | 161.44 | 30.00 | 1000 | 7.92 |
| 2 | 3 | 2422.0 | 0.72 | 1.48 | 20.25 | 22.45 | 175.79 | 30.00 | 1000 | 7.55 |
| 2 | 4 | 2422.0 | 0.43 | 1.48 | 20.25 | 22.16 | 164.44 | 30.00 | 1000 | 7.84 |
| 2 | 5 | 2422.0 | 0.54 | 1.48 | 20.25 | 22.27 | 168.66 | 30.00 | 1000 | 7.73 |
| 2 | 6 | 2422.0 | 0.61 | 1.48 | 20.25 | 22.34 | 171.40 | 30.00 | 1000 | 7.66 |
| 2 | 7 | 2422.0 | -2.21 | 1.48 | 20.25 | 19.52 | 89.54 | 30.00 | 1000 | 10.48 |

Worst

Sample Calculation:

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

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Peak Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date August 2, 2012
 Temperature / Humidity 25deg.C , 54%RH
 Engineer Hikaru Shirasawa
 Mode Tx, IEEE802.11n (HT40), PN9, worst data mode : 8 (MCS)

Antenna 1 + Antenna 2

| Ch | Freq. [MHz] | Result Ant 2 [mW] | Result Ant 1 [mW] | Result Ant 1 + Ant 2 | | Limit | | Margin [dB] |
|------|----------------|-------------------------|-------------------------|-------------------------|--------|-------|------|----------------|
| | | | | [dBm] | [mW] | [dBm] | [mW] | |
| Low | 2422.0 | 168.27 | 171.40 | 25.31 | 339.66 | 30.00 | 1000 | 4.69 |
| Mid | 2437.0 | 160.32 | 164.82 | 25.12 | 325.14 | 30.00 | 1000 | 4.88 |
| High | 2452.0 | 159.96 | 165.58 | 25.13 | 325.53 | 30.00 | 1000 | 4.87 |

Antenna 2

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

| Ch | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|------|----------------|--------------------------------|-----------------------|------------------------|--------|--------|-------|------|----------------|
| | | | | | [dBm] | [mW] | [dBm] | [mW] | |
| Low | 2422.0 | 0.63 | 1.48 | 20.15 | 22.26 | 168.27 | 30.00 | 1000 | 7.74 |
| Mid | 2437.0 | 0.42 | 1.48 | 20.15 | 22.05 | 160.32 | 30.00 | 1000 | 7.95 |
| High | 2452.0 | 0.41 | 1.48 | 20.15 | 22.04 | 159.96 | 30.00 | 1000 | 7.96 |

Antenna 1

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

| Ch | Freq. [MHz] | P/M (Peak) Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|------|----------------|--------------------------------|-----------------------|------------------------|--------|--------|-------|------|----------------|
| | | | | | [dBm] | [mW] | [dBm] | [mW] | |
| Low | 2422.0 | 0.71 | 1.48 | 20.15 | 22.34 | 171.40 | 30.00 | 1000 | 7.66 |
| Mid | 2437.0 | 0.54 | 1.48 | 20.15 | 22.17 | 164.82 | 30.00 | 1000 | 7.83 |
| High | 2452.0 | 0.56 | 1.48 | 20.15 | 22.19 | 165.58 | 30.00 | 1000 | 7.81 |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss

[Pre check]

| Mode (MCS) | Freq. [MHz] | Reding Antenna 2 | | Reding Antenna 1 | | Result Antenna 1 + 2 | | Worst |
|---------------|----------------|---------------------|------|---------------------|------|-------------------------|------|-------|
| | | [dBm] | [mW] | [dBm] | [mW] | [dBm] | [mW] | |
| 8 | 2422.0 | 0.66 | 1.16 | 0.72 | 1.18 | 3.70 | 2.34 | |
| 9 | 2422.0 | 0.45 | 1.11 | 0.61 | 1.15 | 3.54 | 2.26 | |
| 10 | 2422.0 | 0.52 | 1.13 | 0.50 | 1.12 | 3.52 | 2.25 | |
| 11 | 2422.0 | 0.57 | 1.14 | 0.51 | 1.12 | 3.55 | 2.26 | |
| 12 | 2422.0 | 0.58 | 1.14 | 0.65 | 1.16 | 3.63 | 2.30 | |
| 13 | 2422.0 | 0.20 | 1.05 | 0.40 | 1.10 | 3.31 | 2.14 | |
| 14 | 2422.0 | 0.41 | 1.10 | 0.39 | 1.09 | 3.41 | 2.19 | |
| 15 | 2422.0 | -2.20 | 0.60 | -1.81 | 0.66 | 1.01 | 1.26 | |

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/9/14 2012/9/15
 Temperature / Humidity 24 deg.C , 62%RH 26 deg.C , 65%RH
 Engineer Makoto Hosaka Shinichi Takano
 Mode Tx, 2412 MHz Antenna: ANT1468
 Tx, IEEE802.11b, PN9, worst antenna port 1, worst data mode 1Mbps

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|--------------|----------|
| Hori. | 2390.000 | PK | 46.3 | 27.4 | 24.5 | 41.4 | 56.8 | 73.9 | 17.1 | 123 | 151 | |
| Hori. | 2500.000 | PK | 50.3 | 27.6 | 24.6 | 41.4 | 61.1 | 73.9 | 12.8 | 155 | 177 | |
| Hori. | 2640.000 | PK | 45.8 | 27.8 | 24.7 | 41.4 | 56.9 | 73.9 | 17.0 | 157 | 359 | |
| Hori. | 4824.000 | PK | 48.7 | 31.1 | 6.8 | 41.2 | 45.4 | 73.9 | 28.5 | 100 | 218 | |
| Hori. | 5000.000 | PK | 51.7 | 31.7 | 7.0 | 40.9 | 49.5 | 73.9 | 24.4 | 100 | 213 | |
| Hori. | 7236.000 | PK | 47.1 | 36.6 | 8.5 | 41.4 | 50.8 | 73.9 | 23.1 | 100 | 0 | |
| Hori. | 9648.000 | PK | 45.2 | 38.6 | 9.4 | 38.9 | 54.3 | 73.9 | 19.6 | 100 | 254 | |
| Hori. | 12060.000 | PK | 47.5 | 39.5 | 10.7 | 39.4 | 58.3 | 73.9 | 15.6 | 100 | 0 | |
| Hori. | 2390.000 | AV | 34.5 | 27.4 | 24.5 | 41.4 | 45.0 | 53.9 | 8.9 | 123 | 151 | VBW:56Hz |
| Hori. | 2500.000 | AV | 41.9 | 27.6 | 24.6 | 41.4 | 52.7 | 53.9 | 1.2 | 155 | 177 | VBW:10Hz |
| Hori. | 2640.000 | AV | 35.7 | 27.8 | 24.7 | 41.4 | 46.8 | 53.9 | 7.1 | 157 | 359 | VBW:10Hz |
| Hori. | 4824.000 | AV | 42.6 | 31.1 | 6.8 | 41.2 | 39.3 | 53.9 | 14.6 | 100 | 218 | VBW:56Hz |
| Hori. | 5000.000 | AV | 44.7 | 31.7 | 7.0 | 40.9 | 42.5 | 53.9 | 11.4 | 100 | 213 | VBW:10Hz |
| Hori. | 7236.000 | AV | 36.4 | 36.6 | 8.5 | 41.4 | 40.1 | 53.9 | 13.8 | 100 | 0 | VBW:56Hz |
| Hori. | 9648.000 | AV | 34.7 | 38.6 | 9.4 | 38.9 | 43.8 | 53.9 | 10.1 | 100 | 254 | VBW:56Hz |
| Hori. | 12060.000 | AV | 35.2 | 39.5 | 10.7 | 39.4 | 46.0 | 53.9 | 7.9 | 100 | 0 | VBW:56Hz |
| Vert. | 2390.000 | PK | 47.0 | 27.4 | 24.5 | 41.4 | 57.5 | 73.9 | 16.4 | 100 | 156 | |
| Vert. | 2500.000 | PK | 50.4 | 27.6 | 24.6 | 41.4 | 61.2 | 73.9 | 12.7 | 153 | 185 | |
| Vert. | 2640.000 | PK | 46.7 | 27.8 | 24.7 | 41.4 | 57.8 | 73.9 | 16.1 | 117 | 187 | |
| Vert. | 4824.000 | PK | 49.5 | 31.1 | 6.8 | 41.2 | 46.2 | 73.9 | 27.7 | 100 | 218 | |
| Vert. | 7236.000 | PK | 47.5 | 36.6 | 8.5 | 41.4 | 51.2 | 73.9 | 22.7 | 100 | 0 | |
| Vert. | 9648.000 | PK | 45.9 | 38.6 | 9.4 | 38.9 | 55.0 | 73.9 | 18.9 | 161 | 119 | |
| Vert. | 12060.000 | PK | 46.4 | 39.5 | 10.7 | 39.4 | 57.2 | 73.9 | 16.7 | 100 | 0 | |
| Vert. | 2390.000 | AV | 34.6 | 27.4 | 24.5 | 41.4 | 45.1 | 53.9 | 8.8 | 100 | 156 | VBW:56Hz |
| Vert. | 2500.000 | AV | 42.4 | 27.6 | 24.6 | 41.4 | 53.2 | 53.9 | 0.7 | 153 | 185 | VBW:10Hz |
| Vert. | 2640.000 | AV | 36.6 | 27.8 | 24.7 | 41.4 | 47.7 | 53.9 | 6.2 | 117 | 187 | VBW:10Hz |
| Vert. | 4824.000 | AV | 42.6 | 31.1 | 6.8 | 41.2 | 39.3 | 53.9 | 14.6 | 100 | 218 | VBW:56Hz |
| Vert. | 7236.000 | AV | 36.3 | 36.6 | 8.5 | 41.4 | 40.0 | 53.9 | 13.9 | 100 | 0 | VBW:56Hz |
| Vert. | 9648.000 | AV | 35.7 | 38.6 | 9.4 | 38.9 | 44.8 | 53.9 | 9.1 | 161 | 119 | VBW:56Hz |
| Vert. | 12060.000 | AV | 35.0 | 39.5 | 10.7 | 39.4 | 45.8 | 53.9 | 8.1 | 100 | 0 | VBW:56Hz |

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

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

*No noise was detected other than listed points.

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

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|-----------------|----------------|-------------|-----------|
| Hori. | 2412.000 | PK | 89.2 | 27.5 | 24.5 | 41.4 | 99.8 | - | - | 100k/300k |
| Hori. | 2400.000 | PK | 47.1 | 27.4 | 24.5 | 41.4 | 57.6 | 79.8 | 22.2 | 100k/300k |
| Vert. | 2412.000 | PK | 89.6 | 27.5 | 24.5 | 41.4 | 100.2 | - | - | 100k/300k |
| Vert. | 2400.000 | PK | 47.3 | 27.4 | 24.5 | 41.4 | 57.8 | 80.2 | 22.4 | 100k/300k |

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/9/14 2012/9/15
 Temperature / Humidity 24 deg.C , 62%RH 26 deg.C , 65%RH
 Engineer Makoto Hosaka Shinichi Takano
 Mode Tx, 2437 MHz Antenna: ANT1468
 Tx, IEEE802.11b, PN9, worst antenna port 1, worst data mode 1Mbps

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|--------------|----------|
| Hori. | 2500.000 | PK | 50.7 | 27.6 | 24.6 | 41.4 | 61.5 | 73.9 | 12.4 | 153 | 182 | |
| Hori. | 2640.000 | PK | 45.9 | 27.8 | 24.7 | 41.4 | 57.0 | 73.9 | 16.9 | 159 | 359 | |
| Hori. | 4874.000 | PK | 48.8 | 31.3 | 6.9 | 41.1 | 45.9 | 73.9 | 28.0 | 104 | 210 | |
| Hori. | 5000.000 | PK | 51.3 | 31.7 | 7.0 | 40.9 | 49.1 | 73.9 | 24.8 | 100 | 203 | |
| Hori. | 7311.000 | PK | 46.8 | 36.6 | 8.6 | 41.4 | 50.6 | 73.9 | 23.3 | 100 | 0 | |
| Hori. | 9748.000 | PK | 45.4 | 38.7 | 9.5 | 38.9 | 54.7 | 73.9 | 19.2 | 129 | 167 | |
| Hori. | 12185.000 | PK | 44.2 | 39.5 | 10.7 | 39.3 | 55.1 | 73.9 | 18.8 | 100 | 0 | |
| Hori. | 2500.000 | AV | 42.1 | 27.6 | 24.6 | 41.4 | 52.9 | 53.9 | 1.0 | 153 | 182 | VBW:10Hz |
| Hori. | 2640.000 | AV | 35.4 | 27.8 | 24.7 | 41.4 | 46.5 | 53.9 | 7.4 | 159 | 359 | VBW:10Hz |
| Hori. | 4874.000 | AV | 42.0 | 31.3 | 6.9 | 41.1 | 39.1 | 53.9 | 14.8 | 104 | 210 | VBW:56Hz |
| Hori. | 5000.000 | AV | 44.6 | 31.7 | 7.0 | 40.9 | 42.4 | 53.9 | 11.5 | 100 | 203 | VBW:10Hz |
| Hori. | 7311.000 | AV | 35.6 | 36.6 | 8.6 | 41.4 | 39.4 | 53.9 | 14.5 | 100 | 0 | VBW:56Hz |
| Hori. | 9748.000 | AV | 34.9 | 38.7 | 9.5 | 38.9 | 44.2 | 53.9 | 9.7 | 129 | 167 | VBW:56Hz |
| Hori. | 12185.000 | AV | 33.4 | 39.5 | 10.7 | 39.3 | 44.3 | 53.9 | 9.6 | 100 | 0 | VBW:56Hz |
| Vert. | 2500.000 | PK | 50.9 | 27.6 | 24.6 | 41.4 | 61.7 | 73.9 | 12.2 | 122 | 157 | |
| Vert. | 2640.000 | PK | 46.8 | 27.8 | 24.7 | 41.4 | 57.9 | 73.9 | 16.0 | 100 | 0 | |
| Vert. | 4874.000 | PK | 49.0 | 31.3 | 6.9 | 41.1 | 46.1 | 73.9 | 27.8 | 100 | 333 | |
| Vert. | 7311.000 | PK | 46.9 | 36.6 | 8.6 | 41.4 | 50.7 | 73.9 | 23.2 | 100 | 0 | |
| Vert. | 9748.000 | PK | 45.7 | 38.7 | 9.5 | 38.9 | 55.0 | 73.9 | 18.9 | 154 | 120 | |
| Vert. | 12185.000 | PK | 44.1 | 39.5 | 10.7 | 39.3 | 55.0 | 73.9 | 18.9 | 100 | 0 | |
| Vert. | 2500.000 | AV | 42.0 | 27.6 | 24.6 | 41.4 | 52.8 | 53.9 | 1.1 | 122 | 157 | VBW:10Hz |
| Vert. | 2640.000 | AV | 35.5 | 27.8 | 24.7 | 41.4 | 46.6 | 53.9 | 7.3 | 100 | 0 | VBW:10Hz |
| Vert. | 4874.000 | AV | 41.9 | 31.3 | 6.9 | 41.1 | 39.0 | 53.9 | 14.9 | 100 | 333 | VBW:56Hz |
| Vert. | 7311.000 | AV | 35.5 | 36.6 | 8.6 | 41.4 | 39.3 | 53.9 | 14.6 | 100 | 0 | VBW:56Hz |
| Vert. | 9748.000 | AV | 35.1 | 38.7 | 9.5 | 38.9 | 44.4 | 53.9 | 9.5 | 154 | 120 | VBW:56Hz |
| Vert. | 12185.000 | AV | 33.2 | 39.5 | 10.7 | 39.3 | 44.1 | 53.9 | 9.8 | 100 | 0 | VBW:56Hz |

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

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

*No noise was detected other than listed points.

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/9/14 2012/9/15
 Temperature / Humidity 24 deg.C , 62%RH 26 deg.C , 65%RH
 Engineer Makoto Hosaka Shinichi Takano
 Mode Tx, 2462 MHz Antenna: ANT1468
 Tx, IEEE802.11b, PN9, worst antenna port 1, worst data mode 1Mbps

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|--------------|----------|
| Hori. | 2483.500 | PK | 46.1 | 27.5 | 24.6 | 41.4 | 56.8 | 73.9 | 17.1 | 120 | 151 | |
| Hori. | 2500.000 | PK | 50.1 | 27.6 | 24.6 | 41.4 | 60.9 | 73.9 | 13.0 | 150 | 179 | |
| Hori. | 2640.000 | PK | 46.4 | 27.8 | 24.7 | 41.4 | 57.5 | 73.9 | 16.4 | 100 | 0 | |
| Hori. | 4924.000 | PK | 48.4 | 31.5 | 6.9 | 41.0 | 45.8 | 73.9 | 28.1 | 100 | 17 | |
| Hori. | 5000.000 | PK | 51.5 | 31.7 | 7.0 | 40.9 | 49.3 | 73.9 | 24.6 | 100 | 212 | |
| Hori. | 7386.000 | PK | 47.0 | 36.7 | 8.7 | 41.5 | 50.9 | 73.9 | 23.0 | 100 | 0 | |
| Hori. | 9848.000 | PK | 44.4 | 38.9 | 9.5 | 38.9 | 53.9 | 73.9 | 20.0 | 100 | 220 | |
| Hori. | 12310.000 | PK | 43.4 | 39.5 | 10.8 | 39.3 | 54.4 | 73.9 | 19.5 | 100 | 0 | |
| Hori. | 2483.500 | AV | 34.5 | 27.5 | 24.6 | 41.4 | 45.2 | 53.9 | 8.7 | 120 | 151 | VBW:56Hz |
| Hori. | 2500.000 | AV | 42.5 | 27.6 | 24.6 | 41.4 | 53.3 | 53.9 | 0.6 | 150 | 179 | VBW:10Hz |
| Hori. | 2640.000 | AV | 34.8 | 27.8 | 24.7 | 41.4 | 45.9 | 53.9 | 8.0 | 100 | 0 | VBW:10Hz |
| Hori. | 4924.000 | AV | 42.3 | 31.5 | 6.9 | 41.0 | 39.7 | 53.9 | 14.2 | 100 | 17 | VBW:56Hz |
| Hori. | 5000.000 | AV | 44.9 | 31.7 | 7.0 | 40.9 | 42.7 | 53.9 | 11.2 | 100 | 212 | VBW:10Hz |
| Hori. | 7386.000 | AV | 35.4 | 36.7 | 8.7 | 41.5 | 39.3 | 53.9 | 14.6 | 100 | 0 | VBW:56Hz |
| Hori. | 9848.000 | AV | 34.6 | 38.9 | 9.5 | 38.9 | 44.1 | 53.9 | 9.8 | 100 | 220 | VBW:56Hz |
| Hori. | 12310.000 | AV | 32.4 | 39.5 | 10.8 | 39.3 | 43.4 | 53.9 | 10.5 | 100 | 0 | VBW:56Hz |
| Vert. | 2483.500 | PK | 47.5 | 27.5 | 24.6 | 41.4 | 58.2 | 73.9 | 15.7 | 117 | 17 | |
| Vert. | 2500.000 | PK | 50.4 | 27.6 | 24.6 | 41.4 | 61.2 | 73.9 | 12.7 | 124 | 157 | |
| Vert. | 2640.000 | PK | 46.5 | 27.8 | 24.7 | 41.4 | 57.6 | 73.9 | 16.3 | 100 | 0 | |
| Vert. | 4924.000 | PK | 49.3 | 31.5 | 6.9 | 41.0 | 46.7 | 73.9 | 27.2 | 100 | 37 | |
| Vert. | 7386.000 | PK | 46.3 | 36.7 | 8.7 | 41.5 | 50.2 | 73.9 | 23.7 | 100 | 0 | |
| Vert. | 9848.000 | PK | 44.2 | 38.9 | 9.5 | 38.9 | 53.7 | 73.9 | 20.2 | 157 | 116 | |
| Vert. | 12310.000 | PK | 43.1 | 39.5 | 10.8 | 39.3 | 54.1 | 73.9 | 19.8 | 100 | 0 | |
| Vert. | 2483.500 | AV | 35.1 | 27.5 | 24.6 | 41.4 | 45.8 | 53.9 | 8.1 | 117 | 17 | VBW:56Hz |
| Vert. | 2500.000 | AV | 42.3 | 27.6 | 24.6 | 41.4 | 53.1 | 53.9 | 0.8 | 124 | 157 | VBW:10Hz |
| Vert. | 2640.000 | AV | 35.0 | 27.8 | 24.7 | 41.4 | 46.1 | 53.9 | 7.8 | 100 | 0 | VBW:10Hz |
| Vert. | 4924.000 | AV | 43.0 | 31.5 | 6.9 | 41.0 | 40.4 | 53.9 | 13.5 | 100 | 37 | VBW:56Hz |
| Vert. | 7386.000 | AV | 35.3 | 36.7 | 8.7 | 41.5 | 39.2 | 53.9 | 14.7 | 100 | 0 | VBW:56Hz |
| Vert. | 9848.000 | AV | 34.0 | 38.9 | 9.5 | 38.9 | 43.5 | 53.9 | 10.4 | 157 | 116 | VBW:56Hz |
| Vert. | 12310.000 | AV | 32.3 | 39.5 | 10.8 | 39.3 | 43.3 | 53.9 | 10.6 | 100 | 0 | VBW:56Hz |

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

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

*No noise was detected other than listed points.

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date 2012/9/5 2012/9/6
Temperature / Humidity 25 deg.C , 60%RH 26 deg.C , 62%RH
Engineer Makoto Hosaka Makoto Hosaka
Mode Tx, 2412 MHz Antenna: ANT1431-161C/M-AB-58
Tx, IEEE802.11b, PN9, worst antenna port 1, worst data mode 1Mbps

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|--------------|----------|
| Hori. | 2390.000 | PK | 47.2 | 27.4 | 24.5 | 41.4 | 57.7 | 73.9 | 16.2 | 100 | 239 | |
| Hori. | 2500.000 | PK | 49.7 | 27.6 | 24.6 | 41.4 | 60.5 | 73.9 | 13.4 | 100 | 282 | |
| Hori. | 2640.000 | PK | 47.5 | 27.8 | 24.7 | 41.4 | 58.6 | 73.9 | 15.3 | 100 | 0 | |
| Hori. | 4824.000 | PK | 51.6 | 31.1 | 6.8 | 41.2 | 48.3 | 73.9 | 25.6 | 100 | 16 | |
| Hori. | 7236.000 | PK | 47.8 | 36.6 | 8.5 | 41.4 | 51.5 | 73.9 | 22.4 | 100 | 0 | |
| Hori. | 9648.000 | PK | 45.1 | 38.6 | 9.4 | 38.9 | 54.2 | 73.9 | 19.7 | 100 | 0 | |
| Hori. | 12060.000 | PK | 46.3 | 39.5 | 10.7 | 39.4 | 57.1 | 73.9 | 16.8 | 100 | 0 | |
| Hori. | 2390.000 | AV | 34.7 | 27.4 | 24.5 | 41.4 | 45.2 | 53.9 | 8.7 | 100 | 239 | VBW:56Hz |
| Hori. | 2500.000 | AV | 41.1 | 27.6 | 24.6 | 41.4 | 51.9 | 53.9 | 2.0 | 100 | 282 | VBW:10Hz |
| Hori. | 2640.000 | AV | 34.9 | 27.8 | 24.7 | 41.4 | 46.0 | 53.9 | 7.9 | 100 | 0 | VBW:10Hz |
| Hori. | 4824.000 | AV | 44.1 | 31.1 | 6.8 | 41.2 | 40.8 | 53.9 | 13.1 | 100 | 16 | VBW:56Hz |
| Hori. | 7236.000 | AV | 35.8 | 36.6 | 8.5 | 41.4 | 39.5 | 53.9 | 14.4 | 100 | 0 | VBW:56Hz |
| Hori. | 9648.000 | AV | 33.0 | 38.6 | 9.4 | 38.9 | 42.1 | 53.9 | 11.8 | 100 | 0 | VBW:56Hz |
| Hori. | 12060.000 | AV | 34.5 | 39.5 | 10.7 | 39.4 | 45.3 | 53.9 | 8.6 | 100 | 0 | VBW:56Hz |
| Vert. | 2390.000 | PK | 47.0 | 27.4 | 24.5 | 41.4 | 57.5 | 73.9 | 16.4 | 113 | 202 | |
| Vert. | 2500.000 | PK | 50.7 | 27.6 | 24.6 | 41.4 | 61.5 | 73.9 | 12.4 | 137 | 249 | |
| Vert. | 2640.000 | PK | 48.5 | 27.8 | 24.7 | 41.4 | 59.6 | 73.9 | 14.3 | 100 | 65 | |
| Vert. | 4824.000 | PK | 50.0 | 31.1 | 6.8 | 41.2 | 46.7 | 73.9 | 27.2 | 100 | 199 | |
| Vert. | 7236.000 | PK | 48.9 | 36.6 | 8.5 | 41.4 | 52.6 | 73.9 | 21.3 | 100 | 0 | |
| Vert. | 9648.000 | PK | 45.1 | 38.6 | 9.4 | 38.9 | 54.2 | 73.9 | 19.7 | 100 | 0 | |
| Vert. | 12060.000 | PK | 46.6 | 39.5 | 10.7 | 39.4 | 57.4 | 73.9 | 16.5 | 100 | 0 | |
| Vert. | 2390.000 | AV | 34.6 | 27.4 | 24.5 | 41.4 | 45.1 | 53.9 | 8.8 | 113 | 202 | VBW:56Hz |
| Vert. | 2500.000 | AV | 41.7 | 27.6 | 24.6 | 41.4 | 52.5 | 53.9 | 1.4 | 137 | 249 | VBW:10Hz |
| Vert. | 2640.000 | AV | 34.9 | 27.8 | 24.7 | 41.4 | 46.0 | 53.9 | 7.9 | 100 | 65 | VBW:10Hz |
| Vert. | 4824.000 | AV | 41.0 | 31.1 | 6.8 | 41.2 | 37.7 | 53.9 | 16.2 | 100 | 199 | VBW:56Hz |
| Vert. | 7236.000 | AV | 35.7 | 36.6 | 8.5 | 41.4 | 39.4 | 53.9 | 14.5 | 100 | 0 | VBW:56Hz |
| Vert. | 9648.000 | AV | 32.8 | 38.6 | 9.4 | 38.9 | 41.9 | 53.9 | 12.0 | 100 | 0 | VBW:56Hz |
| Vert. | 12060.000 | AV | 34.3 | 39.5 | 10.7 | 39.4 | 45.1 | 53.9 | 8.8 | 100 | 0 | VBW:56Hz |

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

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

*No noise was detected other than listed points.

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

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|-----------------|----------------|-------------|-----------|
| Hori. | 2412.000 | PK | 89.2 | 27.5 | 24.5 | 41.4 | 99.8 | - | - | 100k/300k |
| Hori. | 2400.000 | PK | 47.3 | 27.4 | 24.5 | 41.4 | 57.8 | 79.8 | 22.0 | 100k/300k |
| Vert. | 2412.000 | PK | 88.2 | 27.5 | 24.5 | 41.4 | 98.8 | - | - | 100k/300k |
| Vert. | 2400.000 | PK | 45.9 | 27.4 | 24.5 | 41.4 | 56.4 | 78.8 | 22.4 | 100k/300k |

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date 2012/9/5 2012/9/6
Temperature / Humidity 25 deg.C , 60%RH 26 deg.C , 62%RH
Engineer Makoto Hosaka Makoto Hosaka
Mode Tx, 2437 MHz Antenna: ANT1431-161C/M-AB-58
Tx, IEEE802.11b, PN9, worst antenna port 1, worst data mode 1Mbps

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|--------------|----------|
| Hori. | 2500.000 | PK | 49.9 | 27.6 | 24.6 | 41.4 | 60.7 | 73.9 | 13.2 | 100 | 284 | |
| Hori. | 2640.000 | PK | 47.8 | 27.8 | 24.7 | 41.4 | 58.9 | 73.9 | 15.0 | 100 | 319 | |
| Hori. | 4874.000 | PK | 50.2 | 31.3 | 6.9 | 41.1 | 47.3 | 73.9 | 26.6 | 100 | 16 | |
| Hori. | 7311.000 | PK | 47.3 | 36.6 | 8.6 | 41.4 | 51.1 | 73.9 | 22.8 | 100 | 0 | |
| Hori. | 9748.000 | PK | 44.8 | 38.7 | 9.5 | 38.9 | 54.1 | 73.9 | 19.8 | 100 | 0 | |
| Hori. | 12185.000 | PK | 45.2 | 39.5 | 10.7 | 39.3 | 56.1 | 73.9 | 17.8 | 100 | 0 | |
| Hori. | 2500.000 | AV | 41.3 | 27.6 | 24.6 | 41.4 | 52.1 | 53.9 | 1.8 | 100 | 284 | VBW:10Hz |
| Hori. | 2640.000 | AV | 36.9 | 27.8 | 24.7 | 41.4 | 48.0 | 53.9 | 5.9 | 100 | 319 | VBW:10Hz |
| Hori. | 4874.000 | AV | 42.8 | 31.3 | 6.9 | 41.1 | 39.9 | 53.9 | 14.0 | 100 | 16 | VBW:56Hz |
| Hori. | 7311.000 | AV | 35.0 | 36.6 | 8.6 | 41.4 | 38.8 | 53.9 | 15.1 | 100 | 0 | VBW:56Hz |
| Hori. | 9748.000 | AV | 32.4 | 38.7 | 9.5 | 38.9 | 41.7 | 53.9 | 12.2 | 100 | 0 | VBW:56Hz |
| Hori. | 12185.000 | AV | 32.7 | 39.5 | 10.7 | 39.3 | 43.6 | 53.9 | 10.3 | 100 | 0 | VBW:56Hz |
| Vert. | 2500.000 | PK | 49.3 | 27.6 | 24.6 | 41.4 | 60.1 | 73.9 | 13.8 | 159 | 258 | |
| Vert. | 2640.000 | PK | 47.4 | 27.8 | 24.7 | 41.4 | 58.5 | 73.9 | 15.4 | 100 | 68 | |
| Vert. | 4874.000 | PK | 49.6 | 31.3 | 6.9 | 41.1 | 46.7 | 73.9 | 27.2 | 100 | 211 | |
| Vert. | 7311.000 | PK | 47.3 | 36.6 | 8.6 | 41.4 | 51.1 | 73.9 | 22.8 | 100 | 0 | |
| Vert. | 9748.000 | PK | 45.6 | 38.7 | 9.5 | 38.9 | 54.9 | 73.9 | 19.0 | 100 | 0 | |
| Vert. | 12185.000 | PK | 44.8 | 39.5 | 10.7 | 39.3 | 55.7 | 73.9 | 18.2 | 100 | 0 | |
| Vert. | 2500.000 | AV | 40.8 | 27.6 | 24.6 | 41.4 | 51.6 | 53.9 | 2.3 | 159 | 258 | VBW:10Hz |
| Vert. | 2640.000 | AV | 36.1 | 27.8 | 24.7 | 41.4 | 47.2 | 53.9 | 6.7 | 100 | 68 | VBW:10Hz |
| Vert. | 4874.000 | AV | 42.1 | 31.3 | 6.9 | 41.1 | 39.2 | 53.9 | 14.7 | 100 | 211 | VBW:56Hz |
| Vert. | 7311.000 | AV | 35.2 | 36.6 | 8.6 | 41.4 | 39.0 | 53.9 | 14.9 | 100 | 0 | VBW:56Hz |
| Vert. | 9748.000 | AV | 33.4 | 38.7 | 9.5 | 38.9 | 42.7 | 53.9 | 11.2 | 100 | 0 | VBW:56Hz |
| Vert. | 12185.000 | AV | 32.9 | 39.5 | 10.7 | 39.3 | 43.8 | 53.9 | 10.1 | 100 | 0 | VBW:56Hz |

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

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

*No noise was detected other than listed points.

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/9/5 2012/9/6
 Temperature / Humidity 25 deg.C , 60%RH 26 deg.C , 62%RH
 Engineer Makoto Hosaka Makoto Hosaka
 Mode Tx, 2462 MHz Antenna: ANT1431-161C/M-AB-58
 Tx, IEEE802.11b, PN9, worst antenna port 1, worst data mode 1Mbps

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|--------------|----------|
| Hori. | 2483.500 | PK | 47.7 | 27.5 | 24.6 | 41.4 | 58.4 | 73.9 | 15.5 | 100 | 236 | |
| Hori. | 2500.000 | PK | 49.9 | 27.6 | 24.6 | 41.4 | 60.7 | 73.9 | 13.2 | 100 | 282 | |
| Hori. | 2640.000 | PK | 48.5 | 27.8 | 24.7 | 41.4 | 59.6 | 73.9 | 14.3 | 100 | 317 | |
| Hori. | 4924.000 | PK | 50.5 | 31.5 | 6.9 | 41.0 | 47.9 | 73.9 | 26.0 | 100 | 19 | |
| Hori. | 7386.000 | PK | 47.5 | 36.7 | 8.7 | 41.5 | 51.4 | 73.9 | 22.5 | 100 | 0 | |
| Hori. | 9848.000 | PK | 44.7 | 38.9 | 9.5 | 38.9 | 54.2 | 73.9 | 19.7 | 100 | 0 | |
| Hori. | 12310.000 | PK | 44.9 | 39.5 | 10.8 | 39.3 | 55.9 | 73.9 | 18.0 | 100 | 0 | |
| Hori. | 2483.500 | AV | 34.9 | 27.5 | 24.6 | 41.4 | 45.6 | 53.9 | 8.3 | 100 | 236 | VBW:56Hz |
| Hori. | 2500.000 | AV | 41.2 | 27.6 | 24.6 | 41.4 | 52.0 | 53.9 | 1.9 | 100 | 282 | VBW:10Hz |
| Hori. | 2640.000 | AV | 36.6 | 27.8 | 24.7 | 41.4 | 47.7 | 53.9 | 6.2 | 100 | 317 | VBW:10Hz |
| Hori. | 4924.000 | AV | 42.4 | 31.5 | 6.9 | 41.0 | 39.8 | 53.9 | 14.1 | 100 | 19 | VBW:56Hz |
| Hori. | 7386.000 | AV | 34.8 | 36.7 | 8.7 | 41.5 | 38.7 | 53.9 | 15.2 | 100 | 0 | VBW:56Hz |
| Hori. | 9848.000 | AV | 31.7 | 38.9 | 9.5 | 38.9 | 41.2 | 53.9 | 12.7 | 100 | 0 | VBW:56Hz |
| Hori. | 12310.000 | AV | 31.7 | 39.5 | 10.8 | 39.3 | 42.7 | 53.9 | 11.2 | 100 | 0 | VBW:56Hz |
| Vert. | 2483.500 | PK | 47.3 | 27.5 | 24.6 | 41.4 | 58.0 | 73.9 | 15.9 | 146 | 257 | |
| Vert. | 2500.000 | PK | 50.1 | 27.6 | 24.6 | 41.4 | 60.9 | 73.9 | 13.0 | 130 | 250 | |
| Vert. | 2640.000 | PK | 46.3 | 27.8 | 24.7 | 41.4 | 57.4 | 73.9 | 16.5 | 100 | 75 | |
| Vert. | 4924.000 | PK | 50.3 | 31.5 | 6.9 | 41.0 | 47.7 | 73.9 | 26.2 | 100 | 185 | |
| Vert. | 7386.000 | PK | 46.7 | 36.7 | 8.7 | 41.5 | 50.6 | 73.9 | 23.3 | 100 | 0 | |
| Vert. | 9848.000 | PK | 44.3 | 38.9 | 9.5 | 38.9 | 53.8 | 73.9 | 20.1 | 100 | 0 | |
| Vert. | 12310.000 | PK | 44.0 | 39.5 | 10.8 | 39.3 | 55.0 | 73.9 | 18.9 | 100 | 0 | |
| Vert. | 2483.500 | AV | 34.5 | 27.5 | 24.6 | 41.4 | 45.2 | 53.9 | 8.7 | 146 | 257 | VBW:56Hz |
| Vert. | 2500.000 | AV | 41.2 | 27.6 | 24.6 | 41.4 | 52.0 | 53.9 | 1.9 | 130 | 250 | VBW:10Hz |
| Vert. | 2640.000 | AV | 34.7 | 27.8 | 24.7 | 41.4 | 45.8 | 53.9 | 8.1 | 100 | 75 | VBW:10Hz |
| Vert. | 4924.000 | AV | 43.3 | 31.5 | 6.9 | 41.0 | 40.7 | 53.9 | 13.2 | 100 | 185 | VBW:56Hz |
| Vert. | 7386.000 | AV | 34.9 | 36.7 | 8.7 | 41.5 | 38.8 | 53.9 | 15.1 | 100 | 0 | VBW:56Hz |
| Vert. | 9848.000 | AV | 32.1 | 38.9 | 9.5 | 38.9 | 41.6 | 53.9 | 12.3 | 100 | 0 | VBW:56Hz |
| Vert. | 12310.000 | AV | 31.6 | 39.5 | 10.8 | 39.3 | 42.6 | 53.9 | 11.3 | 100 | 0 | VBW:56Hz |

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

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

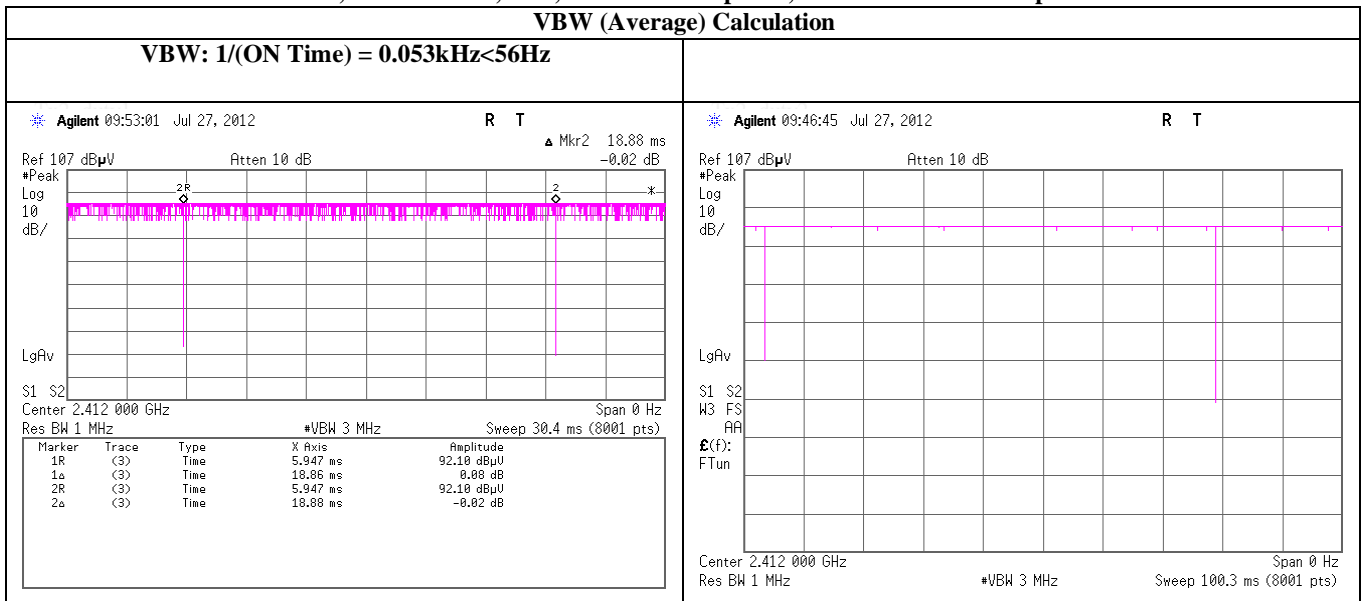
*No noise was detected other than listed points.

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

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VBW(Average) Calculation chart

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



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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date 2012/9/14 2012/9/15
Temperature / Humidity 24 deg.C , 62%RH 26 deg.C , 65%RH
Engineer Makoto Hosaka Shinichi Takano
Mode Tx, 2412 MHz Antenna: ANT1468
Tx, IEEE802.11g, PN9, worst antenna port 1, worst data mode 6Mbps

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|--------------|-----------|
| Hori. | 2287.990 | PK | 45.9 | 27.3 | 24.4 | 41.3 | 56.3 | 73.9 | 17.6 | 100 | 0 | |
| Hori. | 2390.000 | PK | 59.4 | 27.4 | 24.5 | 41.4 | 69.9 | 73.9 | 4.0 | 125 | 153 | |
| Hori. | 2500.000 | PK | 50.5 | 27.6 | 24.6 | 41.4 | 61.3 | 73.9 | 12.6 | 152 | 178 | |
| Hori. | 4824.000 | PK | 50.4 | 31.1 | 6.8 | 41.2 | 47.1 | 73.9 | 26.8 | 100 | 155 | |
| Hori. | 5000.000 | PK | 52.0 | 31.7 | 7.0 | 40.9 | 49.8 | 73.9 | 24.1 | 100 | 218 | |
| Hori. | 7236.000 | PK | 48.0 | 36.6 | 8.5 | 41.4 | 51.7 | 73.9 | 22.2 | 100 | 0 | |
| Hori. | 9648.000 | PK | 44.8 | 38.6 | 9.4 | 38.9 | 53.9 | 73.9 | 20.0 | 100 | 255 | |
| Hori. | 12060.000 | PK | 46.0 | 39.5 | 10.7 | 39.4 | 56.8 | 73.9 | 17.1 | 100 | 0 | |
| Hori. | 2287.990 | AV | 35.0 | 27.3 | 24.4 | 41.3 | 45.4 | 53.9 | 8.5 | 100 | 0 | VBW:10Hz |
| Hori. | 2390.000 | AV | 40.4 | 27.4 | 24.5 | 41.4 | 50.9 | 53.9 | 3.0 | 125 | 153 | VBW:330Hz |
| Hori. | 2500.000 | AV | 41.7 | 27.6 | 24.6 | 41.4 | 52.5 | 53.9 | 1.4 | 152 | 178 | VBW:10Hz |
| Hori. | 4824.000 | AV | 38.2 | 31.1 | 6.8 | 41.2 | 34.9 | 53.9 | 19.0 | 100 | 155 | VBW:330Hz |
| Hori. | 5000.000 | AV | 44.9 | 31.7 | 7.0 | 40.9 | 42.7 | 53.9 | 11.2 | 100 | 218 | VBW:330Hz |
| Hori. | 7236.000 | AV | 36.5 | 36.6 | 8.5 | 41.4 | 40.2 | 53.9 | 13.7 | 100 | 0 | VBW:330Hz |
| Hori. | 9648.000 | AV | 34.7 | 38.6 | 9.4 | 38.9 | 43.8 | 53.9 | 10.1 | 100 | 255 | VBW:330Hz |
| Hori. | 12060.000 | AV | 35.0 | 39.5 | 10.7 | 39.4 | 45.8 | 53.9 | 8.1 | 100 | 0 | VBW:330Hz |
| Vert. | 2287.990 | PK | 48.1 | 27.3 | 24.4 | 41.3 | 58.5 | 73.9 | 15.4 | 100 | 294 | |
| Vert. | 2390.000 | PK | 58.6 | 27.4 | 24.5 | 41.4 | 69.1 | 73.9 | 4.8 | 100 | 155 | |
| Vert. | 2500.000 | PK | 50.7 | 27.6 | 24.6 | 41.4 | 61.5 | 73.9 | 12.4 | 152 | 188 | |
| Vert. | 4824.000 | PK | 49.2 | 31.1 | 6.8 | 41.2 | 45.9 | 73.9 | 28.0 | 100 | 218 | |
| Vert. | 7236.000 | PK | 47.2 | 36.6 | 8.5 | 41.4 | 50.9 | 73.9 | 23.0 | 100 | 0 | |
| Vert. | 9648.000 | PK | 45.9 | 38.6 | 9.4 | 38.9 | 55.0 | 73.9 | 18.9 | 146 | 120 | |
| Vert. | 12060.000 | PK | 47.0 | 39.5 | 10.7 | 39.4 | 57.8 | 73.9 | 16.1 | 100 | 0 | |
| Vert. | 2287.990 | AV | 36.6 | 27.3 | 24.4 | 41.3 | 47.0 | 53.9 | 6.9 | 100 | 294 | VBW:10Hz |
| Vert. | 2390.000 | AV | 40.2 | 27.4 | 24.5 | 41.4 | 50.7 | 53.9 | 3.2 | 100 | 155 | VBW:330Hz |
| Vert. | 2500.000 | AV | 42.2 | 27.6 | 24.6 | 41.4 | 53.0 | 53.9 | 0.9 | 152 | 188 | VBW:10Hz |
| Vert. | 4824.000 | AV | 38.1 | 31.1 | 6.8 | 41.2 | 34.8 | 53.9 | 19.1 | 100 | 218 | VBW:330Hz |
| Vert. | 7236.000 | AV | 36.6 | 36.6 | 8.5 | 41.4 | 40.3 | 53.9 | 13.6 | 100 | 0 | VBW:330Hz |
| Vert. | 9648.000 | AV | 35.8 | 38.6 | 9.4 | 38.9 | 44.9 | 53.9 | 9.0 | 146 | 120 | VBW:330Hz |
| Vert. | 12060.000 | AV | 35.4 | 39.5 | 10.7 | 39.4 | 46.2 | 53.9 | 7.7 | 100 | 0 | VBW:330Hz |

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

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

*No noise was detected other than listed points.

