




# RADIO TEST REPORT


Test Report No.: 33CE0267-SH-02-A

**Applicant** : Toshiba Corporation  
**Type of Equipment** : Notebook Computer  
**Model No.** : Satellite U930  
**FCC ID** : CJ6UPSU7FPC1  
**Test regulation** : FCC Part15 Subpart C: 2012  
**Test result** : Complied

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6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.

**Date of test:** November 15 to 22, 2012

**Tested by:**   
Kenichi Adachi  
Engineer of WiSE Japan,  
UL Verification Service

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

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13-EM-F0429



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## **SECTION 1: Customer information**

Company Name : Toshiba Corporation  
Address : 2-9, Suehiro-cho, Ome-shi, Tokyo, 198-8710 Japan  
Telephone Number : +81 42 834 1050  
Facsimile Number : +81 42 830 7331  
Contact Person : Toshiyuki Echigo

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

### **2.1 Identification of E.U.T.**

Type of Equipment : Notebook Computer  
Model Number : Satellite U930  
Serial Number : Refer to 4.2 in this report.  
Rating : DC19V  
Country of Mass-production : China  
Condition of EUT : Production prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Receipt Date of Sample : November 14, 2012  
Modification of EUT : No modification by the test lab.

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## 2.2 Product description

Model: Satellite U930 (referred to as the EUT in this report) is a Notebook Computer.

Derived models of the EUT:

| Model                | Touch screen function |
|----------------------|-----------------------|
| Satellite U930 (EUT) | -                     |
| Satellite U930t      | Yes                   |
| Satellite U935       | -                     |
| Satellite U935t      | Yes                   |

Model: Satellite U930/ Satellite U930t has a different sales channel with Satellite U935/Satellite U935t.

Clock frequency(ies) in the system : 40MHz (XTAL)

Radio specification:

Bluetooth:

Equipment type : Transceiver  
Frequency of operation : 2402-2480MHz  
Bandwidth : 79MHz  
Channel spacing : 1MHz (BDR/EDR mode), 2MHz (Low Energy mode)  
Type of modulation : FHSS, DSSS  
Antenna type : PIFA  
Antenna gain with cable loss : 3.24dBi  
Antenna connector type : U.FL  
ITU code : F1D, G1D  
Operation temperature range : 0 to +80 deg.C

Refer to the test report: 33CE0267-SH-02-B/C for Bluetooth part.

When Bluetooth is used, IEEE 802.11 b/g/n is not transmitted.

Wireless LAN (IEEE802.11b/g/n):

Equipment type : Transceiver  
Frequency of operation : 2412-2462MHz (IEEE 802.11b, 11g, 11n (HT20))  
2422-2452MHz (IEEE 802.11n (HT40))  
Bandwidth : 20MHz (IEEE 802.11b/g/n), 40MHz (IEEE 802.11n)  
Channel spacing : 5MHz  
Type of modulation : DSSS, OFDM  
Antenna type : PIFA  
Antenna gain with cable loss : 3.24dBi  
Antenna connector type : U.FL  
ITU code : D1D, G1D  
Operation temperature range : 0 to +80 deg.C

FCC 15.31 (e)

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

FCC 15.203

The EUT has a unique coupling/antenna connector (U.FL). 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 EUT will be tested for compliance with FCC Part 15 Subpart B by the customer.

### **3.2 Procedures & Results**

| Item   | Test Procedure *1) | Specification                         | Remarks                    | Deviation | Worst Margin  | Results  |
|--|--------------------|---------------------------------------|----------------------------|-----------|---|----------|
| Conducted emission                           | ANSI C63.10:2009   | FCC 15.207                            | -                          | N/A       | 12.2dB<br>Freq.: 0.15MHz<br>Detection: Quasi-Peak<br>Phase: L1<br>Mode: Tx 2437MHz,<br>IEEE 802.11n (HT20)                | Complied |
| 6dB bandwidth                                | ANSI C63.10:2009   | FCC 15.247<br>(a)(2)                  | Conducted                  | N/A       | * See data  | Complied |
| Maximum peak output power                    | ANSI C63.10:2009   | FCC 15.247<br>(b)(3)                  | Conducted                  | N/A       |   | Complied |
| Out of band emission & Restricted band edges | ANSI C63.10:2009   | FCC 15.109,<br>15.247 (d) &<br>15.209 | Conducted<br>/<br>Radiated | N/A       | 0.2dB<br>Freq.: 2483.500MHz<br>Polarization: Horizontal<br>Detection: Average<br>Mode: Tx 2462MHz,<br>IEEE 802.11n (HT20) | Complied |
| Power density                                | ANSI C63.10:2009   | FCC 15.247<br>(e)                     | Conducted                  | N/A       | * See data  | Complied |

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

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

### **3.3 Addition to standard**

| Item                     | Test Procedure                     | Specification | Remarks   | Worst Margin | Results |
|--------------------------|------------------------------------|---------------|-----------|--------------|---------|
| Occupied Bandwidth (99%) | ANSI C63.10:2009,<br>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 <sup>*1</sup> /SR <sup>*2</sup><br>(±) | No.2 SAC/SR<br>(±) | No.3 SAC/SR<br>(±) |
|---|-----------------|---|--------------------|--------------------|
| <b>Conducted emission<br/>(AC Mains) LISN</b>           | 150kHz-30MHz    | 3.6 dB  | 3.6 dB             | 3.5 dB             |
| <b>Radiated emission<br/>(Measurement distance: 3m)</b> | 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             |
| <b>Radiated emission<br/>(Measurement distance: 1m)</b> | 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<br>Registration<br>No. | IC<br>Registration<br>No. | Width x Depth x<br>Height (m) | Size of reference<br>ground plane (m)<br>/ horizontal<br>conducting plane | Maximum<br>measurement<br>distance |
|--|----------------------------|---------------------------|-------------------------------|---|------------------------------------|
| <input checked="" 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 checked="" 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 type="checkbox"/> No.3 shielded room                    | -                          | -                         | 6.3 x 4.7 x 2.7               | 6.3 x 4.7   | -                                  |
| <input type="checkbox"/> No.4 shielded room                    | -                          | -                         | 4.4 x 4.7 x 2.7               | 4.4 x 4.7   | -                                  |
| <input checked="" type="checkbox"/> No.5 shielded room         | -                          | -                         | 7.8 x 6.4 x 2.7               | 7.8 x 6.4   | -                                  |
| <input type="checkbox"/> No.6 shielded room                    | -                          | -                         | 7.8 x 6.4 x 2.7               | 7.8 x 6.4   | -                                  |
| <input checked="" type="checkbox"/> No.7 shielded room         | -                          | -                         | 2.76 x 3.76 x 2.4             | 2.76 x 3.76   | -                                  |

### 3.6 Test setup, Test data & Test instruments

Refer to APPENDIX 1 to 3.

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

### 4.1 Operating mode

| Test item   | Mode   | Tested frequency          | Worst data mode *1)              |
|---|--|---------------------------|----------------------------------|
| Conducted emission<br>Radiated emission<br>(below 1GHz) *2) | Transmitting IEEE 802.11n (HT20)<br>(SISO)     | 2437MHz                   | PN9, MCS0,<br>Mix, Long          |
| Other items   | Transmitting IEEE 802.11b                      | 2412MHz, 2437MHz, 2462MHz | PN9, 1Mbps                       |
|   | Transmitting IEEE 802.11g *3)                  | 2412MHz, 2437MHz, 2462MHz | PN9, 6Mbps                       |
|   | Transmitting IEEE 802.11n (HT20)<br>(SISO) *3) | 2412MHz, 2437MHz, 2462MHz | PN9, MCS0,<br>Mix, Long          |
|   | Transmitting IEEE 802.11n (HT20)<br>(MIMO) *4) | 2412MHz, 2437MHz, 2462MHz | PN9, MCS8,<br>Mix, Long          |
|   | Transmitting IEEE 802.11n (HT40)<br>(SISO)     | 2422MHz, 2437MHz, 2452MHz | PN9, MCS0,<br>Mix, Long,<br>Wide |
|   | Transmitting IEEE 802.11n (HT40)<br>(MIMO) *4) | 2422MHz, 2437MHz, 2452MHz | PN9, MCS8,<br>Mix, Long,<br>Wide |

\*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.

\*3) Since 11g and 11n (HT20) have the same modulation method and no differences in transmitting specification, test was performed on the representative mode that had the highest peak output power.

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

EUT has the power settings by the software as follows;

Test software: DRTU version 1.5.7.0432 (Intel)

Power settings:

|                  | 2412MHz/2422MHz |      | 2437MHz |      | 2462MHz/2452MHz |      |
|------------------|-----------------|------|---------|------|-----------------|------|
|                  | Main            | Aux  | Main    | Aux  | Main            | Aux  |
| 11b              | 20.0            | 21.5 | 21.5    | 23.5 | 22.0            | 24.0 |
| 11g              | 24.5            | 26.5 | 28.0    | 30.0 | 25.5            | 27.5 |
| 11n (HT20)(SISO) | 23.5            | 25.5 | 28.0    | 30.0 | 24.5            | 26.5 |
| 11n (HT20)(MIMO) | 23.5            | 25.5 | 26.5    | 28.5 | 25.5            | 27.5 |
| 11n (HT40)(SISO) | 20.5            | 21.5 | 24.5    | 26.5 | 22.0            | 23.5 |
| 11n (HT40)(MIMO) | 20.5            | 22.5 | 26.5    | 28.0 | 21.5            | 23.5 |

\* This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.

IEEE 802.11n data mode

|            |                   |                |             |              |     |
|------------|-------------------|----------------|-------------|--------------|-----|
| 11n (HT20) | Guard interval    | Long (worst)   | Short       |              |     |
|            | Bandwidth setting | - (only 20MHz) |             |              |     |
|            | Frame settings    | Green          | Mix (worst) |              |     |
| 11n (HT40) | Guard interval    | Long (worst)   | Short       |              |     |
|            | Bandwidth setting | Low            | High        | Wide (worst) | Dup |
|            | Frame settings    | Green          | Mix (worst) |              |     |

\* Long = Long guard interval (800ns), Short = Short guard interval (400ns).

\* Green = Green field mode (only used 11n), Mix = Mix mode (The radio of any modes (11b, 11g, 11n) exists).

\* Low = 20MHz lower output from the center of 40MHz, High = 20MHz upper output from the center of 40MHz,

Wide = output of full of 40MHz band, Dup = Duplicated Non-HT mode. Output with 2 channels of 20MHz widths.

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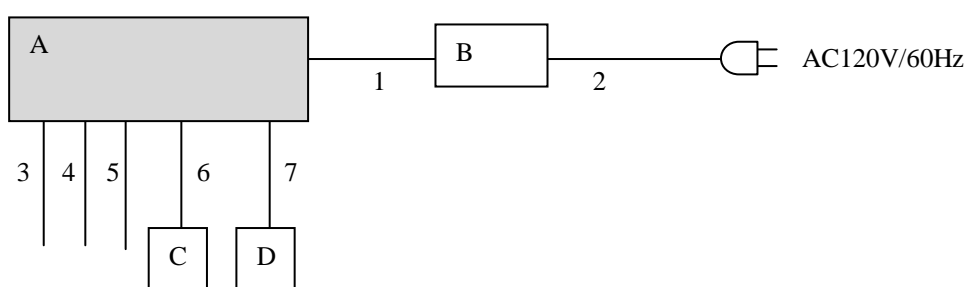
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Antenna port used:

|                           | Single output<br>(11b, 11g, 11n (SISO)) | Multi output<br>(11n (MIMO)) |
|---------------------------|---|------------------------------|
| Maximum peak output power | - Main<br>- AUX                         | Main + Aux                   |
| Other tests               | - AUX (worst)                           | Main + Aux                   |

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

## 4.2 Configuration and peripherals



\* Test data was taken under worse case conditions.

### Description of EUT and support equipment

| No. | Item              | Model number   | Serial number | Manufacturer | Remarks |
|-----|-------------------|----------------|---------------|--------------|---------|
| A   | Notebook Computer | Satellite U930 | *1)           | Toshiba      | EUT *2) |
| B   | AC Adaptor        | PA5096U-1ACA   | G71C000FF1100 | Toshiba      | -       |
| C   | Mouse             | MO28UOL        | 453859        | Lenovo       | -       |
| D   | Headphones        | HP-H500N       | -             | AudioComm    | -       |

\*1) XC125734H: Maximum peak output power test, XC125724H: Other test

\*2) Intel® Centrino® Wireless-N 2230 (Model: 2230BNHMW, FCC ID: PD92230BNH) is installed in the EUT.

### List of cables used

| No. | Cable Name | Length (m) | Shield     |            | Remarks |
|-----|------------|------------|------------|------------|---------|
|     |            |            | Cable      | Connector  |         |
| 1   | DC         | 1.7        | Unshielded | Unshielded | -       |
| 2   | AC         | 1.7        | Unshielded | Unshielded | -       |
| 3   | HDMI       | 3.0        | Shielded   | Shielded   | -       |
| 4   | USB        | 2.0        | Shielded   | Shielded   | -       |
| 5   | USB        | 1.8        | Shielded   | Shielded   | -       |
| 6   | Audio      | 1.2        | Unshielded | Unshielded | -       |
| 7   | Mouse      | 1.8        | 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 within a Shielded room. The EUT was connected to a Line Impedance Stabilization Network (LISN). An overview sweep with peak detection has been performed. The measurements had been performed with a quasi-peak detector and if required, an average detector. The conducted emission measurements were made with the following detection of the test receiver.

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

### **5.5 Results**

Summary of the test results : Pass  
Refer to APPENDIX 1

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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<br>VBW: 3MHz | RBW: 1MHz<br>VBW: 3MHz<br>Detector: RMS | RBW: 100kHz<br>VBW: 300kHz |

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

The carrier level and noise levels were confirmed at each tilt angle of LCD of EUT to see the angle of maximum noise, and the test was made at the tilt angle of 90 deg. that has the maximum noise.

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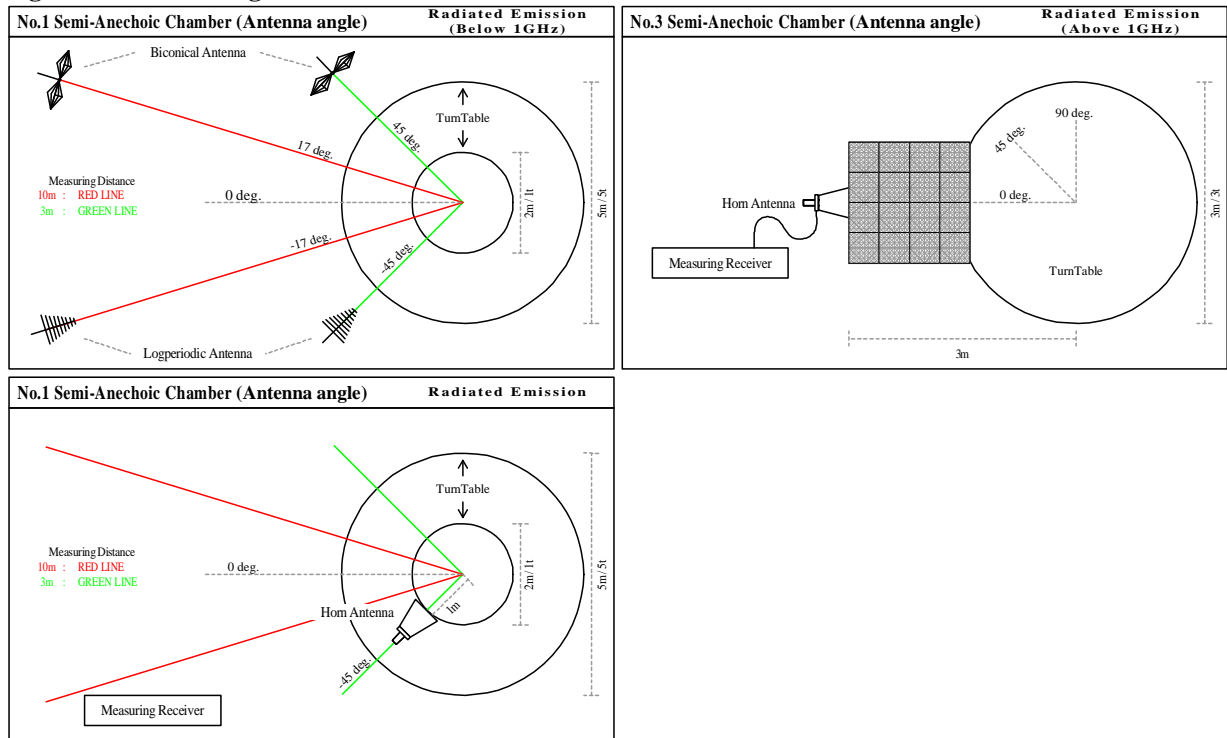
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**Figure 1. Antenna angle**



## 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 5<sup>th</sup> 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

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

### **Test procedure**

The bandwidth was measured with a spectrum analyzer connected to the antenna port. The test was measured based on Method 7.1 Option 1 and 7.2 Option 2 of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

Summary of the test results: Pass  
Refer to APPENDIX

## **SECTION 9: Maximum peak output power**

### **Test procedure**

The Maximum Peak Output Power was measured with a power meter connected to the antenna port. The test was measured based on Method 8.1.3 Option 3 of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".  
Detection type: Peak / Average \*1)

Summary of the test results: Pass  
Refer to APPENDIX 1

\*1) Average detector was used only for Reference data of SAR testing.

## **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  
RBW / VBW : 3kHz / 9.1kHz

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

Summary of the test results: Pass  
Refer to APPENDIX

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## **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

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APPENDIX 1: Data of Radio tests

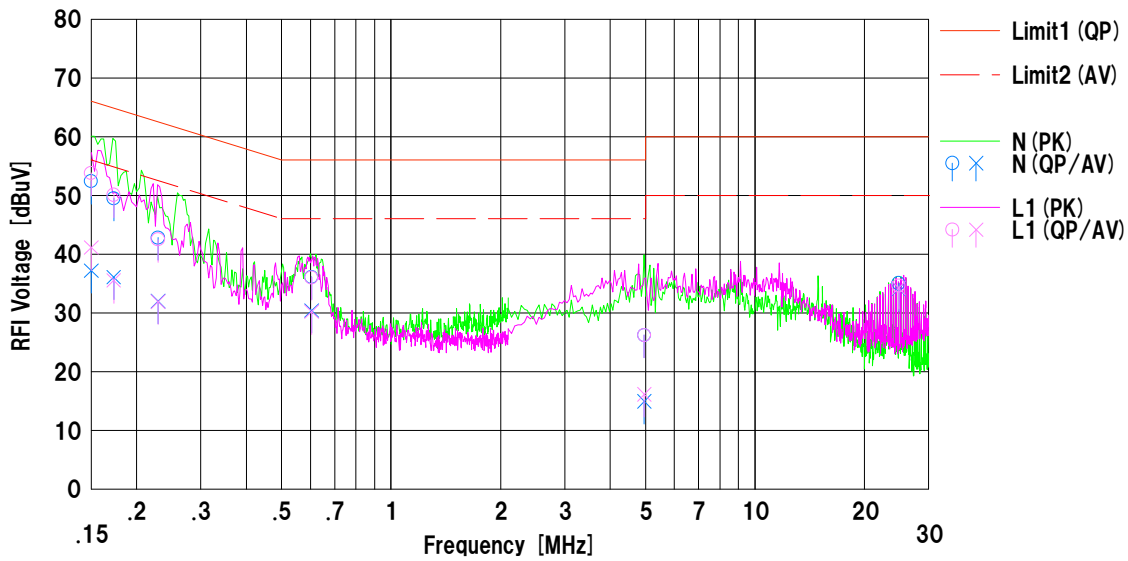
**DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Shonan EMC Lab. No.1 Shielded Room  
Date : 2012/11/21

Mode : IEEE802.11n (HT20) , Tx2437MHz,MCS0  
Report No. : 33CE0267-SH-02-A  
Power : AC 120V / 60Hz  
Temp./Humi. : 25deg.C / 43%RH

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

Engineer : Kenichi Adachi



| No. | Freq.<br>[MHz] | Reading        |                | C.Fac<br>[dB] | Results        |                | Limit          |                | Margin       |              | Phase | Comment |
|-----|----------------|----------------|----------------|---------------|----------------|----------------|----------------|----------------|--------------|--------------|-------|---------|
|     |                | <QP><br>[dBuV] | <AV><br>[dBuV] |               | <QP><br>[dBuV] | <AV><br>[dBuV] | <QP><br>[dBuV] | <AV><br>[dBuV] | <QP><br>[dB] | <AV><br>[dB] |       |         |
| 1   | 0.15000        | 39.7           | 24.5           | 12.7          | 52.4           | 37.2           | 66.0           | 56.0           | 13.6         | 18.8         | N     |         |
| 2   | 0.17300        | 36.8           | 23.4           | 12.7          | 49.5           | 36.1           | 64.8           | 54.8           | 15.3         | 18.7         | N     |         |
| 3   | 0.22900        | 30.1           | 19.3           | 12.7          | 42.8           | 32.0           | 62.4           | 52.4           | 19.6         | 20.4         | N     |         |
| 4   | 0.60500        | 23.4           | 17.7           | 12.7          | 36.1           | 30.4           | 56.0           | 46.0           | 19.9         | 15.6         | N     |         |
| 5   | 4.95800        | 13.2           | 1.9            | 13.0          | 26.2           | 14.9           | 56.0           | 46.0           | 29.8         | 31.1         | N     |         |
| 6   | 24.80414       | 21.3           | 20.4           | 13.7          | 35.0           | 34.1           | 60.0           | 50.0           | 25.0         | 15.9         | N     |         |
| 7   | 0.15000        | 41.1           | 28.4           | 12.7          | 53.8           | 41.1           | 66.0           | 56.0           | 12.2         | 14.9         | L1    |         |
| 8   | 0.17300        | 37.4           | 22.8           | 12.7          | 50.1           | 35.5           | 64.8           | 54.8           | 14.7         | 19.3         | L1    |         |
| 9   | 0.22900        | 29.8           | 19.2           | 12.7          | 42.5           | 31.9           | 62.4           | 52.4           | 19.9         | 20.5         | L1    |         |
| 10  | 0.60500        | 23.3           | 17.5           | 12.7          | 36.0           | 30.2           | 56.0           | 46.0           | 20.0         | 15.8         | L1    |         |
| 11  | 4.95800        | 13.2           | 3.1            | 13.0          | 26.2           | 16.1           | 56.0           | 46.0           | 29.8         | 29.9         | L1    |         |
| 12  | 24.80414       | 20.9           | 20.5           | 13.7          | 34.6           | 34.2           | 60.0           | 50.0           | 25.4         | 15.8         | L1    |         |

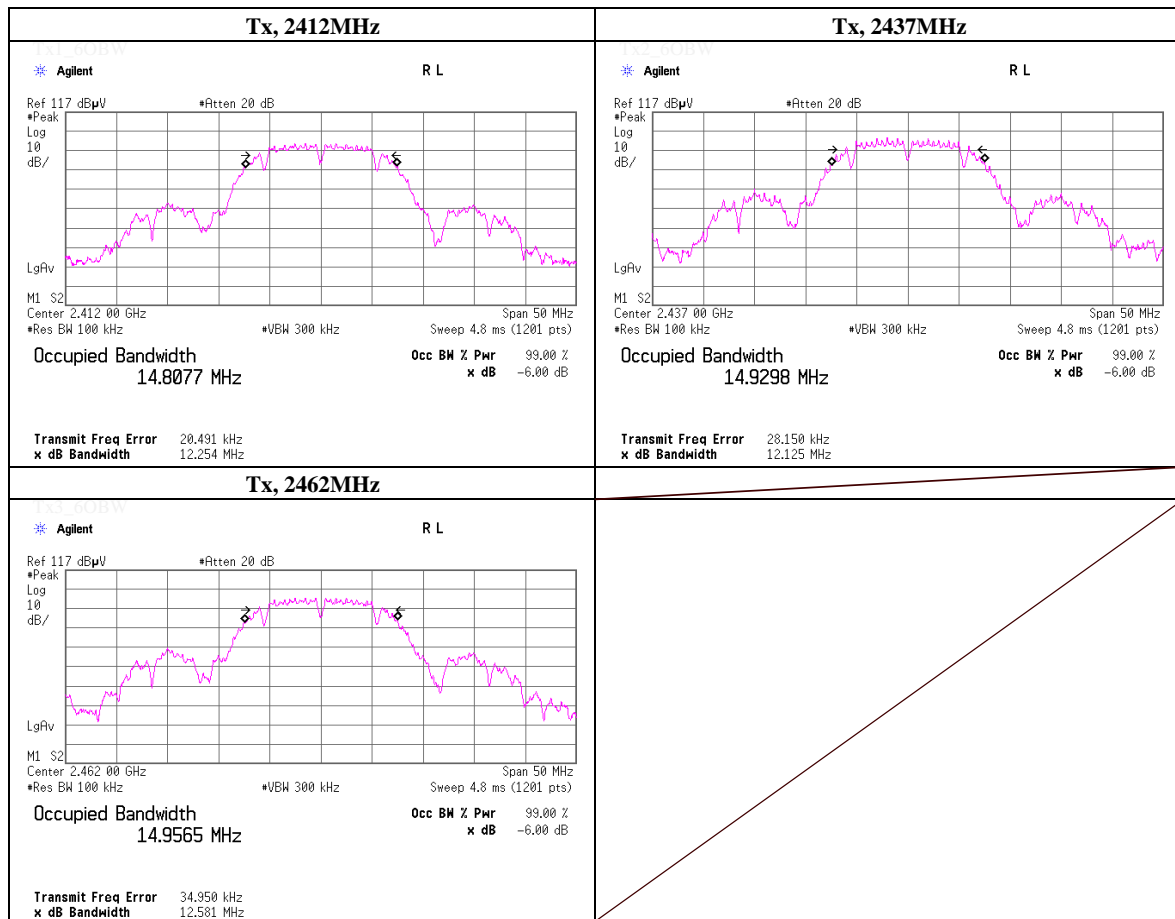
Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable+ATT) [dB]  
LISN: SLS-01



### -6dB Bandwidth

|                        |   |                    |
|------------------------|---|--------------------|
| Test place             | UL Japan, Inc. Shonan EMC Lab.                                      | No.5 Shielded Room |
| Date                   | Novemer 19, 2012  |                    |
| Temperature / Humidity | 23deg.C , 38%RH   |                    |
| Engineer               | Kenichi Adachi  |                    |
| Mode                   | Tx, IEEE802.11b, PN9, worst antenna port Aux, worst data mode 1Mbps |                    |

| Freq.<br>[MHz] | -6dB Bandwidth<br>[MHz] | Limit<br>[MHz] |  |
|----------------|-------------------------|----------------|--|
| 2412.0000      | 12.254                  | > 0.500        |  |
| 2437.0000      | 12.125                  | > 0.500        |  |
| 2462.0000      | 12.581                  | > 0.500        |  |

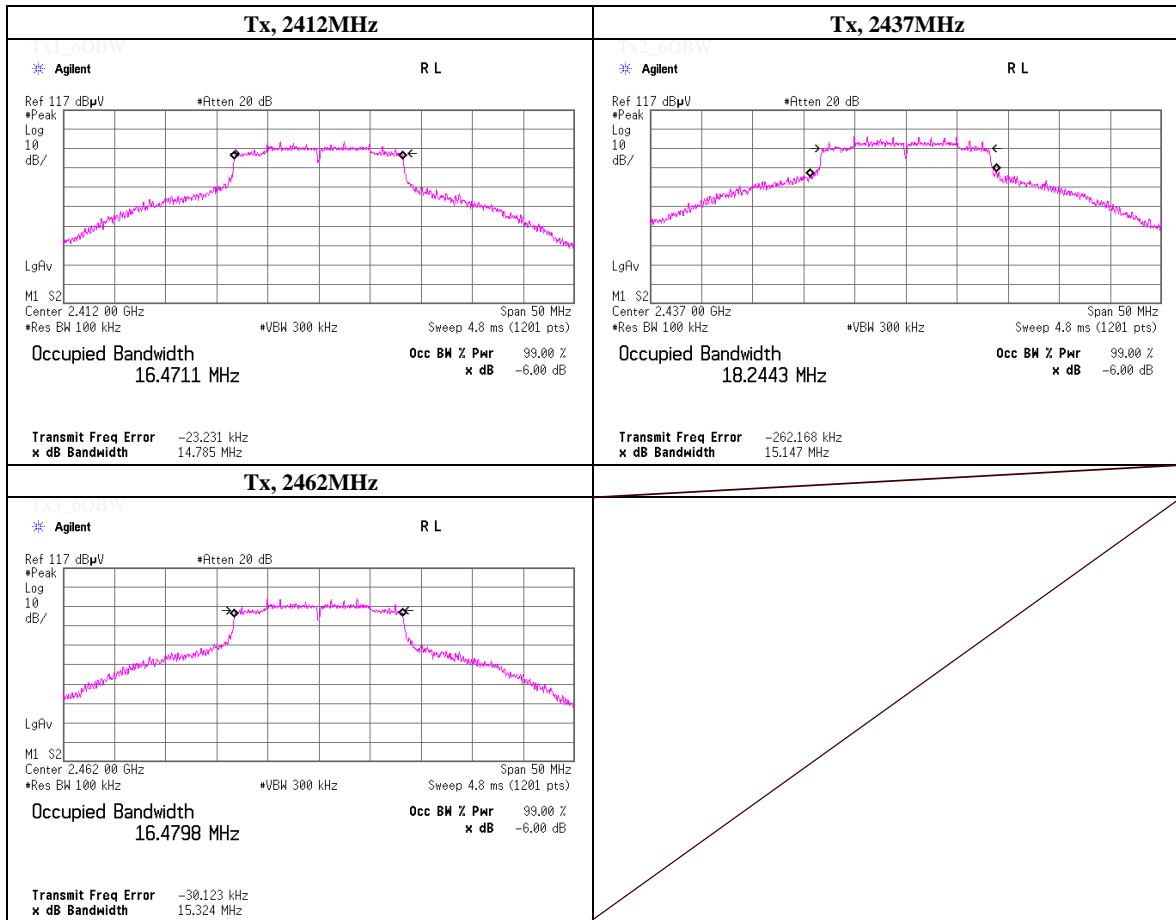


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**-6dB Bandwidth**

|                        |   |                    |
|------------------------|---|--------------------|
| Test place             | UL Japan, Inc. Shonan EMC Lab.                                      | No.5 Shielded Room |
| Date                   | Novemer 19, 2012  |                    |
| Temperature / Humidity | 23deg.C , 38%RH   |                    |
| Engineer               | Kenichi Adachi  |                    |
| Mode                   | Tx, IEEE802.11g, PN9, worst antenna port Aux, worst data mode 6Mbps |                    |

| Freq.<br>[MHz] | -6dB Bandwidth<br>[MHz] | Limit<br>[MHz] |
|----------------|-------------------------|----------------|
| 2412.0000      | 14.785                  | > 0.500        |
| 2437.0000      | 15.147                  | > 0.500        |
| 2462.0000      | 15.324                  | > 0.500        |



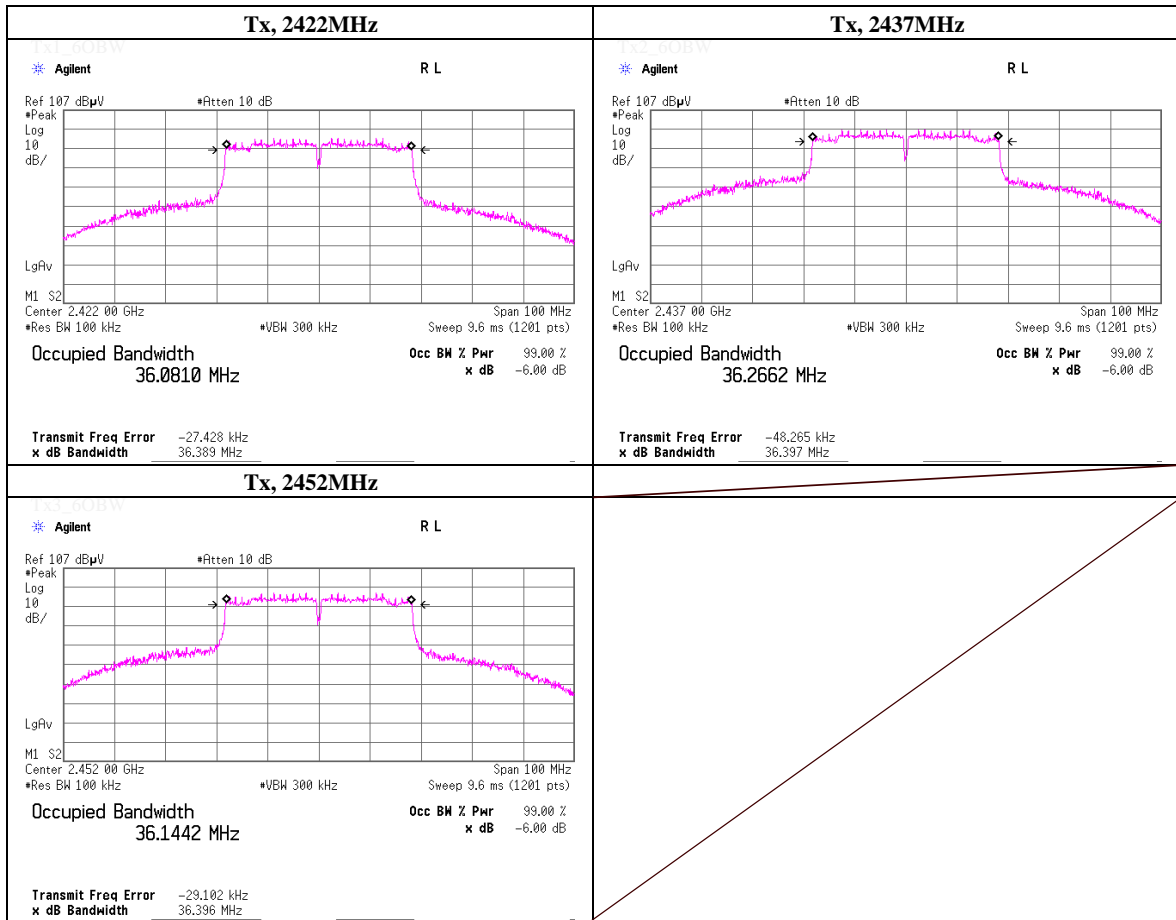
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**-6dB Bandwidth**

|                        |  |                    |
|------------------------|--|--------------------|
| Test place             | UL Japan, Inc. Shonan EMC Lab.   | No.5 Shielded Room |
| Date                   | Novemer 19, 2012   |                    |
| Temperature / Humidity | 23deg.C , 38%RH  |                    |
| Engineer               | Kenichi Adachi   |                    |
| Mode                   | Tx, 11n (HT40, Wide, Mix, Long), PN9, worst antenna port Aux, worst data mode 0(MCS) |                    |

| Freq. [MHz] | -6dB Bandwidth [MHz] | Limit [MHz] |
|-------------|----------------------|-------------|
| 2422.0000   | 36.389               | > 0.500     |
| 2437.0000   | 36.397               | > 0.500     |
| 2452.0000   | 36.396               | > 0.500     |



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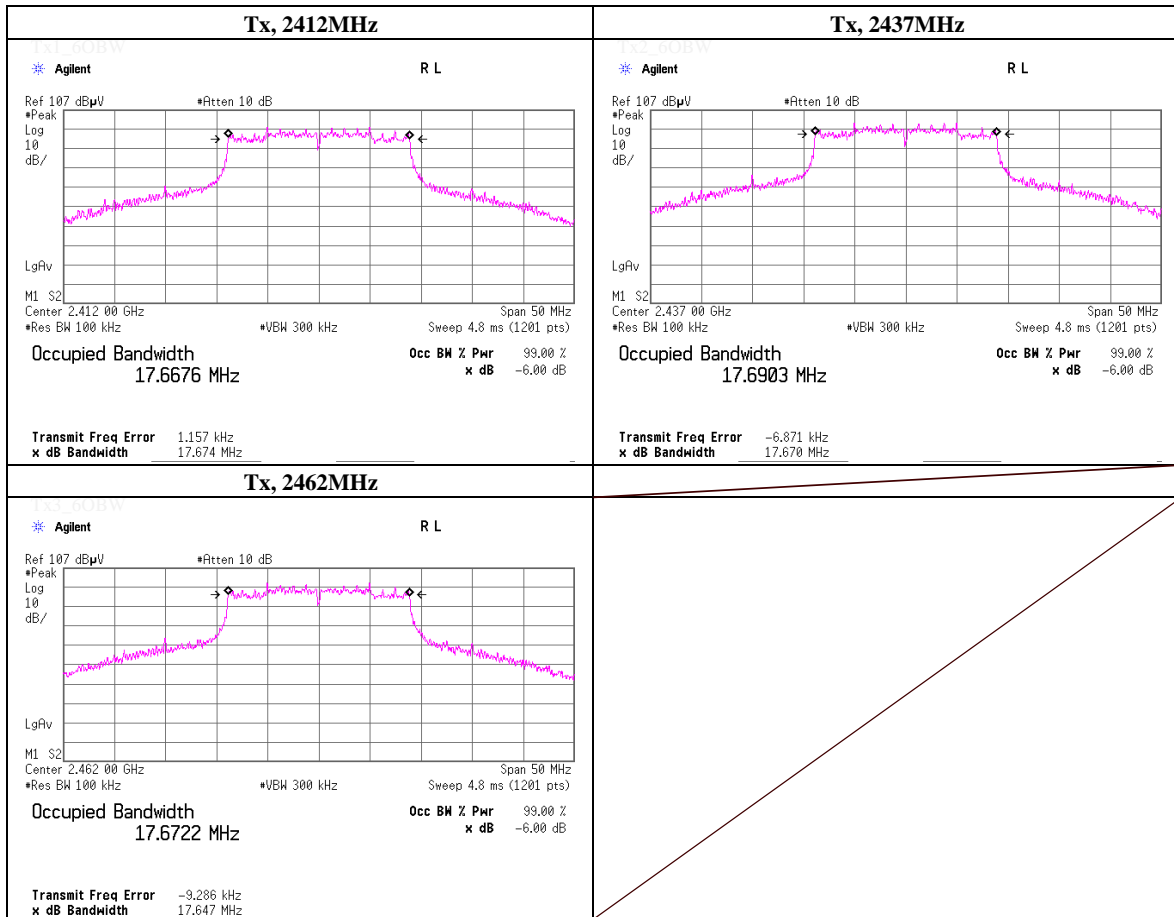
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### -6dB Bandwidth

|                        |   |                    |
|------------------------|---|--------------------|
| Test place             | UL Japan, Inc. Shonan EMC Lab.  | No.5 Shielded Room |
| Date                   | Novemer 19, 2012  |                    |
| Temperature / Humidity | 23deg.C , 38%RH   |                    |
| Engineer               | Kenichi Adachi  |                    |
| Mode                   | Tx, IEEE802.11n (HT20, Mix, Long), PN9, antenna port Main, worst data mode 8(MCS) |                    |

| Freq.<br>[MHz] | -6dB Bandwidth<br>[MHz] | Limit<br>[MHz] |
|----------------|-------------------------|----------------|
| 2412.0000      | 17.674                  | > 0.500        |
| 2437.0000      | 17.670                  | > 0.500        |
| 2462.0000      | 17.647                  | > 0.500        |