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

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|-----------------|----------------|-------------|-----------|
| Hori. | 2412.000 | PK | 91.0 | 27.5 | 24.5 | 41.4 | 101.6 | - | - | 100k/300k |
| Hori. | 2400.000 | PK | 61.4 | 27.4 | 24.5 | 41.4 | 71.9 | 81.6 | 9.7 | 100k/300k |
| Vert. | 2412.000 | PK | 89.6 | 27.5 | 24.5 | 41.4 | 100.2 | - | - | 100k/300k |
| Vert. | 2400.000 | PK | 60.5 | 27.4 | 24.5 | 41.4 | 71.0 | 80.2 | 9.2 | 100k/300k |

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/9/14 2012/9/15
 Temperature / Humidity 24 deg.C , 62%RH 26 deg.C , 65%RH
 Engineer Makoto Hosaka Shinichi Takano
 Mode Tx, 2437 MHz Antenna: ANT1468
 Tx, IEEE802.11g, PN9, worst antenna port 1, worst data mode 6Mbps

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|-----------------|-----------|
| Hori. | 2287.990 | PK | 47.0 | 27.3 | 24.4 | 41.3 | 57.4 | 73.9 | 16.5 | 100 | 151 | |
| Hori. | 2500.000 | PK | 50.3 | 27.6 | 24.6 | 41.4 | 61.1 | 73.9 | 12.8 | 152 | 180 | |
| Hori. | 2640.000 | PK | 47.7 | 27.8 | 24.7 | 41.4 | 58.8 | 73.9 | 15.1 | 100 | 14 | |
| Hori. | 4874.000 | PK | 50.3 | 31.3 | 6.9 | 41.1 | 47.4 | 73.9 | 26.5 | 100 | 170 | |
| Hori. | 5000.000 | PK | 52.0 | 31.7 | 7.0 | 40.9 | 49.8 | 73.9 | 24.1 | 100 | 220 | |
| Hori. | 7311.000 | PK | 45.7 | 36.6 | 8.6 | 41.4 | 49.5 | 73.9 | 24.4 | 100 | 0 | |
| Hori. | 9748.000 | PK | 45.2 | 38.7 | 9.5 | 38.9 | 54.5 | 73.9 | 19.4 | 100 | 147 | |
| Hori. | 12185.000 | PK | 43.8 | 39.5 | 10.7 | 39.3 | 54.7 | 73.9 | 19.2 | 100 | 0 | |
| Hori. | 2287.990 | AV | 35.7 | 27.3 | 24.4 | 41.3 | 46.1 | 53.9 | 7.8 | 100 | 151 | VBW:10Hz |
| Hori. | 2500.000 | AV | 42.1 | 27.6 | 24.6 | 41.4 | 52.9 | 53.9 | 1.0 | 152 | 180 | VBW:10Hz |
| Hori. | 2640.000 | AV | 36.2 | 27.8 | 24.7 | 41.4 | 47.3 | 53.9 | 6.6 | 100 | 14 | VBW:10Hz |
| Hori. | 4874.000 | AV | 38.0 | 31.3 | 6.9 | 41.1 | 35.1 | 53.9 | 18.8 | 100 | 170 | VBW:330Hz |
| Hori. | 5000.000 | AV | 44.5 | 31.7 | 7.0 | 40.9 | 42.3 | 53.9 | 11.6 | 100 | 220 | VBW:10Hz |
| Hori. | 7311.000 | AV | 35.7 | 36.6 | 8.6 | 41.4 | 39.5 | 53.9 | 14.4 | 100 | 0 | VBW:330Hz |
| Hori. | 9748.000 | AV | 34.8 | 38.7 | 9.5 | 38.9 | 44.1 | 53.9 | 9.8 | 100 | 147 | VBW:330Hz |
| Hori. | 12185.000 | AV | 33.2 | 39.5 | 10.7 | 39.3 | 44.1 | 53.9 | 9.8 | 100 | 0 | VBW:330Hz |
| Vert. | 2287.990 | PK | 46.6 | 27.3 | 24.4 | 41.3 | 57.0 | 73.9 | 16.9 | 100 | 296 | |
| Vert. | 2500.000 | PK | 50.0 | 27.6 | 24.6 | 41.4 | 60.8 | 73.9 | 13.1 | 156 | 182 | |
| Vert. | 2640.000 | PK | 47.0 | 27.8 | 24.7 | 41.4 | 58.1 | 73.9 | 15.8 | 100 | 187 | |
| Vert. | 4874.000 | PK | 51.5 | 31.3 | 6.9 | 41.1 | 48.6 | 73.9 | 25.3 | 100 | 190 | |
| Vert. | 7311.000 | PK | 47.1 | 36.6 | 8.6 | 41.4 | 50.9 | 73.9 | 23.0 | 100 | 0 | |
| Vert. | 9748.000 | PK | 44.9 | 38.7 | 9.5 | 38.9 | 54.2 | 73.9 | 19.7 | 151 | 111 | |
| Vert. | 12185.000 | PK | 45.0 | 39.5 | 10.7 | 39.3 | 55.9 | 73.9 | 18.0 | 100 | 0 | |
| Vert. | 2287.990 | AV | 36.0 | 27.3 | 24.4 | 41.3 | 46.4 | 53.9 | 7.5 | 100 | 296 | VBW:10Hz |
| Vert. | 2500.000 | AV | 42.2 | 27.6 | 24.6 | 41.4 | 53.0 | 53.9 | 0.9 | 156 | 182 | VBW:10Hz |
| Vert. | 2640.000 | AV | 36.1 | 27.8 | 24.7 | 41.4 | 47.2 | 53.9 | 6.7 | 100 | 187 | VBW:10Hz |
| Vert. | 4874.000 | AV | 38.1 | 31.3 | 6.9 | 41.1 | 35.2 | 53.9 | 18.7 | 100 | 190 | VBW:330Hz |
| Vert. | 7311.000 | AV | 35.6 | 36.6 | 8.6 | 41.4 | 39.4 | 53.9 | 14.5 | 100 | 0 | VBW:330Hz |
| Vert. | 9748.000 | AV | 35.0 | 38.7 | 9.5 | 38.9 | 44.3 | 53.9 | 9.6 | 151 | 111 | VBW:330Hz |
| Vert. | 12185.000 | AV | 33.1 | 39.5 | 10.7 | 39.3 | 44.0 | 53.9 | 9.9 | 100 | 0 | VBW:330Hz |

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

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

*No noise was detected other than listed points.

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/9/14 2012/9/15
 Temperature / Humidity 24 deg.C , 62%RH 26 deg.C , 65%RH
 Engineer Makoto Hosaka Shinichi Takano
 Mode Tx, 2462 MHz Antenna: ANT1468
 Tx, IEEE802.11g, PN9, worst antenna port 1, worst data mode 6Mbps

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|--------------|-----------|
| Hori. | 2483.500 | PK | 62.4 | 27.5 | 24.6 | 41.4 | 73.1 | 73.9 | 0.8 | 122 | 152 | |
| Hori. | 2500.000 | PK | 51.0 | 27.6 | 24.6 | 41.4 | 61.8 | 73.9 | 12.1 | 153 | 182 | |
| Hori. | 2640.000 | PK | 45.9 | 27.8 | 24.7 | 41.4 | 57.0 | 73.9 | 16.9 | 100 | 0 | |
| Hori. | 4924.000 | PK | 48.8 | 31.5 | 6.9 | 41.0 | 46.2 | 73.9 | 27.7 | 103 | 154 | |
| Hori. | 5000.000 | PK | 52.0 | 31.7 | 7.0 | 40.9 | 49.8 | 73.9 | 24.1 | 100 | 216 | |
| Hori. | 7386.000 | PK | 47.0 | 36.7 | 8.7 | 41.5 | 50.9 | 73.9 | 23.0 | 100 | 0 | |
| Hori. | 9848.000 | PK | 44.4 | 38.9 | 9.5 | 38.9 | 53.9 | 73.9 | 20.0 | 100 | 220 | |
| Hori. | 12310.000 | PK | 43.6 | 39.5 | 10.8 | 39.3 | 54.6 | 73.9 | 19.3 | 100 | 0 | |
| Hori. | 2483.500 | AV | 42.5 | 27.5 | 24.6 | 41.4 | 53.2 | 53.9 | 0.7 | 122 | 152 | VBW:330Hz |
| Hori. | 2500.000 | AV | 42.3 | 27.6 | 24.6 | 41.4 | 53.1 | 53.9 | 0.8 | 153 | 182 | VBW:10Hz |
| Hori. | 2640.000 | AV | 35.0 | 27.8 | 24.7 | 41.4 | 46.1 | 53.9 | 7.8 | 100 | 0 | VBW:10Hz |
| Hori. | 4924.000 | AV | 37.7 | 31.5 | 6.9 | 41.0 | 35.1 | 53.9 | 18.8 | 103 | 154 | VBW:330Hz |
| Hori. | 5000.000 | AV | 45.6 | 31.7 | 7.0 | 40.9 | 43.4 | 53.9 | 10.5 | 100 | 216 | VBW:10Hz |
| Hori. | 7386.000 | AV | 35.6 | 36.7 | 8.7 | 41.5 | 39.5 | 53.9 | 14.4 | 100 | 0 | VBW:330Hz |
| Hori. | 9848.000 | AV | 34.8 | 38.9 | 9.5 | 38.9 | 44.3 | 53.9 | 9.6 | 100 | 220 | VBW:330Hz |
| Hori. | 12310.000 | AV | 32.2 | 39.5 | 10.8 | 39.3 | 43.2 | 53.9 | 10.7 | 100 | 0 | VBW:330Hz |
| Vert. | 2483.500 | PK | 62.6 | 27.5 | 24.6 | 41.4 | 73.3 | 73.9 | 0.6 | 126 | 290 | |
| Vert. | 2500.000 | PK | 48.0 | 27.6 | 24.6 | 41.4 | 58.8 | 73.9 | 15.1 | 100 | 193 | |
| Vert. | 2640.000 | PK | 45.8 | 27.8 | 24.7 | 41.4 | 56.9 | 73.9 | 17.0 | 100 | 0 | |
| Vert. | 4924.000 | PK | 51.8 | 31.5 | 6.9 | 41.0 | 49.2 | 73.9 | 24.7 | 100 | 209 | |
| Vert. | 7386.000 | PK | 46.3 | 36.7 | 8.7 | 41.5 | 50.2 | 73.9 | 23.7 | 100 | 0 | |
| Vert. | 9848.000 | PK | 44.8 | 38.9 | 9.5 | 38.9 | 54.3 | 73.9 | 19.6 | 137 | 115 | |
| Vert. | 12310.000 | PK | 42.7 | 39.5 | 10.8 | 39.3 | 53.7 | 73.9 | 20.2 | 100 | 0 | |
| Vert. | 2483.500 | AV | 42.7 | 27.5 | 24.6 | 41.4 | 53.4 | 53.9 | 0.5 | 126 | 290 | VBW:330Hz |
| Vert. | 2500.000 | AV | 39.2 | 27.6 | 24.6 | 41.4 | 50.0 | 53.9 | 3.9 | 100 | 193 | VBW:10Hz |
| Vert. | 2640.000 | AV | 34.8 | 27.8 | 24.7 | 41.4 | 45.9 | 53.9 | 8.0 | 100 | 0 | VBW:10Hz |
| Vert. | 4924.000 | AV | 38.0 | 31.5 | 6.9 | 41.0 | 35.4 | 53.9 | 18.5 | 100 | 209 | VBW:330Hz |
| Vert. | 7386.000 | AV | 35.9 | 36.7 | 8.7 | 41.5 | 39.8 | 53.9 | 14.1 | 100 | 0 | VBW:330Hz |
| Vert. | 9848.000 | AV | 35.0 | 38.9 | 9.5 | 38.9 | 44.5 | 53.9 | 9.4 | 137 | 115 | VBW:330Hz |
| Vert. | 12310.000 | AV | 32.3 | 39.5 | 10.8 | 39.3 | 43.3 | 53.9 | 10.6 | 100 | 0 | VBW:330Hz |

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

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

*No noise was detected other than listed points.

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/9/5 2012/9/6
 Temperature / Humidity 25 deg.C , 60%RH 26 deg.C , 62%RH
 Engineer Makoto Hosaka Makoto Hosaka
 Mode Tx, 2412 MHz Antenna: ANT1431-161C/M-AB-58
 Tx, IEEE802.11g, PN9, worst antenna port 1, worst data mode 6Mbps

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|-----------------|-----------|
| Hori. | 2287.990 | PK | 48.1 | 27.3 | 24.4 | 41.3 | 58.5 | 73.9 | 15.4 | 100 | 0 | |
| Hori. | 2390.000 | PK | 58.3 | 27.4 | 24.5 | 41.4 | 68.8 | 73.9 | 5.1 | 100 | 305 | |
| Hori. | 2500.000 | PK | 49.6 | 27.6 | 24.6 | 41.4 | 60.4 | 73.9 | 13.5 | 141 | 294 | |
| Hori. | 4824.000 | PK | 52.2 | 31.1 | 6.8 | 41.2 | 48.9 | 73.9 | 25.0 | 100 | 20 | |
| Hori. | 7236.000 | PK | 47.9 | 36.6 | 8.5 | 41.4 | 51.6 | 73.9 | 22.3 | 100 | 0 | |
| Hori. | 9648.000 | PK | 44.9 | 38.6 | 9.4 | 38.9 | 54.0 | 73.9 | 19.9 | 100 | 0 | |
| Hori. | 12060.000 | PK | 46.6 | 39.5 | 10.7 | 39.4 | 57.4 | 73.9 | 16.5 | 100 | 0 | |
| Hori. | 2287.990 | AV | 35.4 | 27.3 | 24.4 | 41.3 | 45.8 | 53.9 | 8.1 | 100 | 0 | VBW:10Hz |
| Hori. | 2390.000 | AV | 39.8 | 27.4 | 24.5 | 41.4 | 50.3 | 53.9 | 3.6 | 100 | 305 | VBW:330Hz |
| Hori. | 2500.000 | AV | 39.9 | 27.6 | 24.6 | 41.4 | 50.7 | 53.9 | 3.2 | 141 | 294 | VBW:10Hz |
| Hori. | 4824.000 | AV | 38.0 | 31.1 | 6.8 | 41.2 | 34.7 | 53.9 | 19.2 | 100 | 20 | VBW:330Hz |
| Hori. | 7236.000 | AV | 36.1 | 36.6 | 8.5 | 41.4 | 39.8 | 53.9 | 14.1 | 100 | 0 | VBW:330Hz |
| Hori. | 9648.000 | AV | 33.5 | 38.6 | 9.4 | 38.9 | 42.6 | 53.9 | 11.3 | 100 | 0 | VBW:330Hz |
| Hori. | 12060.000 | AV | 34.9 | 39.5 | 10.7 | 39.4 | 45.7 | 53.9 | 8.2 | 100 | 0 | VBW:330Hz |
| Vert. | 2287.990 | PK | 47.3 | 27.3 | 24.4 | 41.3 | 57.7 | 73.9 | 16.2 | 100 | 0 | |
| Vert. | 2390.000 | PK | 56.5 | 27.4 | 24.5 | 41.4 | 67.0 | 73.9 | 6.9 | 149 | 324 | |
| Vert. | 2500.000 | PK | 49.5 | 27.6 | 24.6 | 41.4 | 60.3 | 73.9 | 13.6 | 112 | 286 | |
| Vert. | 4824.000 | PK | 51.3 | 31.1 | 6.8 | 41.2 | 48.0 | 73.9 | 25.9 | 100 | 200 | |
| Vert. | 7236.000 | PK | 48.4 | 36.6 | 8.5 | 41.4 | 52.1 | 73.9 | 21.8 | 100 | 0 | |
| Vert. | 9648.000 | PK | 45.7 | 38.6 | 9.4 | 38.9 | 54.8 | 73.9 | 19.1 | 100 | 0 | |
| Vert. | 12060.000 | PK | 47.0 | 39.5 | 10.7 | 39.4 | 57.8 | 73.9 | 16.1 | 100 | 0 | |
| Vert. | 2287.990 | AV | 35.1 | 27.3 | 24.4 | 41.3 | 45.5 | 53.9 | 8.4 | 100 | 0 | VBW:10Hz |
| Vert. | 2390.000 | AV | 38.9 | 27.4 | 24.5 | 41.4 | 49.4 | 53.9 | 4.5 | 149 | 324 | VBW:330Hz |
| Vert. | 2500.000 | AV | 40.2 | 27.6 | 24.6 | 41.4 | 51.0 | 53.9 | 2.9 | 112 | 286 | VBW:10Hz |
| Vert. | 4824.000 | AV | 38.1 | 31.1 | 6.8 | 41.2 | 34.8 | 53.9 | 19.1 | 100 | 200 | VBW:330Hz |
| Vert. | 7236.000 | AV | 36.2 | 36.6 | 8.5 | 41.4 | 39.9 | 53.9 | 14.0 | 100 | 0 | VBW:330Hz |
| Vert. | 9648.000 | AV | 34.1 | 38.6 | 9.4 | 38.9 | 43.2 | 53.9 | 10.7 | 100 | 0 | VBW:330Hz |
| Vert. | 12060.000 | AV | 35.3 | 39.5 | 10.7 | 39.4 | 46.1 | 53.9 | 7.8 | 100 | 0 | VBW:330Hz |

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

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

*No noise was detected other than listed points.

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|--------------------|----------|-------------------|-------------------------|--------------|--------------|--------------------|-------------------|----------------|-----------|
| Hori. | 2412.000 | PK | 88.2 | 27.5 | 24.5 | 41.4 | 98.8 | - | - | 100k/300k |
| Hori. | 2400.000 | PK | 60.7 | 27.4 | 24.5 | 41.4 | 71.2 | 78.8 | 7.6 | 100k/300k |
| Vert. | 2412.000 | PK | 88.7 | 27.5 | 24.5 | 41.4 | 99.3 | - | - | 100k/300k |
| Vert. | 2400.000 | PK | 59.0 | 27.4 | 24.5 | 41.4 | 69.5 | 79.3 | 9.8 | 100k/300k |

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/9/5 2012/9/6
 Temperature / Humidity 25 deg.C , 60%RH 26 deg.C , 62%RH
 Engineer Makoto Hosaka Makoto Hosaka
 Mode Tx, 2437 MHz Antenna: ANT1431-161C/M-AB-58
 Tx, IEEE802.11g, PN9, worst antenna port 1, worst data mode 6Mbps

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|-----------------|-----------|
| Hori. | 2287.990 | PK | 47.5 | 27.3 | 24.4 | 41.3 | 57.9 | 73.9 | 16.0 | 100 | 0 | VBW:10Hz |
| Hori. | 2500.000 | PK | 49.5 | 27.6 | 24.6 | 41.4 | 60.3 | 73.9 | 13.6 | 130 | 285 | VBW:10Hz |
| Hori. | 2640.000 | PK | 49.0 | 27.8 | 24.7 | 41.4 | 60.1 | 73.9 | 13.8 | 100 | 339 | VBW:10Hz |
| Hori. | 4874.000 | PK | 52.8 | 31.3 | 6.9 | 41.1 | 49.9 | 73.9 | 24.0 | 100 | 19 | VBW:330Hz |
| Hori. | 7311.000 | PK | 48.0 | 36.6 | 8.6 | 41.4 | 51.8 | 73.9 | 22.1 | 100 | 0 | VBW:330Hz |
| Hori. | 9748.000 | PK | 45.2 | 38.7 | 9.5 | 38.9 | 54.5 | 73.9 | 19.4 | 100 | 0 | VBW:330Hz |
| Hori. | 12185.000 | PK | 45.1 | 39.5 | 10.7 | 39.3 | 56.0 | 73.9 | 17.9 | 100 | 0 | VBW:330Hz |
| Hori. | 2287.990 | AV | 35.4 | 27.3 | 24.4 | 41.3 | 45.8 | 53.9 | 8.1 | 100 | 0 | VBW:10Hz |
| Hori. | 2500.000 | AV | 40.3 | 27.6 | 24.6 | 41.4 | 51.1 | 53.9 | 2.8 | 130 | 285 | VBW:10Hz |
| Hori. | 2640.000 | AV | 36.3 | 27.8 | 24.7 | 41.4 | 47.4 | 53.9 | 6.5 | 100 | 339 | VBW:10Hz |
| Hori. | 4874.000 | AV | 38.3 | 31.3 | 6.9 | 41.1 | 35.4 | 53.9 | 18.5 | 100 | 19 | VBW:330Hz |
| Hori. | 7311.000 | AV | 35.8 | 36.6 | 8.6 | 41.4 | 39.6 | 53.9 | 14.3 | 100 | 0 | VBW:330Hz |
| Hori. | 9748.000 | AV | 33.2 | 38.7 | 9.5 | 38.9 | 42.5 | 53.9 | 11.4 | 100 | 0 | VBW:330Hz |
| Hori. | 12185.000 | AV | 33.2 | 39.5 | 10.7 | 39.3 | 44.1 | 53.9 | 9.8 | 100 | 0 | VBW:330Hz |
| Vert. | 2287.990 | PK | 47.2 | 27.3 | 24.4 | 41.3 | 57.6 | 73.9 | 16.3 | 100 | 0 | VBW:10Hz |
| Vert. | 2500.000 | PK | 49.2 | 27.6 | 24.6 | 41.4 | 60.0 | 73.9 | 13.9 | 108 | 289 | VBW:10Hz |
| Vert. | 2640.000 | PK | 48.4 | 27.8 | 24.7 | 41.4 | 59.5 | 73.9 | 14.4 | 100 | 91 | VBW:10Hz |
| Vert. | 4874.000 | PK | 53.4 | 31.3 | 6.9 | 41.1 | 50.5 | 73.9 | 23.4 | 100 | 205 | VBW:330Hz |
| Vert. | 7311.000 | PK | 46.9 | 36.6 | 8.6 | 41.4 | 50.7 | 73.9 | 23.2 | 100 | 0 | VBW:330Hz |
| Vert. | 9748.000 | PK | 45.2 | 38.7 | 9.5 | 38.9 | 54.5 | 73.9 | 19.4 | 100 | 0 | VBW:330Hz |
| Vert. | 12185.000 | PK | 44.3 | 39.5 | 10.7 | 39.3 | 55.2 | 73.9 | 18.7 | 100 | 0 | VBW:330Hz |
| Vert. | 2287.990 | AV | 35 | 27.3 | 24.4 | 41.3 | 45.4 | 53.9 | 8.5 | 100 | 0 | VBW:10Hz |
| Vert. | 2500.000 | AV | 40.1 | 27.6 | 24.6 | 41.4 | 50.9 | 53.9 | 3.0 | 108 | 289 | VBW:10Hz |
| Vert. | 2640.000 | AV | 36.1 | 27.8 | 24.7 | 41.4 | 47.2 | 53.9 | 6.7 | 100 | 91 | VBW:10Hz |
| Vert. | 4874.000 | AV | 38.5 | 31.3 | 6.9 | 41.1 | 35.6 | 53.9 | 18.3 | 100 | 205 | VBW:330Hz |
| Vert. | 7311.000 | AV | 35.4 | 36.6 | 8.6 | 41.4 | 39.2 | 53.9 | 14.7 | 100 | 0 | VBW:330Hz |
| Vert. | 9748.000 | AV | 33.2 | 38.7 | 9.5 | 38.9 | 42.5 | 53.9 | 11.4 | 100 | 0 | VBW:330Hz |
| Vert. | 12185.000 | AV | 32.9 | 39.5 | 10.7 | 39.3 | 43.8 | 53.9 | 10.1 | 100 | 0 | VBW:330Hz |

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

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

*No noise was detected other than listed points.

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

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

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/9/5 2012/9/6
 Temperature / Humidity 25 deg.C , 60%RH 26 deg.C , 62%RH
 Engineer Makoto Hosaka Makoto Hosaka
 Mode Tx, 2462 MHz Antenna: ANT1431-161C/M-AB-58
 Tx, IEEE802.11g, PN9, worst antenna port 1, worst data mode 6Mbps

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|--------------|-----------|
| Hori. | 2483.500 | PK | 62.9 | 27.5 | 24.6 | 41.4 | 73.6 | 73.9 | 0.3 | 100 | 237 | |
| Hori. | 2500.000 | PK | 50.4 | 27.6 | 24.6 | 41.4 | 61.2 | 73.9 | 12.7 | 129 | 285 | |
| Hori. | 2640.000 | PK | 49.0 | 27.8 | 24.7 | 41.4 | 60.1 | 73.9 | 13.8 | 100 | 339 | |
| Hori. | 4924.000 | PK | 52.0 | 31.5 | 6.9 | 41.0 | 49.4 | 73.9 | 24.5 | 100 | 28 | |
| Hori. | 7386.000 | PK | 47.4 | 36.7 | 8.7 | 41.5 | 51.3 | 73.9 | 22.6 | 100 | 0 | |
| Hori. | 9848.000 | PK | 44.2 | 38.9 | 9.5 | 38.9 | 53.7 | 73.9 | 20.2 | 100 | 0 | |
| Hori. | 12310.000 | PK | 44.3 | 39.5 | 10.8 | 39.3 | 55.3 | 73.9 | 18.6 | 100 | 0 | |
| Hori. | 2483.500 | AV | 42.6 | 27.5 | 24.6 | 41.4 | 53.3 | 53.9 | 0.6 | 100 | 237 | VBW:330Hz |
| Hori. | 2500.000 | AV | 40.6 | 27.6 | 24.6 | 41.4 | 51.4 | 53.9 | 2.5 | 129 | 285 | VBW:10Hz |
| Hori. | 2640.000 | AV | 34.9 | 27.8 | 24.7 | 41.4 | 46.0 | 53.9 | 7.9 | 100 | 339 | VBW:10Hz |
| Hori. | 4924.000 | AV | 37.6 | 31.5 | 6.9 | 41.0 | 35.0 | 53.9 | 18.9 | 100 | 28 | VBW:330Hz |
| Hori. | 7386.000 | AV | 35.6 | 36.7 | 8.7 | 41.5 | 39.5 | 53.9 | 14.4 | 100 | 0 | VBW:330Hz |
| Hori. | 9848.000 | AV | 32.5 | 38.9 | 9.5 | 38.9 | 42.0 | 53.9 | 11.9 | 100 | 0 | VBW:330Hz |
| Hori. | 12310.000 | AV | 32.1 | 39.5 | 10.8 | 39.3 | 43.1 | 53.9 | 10.8 | 100 | 0 | VBW:330Hz |
| Vert. | 2483.500 | PK | 62.2 | 27.5 | 24.6 | 41.4 | 72.9 | 73.9 | 1.0 | 109 | 136 | |
| Vert. | 2500.000 | PK | 49.7 | 27.6 | 24.6 | 41.4 | 60.5 | 73.9 | 13.4 | 100 | 287 | |
| Vert. | 2640.000 | PK | 47.2 | 27.8 | 24.7 | 41.4 | 58.3 | 73.9 | 15.6 | 100 | 60 | |
| Vert. | 4924.000 | PK | 52.2 | 31.5 | 6.9 | 41.0 | 49.6 | 73.9 | 24.3 | 100 | 205 | |
| Vert. | 7386.000 | PK | 47.1 | 36.7 | 8.7 | 41.5 | 51.0 | 73.9 | 22.9 | 100 | 0 | |
| Vert. | 9848.000 | PK | 43.5 | 38.9 | 9.5 | 38.9 | 53.0 | 73.9 | 20.9 | 100 | 0 | |
| Vert. | 12310.000 | PK | 44.4 | 39.5 | 10.8 | 39.3 | 55.4 | 73.9 | 18.5 | 100 | 0 | |
| Vert. | 2483.500 | AV | 41.6 | 27.5 | 24.6 | 41.4 | 52.3 | 53.9 | 1.6 | 109 | 136 | VBW:330Hz |
| Vert. | 2500.000 | AV | 40.1 | 27.6 | 24.6 | 41.4 | 50.9 | 53.9 | 3.0 | 100 | 287 | VBW:10Hz |
| Vert. | 2640.000 | AV | 34.8 | 27.8 | 24.7 | 41.4 | 45.9 | 53.9 | 8.0 | 100 | 60 | VBW:10Hz |
| Vert. | 4924.000 | AV | 38.7 | 31.5 | 6.9 | 41.0 | 36.1 | 53.9 | 17.8 | 100 | 205 | VBW:330Hz |
| Vert. | 7386.000 | AV | 35.5 | 36.7 | 8.7 | 41.5 | 39.4 | 53.9 | 14.5 | 100 | 0 | VBW:330Hz |
| Vert. | 9848.000 | AV | 32.4 | 38.9 | 9.5 | 38.9 | 41.9 | 53.9 | 12.0 | 100 | 0 | VBW:330Hz |
| Vert. | 12310.000 | AV | 32.1 | 39.5 | 10.8 | 39.3 | 43.1 | 53.9 | 10.8 | 100 | 0 | VBW:330Hz |

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

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

*No noise was detected other than listed points.

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

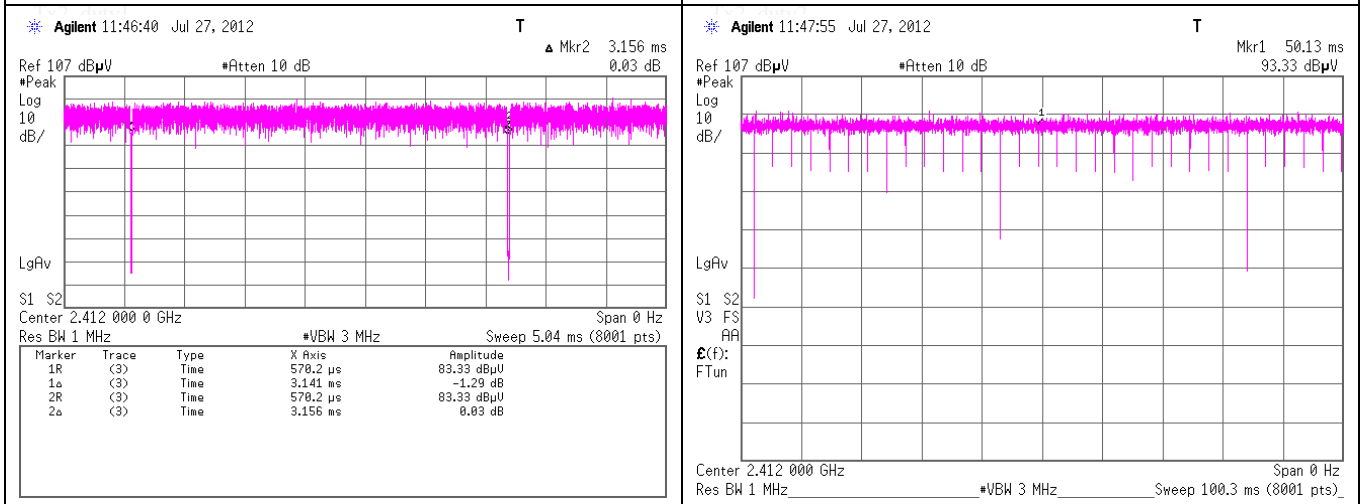
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VBW(Average) Calculation chart

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

VBW (Average) Calculation

VBW: $1/(\text{ON Time}) = 0.318\text{kHz} < 330\text{Hz}$



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Radiated Emission

| | | | |
|------------------------|--|------------------|------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber | | |
| Date | 2012/9/14 | 2012/9/15 | 2012/9/17 |
| Temperature / Humidity | 24 deg.C , 62%RH | 26 deg.C , 65%RH | 26 deg.C , 70%RH |
| Engineer | Makoto Hosaka | Shinichi Takano | Makoto Hosaka |
| Mode | Tx, 2412 MHz Antenna: ANT1468 Tx, IEEE802.11n (HT20), PN9, worst data mode 8(MCS), mimo | | |

(* 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. | 110.228 | QP | 52.7 | 11.3 | 7.2 | 32.1 | 39.1 | 43.5 | 4.4 | 296 | 269 | |
| Hori. | 114.234 | QP | 53.4 | 11.9 | 7.1 | 32.1 | 40.3 | 43.5 | 3.2 | 301 | 270 | |
| Hori. | 120.880 | QP | 54.7 | 12.8 | 7.2 | 32.1 | 42.6 | 43.5 | 0.9 | 200 | 255 | |
| Hori. | 2390.000 | PK | 53.6 | 27.4 | 24.5 | 41.4 | 64.1 | 73.9 | 9.8 | 100 | 151 | |
| Hori. | 2500.000 | PK | 50.4 | 27.6 | 24.6 | 41.4 | 61.2 | 73.9 | 12.7 | 151 | 175 | |
| Hori. | 4824.000 | PK | 48.0 | 31.1 | 6.8 | 41.2 | 44.7 | 73.9 | 29.2 | 100 | 152 | |
| Hori. | 7236.000 | PK | 46.9 | 36.6 | 8.5 | 41.4 | 50.6 | 73.9 | 23.3 | 100 | 0 | |
| Hori. | 9648.000 | PK | 45.7 | 38.6 | 9.4 | 38.9 | 54.8 | 73.9 | 19.1 | 100 | 156 | |
| Hori. | 12060.000 | PK | 46.5 | 39.5 | 10.7 | 39.4 | 57.3 | 73.9 | 16.6 | 100 | 0 | |
| Hori. | 2390.000 | AV | 38.1 | 27.4 | 24.5 | 41.4 | 48.6 | 53.9 | 5.3 | 100 | 151 | VBW:680Hz |
| Hori. | 2500.000 | AV | 42.4 | 27.6 | 24.6 | 41.4 | 53.2 | 53.9 | 0.7 | 151 | 175 | VBW:10Hz |
| Hori. | 4824.000 | AV | 37.2 | 31.1 | 6.8 | 41.2 | 33.9 | 53.9 | 20.0 | 100 | 152 | VBW:680Hz |
| Hori. | 7236.000 | AV | 36.8 | 36.6 | 8.5 | 41.4 | 40.5 | 53.9 | 13.4 | 100 | 0 | VBW:680Hz |
| Hori. | 9648.000 | AV | 35.2 | 38.6 | 9.4 | 38.9 | 44.3 | 53.9 | 9.6 | 100 | 156 | VBW:680Hz |
| Hori. | 12060.000 | AV | 35.3 | 39.5 | 10.7 | 39.4 | 46.1 | 53.9 | 7.8 | 100 | 0 | VBW:680Hz |
| Vert. | 42.855 | QP | 40.2 | 13.2 | 6.7 | 32.2 | 27.9 | 40.0 | 12.1 | 100 | 146 | |
| Vert. | 47.945 | QP | 52.4 | 11.7 | 6.8 | 32.2 | 38.7 | 40.0 | 1.3 | 100 | 301 | |
| Vert. | 103.442 | QP | 43.3 | 10.3 | 7.3 | 32.1 | 28.8 | 43.5 | 14.7 | 100 | 259 | |
| Vert. | 110.224 | QP | 53.7 | 11.3 | 7.2 | 32.1 | 40.1 | 43.5 | 3.4 | 100 | 1 | |
| Vert. | 114.222 | QP | 54.0 | 11.9 | 7.1 | 32.1 | 40.9 | 43.5 | 2.6 | 100 | 359 | |
| Vert. | 120.880 | QP | 53.6 | 12.8 | 7.2 | 32.1 | 41.5 | 43.5 | 2.0 | 100 | 341 | |
| Vert. | 2390.000 | PK | 54.3 | 27.4 | 24.5 | 41.4 | 64.8 | 73.9 | 9.1 | 100 | 154 | |
| Vert. | 2500.000 | PK | 49.7 | 27.6 | 24.6 | 41.4 | 60.5 | 73.9 | 13.4 | 122 | 158 | |
| Vert. | 4824.000 | PK | 48.2 | 31.1 | 6.8 | 41.2 | 44.9 | 73.9 | 29.0 | 100 | 172 | |
| Vert. | 7236.000 | PK | 47.7 | 36.6 | 8.5 | 41.4 | 51.4 | 73.9 | 22.5 | 100 | 0 | |
| Vert. | 9648.000 | PK | 44.2 | 38.6 | 9.4 | 38.9 | 53.3 | 73.9 | 20.6 | 100 | 0 | |
| Vert. | 12060.000 | PK | 45.4 | 39.5 | 10.7 | 39.4 | 56.2 | 73.9 | 17.7 | 100 | 0 | |
| Vert. | 2390.000 | AV | 39.0 | 27.4 | 24.5 | 41.4 | 49.5 | 53.9 | 4.4 | 100 | 154 | VBW:680Hz |
| Vert. | 2500.000 | AV | 42.0 | 27.6 | 24.6 | 41.4 | 52.8 | 53.9 | 1.1 | 122 | 158 | VBW:10Hz |
| Vert. | 4824.000 | AV | 37.5 | 31.1 | 6.8 | 41.2 | 34.2 | 53.9 | 19.7 | 100 | 172 | VBW:680Hz |
| Vert. | 7236.000 | AV | 36.6 | 36.6 | 8.5 | 41.4 | 40.3 | 53.9 | 13.6 | 100 | 0 | VBW:680Hz |
| Vert. | 9648.000 | AV | 33.8 | 38.6 | 9.4 | 38.9 | 42.9 | 53.9 | 11.0 | 100 | 0 | VBW:680Hz |
| Vert. | 12060.000 | AV | 35.2 | 39.5 | 10.7 | 39.4 | 46.0 | 53.9 | 7.9 | 100 | 0 | VBW:680Hz |

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

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

*No noise was detected other than listed points.

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|-----------------|----------------|-------------|-----------|
| Hori. | 2412.000 | PK | 90.2 | 27.5 | 24.5 | 41.4 | 100.8 | - | - | 100k/300k |
| Hori. | 2400.000 | PK | 59.6 | 27.4 | 24.5 | 41.4 | 70.1 | 80.8 | 10.7 | 100k/300k |
| Vert. | 2412.000 | PK | 91.5 | 27.5 | 24.5 | 41.4 | 102.1 | - | - | 100k/300k |
| Vert. | 2400.000 | PK | 60.9 | 27.4 | 24.5 | 41.4 | 71.4 | 82.1 | 10.7 | 100k/300k |

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date 2012/9/14 2012/9/15
Temperature / Humidity 24 deg.C , 62%RH 26 deg.C , 65%RH
Engineer Makoto Hosaka Shinichi Takano
Mode Tx, 2437 MHz Antenna: ANT1468
 Tx, IEEE802.11n (HT20), PN9, worst data mode 8(MCS), mimo

(* 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. | 2500.000 | PK | 50.3 | 27.6 | 24.6 | 41.4 | 61.1 | 73.9 | 12.8 | 150 | 176 | |
| Hori. | 4874.000 | PK | 47.4 | 31.3 | 6.9 | 41.1 | 44.5 | 73.9 | 29.4 | 100 | 206 | |
| Hori. | 7311.000 | PK | 46.3 | 36.6 | 8.6 | 41.4 | 50.1 | 73.9 | 23.8 | 100 | 0 | |
| Hori. | 9748.000 | PK | 44.2 | 38.7 | 9.5 | 38.9 | 53.5 | 73.9 | 20.4 | 100 | 0 | |
| Hori. | 12185.000 | PK | 44.4 | 39.5 | 10.7 | 39.3 | 55.3 | 73.9 | 18.6 | 100 | 0 | |
| Hori. | 2500.000 | AV | 42.3 | 27.6 | 24.6 | 41.4 | 53.1 | 53.9 | 0.8 | 150 | 176 | VBW:10Hz |
| Hori. | 4874.000 | AV | 36.2 | 31.3 | 6.9 | 41.1 | 33.3 | 53.9 | 20.6 | 100 | 206 | VBW:680Hz |
| Hori. | 7311.000 | AV | 36.0 | 36.6 | 8.6 | 41.4 | 39.8 | 53.9 | 14.1 | 100 | 0 | VBW:680Hz |
| Hori. | 9748.000 | AV | 33.8 | 38.7 | 9.5 | 38.9 | 43.1 | 53.9 | 10.8 | 100 | 0 | VBW:680Hz |
| Hori. | 12185.000 | AV | 33.7 | 39.5 | 10.7 | 39.3 | 44.6 | 53.9 | 9.3 | 100 | 0 | VBW:680Hz |
| Vert. | 2500.000 | PK | 50.1 | 27.6 | 24.6 | 41.4 | 60.9 | 73.9 | 13.0 | 122 | 157 | |
| Vert. | 4874.000 | PK | 47.5 | 31.3 | 6.9 | 41.1 | 44.6 | 73.9 | 29.3 | 100 | 192 | |
| Vert. | 7311.000 | PK | 45.7 | 36.6 | 8.6 | 41.4 | 49.5 | 73.9 | 24.4 | 100 | 0 | |
| Vert. | 9748.000 | PK | 43.6 | 38.7 | 9.5 | 38.9 | 52.9 | 73.9 | 21.0 | 100 | 0 | |
| Vert. | 12185.000 | PK | 43.6 | 39.5 | 10.7 | 39.3 | 54.5 | 73.9 | 19.4 | 100 | 0 | |
| Vert. | 2500.000 | AV | 41.9 | 27.6 | 24.6 | 41.4 | 52.7 | 53.9 | 1.2 | 122 | 157 | VBW:10Hz |
| Vert. | 4874.000 | AV | 35.9 | 31.3 | 6.9 | 41.1 | 33.0 | 53.9 | 20.9 | 100 | 192 | VBW:680Hz |
| Vert. | 7311.000 | AV | 36.2 | 36.6 | 8.6 | 41.4 | 40.0 | 53.9 | 13.9 | 100 | 0 | VBW:680Hz |
| Vert. | 9748.000 | AV | 33.5 | 38.7 | 9.5 | 38.9 | 42.8 | 53.9 | 11.1 | 100 | 0 | VBW:680Hz |
| Vert. | 12185.000 | AV | 33.6 | 39.5 | 10.7 | 39.3 | 44.5 | 53.9 | 9.4 | 100 | 0 | VBW:680Hz |

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

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

*No noise was detected other than listed points.