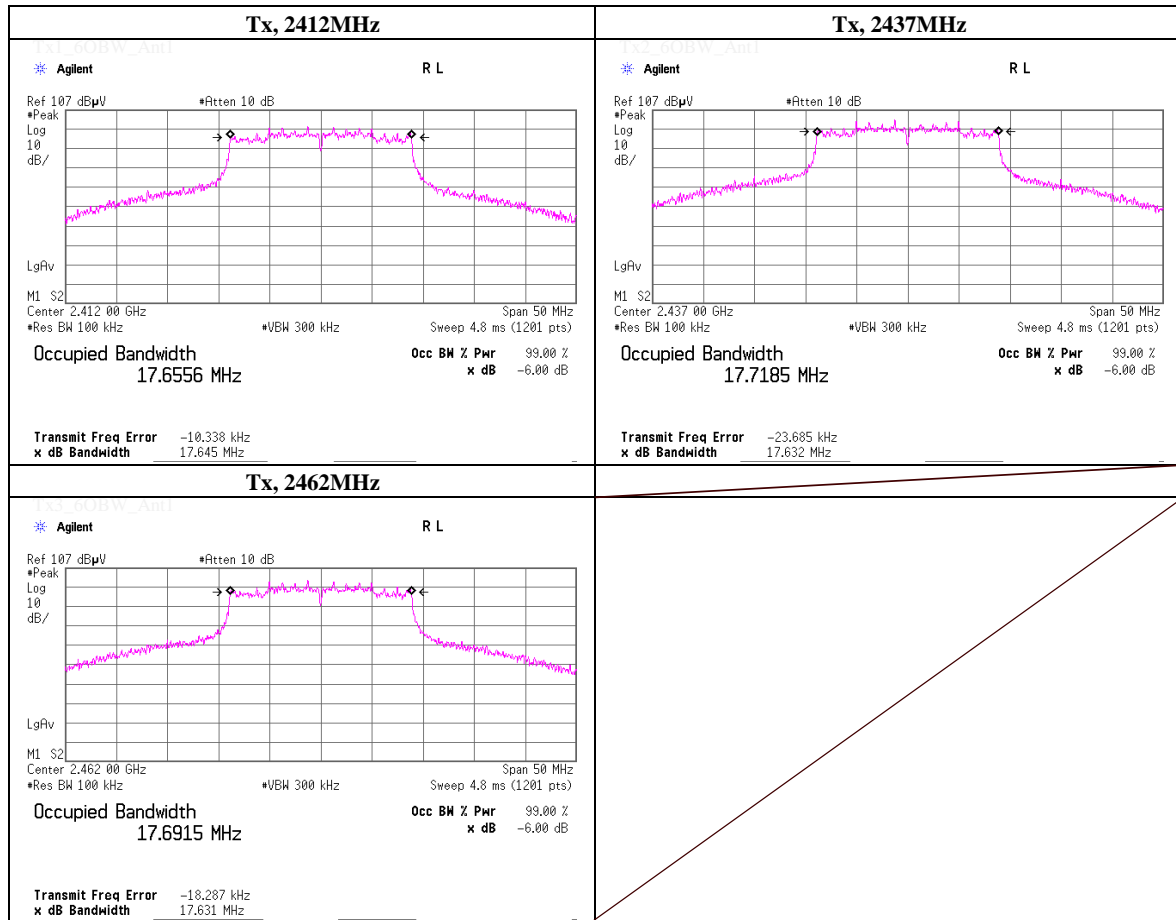


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### -6dB Bandwidth

|                        |  |                    |
|------------------------|--|--------------------|
| Test place             | UL Japan, Inc. Shonan EMC Lab.   | No.5 Shielded Room |
| Date                   | Novemer 19, 2012   |                    |
| Temperature / Humidity | 23deg.C , 38%RH  |                    |
| Engineer               | Kenichi Adachi   |                    |
| Mode                   | Tx, IEEE802.11n (HT20, Mix, Long), PN9, antenna port Aux, worst data mode 8(MCS) |                    |

| Freq.<br>[MHz] | -6dB Bandwidth<br>[MHz] | Limit<br>[MHz] |
|----------------|-------------------------|----------------|
| 2412.0000      | 17.645                  | > 0.500        |
| 2437.0000      | 17.632                  | > 0.500        |
| 2462.0000      | 17.631                  | > 0.500        |

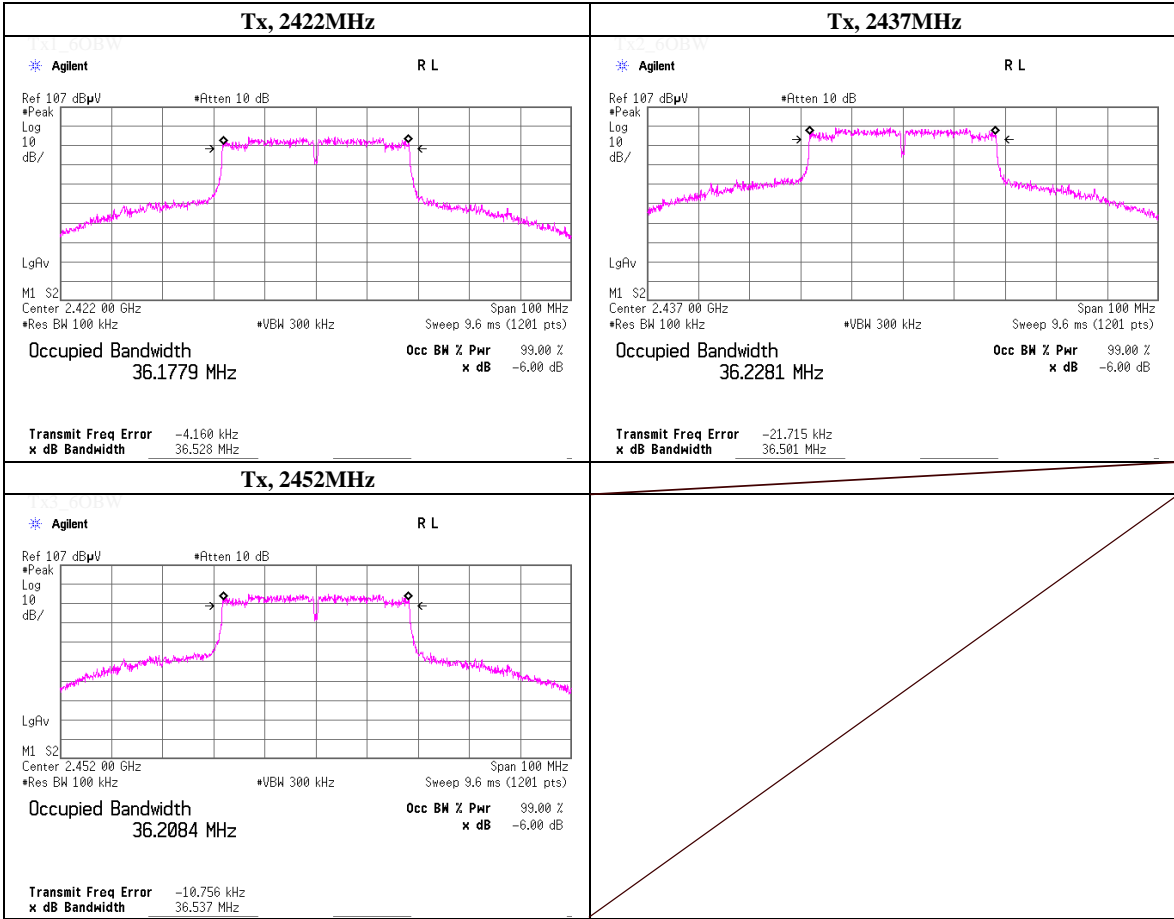


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**-6dB Bandwidth**

Test place                               UL Japan, Inc. Shonan EMC Lab.                               No.5 Shielded Room  
 Date                                        November 19, 2012  
 Temperature / Humidity               23deg.C   , 38%RH  
 Engineer                                 Kenichi Adachi  
 Mode                                       Tx, 11n (HT40, Wide, Mix, Long), PN9, antenna port Main, worst data mode 8(MCS)

| Freq.<br>[MHz] | -6dB Bandwidth<br>[MHz] | Limit<br>[MHz] |
|----------------|-------------------------|----------------|
| 2422.0000      | 36.528                  | > 0.500        |
| 2437.0000      | 36.501                  | > 0.500        |
| 2452.0000      | 36.537                  | > 0.500        |

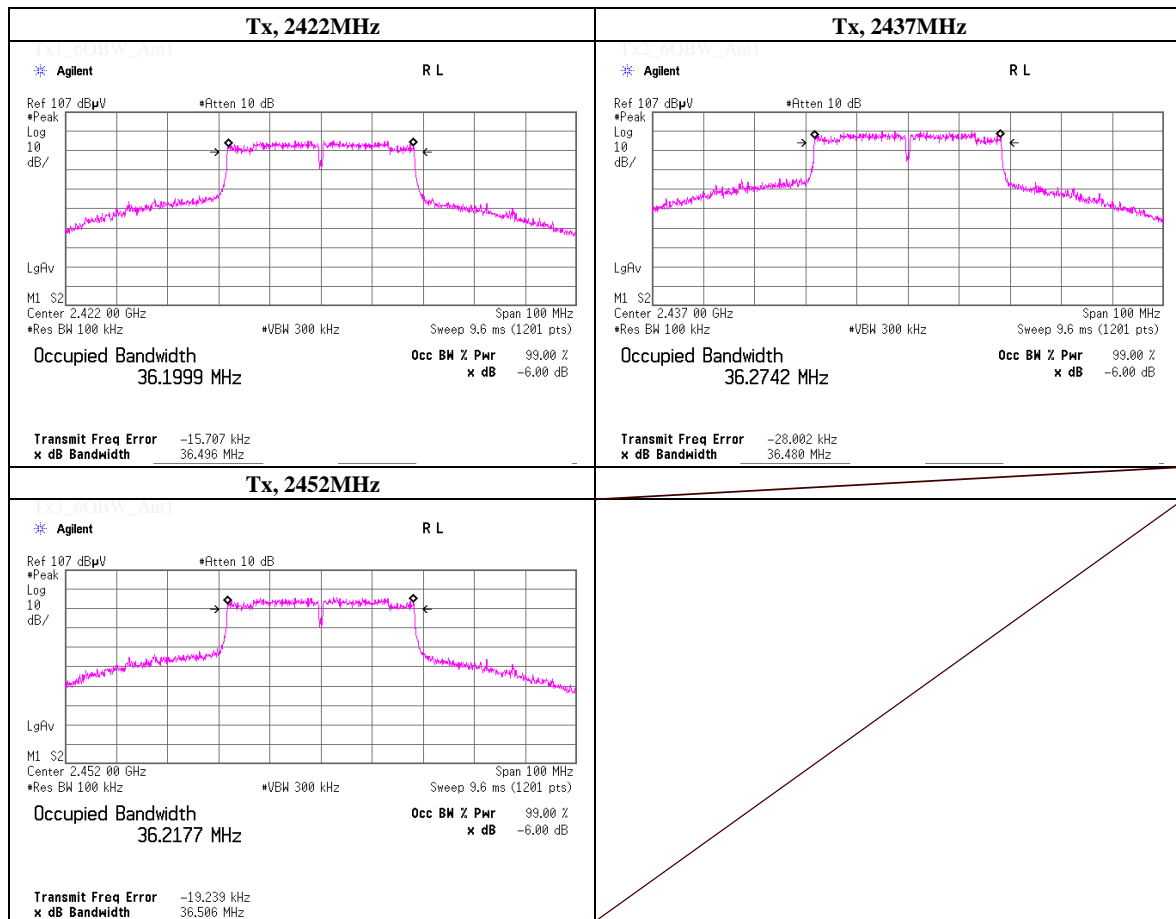


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### -6dB Bandwidth

|                        |  |                    |
|------------------------|--|--------------------|
| Test place             | UL Japan, Inc. Shonan EMC Lab.   | No.5 Shielded Room |
| Date                   | Novemer 19, 2012   |                    |
| Temperature / Humidity | 23deg.C , 38%RH  |                    |
| Engineer               | Kenichi Adachi   |                    |
| Mode                   | Tx, 11n (HT40, Wide, Mix, Long), PN9, antenna port Aux, worst data mode 8(MCS) |                    |

| Freq.<br>[MHz] | -6dB Bandwidth<br>[MHz] | Limit<br>[MHz] |
|----------------|-------------------------|----------------|
| 2422.0000      | 36.496                  | > 0.500        |
| 2437.0000      | 36.480                  | > 0.500        |
| 2452.0000      | 36.506                  | > 0.500        |



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**Maximum Peak Conducted Output Power**  
(Option 3)

Test place                   UL Japan, Inc. Shonan EMC Lab.       No.7 Shielded Room  
 Date                        November 15, 2012  
 Temperature / Humidity   24deg.C       , 45%RH  
 Engineer                  Kenichi Adachi  
 Mode                        Tx, IEEE802.11b, PN9,                    Antenna : Main                    worst data mode :            1 Mbps

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

| Ch   | Freq.<br>[MHz] | P/M (Peak)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Result |        | Limit |      | Margin<br>[dB] |
|------|----------------|--------------------------------|-----------------------|---------------------|--------|--------|-------|------|----------------|
|      |                |                                |                       |                     | [dBm]  | [mW]   | [dBm] | [mW] |                |
| Low  | 2412.0         | 8.49                           | 0.74                  | 10.00               | 19.23  | 83.75  | 30.00 | 1000 | 10.77          |
| Mid  | 2437.0         | 9.39                           | 0.75                  | 10.00               | 20.14  | 103.28 | 30.00 | 1000 | 9.86           |
| High | 2462.0         | 9.33                           | 0.75                  | 10.00               | 20.08  | 101.86 | 30.00 | 1000 | 9.92           |

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

**[Pre check]**  
**Antenna Main**

|      | Data rate<br>[Mbps] | Freq.<br>[MHz] | P/M (Peak)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Result       |        | Limit |      | Margin<br>[dB] |
|------|---------------------|----------------|--------------------------------|-----------------------|---------------------|--------------|--------|-------|------|----------------|
|      |                     |                |                                |                       |                     | [dBm]        | [mW]   | [dBm] | [mW] |                |
| Main | 1                   | 2437.0         | 9.39                           | 0.75                  | 10.00               | <b>20.14</b> | 103.28 | 30.00 | 1000 | <b>9.86</b>    |
| Main | 2                   | 2437.0         | 9.23                           | 0.75                  | 10.00               | 19.98        | 99.54  | 30.00 | 1000 | 10.02          |
| Main | 5.5                 | 2437.0         | 9.16                           | 0.75                  | 10.00               | 19.91        | 97.95  | 30.00 | 1000 | 10.09          |
| Main | 11                  | 2437.0         | 9.20                           | 0.75                  | 10.00               | 19.95        | 98.86  | 30.00 | 1000 | 10.05          |
|      |                     |                |                                |                       |                     |              |        |       |      |                |
|      |                     |                |                                |                       |                     |              |        |       |      |                |
|      |                     |                |                                |                       |                     |              |        |       |      |                |
|      |                     |                |                                |                       |                     |              |        |       |      |                |

**Worst**



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

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**Maximum Peak Conducted Output Power**

(Option 3)

Test place                   UL Japan, Inc. Shonan EMC Lab.       No.7 Shielded Room  
 Date                         November 15, 2012  
 Temperature / Humidity   24deg.C       , 45%RH  
 Engineer                  Kenichi Adachi  
 Mode                        Tx, IEEE802.11b, PN9,                    Antenna : Aux                    worst data mode :            1 Mbps

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

| Ch   | Freq.<br>[MHz] | P/M (Peak)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Result |        | Limit |      | Margin<br>[dB] |
|------|----------------|--------------------------------|-----------------------|---------------------|--------|--------|-------|------|----------------|
|      |                |                                |                       |                     | [dBm]  | [mW]   | [dBm] | [mW] |                |
| Low  | 2412.0         | 9.04                           | 0.74                  | 10.00               | 19.78  | 95.06  | 30.00 | 1000 | 10.22          |
| Mid  | 2437.0         | 9.88                           | 0.75                  | 10.00               | 20.63  | 115.61 | 30.00 | 1000 | 9.37           |
| High | 2462.0         | 10.02                          | 0.75                  | 10.00               | 20.77  | 119.40 | 30.00 | 1000 | 9.23           |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss

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**Maximum Peak Conducted Output Power**

(Option 3)

Test place                   UL Japan, Inc. Shonan EMC Lab.       No.7 Shielded Room  
 Date                         November 15, 2012  
 Temperature / Humidity   25deg.C       , 45%RH  
 Engineer                  Kenichi Adachi  
 Mode                        Tx, IEEE802.11g, PN9,                    Antenna : Aux                    worst data mode :           6 Mbps

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

| Ch   | Freq.<br>[MHz] | P/M (Peak)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Result |        | Limit |      | Margin<br>[dB] |
|------|----------------|--------------------------------|-----------------------|---------------------|--------|--------|-------|------|----------------|
|      |                |                                |                       |                     | [dBm]  | [mW]   | [dBm] | [mW] |                |
| Low  | 2412.0         | 12.19                          | 0.74                  | 10.00               | 22.93  | 196.34 | 30.00 | 1000 | 7.07           |
| Mid  | 2437.0         | 12.84                          | 0.75                  | 10.00               | 23.59  | 228.56 | 30.00 | 1000 | 6.41           |
| High | 2462.0         | 12.47                          | 0.75                  | 10.00               | 23.22  | 209.89 | 30.00 | 1000 | 6.78           |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss

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**Maximum Peak Conducted Output Power**  
(Option 3)

Test place : UL Japan, Inc. Shonan EMC Lab. No.7 Shielded Room  
 Date : November 15, 2012  
 Temperature / Humidity : 25deg.C , 45%RH  
 Engineer : Kenichi Adachi  
 Mode : Tx, IEEE802.11n (HT20, Mix, Long), PN9, Antenna : Main worst data mode : 0 (MCS)

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

| Ch   | Freq.<br>[MHz] | P/M (Peak)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Result |        | Limit |      | Margin<br>[dB] |
|------|----------------|--------------------------------|-----------------------|---------------------|--------|--------|-------|------|----------------|
|      |                |                                |                       |                     | [dBm]  | [mW]   | [dBm] | [mW] |                |
| Low  | 2412.0         | 11.76                          | 0.74                  | 10.00               | 22.50  | 177.83 | 30.00 | 1000 | 7.50           |
| Mid  | 2437.0         | 12.99                          | 0.75                  | 10.00               | 23.74  | 236.59 | 30.00 | 1000 | 6.26           |
| High | 2462.0         | 12.19                          | 0.75                  | 10.00               | 22.94  | 196.79 | 30.00 | 1000 | 7.06           |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss

**[Pre check]**

**Antenna Main**

|      | Mode<br>(MCS) | Freq.<br>[MHz] | P/M (Peak)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Result       |        | Limit |      | Margin<br>[dB] |
|------|---------------|----------------|--------------------------------|-----------------------|---------------------|--------------|--------|-------|------|----------------|
|      |               |                |                                |                       |                     | [dBm]        | [mW]   | [dBm] | [mW] |                |
| Main | 0             | 2437.0         | 12.99                          | 0.75                  | 10.00               | <b>23.74</b> | 236.59 | 30.00 | 1000 | <b>6.26</b>    |
| Main | 1             | 2437.0         | 12.63                          | 0.75                  | 10.00               | 23.38        | 217.77 | 30.00 | 1000 | 6.62           |
| Main | 2             | 2437.0         | 12.68                          | 0.75                  | 10.00               | 23.43        | 220.29 | 30.00 | 1000 | 6.57           |
| Main | 3             | 2437.0         | 12.58                          | 0.75                  | 10.00               | 23.33        | 215.28 | 30.00 | 1000 | 6.67           |
| Main | 4             | 2437.0         | 12.56                          | 0.75                  | 10.00               | 23.31        | 214.29 | 30.00 | 1000 | 6.69           |
| Main | 5             | 2437.0         | 12.50                          | 0.75                  | 10.00               | 23.25        | 211.35 | 30.00 | 1000 | 6.75           |
| Main | 6             | 2437.0         | 12.45                          | 0.75                  | 10.00               | 23.20        | 208.93 | 30.00 | 1000 | 6.80           |
| Main | 7             | 2437.0         | 12.46                          | 0.75                  | 10.00               | 23.21        | 209.41 | 30.00 | 1000 | 6.79           |

**Worst**

|  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss

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**Maximum Peak Conducted Output Power**

(Option 3)

Test place                   UL Japan, Inc. Shonan EMC Lab.       No.7 Shielded Room  
 Date                        November 15, 2012  
 Temperature / Humidity   25deg.C       , 45%RH  
 Engineer                  Kenichi Adachi  
 Mode                        Tx, IEEE802.11n (HT20, Mix, Long), PN9,        Antenna : Aux                    worst data mode :        0 (MCS)

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

| Ch   | Freq.<br>[MHz] | P/M (Peak)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Result |        | Limit |      | Margin<br>[dB] |
|------|----------------|--------------------------------|-----------------------|---------------------|--------|--------|-------|------|----------------|
|      |                |                                |                       |                     | [dBm]  | [mW]   | [dBm] | [mW] |                |
| Low  | 2412.0         | 12.14                          | 0.74                  | 10.00               | 22.88  | 194.09 | 30.00 | 1000 | 7.12           |
| Mid  | 2437.0         | 12.89                          | 0.75                  | 10.00               | 23.64  | 231.21 | 30.00 | 1000 | 6.36           |
| High | 2462.0         | 12.48                          | 0.75                  | 10.00               | 23.23  | 210.38 | 30.00 | 1000 | 6.77           |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss

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**Maximum Peak Conducted Output Power**  
(Option 3)

Test place : UL Japan, Inc. Shonan EMC Lab. No.7 Shielded Room  
 Date : November 15, 2012  
 Temperature / Humidity : 24deg.C , 45%RH  
 Engineer : Kenichi Adachi  
 Mode : Tx, 11n (HT40, Wide, Mix, Long), PN9. Antenna : Main worst data mode : 0 (MCS)

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

| Ch   | Freq.<br>[MHz] | P/M (Peak)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Result |        | Limit |      | Margin<br>[dB] |
|------|----------------|--------------------------------|-----------------------|---------------------|--------|--------|-------|------|----------------|
|      |                |                                |                       |                     | [dBm]  | [mW]   | [dBm] | [mW] |                |
| Low  | 2422.0         | 7.57                           | 0.74                  | 10.00               | 18.31  | 67.76  | 30.00 | 1000 | 11.69          |
| Mid  | 2437.0         | 10.32                          | 0.75                  | 10.00               | 21.07  | 127.94 | 30.00 | 1000 | 8.93           |
| High | 2452.0         | 10.31                          | 0.75                  | 10.00               | 21.06  | 127.64 | 30.00 | 1000 | 8.94           |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss

**[Pre check]**

**Antenna Main**

|      | Mode<br>(MCS) | Freq.<br>[MHz] | P/M (Peak)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Result |        | Limit |      | Margin<br>[dB] |
|------|---------------|----------------|--------------------------------|-----------------------|---------------------|--------|--------|-------|------|----------------|
|      |               |                |                                |                       |                     | [dBm]  | [mW]   | [dBm] | [mW] |                |
| Main | 0             | 2437.0         | 10.32                          | 0.75                  | 10.00               | 21.07  | 127.94 | 30.00 | 1000 | 8.93           |
| Main | 1             | 2437.0         | 10.21                          | 0.75                  | 10.00               | 20.96  | 124.74 | 30.00 | 1000 | 9.04           |
| Main | 2             | 2437.0         | 10.14                          | 0.75                  | 10.00               | 20.89  | 122.74 | 30.00 | 1000 | 9.11           |
| Main | 3             | 2437.0         | 10.11                          | 0.75                  | 10.00               | 20.86  | 121.90 | 30.00 | 1000 | 9.14           |
| Main | 4             | 2437.0         | 10.04                          | 0.75                  | 10.00               | 20.79  | 119.95 | 30.00 | 1000 | 9.21           |
| Main | 5             | 2437.0         | 9.43                           | 0.75                  | 10.00               | 20.18  | 104.23 | 30.00 | 1000 | 9.82           |
| Main | 6             | 2437.0         | 8.48                           | 0.75                  | 10.00               | 19.23  | 83.75  | 30.00 | 1000 | 10.77          |
| Main | 7             | 2437.0         | 6.65                           | 0.75                  | 10.00               | 17.40  | 54.95  | 30.00 | 1000 | 12.60          |

**Worst**

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Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss

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**Maximum Peak Conducted Output Power**

(Option 3)

Test place                   UL Japan, Inc. Shonan EMC Lab.       No.7 Shielded Room  
 Date                         November 15, 2012  
 Temperature / Humidity    24deg.C       , 45%RH  
 Engineer                  Kenichi Adachi  
 Mode                        Tx, 11n (HT40, Wide, Mix, Long), PN9,        Antenna : Aux                    worst data mode :            0 (MCS)

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

| Ch   | Freq.<br>[MHz] | P/M (Peak)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Result |        | Limit |      | Margin<br>[dB] |
|------|----------------|--------------------------------|-----------------------|---------------------|--------|--------|-------|------|----------------|
|      |                |                                |                       |                     | [dBm]  | [mW]   | [dBm] | [mW] |                |
| Low  | 2422.0         | 4.46                           | 0.74                  | 10.00               | 15.20  | 33.11  | 30.00 | 1000 | 14.80          |
| Mid  | 2437.0         | 10.35                          | 0.75                  | 10.00               | 21.10  | 128.82 | 30.00 | 1000 | 8.90           |
| High | 2452.0         | 10.33                          | 0.75                  | 10.00               | 21.08  | 128.23 | 30.00 | 1000 | 8.92           |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss

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**Maximum Peak Conducted Output Power**

(Option 3)

Test place UL Japan, Inc. Shonan EMC Lab. No.7 Shielded Room  
 Date November 15, 2012  
 Temperature / Humidity 24deg.C , 45%RH  
 Engineer Kenichi Adachi  
 Mode Tx, IEEE802.11n (HT20, Mix, Long), PN9, worst data mode : 8 (MCS)

**Antenna Main + Antenna Aux**

| Ch   | Freq.<br>[MHz] | Result<br>Ant Main<br>[mW] | Result<br>Ant Aux<br>[mW] | Result                      |        | Limit |      | Margin<br>[dB] |
|------|----------------|----------------------------|---------------------------|-----------------------------|--------|-------|------|----------------|
|      |                |                            |                           | Ant Main + Ant Aux<br>[dBm] | [mW]   | [dBm] | [mW] |                |
| Low  | 2412.0         | 127.06                     | 141.91                    | 24.30                       | 268.96 | 30.00 | 1000 | 5.70           |
| Mid  | 2437.0         | 185.35                     | 208.93                    | 25.96                       | 394.28 | 30.00 | 1000 | 4.04           |
| High | 2462.0         | 156.31                     | 173.78                    | 25.19                       | 330.09 | 30.00 | 1000 | 4.81           |

**Antenna Main**

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

| Ch   | Freq.<br>[MHz] | P/M (Peak)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Result |        | Limit |      | Margin<br>[dB] |
|------|----------------|--------------------------------|-----------------------|---------------------|--------|--------|-------|------|----------------|
|      |                |                                |                       |                     | [dBm]  | [mW]   | [dBm] | [mW] |                |
| Low  | 2412.0         | 10.30                          | 0.74                  | 10.00               | 21.04  | 127.06 | 30.00 | 1000 | 8.96           |
| Mid  | 2437.0         | 11.93                          | 0.75                  | 10.00               | 22.68  | 185.35 | 30.00 | 1000 | 7.32           |
| High | 2462.0         | 11.19                          | 0.75                  | 10.00               | 21.94  | 156.31 | 30.00 | 1000 | 8.06           |

**Antenna Aux**

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

| Ch   | Freq.<br>[MHz] | P/M (Peak)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Result |        | Limit |      | Margin<br>[dB] |
|------|----------------|--------------------------------|-----------------------|---------------------|--------|--------|-------|------|----------------|
|      |                |                                |                       |                     | [dBm]  | [mW]   | [dBm] | [mW] |                |
| Low  | 2412.0         | 10.78                          | 0.74                  | 10.00               | 21.52  | 141.91 | 30.00 | 1000 | 8.48           |
| Mid  | 2437.0         | 12.45                          | 0.75                  | 10.00               | 23.20  | 208.93 | 30.00 | 1000 | 6.80           |
| High | 2462.0         | 11.65                          | 0.75                  | 10.00               | 22.40  | 173.78 | 30.00 | 1000 | 7.60           |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss

**[Pre check]**

| Mode<br>(MCS) | Freq.<br>[MHz] | Reading<br>Antenna Main |       | Reading<br>Antenna Aux |       | Reading<br>Antenna Main + Aux |       |
|---------------|----------------|-------------------------|-------|------------------------|-------|-------------------------------|-------|
|               |                | [dBm]                   | [mW]  | [dBm]                  | [mW]  | [dBm]                         | [mW]  |
| 8             | 2437.0         | 11.93                   | 15.60 | 12.45                  | 17.58 | 15.21                         | 33.17 |
| 9             | 2437.0         | 11.47                   | 14.03 | 11.73                  | 14.89 | 14.61                         | 28.92 |
| 10            | 2437.0         | 11.60                   | 14.45 | 11.92                  | 15.56 | 14.77                         | 30.01 |
| 11            | 2437.0         | 11.73                   | 14.89 | 11.93                  | 15.60 | 14.84                         | 30.49 |
| 12            | 2437.0         | 11.50                   | 14.13 | 11.95                  | 15.67 | 14.74                         | 29.79 |
| 13            | 2437.0         | 11.52                   | 14.19 | 11.98                  | 15.78 | 14.77                         | 29.97 |
| 14            | 2437.0         | 11.47                   | 14.03 | 11.97                  | 15.74 | 14.74                         | 29.77 |
| 15            | 2437.0         | 11.37                   | 13.71 | 11.93                  | 15.60 | 14.67                         | 29.30 |

Worst

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**Maximum Peak Conducted Output Power**  
(Option 3)

Test place : UL Japan, Inc. Shonan EMC Lab. No.7 Shielded room  
 Date : November 15, 2012  
 Temperature / Humidity : 24deg.C , 45%RH  
 Engineer : Kenichi Adachi  
 Mode : Tx, 11n (HT40, Wide, Mix, Long), PN9, worst data mode : 8 (MCS)

**Antenna Main + Antenna Aux**

| Ch   | Freq.<br>[MHz] | Result<br>Ant Main<br>[mW] | Result<br>Ant Aux<br>[mW] | Result<br>Ant Main + Ant Aux |        | Limit |      | Margin<br>[dB] |
|------|----------------|----------------------------|---------------------------|------------------------------|--------|-------|------|----------------|
|      |                |                            |                           | [dBm]                        | [mW]   | [dBm] | [mW] |                |
| Low  | 2422.0         | 33.50                      | 32.58                     | 18.20                        | 66.08  | 30.00 | 1000 | 11.80          |
| Mid  | 2437.0         | 67.61                      | 99.31                     | 22.23                        | 166.92 | 30.00 | 1000 | 7.77           |
| High | 2452.0         | 63.53                      | 78.70                     | 21.53                        | 142.24 | 30.00 | 1000 | 8.47           |

**Antenna Main**

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

| Ch   | Freq.<br>[MHz] | P/M (Peak)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Result |       | Limit |      | Margin<br>[dB] |
|------|----------------|--------------------------------|-----------------------|---------------------|--------|-------|-------|------|----------------|
|      |                |                                |                       |                     | [dBm]  | [mW]  | [dBm] | [mW] |                |
| Low  | 2422.0         | 4.51                           | 0.74                  | 10.00               | 15.25  | 33.50 | 30.00 | 1000 | 14.75          |
| Mid  | 2437.0         | 7.55                           | 0.75                  | 10.00               | 18.30  | 67.61 | 30.00 | 1000 | 11.70          |
| High | 2452.0         | 7.28                           | 0.75                  | 10.00               | 18.03  | 63.53 | 30.00 | 1000 | 11.97          |

**Antenna Aux**

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

| Ch   | Freq.<br>[MHz] | P/M (Peak)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Result |       | Limit |      | Margin<br>[dB] |
|------|----------------|--------------------------------|-----------------------|---------------------|--------|-------|-------|------|----------------|
|      |                |                                |                       |                     | [dBm]  | [mW]  | [dBm] | [mW] |                |
| Low  | 2422.0         | 4.39                           | 0.74                  | 10.00               | 15.13  | 32.58 | 30.00 | 1000 | 14.87          |
| Mid  | 2437.0         | 9.22                           | 0.75                  | 10.00               | 19.97  | 99.31 | 30.00 | 1000 | 10.03          |
| High | 2452.0         | 8.21                           | 0.75                  | 10.00               | 18.96  | 78.70 | 30.00 | 1000 | 11.04          |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss

**[Pre check]**

| Mode<br>(MCS) | Freq.<br>[MHz] | Reading<br>Antenna Main |      | Reading<br>Antenna Aux |      | Reading<br>Antenna Main + Aux |       |
|---------------|----------------|-------------------------|------|------------------------|------|-------------------------------|-------|
|               |                | [dBm]                   | [mW] | [dBm]                  | [mW] | [dBm]                         | [mW]  |
| 8             | 2437.0         | 7.55                    | 5.69 | 9.22                   | 8.36 | 11.48                         | 14.04 |
| 9             | 2437.0         | 6.75                    | 4.73 | 8.34                   | 6.82 | 10.63                         | 11.55 |
| 10            | 2437.0         | 6.92                    | 4.92 | 8.74                   | 7.48 | 10.93                         | 12.40 |
| 11            | 2437.0         | 7.05                    | 5.07 | 8.67                   | 7.36 | 10.95                         | 12.43 |
| 12            | 2437.0         | 7.21                    | 5.26 | 8.89                   | 7.74 | 11.14                         | 13.00 |
| 13            | 2437.0         | 7.16                    | 5.20 | 8.81                   | 7.60 | 11.07                         | 12.80 |
| 14            | 2437.0         | 6.09                    | 4.06 | 6.03                   | 4.01 | 9.07                          | 8.07  |
| 15            | 2437.0         | 4.81                    | 3.03 | 4.47                   | 2.80 | 7.65                          | 5.83  |

Worst

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**Average Conducted Output Power**

(Option 3)

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.7 Shielded Room  
 Date                         November 15, 2012  
 Temperature / Humidity   24deg.C         , 45%RH  
 Engineer                   Kenichi Adachi  
 Mode                        Tx, IEEE802.11b, PN9,                   Antenna : Aux                   worst data mode :                   1 Mbps

(\* P/M: Power Meter with power sensor, AV: Average)

| Ch   | Freq.<br>[MHz] | P/M (AV)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Duty<br>Factor<br>[dB] | Result |       | Limit |      | Margin<br>[dB] |
|------|----------------|------------------------------|-----------------------|---------------------|------------------------|--------|-------|-------|------|----------------|
|      |                |                              |                       |                     |                        | [dBm]  | [mW]  | [dBm] | [mW] |                |
| Low  | 2412.0         | 6.27                         | 0.74                  | 10.00               | 0.04                   | 17.05  | 50.70 | 30.00 | 1000 | 12.95          |
| Mid  | 2437.0         | 7.16                         | 0.75                  | 10.00               | 0.04                   | 17.95  | 62.37 | 30.00 | 1000 | 12.05          |
| High | 2462.0         | 7.30                         | 0.75                  | 10.00               | 0.04                   | 18.09  | 64.42 | 30.00 | 1000 | 11.91          |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss + Duty Factor

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**Average Conducted Output Power**

(Option 3)

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.7 Shielded Room  
 Date                         November 15, 2012  
 Temperature / Humidity   25deg.C           , 45%RH  
 Engineer                   Kenichi Adachi  
 Mode                        Tx, IEEE802.11n (HT20, Mix, Long), PN9,                   Antenna : Aux                   worst data mode :                   0 (MCS)

(\* P/M: Power Meter with power sensor, AV: Average)

| Ch   | Freq.<br>[MHz] | P/M (AV)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Duty<br>Factor<br>[dB] | Result |       | Limit |      | Margin<br>[dB] |
|------|----------------|------------------------------|-----------------------|---------------------|------------------------|--------|-------|-------|------|----------------|
|      |                |                              |                       |                     |                        | [dBm]  | [mW]  | [dBm] | [mW] |                |
| Low  | 2412.0         | 4.13                         | 0.74                  | 10.00               | 0.05                   | 14.92  | 31.05 | 30.00 | 1000 | 15.08          |
| Mid  | 2437.0         | 7.48                         | 0.75                  | 10.00               | 0.05                   | 18.28  | 67.30 | 30.00 | 1000 | 11.72          |
| High | 2462.0         | 4.76                         | 0.75                  | 10.00               | 0.05                   | 15.56  | 35.97 | 30.00 | 1000 | 14.44          |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss + Duty Factor

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**Average Conducted Output Power**

(Option 3)

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.7 Shielded Room  
Date                           November 15, 2012  
Temperature / Humidity    24deg.C       , 45%RH  
Engineer                    Kenichi Adachi  
Mode                         Tx, 11n (HT40, Wide, Mix, Long), PN9,                   Antenna : Aux                   worst data mode :                   0 (MCS)

(\* P/M: Power Meter with power sensor, AV: Average)

| Ch   | Freq.<br>[MHz] | P/M (AV)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Duty<br>Factor<br>[dB] | Result |       | Limit |      | Margin<br>[dB] |
|------|----------------|------------------------------|-----------------------|---------------------|------------------------|--------|-------|-------|------|----------------|
|      |                |                              |                       |                     |                        | [dBm]  | [mW]  | [dBm] | [mW] |                |
| Low  | 2422.0         | -4.95                        | 0.74                  | 10.00               | 0.11                   | 5.90   | 3.89  | 30.00 | 1000 | 24.10          |
| Mid  | 2437.0         | 1.31                         | 0.75                  | 10.00               | 0.11                   | 12.17  | 16.48 | 30.00 | 1000 | 17.83          |
| High | 2452.0         | 0.95                         | 0.75                  | 10.00               | 0.11                   | 11.81  | 15.17 | 30.00 | 1000 | 18.19          |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss + Duty Factor

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## Average Conducted Output Power

(Option 3)

Test place : UL Japan, Inc. Shonan EMC Lab. No.7 Shielded Room  
 Date : November 15, 2012  
 Temperature / Humidity : 24deg.C , 45%RH  
 Engineer : Kenichi Adachi  
 Mode : Tx, IEEE802.11n (HT20, Mix, Long), PN9, worst data mode : 8 (MCS)

**Antenna Main + Antenna Aux**

| Ch   | Freq.<br>[MHz] | Ant Main<br>Result<br>[mW] | Ant Aux<br>Result<br>[mW] | Result                      |       | Limit |      | Margin<br>[dB] |
|------|----------------|----------------------------|---------------------------|-----------------------------|-------|-------|------|----------------|
|      |                |                            |                           | Ant Main + Ant Aux<br>[dBm] | [mW]  | [dBm] | [mW] |                |
| Low  | 2412.0         | 18.24                      | 19.41                     | 15.76                       | 37.65 | 30.00 | 1000 | 14.24          |
| Mid  | 2437.0         | 30.76                      | 35.65                     | 18.22                       | 66.41 | 30.00 | 1000 | 11.78          |
| High | 2462.0         | 25.35                      | 28.71                     | 17.33                       | 54.06 | 30.00 | 1000 | 12.67          |

**Antenna Main**

(\* P/M: Power Meter with power sensor, AV: Average)

| Ch   | Freq.<br>[MHz] | P/M (AV)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Duty<br>Factor<br>[dB] | Result |       | Limit |      | Margin<br>[dB] |
|------|----------------|------------------------------|-----------------------|---------------------|------------------------|--------|-------|-------|------|----------------|
|      |                |                              |                       |                     |                        | [dBm]  | [mW]  | [dBm] | [mW] |                |
| Low  | 2412.0         | 1.76                         | 0.74                  | 10.00               | 0.11                   | 12.61  | 18.24 | 30.00 | 1000 | 17.39          |
| Mid  | 2437.0         | 4.02                         | 0.75                  | 10.00               | 0.11                   | 14.88  | 30.76 | 30.00 | 1000 | 15.12          |
| High | 2462.0         | 3.18                         | 0.75                  | 10.00               | 0.11                   | 14.04  | 25.35 | 30.00 | 1000 | 15.96          |

**Antenna Aux**

(\* P/M: Power Meter with power sensor, AV: Average)

| Ch   | Freq.<br>[MHz] | P/M (AV)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Duty<br>Factor<br>[dB] | Result |       | Limit |      | Margin<br>[dB] |
|------|----------------|------------------------------|-----------------------|---------------------|------------------------|--------|-------|-------|------|----------------|
|      |                |                              |                       |                     |                        | [dBm]  | [mW]  | [dBm] | [mW] |                |
| Low  | 2412.0         | 2.03                         | 0.74                  | 10.00               | 0.11                   | 12.88  | 19.41 | 30.00 | 1000 | 17.12          |
| Mid  | 2437.0         | 4.66                         | 0.75                  | 10.00               | 0.11                   | 15.52  | 35.65 | 30.00 | 1000 | 14.48          |
| High | 2462.0         | 3.72                         | 0.75                  | 10.00               | 0.11                   | 14.58  | 28.71 | 30.00 | 1000 | 15.42          |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss + Duty Factor

**[Pre check]**

| Mode<br>(MCS) | Freq.<br>[MHz] | Reading<br>Antenna Main |      | Duty<br>Factor<br>[dB] | Reading<br>Antenna Aux |      | Duty<br>Factor<br>[dB] | Reading * Duty factor<br>Antenna Main + Aux |      | Worst |
|---------------|----------------|-------------------------|------|------------------------|------------------------|------|------------------------|---|------|-------|
|               |                | [dBm]                   | [mW] |                        | [dBm]                  | [mW] |                        | [dBm]                                       | [mW] |       |
| 8             | 2437.0         | 4.02                    | 2.52 | 0.11                   | 4.66                   | 2.92 | 0.11                   | 7.47  | 5.59 |       |
| 9             | 2437.0         | 3.90                    | 2.45 | 0.22                   | 4.53                   | 2.84 | 0.22                   | 7.46  | 5.57 |       |
| 10            | 2437.0         | 3.81                    | 2.40 | 0.31                   | 4.37                   | 2.74 | 0.31                   | 7.42  | 5.52 |       |
| 11            | 2437.0         | 3.68                    | 2.33 | 0.37                   | 4.31                   | 2.70 | 0.37                   | 7.39  | 5.48 |       |
| 12            | 2437.0         | 3.46                    | 2.22 | 0.53                   | 4.11                   | 2.58 | 0.53                   | 7.34  | 5.42 |       |
| 13            | 2437.0         | 3.42                    | 2.20 | 0.65                   | 4.10                   | 2.57 | 0.65                   | 7.43  | 5.54 |       |
| 14            | 2437.0         | 3.31                    | 2.14 | 0.68                   | 4.07                   | 2.55 | 0.68                   | 7.40  | 5.49 |       |
| 15            | 2437.0         | 3.27                    | 2.12 | 0.73                   | 3.97                   | 2.49 | 0.73                   | 7.37  | 5.46 |       |

Sample Calculation:

Reading \* Duty factor [mW] = Reading Antenna Main [mW] x 10 ^ ( Duty Factor [dB] / 10) + Reading Antenna Aux [mW] x 10 ^ ( Duty Factor [dB] / 10)

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## Average Conducted Output Power

(Option 3)

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.7 Shielded Room  
 Date                         November 15, 2012  
 Temperature / Humidity   24deg.C             , 45%RH  
 Engineer                   Kenichi Adachi  
 Mode                        Tx, 11n (HT40, Wide, Mix, Long), PN9,                   worst data mode :             8 (MCS)

**Antenna Main + Antenna Aux**

| Ch   | Freq.<br>[MHz] | Ant Main<br>Result<br>[mW] | Ant Aux<br>Result<br>[mW] | Result                      |       | Limit |      | Margin<br>[dB] |
|------|----------------|----------------------------|---------------------------|-----------------------------|-------|-------|------|----------------|
|      |                |                            |                           | Ant Main + Ant Aux<br>[dBm] | [mW]  | [dBm] | [mW] |                |
| Low  | 2422.0         | 3.40                       | 3.55                      | 8.42                        | 6.94  | 30.00 | 1000 | 21.58          |
| Mid  | 2437.0         | 8.51                       | 8.99                      | 12.43                       | 17.51 | 30.00 | 1000 | 17.57          |
| High | 2452.0         | 7.28                       | 8.20                      | 11.90                       | 15.48 | 30.00 | 1000 | 18.10          |

**Antenna Main**

(\* P/M: Power Meter with power sensor, AV: Average)

| Ch   | Freq.<br>[MHz] | P/M (AV)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Duty<br>Factor<br>[dB] | Result |      | Limit |      | Margin<br>[dB] |
|------|----------------|------------------------------|-----------------------|---------------------|------------------------|--------|------|-------|------|----------------|
|      |                |                              |                       |                     |                        | [dBm]  | [mW] | [dBm] | [mW] |                |
| Low  | 2422.0         | -5.65                        | 0.74                  | 10.00               | 0.22                   | 5.31   | 3.40 | 30.00 | 1000 | 24.69          |
| Mid  | 2437.0         | -1.67                        | 0.75                  | 10.00               | 0.22                   | 9.30   | 8.51 | 30.00 | 1000 | 20.70          |
| High | 2452.0         | -2.35                        | 0.75                  | 10.00               | 0.22                   | 8.62   | 7.28 | 30.00 | 1000 | 21.38          |

**Antenna Aux**

(\* P/M: Power Meter with power sensor, AV: Average)

| Ch   | Freq.<br>[MHz] | P/M (AV)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten. Loss<br>[dB] | Duty<br>Factor<br>[dB] | Result |      | Limit |      | Margin<br>[dB] |
|------|----------------|------------------------------|-----------------------|---------------------|------------------------|--------|------|-------|------|----------------|
|      |                |                              |                       |                     |                        | [dBm]  | [mW] | [dBm] | [mW] |                |
| Low  | 2422.0         | -5.46                        | 0.74                  | 10.00               | 0.22                   | 5.50   | 3.55 | 30.00 | 1000 | 24.50          |
| Mid  | 2437.0         | -1.43                        | 0.75                  | 10.00               | 0.22                   | 9.54   | 8.99 | 30.00 | 1000 | 20.46          |
| High | 2452.0         | -1.83                        | 0.75                  | 10.00               | 0.22                   | 9.14   | 8.20 | 30.00 | 1000 | 20.86          |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss + Duty Factor

**[Pre check]**

| Mode<br>(MCS) | Freq.<br>[MHz] | Reding<br>Antenna Main |      | Duty<br>Factor<br>[dB] | Reding<br>Antenna Aux |      | Duty<br>Factor<br>[dB] | Reading * Duty factor<br>Antenna Main + Aux |      | Worst |
|---------------|----------------|------------------------|------|------------------------|-----------------------|------|------------------------|---|------|-------|
|               |                | [dBm]                  | [mW] |                        | [dBm]                 | [mW] |                        | [dBm]                                       | [mW] |       |
| 8             | 2437.0         | -1.67                  | 0.68 | 0.22                   | -1.43                 | 0.72 | 0.22                   | 1.68  | 1.47 |       |
| 9             | 2437.0         | -1.95                  | 0.64 | 0.39                   | -1.61                 | 0.69 | 0.39                   | 1.62  | 1.45 |       |
| 10            | 2437.0         | -1.99                  | 0.63 | 0.52                   | -1.76                 | 0.67 | 0.52                   | 1.66  | 1.46 |       |
| 11            | 2437.0         | -2.18                  | 0.61 | 0.66                   | -1.94                 | 0.64 | 0.66                   | 1.61  | 1.45 |       |
| 12            | 2437.0         | -2.35                  | 0.58 | 0.82                   | -2.04                 | 0.63 | 0.82                   | 1.64  | 1.46 |       |
| 13            | 2437.0         | -2.46                  | 0.57 | 1.00                   | -2.27                 | 0.59 | 1.00                   | 1.65  | 1.46 |       |
| 14            | 2437.0         | -3.05                  | 0.50 | 1.04                   | -3.98                 | 0.40 | 1.04                   | 0.56  | 1.14 |       |
| 15            | 2437.0         | -5.75                  | 0.27 | 1.08                   | -5.50                 | 0.28 | 1.08                   | -1.53                                       | 0.70 |       |

Sample Calculation:

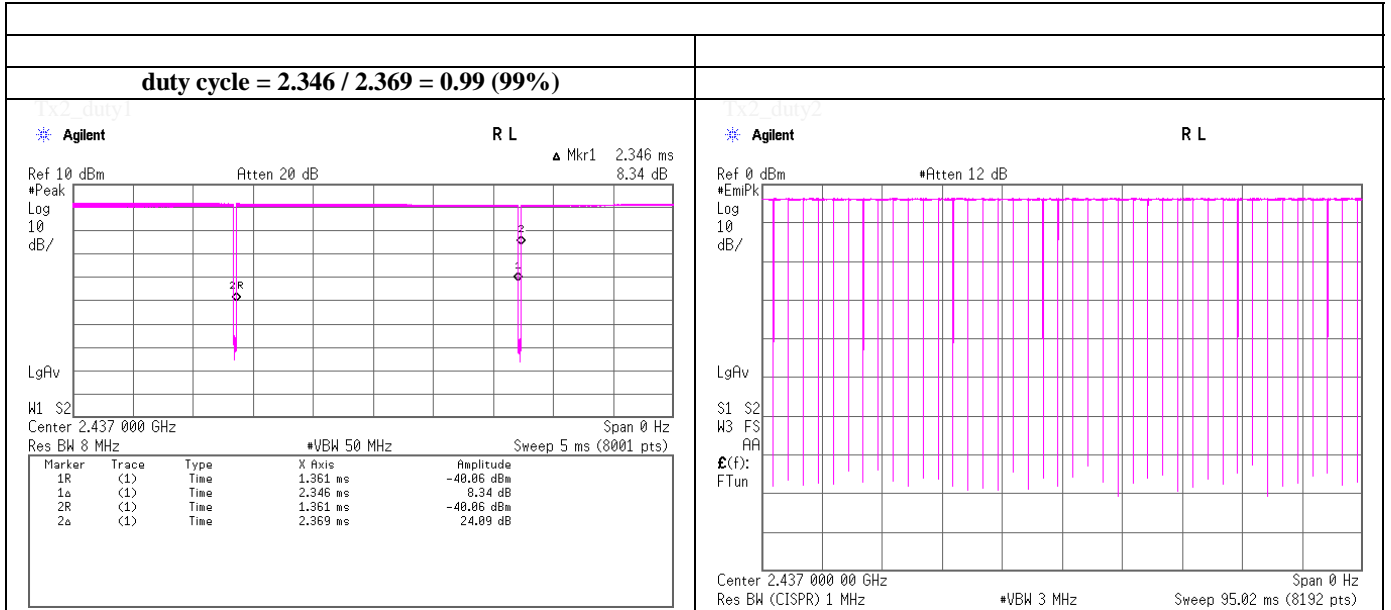
Reading \* Duty factor [mW] = Reading Antenna Main [mW] x 10 ^ ( Duty Factor [dB] / 10) + Reading Antenna Aux [mW] x 10 ^ ( Duty Factor [dB] / 10)

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**Burst rate confirmation**

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



(Reference)

- \* for power sheet duty factor (1Mbps) =  $10 \times \log ( 2.369 / 2.346 ) = 0.04 \text{ dB}$
- \* for power sheet duty factor (2Mbps) =  $10 \times \log ( 2.333 / 2.309 ) = 0.04 \text{ dB}$
- \* for power sheet duty factor (5.5Mbps) =  $10 \times \log ( 2.313 / 2.289 ) = 0.05 \text{ dB}$
- \* for power sheet duty factor (11Mbps) =  $10 \times \log ( 1.158 / 1.133 ) = 0.09 \text{ dB}$

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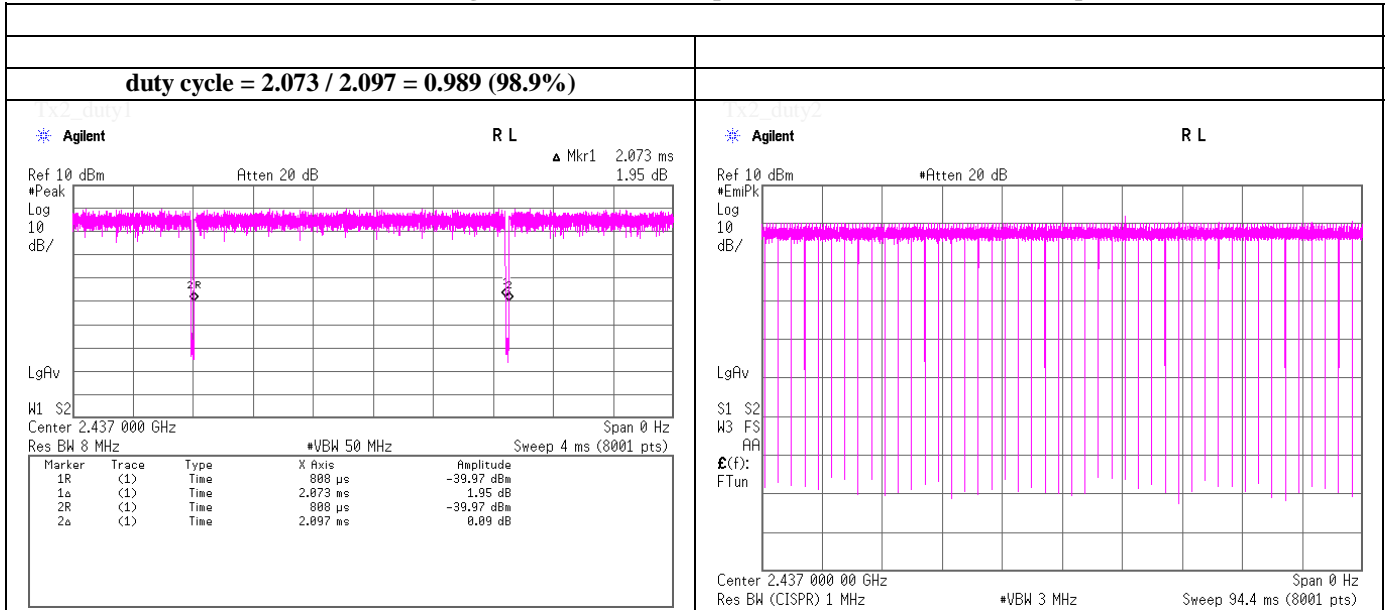
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## Burst rate confirmation

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



(Reference)

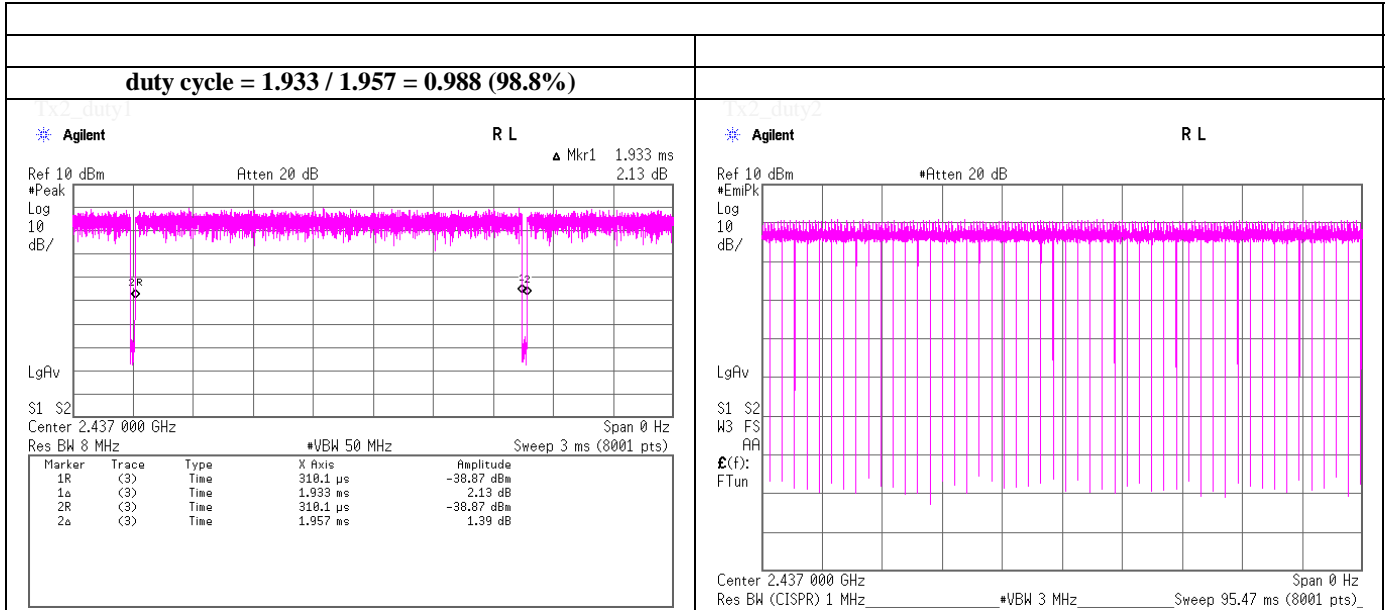
- \* for power sheet duty factor (6Mbps) =  $10 \times \log ( 2.097 / 2.073 ) = 0.05 \text{ dB}$
- \* for power sheet duty factor (9Mbps) =  $10 \times \log ( 1.158 / 1.134 ) = 0.09 \text{ dB}$
- \* for power sheet duty factor (12Mbps) =  $10 \times \log ( 1.073 / 1.048 ) = 0.10 \text{ dB}$
- \* for power sheet duty factor (18Mbps) =  $10 \times \log ( 0.729 / 0.705 ) = 0.15 \text{ dB}$
- \* for power sheet duty factor (24Mbps) =  $10 \times \log ( 0.562 / 0.537 ) = 0.20 \text{ dB}$
- \* for power sheet duty factor (36Mbps) =  $10 \times \log ( 0.385 / 0.360 ) = 0.29 \text{ dB}$
- \* for power sheet duty factor (48Mbps) =  $10 \times \log ( 0.293 / 0.268 ) = 0.39 \text{ dB}$
- \* for power sheet duty factor (54Mbps) =  $10 \times \log ( 0.274 / 0.248 ) = 0.43 \text{ dB}$

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**Burst rate confirmation**

**Tx, IEEE802.11n (HT20, Mix, Long), PN9, worst antenna port Main, worst data mode 0(MCS)**



(Reference)

- \* for power sheet duty factor (MCS0) =  $10 \times \log ( 1.957 / 1.933 ) = 0.05 \text{ dB}$
- \* for power sheet duty factor (MCS1) =  $10 \times \log ( 1.010 / 0.984 ) = 0.11 \text{ dB}$
- \* for power sheet duty factor (MCS2) =  $10 \times \log ( 0.694 / 0.669 ) = 0.16 \text{ dB}$
- \* for power sheet duty factor (MCS3) =  $10 \times \log ( 0.537 / 0.513 ) = 0.20 \text{ dB}$
- \* for power sheet duty factor (MCS4) =  $10 \times \log ( 0.379 / 0.354 ) = 0.30 \text{ dB}$
- \* for power sheet duty factor (MCS5) =  $10 \times \log ( 0.295 / 0.270 ) = 0.38 \text{ dB}$
- \* for power sheet duty factor (MCS6) =  $10 \times \log ( 0.274 / 0.250 ) = 0.40 \text{ dB}$
- \* for power sheet duty factor (MCS7) =  $10 \times \log ( 0.254 / 0.230 ) = 0.43 \text{ dB}$

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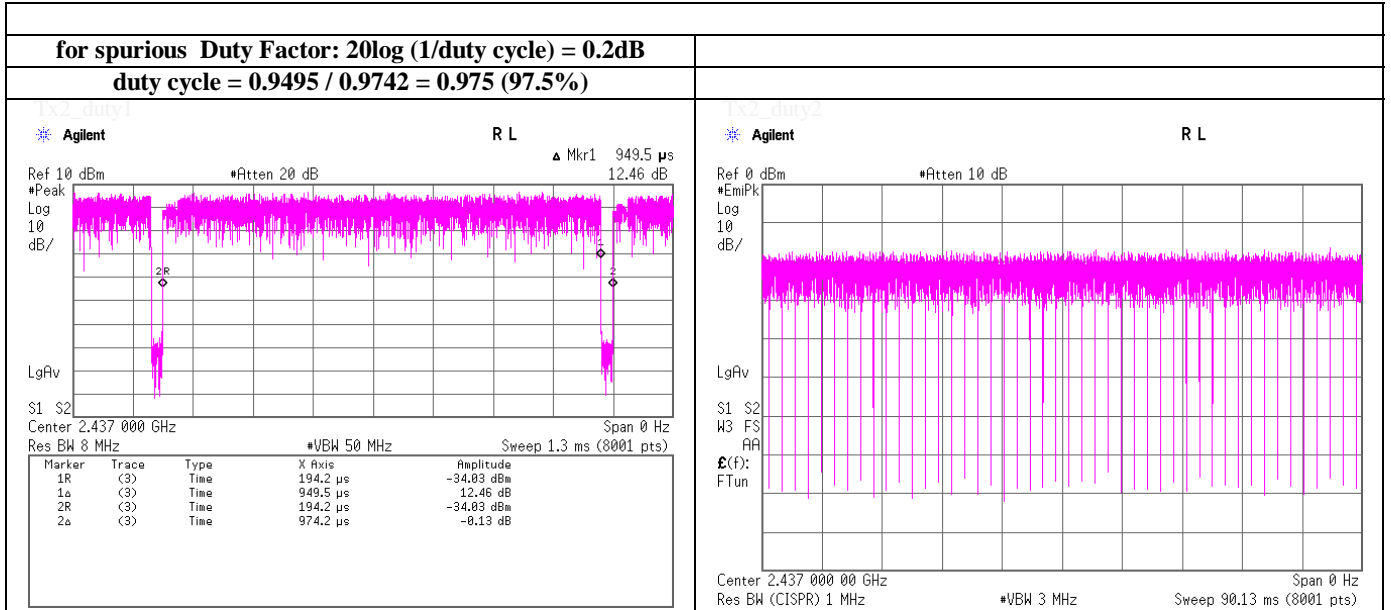
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## Duty Factor Calculation chart

**Tx, 11n (HT40, Wide, Mix, Long), PN9, worst antenna port Main, worst data mode 0(MCS)**



**(Reference)**

- \* for power sheet duty factor (MCS0) =  $10 \times \log(0.974 / 0.950) = 0.11 \text{ dB}$
- \* for power sheet duty factor (MCS1) =  $10 \times \log(0.518 / 0.493) = 0.21 \text{ dB}$
- \* for power sheet duty factor (MCS2) =  $10 \times \log(0.365 / 0.341) = 0.30 \text{ dB}$
- \* for power sheet duty factor (MCS3) =  $10 \times \log(0.291 / 0.266) = 0.39 \text{ dB}$
- \* for power sheet duty factor (MCS4) =  $10 \times \log(0.214 / 0.190) = 0.52 \text{ dB}$
- \* for power sheet duty factor (MCS5) =  $10 \times \log(0.179 / 0.153) = 0.68 \text{ dB}$
- \* for power sheet duty factor (MCS6) =  $10 \times \log(0.166 / 0.142) = 0.68 \text{ dB}$
- \* for power sheet duty factor (MCS7) =  $10 \times \log(0.154 / 0.130) = 0.74 \text{ dB}$

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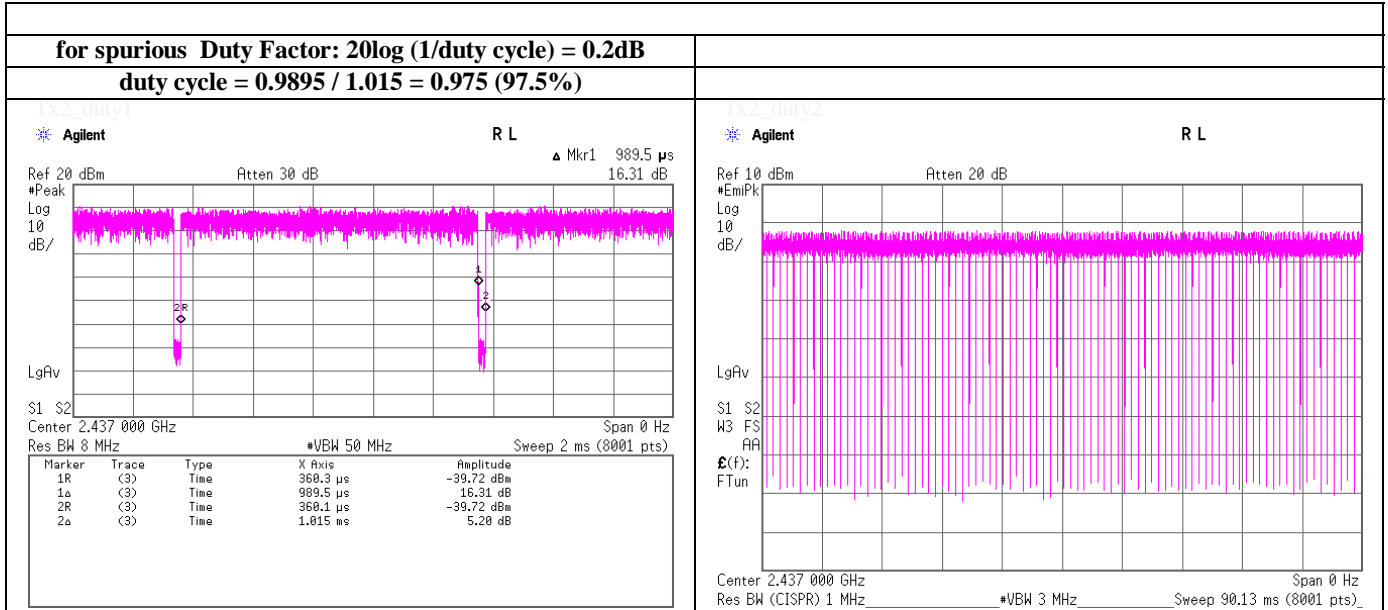
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## Duty Factor Calculation chart

**Tx, IEEE802.11n (HT20, Mix, Long), PN9, worst data mode 8(MCS)**



(Reference)

- \* for power sheet duty factor (MCS8) =  $10 \times \log(1.0150 / 0.9895) = 0.11 \text{ dB}$
- \* for power sheet duty factor (MCS9) =  $10 \times \log(0.5425 / 0.5162) = 0.22 \text{ dB}$
- \* for power sheet duty factor (MCS10) =  $10 \times \log(0.3825 / 0.3563) = 0.31 \text{ dB}$
- \* for power sheet duty factor (MCS11) =  $10 \times \log(0.2934 / 0.2693) = 0.37 \text{ dB}$
- \* for power sheet duty factor (MCS12) =  $10 \times \log(0.2265 / 0.2004) = 0.53 \text{ dB}$
- \* for power sheet duty factor (MCS13) =  $10 \times \log(0.1825 / 0.1572) = 0.65 \text{ dB}$
- \* for power sheet duty factor (MCS14) =  $10 \times \log(0.1745 / 0.1491) = 0.68 \text{ dB}$
- \* for power sheet duty factor (MCS15) =  $10 \times \log(0.1625 / 0.1372) = 0.73 \text{ dB}$

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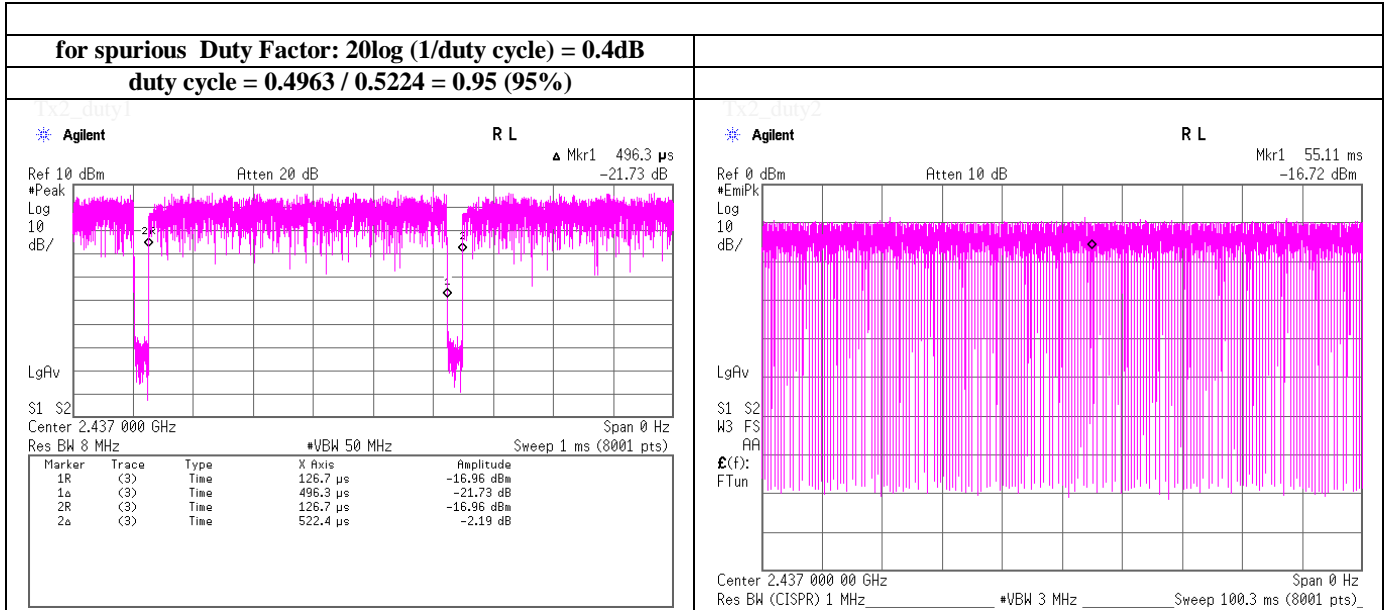
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### Duty Factor Calculation chart

**Tx, 11n (HT40, Wide, Mix, Long), PN9, worst data mode 8(MCS)**



**(Reference)**

- \* for power sheet duty factor (MCS8) =  $10 \times \log(0.5224 / 0.4963) = 0.22 \text{ dB}$
- \* for power sheet duty factor (MCS9) =  $10 \times \log(0.2936 / 0.2682) = 0.39 \text{ dB}$
- \* for power sheet duty factor (MCS10) =  $10 \times \log(0.2135 / 0.1892) = 0.52 \text{ dB}$
- \* for power sheet duty factor (MCS11) =  $10 \times \log(0.1785 / 0.1533) = 0.66 \text{ dB}$
- \* for power sheet duty factor (MCS12) =  $10 \times \log(0.1415 / 0.1172) = 0.82 \text{ dB}$
- \* for power sheet duty factor (MCS13) =  $10 \times \log(0.1225 / 0.0972) = 1.00 \text{ dB}$
- \* for power sheet duty factor (MCS14) =  $10 \times \log(0.1184 / 0.0932) = 1.04 \text{ dB}$
- \* for power sheet duty factor (MCS15) =  $10 \times \log(0.1145 / 0.0892) = 1.08 \text{ dB}$

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## Radiated Emission

|                        |                               |                            |
|------------------------|-------------------------------|----------------------------|
| Test place             | No.3 Semi Anechoic Chamber    | No.1 Semi Anechoic Chamber |
| Date                   | November 18, 2012             | November 22, 2012          |
| Temperature / Humidity | 25 deg.C, 40%RH               | 26 deg.C, 43%RH            |
| Engineer               | Kenichi Adachi                | Kenichi Adachi             |
| Mode                   | Tx, 2412.0 MHz<br>IEEE802.11b |                            |

(\* 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            | 14.2      | 41.4      | 46.5            | 73.9           | 27.4        | 209         | 292         |        |
| Hori.    | 4824.000        | PK       | 46.4           | 31.1            | 6.8       | 41.2      | 43.1            | 73.9           | 30.8        | 100         | 0           |        |
| Hori.    | 7236.000        | PK       | 46.9           | 36.6            | 8.5       | 41.4      | 50.6            | 73.9           | 23.3        | 100         | 0           |        |
| Hori.    | 9648.000        | PK       | 45.0           | 38.6            | 9.4       | 38.9      | 54.1            | 73.9           | 19.8        | 100         | 0           |        |
| Hori.    | 12060.000       | PK       | 46.7           | 39.5            | 10.7      | 39.4      | 57.5            | 73.9           | 16.4        | 100         | 0           |        |
| Hori.    | 2390.000        | AV       | 38.1           | 27.4            | 14.2      | 41.4      | 38.3            | 53.9           | 15.6        | 209         | 292         |        |
| Hori.    | 4824.000        | AV       | 36.2           | 31.1            | 6.8       | 41.2      | 32.9            | 53.9           | 21.0        | 100         | 0           |        |
| Hori.    | 7236.000        | AV       | 38.7           | 36.6            | 8.5       | 41.4      | 42.4            | 53.9           | 11.5        | 100         | 0           |        |
| Hori.    | 9648.000        | AV       | 33.1           | 38.6            | 9.4       | 38.9      | 42.2            | 53.9           | 11.7        | 100         | 0           |        |
| Hori.    | 12060.000       | AV       | 34.2           | 39.5            | 10.7      | 39.4      | 45.0            | 53.9           | 8.9         | 100         | 0           |        |
| Vert.    | 2390.000        | PK       | 46.3           | 27.4            | 14.2      | 41.4      | 46.5            | 73.9           | 27.4        | 218         | 2           |        |
| Vert.    | 4824.000        | PK       | 45.6           | 31.1            | 6.8       | 41.2      | 42.3            | 73.9           | 31.6        | 100         | 0           |        |
| Vert.    | 7236.000        | PK       | 46.7           | 36.6            | 8.5       | 41.4      | 50.4            | 73.9           | 23.5        | 100         | 0           |        |
| Vert.    | 9648.000        | PK       | 44.6           | 38.6            | 9.4       | 38.9      | 53.7            | 73.9           | 20.2        | 100         | 0           |        |
| Vert.    | 12060.000       | PK       | 45.1           | 39.5            | 10.7      | 39.4      | 55.9            | 73.9           | 18.0        | 100         | 0           |        |
| Vert.    | 2390.000        | AV       | 38.7           | 27.4            | 14.2      | 41.4      | 38.9            | 53.9           | 15.0        | 218         | 2           |        |
| Vert.    | 4824.000        | AV       | 36.7           | 31.1            | 6.8       | 41.2      | 33.4            | 53.9           | 20.5        | 100         | 0           |        |
| Vert.    | 7236.000        | AV       | 38.2           | 36.6            | 8.5       | 41.4      | 41.9            | 53.9           | 12.0        | 100         | 0           |        |
| Vert.    | 9648.000        | AV       | 33.2           | 38.6            | 9.4       | 38.9      | 42.3            | 53.9           | 11.6        | 100         | 0           |        |
| Vert.    | 12060.000       | AV       | 33.4           | 39.5            | 10.7      | 39.4      | 44.2            | 53.9           | 9.7         | 100         | 0           |        |

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

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

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

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

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|-----------------|----------------|-------------|--------|
| Hori.    | 2412.000        | PK       | 93.7           | 27.5              | 14.2      | 41.4      | 94.0            | -              | -           |        |
| Hori.    | 2397.000        | PK       | 62.2           | 27.4              | 14.2      | 41.4      | 62.4            | 74.0           | 11.6        |        |
| Hori.    | 2400.000        | PK       | 52.9           | 27.4              | 14.2      | 41.4      | 53.1            | 74.0           | 20.9        |        |
| Vert.    | 2412.000        | PK       | 95.2           | 27.5              | 14.2      | 41.4      | 95.5            | -              | -           |        |
| Vert.    | 2397.000        | PK       | 64.1           | 27.4              | 14.2      | 41.4      | 64.3            | 75.5           | 11.2        |        |
| Vert.    | 2400.000        | PK       | 54.5           | 27.4              | 14.2      | 41.4      | 54.7            | 75.5           | 20.8        |        |