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

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Facsimile : +81 463 50 6401

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/9/14 2012/9/15
 Temperature / Humidity 24 deg.C , 62%RH 26 deg.C , 65%RH
 Engineer Makoto Hosaka Shinichi Takano
 Mode Tx, 2462 MHz Antenna: ANT1468
 Tx, IEEE802.11n (HT20), PN9, worst data mode 8(MCS), mimo

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|--------------|-----------|
| Hori. | 2483.500 | PK | 54.1 | 27.5 | 24.6 | 41.4 | 64.8 | 73.9 | 9.1 | 140 | 110 | |
| Hori. | 2500.000 | PK | 49.7 | 27.6 | 24.6 | 41.4 | 60.5 | 73.9 | 13.4 | 151 | 175 | |
| Hori. | 4924.000 | PK | 46.3 | 31.5 | 6.9 | 41.0 | 43.7 | 73.9 | 30.2 | 100 | 118 | |
| Hori. | 7386.000 | PK | 46.6 | 36.7 | 8.7 | 41.5 | 50.5 | 73.9 | 23.4 | 100 | 0 | |
| Hori. | 9848.000 | PK | 43.0 | 38.9 | 9.5 | 38.9 | 52.5 | 73.9 | 21.4 | 100 | 0 | |
| Hori. | 12310.000 | PK | 44.5 | 39.5 | 10.8 | 39.3 | 55.5 | 73.9 | 18.4 | 100 | 0 | |
| Hori. | 2483.500 | AV | 39.8 | 27.5 | 24.6 | 41.4 | 50.5 | 53.9 | 3.4 | 140 | 110 | VBW:680Hz |
| Hori. | 2500.000 | AV | 42.2 | 27.6 | 24.6 | 41.4 | 53.0 | 53.9 | 0.9 | 151 | 175 | VBW:10Hz |
| Hori. | 4924.000 | AV | 36.1 | 31.5 | 6.9 | 41.0 | 33.5 | 53.9 | 20.4 | 100 | 118 | VBW:680Hz |
| Hori. | 7386.000 | AV | 35.9 | 36.7 | 8.7 | 41.5 | 39.8 | 53.9 | 14.1 | 100 | 0 | VBW:680Hz |
| Hori. | 9848.000 | AV | 33.0 | 38.9 | 9.5 | 38.9 | 42.5 | 53.9 | 11.4 | 100 | 0 | VBW:680Hz |
| Hori. | 12310.000 | AV | 32.8 | 39.5 | 10.8 | 39.3 | 43.8 | 53.9 | 10.1 | 100 | 0 | VBW:680Hz |
| Vert. | 2483.500 | PK | 54.2 | 27.5 | 24.6 | 41.4 | 64.9 | 73.9 | 9.0 | 100 | 180 | |
| Vert. | 2500.000 | PK | 49.8 | 27.6 | 24.6 | 41.4 | 60.6 | 73.9 | 13.3 | 120 | 157 | |
| Vert. | 4924.000 | PK | 47.2 | 31.5 | 6.9 | 41.0 | 44.6 | 73.9 | 29.3 | 100 | 140 | |
| Vert. | 7386.000 | PK | 46.0 | 36.7 | 8.7 | 41.5 | 49.9 | 73.9 | 24.0 | 100 | 0 | |
| Vert. | 9848.000 | PK | 43.1 | 38.9 | 9.5 | 38.9 | 52.6 | 73.9 | 21.3 | 100 | 0 | |
| Vert. | 12310.000 | PK | 44.1 | 39.5 | 10.8 | 39.3 | 55.1 | 73.9 | 18.8 | 100 | 0 | |
| Vert. | 2483.500 | AV | 39.4 | 27.5 | 24.6 | 41.4 | 50.1 | 53.9 | 3.8 | 100 | 180 | VBW:680Hz |
| Vert. | 2500.000 | AV | 41.6 | 27.6 | 24.6 | 41.4 | 52.4 | 53.9 | 1.5 | 120 | 157 | VBW:10Hz |
| Vert. | 4924.000 | AV | 36.6 | 31.5 | 6.9 | 41.0 | 34.0 | 53.9 | 19.9 | 100 | 140 | VBW:680Hz |
| Vert. | 7386.000 | AV | 36.0 | 36.7 | 8.7 | 41.5 | 39.9 | 53.9 | 14.0 | 100 | 0 | VBW:680Hz |
| Vert. | 9848.000 | AV | 33.1 | 38.9 | 9.5 | 38.9 | 42.6 | 53.9 | 11.3 | 100 | 0 | VBW:680Hz |
| Vert. | 12310.000 | AV | 32.9 | 39.5 | 10.8 | 39.3 | 43.9 | 53.9 | 10.0 | 100 | 0 | VBW:680Hz |

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

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

*No noise was detected other than listed points.

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/9/5 2012/9/6
 Temperature / Humidity 25 deg.C , 60%RH 26 deg.C , 62%RH
 Engineer Makoto Hosaka Makoto Hosaka
 Mode Tx, 2412 MHz Antenna: ANT1431-161C/M-AB-58
 Tx, IEEE802.11n (HT20), PN9, worst data mode 8(MCS), mimo

(* 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. | 114.189 | QP | 52.0 | 11.9 | 7.1 | 32.1 | 38.9 | 43.5 | 4.6 | 293 | 265 | |
| Hori. | 118.553 | QP | 53.3 | 12.5 | 7.2 | 32.1 | 40.9 | 43.5 | 2.6 | 294 | 265 | |
| Hori. | 120.688 | QP | 52.3 | 12.8 | 7.2 | 32.1 | 40.2 | 43.5 | 3.3 | 285 | 268 | |
| Hori. | 122.536 | QP | 49.5 | 13.0 | 7.2 | 32.1 | 37.6 | 43.5 | 5.9 | 245 | 264 | |
| Hori. | 2390.000 | PK | 55.5 | 27.4 | 24.5 | 41.4 | 66.0 | 73.9 | 7.9 | 100 | 79 | |
| Hori. | 2500.000 | PK | 49.8 | 27.6 | 24.6 | 41.4 | 60.6 | 73.9 | 13.3 | 100 | 286 | |
| Hori. | 4824.000 | PK | 48.4 | 31.1 | 6.8 | 41.2 | 45.1 | 73.9 | 28.8 | 100 | 16 | |
| Hori. | 7236.000 | PK | 47.7 | 36.6 | 8.5 | 41.4 | 51.4 | 73.9 | 22.5 | 100 | 0 | |
| Hori. | 9648.000 | PK | 45.4 | 38.6 | 9.4 | 38.9 | 54.5 | 73.9 | 19.4 | 100 | 0 | |
| Hori. | 12060.000 | PK | 46.8 | 39.5 | 10.7 | 39.4 | 57.6 | 73.9 | 16.3 | 100 | 0 | |
| Hori. | 2390.000 | AV | 39.9 | 27.4 | 24.5 | 41.4 | 50.4 | 53.9 | 3.5 | 100 | 79 | VBW:680Hz |
| Hori. | 2500.000 | AV | 40.9 | 27.6 | 24.6 | 41.4 | 51.7 | 53.9 | 2.2 | 100 | 286 | VBW:10Hz |
| Hori. | 4824.000 | AV | 36.8 | 31.1 | 6.8 | 41.2 | 33.5 | 53.9 | 20.4 | 100 | 16 | VBW:680Hz |
| Hori. | 7236.000 | AV | 36.3 | 36.6 | 8.5 | 41.4 | 40.0 | 53.9 | 13.9 | 100 | 0 | VBW:680Hz |
| Hori. | 9648.000 | AV | 33.5 | 38.6 | 9.4 | 38.9 | 42.6 | 53.9 | 11.3 | 100 | 0 | VBW:680Hz |
| Hori. | 12060.000 | AV | 35.0 | 39.5 | 10.7 | 39.4 | 45.8 | 53.9 | 8.1 | 100 | 0 | VBW:680Hz |
| Vert. | 47.686 | QP | 51.0 | 11.8 | 6.8 | 32.2 | 37.4 | 40.0 | 2.6 | 100 | 192 | |
| Vert. | 114.031 | QP | 53.7 | 11.9 | 7.1 | 32.1 | 40.6 | 43.5 | 2.9 | 100 | 359 | |
| Vert. | 118.495 | QP | 53.3 | 12.5 | 7.2 | 32.1 | 40.9 | 43.5 | 2.6 | 100 | 359 | |
| Vert. | 120.714 | QP | 54.2 | 12.8 | 7.2 | 32.1 | 42.1 | 43.5 | 1.4 | 100 | 354 | |
| Vert. | 122.386 | QP | 52.0 | 13.0 | 7.2 | 32.1 | 40.1 | 43.5 | 3.4 | 100 | 1 | |
| Vert. | 266.127 | QP | 48.8 | 17.8 | 8.4 | 32.0 | 43.0 | 46.0 | 3.0 | 100 | 183 | |
| Vert. | 2390.000 | PK | 54.1 | 27.4 | 24.5 | 41.4 | 64.6 | 73.9 | 9.3 | 114 | 135 | |
| Vert. | 2500.000 | PK | 49.9 | 27.6 | 24.6 | 41.4 | 60.7 | 73.9 | 13.2 | 114 | 292 | |
| Vert. | 4824.000 | PK | 48.4 | 31.1 | 6.8 | 41.2 | 45.1 | 73.9 | 28.8 | 100 | 184 | |
| Vert. | 7236.000 | PK | 48.3 | 36.6 | 8.5 | 41.4 | 52.0 | 73.9 | 21.9 | 100 | 0 | |
| Vert. | 9648.000 | PK | 46.3 | 38.6 | 9.4 | 38.9 | 55.4 | 73.9 | 18.5 | 100 | 0 | |
| Vert. | 12060.000 | PK | 46.4 | 39.5 | 10.7 | 39.4 | 57.2 | 73.9 | 16.7 | 100 | 0 | |
| Vert. | 2390.000 | AV | 38.0 | 27.4 | 24.5 | 41.4 | 48.5 | 53.9 | 5.4 | 114 | 135 | VBW:680Hz |
| Vert. | 2500.000 | AV | 40.6 | 27.6 | 24.6 | 41.4 | 51.4 | 53.9 | 2.5 | 114 | 292 | VBW:10Hz |
| Vert. | 4824.000 | AV | 37.2 | 31.1 | 6.8 | 41.2 | 33.9 | 53.9 | 20.0 | 100 | 184 | VBW:680Hz |
| Vert. | 7236.000 | AV | 36.4 | 36.6 | 8.5 | 41.4 | 40.1 | 53.9 | 13.8 | 100 | 0 | VBW:680Hz |
| Vert. | 9648.000 | AV | 34.2 | 38.6 | 9.4 | 38.9 | 43.3 | 53.9 | 10.6 | 100 | 0 | VBW:680Hz |
| Vert. | 12060.000 | AV | 35.2 | 39.5 | 10.7 | 39.4 | 46.0 | 53.9 | 7.9 | 100 | 0 | VBW:680Hz |

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

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

*No noise was detected other than listed points.

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

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|-----------------|----------------|-------------|-----------|
| Hori. | 2412.000 | PK | 92.4 | 27.5 | 24.5 | 41.4 | 103.0 | - | - | 100k/300k |
| Hori. | 2400.000 | PK | 61.2 | 27.4 | 24.5 | 41.4 | 71.7 | 83.0 | 11.3 | 100k/300k |
| Vert. | 2412.000 | PK | 90.7 | 27.5 | 24.5 | 41.4 | 101.3 | - | - | 100k/300k |
| Vert. | 2400.000 | PK | 58.7 | 27.4 | 24.5 | 41.4 | 69.2 | 81.3 | 12.1 | 100k/300k |

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date 2012/9/5 2012/9/6
Temperature / Humidity 25 deg.C , 60%RH 26 deg.C , 62%RH
Engineer Makoto Hosaka Makoto Hosaka
Mode Tx, 2437 MHz Antenna: ANT1431-161C/M-AB-58
 Tx, IEEE802.11n (HT20), PN9, worst data mode 8(MCS), mimo

(* 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. | 2500.000 | PK | 49.8 | 27.6 | 24.6 | 41.4 | 60.6 | 73.9 | 13.3 | 100 | 288 | |
| Hori. | 4874.000 | PK | 47.2 | 31.3 | 6.9 | 41.1 | 44.3 | 73.9 | 29.6 | 100 | 17 | |
| Hori. | 7311.000 | PK | 46.6 | 36.6 | 8.6 | 41.4 | 50.4 | 73.9 | 23.5 | 100 | 0 | |
| Hori. | 9748.000 | PK | 44.0 | 38.7 | 9.5 | 38.9 | 53.3 | 73.9 | 20.6 | 100 | 0 | |
| Hori. | 12185.000 | PK | 44.8 | 39.5 | 10.7 | 39.3 | 55.7 | 73.9 | 18.2 | 100 | 0 | |
| Hori. | 2500.000 | AV | 40.7 | 27.6 | 24.6 | 41.4 | 51.5 | 53.9 | 2.4 | 100 | 288 | VBW:10Hz |
| Hori. | 4874.000 | AV | 35.9 | 31.3 | 6.9 | 41.1 | 33.0 | 53.9 | 20.9 | 100 | 17 | VBW:680Hz |
| Hori. | 7311.000 | AV | 35.5 | 36.6 | 8.6 | 41.4 | 39.3 | 53.9 | 14.6 | 100 | 0 | VBW:680Hz |
| Hori. | 9748.000 | AV | 33.0 | 38.7 | 9.5 | 38.9 | 42.3 | 53.9 | 11.6 | 100 | 0 | VBW:680Hz |
| Hori. | 12185.000 | AV | 33.1 | 39.5 | 10.7 | 39.3 | 44.0 | 53.9 | 9.9 | 100 | 0 | VBW:680Hz |
| Vert. | 2500.000 | PK | 49.5 | 27.6 | 24.6 | 41.4 | 60.3 | 73.9 | 13.6 | 113 | 290 | |
| Vert. | 4874.000 | PK | 48.0 | 31.3 | 6.9 | 41.1 | 45.1 | 73.9 | 28.8 | 100 | 186 | |
| Vert. | 7311.000 | PK | 46.9 | 36.6 | 8.6 | 41.4 | 50.7 | 73.9 | 23.2 | 100 | 0 | |
| Vert. | 9748.000 | PK | 44.5 | 38.7 | 9.5 | 38.9 | 53.8 | 73.9 | 20.1 | 100 | 0 | |
| Vert. | 12185.000 | PK | 44.4 | 39.5 | 10.7 | 39.3 | 55.3 | 73.9 | 18.6 | 100 | 0 | |
| Vert. | 2500.000 | AV | 40.4 | 27.6 | 24.6 | 41.4 | 51.2 | 53.9 | 2.7 | 113 | 290 | VBW:10Hz |
| Vert. | 4874.000 | AV | 36.5 | 31.3 | 6.9 | 41.1 | 33.6 | 53.9 | 20.3 | 100 | 186 | VBW:680Hz |
| Vert. | 7311.000 | AV | 35.5 | 36.6 | 8.6 | 41.4 | 39.3 | 53.9 | 14.6 | 100 | 0 | VBW:680Hz |
| Vert. | 9748.000 | AV | 33.0 | 38.7 | 9.5 | 38.9 | 42.3 | 53.9 | 11.6 | 100 | 0 | VBW:680Hz |
| Vert. | 12185.000 | AV | 33.0 | 39.5 | 10.7 | 39.3 | 43.9 | 53.9 | 10.0 | 100 | 0 | VBW:680Hz |

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

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

*No noise was detected other than listed points.

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

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Facsimile : +81 463 50 6401

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/9/5 2012/9/6
 Temperature / Humidity 25 deg.C , 60%RH 26 deg.C , 62%RH
 Engineer Makoto Hosaka Makoto Hosaka
 Mode Tx, 2462 MHz Antenna: ANT1431-161C/M-AB-58
 Tx, IEEE802.11n (HT20), PN9, worst data mode 8(MCS), mimo

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|--------------|-----------|
| Hori. | 2483.500 | PK | 57.4 | 27.5 | 24.6 | 41.4 | 68.1 | 73.9 | 5.8 | 100 | 78 | |
| Hori. | 2500.000 | PK | 50.1 | 27.6 | 24.6 | 41.4 | 60.9 | 73.9 | 13.0 | 100 | 282 | |
| Hori. | 4924.000 | PK | 47.1 | 31.5 | 6.9 | 41.0 | 44.5 | 73.9 | 29.4 | 100 | 0 | |
| Hori. | 7386.000 | PK | 47.2 | 36.7 | 8.7 | 41.5 | 51.1 | 73.9 | 22.8 | 100 | 0 | |
| Hori. | 9848.000 | PK | 44.9 | 38.9 | 9.5 | 38.9 | 54.4 | 73.9 | 19.5 | 100 | 0 | |
| Hori. | 12310.000 | PK | 43.6 | 39.5 | 10.8 | 39.3 | 54.6 | 73.9 | 19.3 | 100 | 0 | |
| Hori. | 2483.500 | AV | 40.7 | 27.5 | 24.6 | 41.4 | 51.4 | 53.9 | 2.5 | 100 | 78 | VBW:680Hz |
| Hori. | 2500.000 | AV | 40.7 | 27.6 | 24.6 | 41.4 | 51.5 | 53.9 | 2.4 | 100 | 282 | VBW:10Hz |
| Hori. | 4924.000 | AV | 36.3 | 31.5 | 6.9 | 41.0 | 33.7 | 53.9 | 20.2 | 100 | 0 | VBW:680Hz |
| Hori. | 7386.000 | AV | 35.5 | 36.7 | 8.7 | 41.5 | 39.4 | 53.9 | 14.5 | 100 | 0 | VBW:680Hz |
| Hori. | 9848.000 | AV | 32.4 | 38.9 | 9.5 | 38.9 | 41.9 | 53.9 | 12.0 | 100 | 0 | VBW:680Hz |
| Hori. | 12310.000 | AV | 32.2 | 39.5 | 10.8 | 39.3 | 43.2 | 53.9 | 10.7 | 100 | 0 | VBW:680Hz |
| Vert. | 2483.500 | PK | 56.3 | 27.5 | 24.6 | 41.4 | 67.0 | 73.9 | 6.9 | 110 | 134 | |
| Vert. | 2500.000 | PK | 49.8 | 27.6 | 24.6 | 41.4 | 60.6 | 73.9 | 13.3 | 147 | 286 | |
| Vert. | 4924.000 | PK | 49.9 | 31.5 | 6.9 | 41.0 | 47.3 | 73.9 | 26.6 | 100 | 174 | |
| Vert. | 7386.000 | PK | 47.5 | 36.7 | 8.7 | 41.5 | 51.4 | 73.9 | 22.5 | 100 | 0 | |
| Vert. | 9848.000 | PK | 44.4 | 38.9 | 9.5 | 38.9 | 53.9 | 73.9 | 20.0 | 100 | 0 | |
| Vert. | 12310.000 | PK | 44.1 | 39.5 | 10.8 | 39.3 | 55.1 | 73.9 | 18.8 | 100 | 0 | |
| Vert. | 2483.500 | AV | 39.5 | 27.5 | 24.6 | 41.4 | 50.2 | 53.9 | 3.7 | 110 | 134 | VBW:680Hz |
| Vert. | 2500.000 | AV | 40.2 | 27.6 | 24.6 | 41.4 | 51.0 | 53.9 | 2.9 | 147 | 286 | VBW:10Hz |
| Vert. | 4924.000 | AV | 37.9 | 31.5 | 6.9 | 41.0 | 35.3 | 53.9 | 18.6 | 100 | 174 | VBW:680Hz |
| Vert. | 7386.000 | AV | 35.8 | 36.7 | 8.7 | 41.5 | 39.7 | 53.9 | 14.2 | 100 | 0 | VBW:680Hz |
| Vert. | 9848.000 | AV | 33.1 | 38.9 | 9.5 | 38.9 | 42.6 | 53.9 | 11.3 | 100 | 0 | VBW:680Hz |
| Vert. | 12310.000 | AV | 32.4 | 39.5 | 10.8 | 39.3 | 43.4 | 53.9 | 10.5 | 100 | 0 | VBW:680Hz |

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

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

*No noise was detected other than listed points.

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

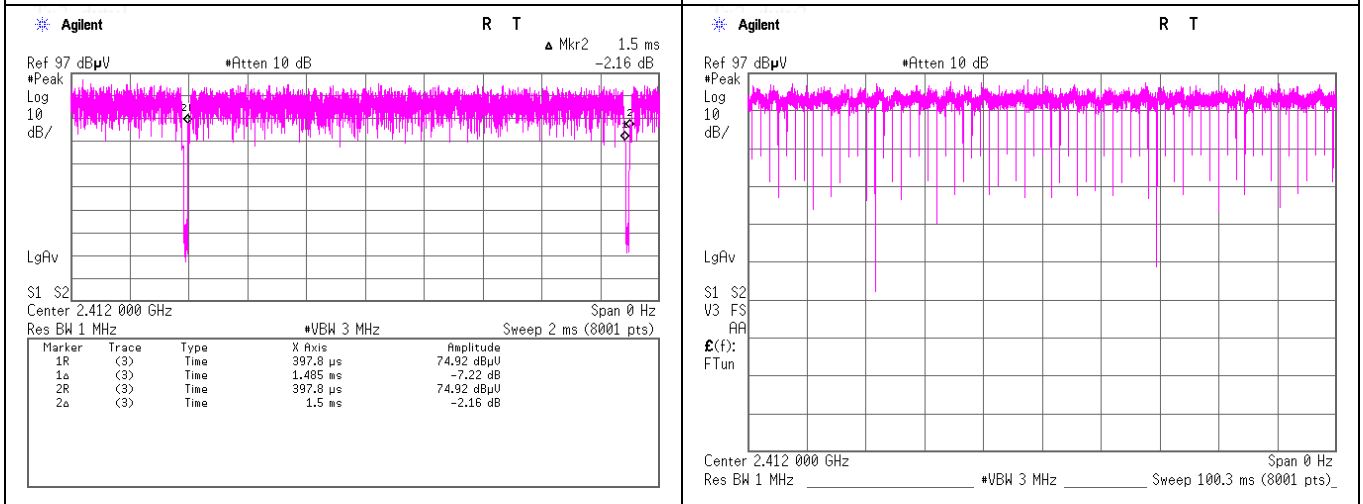
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VBW(Average) Calculation chart

Tx, IEEE802.11n (HT20), PN9, worst data mode 8(MCS), mimo

VBW (Average) Calculation

VBW: $1/(\text{ON Time}) = 0.673\text{kHz} < 680\text{Hz}$



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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/9/14 2012/9/15
 Temperature / Humidity 24 deg.C , 62%RH 26 deg.C , 65%RH
 Engineer Makoto Hosaka Shinichi Takano
 Mode Tx, 2422 MHz Antenna: ANT1468
 Tx, IEEE802.11n (HT40), PN9, worst data mode 8(MCS), mimo

(* 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 | 39.8 | 27.4 | 4.2 | 0.0 | 71.4 | 73.9 | 2.5 | 178 | 94 | |
| Hori. | 2500.000 | PK | 51.4 | 27.6 | 24.6 | 41.4 | 62.2 | 73.9 | 11.7 | 170 | 117 | |
| Hori. | 4844.000 | PK | 48.1 | 31.2 | 6.8 | 41.1 | 45.0 | 73.9 | 28.9 | 100 | 152 | |
| Hori. | 7266.000 | PK | 47.6 | 36.6 | 8.5 | 41.4 | 51.3 | 73.9 | 22.6 | 100 | 0 | |
| Hori. | 9688.000 | PK | 46.0 | 38.6 | 9.5 | 38.9 | 55.2 | 73.9 | 18.7 | 107 | 221 | |
| Hori. | 12110.000 | PK | 45.3 | 39.5 | 10.7 | 39.4 | 56.1 | 73.9 | 17.8 | 100 | 0 | |
| Hori. | 2390.000 | AV | 21.8 | 27.4 | 4.2 | 0.0 | 53.4 | 53.9 | 0.5 | 178 | 94 | VBW:10Hz |
| Hori. | 2500.000 | AV | 42.2 | 27.6 | 24.6 | 41.4 | 53.0 | 53.9 | 0.9 | 170 | 117 | VBW:10Hz |
| Hori. | 4844.000 | AV | 37.0 | 31.2 | 6.8 | 41.1 | 33.9 | 53.9 | 20.0 | 100 | 152 | VBW:10Hz |
| Hori. | 7266.000 | AV | 35.9 | 36.6 | 8.5 | 41.4 | 39.6 | 53.9 | 14.3 | 100 | 0 | VBW:10Hz |
| Hori. | 9688.000 | AV | 34.5 | 38.6 | 9.5 | 38.9 | 43.7 | 53.9 | 10.2 | 107 | 221 | VBW:10Hz |
| Hori. | 12110.000 | AV | 33.9 | 39.5 | 10.7 | 39.4 | 44.7 | 53.9 | 9.2 | 100 | 0 | VBW:10Hz |
| Vert. | 2390.000 | PK | 37.8 | 27.4 | 4.2 | 0.0 | 69.4 | 73.9 | 4.5 | 100 | 152 | |
| Vert. | 2500.000 | PK | 50.7 | 27.6 | 24.6 | 41.4 | 61.5 | 73.9 | 12.4 | 117 | 158 | |
| Vert. | 4844.000 | PK | 47.4 | 31.2 | 6.8 | 41.1 | 44.3 | 73.9 | 29.6 | 100 | 210 | |
| Vert. | 7266.000 | PK | 46.7 | 36.6 | 8.5 | 41.4 | 50.4 | 73.9 | 23.5 | 100 | 0 | |
| Vert. | 9688.000 | PK | 45.0 | 38.6 | 9.5 | 38.9 | 54.2 | 73.9 | 19.7 | 152 | 279 | |
| Vert. | 12110.000 | PK | 44.5 | 39.5 | 10.7 | 39.4 | 55.3 | 73.9 | 18.6 | 100 | 0 | |
| Vert. | 2390.000 | AV | 20.4 | 27.4 | 4.2 | 0.0 | 52.0 | 53.9 | 1.9 | 100 | 152 | VBW:10Hz |
| Vert. | 2500.000 | AV | 41.1 | 27.6 | 24.6 | 41.4 | 51.9 | 53.9 | 2.0 | 117 | 158 | VBW:10Hz |
| Vert. | 4844.000 | AV | 36.6 | 31.2 | 6.8 | 41.1 | 33.5 | 53.9 | 20.4 | 100 | 210 | VBW:10Hz |
| Vert. | 7266.000 | AV | 35.9 | 36.6 | 8.5 | 41.4 | 39.6 | 53.9 | 14.3 | 100 | 0 | VBW:10Hz |
| Vert. | 9688.000 | AV | 34.0 | 38.6 | 9.5 | 38.9 | 43.2 | 53.9 | 10.7 | 152 | 279 | VBW:10Hz |
| Vert. | 12110.000 | AV | 34.0 | 39.5 | 10.7 | 39.4 | 44.8 | 53.9 | 9.1 | 100 | 0 | VBW:10Hz |

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

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

*No noise was detected other than listed points.

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

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|--------------------|----------|-------------------|-------------------------|--------------|--------------|--------------------|-------------------|----------------|-----------|
| Hori. | 2422.000 | PK | 87.7 | 27.5 | 24.5 | 41.4 | 98.3 | - | - | 100k/300k |
| Hori. | 2400.000 | PK | 60.2 | 27.4 | 24.5 | 41.4 | 70.7 | 78.3 | 7.6 | 100k/300k |
| Vert. | 2422.000 | PK | 85.4 | 27.5 | 24.5 | 41.4 | 96.0 | - | - | 100k/300k |
| Vert. | 2400.000 | PK | 59.4 | 27.4 | 24.5 | 41.4 | 69.9 | 76.0 | 6.1 | 100k/300k |

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/9/14 2012/9/15
 Temperature / Humidity 24 deg.C , 62%RH 26 deg.C , 65%RH
 Engineer Makoto Hosaka Shinichi Takano
 Mode Tx, 2437 MHz Antenna: ANT1468
 Tx, IEEE802.11n (HT40), PN9, worst data mode 8(MCS), mimo

(* 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. | 2500.000 | PK | 51.0 | 27.6 | 24.6 | 41.4 | 61.8 | 73.9 | 12.1 | 171 | 120 | |
| Hori. | 4874.000 | PK | 48.5 | 31.3 | 6.9 | 41.1 | 45.6 | 73.9 | 28.3 | 100 | 149 | |
| Hori. | 7311.000 | PK | 46.7 | 36.6 | 8.6 | 41.4 | 50.5 | 73.9 | 23.4 | 100 | 0 | |
| Hori. | 9748.000 | PK | 43.0 | 38.7 | 9.5 | 38.9 | 52.3 | 73.9 | 21.6 | 100 | 0 | |
| Hori. | 12185.000 | PK | 43.6 | 39.5 | 10.7 | 39.3 | 54.5 | 73.9 | 19.4 | 100 | 0 | |
| Hori. | 2500.000 | AV | 42.2 | 27.6 | 24.6 | 41.4 | 53.0 | 53.9 | 0.9 | 171 | 120 | VBW:10Hz |
| Hori. | 4874.000 | AV | 36.6 | 31.3 | 6.9 | 41.1 | 33.7 | 53.9 | 20.2 | 100 | 149 | VBW:10Hz |
| Hori. | 7311.000 | AV | 35.2 | 36.6 | 8.6 | 41.4 | 39.0 | 53.9 | 14.9 | 100 | 0 | VBW:10Hz |
| Hori. | 9748.000 | AV | 32.8 | 38.7 | 9.5 | 38.9 | 42.1 | 53.9 | 11.8 | 100 | 0 | VBW:10Hz |
| Hori. | 12185.000 | AV | 32.9 | 39.5 | 10.7 | 39.3 | 43.8 | 53.9 | 10.1 | 100 | 0 | VBW:10Hz |
| Vert. | 2500.000 | PK | 51.4 | 27.6 | 24.6 | 41.4 | 62.2 | 73.9 | 11.7 | 119 | 160 | |
| Vert. | 4874.000 | PK | 48.3 | 31.3 | 6.9 | 41.1 | 45.4 | 73.9 | 28.5 | 100 | 179 | |
| Vert. | 7311.000 | PK | 47.8 | 36.6 | 8.6 | 41.4 | 51.6 | 73.9 | 22.3 | 100 | 0 | |
| Vert. | 9748.000 | PK | 43.8 | 38.7 | 9.5 | 38.9 | 53.1 | 73.9 | 20.8 | 100 | 0 | |
| Vert. | 12185.000 | PK | 44.5 | 39.5 | 10.7 | 39.3 | 55.4 | 73.9 | 18.5 | 100 | 0 | |
| Vert. | 2500.000 | AV | 41.4 | 27.6 | 24.6 | 41.4 | 52.2 | 53.9 | 1.7 | 119 | 160 | VBW:10Hz |
| Vert. | 4874.000 | AV | 36.7 | 31.3 | 6.9 | 41.1 | 33.8 | 53.9 | 20.1 | 100 | 179 | VBW:10Hz |
| Vert. | 7311.000 | AV | 35.3 | 36.6 | 8.6 | 41.4 | 39.1 | 53.9 | 14.8 | 100 | 0 | VBW:10Hz |
| Vert. | 9748.000 | AV | 32.9 | 38.7 | 9.5 | 38.9 | 42.2 | 53.9 | 11.7 | 100 | 0 | VBW:10Hz |
| Vert. | 12185.000 | AV | 32.9 | 39.5 | 10.7 | 39.3 | 43.8 | 53.9 | 10.1 | 100 | 0 | VBW:10Hz |

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

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

*No noise was detected other than listed points.

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/9/14 2012/9/15
 Temperature / Humidity 24 deg.C , 62%RH 26 deg.C , 65%RH
 Engineer Makoto Hosaka Shinichi Takano
 Mode Tx, 2452 MHz Antenna: ANT1468
 Tx, IEEE802.11n (HT40), PN9, worst data mode 8(MCS), mimo

(* 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 | 39.0 | 27.5 | 4.3 | 0.0 | 70.8 | 73.9 | 3.1 | 177 | 94 | |
| Hori. | 2500.000 | PK | 31.8 | 27.6 | 4.3 | 0.0 | 63.7 | 73.9 | 10.2 | 171 | 120 | |
| Hori. | 4904.000 | PK | 47.7 | 31.4 | 6.9 | 41.0 | 45.0 | 73.9 | 28.9 | 100 | 151 | |
| Hori. | 7356.000 | PK | 46.7 | 36.6 | 8.7 | 41.5 | 50.5 | 73.9 | 23.4 | 100 | 0 | |
| Hori. | 9808.000 | PK | 45.6 | 38.8 | 9.6 | 38.9 | 55.1 | 73.9 | 18.8 | 100 | 165 | |
| Hori. | 12260.000 | PK | 43.8 | 39.5 | 10.8 | 39.3 | 54.8 | 73.9 | 19.1 | 100 | 0 | |
| Hori. | 2483.500 | AV | 21.2 | 27.5 | 4.3 | 0.0 | 53.0 | 53.9 | 0.9 | 177 | 94 | VBW:10Hz |
| Hori. | 2500.000 | AV | 21.0 | 27.6 | 4.3 | 0.0 | 52.9 | 53.9 | 1.0 | 171 | 120 | VBW:10Hz |
| Hori. | 4904.000 | AV | 36.6 | 31.4 | 6.9 | 41.0 | 33.9 | 53.9 | 20.0 | 100 | 151 | VBW:10Hz |
| Hori. | 7356.000 | AV | 35.6 | 36.6 | 8.7 | 41.5 | 39.4 | 53.9 | 14.5 | 100 | 0 | VBW:10Hz |
| Hori. | 9808.000 | AV | 34.2 | 38.8 | 9.6 | 38.9 | 43.7 | 53.9 | 10.2 | 100 | 165 | VBW:10Hz |
| Hori. | 12260.000 | AV | 32.6 | 39.5 | 10.8 | 39.3 | 43.6 | 53.9 | 10.3 | 100 | 0 | VBW:10Hz |
| Vert. | 2483.500 | PK | 38.5 | 27.5 | 4.3 | 0.0 | 70.3 | 73.9 | 3.6 | 126 | 155 | |
| Vert. | 2500.000 | PK | 29.4 | 27.6 | 4.3 | 0.0 | 61.3 | 73.9 | 12.6 | 150 | 163 | |
| Vert. | 4904.000 | PK | 47.4 | 31.4 | 6.9 | 41.0 | 44.7 | 73.9 | 29.2 | 100 | 189 | |
| Vert. | 7356.000 | PK | 46.7 | 36.6 | 8.7 | 41.5 | 50.5 | 73.9 | 23.4 | 100 | 0 | |
| Vert. | 9808.000 | PK | 44.0 | 38.8 | 9.6 | 38.9 | 53.5 | 73.9 | 20.4 | 100 | 0 | |
| Vert. | 12260.000 | PK | 42.9 | 39.5 | 10.8 | 39.3 | 53.9 | 73.9 | 20.0 | 100 | 0 | |
| Vert. | 2483.500 | AV | 21.4 | 27.5 | 4.3 | 0.0 | 53.2 | 53.9 | 0.7 | 126 | 155 | VBW:10Hz |
| Vert. | 2500.000 | AV | 20.0 | 27.6 | 4.3 | 0.0 | 51.9 | 53.9 | 2.0 | 150 | 163 | VBW:10Hz |
| Vert. | 4904.000 | AV | 36.3 | 31.4 | 6.9 | 41.0 | 33.6 | 53.9 | 20.3 | 100 | 189 | VBW:10Hz |
| Vert. | 7356.000 | AV | 35.5 | 36.6 | 8.7 | 41.5 | 39.3 | 53.9 | 14.6 | 100 | 0 | VBW:10Hz |
| Vert. | 9808.000 | AV | 32.4 | 38.8 | 9.6 | 38.9 | 41.9 | 53.9 | 12.0 | 100 | 0 | VBW:10Hz |
| Vert. | 12260.000 | AV | 32.5 | 39.5 | 10.8 | 39.3 | 43.5 | 53.9 | 10.4 | 100 | 0 | VBW:10Hz |

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

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

*No noise was detected other than listed points.

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/9/5 2012/9/6
 Temperature / Humidity 25 deg.C , 60%RH 26 deg.C , 62%RH
 Engineer Makoto Hosaka Makoto Hosaka
 Mode Tx, 2422 MHz Antenna: ANT1431-161C/M-AB-58
 Tx, IEEE802.11n (HT40), PN9, worst data mode 8(MCS), mimo

(* 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 | 36.6 | 27.4 | 4.2 | 0.0 | 68.2 | 73.9 | 5.7 | 100 | 76 | |
| Hori. | 2500.000 | PK | 50.0 | 27.6 | 24.6 | 41.4 | 60.8 | 73.9 | 13.1 | 100 | 280 | |
| Hori. | 4844.000 | PK | 50.0 | 31.2 | 6.8 | 41.1 | 46.9 | 73.9 | 27.0 | 100 | 0 | |
| Hori. | 7266.000 | PK | 48.4 | 36.6 | 8.5 | 41.4 | 52.1 | 73.9 | 21.8 | 100 | 0 | |
| Hori. | 9688.000 | PK | 44.4 | 38.6 | 9.5 | 38.9 | 53.6 | 73.9 | 20.3 | 100 | 0 | |
| Hori. | 12110.000 | PK | 45.7 | 39.5 | 10.7 | 39.4 | 56.5 | 73.9 | 17.4 | 100 | 0 | |
| Hori. | 2390.000 | AV | 20.2 | 27.4 | 4.2 | 0.0 | 51.8 | 53.9 | 2.1 | 100 | 76 | VBW:10Hz |
| Hori. | 2500.000 | AV | 40.6 | 27.6 | 24.6 | 41.4 | 51.4 | 53.9 | 2.5 | 100 | 280 | VBW:10Hz |
| Hori. | 4844.000 | AV | 36.1 | 31.2 | 6.8 | 41.1 | 33.0 | 53.9 | 20.9 | 100 | 0 | VBW:10Hz |
| Hori. | 7266.000 | AV | 36.5 | 36.6 | 8.5 | 41.4 | 40.2 | 53.9 | 13.7 | 100 | 0 | VBW:10Hz |
| Hori. | 9688.000 | AV | 33.7 | 38.6 | 9.5 | 38.9 | 42.9 | 53.9 | 11.0 | 100 | 0 | VBW:10Hz |
| Hori. | 12110.000 | AV | 34.1 | 39.5 | 10.7 | 39.4 | 44.9 | 53.9 | 9.0 | 100 | 0 | VBW:10Hz |
| Vert. | 2390.000 | PK | 36.0 | 27.4 | 4.2 | 0.0 | 67.6 | 73.9 | 6.3 | 113 | 81 | |
| Vert. | 2500.000 | PK | 49.7 | 27.6 | 24.6 | 41.4 | 60.5 | 73.9 | 13.4 | 145 | 290 | |
| Vert. | 4844.000 | PK | 47.4 | 31.2 | 6.8 | 41.1 | 44.3 | 73.9 | 29.6 | 100 | 0 | |
| Vert. | 7266.000 | PK | 47.5 | 36.6 | 8.5 | 41.4 | 51.2 | 73.9 | 22.7 | 100 | 0 | |
| Vert. | 9688.000 | PK | 45.3 | 38.6 | 9.5 | 38.9 | 54.5 | 73.9 | 19.4 | 100 | 0 | |
| Vert. | 12110.000 | PK | 45.5 | 39.5 | 10.7 | 39.4 | 56.3 | 73.9 | 17.6 | 100 | 0 | |
| Vert. | 2390.000 | AV | 20.0 | 27.4 | 4.2 | 0.0 | 51.6 | 53.9 | 2.3 | 113 | 81 | VBW:10Hz |
| Vert. | 2500.000 | AV | 40.1 | 27.6 | 24.6 | 41.4 | 50.9 | 53.9 | 3.0 | 145 | 290 | VBW:10Hz |
| Vert. | 4844.000 | AV | 36.0 | 31.2 | 6.8 | 41.1 | 32.9 | 53.9 | 21.0 | 100 | 0 | VBW:10Hz |
| Vert. | 7266.000 | AV | 36.3 | 36.6 | 8.5 | 41.4 | 40.0 | 53.9 | 13.9 | 100 | 0 | VBW:10Hz |
| Vert. | 9688.000 | AV | 33.9 | 38.6 | 9.5 | 38.9 | 43.1 | 53.9 | 10.8 | 100 | 0 | VBW:10Hz |
| Vert. | 12110.000 | AV | 33.2 | 39.5 | 10.7 | 39.4 | 44.0 | 53.9 | 9.9 | 100 | 0 | VBW:10Hz |

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

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

*No noise was detected other than listed points.

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

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|--------------------|----------|-------------------|-------------------------|--------------|--------------|--------------------|-------------------|----------------|-----------|
| Hori. | 2422.000 | PK | 89.7 | 27.5 | 24.5 | 41.4 | 100.3 | - | - | 100k/300k |
| Hori. | 2400.000 | PK | 59.7 | 27.4 | 24.5 | 41.4 | 70.2 | 80.3 | 10.1 | 100k/300k |
| Vert. | 2422.000 | PK | 89.0 | 27.5 | 24.5 | 41.4 | 99.6 | - | - | 100k/300k |
| Vert. | 2400.000 | PK | 56.9 | 27.4 | 24.5 | 41.4 | 67.4 | 79.6 | 12.2 | 100k/300k |

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/9/5 2012/9/6
 Temperature / Humidity 25 deg.C , 60%RH 26 deg.C , 62%RH
 Engineer Makoto Hosaka Makoto Hosaka
 Mode Tx, 2437 MHz Antenna: ANT1431-161C/M-AB-58
 Tx, IEEE802.11n (HT40), PN9, worst data mode 8(MCS), mimo

(* 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. | 2500.000 | PK | 50.3 | 27.6 | 24.6 | 41.4 | 61.1 | 73.9 | 12.8 | 100 | 282 | |
| Hori. | 4874.000 | PK | 48.0 | 31.3 | 6.9 | 41.1 | 45.1 | 73.9 | 28.8 | 100 | 0 | |
| Hori. | 7311.000 | PK | 47.1 | 36.6 | 8.6 | 41.4 | 50.9 | 73.9 | 23.0 | 100 | 0 | |
| Hori. | 9748.000 | PK | 45.0 | 38.7 | 9.5 | 38.9 | 54.3 | 73.9 | 19.6 | 100 | 0 | |
| Hori. | 12185.000 | PK | 44.7 | 39.5 | 10.7 | 39.3 | 55.6 | 73.9 | 18.3 | 100 | 0 | |
| Hori. | 2500.000 | AV | 40.7 | 27.6 | 24.6 | 41.4 | 51.5 | 53.9 | 2.4 | 100 | 282 | VBW:10Hz |
| Hori. | 4874.000 | AV | 36.0 | 31.3 | 6.9 | 41.1 | 33.1 | 53.9 | 20.8 | 100 | 0 | VBW:10Hz |
| Hori. | 7311.000 | AV | 35.8 | 36.6 | 8.6 | 41.4 | 39.6 | 53.9 | 14.3 | 100 | 0 | VBW:10Hz |
| Hori. | 9748.000 | AV | 33.1 | 38.7 | 9.5 | 38.9 | 42.4 | 53.9 | 11.5 | 100 | 0 | VBW:10Hz |
| Hori. | 12185.000 | AV | 33.3 | 39.5 | 10.7 | 39.3 | 44.2 | 53.9 | 9.7 | 100 | 0 | VBW:10Hz |
| Vert. | 2500.000 | PK | 50.0 | 27.6 | 24.6 | 41.4 | 60.8 | 73.9 | 13.1 | 142 | 290 | |
| Vert. | 4874.000 | PK | 46.9 | 31.3 | 6.9 | 41.1 | 44.0 | 73.9 | 29.9 | 100 | 0 | |
| Vert. | 7311.000 | PK | 47.5 | 36.6 | 8.6 | 41.4 | 51.3 | 73.9 | 22.6 | 100 | 0 | |
| Vert. | 9748.000 | PK | 45.0 | 38.7 | 9.5 | 38.9 | 54.3 | 73.9 | 19.6 | 100 | 0 | |
| Vert. | 12185.000 | PK | 44.6 | 39.5 | 10.7 | 39.3 | 55.5 | 73.9 | 18.4 | 100 | 0 | |
| Vert. | 2500.000 | AV | 40.2 | 27.6 | 24.6 | 41.4 | 51.0 | 53.9 | 2.9 | 142 | 290 | VBW:10Hz |
| Vert. | 4874.000 | AV | 35.8 | 31.3 | 6.9 | 41.1 | 32.9 | 53.9 | 21.0 | 100 | 0 | VBW:10Hz |
| Vert. | 7311.000 | AV | 36.0 | 36.6 | 8.6 | 41.4 | 39.8 | 53.9 | 14.1 | 100 | 0 | VBW:10Hz |
| Vert. | 9748.000 | AV | 34.2 | 38.7 | 9.5 | 38.9 | 43.5 | 53.9 | 10.4 | 100 | 0 | VBW:10Hz |
| Vert. | 12185.000 | AV | 33.3 | 39.5 | 10.7 | 39.3 | 44.2 | 53.9 | 9.7 | 100 | 0 | VBW:10Hz |

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

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

*No noise was detected other than listed points.