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

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## Radiated Emission

|                        |                               |                            |
|------------------------|-------------------------------|----------------------------|
| Test place             | No.3 Semi Anechoic Chamber    | No.1 Semi Anechoic Chamber |
| Date                   | November 18, 2012             | November 22, 2012          |
| Temperature / Humidity | 25 deg.C, 40%RH               | 26 deg.C, 43%RH            |
| Engineer               | Kenichi Adachi                | Kenichi Adachi             |
| Mode                   | Tx, 2437.0 MHz<br>IEEE802.11b |                            |

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|-------------|--------|
| Hori.    | 4874.000        | PK       | 45.3           | 31.3            | 6.9       | 41.1      | 42.4            | 73.9           | 31.5        | 100         | 0           |        |
| Hori.    | 7311.000        | PK       | 46.5           | 36.6            | 8.6       | 41.4      | 50.3            | 73.9           | 23.6        | 100         | 0           |        |
| Hori.    | 9748.000        | PK       | 45.8           | 38.7            | 9.5       | 38.9      | 55.1            | 73.9           | 18.8        | 100         | 0           |        |
| Hori.    | 12185.000       | PK       | 47.1           | 39.5            | 10.7      | 39.3      | 58.0            | 73.9           | 15.9        | 100         | 0           |        |
| Hori.    | 4874.000        | AV       | 36.0           | 31.3            | 6.9       | 41.1      | 33.1            | 53.9           | 20.8        | 100         | 0           |        |
| Hori.    | 7311.000        | AV       | 37.6           | 36.6            | 8.6       | 41.4      | 41.4            | 53.9           | 12.5        | 100         | 0           |        |
| Hori.    | 9748.000        | AV       | 34.6           | 38.7            | 9.5       | 38.9      | 43.9            | 53.9           | 10.0        | 100         | 0           |        |
| Hori.    | 12185.000       | AV       | 33.2           | 39.5            | 10.7      | 39.3      | 44.1            | 53.9           | 9.8         | 100         | 0           |        |
| Vert.    | 4874.000        | PK       | 45.7           | 31.3            | 6.9       | 41.1      | 42.8            | 73.9           | 31.1        | 100         | 0           |        |
| Vert.    | 7311.000        | PK       | 45.3           | 36.6            | 8.6       | 41.4      | 49.1            | 73.9           | 24.8        | 100         | 0           |        |
| Vert.    | 9748.000        | PK       | 44.6           | 38.7            | 9.5       | 38.9      | 53.9            | 73.9           | 20.0        | 100         | 0           |        |
| Vert.    | 12185.000       | PK       | 45.0           | 39.5            | 10.7      | 39.3      | 55.9            | 73.9           | 18.0        | 100         | 0           |        |
| Vert.    | 4874.000        | AV       | 34.8           | 31.3            | 6.9       | 41.1      | 31.9            | 53.9           | 22.0        | 100         | 0           |        |
| Vert.    | 7311.000        | AV       | 37.5           | 36.6            | 8.6       | 41.4      | 41.3            | 53.9           | 12.6        | 100         | 0           |        |
| Vert.    | 9748.000        | AV       | 33.5           | 38.7            | 9.5       | 38.9      | 42.8            | 53.9           | 11.1        | 100         | 0           |        |
| Vert.    | 12185.000       | AV       | 33.6           | 39.5            | 10.7      | 39.3      | 44.5            | 53.9           | 9.4         | 100         | 0           |        |

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

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

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

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

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## Radiated Emission

|                        |                               |                            |
|------------------------|-------------------------------|----------------------------|
| Test place             | No.3 Semi Anechoic Chamber    | No.1 Semi Anechoic Chamber |
| Date                   | November 18, 2012             | November 22, 2012          |
| Temperature / Humidity | 25 deg.C, 40%RH               | 26 deg.C, 43%RH            |
| Engineer               | Kenichi Adachi                | Kenichi Adachi             |
| Mode                   | Tx, 2462.0 MHz<br>IEEE802.11b |                            |

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|-------------|--------|
| Hori.    | 2483.500        | PK       | 51.6           | 27.5            | 14.3      | 41.4      | 52.0            | 73.9           | 21.9        | 213         | 299         |        |
| Hori.    | 2486.500        | PK       | 48.9           | 27.5            | 14.3      | 41.4      | 49.3            | 73.9           | 24.6        | 213         | 299         |        |
| Hori.    | 4924.000        | PK       | 45.7           | 31.5            | 6.9       | 41.0      | 43.1            | 73.9           | 30.8        | 100         | 0           |        |
| Hori.    | 7386.000        | PK       | 45.9           | 36.7            | 8.7       | 41.5      | 49.8            | 73.9           | 24.1        | 100         | 0           |        |
| Hori.    | 9848.000        | PK       | 47.0           | 38.9            | 9.5       | 38.9      | 56.5            | 73.9           | 17.4        | 100         | 0           |        |
| Hori.    | 12310.000       | PK       | 45.2           | 39.5            | 10.8      | 39.3      | 56.2            | 73.9           | 17.7        | 100         | 0           |        |
| Hori.    | 2483.500        | AV       | 46.8           | 27.5            | 14.3      | 41.4      | 47.2            | 53.9           | 6.7         | 213         | 299         |        |
| Hori.    | 2486.500        | AV       | 41.2           | 27.5            | 14.3      | 41.4      | 41.6            | 53.9           | 12.3        | 213         | 299         |        |
| Hori.    | 4924.000        | AV       | 37.0           | 31.5            | 6.9       | 41.0      | 34.4            | 53.9           | 19.5        | 100         | 0           |        |
| Hori.    | 7386.000        | AV       | 37.4           | 36.7            | 8.7       | 41.5      | 41.3            | 53.9           | 12.6        | 100         | 0           |        |
| Hori.    | 9848.000        | AV       | 35.4           | 38.9            | 9.5       | 38.9      | 44.9            | 53.9           | 9.0         | 100         | 0           |        |
| Hori.    | 12310.000       | AV       | 35.1           | 39.5            | 10.8      | 39.3      | 46.1            | 53.9           | 7.8         | 100         | 0           |        |
| Vert.    | 2483.500        | PK       | 49.1           | 27.5            | 14.3      | 41.4      | 49.5            | 73.9           | 24.4        | 100         | 132         |        |
| Vert.    | 2486.500        | PK       | 43.7           | 27.5            | 14.3      | 41.4      | 44.1            | 73.9           | 29.8        | 100         | 132         |        |
| Vert.    | 4924.000        | PK       | 45.6           | 31.5            | 6.9       | 41.0      | 43.0            | 73.9           | 30.9        | 100         | 0           |        |
| Vert.    | 7386.000        | PK       | 45.5           | 36.7            | 8.7       | 41.5      | 49.4            | 73.9           | 24.5        | 100         | 0           |        |
| Vert.    | 9848.000        | PK       | 44.5           | 38.9            | 9.5       | 38.9      | 54.0            | 73.9           | 19.9        | 100         | 0           |        |
| Vert.    | 12310.000       | PK       | 44.6           | 39.5            | 10.8      | 39.3      | 55.6            | 73.9           | 18.3        | 100         | 0           |        |
| Vert.    | 2483.500        | AV       | 43.6           | 27.5            | 14.3      | 41.4      | 44.0            | 53.9           | 9.9         | 100         | 132         |        |
| Vert.    | 2486.500        | AV       | 40.2           | 27.5            | 14.3      | 41.4      | 40.6            | 53.9           | 13.3        | 100         | 132         |        |
| Vert.    | 4924.000        | AV       | 36.7           | 31.5            | 6.9       | 41.0      | 34.1            | 53.9           | 19.8        | 100         | 0           |        |
| Vert.    | 7386.000        | AV       | 37.6           | 36.7            | 8.7       | 41.5      | 41.5            | 53.9           | 12.4        | 100         | 0           |        |
| Vert.    | 9848.000        | AV       | 34.0           | 38.9            | 9.5       | 38.9      | 43.5            | 53.9           | 10.4        | 100         | 0           |        |
| Vert.    | 12310.000       | AV       | 34.6           | 39.5            | 10.8      | 39.3      | 45.6            | 53.9           | 8.3         | 100         | 0           |        |

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

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

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

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

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## Radiated Emission

|                        |   |                            |
|------------------------|---|----------------------------|
| Test place             | No.3 Semi Anechoic Chamber                | No.1 Semi Anechoic Chamber |
| Date                   | November 17, 2012                         | November 22, 2012          |
| Temperature / Humidity | 25 deg.C, 42%RH                           | 26 deg.C, 43%RH            |
| Engineer               | Kenichi Adachi                            | Kenichi Adachi             |
| Mode                   | Tx, 2412.0 MHz<br>IEEE802.11n(HT20), MCS0 |                            |

(\* 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       | 68.2           | 27.4            | 14.2      | 41.4      | 68.4            | 73.9           | 5.5         | 212         | 299         |        |
| Hori.    | 4824.000        | PK       | 46.2           | 31.1            | 6.8       | 41.2      | 42.9            | 73.9           | 31.0        | 100         | 0           |        |
| Hori.    | 7236.000        | PK       | 48.1           | 36.6            | 8.5       | 41.4      | 51.8            | 73.9           | 22.1        | 100         | 0           |        |
| Hori.    | 9648.000        | PK       | 44.5           | 38.6            | 9.4       | 38.9      | 53.6            | 73.9           | 20.3        | 100         | 0           |        |
| Hori.    | 12060.000       | PK       | 45.7           | 39.5            | 10.7      | 39.4      | 56.5            | 73.9           | 17.4        | 100         | 0           |        |
| Hori.    | 2390.000        | AV       | 50.8           | 27.4            | 14.2      | 41.4      | 51.0            | 53.9           | 2.9         | 212         | 299         |        |
| Hori.    | 4824.000        | AV       | 34.9           | 31.1            | 6.8       | 41.2      | 31.6            | 53.9           | 22.3        | 100         | 0           |        |
| Hori.    | 7236.000        | AV       | 37.3           | 36.6            | 8.5       | 41.4      | 41.0            | 53.9           | 12.9        | 100         | 0           |        |
| Hori.    | 9648.000        | AV       | 34.6           | 38.6            | 9.4       | 38.9      | 43.7            | 53.9           | 10.2        | 100         | 0           |        |
| Hori.    | 12060.000       | AV       | 36.5           | 39.5            | 10.7      | 39.4      | 47.3            | 53.9           | 6.6         | 100         | 0           |        |
| Vert.    | 2390.000        | PK       | 67.4           | 27.4            | 14.2      | 41.4      | 67.6            | 73.9           | 6.3         | 172         | 10          |        |
| Vert.    | 4824.000        | PK       | 46.3           | 31.1            | 6.8       | 41.2      | 43.0            | 73.9           | 30.9        | 165         | 28          |        |
| Vert.    | 7236.000        | PK       | 45.7           | 36.6            | 8.5       | 41.4      | 49.4            | 73.9           | 24.5        | 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       | 46.5           | 39.5            | 10.7      | 39.4      | 57.3            | 73.9           | 16.6        | 100         | 0           |        |
| Vert.    | 2390.000        | AV       | 51.5           | 27.4            | 14.2      | 41.4      | 51.7            | 53.9           | 2.2         | 172         | 10          |        |
| Vert.    | 4824.000        | AV       | 35.0           | 31.1            | 6.8       | 41.2      | 31.7            | 53.9           | 22.2        | 165         | 28          |        |
| Vert.    | 7236.000        | AV       | 36.7           | 36.6            | 8.5       | 41.4      | 40.4            | 53.9           | 13.5        | 100         | 0           |        |
| Vert.    | 9648.000        | AV       | 35.2           | 38.6            | 9.4       | 38.9      | 44.3            | 53.9           | 9.6         | 100         | 0           |        |
| Vert.    | 12060.000       | AV       | 35.0           | 39.5            | 10.7      | 39.4      | 45.8            | 53.9           | 8.1         | 100         | 0           |        |

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

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

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

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

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark               |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|-----------------|----------------|-------------|----------------------|
| Hori.    | 2412.000        | PK       | 94.6           | 27.5              | 14.2      | 41.4      | 94.9            | -              | -           | (carrier)R100k,V300k |
| Hori.    | 2400.000        | PK       | 64.2           | 27.4              | 14.2      | 41.4      | 64.4            | 74.9           | 10.5        | R100k,V300k          |
| Vert.    | 2412.000        | PK       | 96.7           | 27.5              | 14.2      | 41.4      | 97.0            | -              | -           | (carrier)R100k,V300k |
| Vert.    | 2400.000        | PK       | 67.1           | 27.4              | 14.2      | 41.4      | 67.3            | 77.0           | 9.7         | R100k,V300k          |

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

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## Radiated Emission

|                        |   |                            |
|------------------------|---|----------------------------|
| Test place             | No.3 Semi Anechoic Chamber                | No.1 Semi Anechoic Chamber |
| Date                   | November 17, 2012                         | November 22, 2012          |
| Temperature / Humidity | 25 deg.C, 42%RH                           | 26 deg.C, 43%RH            |
| Engineer               | Kenichi Adachi                            | Kenichi Adachi             |
| Mode                   | Tx, 2437.0 MHz<br>IEEE802.11n(HT20), MCS0 |                            |

(\* 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.    | 212.233         | QP       | 33.7           | 16.8            | 9.3       | 31.7      | 28.1            | 43.5           | 15.4        | 156         | 318         |        |
| Hori.    | 240.799         | QP       | 32.5           | 17.0            | 9.6       | 31.7      | 27.4            | 46.0           | 18.6        | 133         | 207         |        |
| Hori.    | 353.343         | QP       | 39.2           | 15.1            | 7.4       | 31.7      | 30.0            | 46.0           | 16.0        | 100         | 56          |        |
| Hori.    | 377.301         | QP       | 39.3           | 15.5            | 7.6       | 31.8      | 30.6            | 46.0           | 15.4        | 100         | 304         |        |
| Hori.    | 4874.000        | PK       | 46.3           | 31.3            | 6.9       | 41.1      | 43.4            | 73.9           | 30.5        | 111         | 304         |        |
| Hori.    | 7311.000        | PK       | 48.5           | 36.6            | 8.6       | 41.4      | 52.3            | 73.9           | 21.6        | 100         | 0           |        |
| Hori.    | 9748.000        | PK       | 44.6           | 38.7            | 9.5       | 38.9      | 53.9            | 73.9           | 20.0        | 100         | 0           |        |
| Hori.    | 12185.000       | PK       | 44.8           | 39.5            | 10.7      | 39.3      | 55.7            | 73.9           | 18.2        | 100         | 0           |        |
| Hori.    | 4874.000        | AV       | 34.9           | 31.3            | 6.9       | 41.1      | 32.0            | 53.9           | 21.9        | 111         | 304         |        |
| Hori.    | 7311.000        | AV       | 37.2           | 36.6            | 8.6       | 41.4      | 41.0            | 53.9           | 12.9        | 100         | 0           |        |
| Hori.    | 9748.000        | AV       | 34.8           | 38.7            | 9.5       | 38.9      | 44.1            | 53.9           | 9.8         | 100         | 0           |        |
| Hori.    | 12185.000       | AV       | 34.8           | 39.5            | 10.7      | 39.3      | 45.7            | 53.9           | 8.2         | 100         | 0           |        |
| Vert.    | 147.458         | QP       | 32.5           | 14.9            | 8.6       | 31.8      | 24.2            | 43.5           | 19.3        | 100         | 80          |        |
| Vert.    | 174.432         | QP       | 35.6           | 15.9            | 8.9       | 31.8      | 28.6            | 43.5           | 14.9        | 100         | 179         |        |
| Vert.    | 4874.000        | PK       | 46.2           | 31.3            | 6.9       | 41.1      | 43.3            | 73.9           | 30.6        | 169         | 33          |        |
| Vert.    | 7311.000        | PK       | 47.2           | 36.6            | 8.6       | 41.4      | 51.0            | 73.9           | 22.9        | 100         | 0           |        |
| Vert.    | 9748.000        | PK       | 44.2           | 38.7            | 9.5       | 38.9      | 53.5            | 73.9           | 20.4        | 100         | 0           |        |
| Vert.    | 12185.000       | PK       | 46.7           | 39.5            | 10.7      | 39.3      | 57.6            | 73.9           | 16.3        | 100         | 0           |        |
| Vert.    | 4874.000        | AV       | 34.9           | 31.3            | 6.9       | 41.1      | 32.0            | 53.9           | 21.9        | 169         | 33          |        |
| Vert.    | 7311.000        | AV       | 36.7           | 36.6            | 8.6       | 41.4      | 40.5            | 53.9           | 13.4        | 100         | 0           |        |
| Vert.    | 9748.000        | AV       | 33.7           | 38.7            | 9.5       | 38.9      | 43.0            | 53.9           | 10.9        | 100         | 0           |        |
| Vert.    | 12185.000       | AV       | 35.6           | 39.5            | 10.7      | 39.3      | 46.5            | 53.9           | 7.4         | 100         | 0           |        |

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

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

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

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

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## Radiated Emission

|                        |   |                            |
|------------------------|---|----------------------------|
| Test place             | No.3 Semi Anechoic Chamber                | No.1 Semi Anechoic Chamber |
| Date                   | November 17, 2012                         | November 22, 2012          |
| Temperature / Humidity | 25 deg.C, 42%RH                           | 26 deg.C, 43%RH            |
| Engineer               | Kenichi Adachi                            | Kenichi Adachi             |
| Mode                   | Tx, 2462.0 MHz<br>IEEE802.11n(HT20), MCS0 |                            |

(\* 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       | 63.3           | 27.5            | 14.3      | 41.4      | 63.7            | 73.9           | 10.2        | 211         | 302         |        |
| Hori.    | 4924.000        | PK       | 46.1           | 31.5            | 6.9       | 41.0      | 43.5            | 73.9           | 30.4        | 100         | 0           |        |
| Hori.    | 7386.000        | PK       | 46.4           | 36.7            | 8.7       | 41.5      | 50.3            | 73.9           | 23.6        | 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       | 44.2           | 39.5            | 10.8      | 39.3      | 55.2            | 73.9           | 18.7        | 100         | 0           |        |
| Hori.    | 2483.500        | AV       | 53.3           | 27.5            | 14.3      | 41.4      | 53.7            | 53.9           | 0.2         | 211         | 302         |        |
| Hori.    | 4924.000        | AV       | 37.8           | 31.5            | 6.9       | 41.0      | 35.2            | 53.9           | 18.7        | 100         | 0           |        |
| Hori.    | 7386.000        | AV       | 36.7           | 36.7            | 8.7       | 41.5      | 40.6            | 53.9           | 13.3        | 100         | 0           |        |
| Hori.    | 9848.000        | AV       | 34.0           | 38.9            | 9.5       | 38.9      | 43.5            | 53.9           | 10.4        | 100         | 0           |        |
| Hori.    | 12310.000       | AV       | 33.8           | 39.5            | 10.8      | 39.3      | 44.8            | 53.9           | 9.1         | 100         | 0           |        |
| Vert.    | 2483.500        | PK       | 62.6           | 27.5            | 14.3      | 41.4      | 63.0            | 73.9           | 10.9        | 173         | 8           |        |
| Vert.    | 4924.000        | PK       | 46.2           | 31.5            | 6.9       | 41.0      | 43.6            | 73.9           | 30.3        | 162         | 26          |        |
| Vert.    | 7386.000        | PK       | 46.5           | 36.7            | 8.7       | 41.5      | 50.4            | 73.9           | 23.5        | 100         | 0           |        |
| Vert.    | 9848.000        | PK       | 44.5           | 38.9            | 9.5       | 38.9      | 54.0            | 73.9           | 19.9        | 100         | 0           |        |
| Vert.    | 12310.000       | PK       | 45.0           | 39.5            | 10.8      | 39.3      | 56.0            | 73.9           | 17.9        | 100         | 0           |        |
| Vert.    | 2483.500        | AV       | 52.4           | 27.5            | 14.3      | 41.4      | 52.8            | 53.9           | 1.1         | 173         | 8           |        |
| Vert.    | 4924.000        | AV       | 37.9           | 31.5            | 6.9       | 41.0      | 35.3            | 53.9           | 18.6        | 162         | 26          |        |
| Vert.    | 7386.000        | AV       | 35.9           | 36.7            | 8.7       | 41.5      | 39.8            | 53.9           | 14.1        | 100         | 0           |        |
| Vert.    | 9848.000        | AV       | 34.6           | 38.9            | 9.5       | 38.9      | 44.1            | 53.9           | 9.8         | 100         | 0           |        |
| Vert.    | 12310.000       | AV       | 34.0           | 39.5            | 10.8      | 39.3      | 45.0            | 53.9           | 8.9         | 100         | 0           |        |

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

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

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

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

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## Radiated Emission

|                        |   |                            |
|------------------------|---|----------------------------|
| Test place             | No.3 Semi Anechoic Chamber                | No.1 Semi Anechoic Chamber |
| Date                   | November 17, 2012                         | November 22, 2012          |
| Temperature / Humidity | 25 deg.C, 42%RH                           | 26 deg.C, 43%RH            |
| Engineer               | Kenichi Adachi                            | Kenichi Adachi             |
| Mode                   | Tx, 2422.0 MHz<br>IEEE802.11n(HT40), MCS0 |                            |

(\* 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       | 61.1           | 27.4            | 14.2      | 41.4      | 61.3            | 73.9           | 12.6        | 212         | 297         |        |
| Hori.    | 4844.000        | PK       | 46.3           | 31.2            | 6.8       | 41.1      | 43.2            | 73.9           | 30.7        | 100         | 0           |        |
| Hori.    | 7266.000        | PK       | 46.7           | 36.6            | 8.5       | 41.4      | 50.4            | 73.9           | 23.5        | 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       | 46.1           | 39.5            | 10.7      | 39.4      | 56.9            | 73.9           | 17.0        | 100         | 0           |        |
| Vert.    | 2390.000        | PK       | 62.5           | 27.4            | 14.2      | 41.4      | 62.7            | 73.9           | 11.2        | 175         | 9           |        |
| Vert.    | 4844.000        | PK       | 46.4           | 31.2            | 6.8       | 41.1      | 43.3            | 73.9           | 30.6        | 100         | 0           |        |
| Vert.    | 7266.000        | PK       | 47.4           | 36.6            | 8.5       | 41.4      | 51.1            | 73.9           | 22.8        | 100         | 0           |        |
| Vert.    | 9688.000        | PK       | 45.2           | 38.6            | 9.5       | 38.9      | 54.4            | 73.9           | 19.5        | 100         | 0           |        |
| Vert.    | 12110.000       | PK       | 46.4           | 39.5            | 10.7      | 39.4      | 57.2            | 73.9           | 16.7        | 100         | 0           |        |

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|------------------|-----------------|----------------|-------------|--------|
| Hori.    | 2390.000        | AV       | 48.4           | 27.4              | 14.2      | 41.4      | 0.2              | 48.8            | 53.9           | 5.1         |        |
| Hori.    | 4844.000        | AV       | 35.3           | 31.2              | 6.8       | 41.1      | 0.2              | 32.4            | 53.9           | 21.5        |        |
| Hori.    | 7266.000        | AV       | 37.8           | 36.6              | 8.5       | 41.4      | 0.2              | 41.7            | 53.9           | 12.2        |        |
| Hori.    | 9688.000        | AV       | 34.6           | 38.6              | 9.5       | 38.9      | 0.2              | 44.0            | 53.9           | 9.9         |        |
| Hori.    | 12110.000       | AV       | 35.7           | 39.5              | 10.7      | 39.4      | 0.2              | 46.7            | 53.9           | 7.2         |        |
| Vert.    | 2390.000        | AV       | 49.3           | 27.4              | 14.2      | 41.4      | 0.2              | 49.7            | 53.9           | 4.2         |        |
| Vert.    | 4844.000        | AV       | 35.4           | 31.2              | 6.8       | 41.1      | 0.2              | 32.5            | 53.9           | 21.4        |        |
| Vert.    | 7266.000        | AV       | 36.8           | 36.6              | 8.5       | 41.4      | 0.2              | 40.7            | 53.9           | 13.2        |        |
| Vert.    | 9688.000        | AV       | 35.7           | 38.6              | 9.5       | 38.9      | 0.2              | 45.1            | 53.9           | 8.8         |        |
| Vert.    | 12110.000       | AV       | 34.6           | 39.5              | 10.7      | 39.4      | 0.2              | 45.6            | 53.9           | 8.3         |        |

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

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

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

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

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

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|-----------------|----------------|-------------|--------|
| Hori.    | 2422.000        | PK       | 87.0           | 27.5              | 14.2      | 41.4      | 87.3            | -              | -           |        |
| Hori.    | 2400.000        | PK       | 54.0           | 27.4              | 14.2      | 41.4      | 54.2            | 67.3           | 13.1        |        |
| Vert.    | 2422.000        | PK       | 88.1           | 27.5              | 14.2      | 41.4      | 88.4            | -              | -           |        |
| Vert.    | 2400.000        | PK       | 56.4           | 27.4              | 14.2      | 41.4      | 56.6            | 68.4           | 11.8        |        |

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

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## Radiated Emission

|                        |   |                            |
|------------------------|---|----------------------------|
| Test place             | No.3 Semi Anechoic Chamber                | No.1 Semi Anechoic Chamber |
| Date                   | November 17, 2012                         | November 22, 2012          |
| Temperature / Humidity | 25 deg.C, 42%RH                           | 26 deg.C, 43%RH            |
| Engineer               | Kenichi Adachi                            | Kenichi Adachi             |
| Mode                   | Tx, 2437.0 MHz<br>IEEE802.11n(HT40), MCS0 |                            |

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|-------------|--------|
| Hori.    | 4874.000        | PK       | 47.6           | 31.3            | 6.9       | 41.1      | 44.7            | 73.9           | 29.2        | 100         | 0           |        |
| Hori.    | 7311.000        | PK       | 46.2           | 36.6            | 8.6       | 41.4      | 50.0            | 73.9           | 23.9        | 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       | 45.0           | 39.5            | 10.7      | 39.3      | 55.9            | 73.9           | 18.0        | 100         | 0           |        |
| Vert.    | 4874.000        | PK       | 47.1           | 31.3            | 6.9       | 41.1      | 44.2            | 73.9           | 29.7        | 100         | 0           |        |
| Vert.    | 7311.000        | PK       | 47.0           | 36.6            | 8.6       | 41.4      | 50.8            | 73.9           | 23.1        | 100         | 0           |        |
| Vert.    | 9748.000        | PK       | 44.6           | 38.7            | 9.5       | 38.9      | 53.9            | 73.9           | 20.0        | 100         | 0           |        |
| Vert.    | 12185.000       | PK       | 44.7           | 39.5            | 10.7      | 39.3      | 55.6            | 73.9           | 18.3        | 100         | 0           |        |

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|------------------|-----------------|----------------|-------------|--------|
| Hori.    | 4874.000        | AV       | 35.6           | 31.3              | 6.9       | 41.1      | 0.2              | 32.9            | 53.9           | 21.0        |        |
| Hori.    | 7311.000        | AV       | 37.9           | 36.6              | 8.6       | 41.4      | 0.2              | 41.9            | 53.9           | 12.0        |        |
| Hori.    | 9748.000        | AV       | 35.0           | 38.7              | 9.5       | 38.9      | 0.2              | 44.5            | 53.9           | 9.4         |        |
| Hori.    | 12185.000       | AV       | 35.3           | 39.5              | 10.7      | 39.3      | 0.2              | 46.4            | 53.9           | 7.5         |        |
| Vert.    | 4874.000        | AV       | 34.6           | 31.3              | 6.9       | 41.1      | 0.2              | 31.9            | 53.9           | 22.0        |        |
| Vert.    | 7311.000        | AV       | 36.7           | 36.6              | 8.6       | 41.4      | 0.2              | 40.7            | 53.9           | 13.2        |        |
| Vert.    | 9748.000        | AV       | 34.6           | 38.7              | 9.5       | 38.9      | 0.2              | 44.1            | 53.9           | 9.8         |        |
| Vert.    | 12185.000       | AV       | 34.6           | 39.5              | 10.7      | 39.3      | 0.2              | 45.7            | 53.9           | 8.2         |        |

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

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

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

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

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

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## Radiated Emission

|                        |   |                            |
|------------------------|---|----------------------------|
| Test place             | No.3 Semi Anechoic Chamber                | No.1 Semi Anechoic Chamber |
| Date                   | November 17, 2012                         | November 22, 2012          |
| Temperature / Humidity | 25 deg.C, 42%RH                           | 26 deg.C, 43%RH            |
| Engineer               | Kenichi Adachi                            | Kenichi Adachi             |
| Mode                   | Tx, 2452.0 MHz<br>IEEE802.11n(HT40), MCS0 |                            |

(\* 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       | 58.9           | 27.5            | 14.3      | 41.4      | 59.3            | 73.9           | 14.6        | 201         | 298         |        |
| Hori.    | 4904.000        | PK       | 46.2           | 31.4            | 6.9       | 41.0      | 43.5            | 73.9           | 30.4        | 100         | 0           |        |
| Hori.    | 7356.000        | PK       | 47.0           | 36.6            | 8.7       | 41.5      | 50.8            | 73.9           | 23.1        | 100         | 0           |        |
| Hori.    | 9808.000        | PK       | 44.9           | 38.8            | 9.6       | 38.9      | 54.4            | 73.9           | 19.5        | 100         | 0           |        |
| Hori.    | 12260.000       | PK       | 44.2           | 39.5            | 10.8      | 39.3      | 55.2            | 73.9           | 18.7        | 100         | 0           |        |
| Vert.    | 2483.500        | PK       | 57.2           | 27.5            | 14.3      | 41.4      | 57.6            | 73.9           | 16.3        | 100         | 134         |        |
| Vert.    | 4904.000        | PK       | 46.7           | 31.4            | 6.9       | 41.0      | 44.0            | 73.9           | 29.9        | 100         | 0           |        |
| Vert.    | 7356.000        | PK       | 47.2           | 36.6            | 8.7       | 41.5      | 51.0            | 73.9           | 22.9        | 100         | 0           |        |
| Vert.    | 9808.000        | PK       | 44.4           | 38.8            | 9.6       | 38.9      | 53.9            | 73.9           | 20.0        | 100         | 0           |        |
| Vert.    | 12260.000       | PK       | 43.9           | 39.5            | 10.8      | 39.3      | 54.9            | 73.9           | 19.0        | 100         | 0           |        |

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|------------------|-----------------|----------------|-------------|--------|
| Hori.    | 2483.500        | AV       | 49.5           | 27.5              | 14.3      | 41.4      | 0.2              | 50.1            | 53.9           | 3.8         |        |
| Hori.    | 4904.000        | AV       | 36.4           | 31.4              | 6.9       | 41.0      | 0.2              | 33.9            | 53.9           | 20.0        |        |
| Hori.    | 7356.000        | AV       | 37.3           | 36.6              | 8.7       | 41.5      | 0.2              | 41.3            | 53.9           | 12.6        |        |
| Hori.    | 9808.000        | AV       | 34.8           | 38.8              | 9.6       | 38.9      | 0.2              | 44.5            | 53.9           | 9.4         |        |
| Hori.    | 12260.000       | AV       | 33.9           | 39.5              | 10.8      | 39.3      | 0.2              | 45.1            | 53.9           | 8.8         |        |
| Vert.    | 2483.500        | AV       | 47.6           | 27.5              | 14.3      | 41.4      | 0.2              | 48.2            | 53.9           | 5.7         |        |
| Vert.    | 4904.000        | AV       | 36.0           | 31.4              | 6.9       | 41.0      | 0.2              | 33.5            | 53.9           | 20.4        |        |
| Vert.    | 7356.000        | AV       | 37.1           | 36.6              | 8.7       | 41.5      | 0.2              | 41.1            | 53.9           | 12.8        |        |
| Vert.    | 9808.000        | AV       | 34.1           | 38.8              | 9.6       | 38.9      | 0.2              | 43.8            | 53.9           | 10.1        |        |
| Vert.    | 12260.000       | AV       | 33.6           | 39.5              | 10.8      | 39.3      | 0.2              | 44.8            | 53.9           | 9.1         |        |

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

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

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

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

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

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## Radiated Emission

|                        |   |                            |
|------------------------|---|----------------------------|
| Test place             | No.3 Semi Anechoic Chamber                | No.1 Semi Anechoic Chamber |
| Date                   | November 17, 2012                         | November 22, 2012          |
| Temperature / Humidity | 25 deg.C, 42%RH                           | 26 deg.C, 43%RH            |
| Engineer               | Kenichi Adachi                            | Kenichi Adachi             |
| Mode                   | Tx, 2412.0 MHz<br>IEEE802.11n(HT20), MCS8 |                            |

(\* 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       | 62.3           | 27.4            | 14.2      | 41.4      | 62.5            | 73.9           | 11.4        | 204         | 301         |        |
| Hori.    | 4824.000        | PK       | 46.8           | 31.1            | 6.8       | 41.2      | 43.5            | 73.9           | 30.4        | 100         | 0           |        |
| Hori.    | 7236.000        | PK       | 47.0           | 36.6            | 8.5       | 41.4      | 50.7            | 73.9           | 23.2        | 100         | 0           |        |
| Hori.    | 9648.000        | PK       | 44.1           | 38.6            | 9.4       | 38.9      | 53.2            | 73.9           | 20.7        | 100         | 0           |        |
| Hori.    | 12060.000       | PK       | 45.7           | 39.5            | 10.7      | 39.4      | 56.5            | 73.9           | 17.4        | 100         | 0           |        |
| Vert.    | 2390.000        | PK       | 61.2           | 27.4            | 14.2      | 41.4      | 61.4            | 73.9           | 12.5        | 212         | 9           |        |
| Vert.    | 4824.000        | PK       | 47.4           | 31.1            | 6.8       | 41.2      | 44.1            | 73.9           | 29.8        | 100         | 0           |        |
| Vert.    | 7236.000        | PK       | 48.0           | 36.6            | 8.5       | 41.4      | 51.7            | 73.9           | 22.2        | 100         | 0           |        |
| Vert.    | 9648.000        | PK       | 43.8           | 38.6            | 9.4       | 38.9      | 52.9            | 73.9           | 21.0        | 100         | 0           |        |
| Vert.    | 12060.000       | PK       | 46.0           | 39.5            | 10.7      | 39.4      | 56.8            | 73.9           | 17.1        | 100         | 0           |        |

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|------------------|-----------------|----------------|-------------|--------|
| Hori.    | 2390.000        | AV       | 50.2           | 27.4              | 14.2      | 41.4      | 0.2              | 50.6            | 53.9           | 3.3         |        |
| Hori.    | 4824.000        | AV       | 34.8           | 31.1              | 6.8       | 41.2      | 0.2              | 31.7            | 53.9           | 22.2        |        |
| Hori.    | 7236.000        | AV       | 35.7           | 36.6              | 8.5       | 41.4      | 0.2              | 39.6            | 53.9           | 14.3        |        |
| Hori.    | 9648.000        | AV       | 35.7           | 38.6              | 9.4       | 38.9      | 0.2              | 45.0            | 53.9           | 8.9         |        |
| Hori.    | 12060.000       | AV       | 35.2           | 39.5              | 10.7      | 39.4      | 0.2              | 46.2            | 53.9           | 7.7         |        |
| Vert.    | 2390.000        | AV       | 49.5           | 27.4              | 14.2      | 41.4      | 0.2              | 49.9            | 53.9           | 4.0         |        |
| Vert.    | 4824.000        | AV       | 35.7           | 31.1              | 6.8       | 41.2      | 0.2              | 32.6            | 53.9           | 21.3        |        |
| Vert.    | 7236.000        | AV       | 36.9           | 36.6              | 8.5       | 41.4      | 0.2              | 40.8            | 53.9           | 13.1        |        |
| Vert.    | 9648.000        | AV       | 34.8           | 38.6              | 9.4       | 38.9      | 0.2              | 44.1            | 53.9           | 9.8         |        |
| Vert.    | 12060.000       | AV       | 33.6           | 39.5              | 10.7      | 39.4      | 0.2              | 44.6            | 53.9           | 9.3         |        |

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

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

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

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

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

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|-----------------|----------------|-------------|--------|
| Hori.    | 2412.000        | PK       | 92.1           | 27.5              | 14.2      | 41.4      | 92.4            | -              | -           |        |
| Hori.    | 2400.000        | PK       | 59.0           | 27.4              | 14.2      | 41.4      | 59.2            | 72.4           | 13.2        |        |
| Vert.    | 2412.000        | PK       | 95.2           | 27.5              | 14.2      | 41.4      | 95.5            | -              | -           |        |
| Vert.    | 2400.000        | PK       | 59.4           | 27.4              | 14.2      | 41.4      | 59.6            | 75.5           | 15.9        |        |

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

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## Radiated Emission

|                        |   |                            |
|------------------------|---|----------------------------|
| Test place             | No.3 Semi Anechoic Chamber                | No.1 Semi Anechoic Chamber |
| Date                   | November 17, 2012                         | November 22, 2012          |
| Temperature / Humidity | 25 deg.C, 42%RH                           | 26 deg.C, 43%RH            |
| Engineer               | Kenichi Adachi                            | Kenichi Adachi             |
| Mode                   | Tx, 2437.0 MHz<br>IEEE802.11n(HT20), MCS8 |                            |

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|-------------|--------|
| Hori.    | 4874.000        | PK       | 46.0           | 31.3            | 6.9       | 41.1      | 43.1            | 73.9           | 30.8        | 100         | 0           |        |
| Hori.    | 7311.000        | PK       | 46.3           | 36.6            | 8.6       | 41.4      | 50.1            | 73.9           | 23.8        | 100         | 0           |        |
| Hori.    | 9748.000        | PK       | 45.3           | 38.7            | 9.5       | 38.9      | 54.6            | 73.9           | 19.3        | 100         | 0           |        |
| Hori.    | 12185.000       | PK       | 45.5           | 39.5            | 10.7      | 39.3      | 56.4            | 73.9           | 17.5        | 100         | 0           |        |
| Vert.    | 4874.000        | PK       | 46.5           | 31.3            | 6.9       | 41.1      | 43.6            | 73.9           | 30.3        | 100         | 0           |        |
| Vert.    | 7311.000        | PK       | 46.2           | 36.6            | 8.6       | 41.4      | 50.0            | 73.9           | 23.9        | 100         | 0           |        |
| Vert.    | 9748.000        | PK       | 44.0           | 38.7            | 9.5       | 38.9      | 53.3            | 73.9           | 20.6        | 100         | 0           |        |
| Vert.    | 12185.000       | PK       | 45.2           | 39.5            | 10.7      | 39.3      | 56.1            | 73.9           | 17.8        | 100         | 0           |        |

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|------------------|-----------------|----------------|-------------|--------|
| Hori.    | 4874.000        | AV       | 36.8           | 31.3              | 6.9       | 41.1      | 0.2              | 34.1            | 53.9           | 19.8        |        |
| Hori.    | 7311.000        | AV       | 35.6           | 36.6              | 8.6       | 41.4      | 0.2              | 39.6            | 53.9           | 14.3        |        |
| Hori.    | 9748.000        | AV       | 33.4           | 38.7              | 9.5       | 38.9      | 0.2              | 42.9            | 53.9           | 11.0        |        |
| Hori.    | 12185.000       | AV       | 35.8           | 39.5              | 10.7      | 39.3      | 0.2              | 46.9            | 53.9           | 7.0         |        |
| Vert.    | 4874.000        | AV       | 35.7           | 31.3              | 6.9       | 41.1      | 0.2              | 33.0            | 53.9           | 20.9        |        |
| Vert.    | 7311.000        | AV       | 35.2           | 36.6              | 8.6       | 41.4      | 0.2              | 39.2            | 53.9           | 14.7        |        |
| Vert.    | 9748.000        | AV       | 35.2           | 38.7              | 9.5       | 38.9      | 0.2              | 44.7            | 53.9           | 9.2         |        |
| Vert.    | 12185.000       | AV       | 35.0           | 39.5              | 10.7      | 39.3      | 0.2              | 46.1            | 53.9           | 7.8         |        |

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

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

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

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

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

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## Radiated Emission

|                        |   |                            |
|------------------------|---|----------------------------|
| Test place             | No.3 Semi Anechoic Chamber                | No.1 Semi Anechoic Chamber |
| Date                   | November 17, 2012                         | November 22, 2012          |
| Temperature / Humidity | 25 deg.C, 42%RH                           | 26 deg.C, 43%RH            |
| Engineer               | Kenichi Adachi                            | Kenichi Adachi             |
| Mode                   | Tx, 2462.0 MHz<br>IEEE802.11n(HT20), MCS8 |                            |

(\* 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       | 61.9           | 27.5            | 14.3      | 41.4      | 62.3            | 73.9           | 11.6        | 100         | 300         |        |
| Hori.    | 4924.000        | PK       | 46.1           | 31.5            | 6.9       | 41.0      | 43.5            | 73.9           | 30.4        | 100         | 0           |        |
| Hori.    | 7386.000        | PK       | 46.5           | 36.7            | 8.7       | 41.5      | 50.4            | 73.9           | 23.5        | 100         | 0           |        |
| Hori.    | 9848.000        | PK       | 40.5           | 38.9            | 9.5       | 38.9      | 50.0            | 73.9           | 23.9        | 100         | 0           |        |
| Hori.    | 12310.000       | PK       | 45.8           | 39.5            | 10.8      | 39.3      | 56.8            | 73.9           | 17.1        | 100         | 0           |        |
| Vert.    | 2483.500        | PK       | 62.2           | 27.5            | 14.3      | 41.4      | 62.6            | 73.9           | 11.3        | 126         | 269         |        |
| Vert.    | 4924.000        | PK       | 46.4           | 31.5            | 6.9       | 41.0      | 43.8            | 73.9           | 30.1        | 100         | 0           |        |
| Vert.    | 7386.000        | PK       | 46.2           | 36.7            | 8.7       | 41.5      | 50.1            | 73.9           | 23.8        | 100         | 0           |        |
| Vert.    | 9848.000        | PK       | 43.9           | 38.9            | 9.5       | 38.9      | 53.4            | 73.9           | 20.5        | 100         | 0           |        |
| Vert.    | 12310.000       | PK       | 45.3           | 39.5            | 10.8      | 39.3      | 56.3            | 73.9           | 17.6        | 100         | 0           |        |

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|------------------|-----------------|----------------|-------------|--------|
| Hori.    | 2483.500        | AV       | 51.4           | 27.5              | 14.3      | 41.4      | 0.2              | 52.0            | 53.9           | 1.9         |        |
| Hori.    | 4924.000        | AV       | 35.8           | 31.5              | 6.9       | 41.0      | 0.2              | 33.4            | 53.9           | 20.5        |        |
| Hori.    | 7386.000        | AV       | 35.6           | 36.7              | 8.7       | 41.5      | 0.2              | 39.7            | 53.9           | 14.2        |        |
| Hori.    | 9848.000        | AV       | 34.7           | 38.9              | 9.5       | 38.9      | 0.2              | 44.4            | 53.9           | 9.5         |        |
| Hori.    | 12310.000       | AV       | 33.2           | 39.5              | 10.8      | 39.3      | 0.2              | 44.4            | 53.9           | 9.5         |        |
| Vert.    | 2483.500        | AV       | 52.0           | 27.5              | 14.3      | 41.4      | 0.2              | 52.6            | 53.9           | 1.3         |        |
| Vert.    | 4924.000        | AV       | 35.4           | 31.5              | 6.9       | 41.0      | 0.2              | 33.0            | 53.9           | 20.9        |        |
| Vert.    | 7386.000        | AV       | 35.2           | 36.7              | 8.7       | 41.5      | 0.2              | 39.3            | 53.9           | 14.6        |        |
| Vert.    | 9848.000        | AV       | 33.0           | 38.9              | 9.5       | 38.9      | 0.2              | 42.7            | 53.9           | 11.2        |        |
| Vert.    | 12310.000       | AV       | 34.5           | 39.5              | 10.8      | 39.3      | 0.2              | 45.7            | 53.9           | 8.2         |        |

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

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

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

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

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

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## Radiated Emission

|                        |   |                            |
|------------------------|---|----------------------------|
| Test place             | No.3 Semi Anechoic Chamber                | No.1 Semi Anechoic Chamber |
| Date                   | November 17, 2012                         | November 22, 2012          |
| Temperature / Humidity | 25 deg.C, 42%RH                           | 26 deg.C, 43%RH            |
| Engineer               | Kenichi Adachi                            | Kenichi Adachi             |
| Mode                   | Tx, 2422.0 MHz<br>IEEE802.11n(HT40), MCS8 |                            |

(\* 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       | 61.6           | 27.4            | 14.2      | 41.4      | 61.8            | 73.9           | 12.1        | 236         | 301         |        |
| Hori.    | 4844.000        | PK       | 46.3           | 31.2            | 6.8       | 41.1      | 43.2            | 73.9           | 30.7        | 100         | 0           |        |
| Hori.    | 7266.000        | PK       | 47.1           | 36.6            | 8.5       | 41.4      | 50.8            | 73.9           | 23.1        | 100         | 0           |        |
| Hori.    | 9688.000        | PK       | 43.5           | 38.6            | 9.5       | 38.9      | 52.7            | 73.9           | 21.2        | 100         | 0           |        |
| Hori.    | 12110.000       | PK       | 46.0           | 39.5            | 10.7      | 39.4      | 56.8            | 73.9           | 17.1        | 100         | 0           |        |
| Vert.    | 2390.000        | PK       | 62.3           | 27.4            | 14.2      | 41.4      | 62.5            | 73.9           | 11.4        | 230         | 304         |        |
| Vert.    | 4844.000        | PK       | 46.4           | 31.2            | 6.8       | 41.1      | 43.3            | 73.9           | 30.6        | 100         | 0           |        |
| Vert.    | 7266.000        | PK       | 47.3           | 36.6            | 8.5       | 41.4      | 51.0            | 73.9           | 22.9        | 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       | 46.4           | 39.5            | 10.7      | 39.4      | 57.2            | 73.9           | 16.7        | 100         | 0           |        |

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|------------------|-----------------|----------------|-------------|--------|
| Hori.    | 2390.000        | AV       | 51.2           | 27.4              | 14.2      | 41.4      | 0.4              | 51.8            | 53.9           | 2.1         |        |
| Hori.    | 4844.000        | AV       | 37.6           | 31.2              | 6.8       | 41.1      | 0.4              | 34.9            | 53.9           | 19.0        |        |
| Hori.    | 7266.000        | AV       | 38.2           | 36.6              | 8.5       | 41.4      | 0.4              | 42.3            | 53.9           | 11.6        |        |
| Hori.    | 9688.000        | AV       | 35.7           | 38.6              | 9.5       | 38.9      | 0.4              | 45.3            | 53.9           | 8.6         |        |
| Hori.    | 12110.000       | AV       | 37.1           | 39.5              | 10.7      | 39.4      | 0.4              | 48.3            | 53.9           | 5.6         |        |
| Vert.    | 2390.000        | AV       | 50.5           | 27.4              | 14.2      | 41.4      | 0.4              | 51.1            | 53.9           | 2.8         |        |
| Vert.    | 4844.000        | AV       | 37.6           | 31.2              | 6.8       | 41.1      | 0.4              | 34.9            | 53.9           | 19.0        |        |
| Vert.    | 7266.000        | AV       | 37.4           | 36.6              | 8.5       | 41.4      | 0.4              | 41.5            | 53.9           | 12.4        |        |
| Vert.    | 9688.000        | AV       | 35.6           | 38.6              | 9.5       | 38.9      | 0.4              | 45.2            | 53.9           | 8.7         |        |
| Vert.    | 12110.000       | AV       | 36.2           | 39.5              | 10.7      | 39.4      | 0.4              | 47.4            | 53.9           | 6.5         |        |

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

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

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

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

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

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|-----------------|----------------|-------------|--------|
| Hori.    | 2422.000        | PK       | 86.6           | 27.5              | 14.2      | 41.4      | 86.9            | -              | -           |        |
| Hori.    | 2400.000        | PK       | 52.8           | 27.4              | 14.2      | 41.4      | 53.0            | 66.9           | 13.9        |        |
| Vert.    | 2422.000        | PK       | 87.4           | 27.5              | 14.2      | 41.4      | 87.7            | -              | -           |        |
| Vert.    | 2400.000        | PK       | 52.4           | 27.4              | 14.2      | 41.4      | 52.6            | 67.7           | 15.1        |        |

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

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## Radiated Emission

|                        |   |                            |
|------------------------|---|----------------------------|
| Test place             | No.3 Semi Anechoic Chamber                | No.1 Semi Anechoic Chamber |
| Date                   | November 17, 2012                         | November 22, 2012          |
| Temperature / Humidity | 25 deg.C, 42%RH                           | 26 deg.C, 43%RH            |
| Engineer               | Kenichi Adachi                            | Kenichi Adachi             |
| Mode                   | Tx, 2437.0 MHz<br>IEEE802.11n(HT40), MCS8 |                            |

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|-------------|--------|
| Hori.    | 4874.000        | PK       | 45.8           | 31.3            | 6.9       | 41.1      | 42.9            | 73.9           | 31.0        | 100         | 0           |        |
| Hori.    | 7311.000        | PK       | 46.7           | 36.6            | 8.6       | 41.4      | 50.5            | 73.9           | 23.4        | 100         | 0           |        |
| Hori.    | 9748.000        | PK       | 46.0           | 38.7            | 9.5       | 38.9      | 55.3            | 73.9           | 18.6        | 100         | 0           |        |
| Hori.    | 12185.000       | PK       | 46.2           | 39.5            | 10.7      | 39.3      | 57.1            | 73.9           | 16.8        | 100         | 0           |        |
| Vert.    | 4874.000        | PK       | 46.5           | 31.3            | 6.9       | 41.1      | 43.6            | 73.9           | 30.3        | 100         | 0           |        |
| Vert.    | 7311.000        | PK       | 45.8           | 36.6            | 8.6       | 41.4      | 49.6            | 73.9           | 24.3        | 100         | 0           |        |
| Vert.    | 9748.000        | PK       | 44.6           | 38.7            | 9.5       | 38.9      | 53.9            | 73.9           | 20.0        | 100         | 0           |        |
| Vert.    | 12185.000       | PK       | 45.8           | 39.5            | 10.7      | 39.3      | 56.7            | 73.9           | 17.2        | 100         | 0           |        |

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|------------------|-----------------|----------------|-------------|--------|
| Hori.    | 4874.000        | AV       | 35.9           | 31.3              | 6.9       | 41.1      | 0.4              | 33.4            | 53.9           | 20.5        |        |
| Hori.    | 7311.000        | AV       | 36.8           | 36.6              | 8.6       | 41.4      | 0.4              | 41.0            | 53.9           | 12.9        |        |
| Hori.    | 9748.000        | AV       | 35.8           | 38.7              | 9.5       | 38.9      | 0.4              | 45.5            | 53.9           | 8.4         |        |
| Hori.    | 12185.000       | AV       | 34.8           | 39.5              | 10.7      | 39.3      | 0.4              | 46.1            | 53.9           | 7.8         |        |
| Vert.    | 4874.000        | AV       | 35.7           | 31.3              | 6.9       | 41.1      | 0.4              | 33.2            | 53.9           | 20.7        |        |
| Vert.    | 7311.000        | AV       | 36.8           | 36.6              | 8.6       | 41.4      | 0.4              | 41.0            | 53.9           | 12.9        |        |
| Vert.    | 9748.000        | AV       | 35.8           | 38.7              | 9.5       | 38.9      | 0.4              | 45.5            | 53.9           | 8.4         |        |
| Vert.    | 12185.000       | AV       | 34.8           | 39.5              | 10.7      | 39.3      | 0.4              | 46.1            | 53.9           | 7.8         |        |

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

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

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

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

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

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## Radiated Emission

|                        |   |                            |
|------------------------|---|----------------------------|
| Test place             | No.3 Semi Anechoic Chamber                | No.1 Semi Anechoic Chamber |
| Date                   | November 17, 2012                         | November 22, 2012          |
| Temperature / Humidity | 25 deg.C, 42%RH                           | 26 deg.C, 43%RH            |
| Engineer               | Kenichi Adachi                            | Kenichi Adachi             |
| Mode                   | Tx, 2452.0 MHz<br>IEEE802.11n(HT40), MCS8 |                            |

(\* 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       | 58.2           | 27.5            | 14.3      | 41.4      | 58.6            | 73.9           | 15.3        | 159         |             |        |
| Hori.    | 4904.000        | PK       | 46.3           | 31.4            | 6.9       | 41.0      | 43.6            | 73.9           | 30.3        | 100         | 62          |        |
| Hori.    | 7356.000        | PK       | 47.6           | 36.6            | 8.7       | 41.5      | 51.4            | 73.9           | 22.5        | 100         | 0           |        |
| Hori.    | 9808.000        | PK       | 44.2           | 38.8            | 9.6       | 38.9      | 53.7            | 73.9           | 20.2        | 100         | 0           |        |
| Hori.    | 12260.000       | PK       | 42.1           | 39.5            | 10.8      | 39.3      | 53.1            | 73.9           | 20.8        | 122         | 287         |        |
| Vert.    | 2483.500        | PK       | 60.2           | 27.5            | 14.3      | 41.4      | 60.6            | 73.9           | 13.3        | 100         | 0           |        |
| Vert.    | 4904.000        | PK       | 46.4           | 31.4            | 6.9       | 41.0      | 43.7            | 73.9           | 30.2        | 100         | 0           |        |
| Vert.    | 7356.000        | PK       | 47.2           | 36.6            | 8.7       | 41.5      | 51.0            | 73.9           | 22.9        | 100         | 0           |        |
| Vert.    | 9808.000        | PK       | 45.2           | 38.8            | 9.6       | 38.9      | 54.7            | 73.9           | 19.2        | 100         | 0           |        |
| Vert.    | 12260.000       | PK       | 43.0           | 39.5            | 10.8      | 39.3      | 54.0            | 73.9           | 19.9        | 100         | 0           |        |

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-------------------|-----------|-----------|------------------|-----------------|----------------|-------------|--------|
| Hori.    | 2483.500        | AV       | 50.2           | 27.5              | 14.3      | 41.4      | 0.4              | 51.0            | 53.9           | 2.9         |        |
| Hori.    | 4904.000        | AV       | 36.5           | 31.4              | 6.9       | 41.0      | 0.4              | 34.2            | 53.9           | 19.7        |        |
| Hori.    | 7356.000        | AV       | 36.2           | 36.6              | 8.7       | 41.5      | 0.4              | 40.4            | 53.9           | 13.5        |        |
| Hori.    | 9808.000        | AV       | 35.6           | 38.8              | 9.6       | 38.9      | 0.4              | 45.5            | 53.9           | 8.4         |        |
| Hori.    | 12260.000       | AV       | 35.1           | 39.5              | 10.8      | 39.3      | 0.4              | 46.5            | 53.9           | 7.4         |        |
| Vert.    | 2483.500        | AV       | 51.6           | 27.5              | 14.3      | 41.4      | 0.4              | 52.4            | 53.9           | 1.5         |        |
| Vert.    | 4904.000        | AV       | 36.3           | 31.4              | 6.9       | 41.0      | 0.4              | 34.0            | 53.9           | 19.9        |        |
| Vert.    | 7356.000        | AV       | 36.9           | 36.6              | 8.7       | 41.5      | 0.4              | 41.1            | 53.9           | 12.8        |        |
| Vert.    | 9808.000        | AV       | 35.6           | 38.8              | 9.6       | 38.9      | 0.4              | 45.5            | 53.9           | 8.4         |        |
| Vert.    | 12260.000       | AV       | 35.8           | 39.5              | 10.8      | 39.3      | 0.4              | 47.2            | 53.9           | 6.7         |        |

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

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

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

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

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

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**(Reference chart) Spurious emission (Conducted)**

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

Tx, 2412MHz (below 1GHz)



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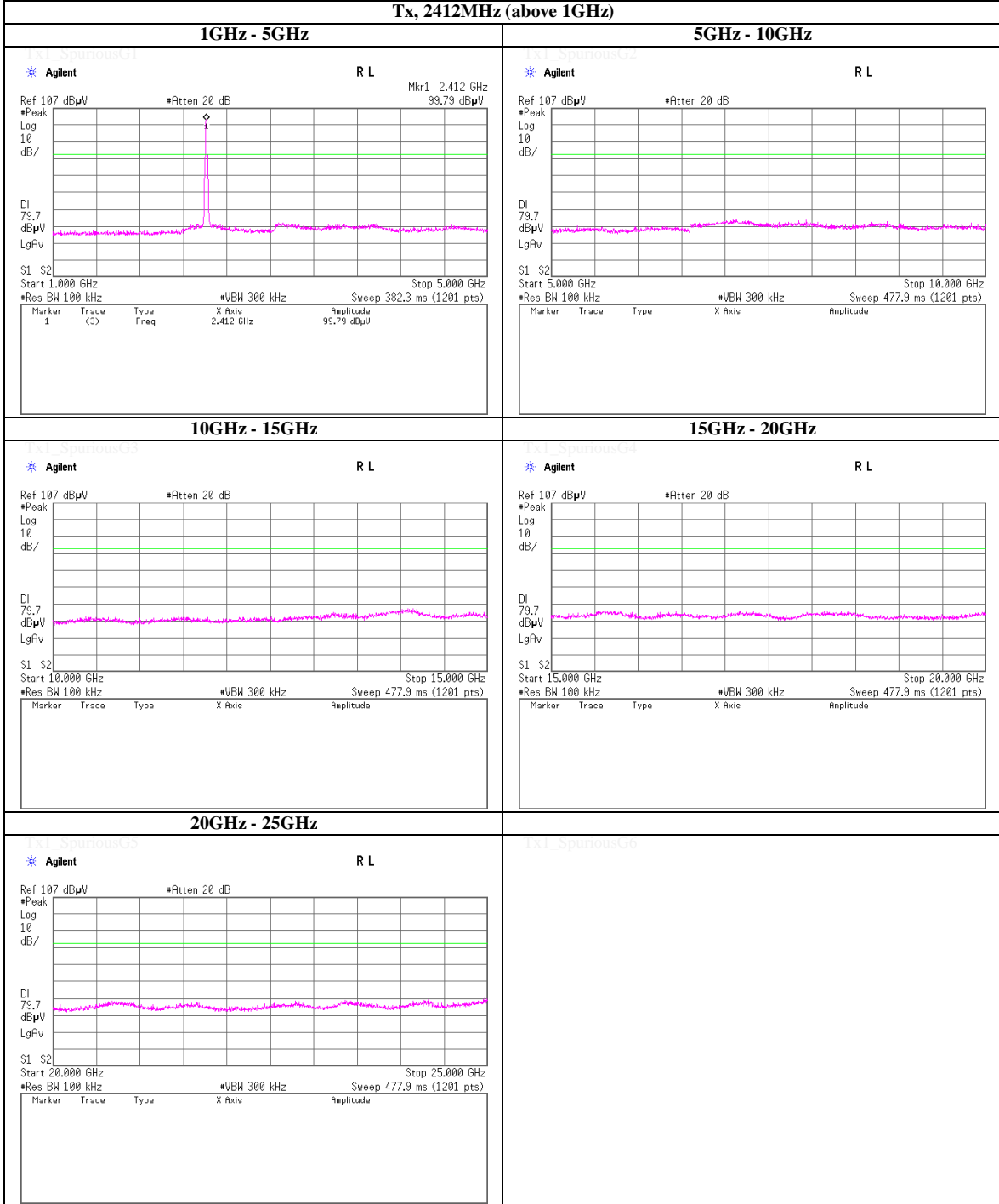
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**(Reference chart) Spurious emission (Conducted)**

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

**Tx, 2412MHz (above 1GHz)**

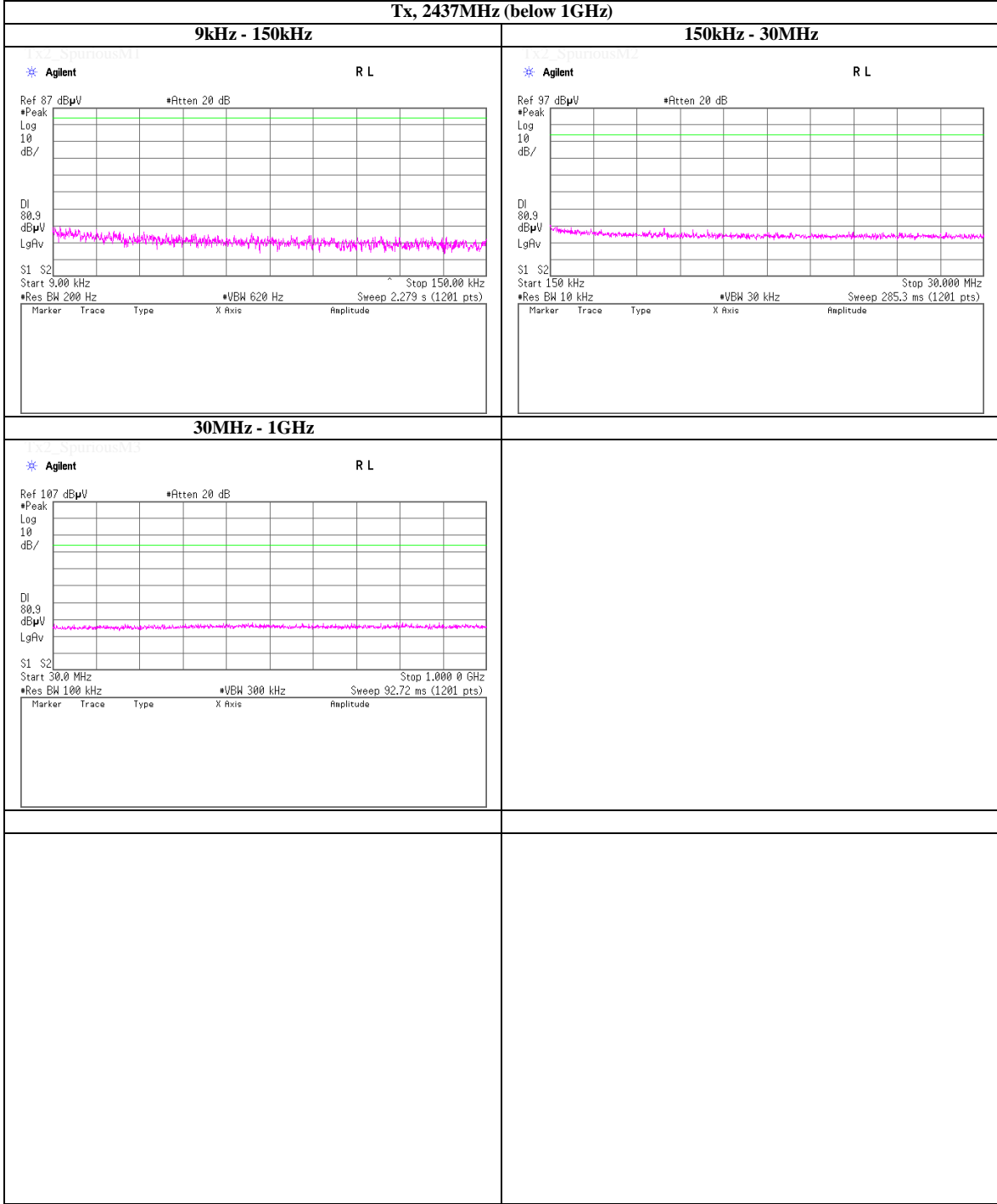


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**(Reference chart) Spurious emission (Conducted)**

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

**Tx, 2437MHz (below 1GHz)**

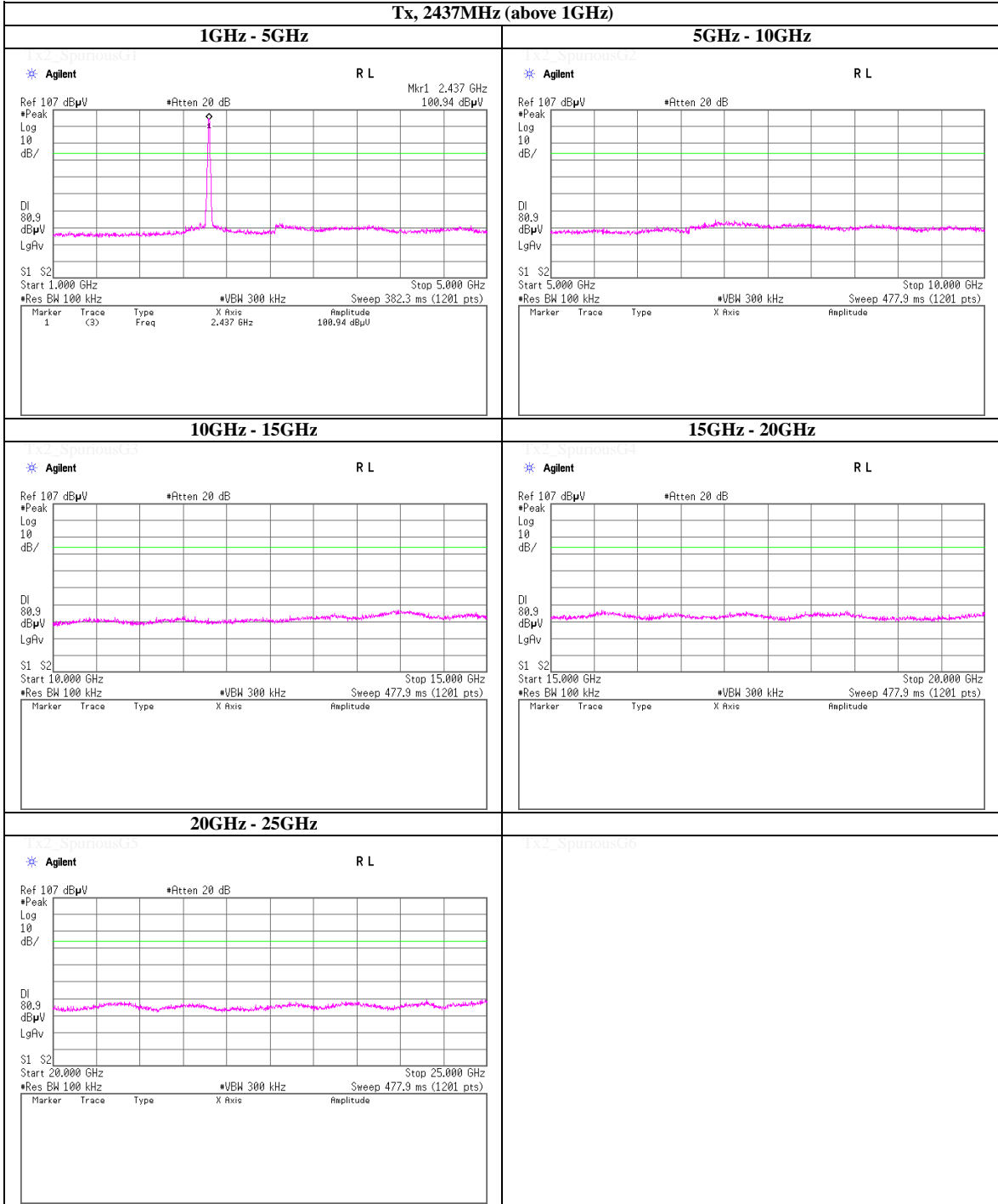


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**(Reference chart) Spurious emission (Conducted)**

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

**Tx, 2437MHz (above 1GHz)**

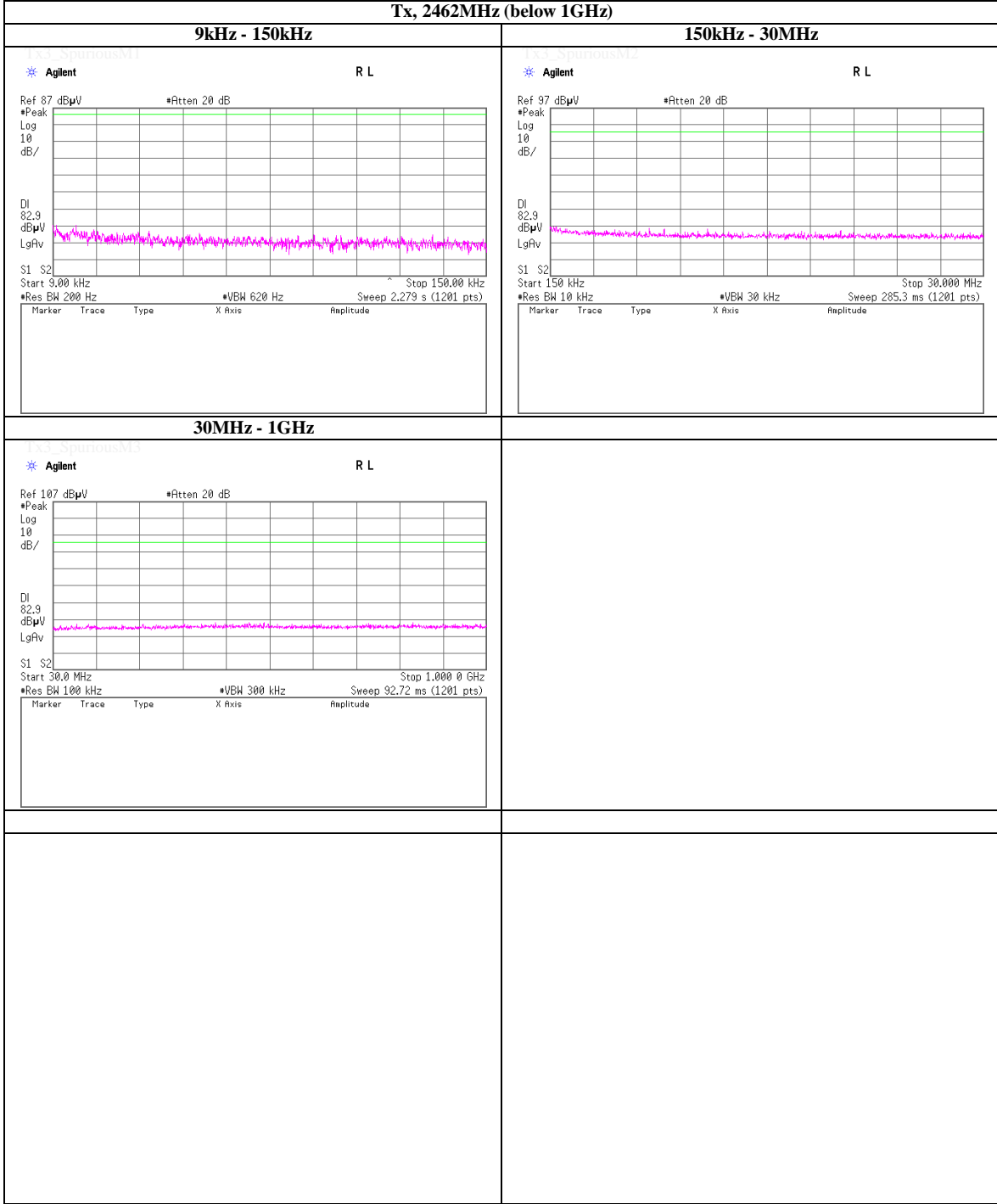


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**(Reference chart) Spurious emission (Conducted)**

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

**Tx, 2462MHz (below 1GHz)**

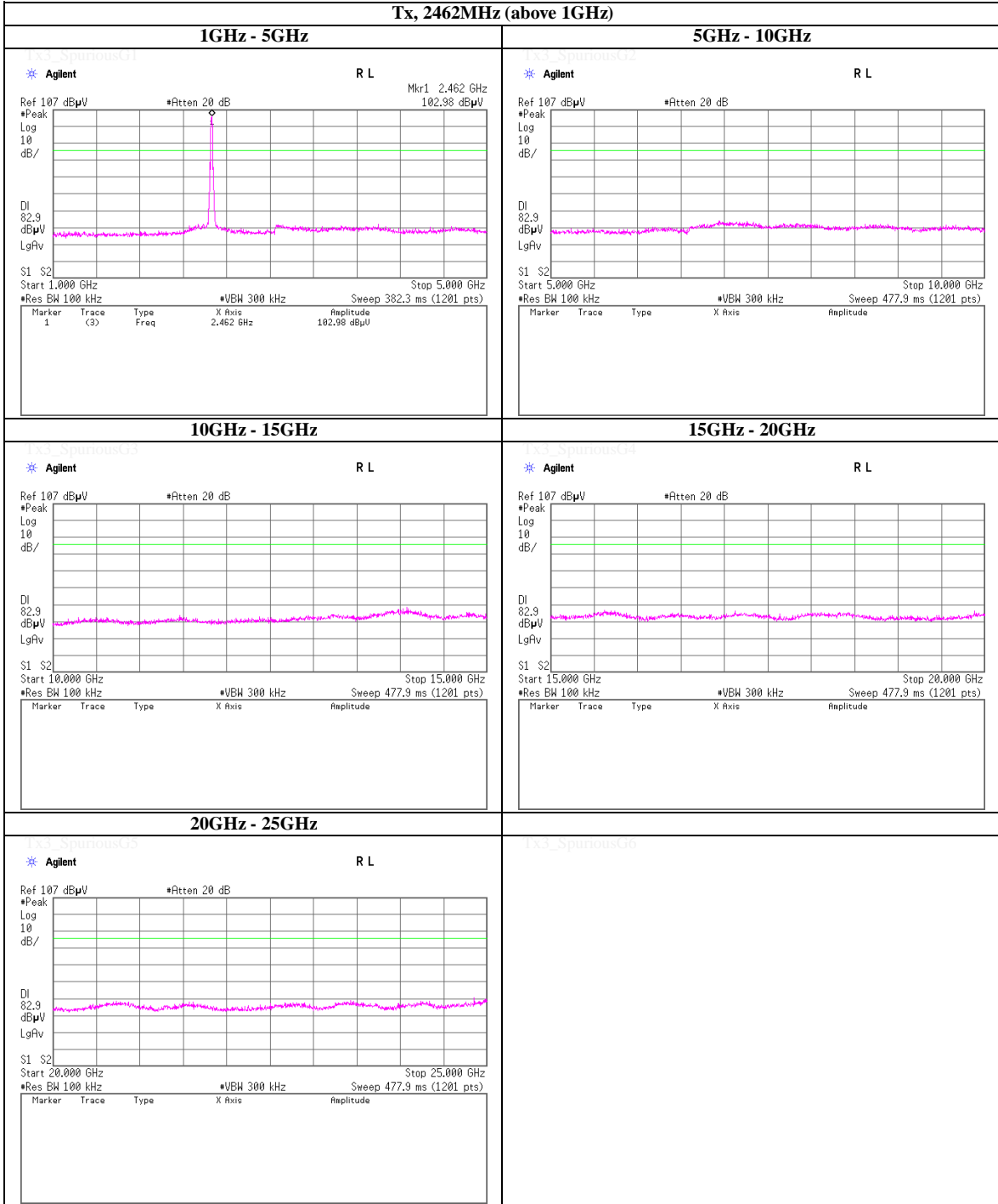


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**(Reference chart) Spurious emission (Conducted)**

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

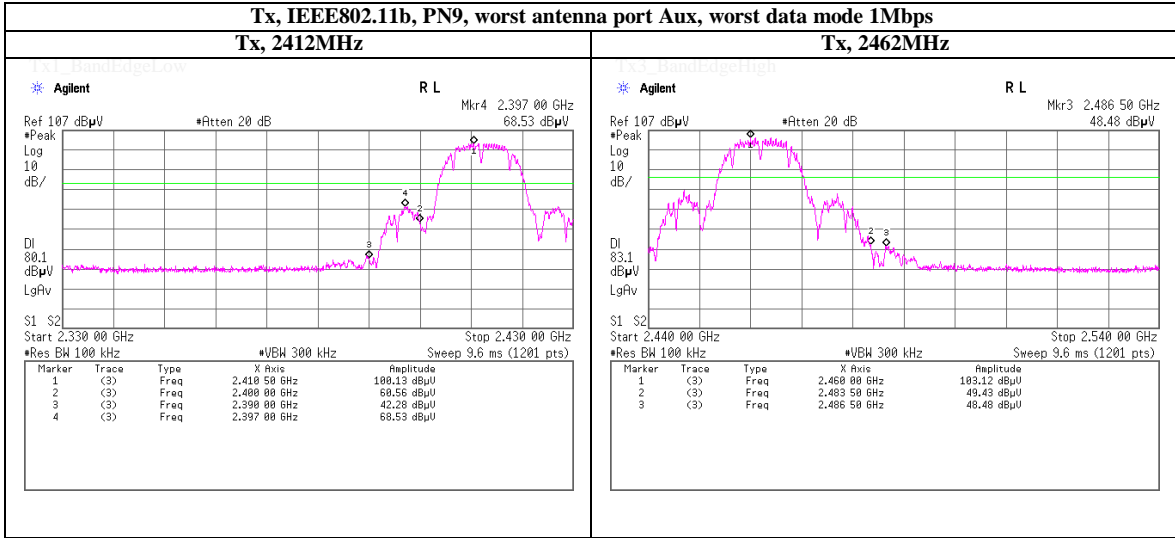
**Tx, 2462MHz (above 1GHz)**



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**(Reference chart) Spurious emission (Conducted)**