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date 2012/9/5 2012/9/6
 Temperature / Humidity 25 deg.C , 60%RH 26 deg.C , 62%RH
 Engineer Makoto Hosaka Makoto Hosaka
 Mode Tx, 2452 MHz Antenna: ANT1431-161C/M-AB-58
 Tx, IEEE802.11n (HT40), PN9, worst data mode 8(MCS), mimo

(* 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 | 39.1 | 27.5 | 4.3 | 0.0 | 70.9 | 73.9 | 3.0 | 100 | 296 | |
| Hori. | 2500.000 | PK | 50.6 | 27.6 | 24.6 | 41.4 | 61.4 | 73.9 | 12.5 | 100 | 282 | |
| Hori. | 4904.000 | PK | 48.9 | 31.4 | 6.9 | 41.0 | 46.2 | 73.9 | 27.7 | 100 | 0 | |
| Hori. | 7356.000 | PK | 48.0 | 36.6 | 8.7 | 41.5 | 51.8 | 73.9 | 22.1 | 100 | 0 | |
| Hori. | 9808.000 | PK | 44.3 | 38.8 | 9.6 | 38.9 | 53.8 | 73.9 | 20.1 | 100 | 0 | |
| Hori. | 12260.000 | PK | 44.0 | 39.5 | 10.8 | 39.3 | 55.0 | 73.9 | 18.9 | 100 | 0 | |
| Hori. | 2483.500 | AV | 21.6 | 27.5 | 4.3 | 0.0 | 53.4 | 53.9 | 0.5 | 100 | 296 | VBW:10Hz |
| Hori. | 2500.000 | AV | 40.9 | 27.6 | 24.6 | 41.4 | 51.7 | 53.9 | 2.2 | 100 | 282 | VBW:10Hz |
| Hori. | 4904.000 | AV | 36.8 | 31.4 | 6.9 | 41.0 | 34.1 | 53.9 | 19.8 | 100 | 0 | VBW:10Hz |
| Hori. | 7356.000 | AV | 36.2 | 36.6 | 8.7 | 41.5 | 40.0 | 53.9 | 13.9 | 100 | 0 | VBW:10Hz |
| Hori. | 9808.000 | AV | 33.2 | 38.8 | 9.6 | 38.9 | 42.7 | 53.9 | 11.2 | 100 | 0 | VBW:10Hz |
| Hori. | 12260.000 | AV | 32.8 | 39.5 | 10.8 | 39.3 | 43.8 | 53.9 | 10.1 | 100 | 0 | VBW:10Hz |
| Vert. | 2483.500 | PK | 38.7 | 27.5 | 4.3 | 0.0 | 70.5 | 73.9 | 3.4 | 107 | 87 | |
| Vert. | 2500.000 | PK | 49.7 | 27.6 | 24.6 | 41.4 | 60.5 | 73.9 | 13.4 | 142 | 290 | |
| Vert. | 4904.000 | PK | 47.4 | 31.4 | 6.9 | 41.0 | 44.7 | 73.9 | 29.2 | 100 | 0 | |
| Vert. | 7356.000 | PK | 47.8 | 36.6 | 8.7 | 41.5 | 51.6 | 73.9 | 22.3 | 100 | 0 | |
| Vert. | 9808.000 | PK | 44.2 | 38.8 | 9.6 | 38.9 | 53.7 | 73.9 | 20.2 | 100 | 0 | |
| Vert. | 12260.000 | PK | 44.2 | 39.5 | 10.8 | 39.3 | 55.2 | 73.9 | 18.7 | 100 | 0 | |
| Vert. | 2483.500 | AV | 20.7 | 27.5 | 4.3 | 0.0 | 52.5 | 53.9 | 1.4 | 107 | 87 | VBW:10Hz |
| Vert. | 2500.000 | AV | 40.0 | 27.6 | 24.6 | 41.4 | 50.8 | 53.9 | 3.1 | 142 | 290 | VBW:10Hz |
| Vert. | 4904.000 | AV | 36.1 | 31.4 | 6.9 | 41.0 | 33.4 | 53.9 | 20.5 | 100 | 0 | VBW:10Hz |
| Vert. | 7356.000 | AV | 35.8 | 36.6 | 8.7 | 41.5 | 39.6 | 53.9 | 14.3 | 100 | 0 | VBW:10Hz |
| Vert. | 9808.000 | AV | 32.7 | 38.8 | 9.6 | 38.9 | 42.2 | 53.9 | 11.7 | 100 | 0 | VBW:10Hz |
| Vert. | 12260.000 | AV | 32.7 | 39.5 | 10.8 | 39.3 | 43.7 | 53.9 | 10.2 | 100 | 0 | VBW:10Hz |

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

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

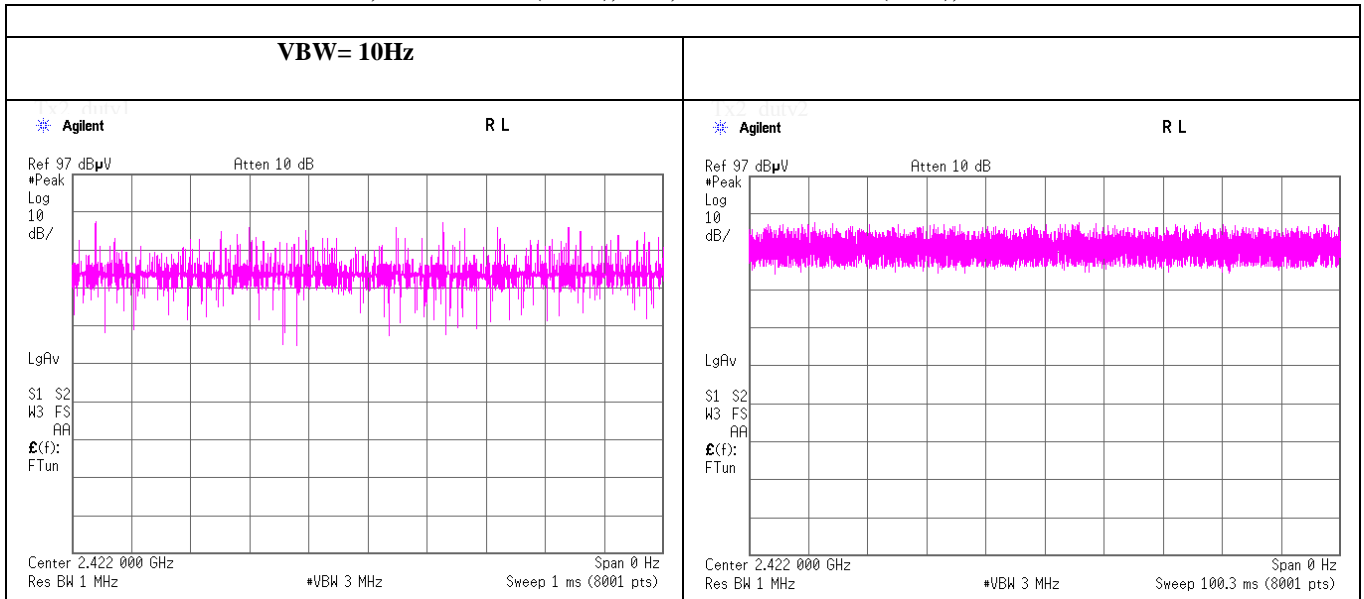
*No noise was detected other than listed points.

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

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Burst rate confirmation

Tx, IEEE802.11n (HT40), PN9, worst data mode 8(MCS), mimo



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Spurious emission (Conducted)

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

Tx, 2412MHz (1/2)

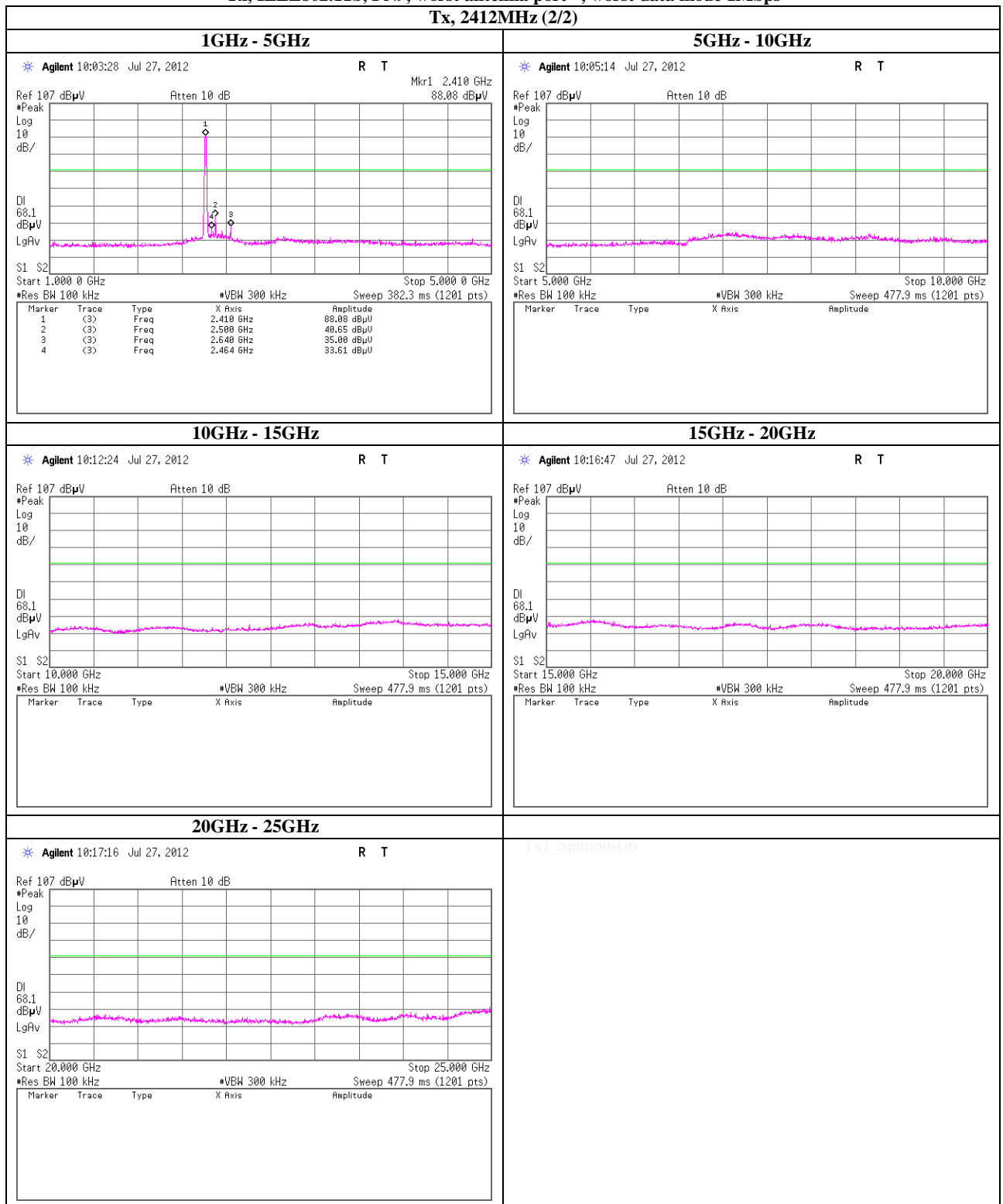


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Spurious emission (Conducted)

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

Tx, 2412MHz (2/2)



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Spurious emission (Conducted)

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

Tx, 2437MHz (1/2)

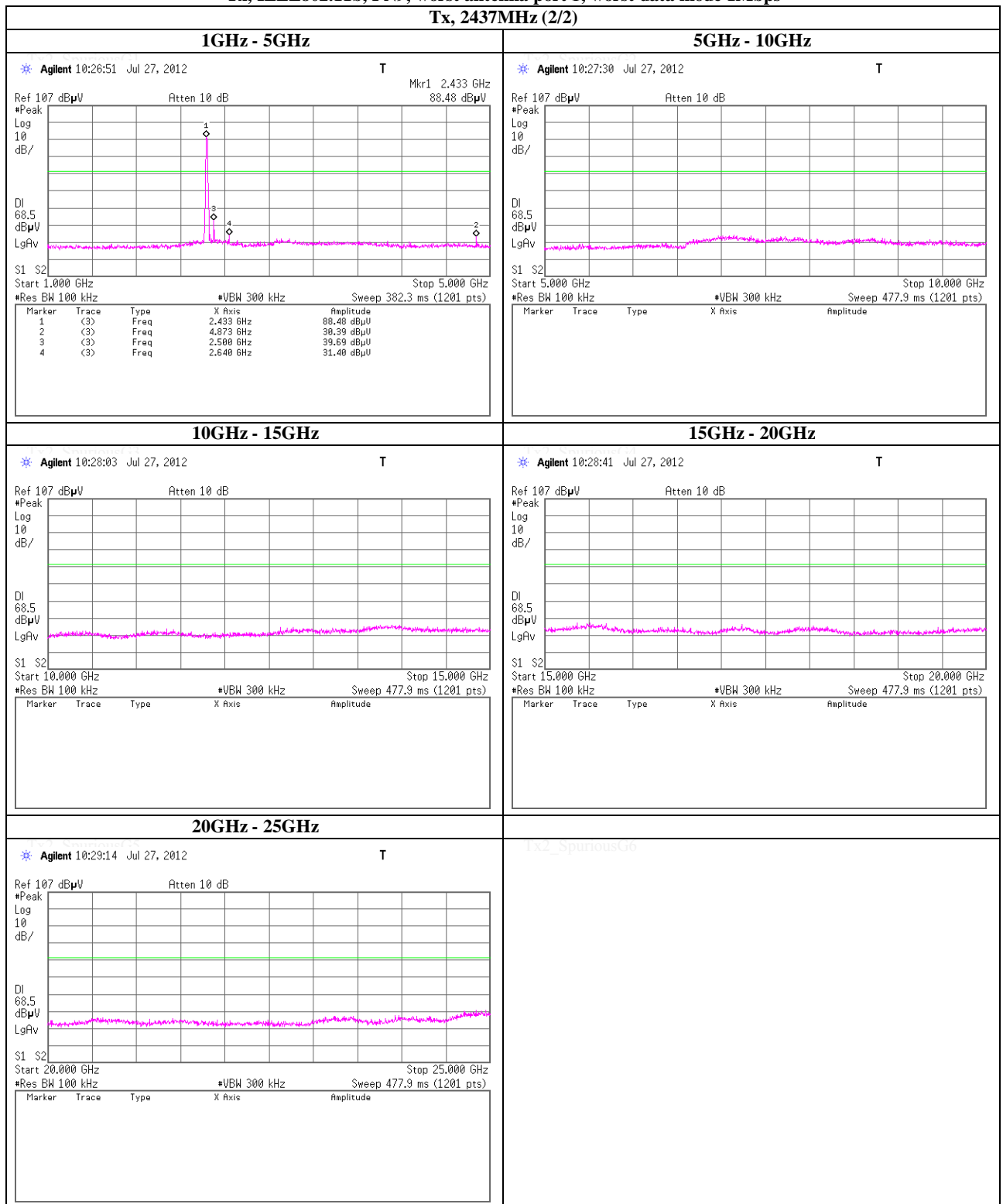


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Spurious emission (Conducted)

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

Tx, 2437MHz (2/2)

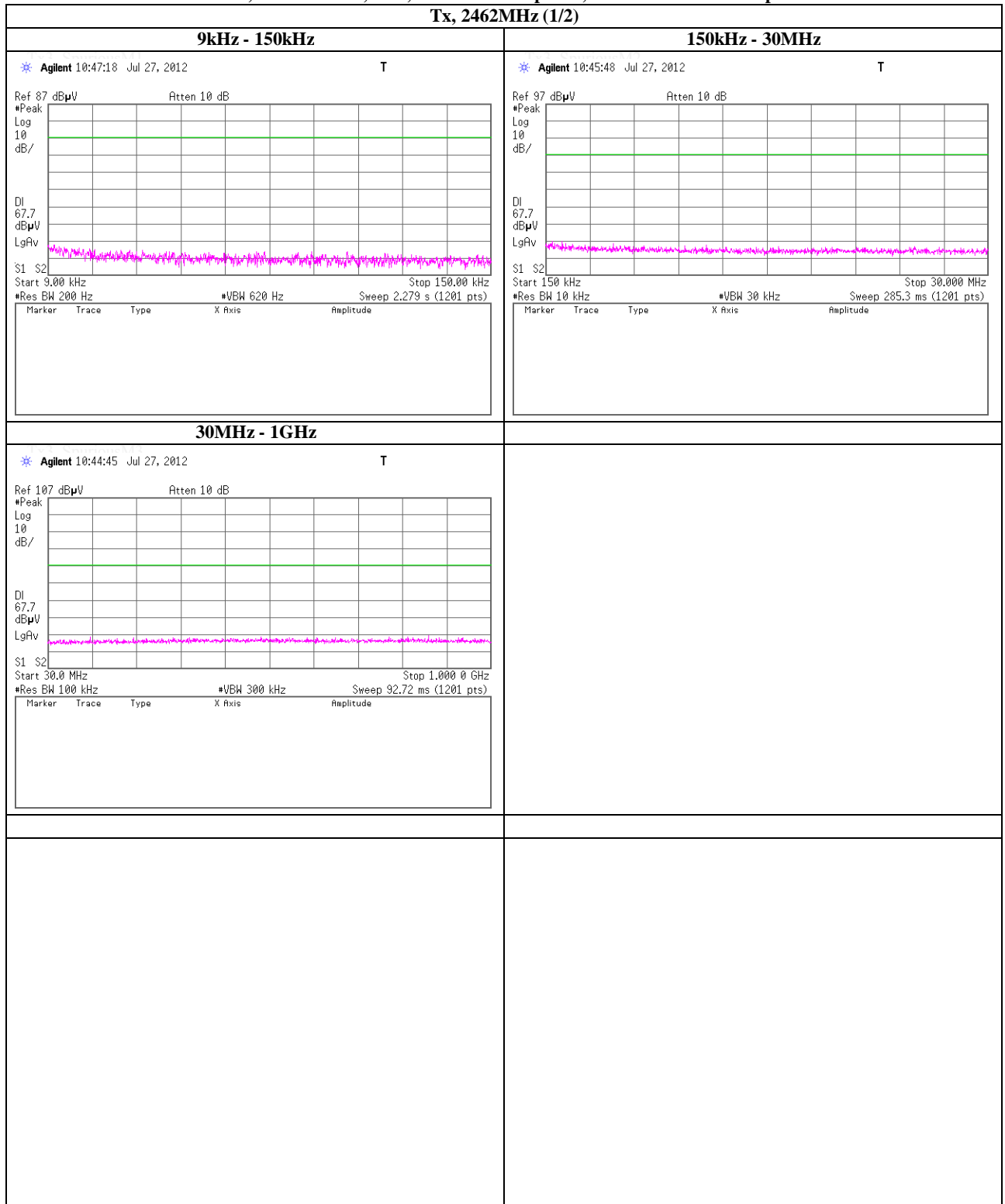


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 Facsimile : +81 463 50 6401

Spurious emission (Conducted)

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

Tx, 2462MHz (1/2)

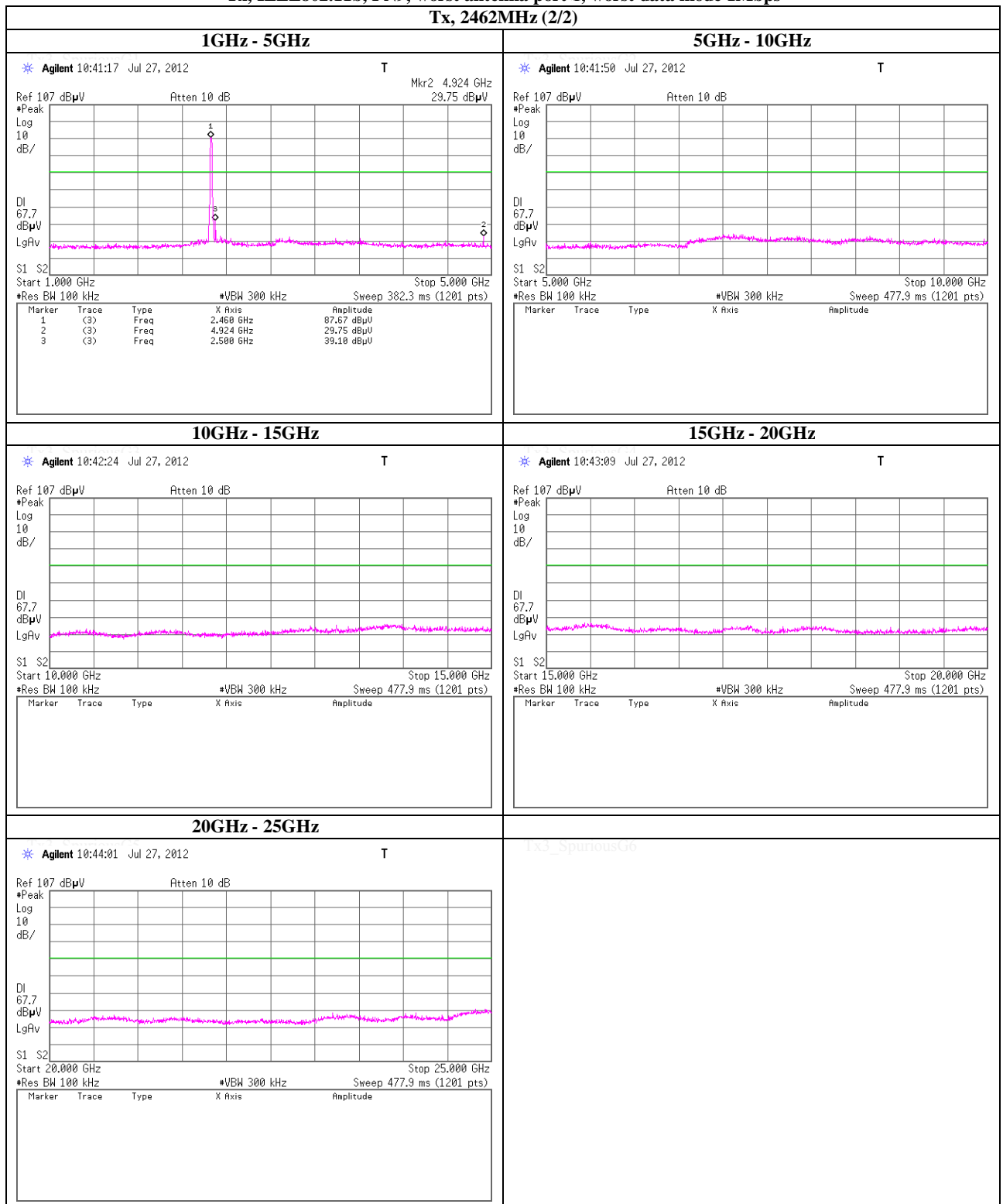


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Spurious emission (Conducted)

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

Tx, 2462MHz (2/2)

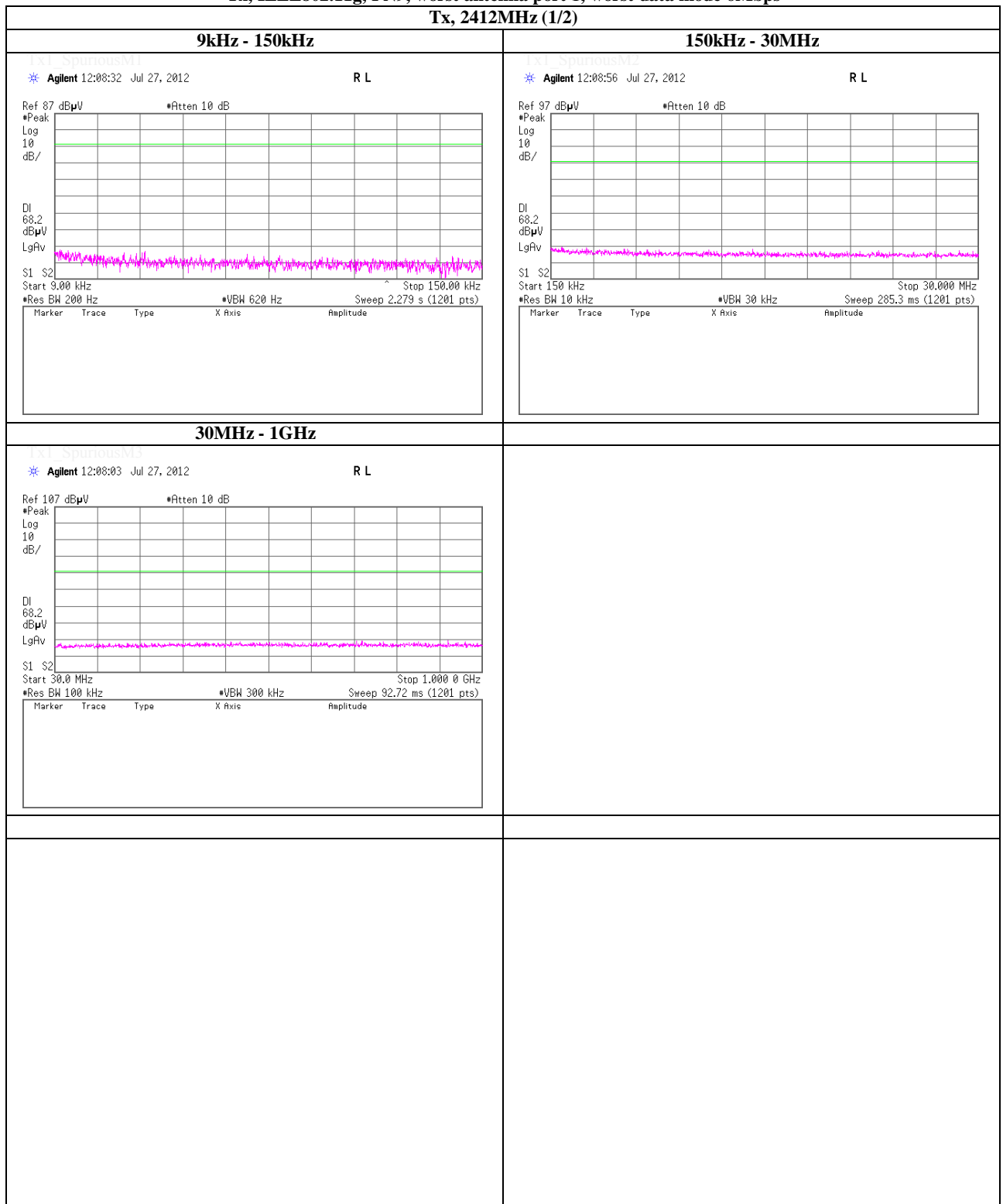


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Spurious emission (Conducted)

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

Tx, 2412MHz (1/2)

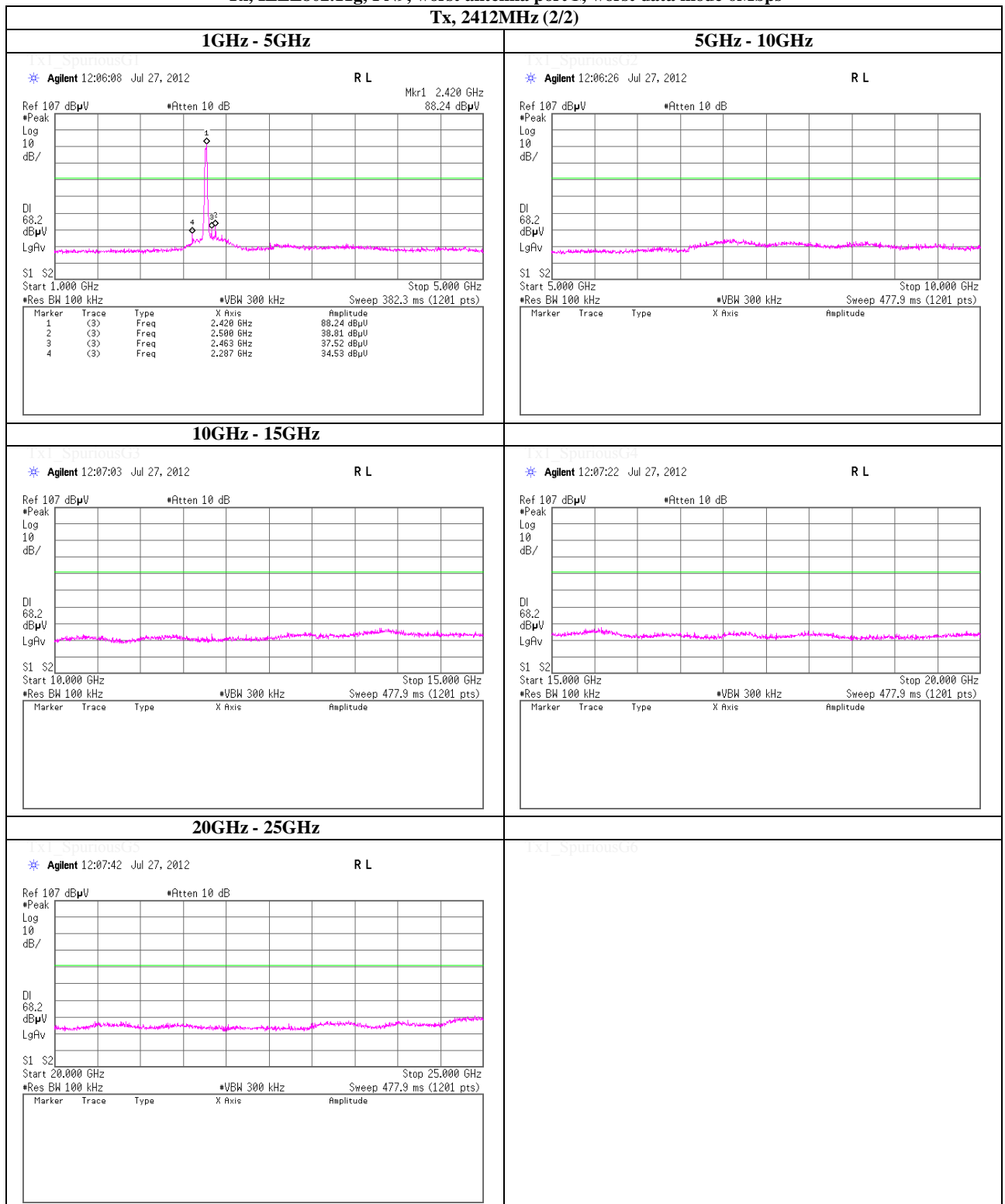


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Spurious emission (Conducted)

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

Tx, 2412MHz (2/2)

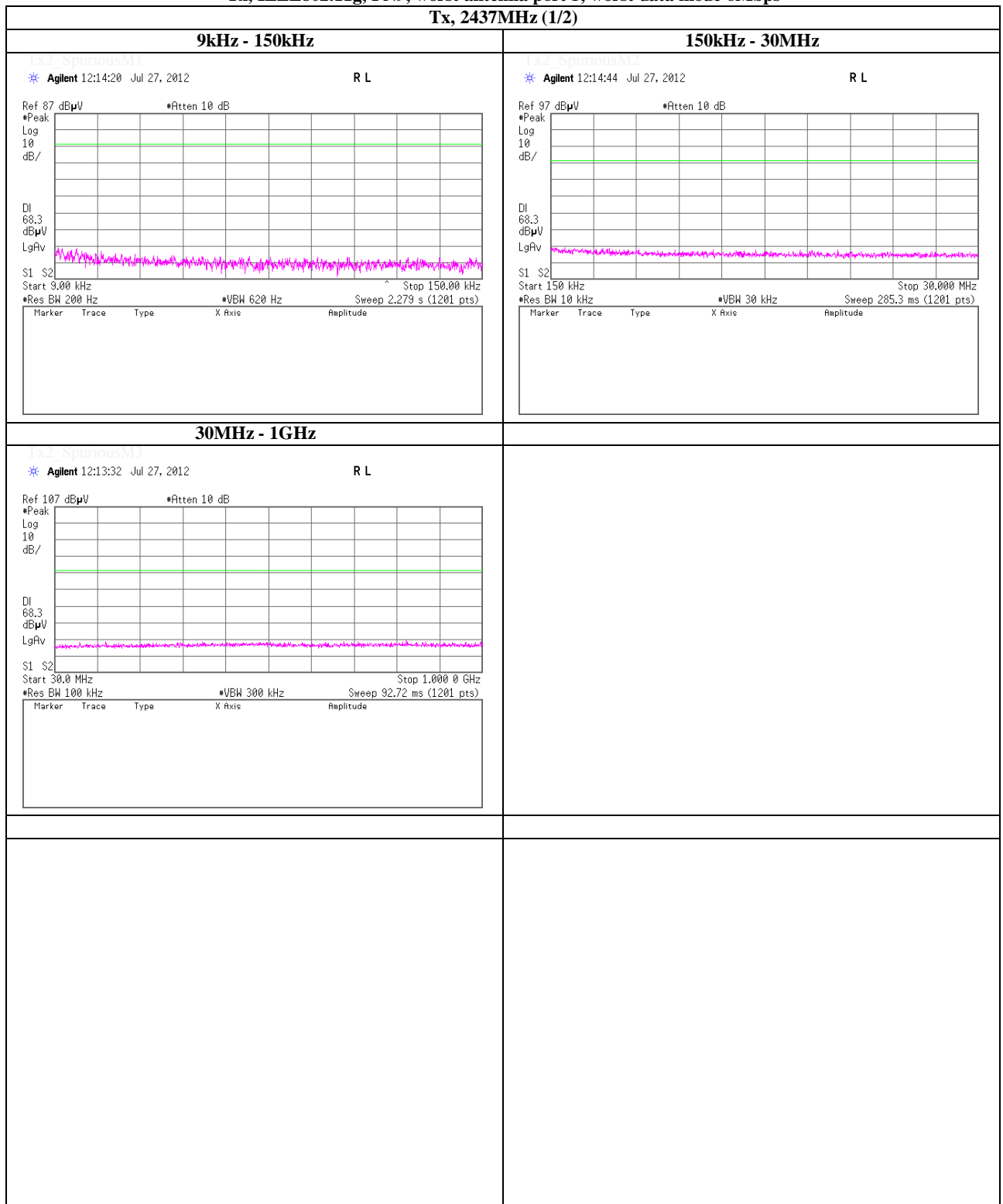


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Spurious emission (Conducted)

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

Tx, 2437MHz (1/2)

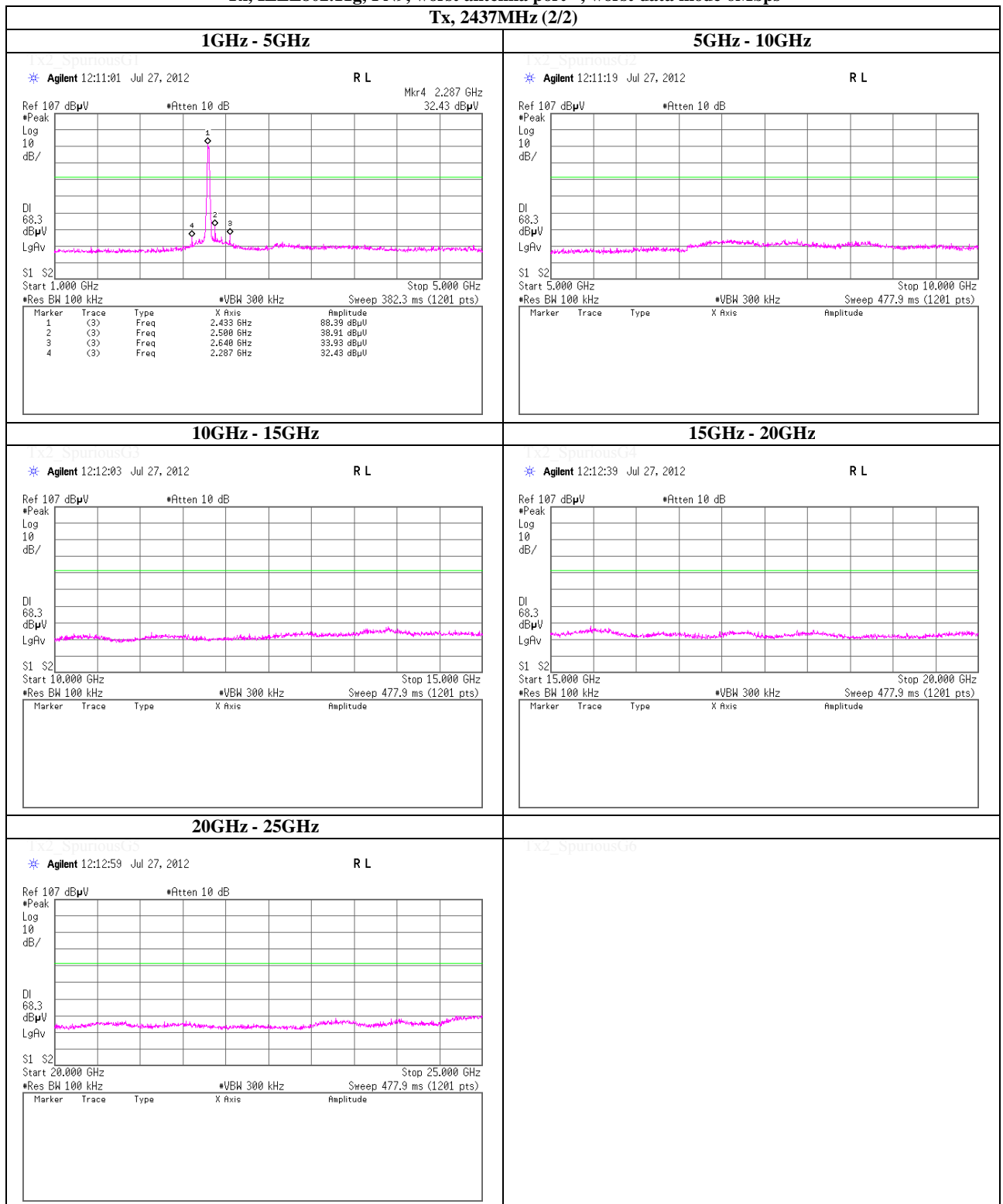


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Spurious emission (Conducted)

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

Tx, 2437MHz (2/2)

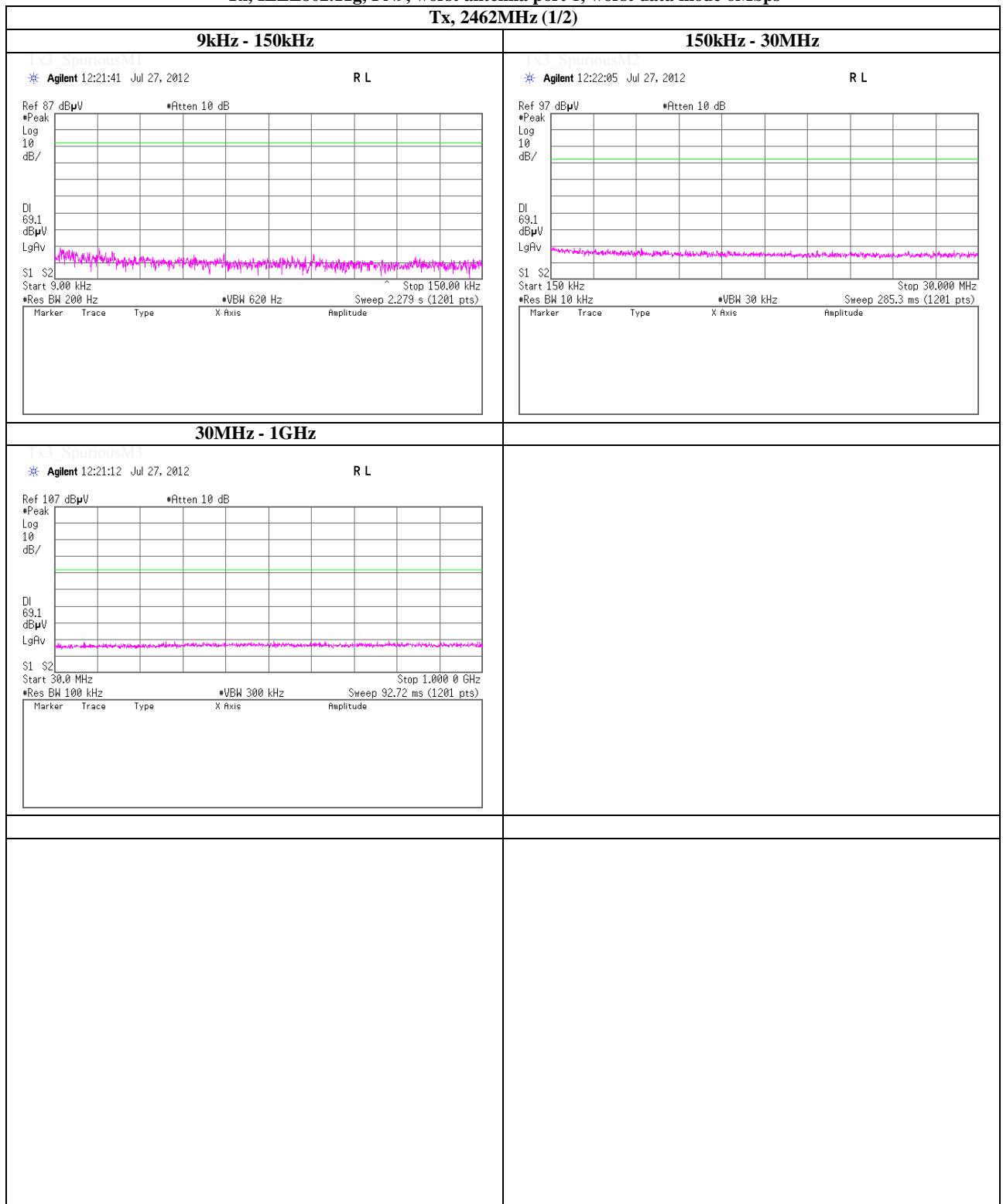


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Spurious emission (Conducted)

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

Tx, 2462MHz (1/2)