**Band Edge compliance**



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**(Reference chart) Spurious emission (Conducted)**

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

**Tx, 2412MHz (below 1GHz)**

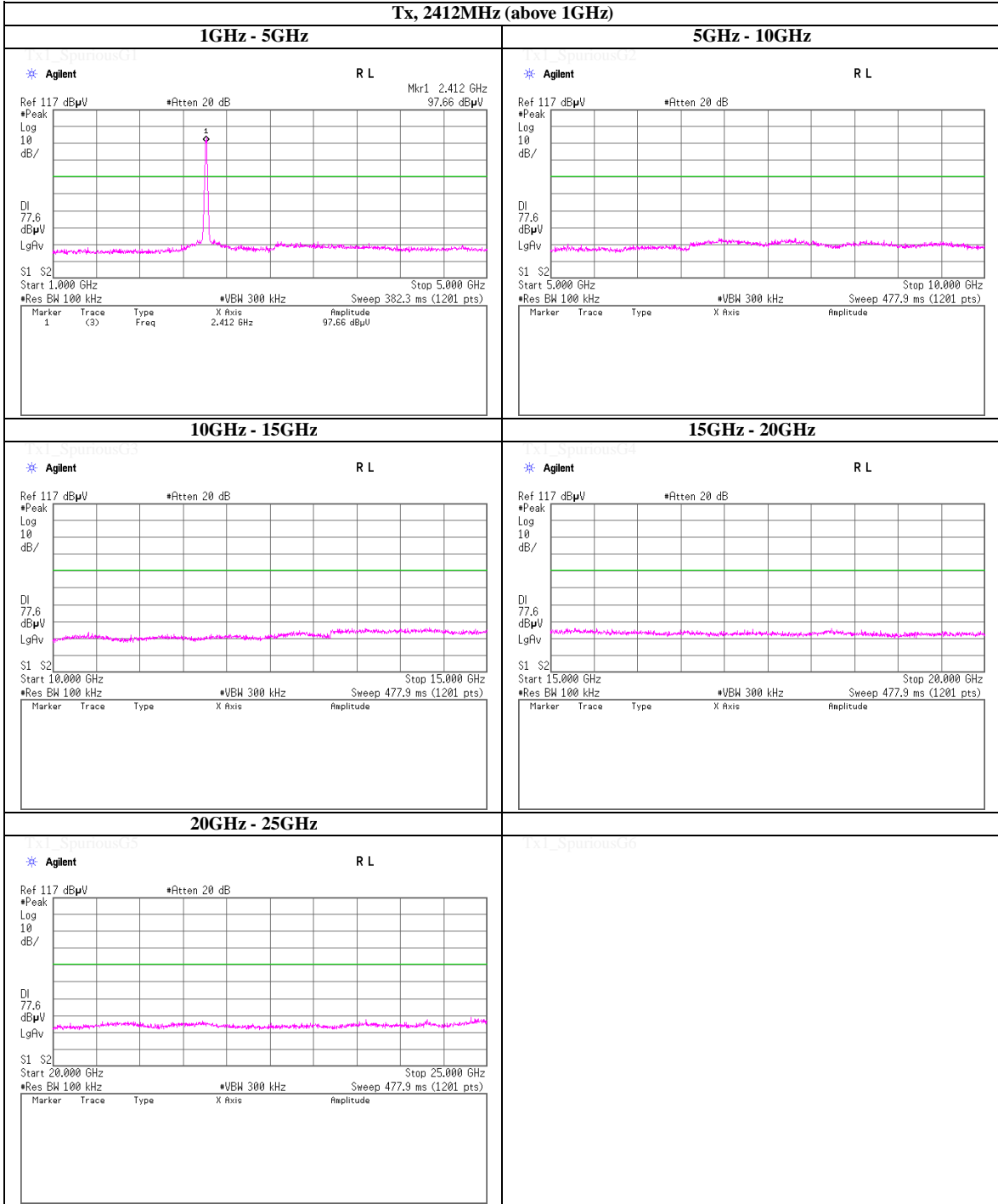


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**(Reference chart) Spurious emission (Conducted)**

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

**Tx, 2412MHz (above 1GHz)**

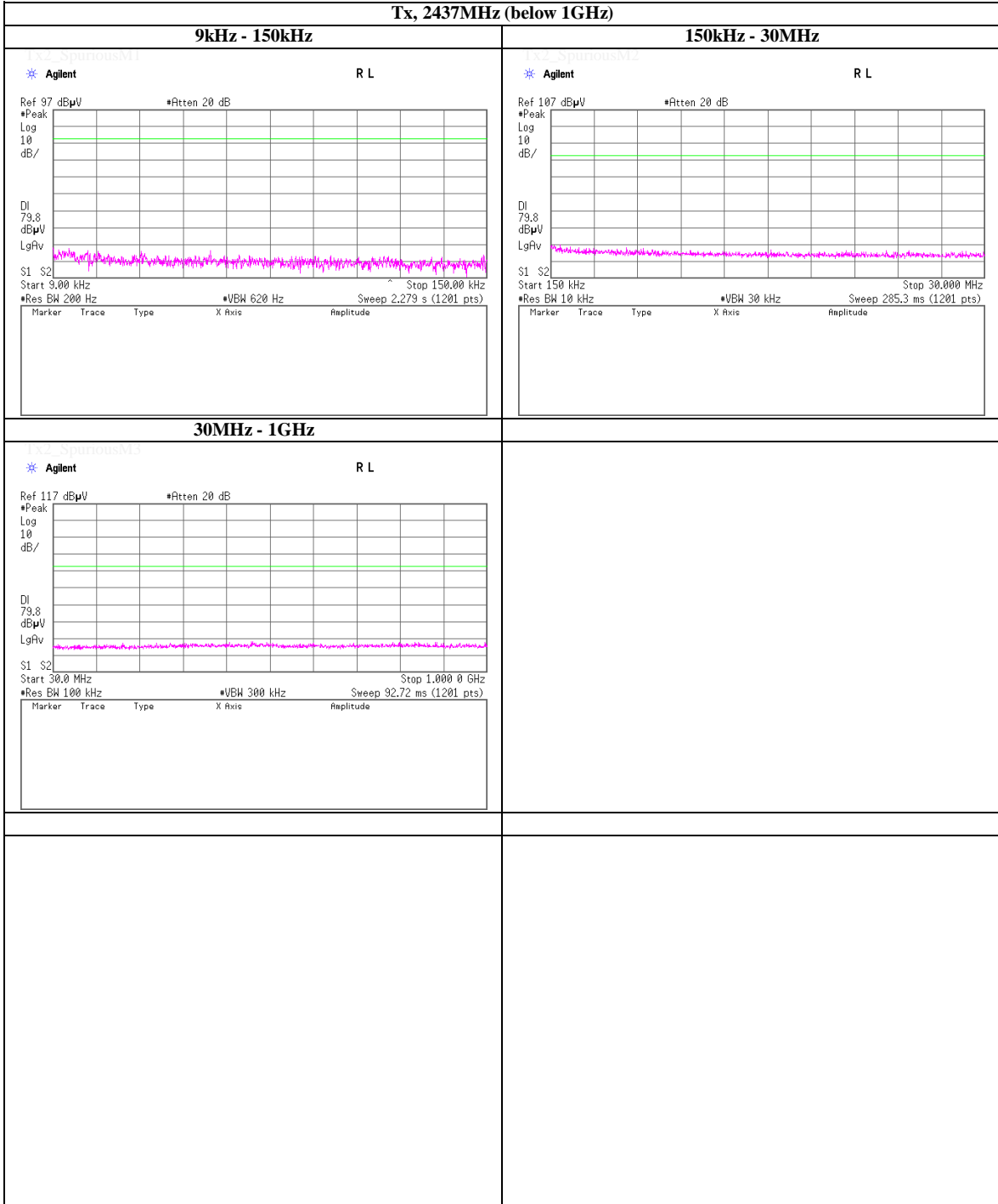


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**(Reference chart) Spurious emission (Conducted)**

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

**Tx, 2437MHz (below 1GHz)**

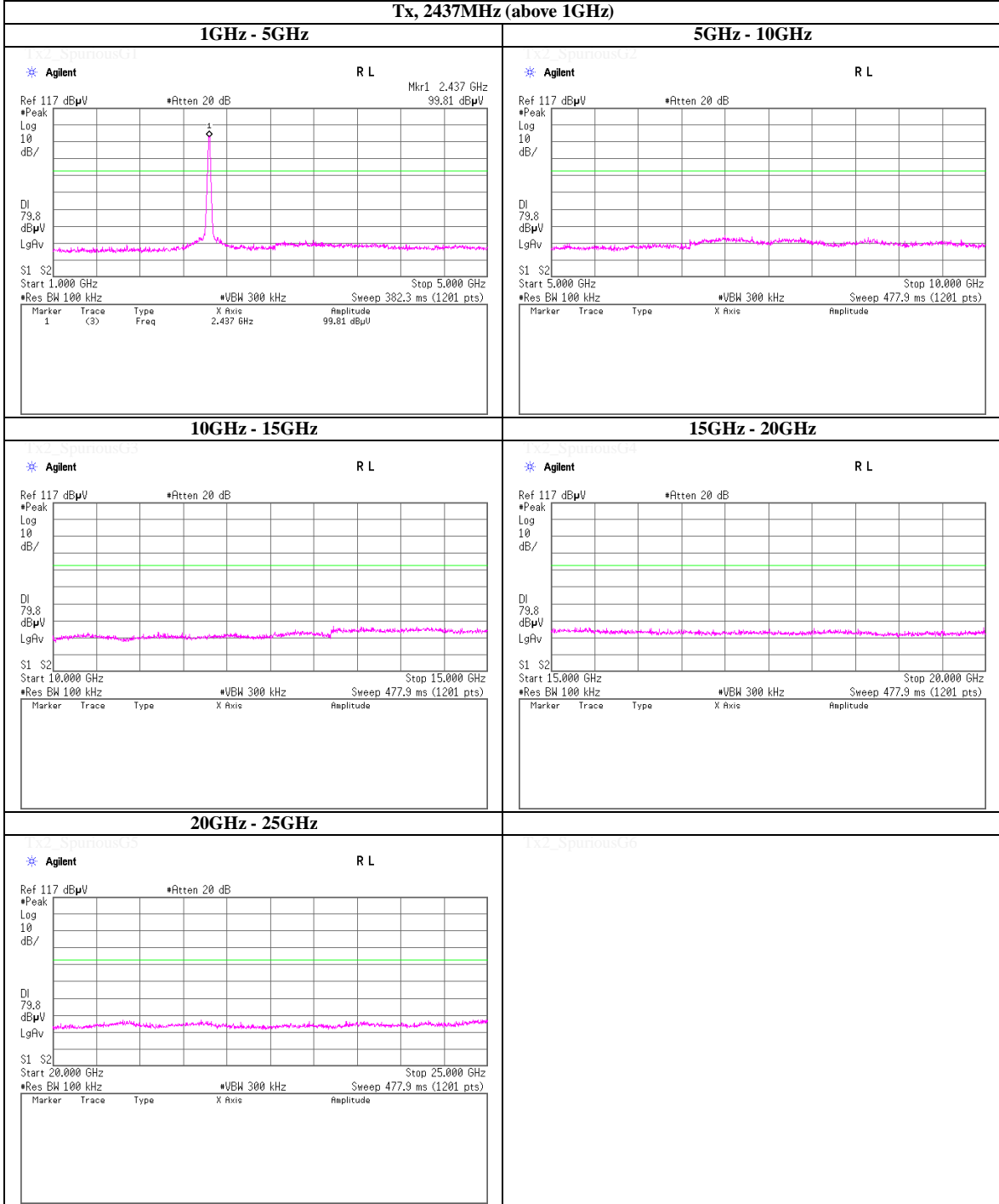


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**(Reference chart) Spurious emission (Conducted)**

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

**Tx, 2437MHz (above 1GHz)**

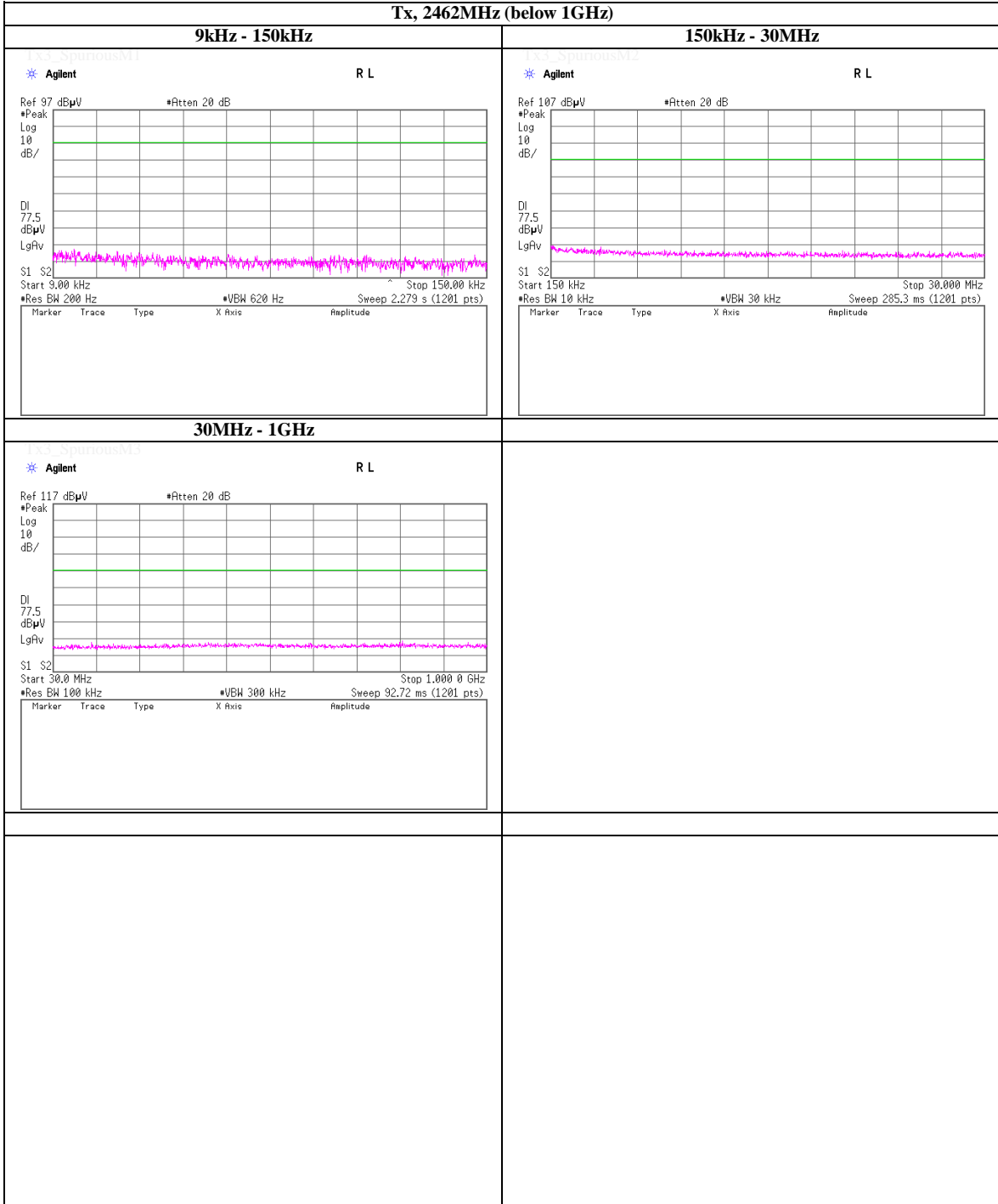


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**(Reference chart) Spurious emission (Conducted)**

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

**Tx, 2462MHz (below 1GHz)**

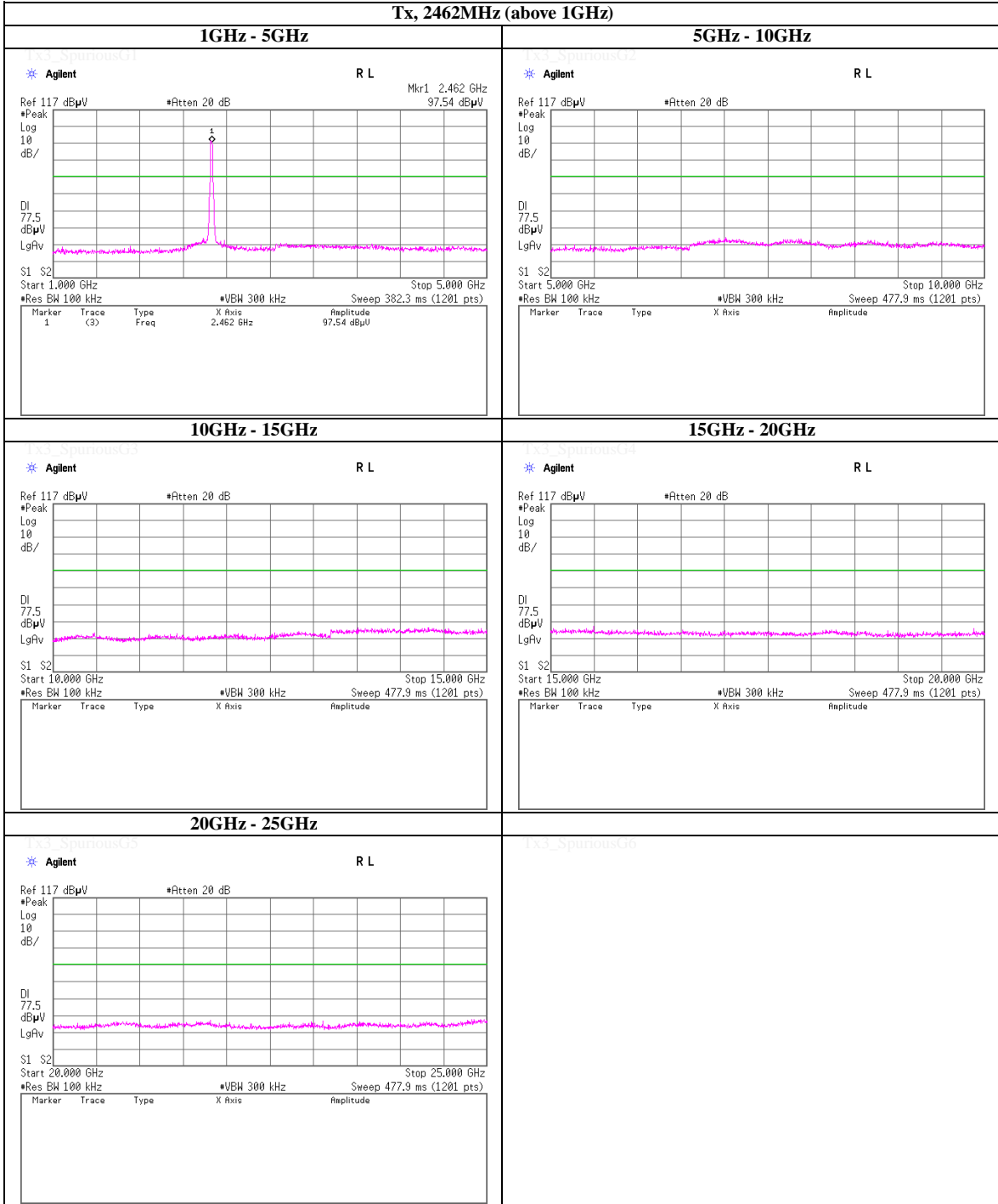


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**(Reference chart) Spurious emission (Conducted)**

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

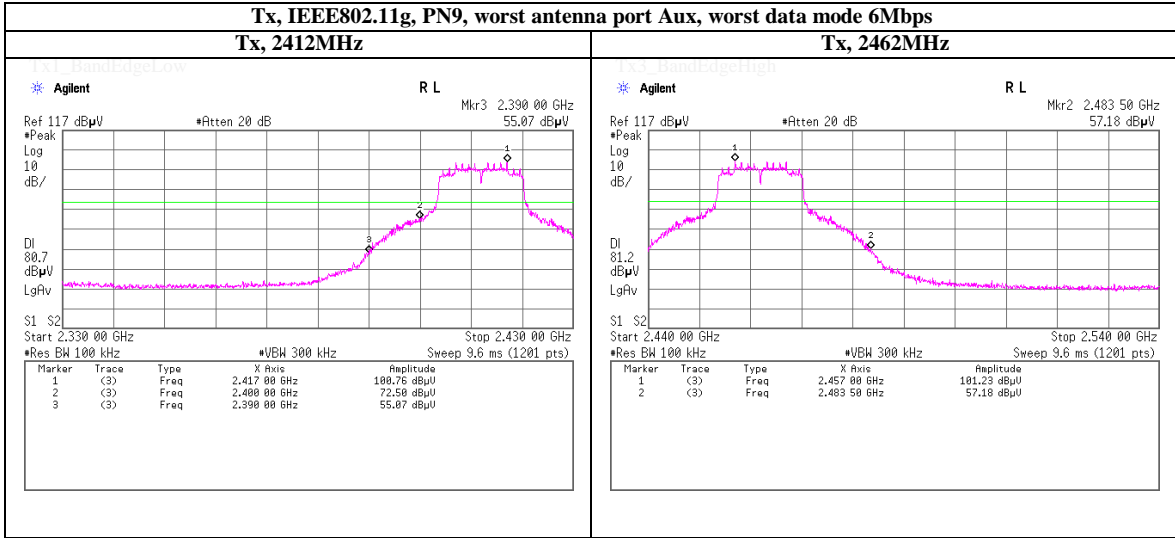
**Tx, 2462MHz (above 1GHz)**



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**(Reference chart) Spurious emission (Conducted)**

**Band Edge compliance**



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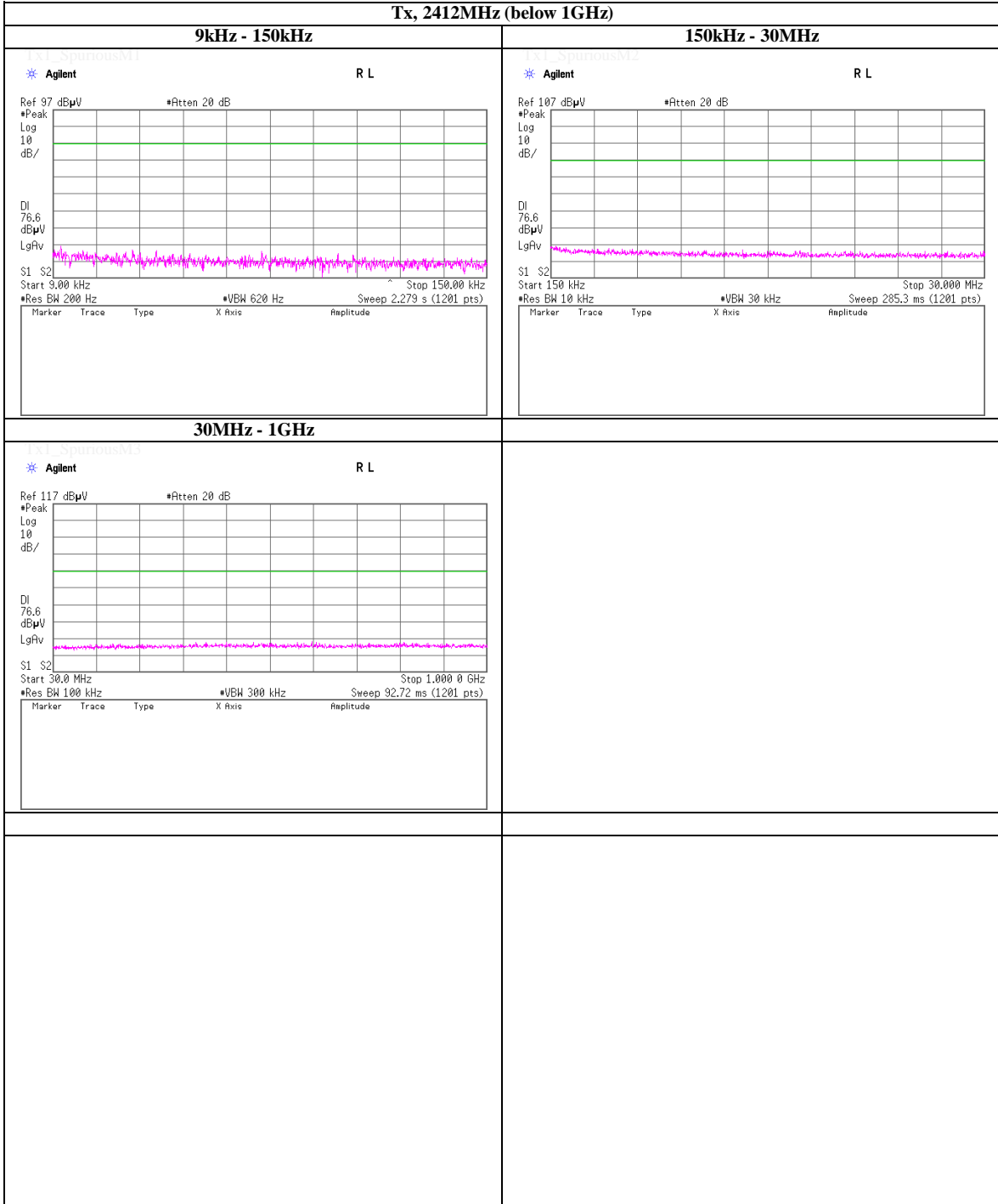
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**(Reference chart) Spurious emission (Conducted)**

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

Tx, 2412MHz (below 1GHz)



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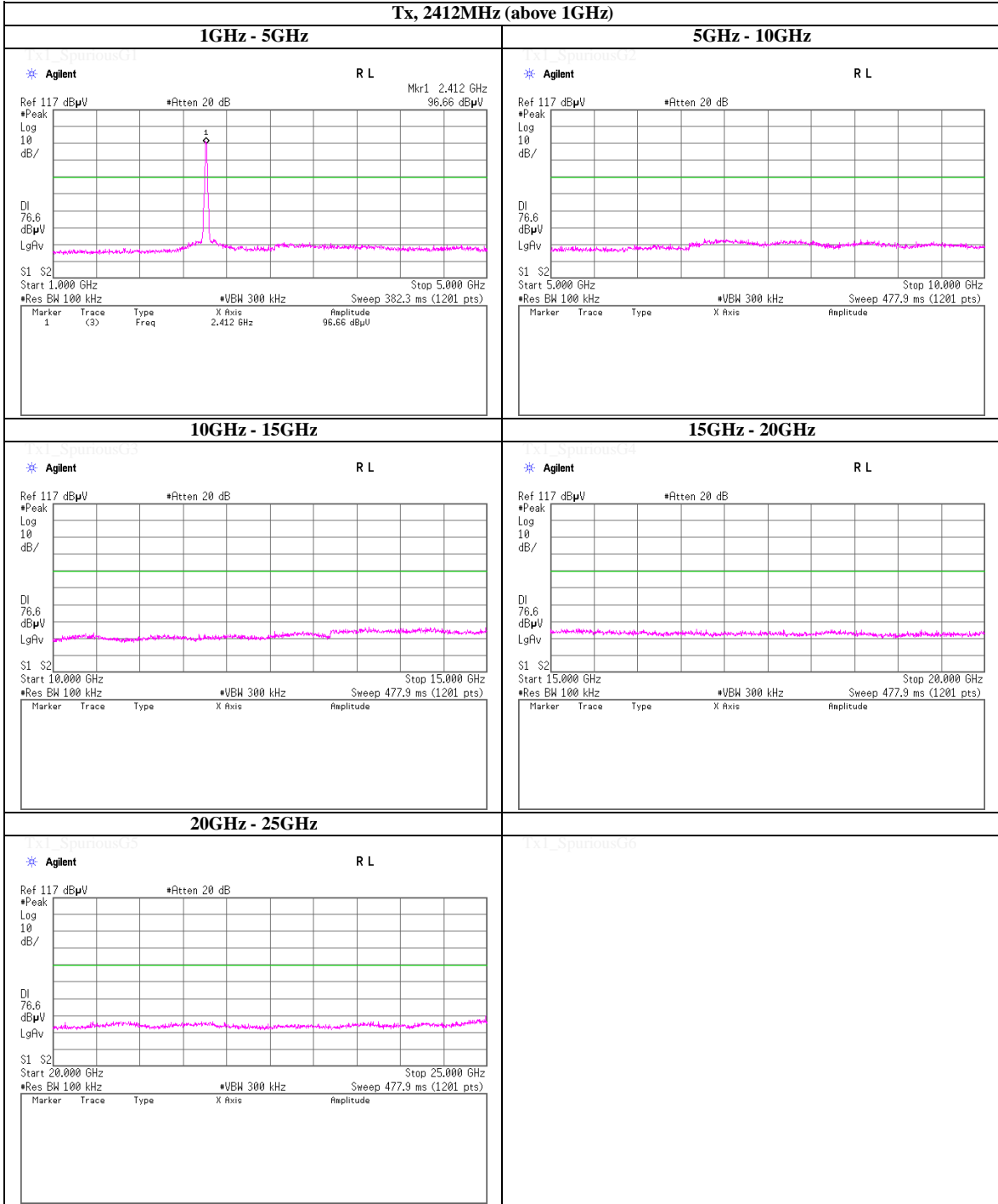
Facsimile : +81 463 50 6401



**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT20, Mix, Long), PN9, worst antenna port Aux, worst data mode 0(MCS)**

**Tx, 2412MHz (above 1GHz)**



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**(Reference chart) Spurious emission (Conducted)**

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

Tx, 2437MHz (below 1GHz)

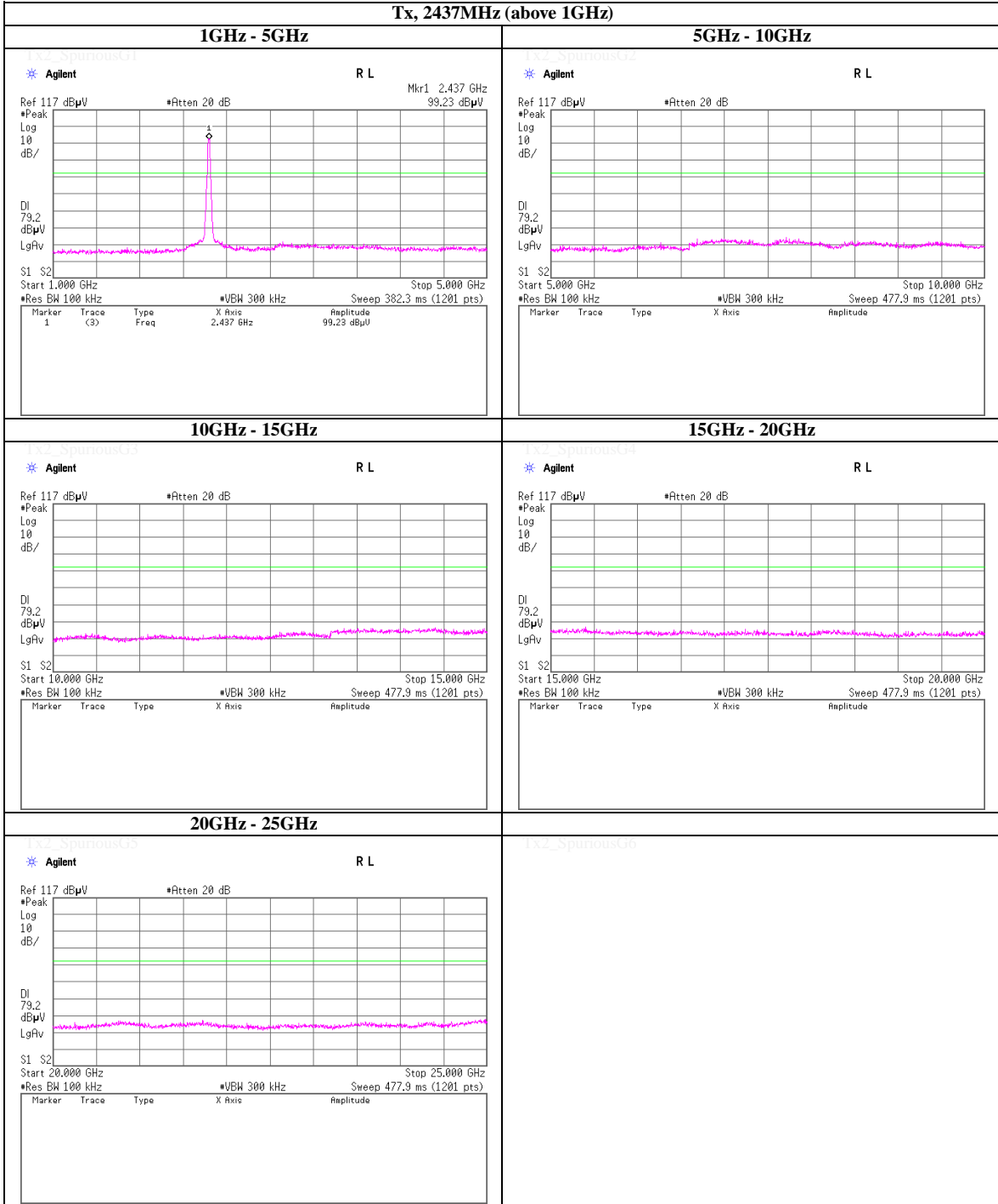


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**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT20, Mix, Long), PN9, worst antenna port Aux, worst data mode 0(MCS)**

**Tx, 2437MHz (above 1GHz)**

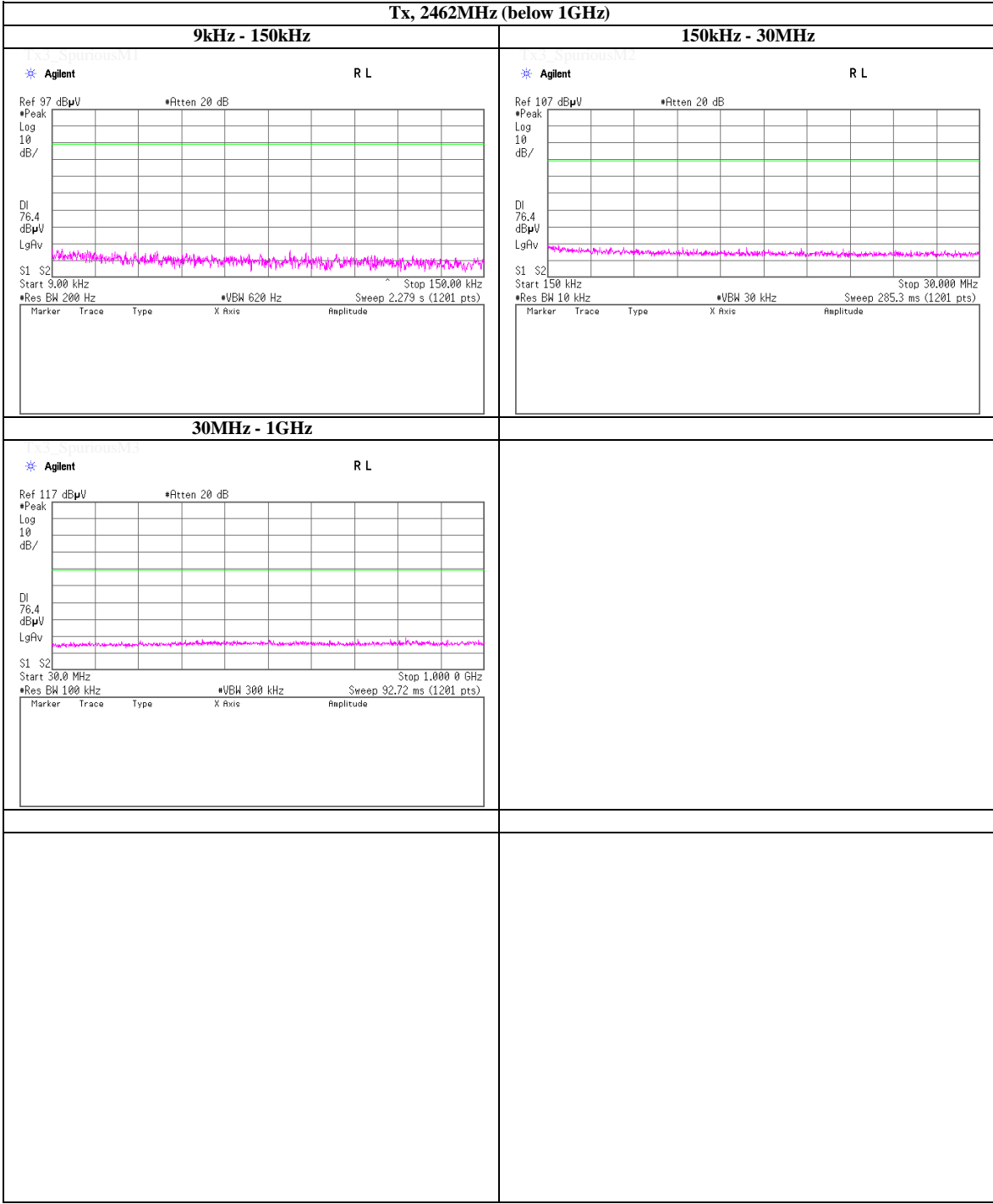


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**(Reference chart) Spurious emission (Conducted)**

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

Tx, 2462MHz (below 1GHz)

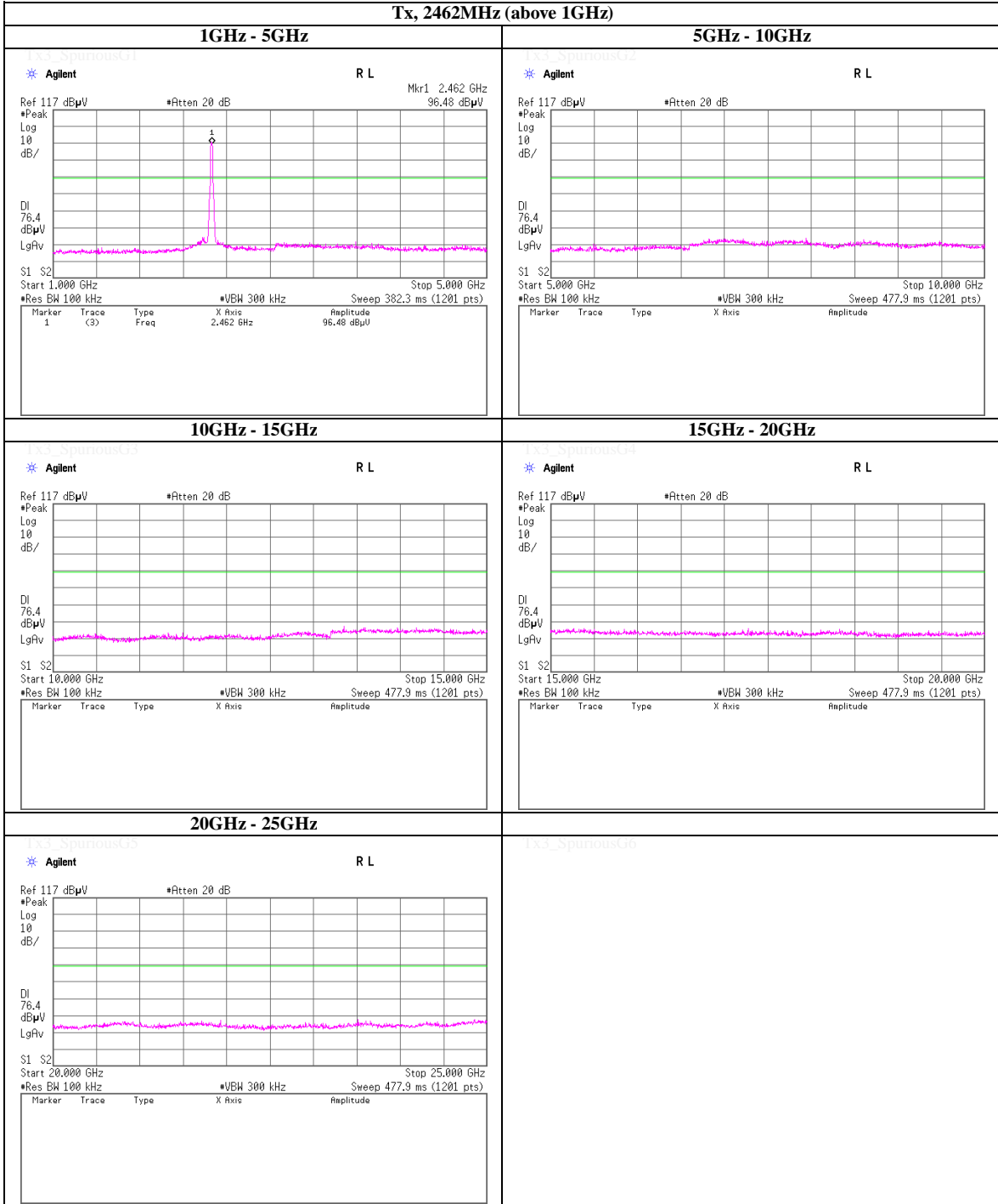


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**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT20, Mix, Long), PN9, worst antenna port Aux, worst data mode 0(MCS)**

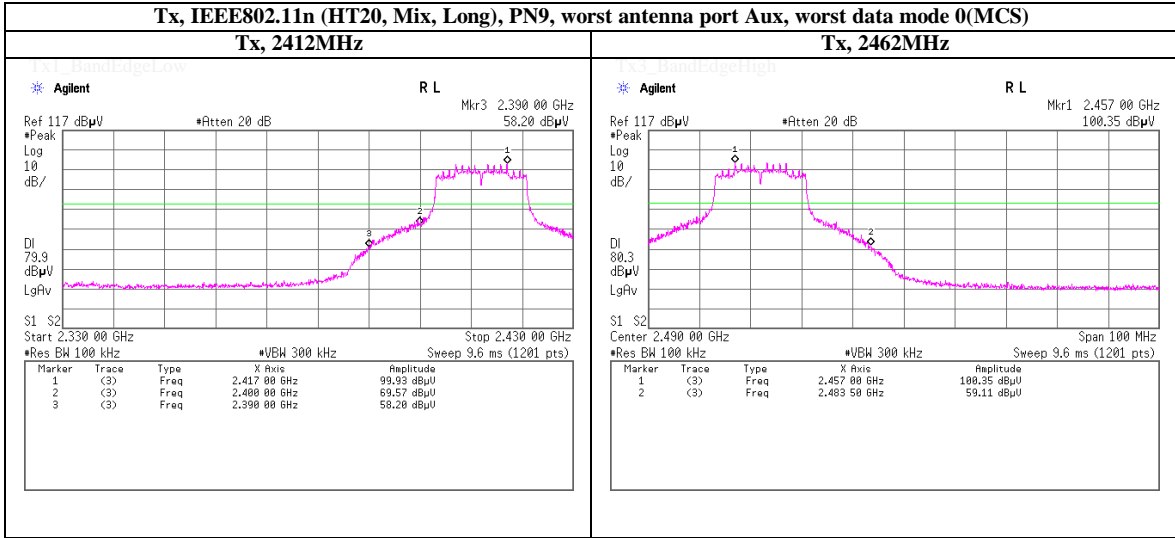
**Tx, 2462MHz (above 1GHz)**



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**(Reference chart) Spurious emission (Conducted)**

**Band Edge compliance**



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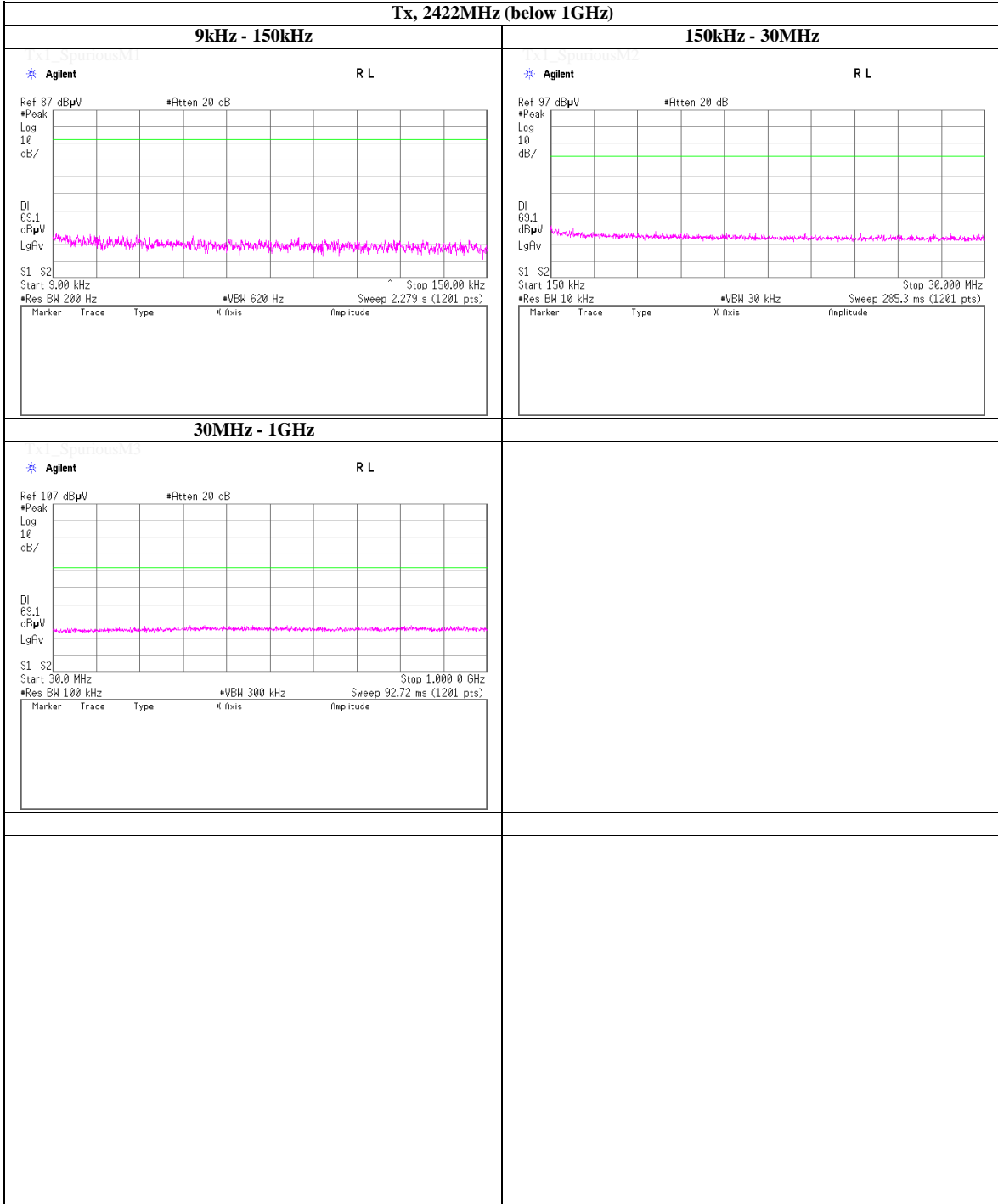
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**(Reference chart) Spurious emission (Conducted)**

**Tx, 11n (HT40, Wide, Mix, Long), PN9, worst antenna port Aux, worst data mode 0(MCS)**

**Tx, 2422MHz (below 1GHz)**



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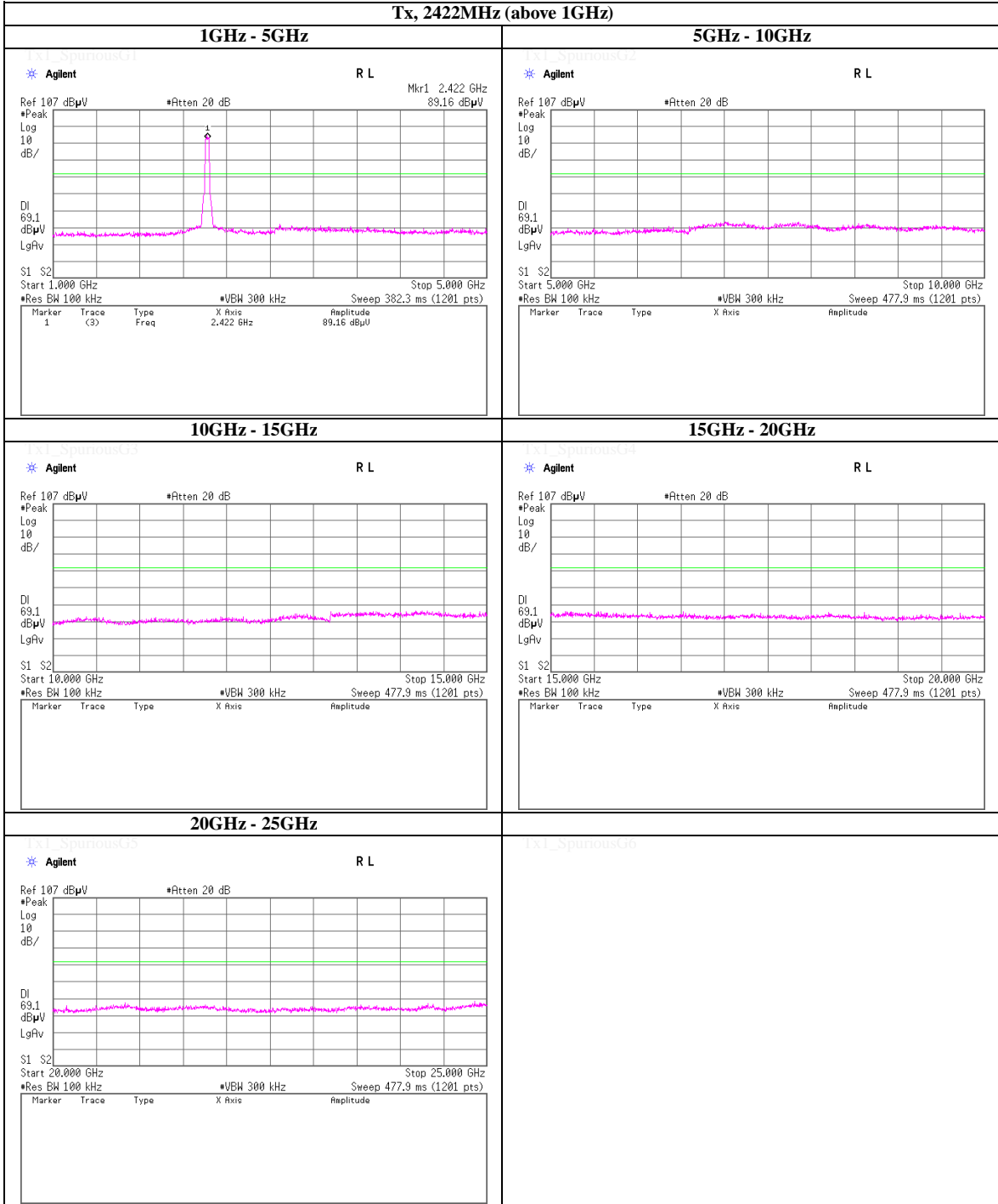
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**(Reference chart) Spurious emission (Conducted)**

**Tx, 11n (HT40, Wide, Mix, Long), PN9, worst antenna port Aux, worst data mode 0(MCS)**

**Tx, 2422MHz (above 1GHz)**



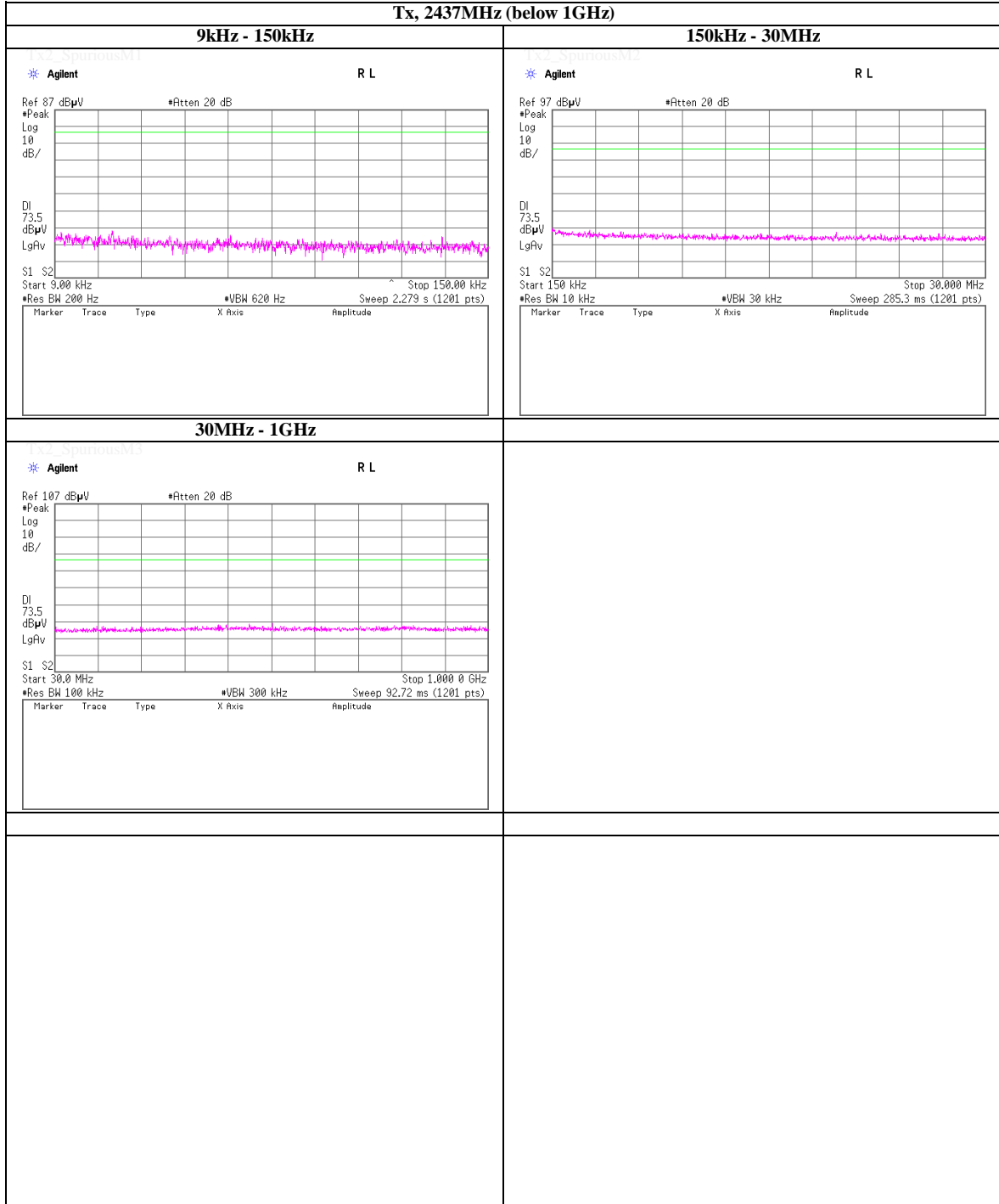
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**(Reference chart) Spurious emission (Conducted)**

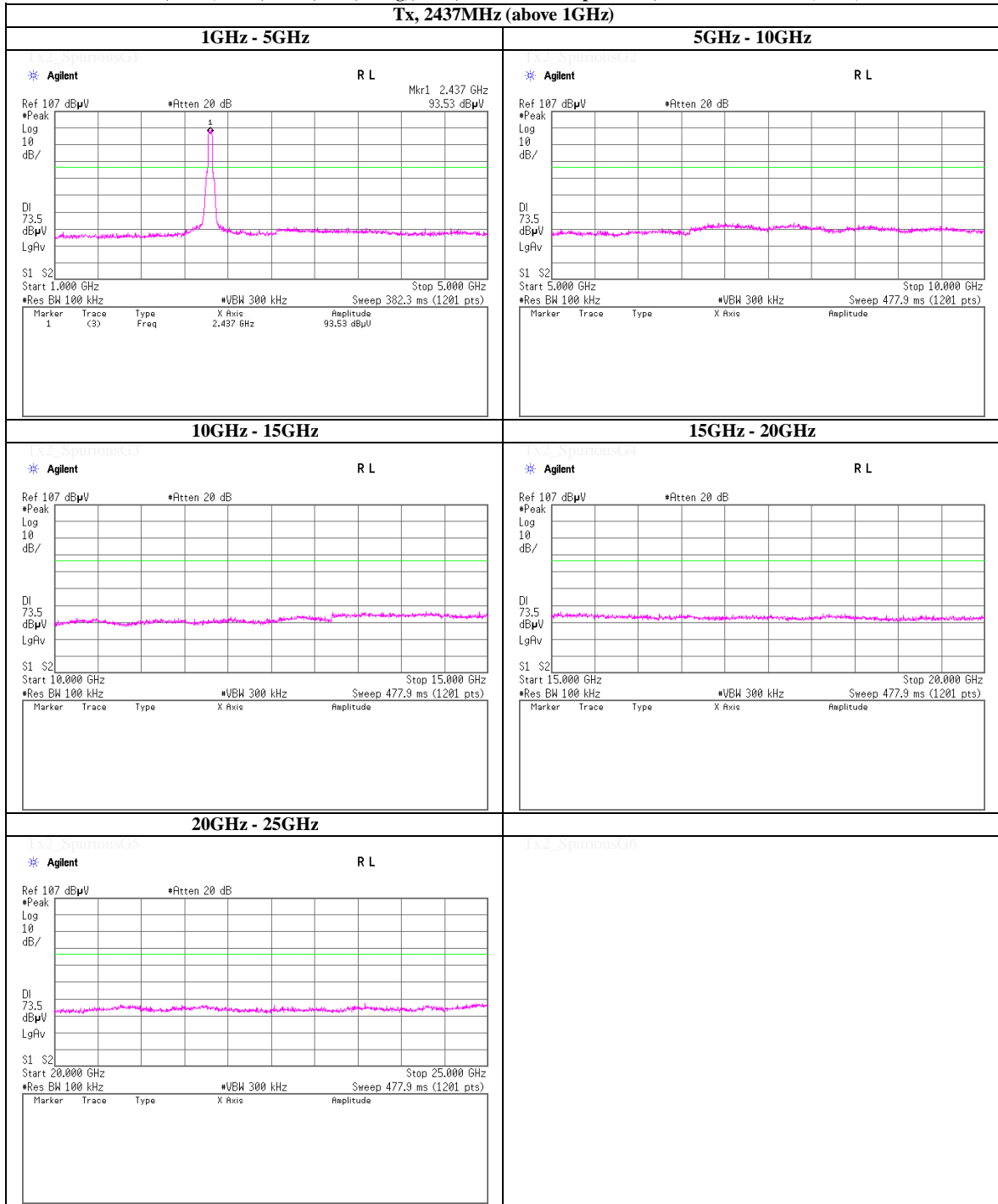
**Tx, 11n (HT40, Wide, Mix, Long), PN9, worst antenna port Aux, worst data mode 0(MCS)**

**Tx, 2437MHz (below 1GHz)**



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**(Reference chart) Spurious emission (Conducted)**  
**Tx, 11n (HT40, Wide, Mix, Long), PN9, worst antenna port Aux, worst data mode 0(MCS)**



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**(Reference chart) Spurious emission (Conducted)**

**Tx, 11n (HT40, Wide, Mix, Long), PN9, worst antenna port Aux, worst data mode 0(MCS)**

**Tx, 2452MHz (below 1GHz)**

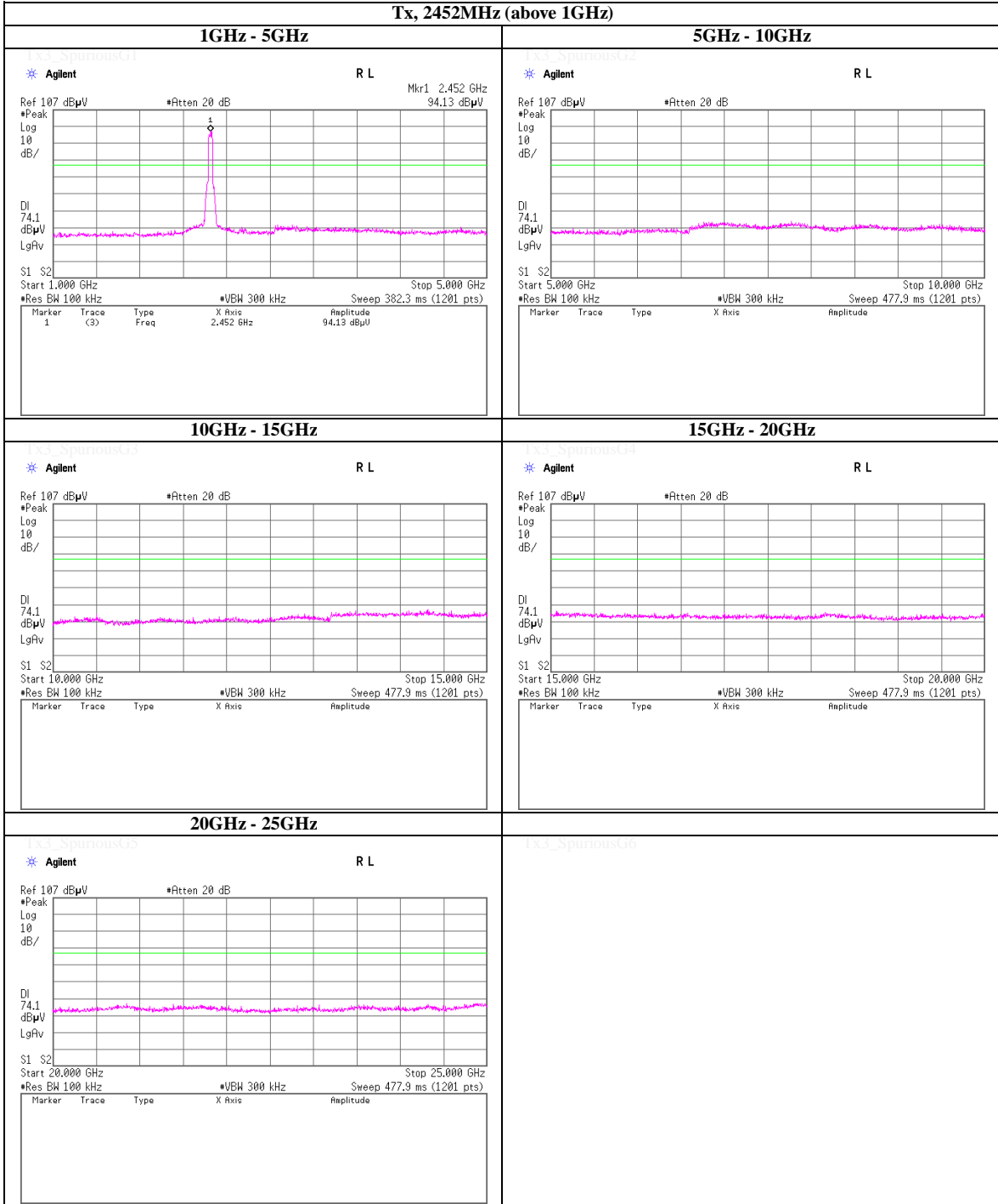


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**(Reference chart) Spurious emission (Conducted)**

**Tx, 11n (HT40, Wide, Mix, Long), PN9, worst antenna port Aux, worst data mode 0(MCS)**

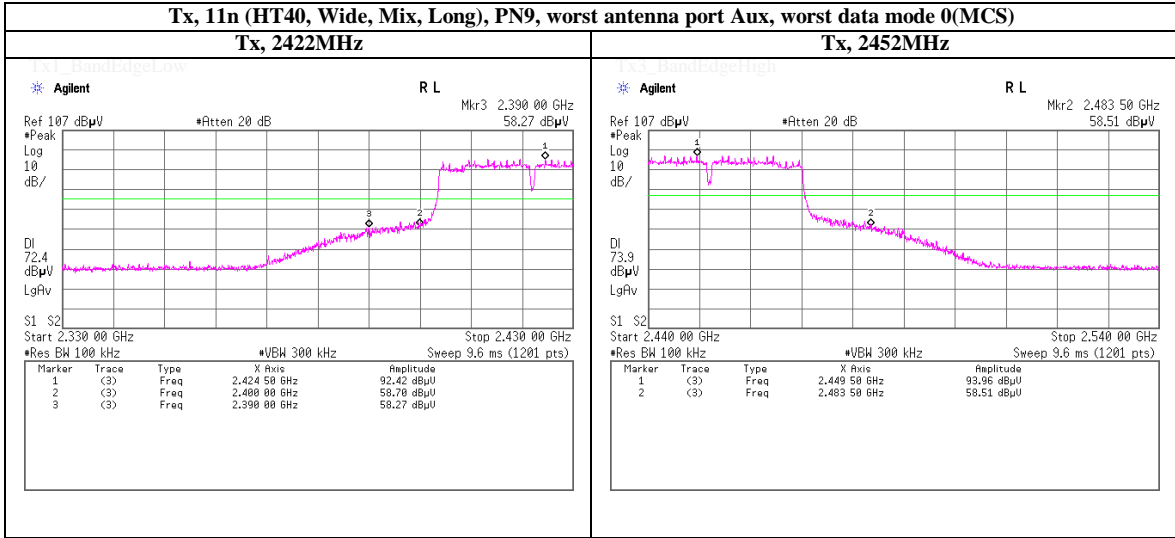
**Tx, 2452MHz (above 1GHz)**



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**(Reference chart) Spurious emission (Conducted)**

**Band Edge compliance**

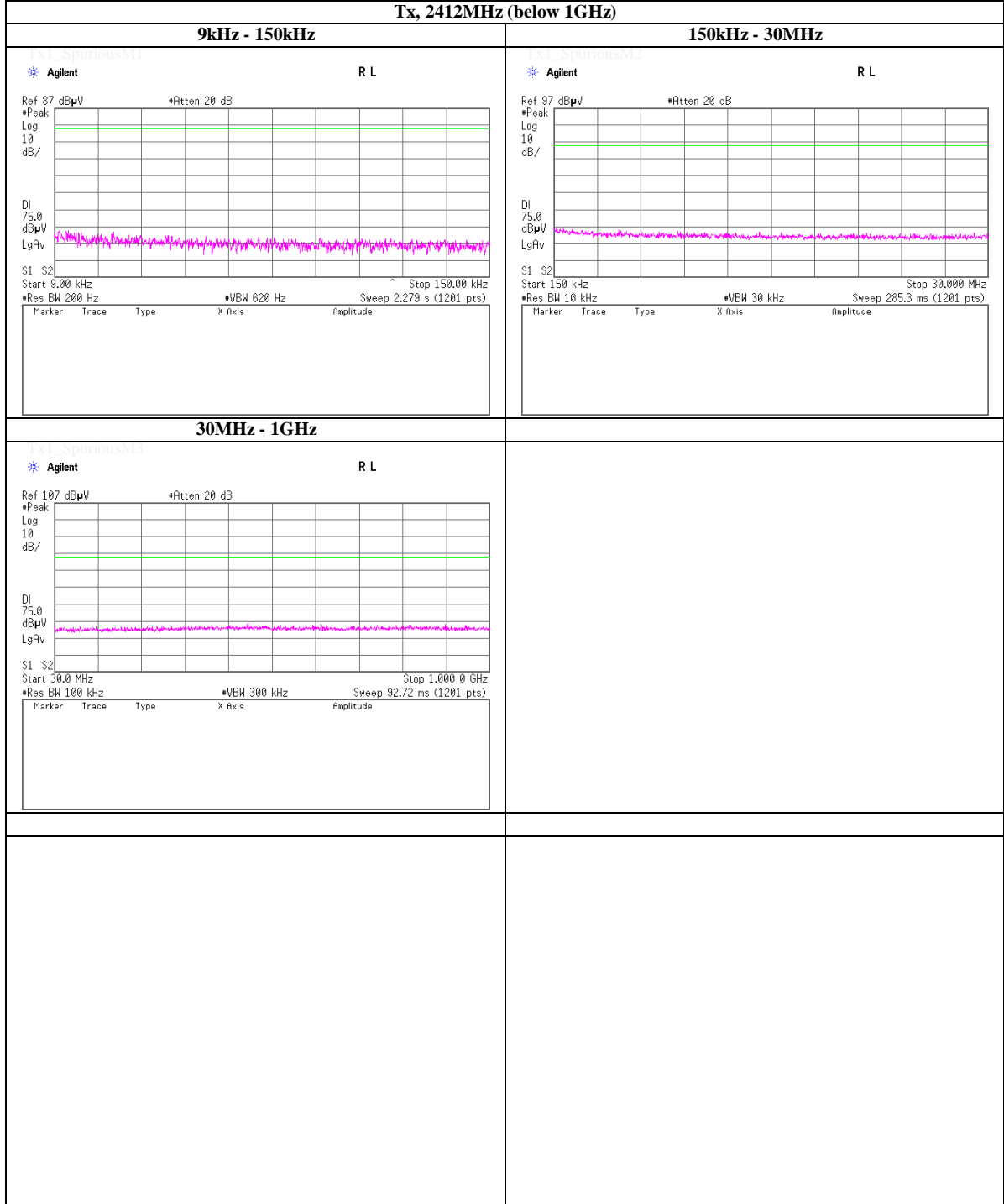


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**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT20, Mix, Long), PN9, antenna port Main, worst data mode 8(MCS)**

**Tx, 2412MHz (below 1GHz)**



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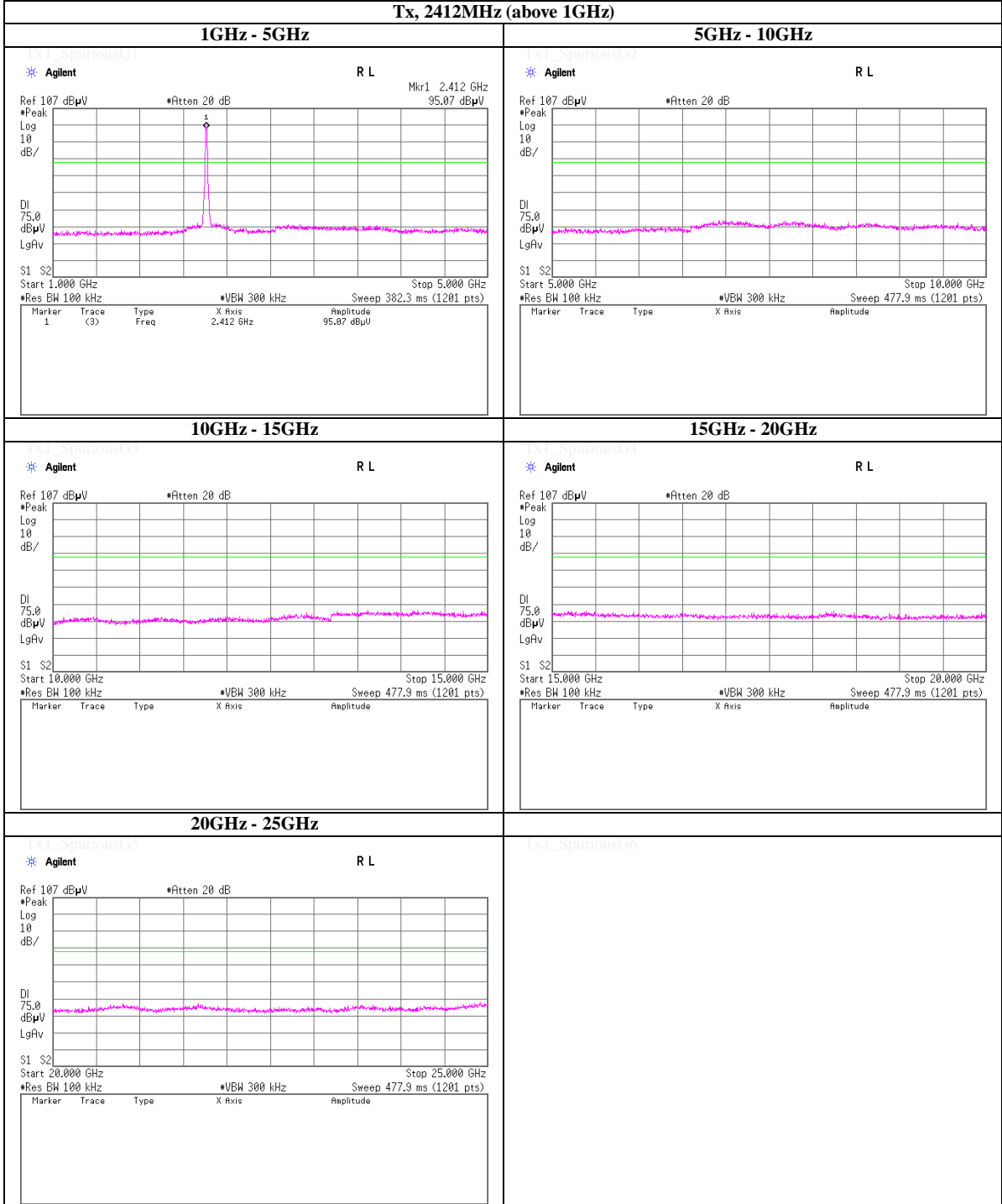
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**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT20, Mix, Long), PN9, antenna port Main, worst data mode 8(MCS)**

**Tx, 2412MHz (above 1GHz)**



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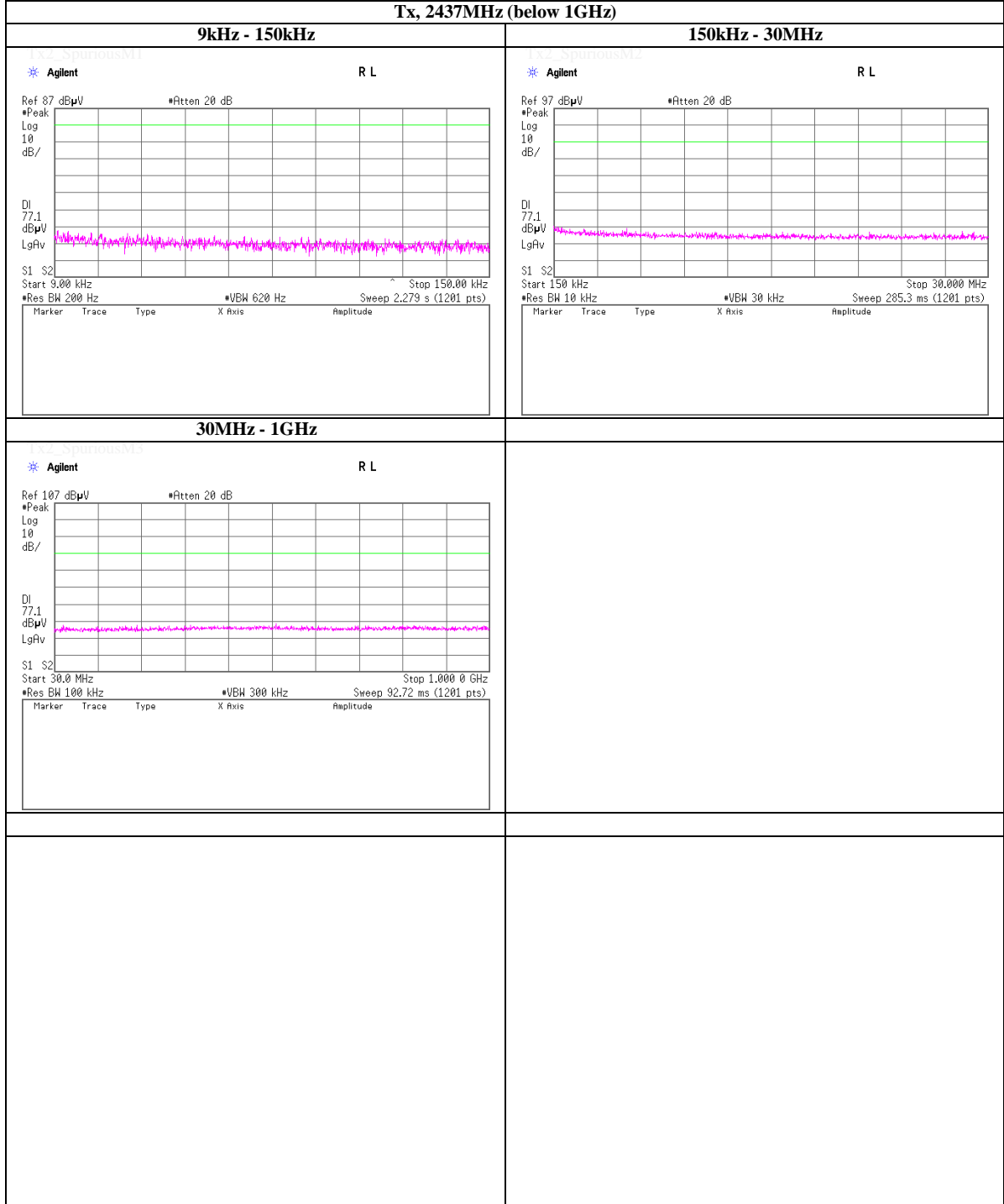
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**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT20, Mix, Long), PN9, antenna port Main, worst data mode 8(MCS)**