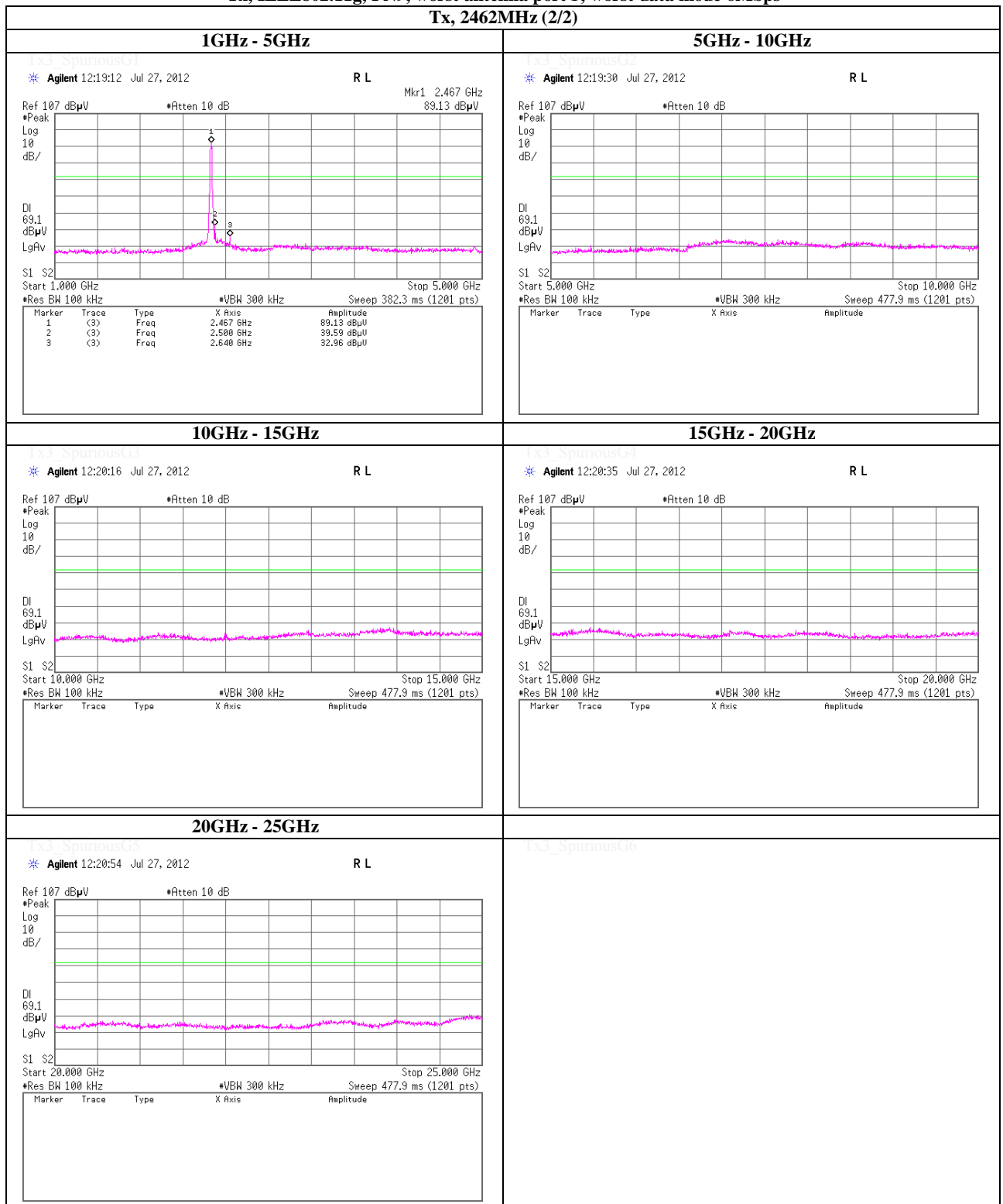


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Spurious emission (Conducted)

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

Tx, 2462MHz (2/2)

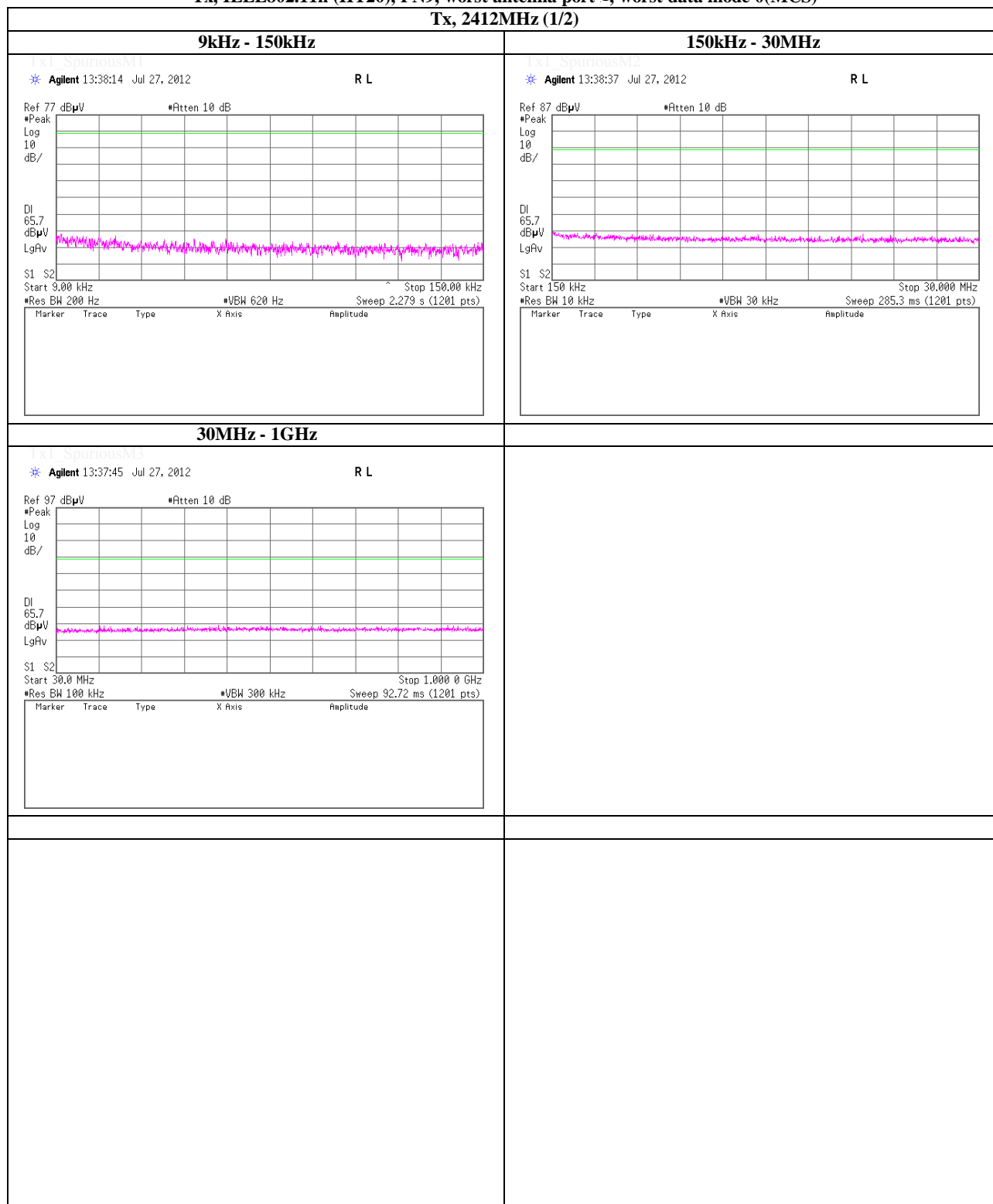


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Spurious emission (Conducted)

Tx, IEEE802.11n (HT20), PN9, worst antenna port 1, worst data mode 0(MCS)

Tx, 2412MHz (1/2)



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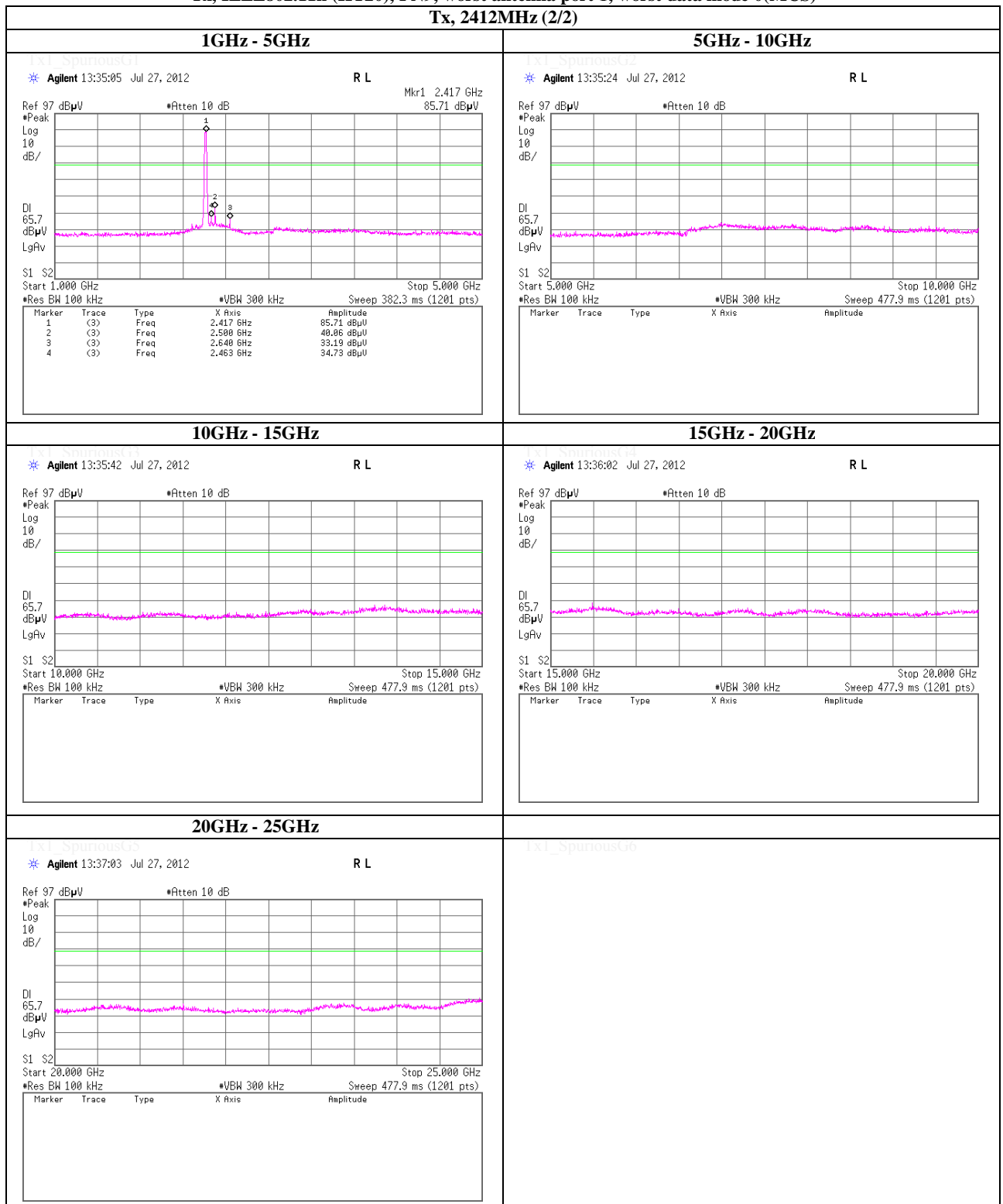
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, IEEE802.11n (HT20), PN9, worst antenna port 1, worst data mode 0(MCS)

Tx, 2412MHz (2/2)



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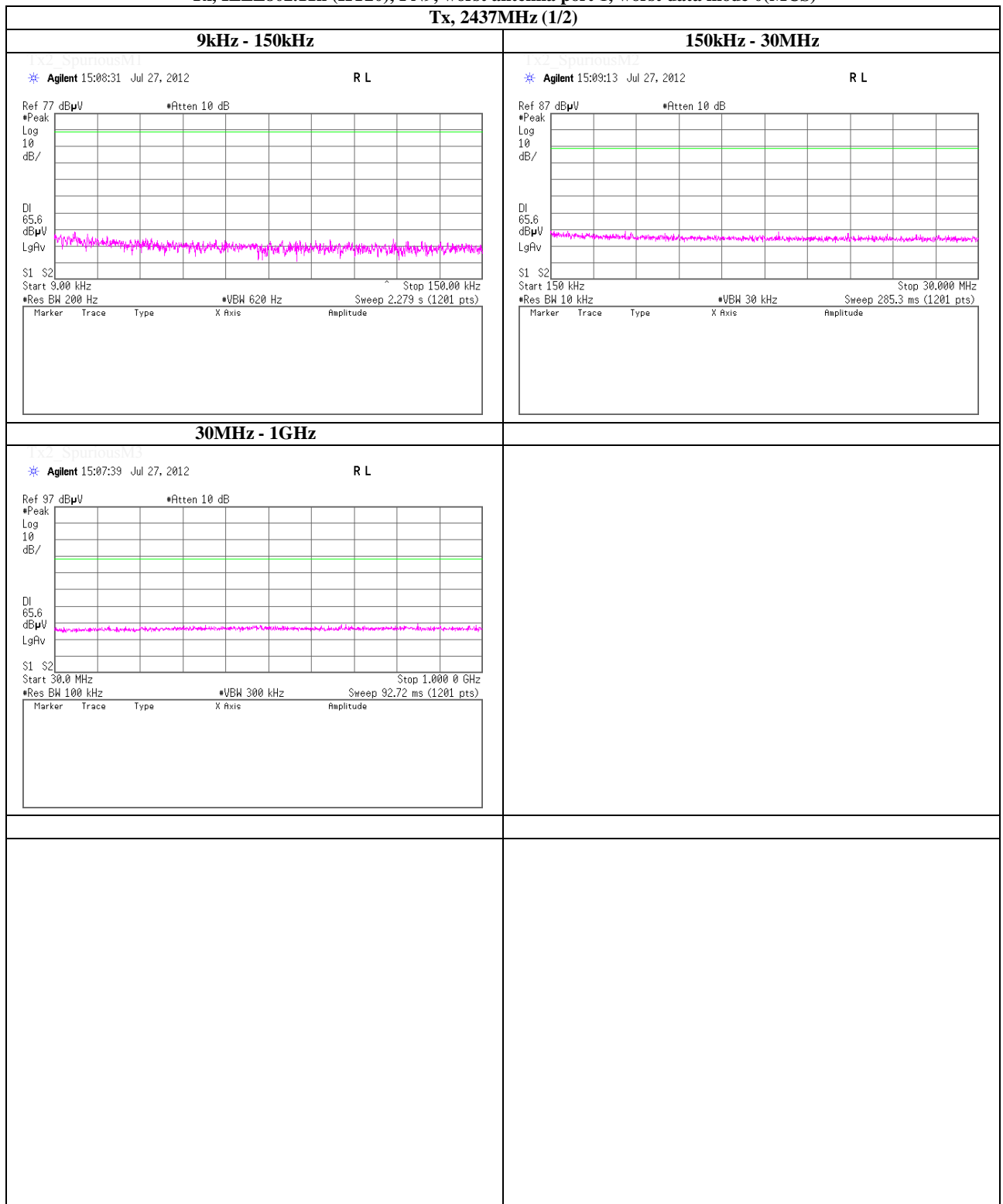
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, IEEE802.11n (HT20), PN9, worst antenna port 1, worst data mode 0(MCS)

Tx, 2437MHz (1/2)

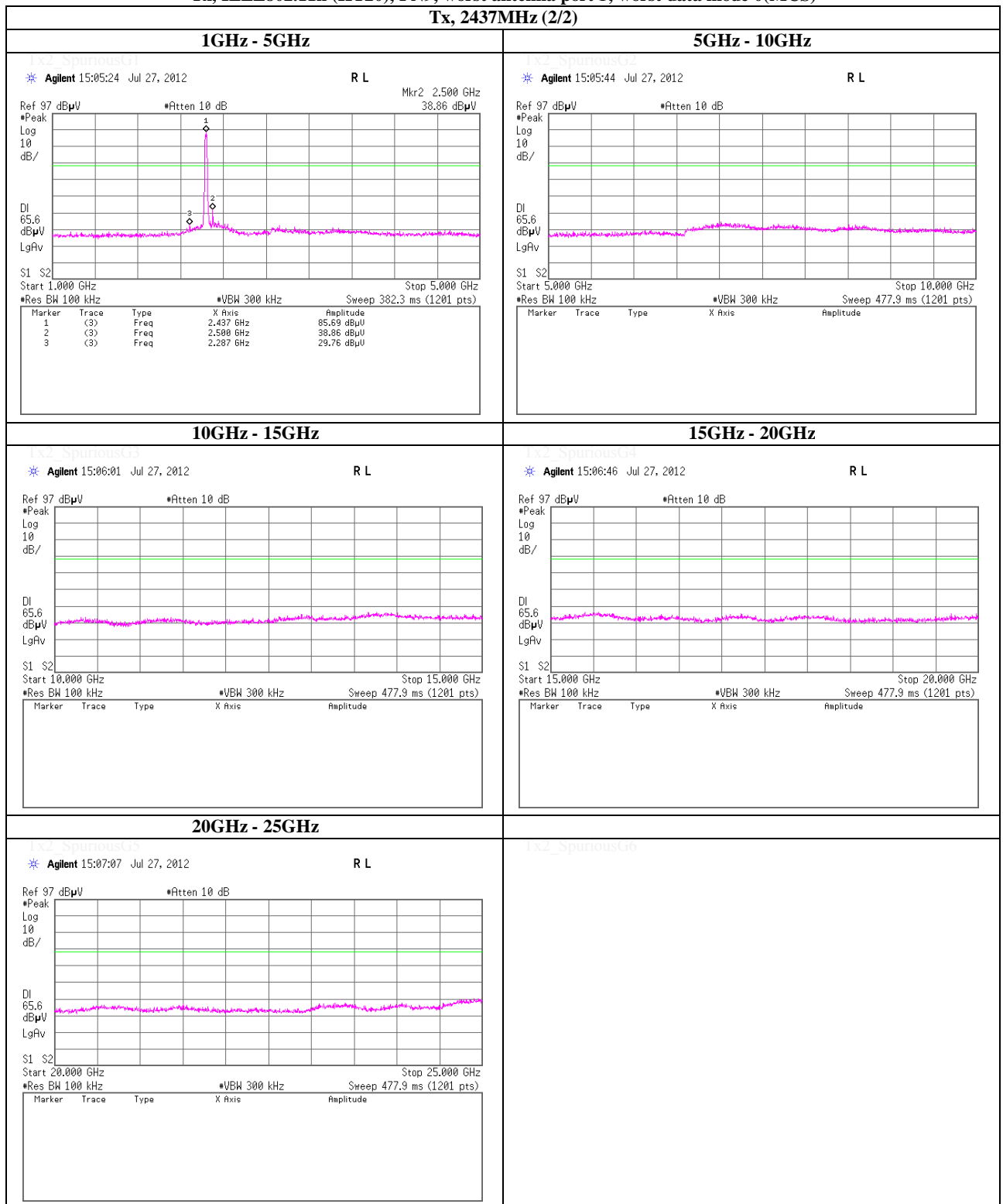


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Spurious emission (Conducted)

Tx, IEEE802.11n (HT20), PN9, worst antenna port 1, worst data mode 0(MCS)

Tx, 2437MHz (2/2)

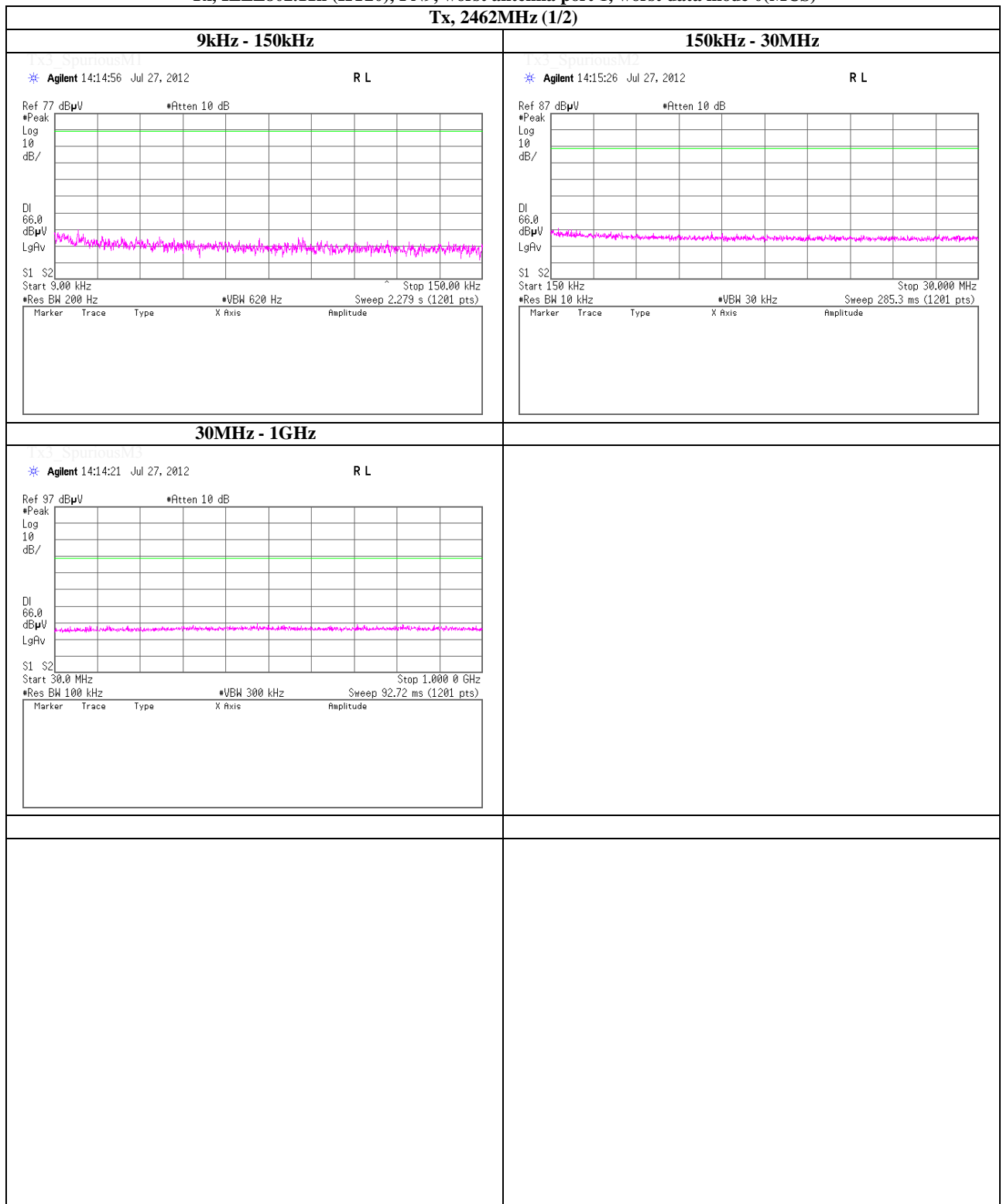


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Spurious emission (Conducted)

Tx, IEEE802.11n (HT20), PN9, worst antenna port 1, worst data mode 0(MCS)

Tx, 2462MHz (1/2)

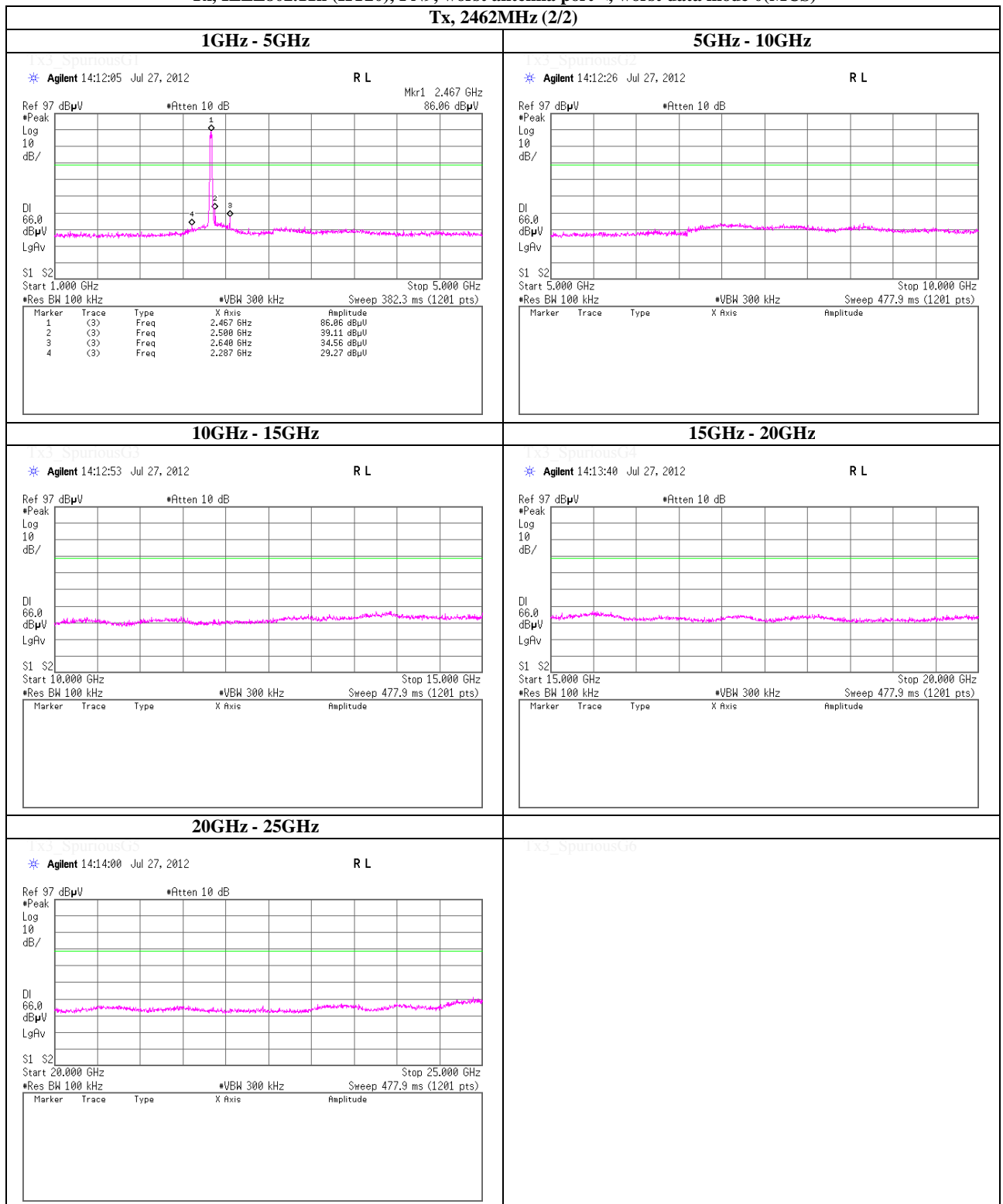


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Spurious emission (Conducted)

Tx, IEEE802.11n (HT20), PN9, worst antenna port 1, worst data mode 0(MCS)

Tx, 2462MHz (2/2)



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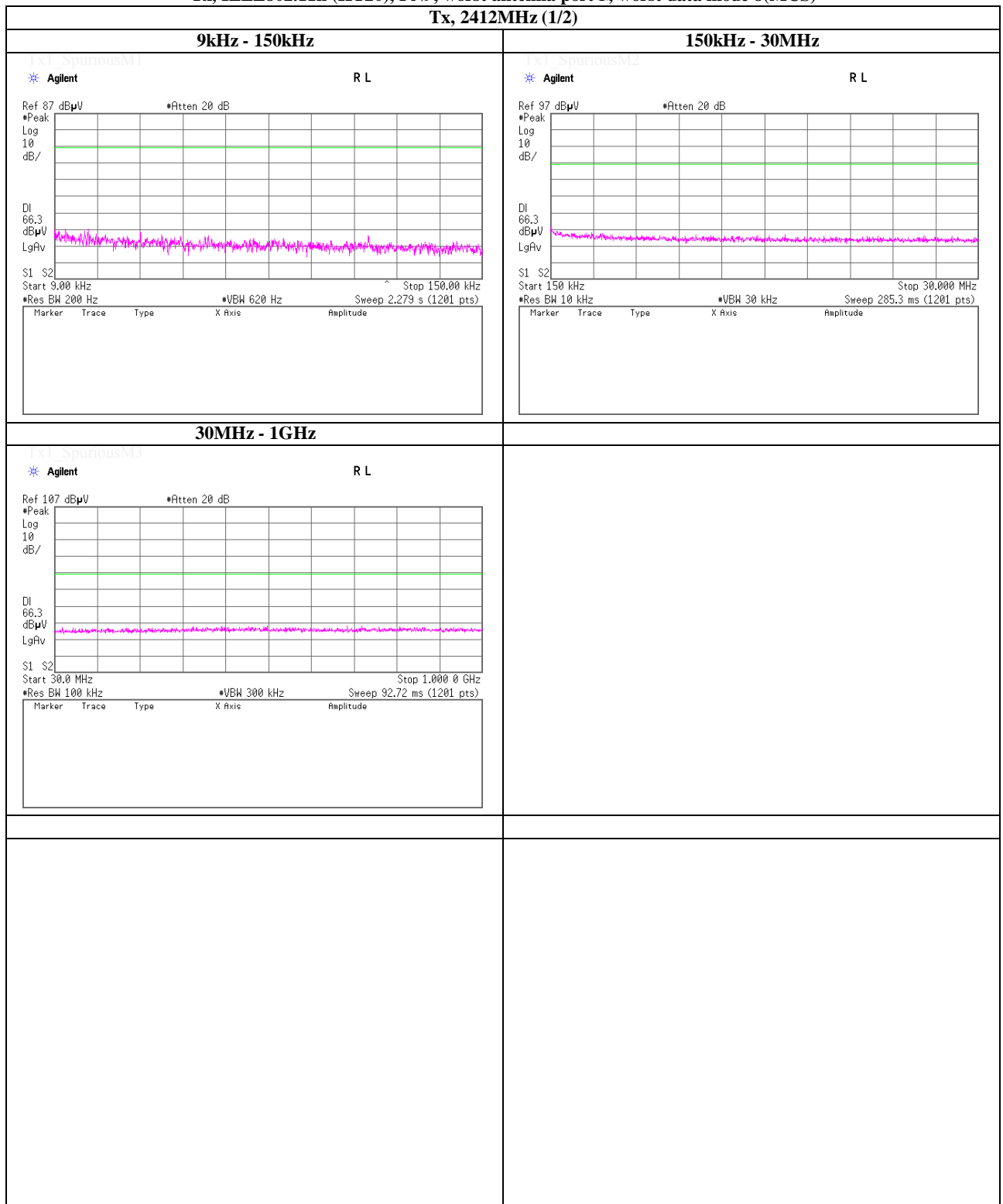
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Spurious emission (Conducted)

Tx, IEEE802.11n (HT20), PN9, worst antenna port 1, worst data mode 8(MCS)

Tx, 2412MHz (1/2)

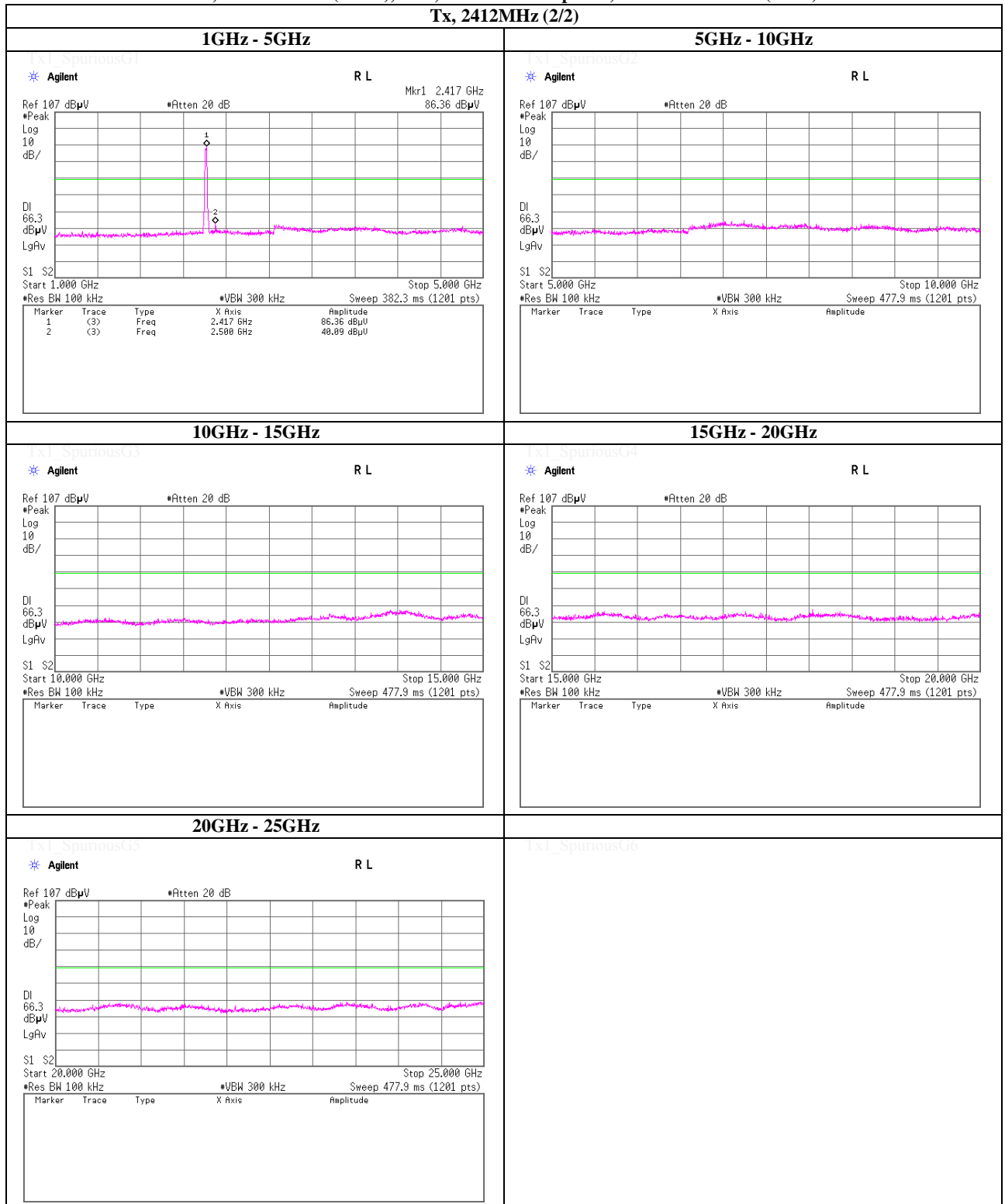


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Spurious emission (Conducted)

Tx, IEEE802.11n (HT20), PN9, worst antenna port 1, worst data mode 8(MCS)

Tx, 2412MHz (2/2)



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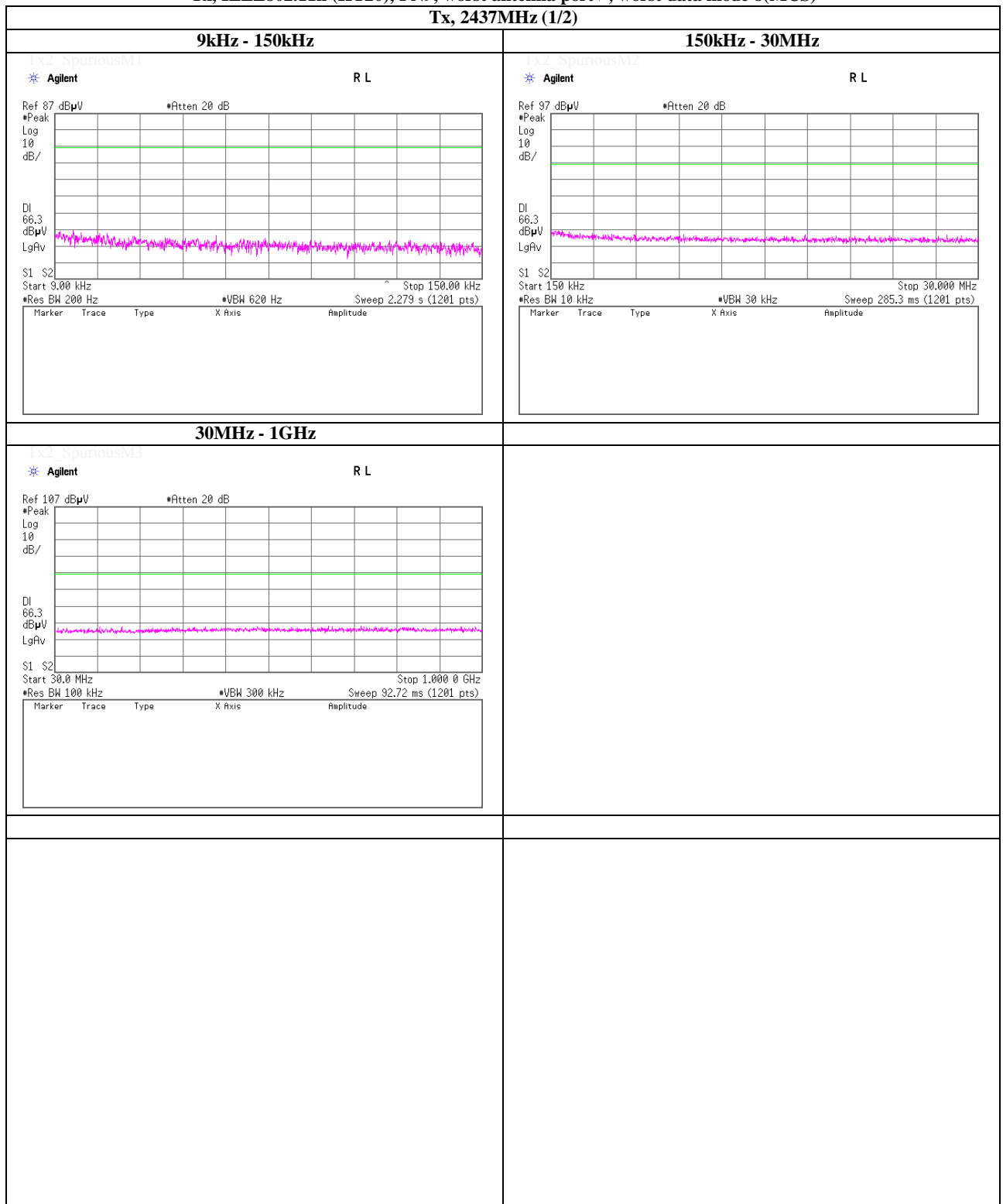
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, IEEE802.11n (HT20), PN9, worst antenna port 1, worst data mode 8(MCS)

Tx, 2437MHz (1/2)

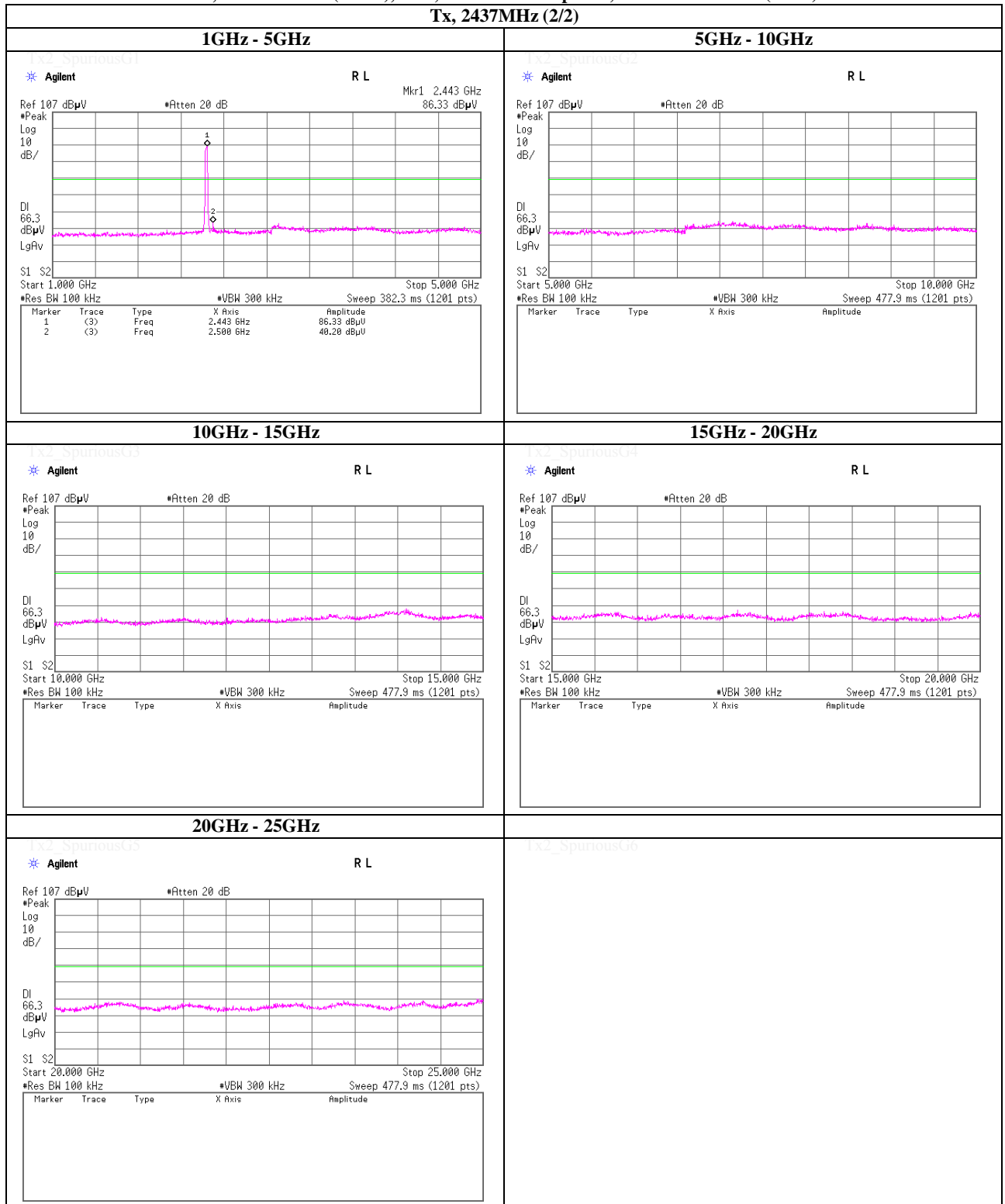


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Spurious emission (Conducted)

Tx, IEEE802.11n (HT20), PN9, worst antenna port 1, worst data mode 8(MCS)

Tx, 2437MHz (2/2)



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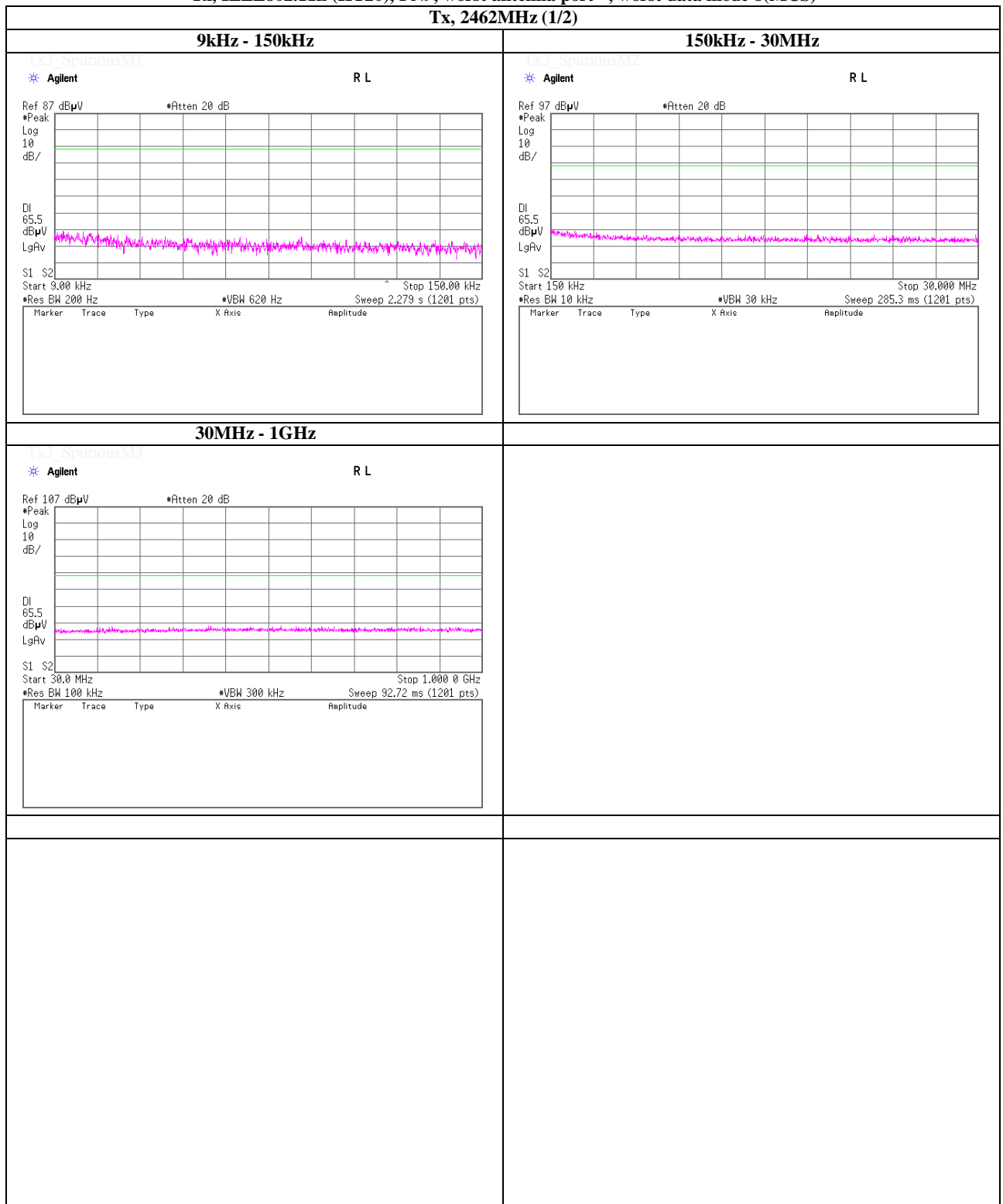
Telephone : +81 463 50 6400

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Spurious emission (Conducted)

Tx, IEEE802.11n (HT20), PN9, worst antenna port 1, worst data mode 8(MCS)

Tx, 2462MHz (1/2)



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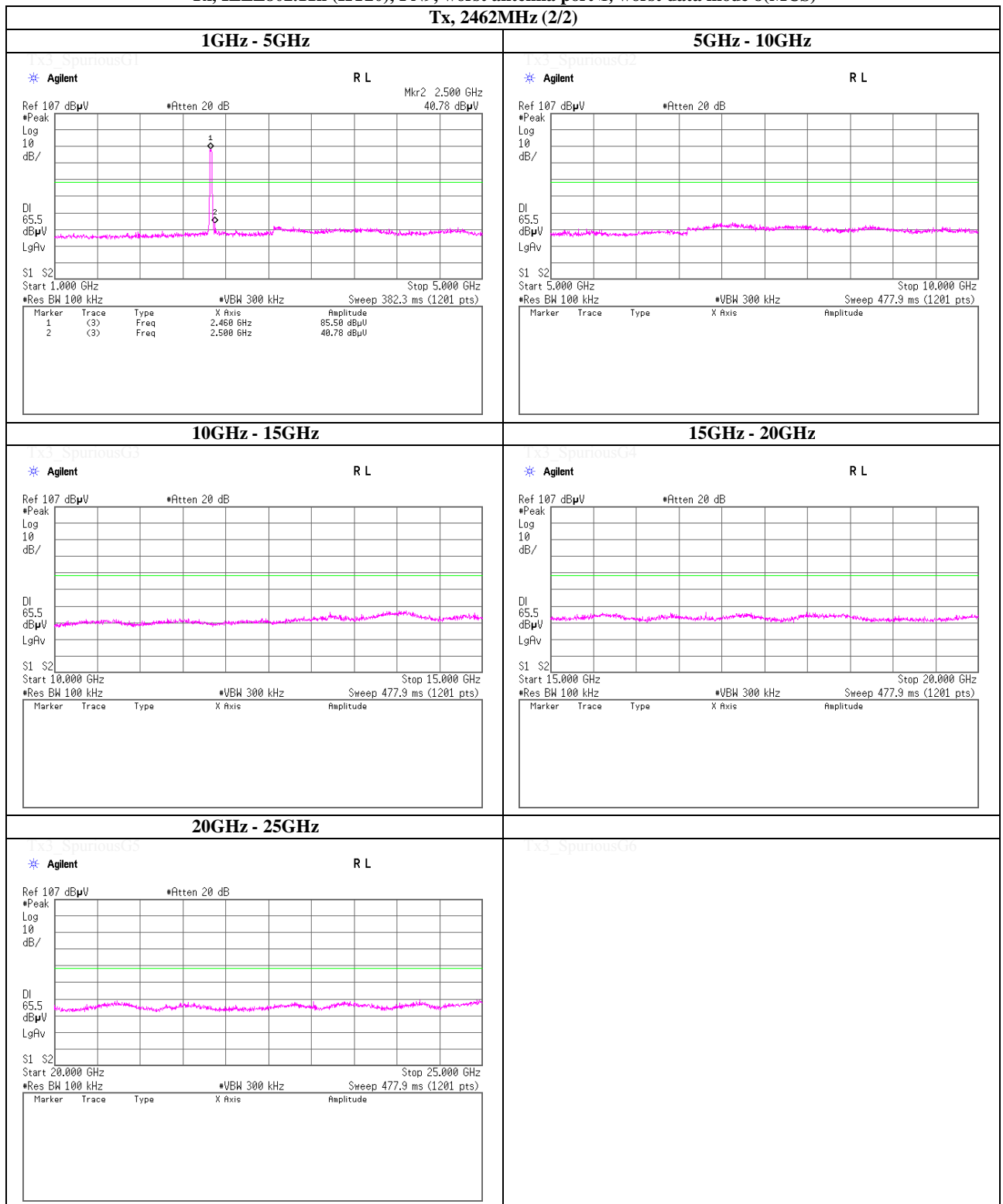
Telephone : +81 463 50 6400

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Spurious emission (Conducted)

Tx, IEEE802.11n (HT20), PN9, worst antenna port 1, worst data mode 8(MCS)

Tx, 2462MHz (2/2)



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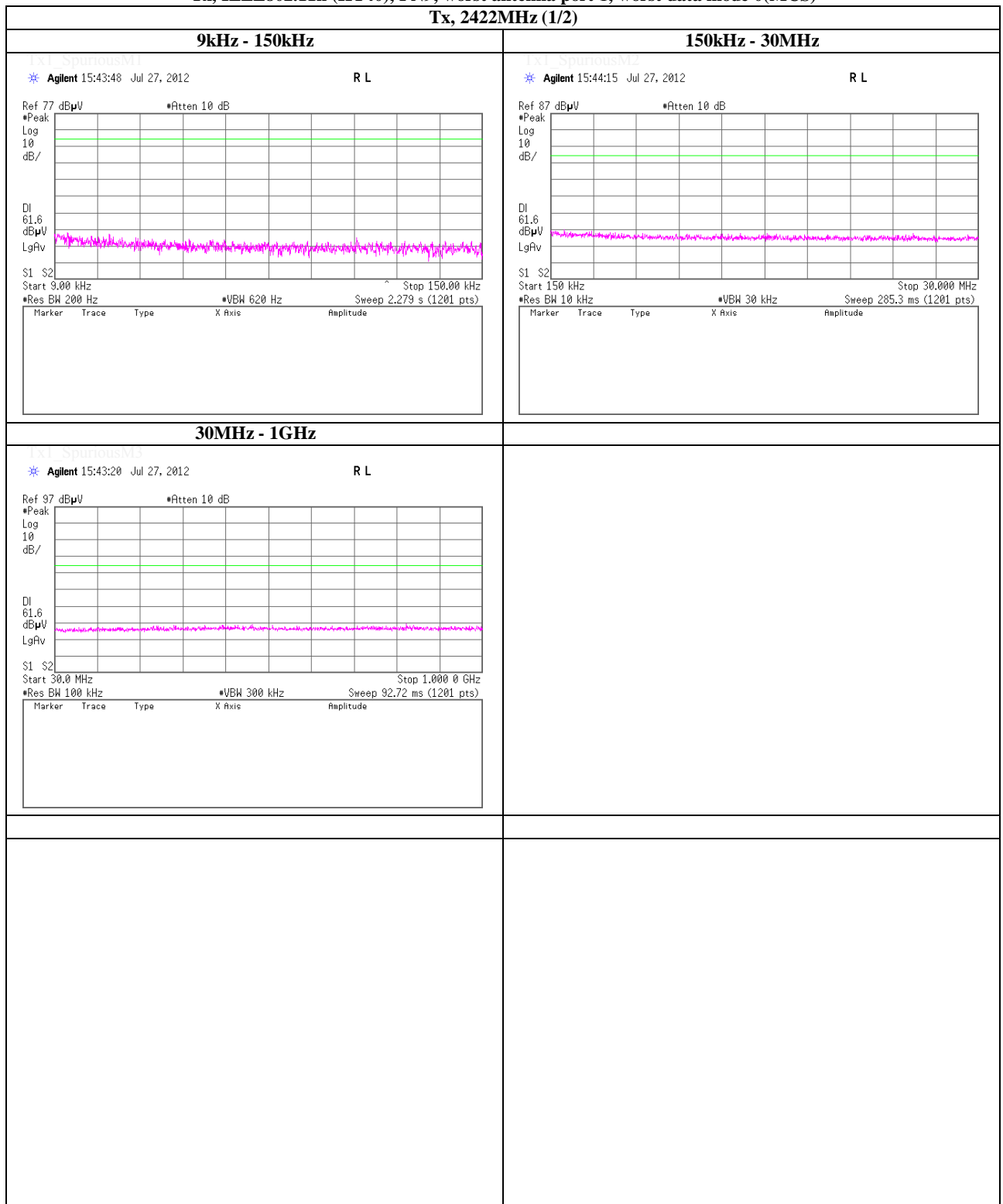
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Spurious emission (Conducted)

Tx, IEEE802.11n (HT40), PN9, worst antenna port 1, worst data mode 0(MCS)

Tx, 2422MHz (1/2)



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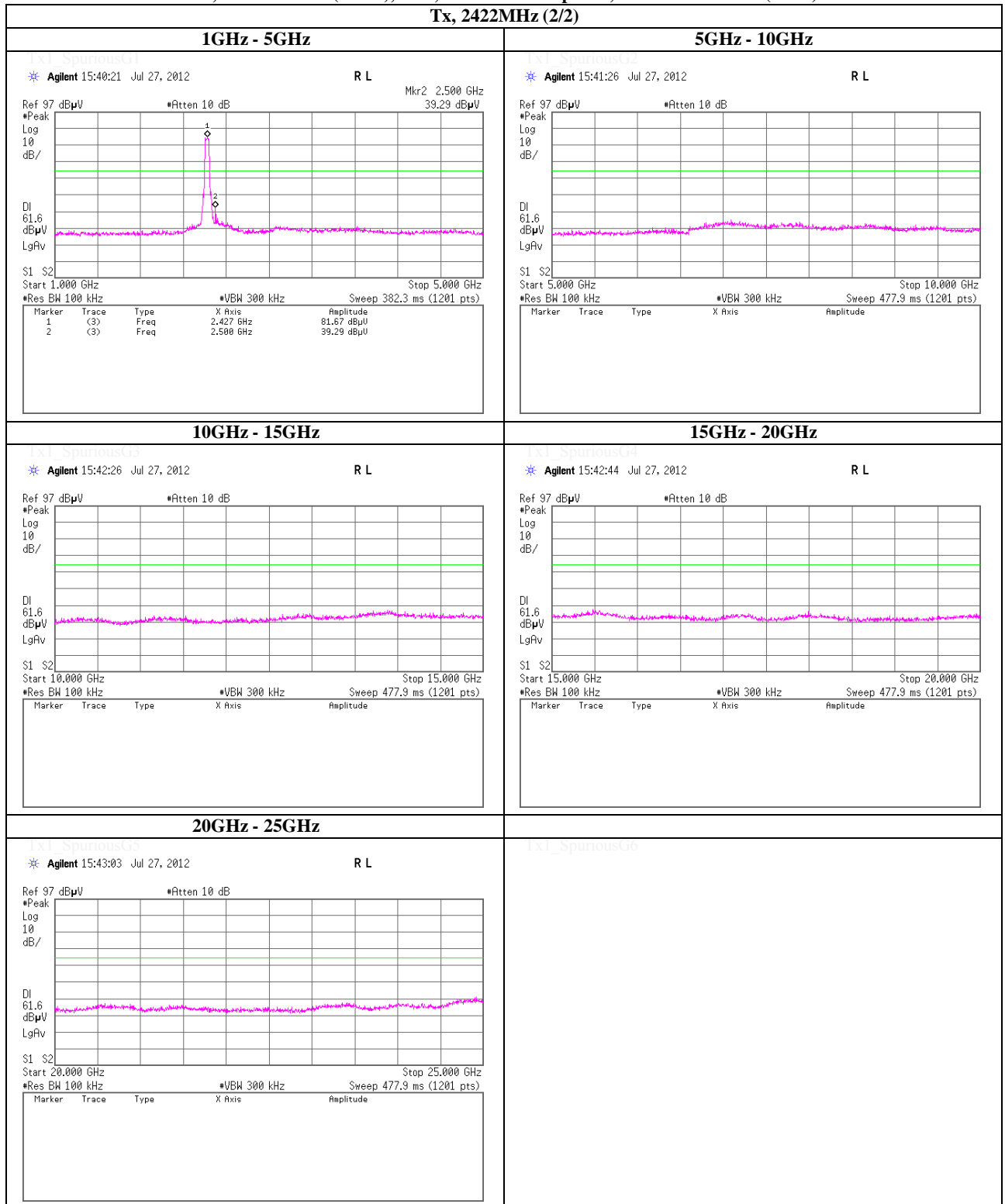
Telephone : +81 463 50 6400

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Spurious emission (Conducted)

Tx, IEEE802.11n (HT40), PN9, worst antenna port 1, worst data mode 0(MCS)

Tx, 2422MHz (2/2)

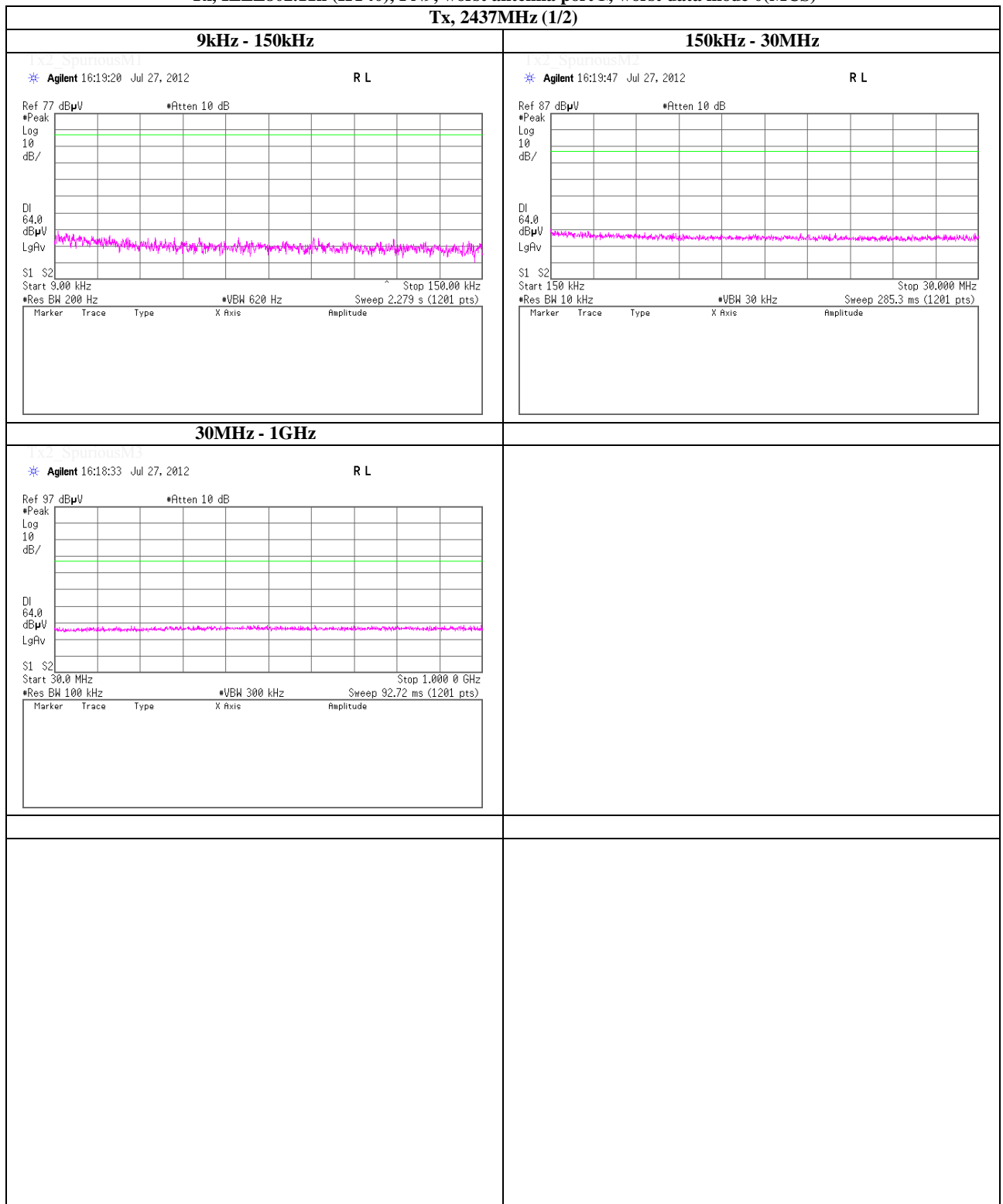


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Spurious emission (Conducted)

Tx, IEEE802.11n (HT40), PN9, worst antenna port 1, worst data mode 0(MCS)

Tx, 2437MHz (1/2)

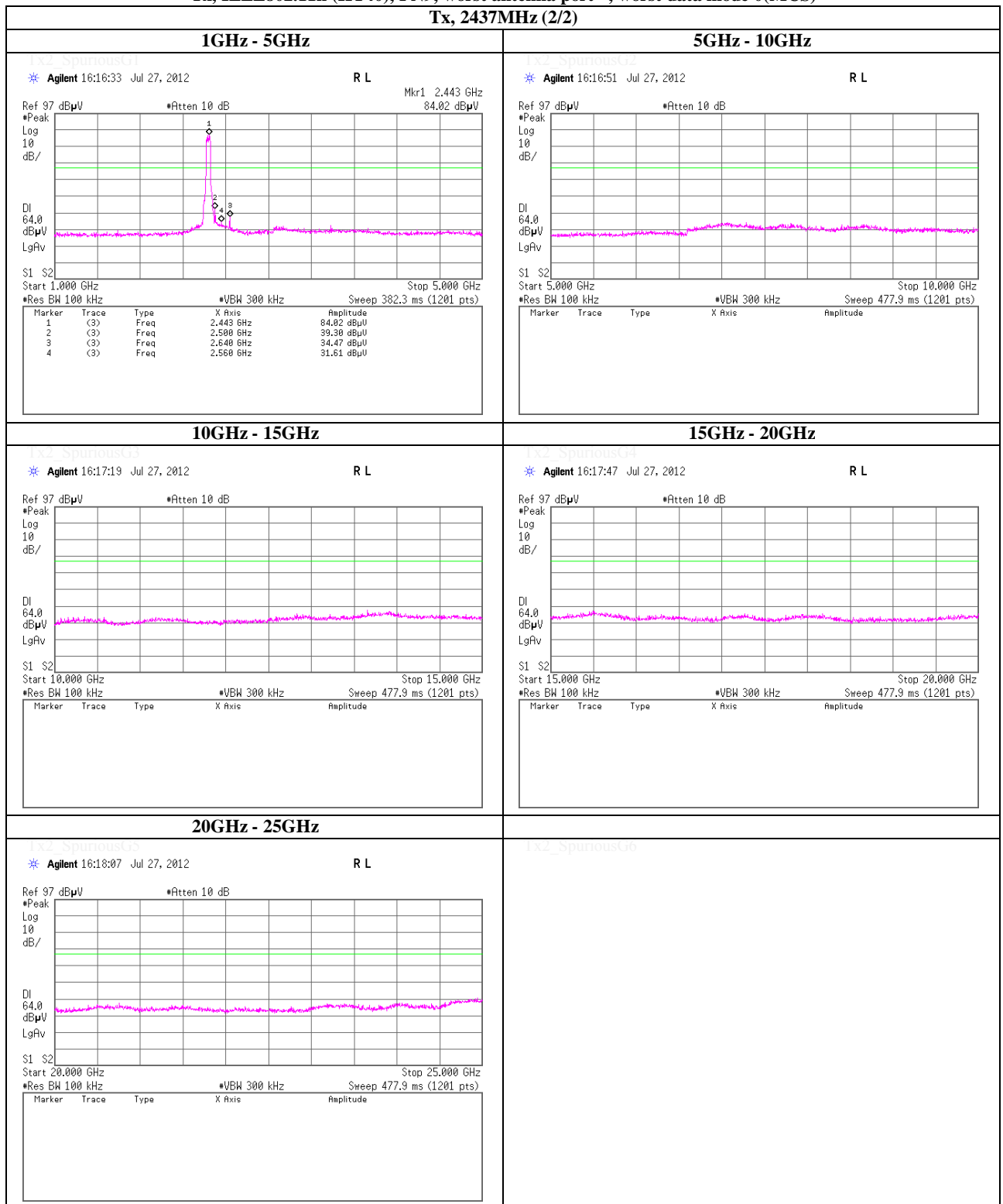


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Spurious emission (Conducted)

Tx, IEEE802.11n (HT40), PN9, worst antenna port 1, worst data mode 0(MCS)

Tx, 2437MHz (2/2)



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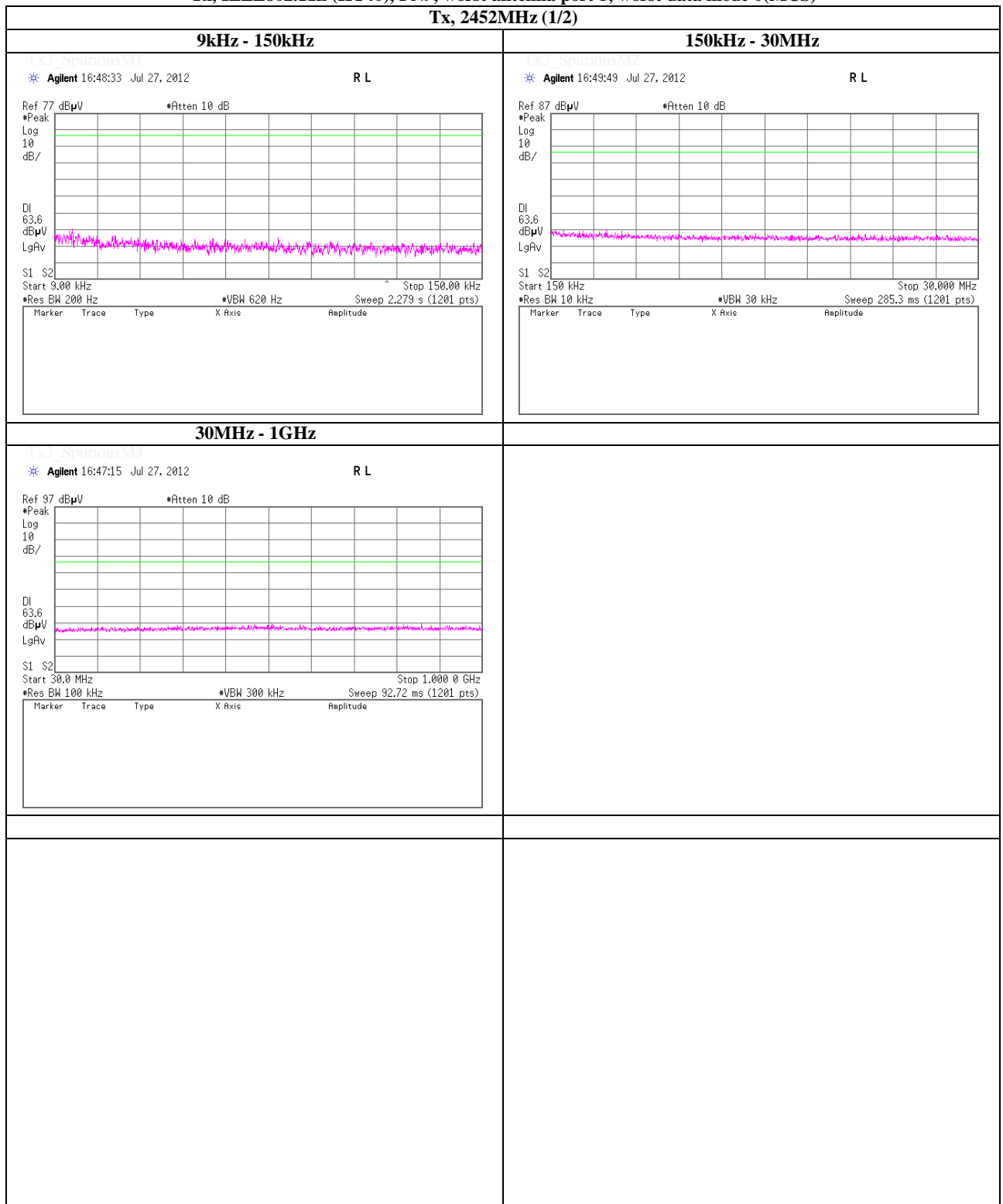
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Spurious emission (Conducted)

Tx, IEEE802.11n (HT40), PN9, worst antenna port 1, worst data mode 0(MCS)

Tx, 2452MHz (1/2)

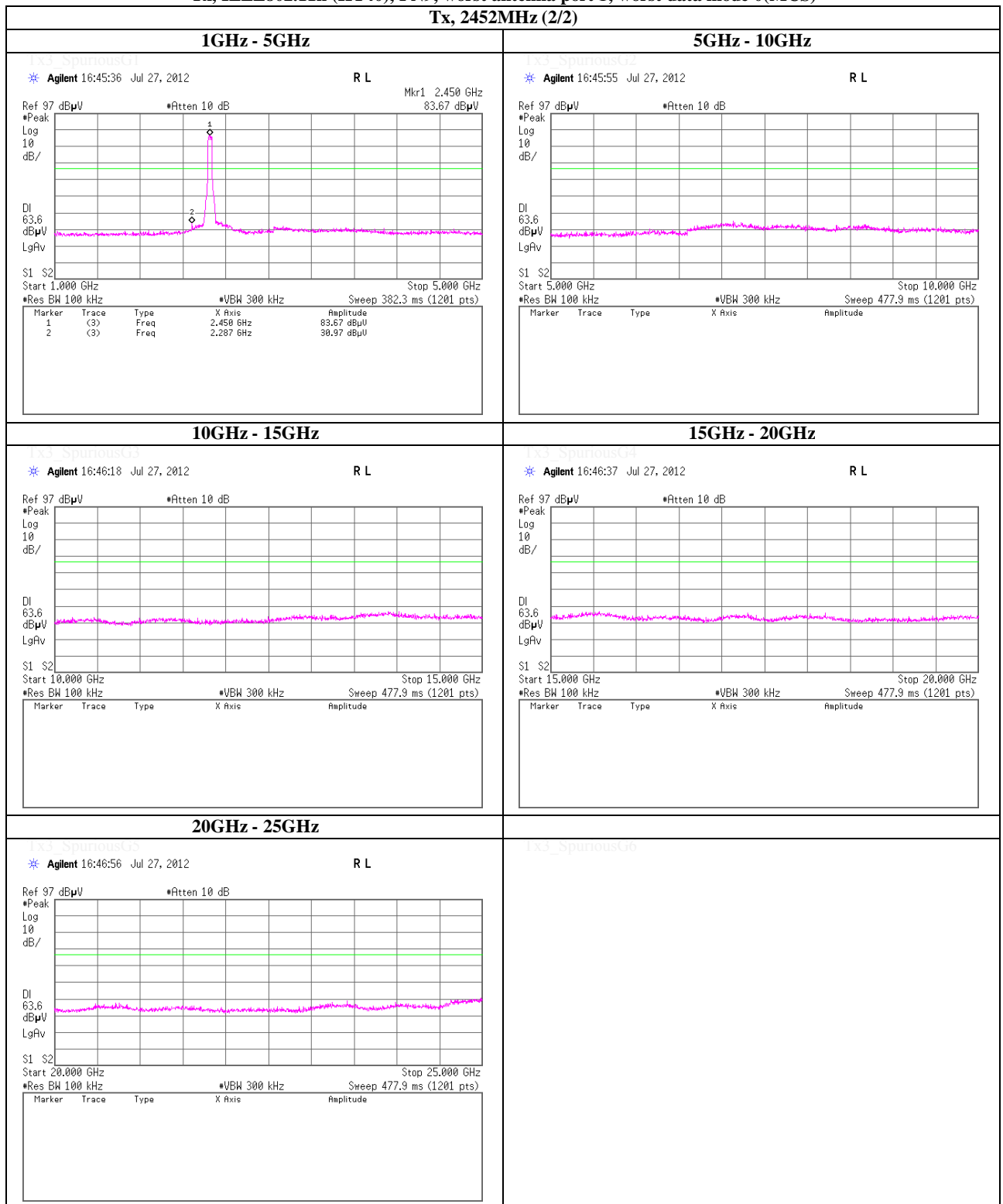


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Spurious emission (Conducted)

Tx, IEEE802.11n (HT40), PN9, worst antenna port 1, worst data mode 0(MCS)

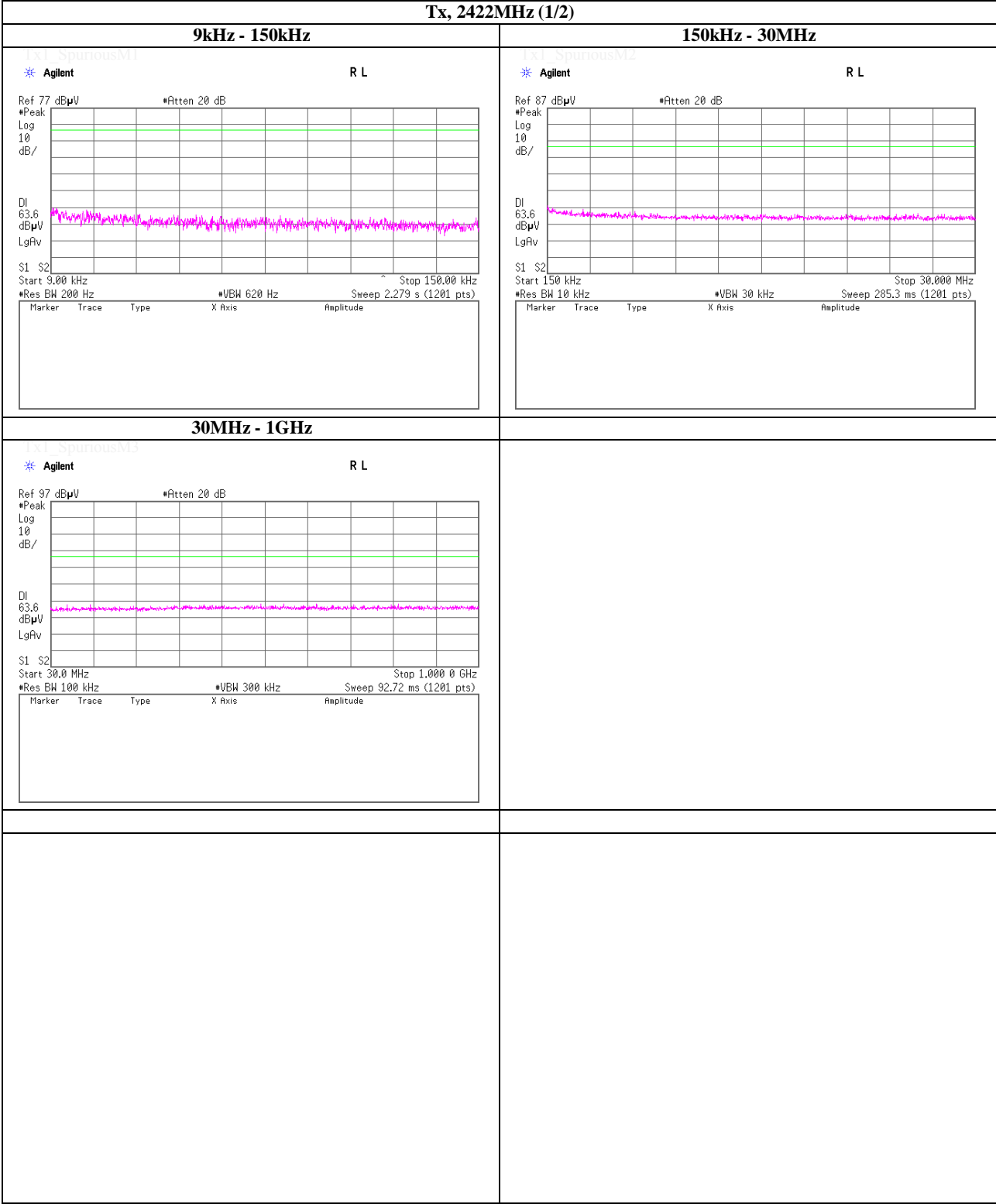
Tx, 2452MHz (2/2)



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Spurious emission (Conducted)

Tx, IEEE802.11n (HT40), PN9, worst antenna port 1, worst data mode 8(MCS)
Tx, 2422MHz (1/2)

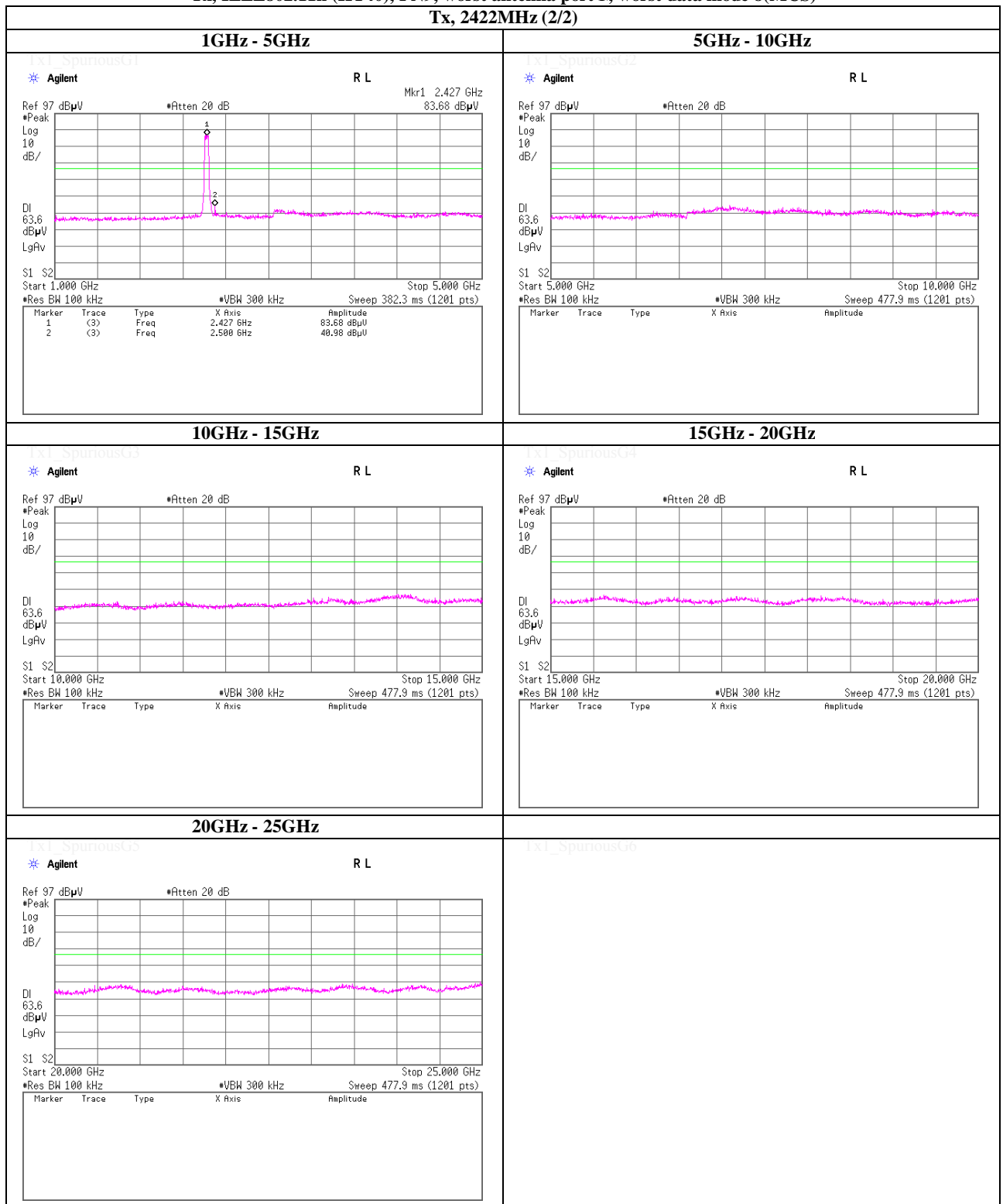


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Spurious emission (Conducted)

Tx, IEEE802.11n (HT40), PN9, worst antenna port 1, worst data mode 8(MCS)

Tx, 2422MHz (2/2)



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Spurious emission (Conducted)

Tx, IEEE802.11n (HT40), PN9, worst antenna port 1, worst data mode 8(MCS)

Tx, 2437MHz (1/2)

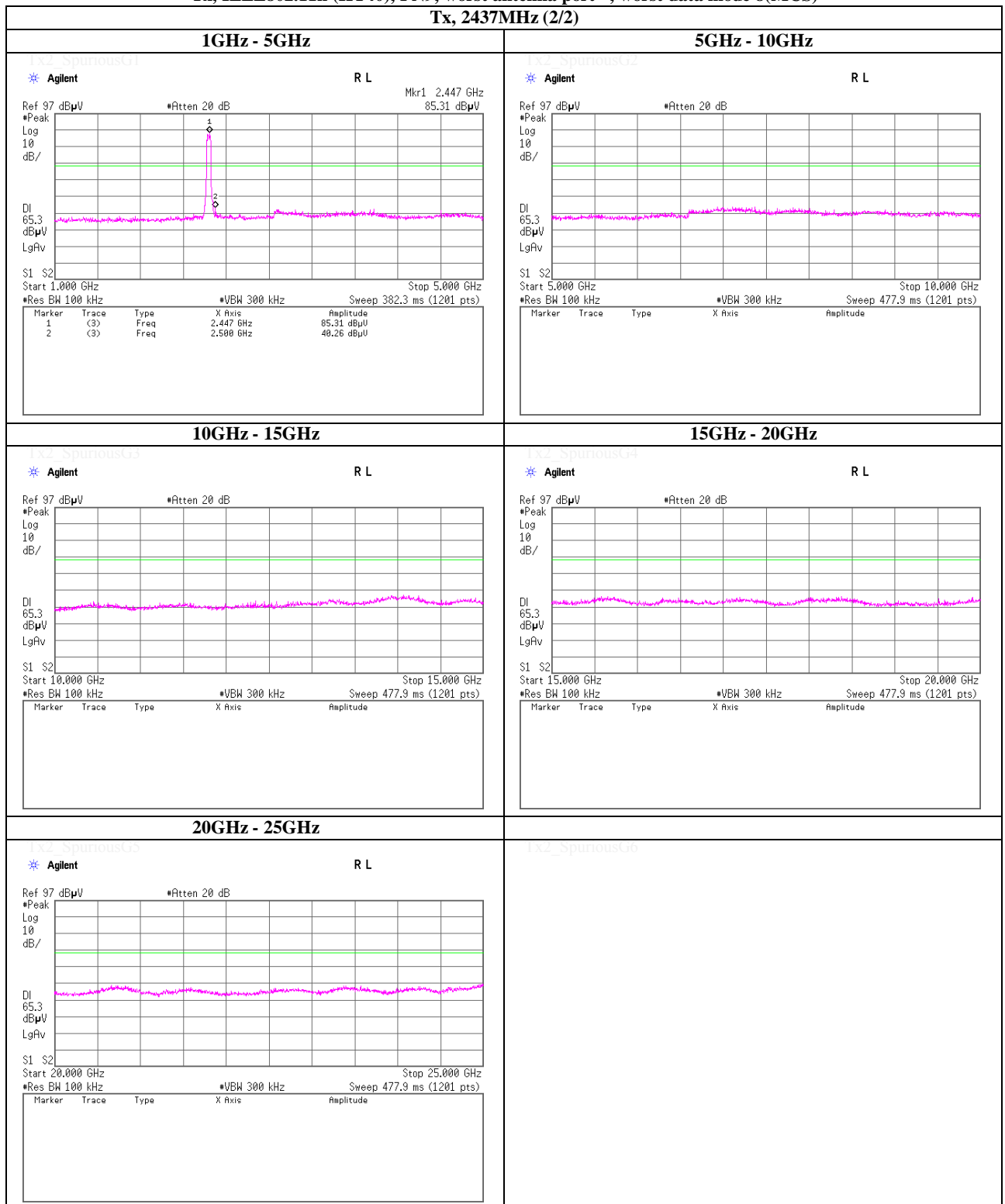


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Spurious emission (Conducted)

Tx, IEEE802.11n (HT40), PN9, worst antenna port 1, worst data mode 8(MCS)

Tx, 2437MHz (2/2)



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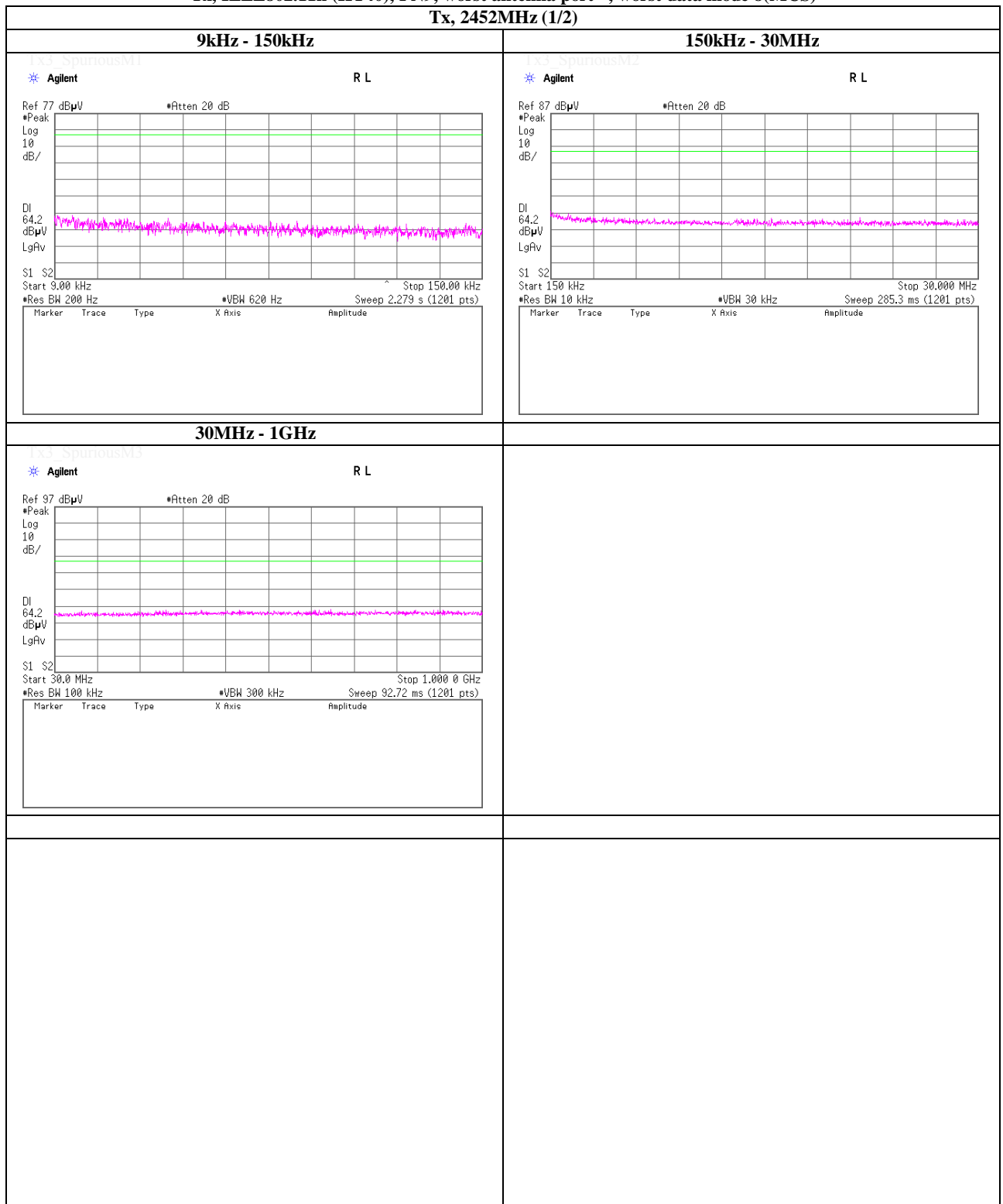
Telephone : +81 463 50 6400

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Spurious emission (Conducted)

Tx, IEEE802.11n (HT40), PN9, worst antenna port 1, worst data mode 8(MCS)

Tx, 2452MHz (1/2)



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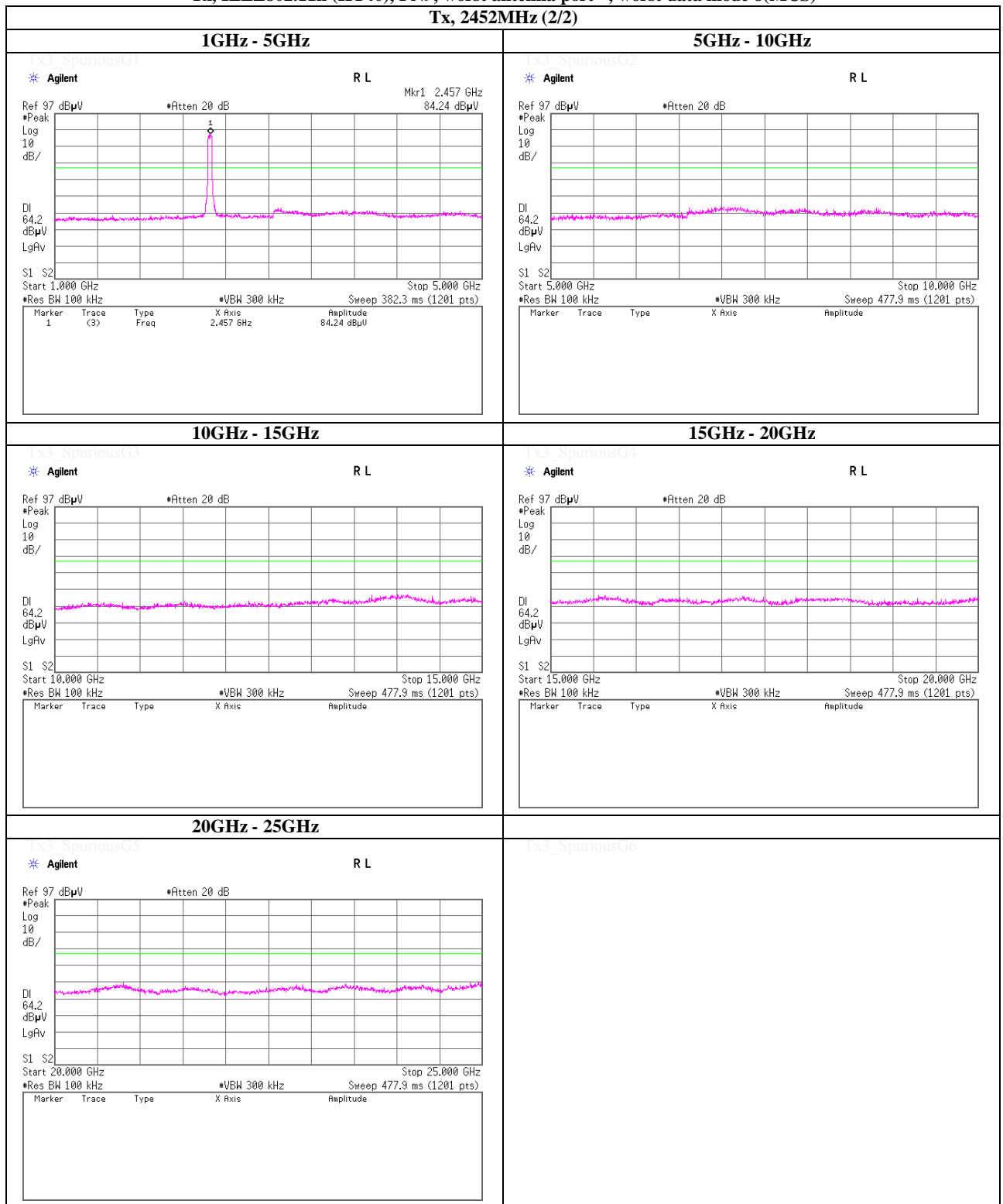
Telephone : +81 463 50 6400

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Spurious emission (Conducted)

Tx, IEEE802.11n (HT40), PN9, worst antenna port 1, worst data mode 8(MCS)

Tx, 2452MHz (2/2)



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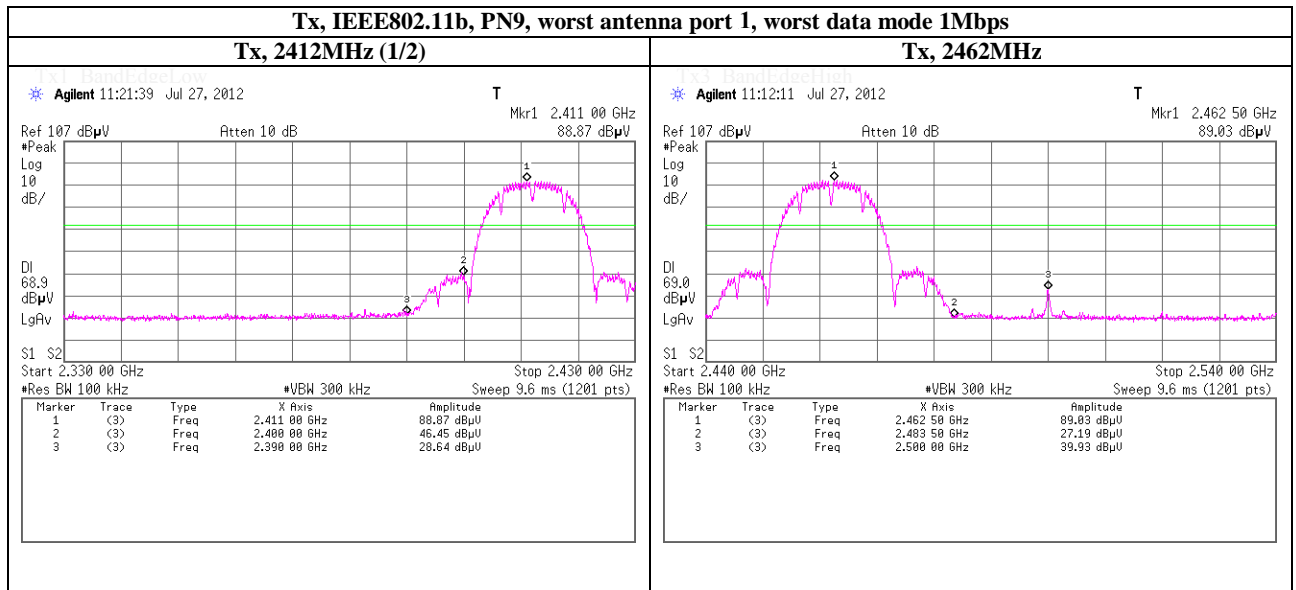
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Spurious emission (Conducted)

Band Edge compliance



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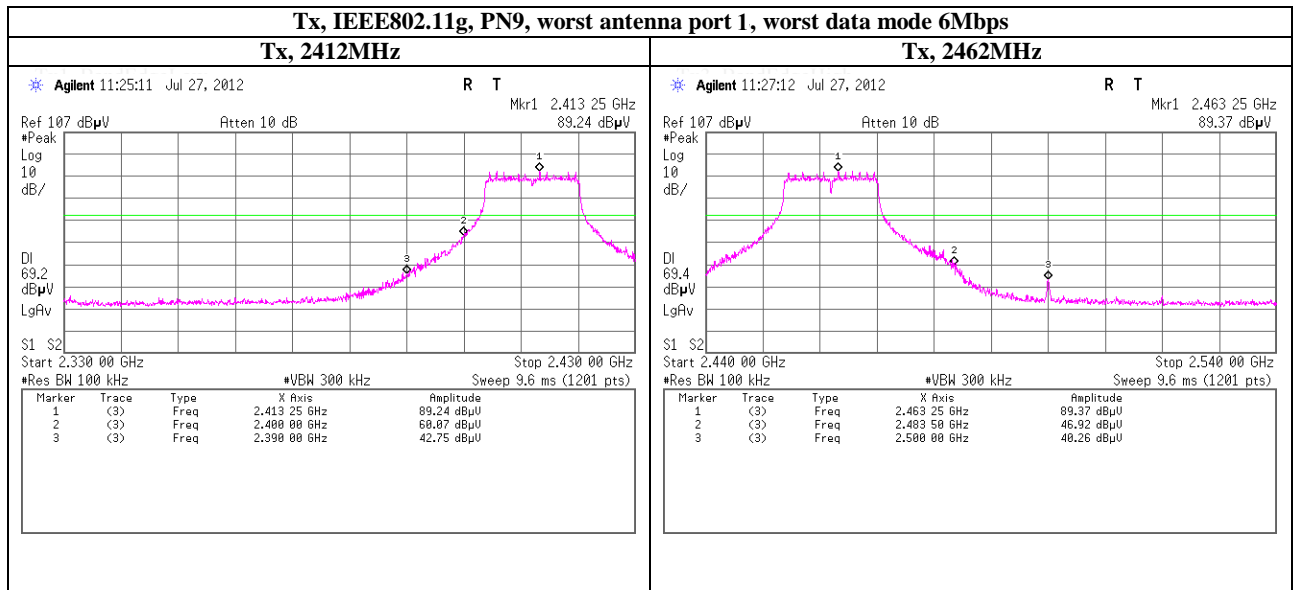
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Spurious emission (Conducted)

Band Edge compliance



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Shonan EMC Lab.

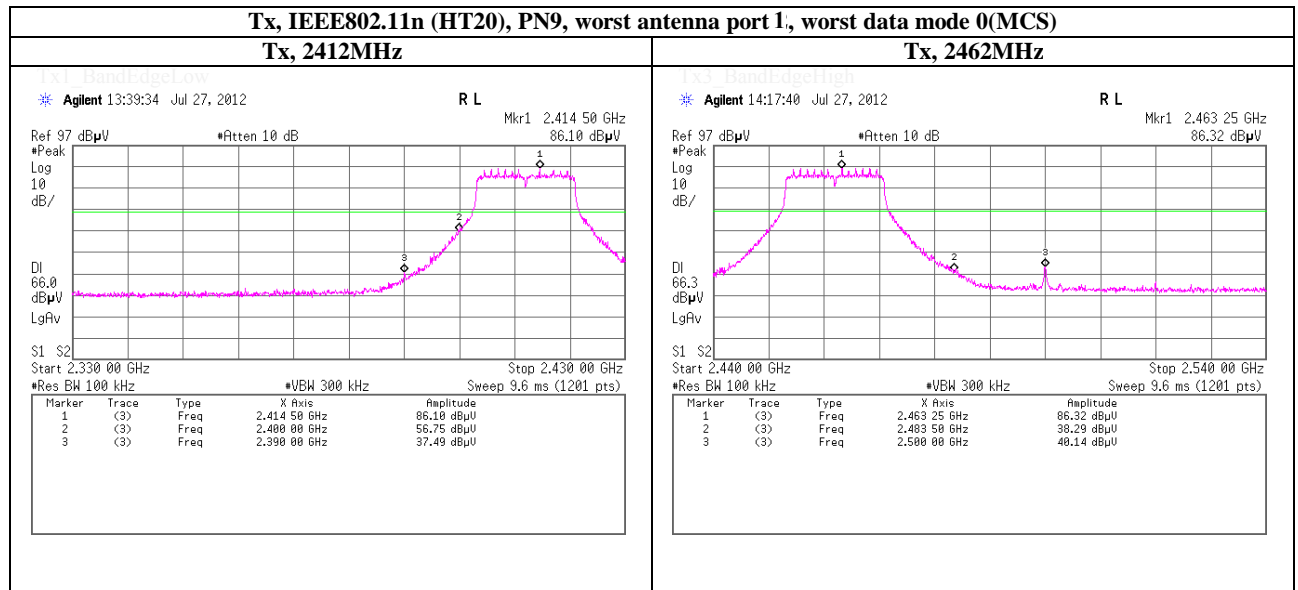
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Spurious emission (Conducted)

Band Edge compliance



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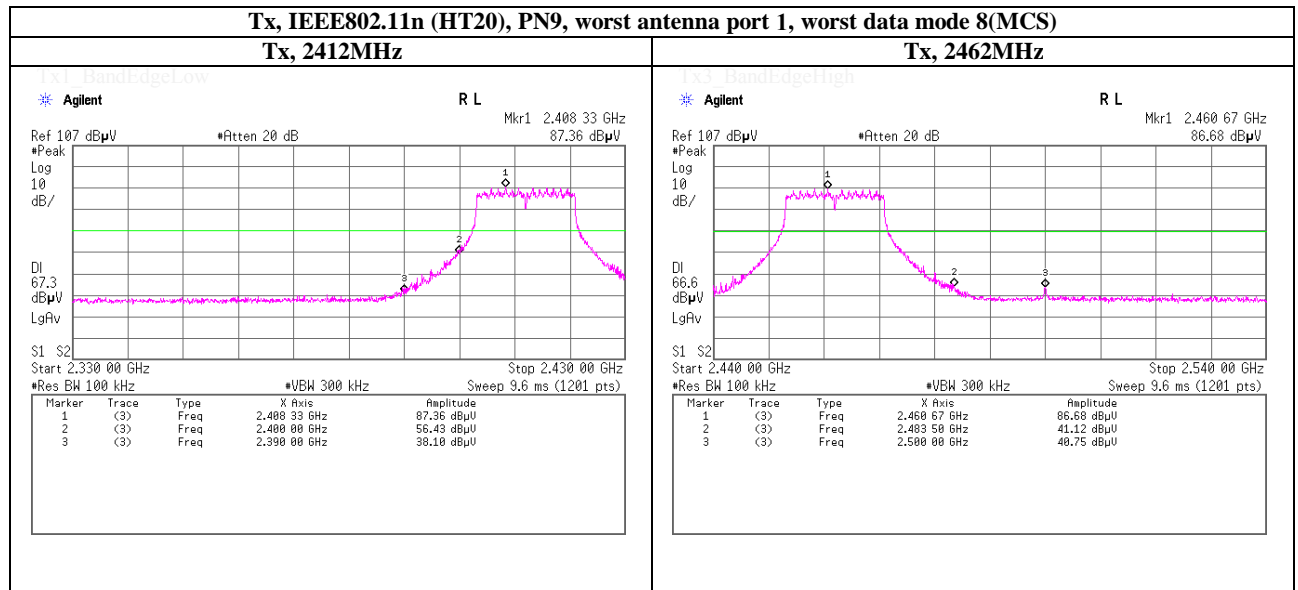
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Spurious emission (Conducted)

Band Edge compliance



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Shonan EMC Lab.

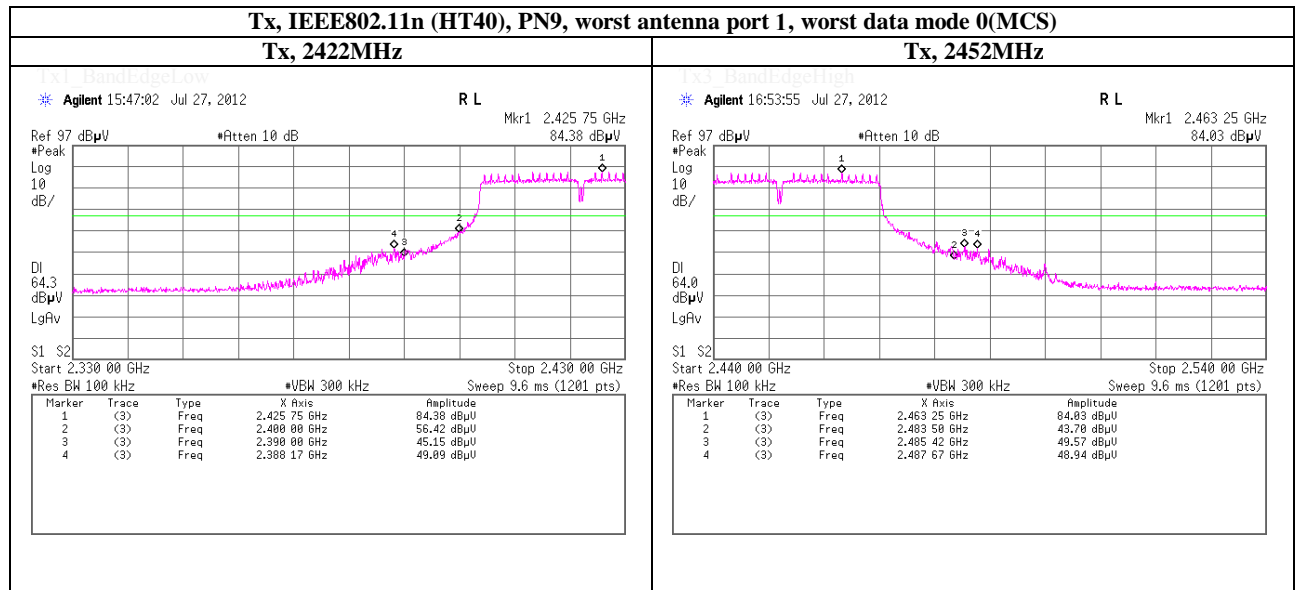
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Spurious emission (Conducted)

Band Edge compliance



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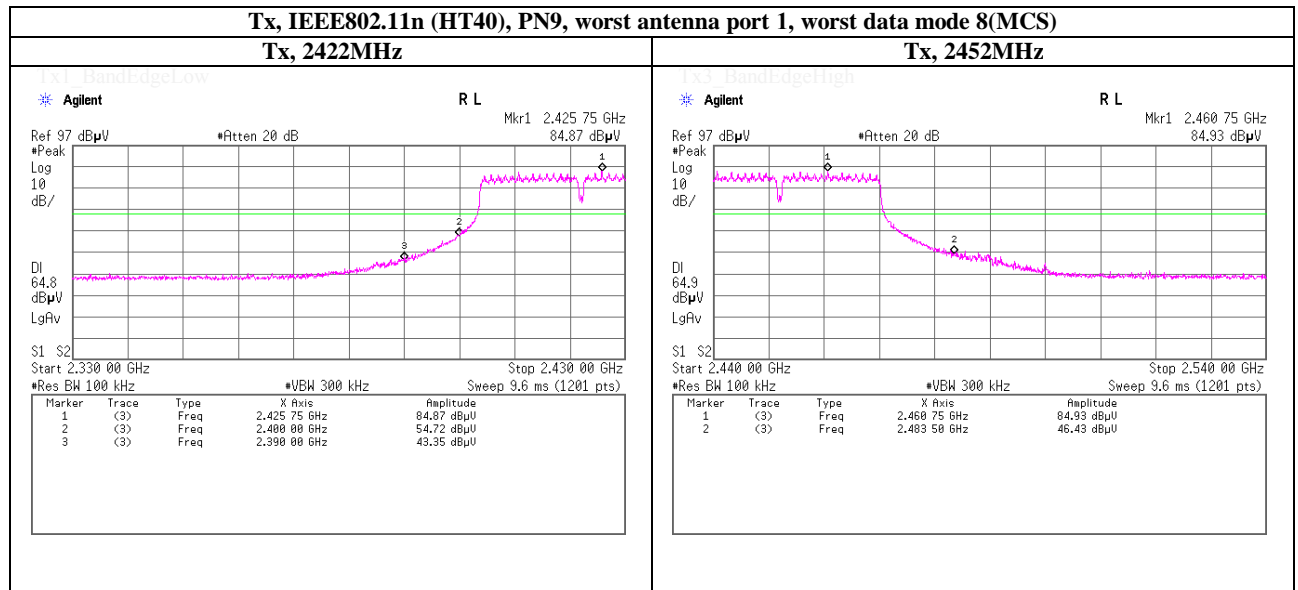
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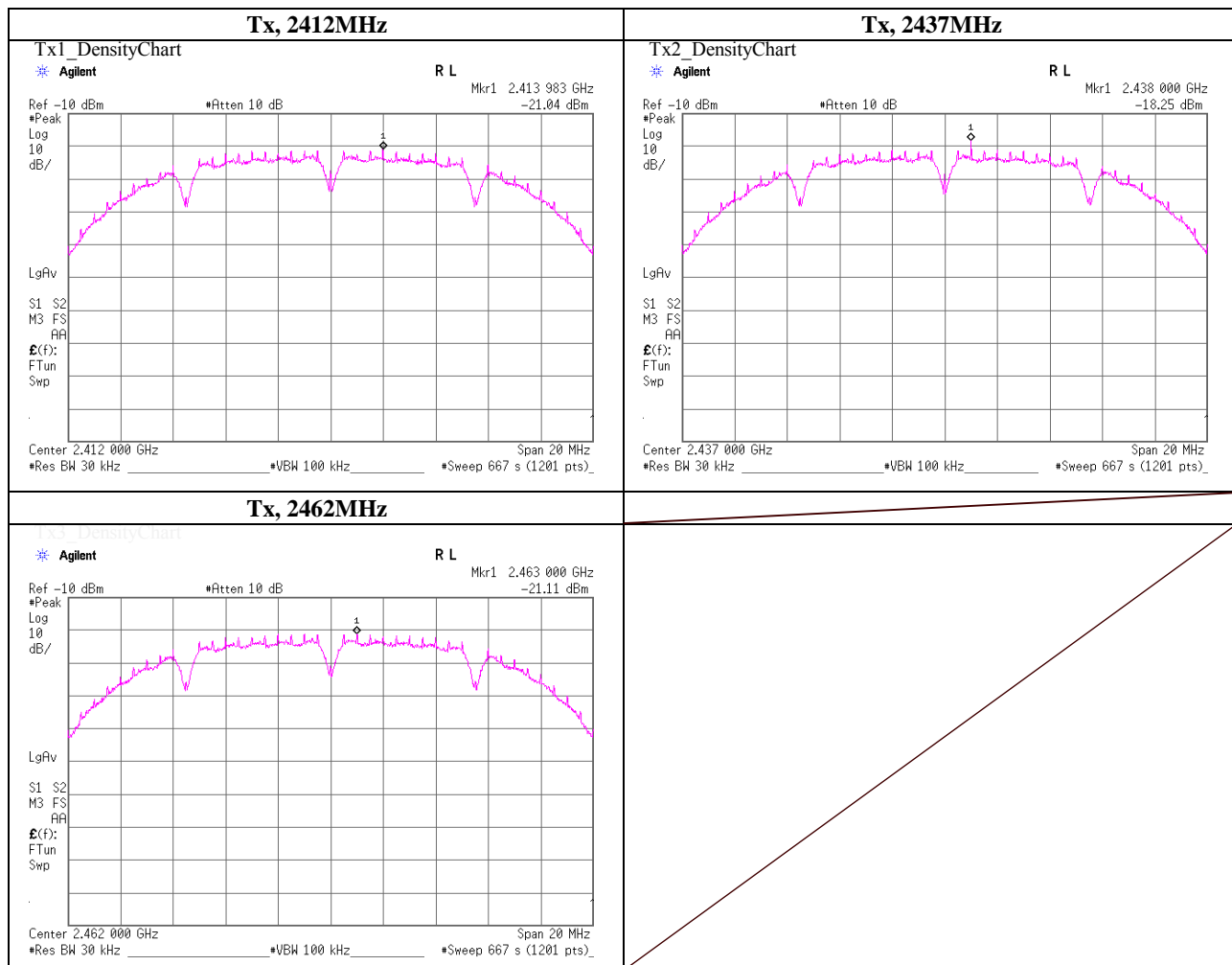
Power Density

| | | |
|------------------------|---|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.6 Shielded Room |
| Date | July 30, 2012 | |
| Temperature / Humidity | 26deg.C , 42%RH | |
| Engineer | Hikaru Shirasawa | |
| Mode | Tx, IEEE802.11b, PN9, worst antenna port 1, worst data mode 1Mbps | |

| Ch. Freq. [MHz] | Freq. Reading [MHz] | Reading [dBm] | Cable Loss [dB] | Atten. [dB] | Result [dBm] | Limit [dBm] | Margin [dB] |
|--------------------|---------------------------|------------------|-----------------------|----------------|-----------------|----------------|----------------|
| 2412.0000 | 2413.98 | -21.04 | 1.48 | 20.25 | 0.69 | 8.00 | 7.31 |
| 2437.0000 | 2438.00 | -18.25 | 1.48 | 20.25 | 3.49 | 8.00 | 4.52 |
| 2462.0000 | 2463.00 | -21.11 | 1.49 | 20.25 | 0.63 | 8.00 | 7.37 |

Sample Calculation:

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



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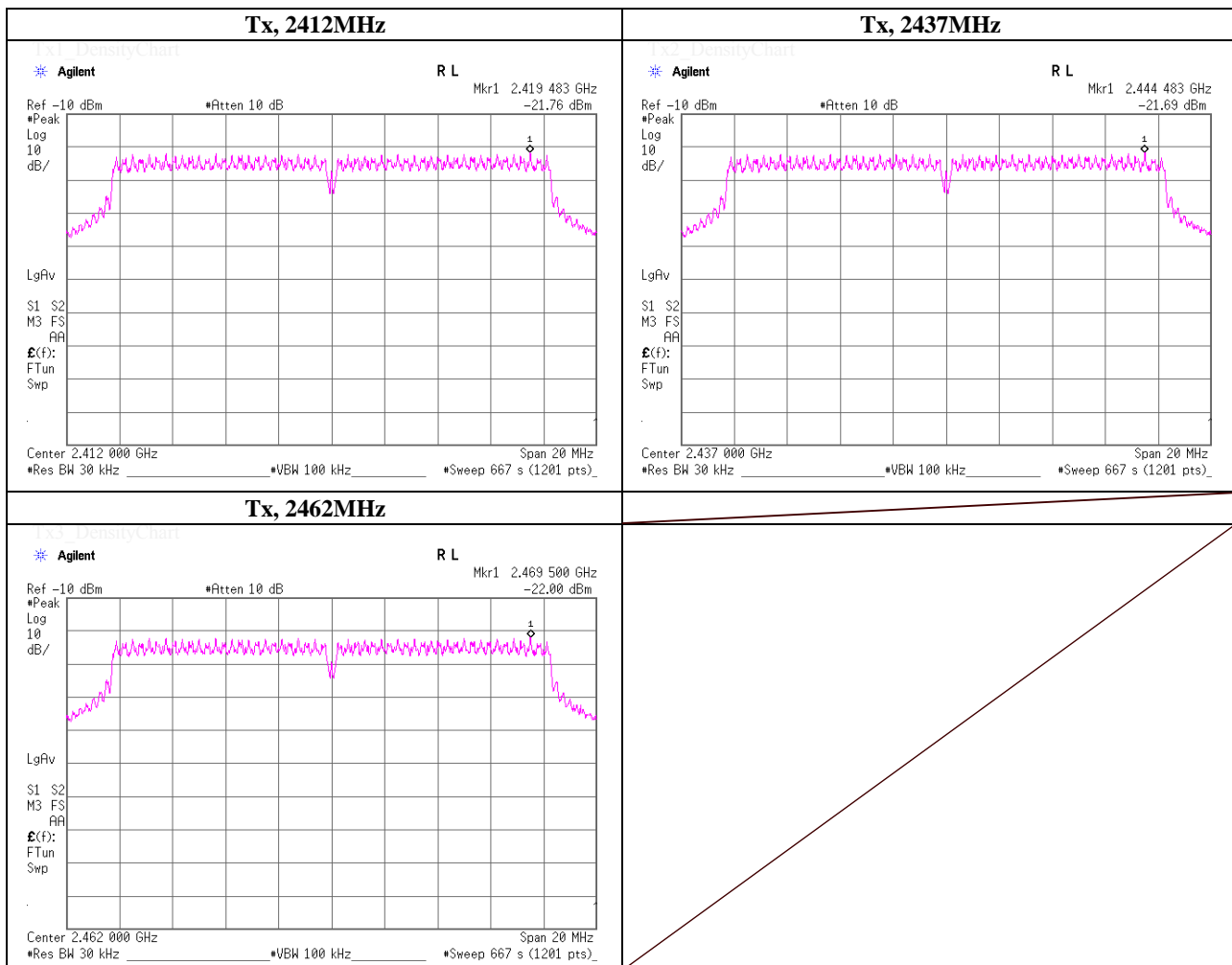
Power Density

| | | |
|------------------------|---|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.6 Shielded Room |
| Date | June 30, 2012 | |
| Temperature / Humidity | 26deg.C , 42%RH | |
| Engineer | Hikaru Shirasawa | |
| Mode | Tx, IEEE802.11g, PN9, worst antenna port 1, worst data mode 6Mbps | |

| Ch. Freq. [MHz] | Freq. Reading [MHz] | Reading [dBm] | Cable Loss [dB] | Atten. [dB] | Result [dBm] | Limit [dBm] | Margin [dB] |
|--------------------|---------------------------|------------------|-----------------------|----------------|-----------------|----------------|----------------|
| 2412.0000 | 2419.48 | -21.76 | 1.48 | 20.25 | -0.03 | 8.00 | 8.03 |
| 2437.0000 | 2444.48 | -21.69 | 1.48 | 20.25 | 0.04 | 8.00 | 7.96 |
| 2462.0000 | 2469.50 | -22.01 | 1.49 | 20.25 | -0.27 | 8.00 | 8.27 |

Sample Calculation:

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



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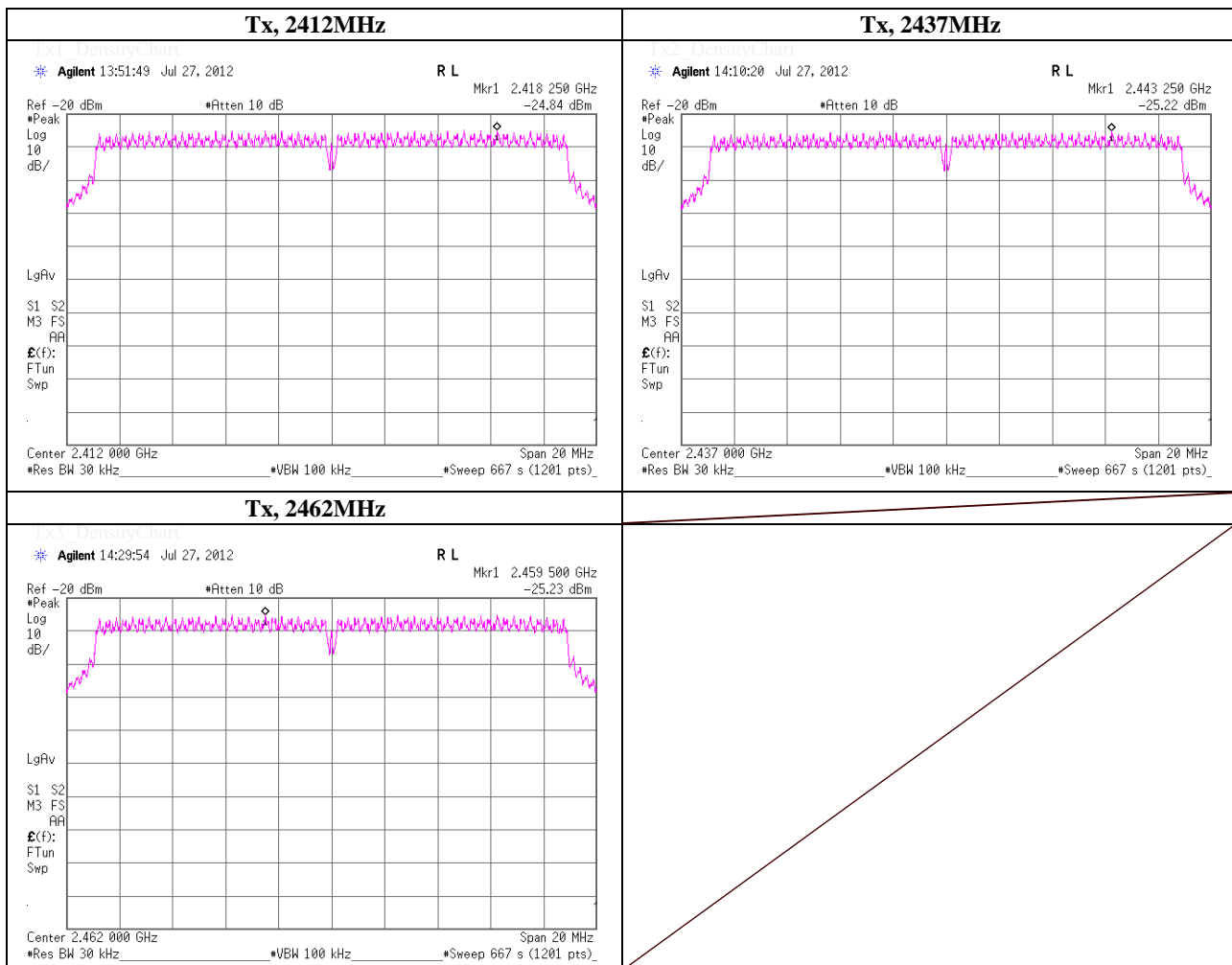
Power Density

| | | |
|------------------------|---|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.6 Shielded Room |
| Date | June 30, 2012 | |
| Temperature / Humidity | 26deg.C , 42%RH | |
| Engineer | Hikaru Shirasawa | |
| Mode | Tx, IEEE802.11n (HT20), PN9, worst antenna port 1, worst data mode 0(MCS) | |

| Ch. Freq. [MHz] | Freq. Reading [MHz] | Reading [dBm] | Cable Loss [dB] | Atten. [dB] | Result [dBm] | Limit [dBm] | Margin [dB] |
|--------------------|---------------------------|------------------|-----------------------|----------------|-----------------|----------------|----------------|
| 2412.0000 | 2418.25 | -24.84 | 1.48 | 20.25 | -3.11 | 8.00 | 11.11 |
| 2437.0000 | 2443.25 | -25.22 | 1.48 | 20.25 | -3.49 | 8.00 | 11.49 |
| 2462.0000 | 2459.50 | -25.23 | 1.49 | 20.25 | -3.49 | 8.00 | 11.49 |

Sample Calculation:

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



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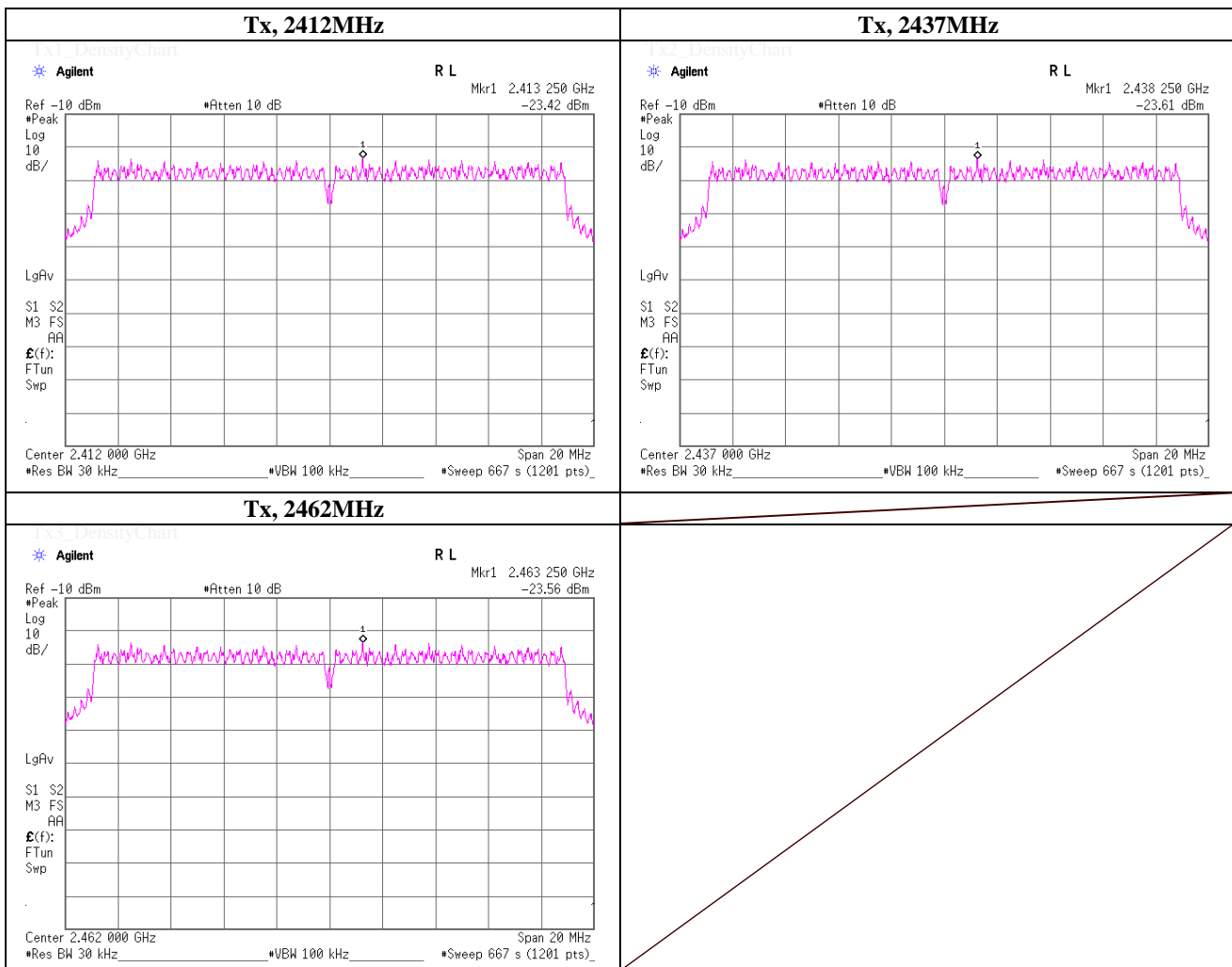
Power Density

| | | |
|------------------------|--|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date | August 2, 2012 | |
| Temperature / Humidity | 25deg.C , 54%RH | |
| Engineer | Hikaru Shirasawa | |
| Mode | Tx, IEEE802.11n (HT20), PN9, worst data mode 8(MCS), mimo, Antenna 2 | |

| Ch. Freq. [MHz] | Freq. Reading [MHz] | Reading [dBm] | Cable Loss [dB] | Atten. [dB] | Result [dBm] | Limit [dBm] | Margin [dB] |
|--------------------|---------------------------|------------------|-----------------------|----------------|-----------------|----------------|----------------|
| 2412.0000 | 2413.25 | -23.42 | 1.48 | 20.25 | -1.69 | 8.00 | 9.69 |
| 2437.0000 | 2438.25 | -23.61 | 1.48 | 20.25 | -1.88 | 8.00 | 9.88 |
| 2462.0000 | 2463.25 | -23.56 | 1.49 | 20.25 | -1.82 | 8.00 | 9.82 |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss



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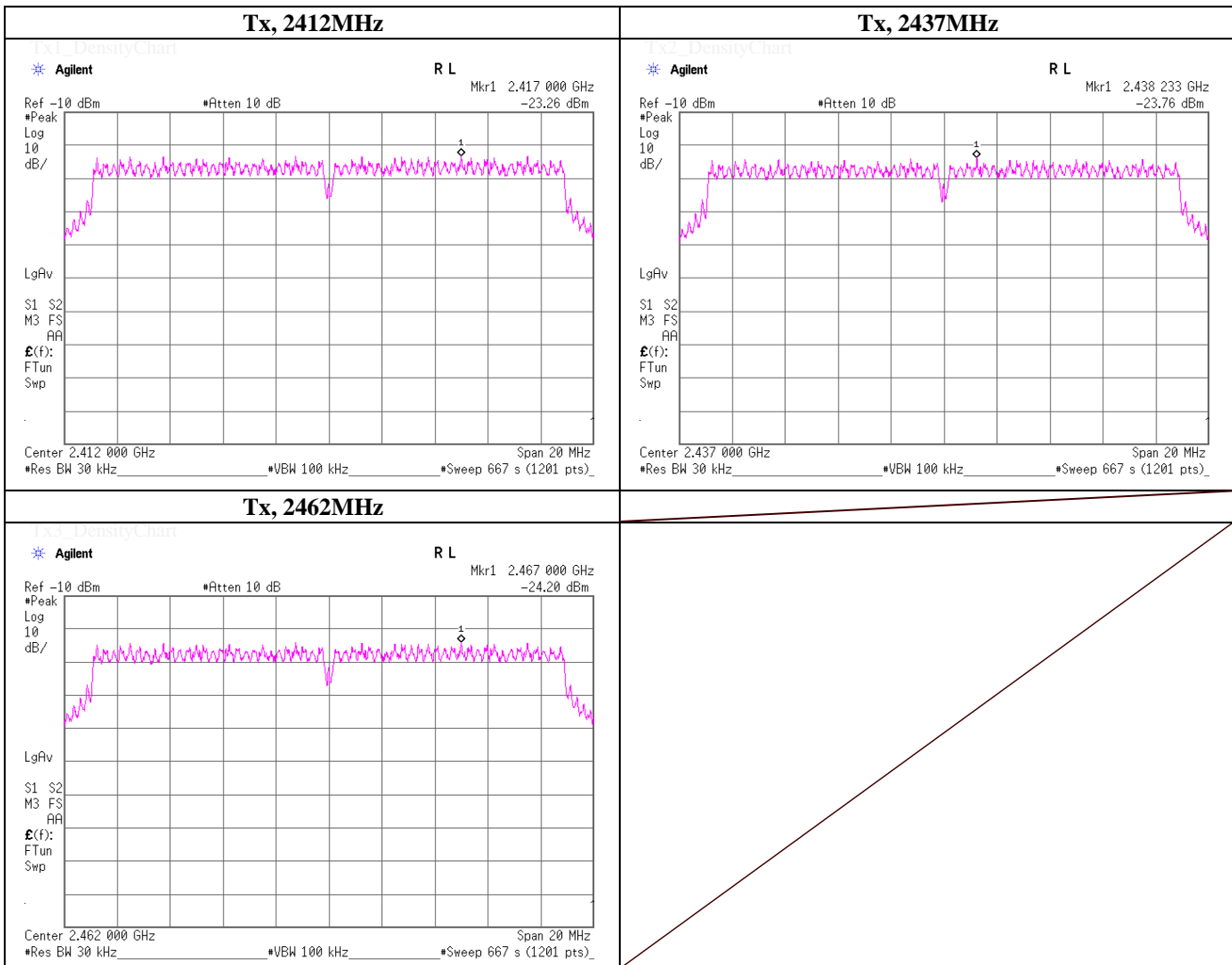
Power Density

| | | |
|------------------------|--|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date | August 2, 2012 | |
| Temperature / Humidity | 25deg.C , 54%RH | |
| Engineer | Hikaru Shirasawa | |
| Mode | Tx, IEEE802.11n (HT20), PN9, worst data mode 8(MCS), mimo, Antenna 1 | |

| Ch. Freq. [MHz] | Freq. Reading [MHz] | Reading [dBm] | Cable Loss [dB] | Atten. [dB] | Result [dBm] | Limit [dBm] | Margin [dB] |
|--------------------|---------------------------|------------------|-----------------------|----------------|-----------------|----------------|----------------|
| 2412.0000 | 2417.00 | -23.26 | 1.48 | 20.25 | -1.53 | 8.00 | 9.53 |
| 2437.0000 | 2438.23 | -23.76 | 1.48 | 20.25 | -2.03 | 8.00 | 10.03 |
| 2462.0000 | 2467.00 | -24.20 | 1.49 | 20.25 | -2.46 | 8.00 | 10.46 |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss



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Power Density(Total)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date August 2, 2012
 Temperature / Humidity 25deg.C , 54%RH
 Engineer Hikaru Shirasawa
 Mode Tx, IEEE802.11n (HT20), PN9, worst data mode 8(MCS), mimo

(* P/M: Power Meter with power sensor, with gate trigger mode)

| Ch | Freq. [MHz] | Result | | Result Total | | Limit [dBm] | Margin [dB] |
|------|----------------|--------------------|--------------------|-----------------|------|----------------|----------------|
| | | Antenna 2 [dBm] | Antenna 1 [dBm] | [dBm] | [mW] | | |
| Low | 2412.0 | -1.69 | -1.53 | 1.40 | 1.38 | 8.00 | 6.60 |
| Mid | 2437.0 | -1.88 | -2.03 | 1.06 | 1.28 | 8.00 | 6.94 |
| High | 2462.0 | -1.82 | -2.46 | 0.88 | 1.23 | 8.00 | 7.12 |

Sample Calculation:

Result = Antenna 1 + Antenna 2

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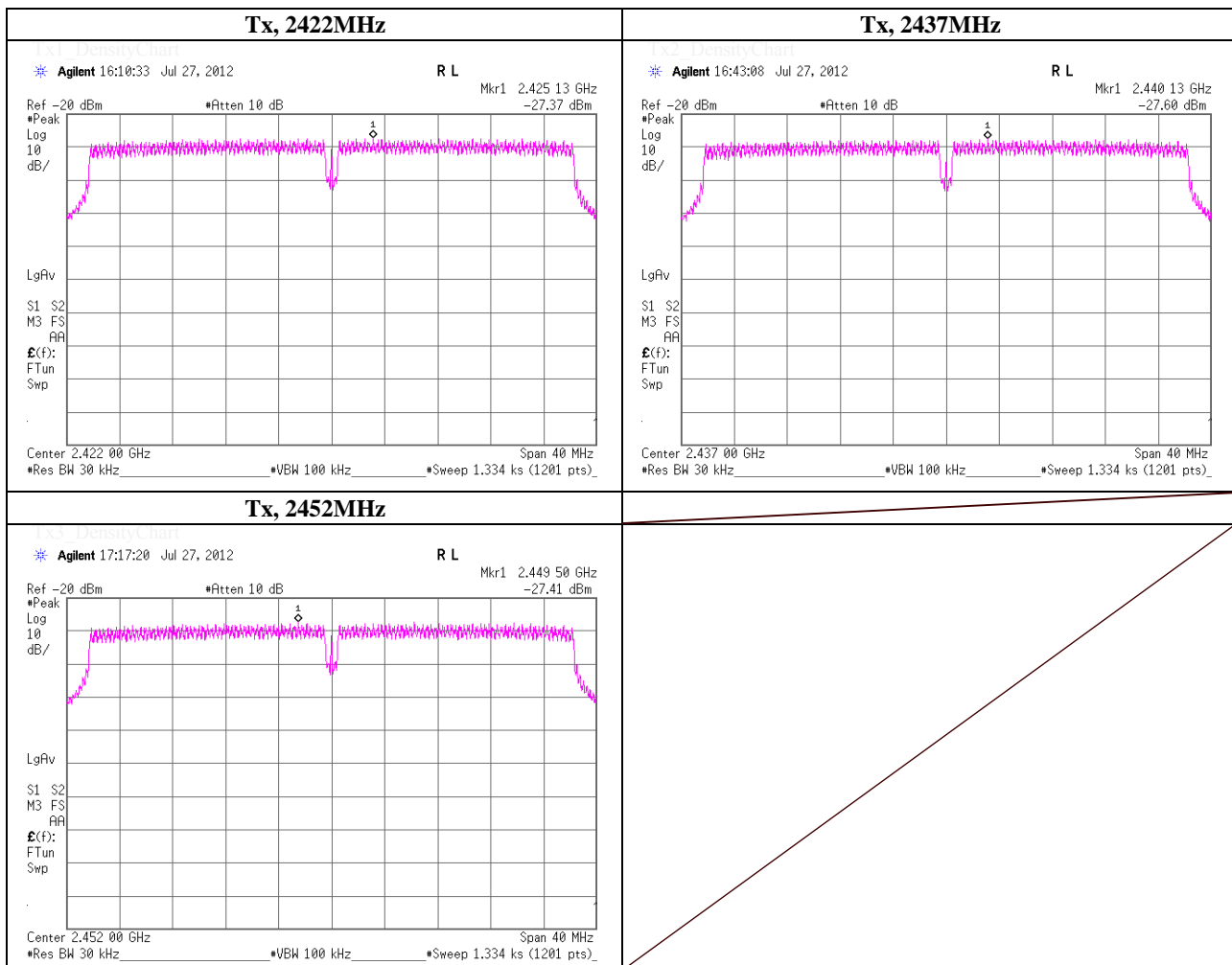
Power Density

| | | |
|------------------------|---|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.6 Shielded Room |
| Date | July 30, 2012 | |
| Temperature / Humidity | 26deg.C , 42%RH | |
| Engineer | Hikaru Shirasawa | |
| Mode | Tx, IEEE802.11n (HT40), PN9, worst antenna port 1, worst data mode 0(MCS) | |

| Ch. Freq. [MHz] | Freq. Reading [MHz] | Reading [dBm] | Cable Loss [dB] | Atten. [dB] | Result [dBm] | Limit [dBm] | Margin [dB] |
|--------------------|---------------------------|------------------|-----------------------|----------------|-----------------|----------------|----------------|
| 2422.0000 | 2425.13 | -27.37 | 1.48 | 20.25 | -5.64 | 8.00 | 13.64 |
| 2437.0000 | 2440.13 | -27.60 | 1.48 | 20.25 | -5.87 | 8.00 | 13.87 |
| 2452.0000 | 2449.50 | -27.41 | 1.48 | 20.25 | -5.68 | 8.00 | 13.68 |

Sample Calculation:

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



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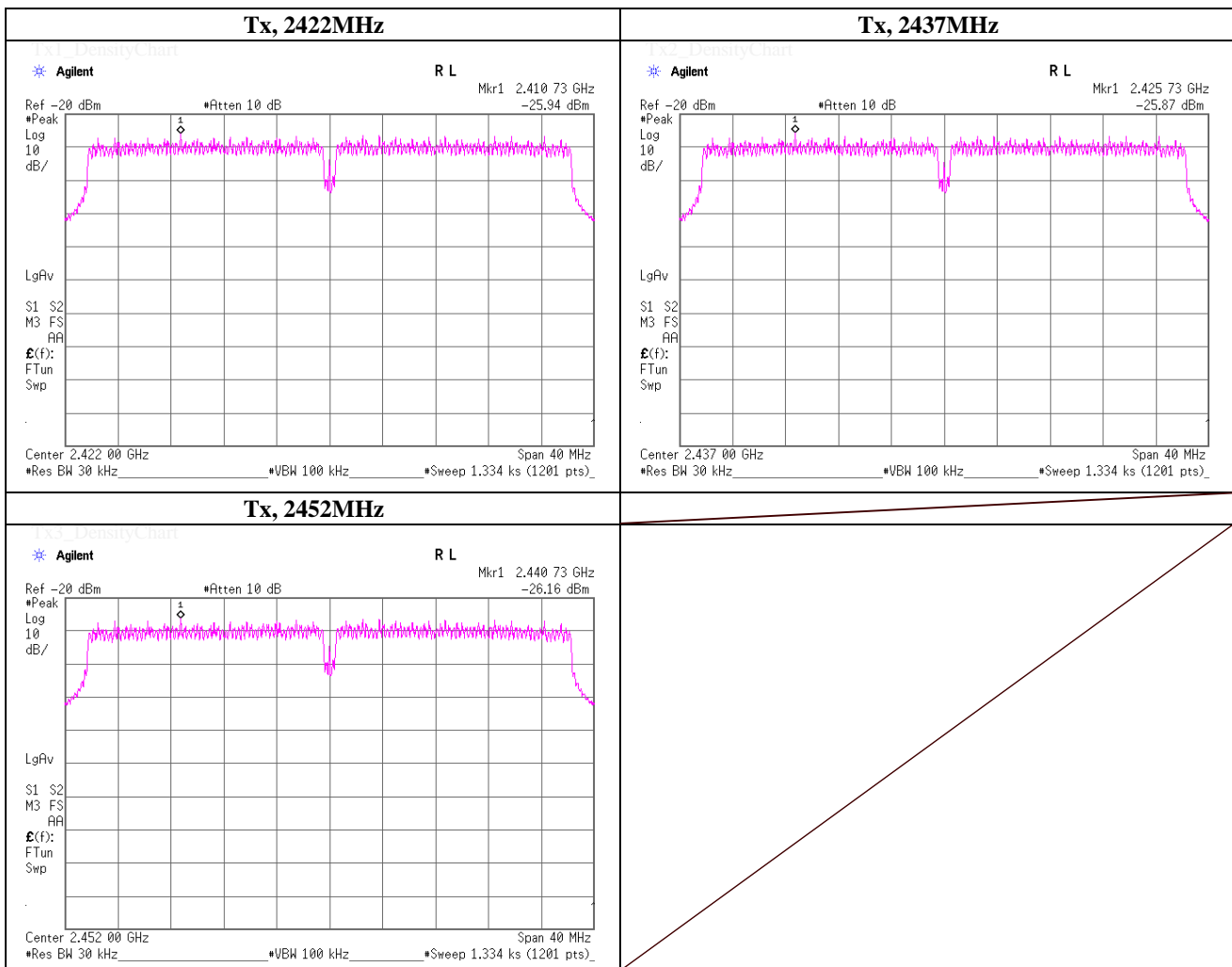
Power Density

| | | |
|------------------------|--|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date | August 2, 2012 | |
| Temperature / Humidity | 25deg.C , 54%RH | |
| Engineer | Hikaru Shirasawa | |
| Mode | Tx, IEEE802.11n (HT40), PN9, worst data mode 8(MCS), mimo, Antenna 2 | |

| Ch. Freq. [MHz] | Freq. Reading [MHz] | Reading [dBm] | Cable Loss [dB] | Atten. [dB] | Result [dBm] | Limit [dBm] | Margin [dB] |
|--------------------|---------------------------|------------------|-----------------------|----------------|-----------------|----------------|----------------|
| 2422.0000 | 2410.73 | -25.95 | 1.49 | 20.15 | -4.31 | 8.00 | 12.31 |
| 2437.0000 | 2425.73 | -25.87 | 1.48 | 20.15 | -4.24 | 8.00 | 12.24 |
| 2452.0000 | 2440.73 | -26.16 | 1.48 | 20.15 | -4.53 | 8.00 | 12.53 |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss



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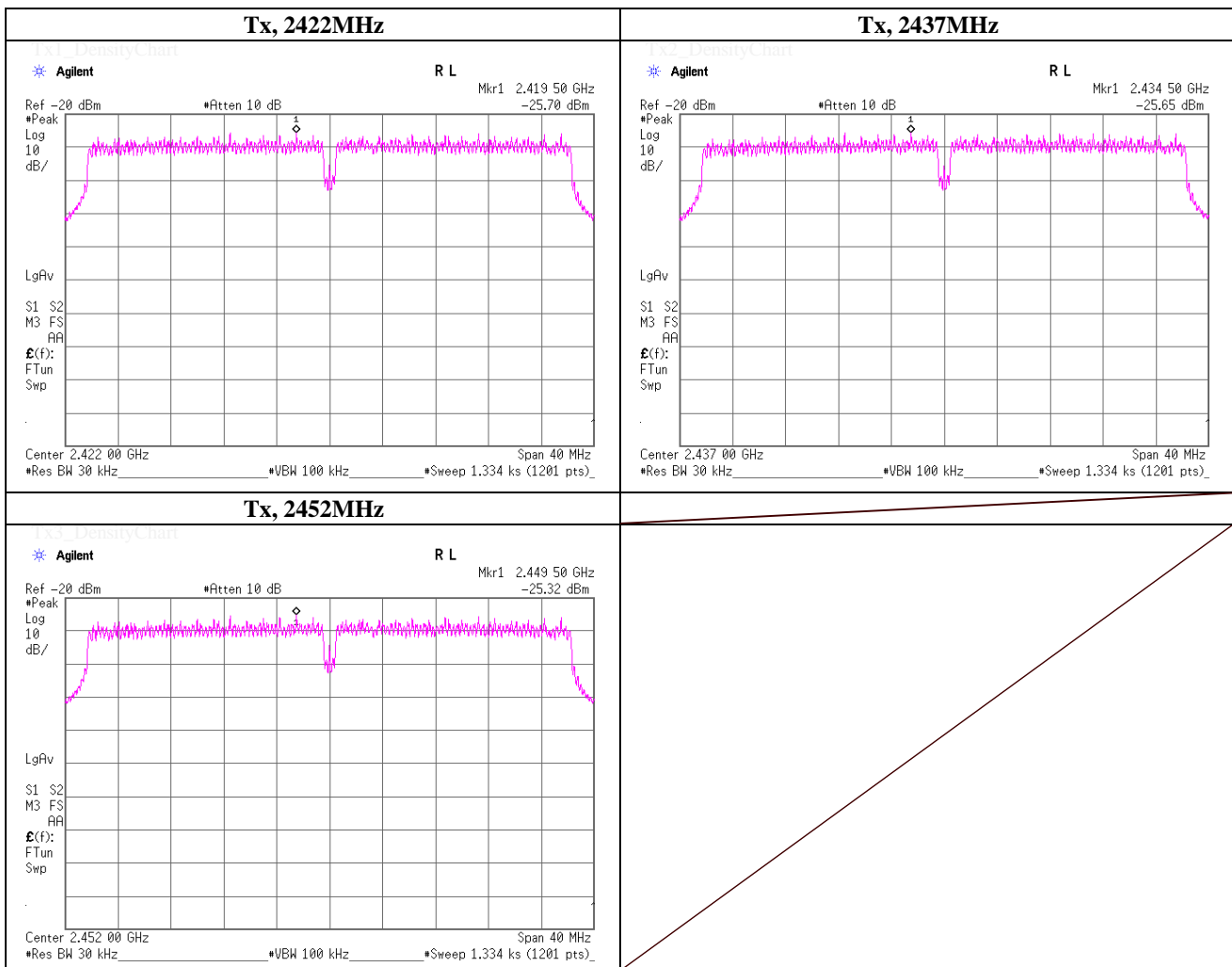
Power Density

| | | |
|------------------------|--|--------------------|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date | August 2, 2012 | |
| Temperature / Humidity | 25deg.C , 54%RH | |
| Engineer | Hikaru Shirasawa | |
| Mode | Tx, IEEE802.11n (HT40), PN9, worst data mode 8(MCS), mimo, Antenna 1 | |

| Ch. Freq. [MHz] | Freq. Reading [MHz] | Reading [dBm] | Cable Loss [dB] | Atten. [dB] | Result [dBm] | Limit [dBm] | Margin [dB] |
|--------------------|---------------------------|------------------|-----------------------|----------------|-----------------|----------------|----------------|
| 2422.0000 | 2419.50 | -25.70 | 1.48 | 20.15 | -4.07 | 8.00 | 12.07 |
| 2437.0000 | 2434.50 | -25.65 | 1.48 | 20.15 | -4.02 | 8.00 | 12.02 |
| 2452.0000 | 2449.50 | -25.32 | 1.48 | 20.15 | -3.69 | 8.00 | 11.69 |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss



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Power Density (Total)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date August 2, 2012
 Temperature / Humidity 25deg.C , 54%RH
 Engineer Hikaru Shirasawa
 Mode Tx, IEEE802.11n (HT40), PN9, worst data mode 8(MCS), mimo

(* P/M: Power Meter with power sensor, with gate trigger mode)

| Ch | Freq. [MHz] | Result | | Result Total | | Limit [dBm] | Margin [dB] |
|------|----------------|--------------------|--------------------|-----------------|------|----------------|----------------|
| | | Antenna 2 [dBm] | Antenna 1 [dBm] | [dBm] | [mW] | | |
| Low | 2422.0 | -4.31 | -4.07 | -1.18 | 0.76 | 8.00 | 9.18 |
| Mid | 2437.0 | -4.24 | -4.02 | -1.11 | 0.77 | 8.00 | 9.11 |
| High | 2452.0 | -4.53 | -3.69 | -1.08 | 0.78 | 8.00 | 9.08 |

Sample Calculation:

Result = Antenna 1 + Antenna 2

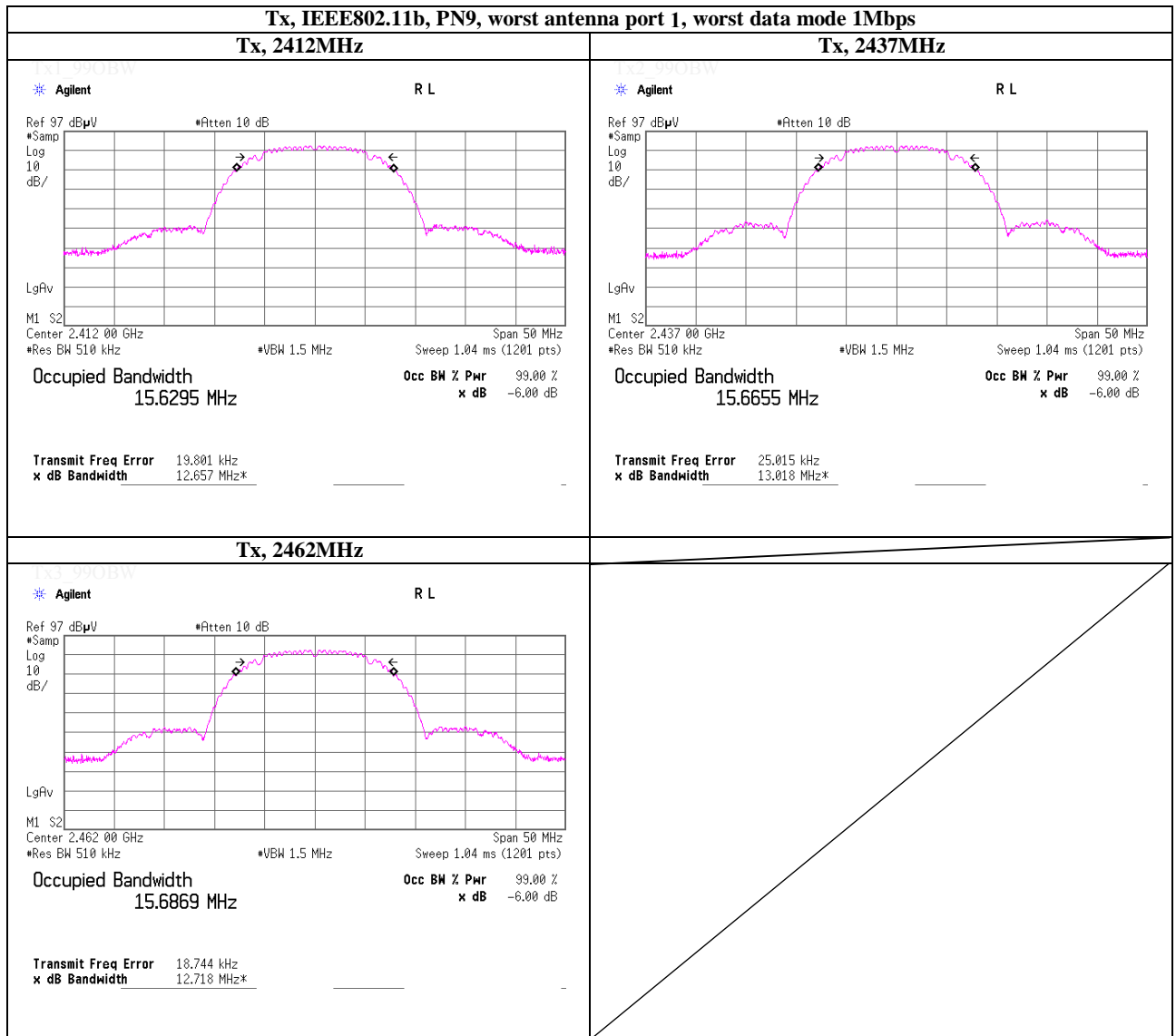
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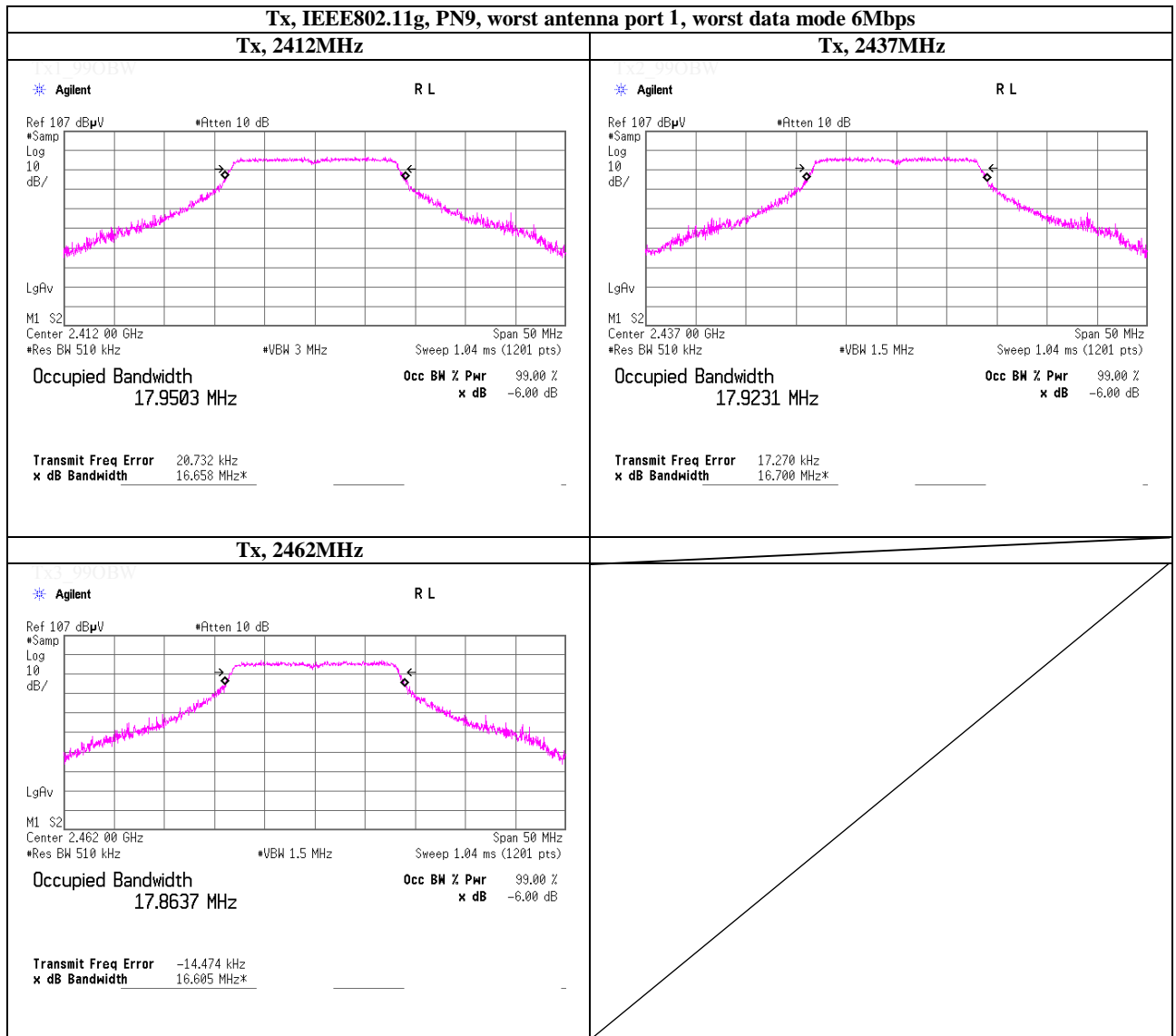
Facsimile : +81 463 50 6401

99% Occupied Bandwidth



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99% Occupied Bandwidth



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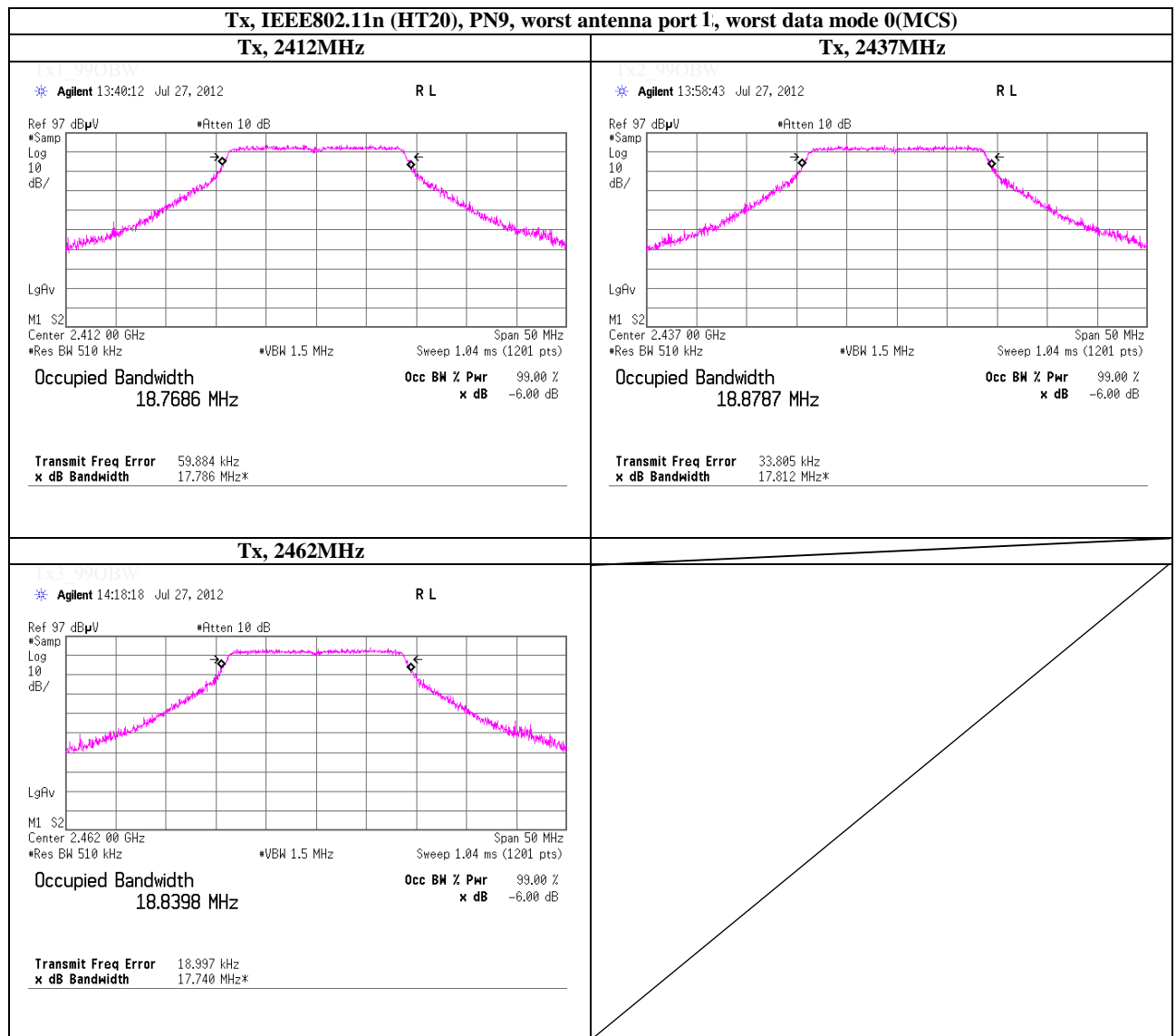
Shonan EMC Lab.

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

Telephone : +81 463 50 6400

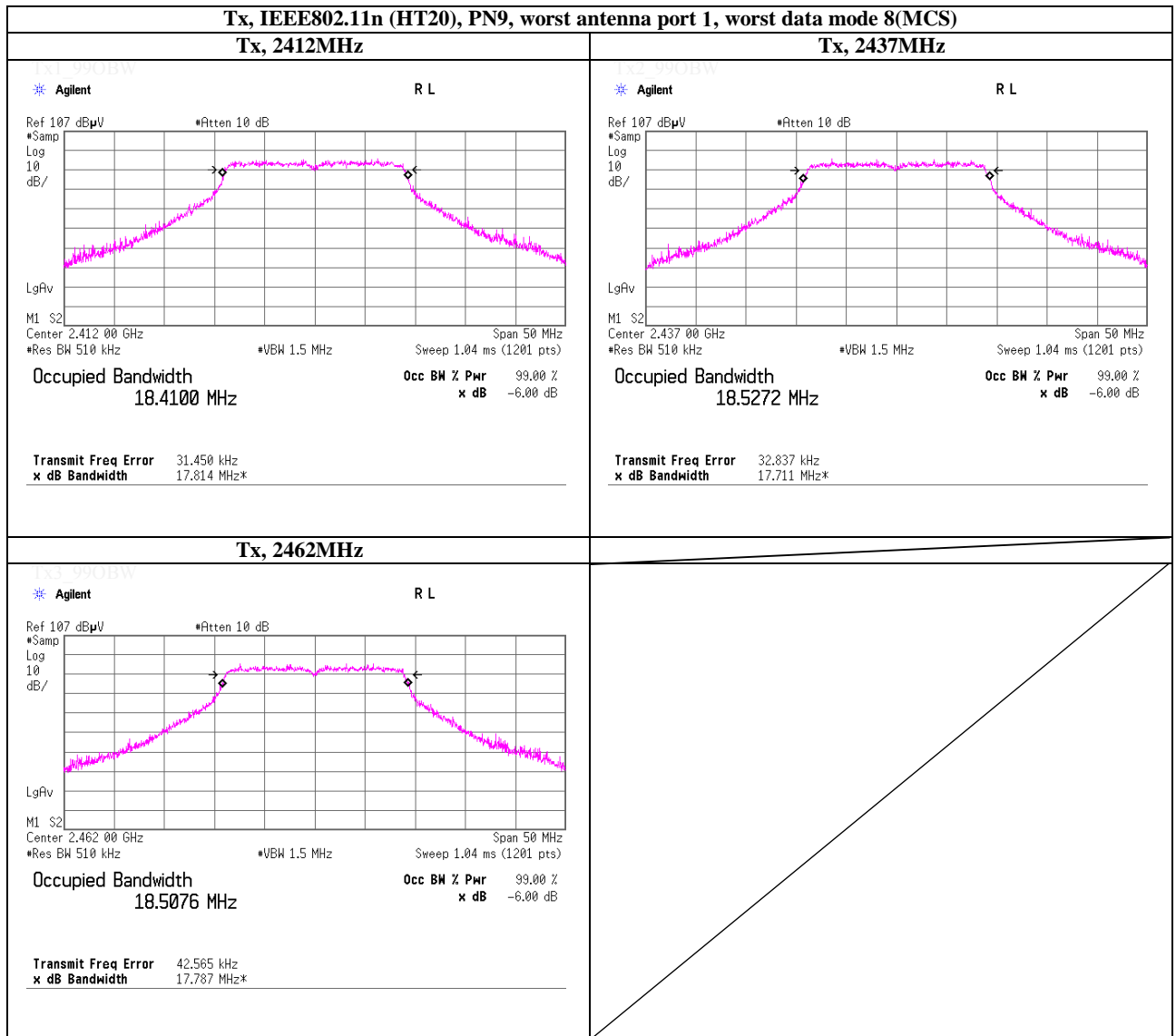
Facsimile : +81 463 50 6401

99% Occupied Bandwidth



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99% Occupied Bandwidth



UL Japan, Inc.

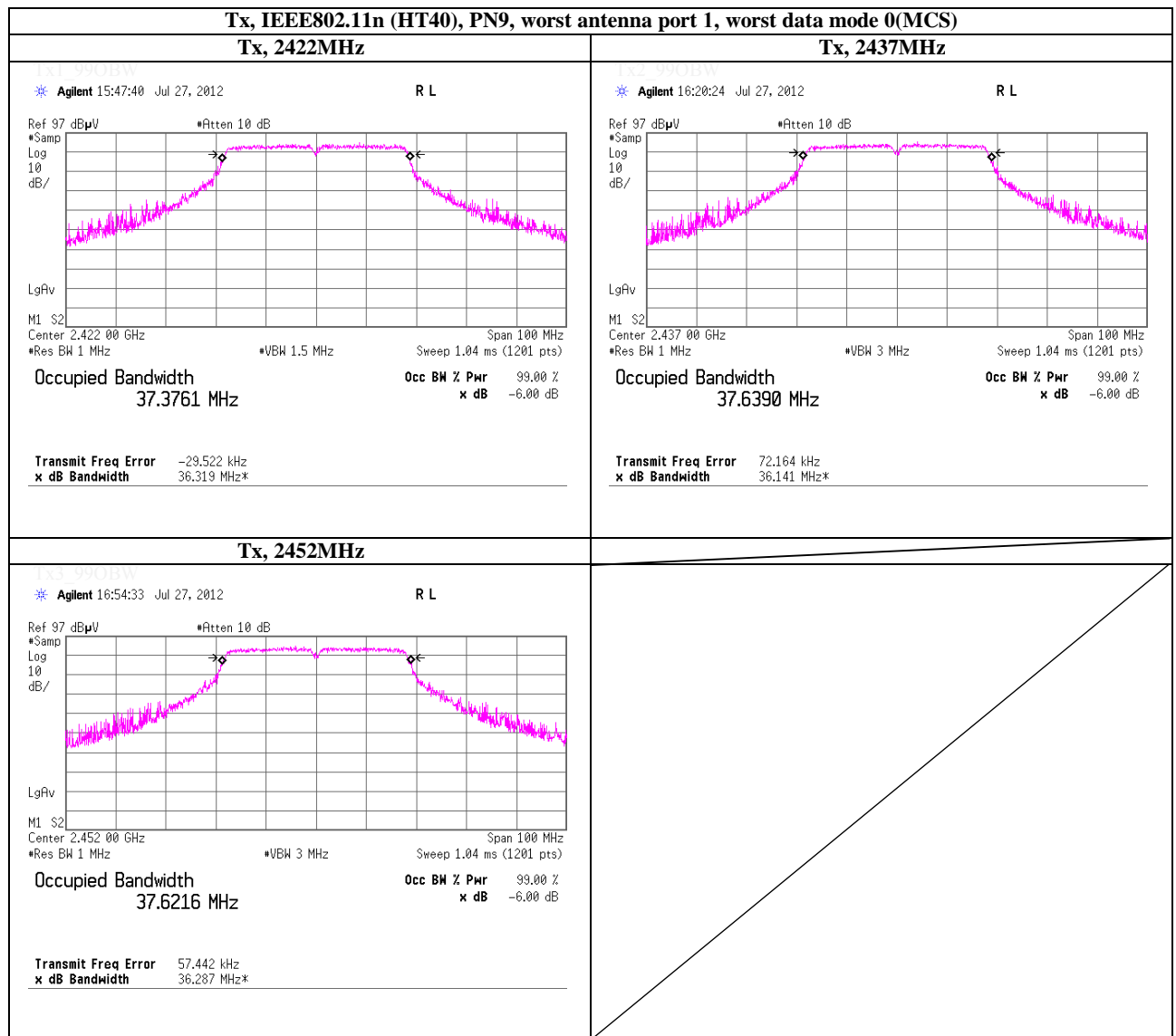
Shonan EMC Lab.

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Telephone : +81 463 50 6400

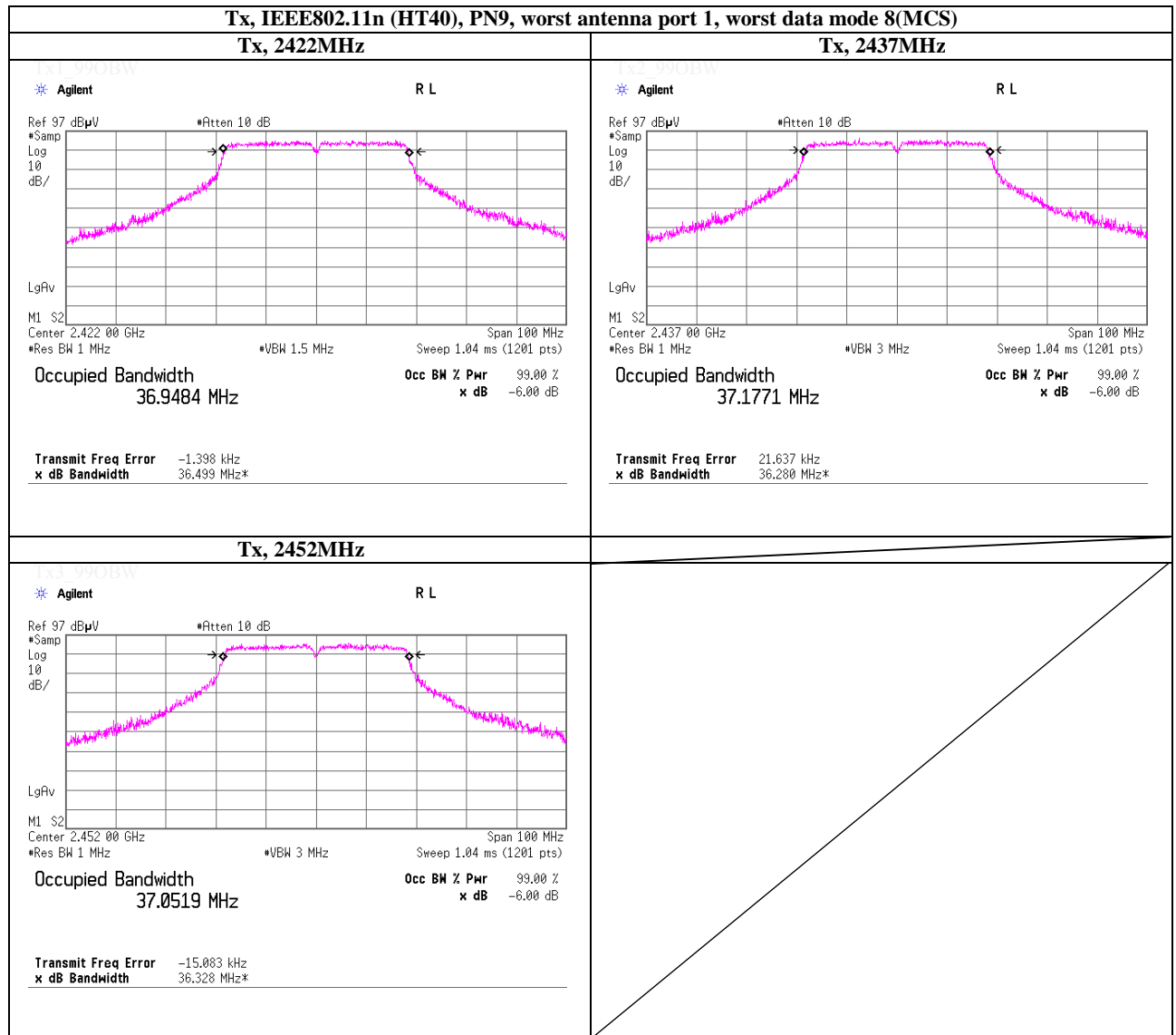
Facsimile : +81 463 50 6401

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 * Interva(month) |
|--------------------------------|---------------------------|---|--------------------------------------|-------------------------|-----------|--------------------------------------|
| KPM-08 | Power meter | Anritsu | ML2495A | 6K00003356 | AT | 2011/09/12 * 12 |
| KPSS-04 | Power sensor | Anritsu | MA2411B | 012088 | AT | 2011/09/12 * 12 |
| SCC-H2 | Microwave cable | Hirose Electric | U.FL-2LP-066J1-A-(200) | - | AT | Pre Check |
| SCC-H3 | Microwave cable | Hirose Electric | U.FL-2LP-066J1-A-(200) | - | AT | Pre Check |
| SCC-G12 | Coaxial Cable | Suhner | SUCOFLEX 102 | 30790/2 | AT | 2012/03/12 * 12 |
| SAT20-07 | Attenuator | Weinschel Corp. | 54A-20 | 31484 | AT | 2012/04/12 * 12 |
| SOS-09 | Humidity Indicator | A&D | AD-5681 | 4061484 | AT | 2012/03/26 * 12 |
| KSA-08 | Spectrum Analyzer | Agilent | E4446A | MY46180525 | AT | 2012/02/16 * 12 |
| SPM-06 | Power Meter | Anritsu | ML2495A | 0850009 | AT | 2012/04/19 * 12 |
| SPSS-03 | Power sensor | Anritsu | MA2411B | 0917063 | AT | 2012/04/19 * 12 |
| SOS-10 | Humidity Indicator | A&D | AD-5681 | 4064561 | AT | 2012/02/06 * 12 |
| SSA-03 | Spectrum Analyzer | Agilent | E4448A | MY48250152 | AT | 2011/12/05 * 12 |
| SAT20-03 | Attenuator | Agilent | 8493C-020 | 74891 | AT | 2012/03/12 * 12 |
| SAEC-03(NSA) | Semi-Anechoic Chamber | TDK | SAEC-03(NSA) | 3 | RE | 2011/09/23 * 12 |
| SAF-06 | Pre Amplifier | TOYO Corporation | TPA0118-36 | 1440491 | RE | 2012/07/18 * 12 |
| SCC-G03 | Coaxial Cable | Suhner | SUCOFLEX 104A | 46499/4A | RE | 2012/04/10 * 12 |
| SCC-G23 | Coaxial Cable | Suhner | SUCOFLEX 104 | 297342/4 | RE | 2012/05/22 * 12 |
| SHA-03 | Horn Antenna | Schwarzbeck | BBHA9120D | 9120D-739 | RE | 2012/08/17 * 12 |
| SOS-05 | Humidity Indicator | A&D | AD-5681 | 4062518 | RE | 2012/02/06 * 12 |
| SSA-02 | Spectrum Analyzer | Agilent | E4448A | MY48250106 | RE | 2012/03/16 * 12 |
| SJM-10 | Measure | PROMART | SEN1935 | - | RE/CE | - |
| COTS-SEMI-1 | EMI Software | TSJ | TEPTO-DV(RE,CE,RFI,MF) | - | RE/CE | - |
| SAT20-01 | Attenuator(above1GHz) | Agilent | 8493C-020 | 74889 | RE | 2011/12/27 * 12 |
| SFL-02 | Highpass Filter | MICRO-TRONICS | HPM50111 | 051 | RE | 2011/12/27 * 12 |
| SHA-04 | Horn Antenna | ETS LINDGREN | 3160-09 | LM3640 | RE | 2012/03/30 * 12 |
| SAF-08 | Pre Amplifier | TOYO Corporation | HAP18-26W | 00000019 | RE | 2012/03/12 * 12 |
| SCC-G17 | Coaxial Cable | Suhner | SUCOFLEX 104A | 46291/4A | RE | 2012/03/12 * 12 |
| SAF-03 | Pre Amplifier | SONOMA | 310N | 290213 | RE | 2012/02/10 * 12 |
| SAT6-03 | Attenuator | JFW | 50HF-006N | - | RE | 2012/02/10 * 12 |
| SBA-03 | Biconical Antenna | Schwarzbeck | BBA9106 | 91032666 | RE | 2011/10/23 * 12 |
| SCC-C1/C2/C3/C4/C5/C10/SRSE-03 | Coaxial Cable&RF Selector | Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO | 8D2W/12DSFA/141PE/141PE/141PE/NS4906 | -/0901-271(RF Selector) | RE | 2012/04/10 * 12 |
| SLA-03 | Logperiodic Antenna | Schwarzbeck | UHALP9108A | UHALP 9108-A0901 | RE | 2011/10/23 * 12 |
| STR-06 | Test Receiver | Rohde & Schwarz | ESCI | 101259 | RE/CE | 2012/02/07 * 12 |
| SCC-C9/C10/SRSE-03 | Coaxial Cable&RF Selector | Suhner/Suhner/TOYO | RG223U/141PE/NS4906 | -/0901-271(RF Selector) | CE | 2012/04/10 * 12 |
| SLS-05 | LISN | Rohde & Schwarz | ENV216 | 100516 | CE | 2012/02/23 * 12 |
| SAT3-03 | Attenuator | JFW | 50HF-003N | - | CE | 2012/02/17 * 12 |
| SOS-06 | Humidity Indicator | A&D | AD-5681 | 4062118 | CE | 2012/03/26 * 12 |
| | | | | | | |
| | | | | | | |

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

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

- Test Item :
- CE: Conducted emission ,
 - RE: Radiated emission ,
 - AT: Antenna terminal conducted