**Tx, 2437MHz (below 1GHz)**



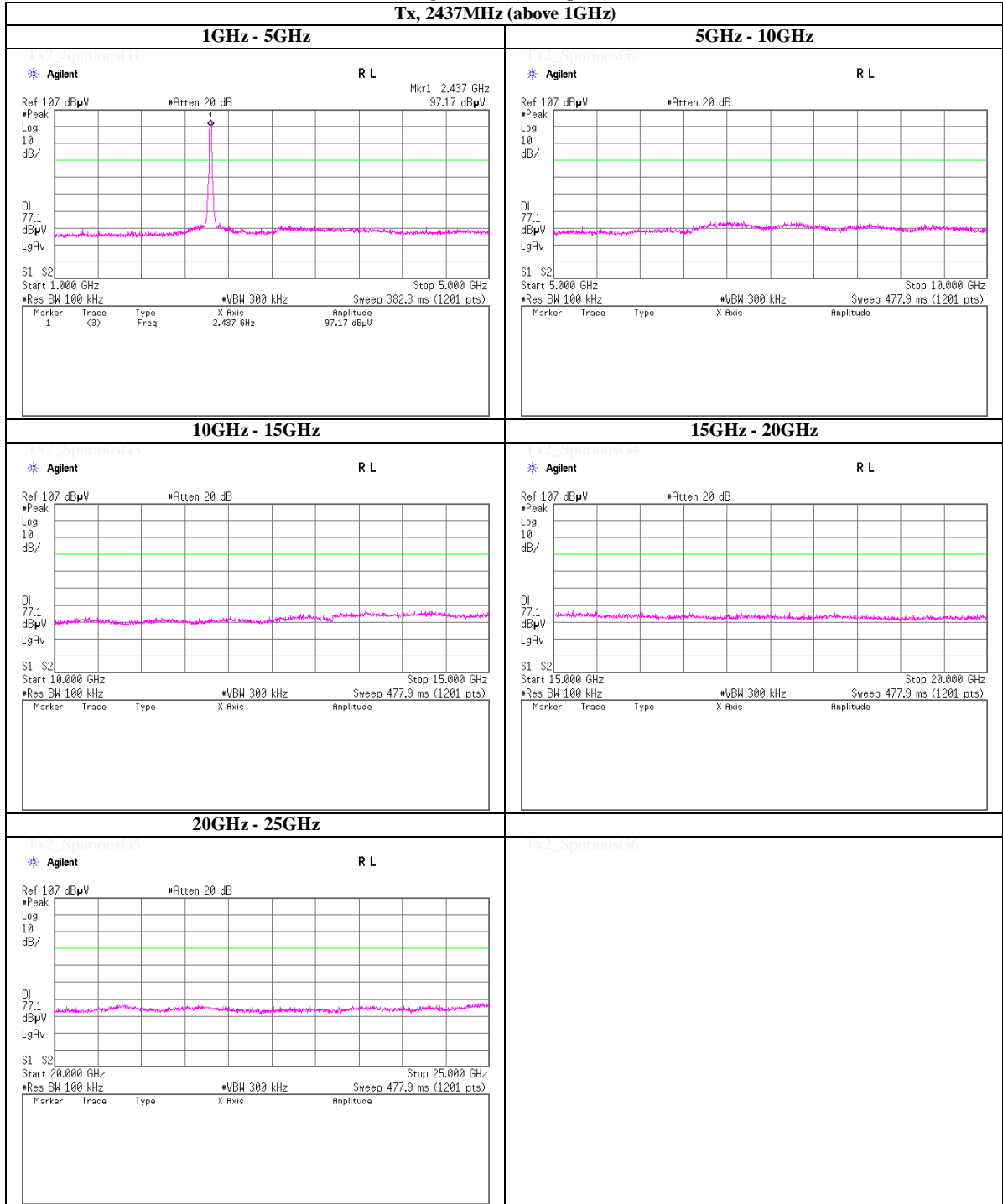
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**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT20, Mix, Long), PN9, antenna port Main, worst data mode 8(MCS)**

**Tx, 2437MHz (above 1GHz)**



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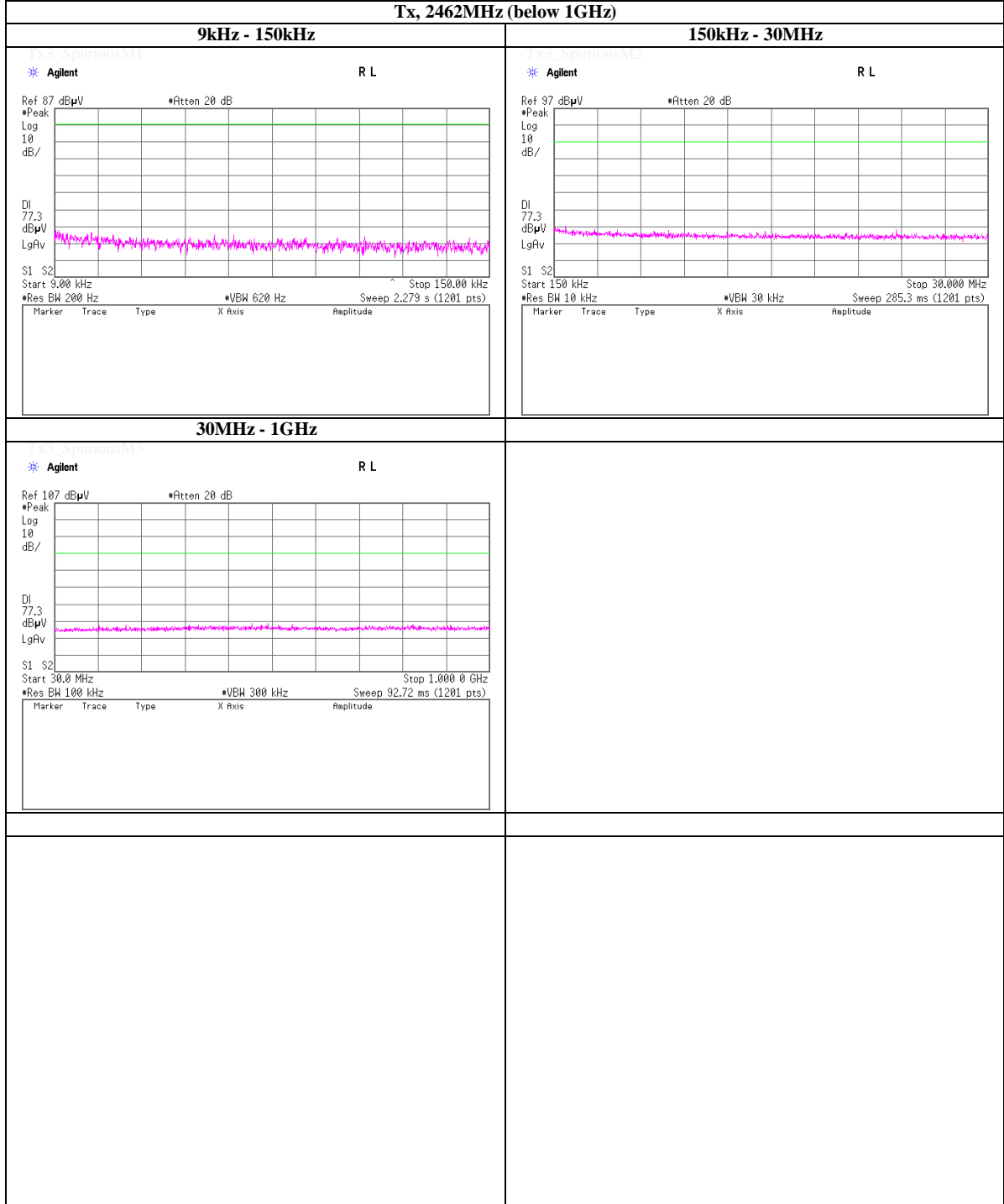
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**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT20, Mix, Long), PN9, antenna port Main, worst data mode 8(MCS)**

**Tx, 2462MHz (below 1GHz)**



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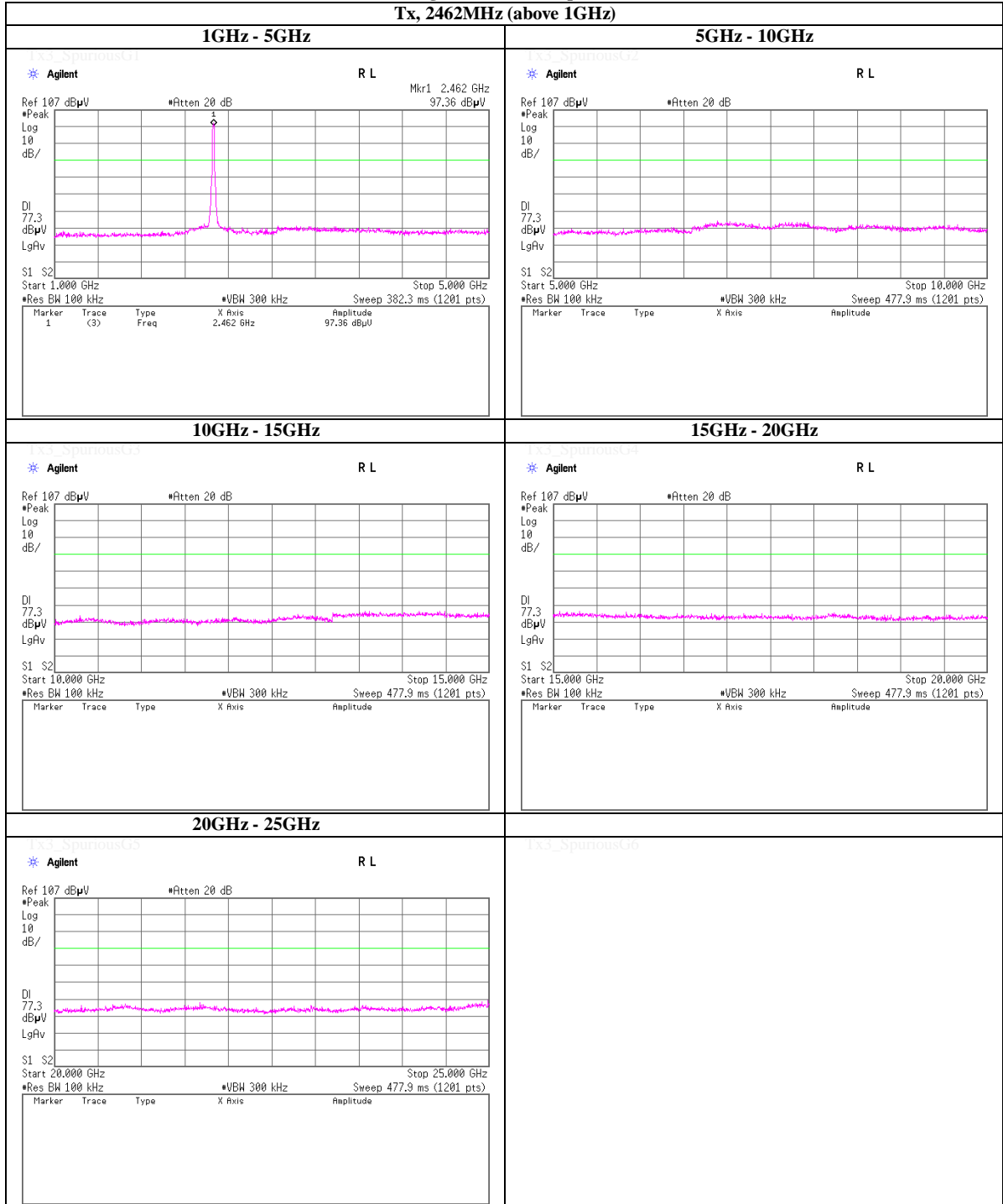
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**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT20, Mix, Long), PN9, antenna port Main, worst data mode 8(MCS)**

**Tx, 2462MHz (above 1GHz)**



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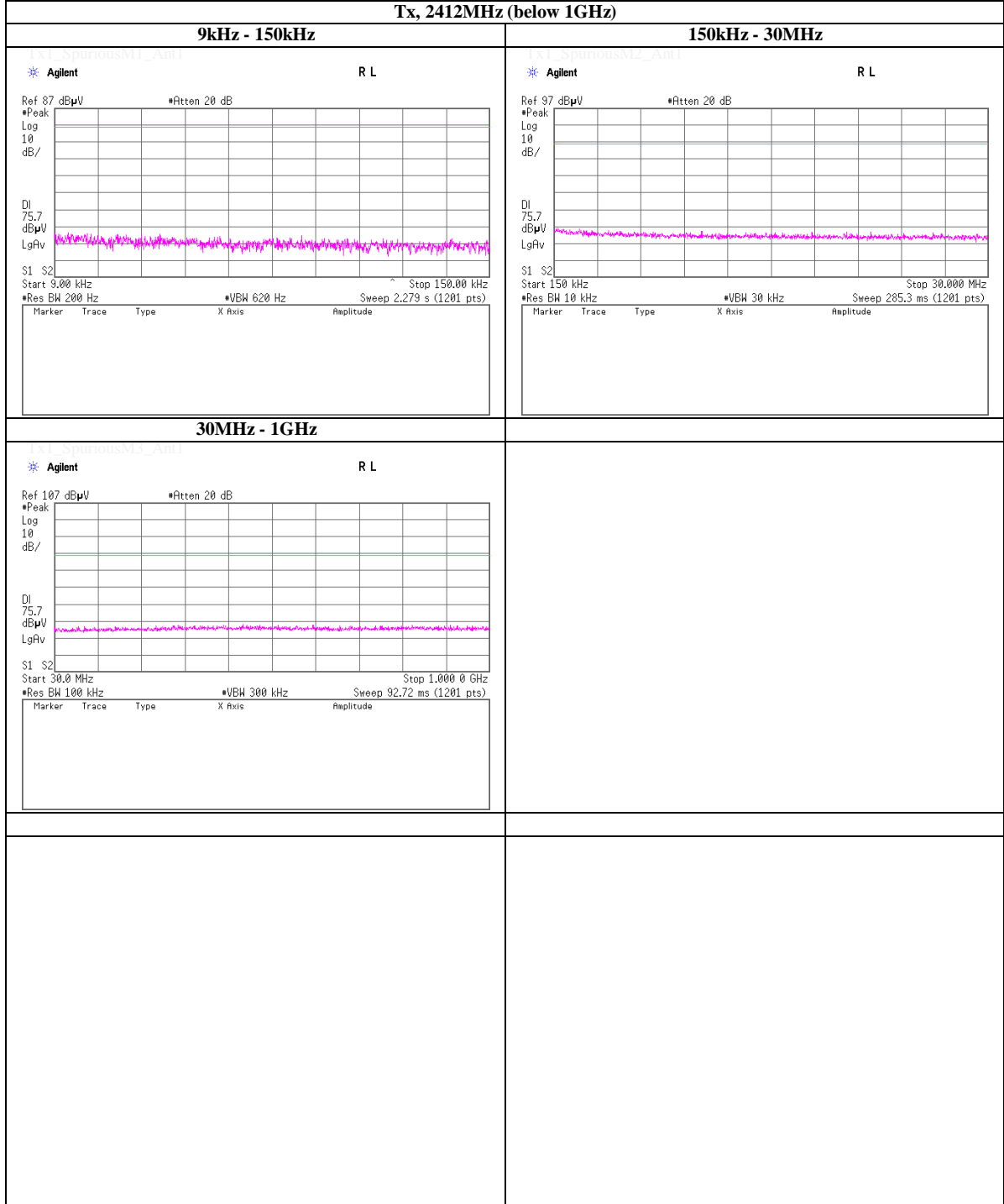
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**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT20, Mix, Long), PN9, antenna port Aux, worst data mode 8(MCS)**

**Tx, 2412MHz (below 1GHz)**

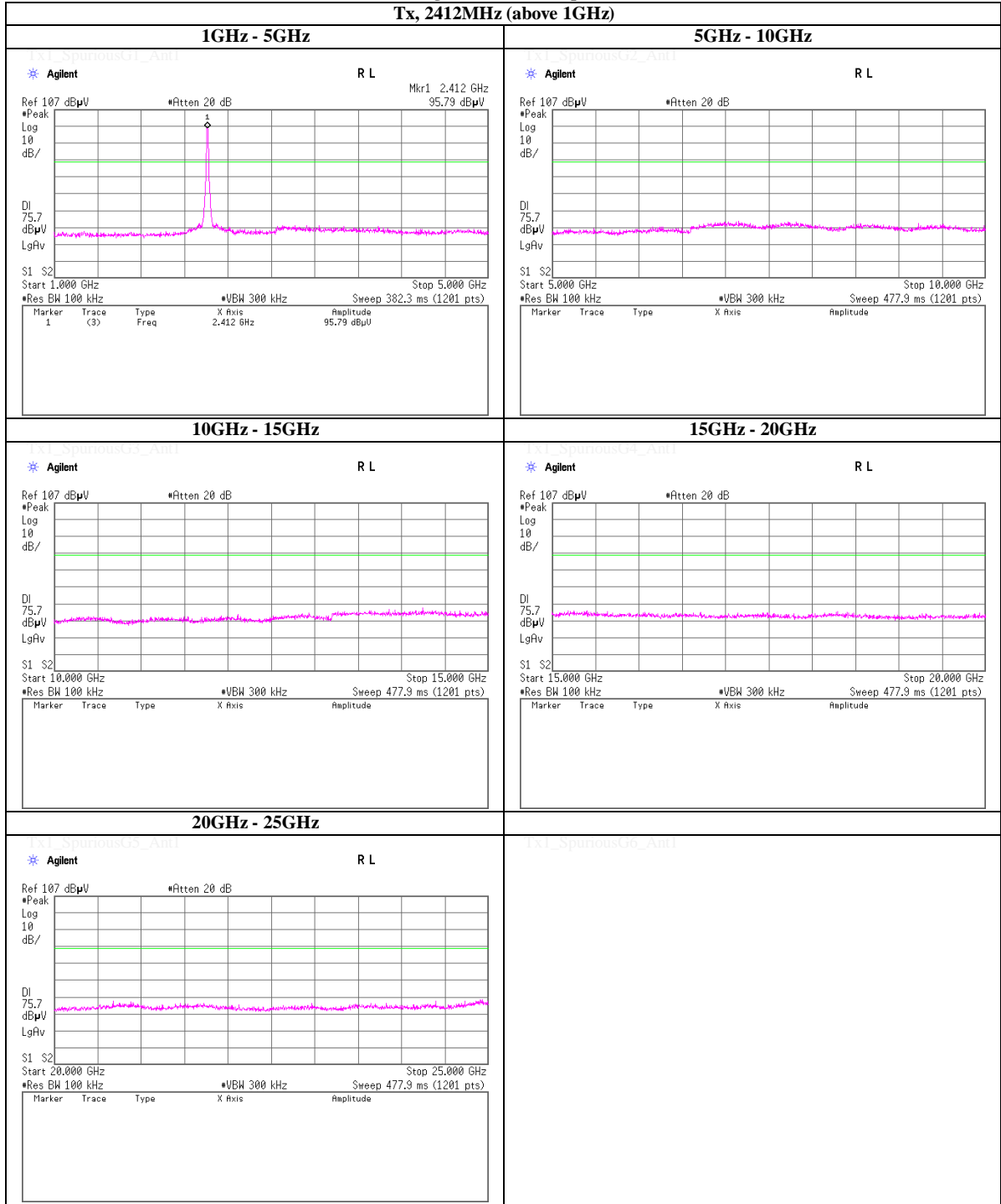


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**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT20, Mix, Long), PN9, antenna port Aux, worst data mode 8(MCS)**

**Tx, 2412MHz (above 1GHz)**



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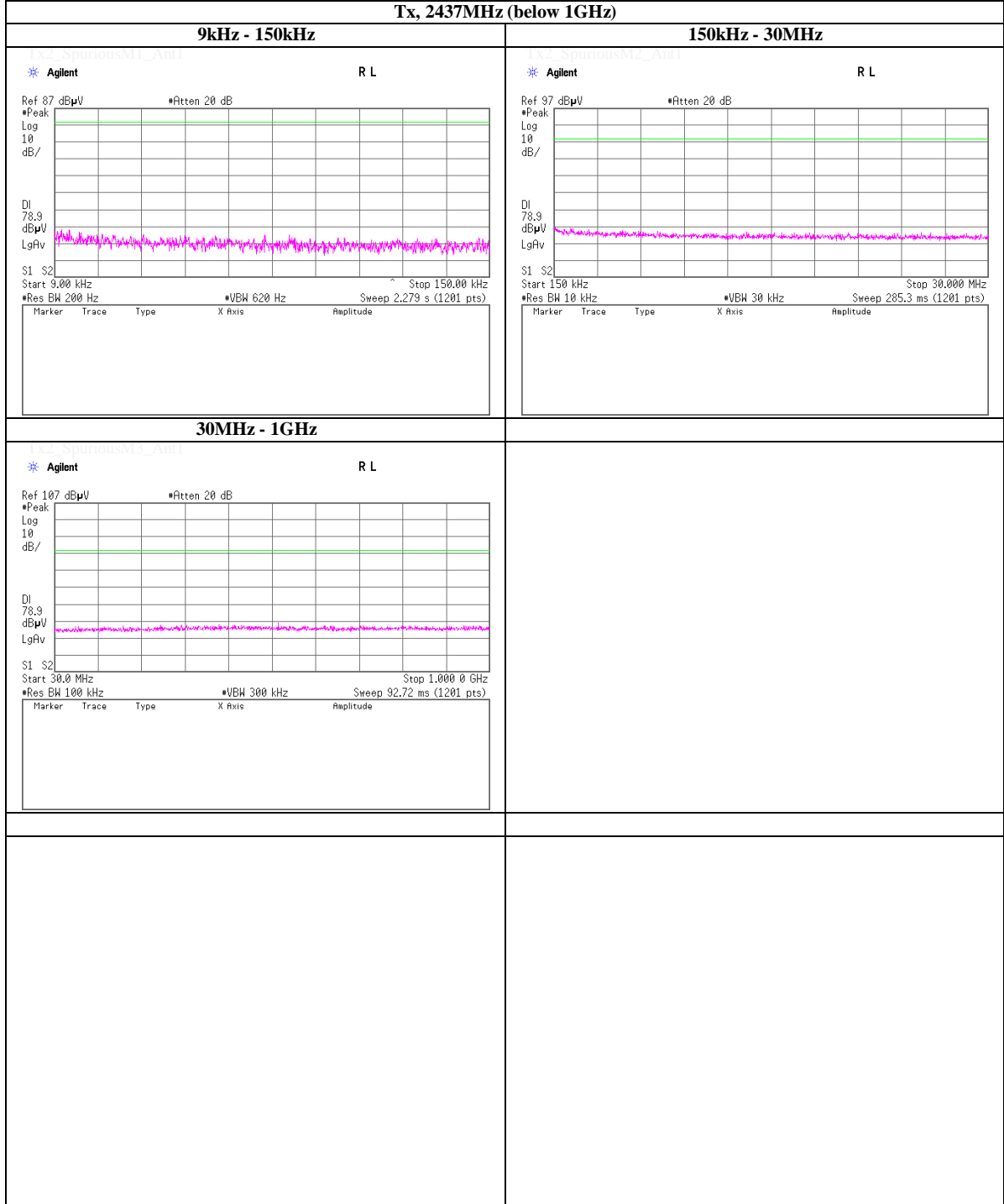
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**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT20, Mix, Long), PN9, antenna port Aux, worst data mode 8(MCS)**

**Tx, 2437MHz (below 1GHz)**



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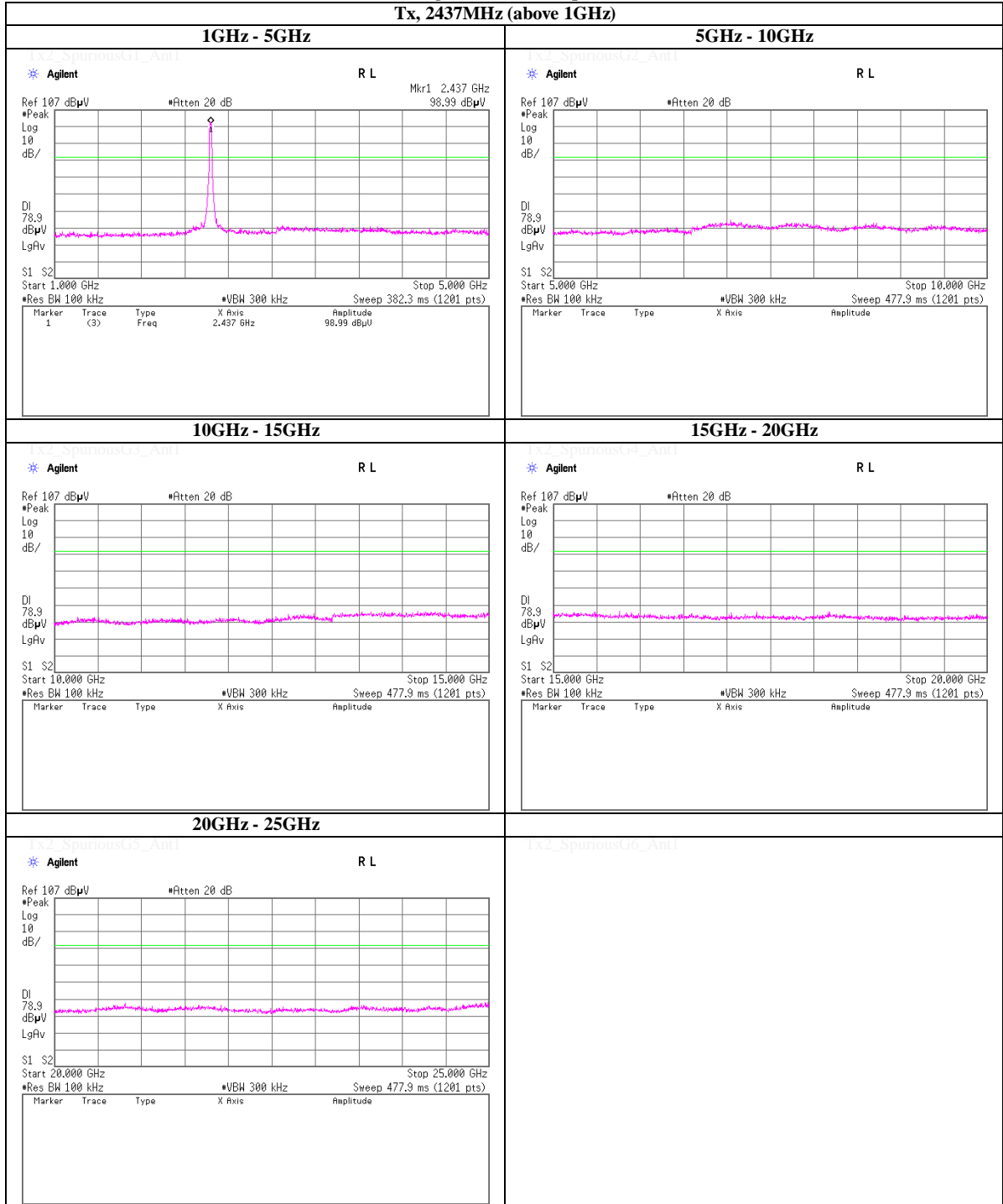
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**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT20, Mix, Long), PN9, antenna port Aux, worst data mode 8(MCS)**

**Tx, 2437MHz (above 1GHz)**



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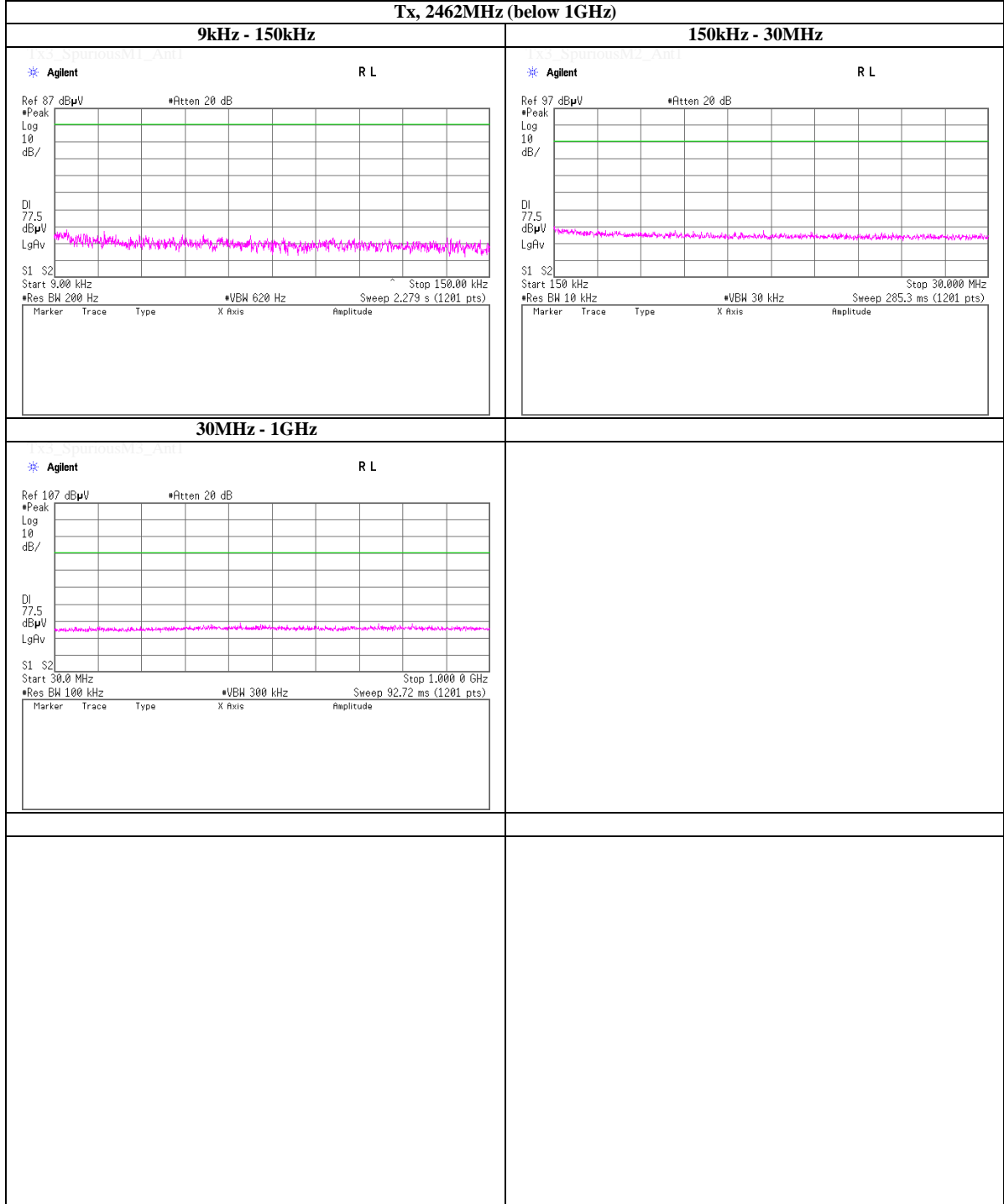
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Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT20, Mix, Long), PN9, antenna port Aux, worst data mode 8(MCS)**

**Tx, 2462MHz (below 1GHz)**



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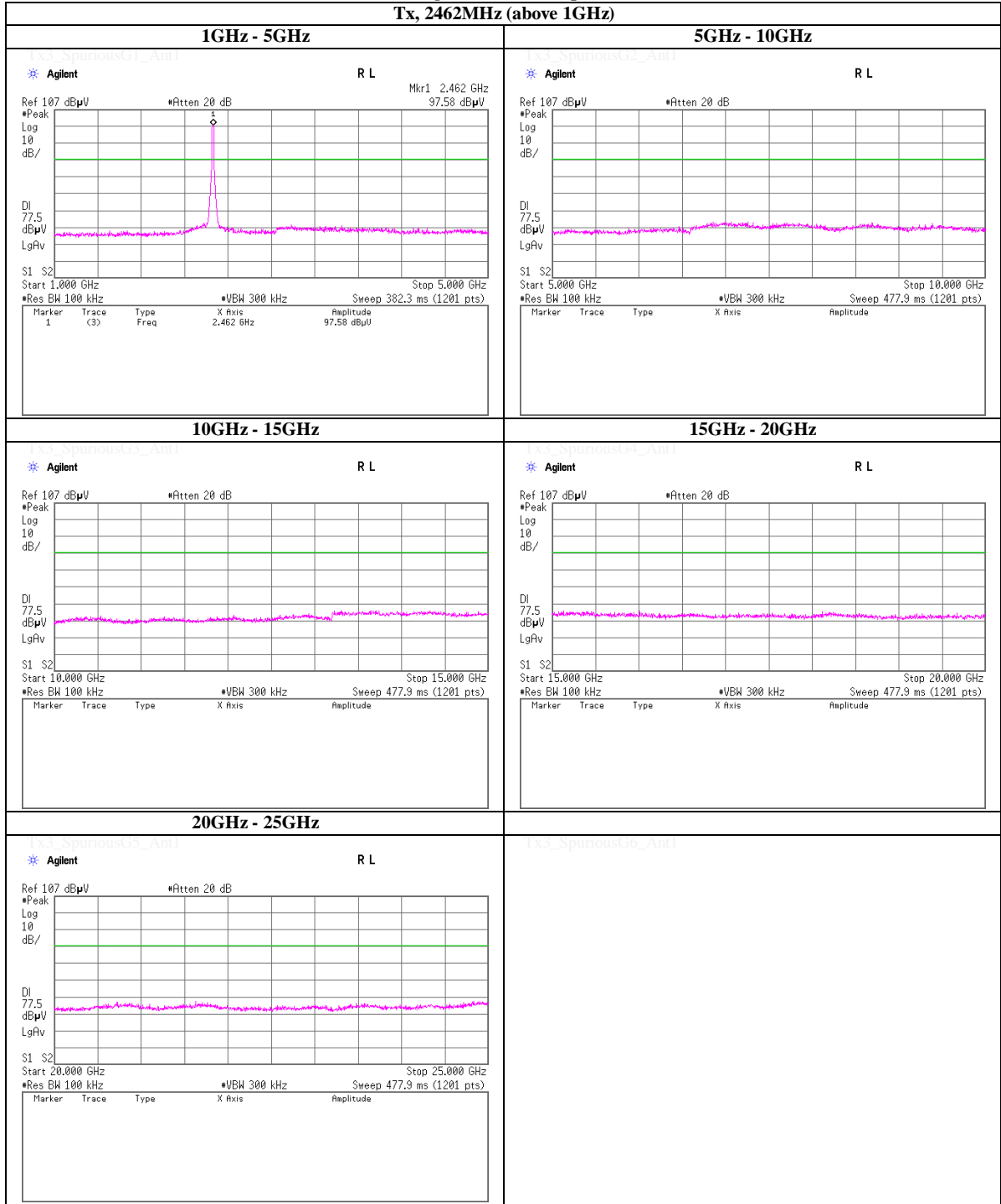
Facsimile : +81 463 50 6401



**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT20, Mix, Long), PN9, antenna port Aux, worst data mode 8(MCS)**

**Tx, 2462MHz (above 1GHz)**



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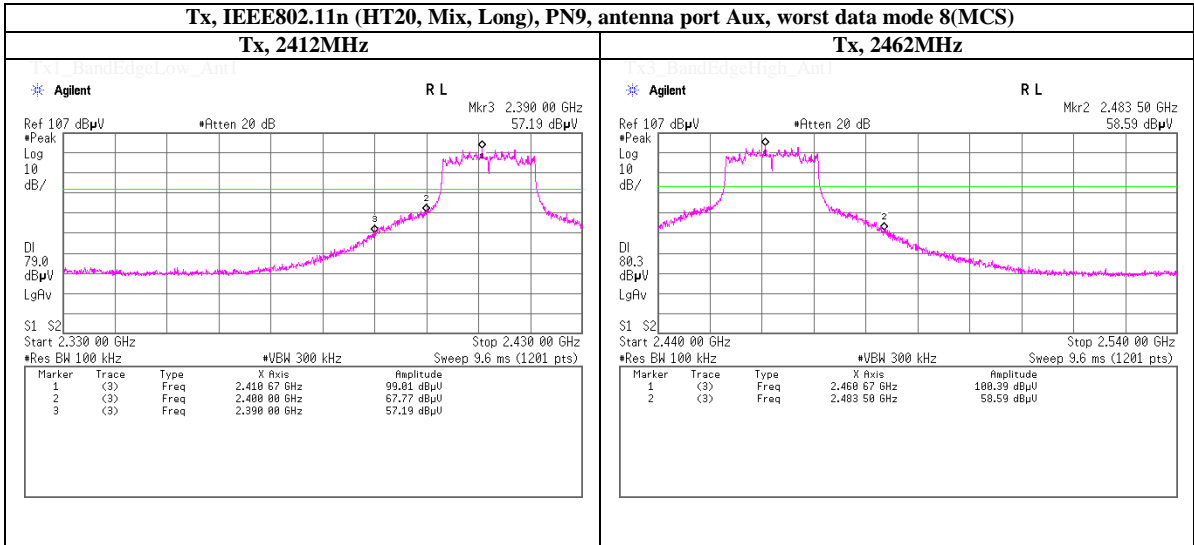
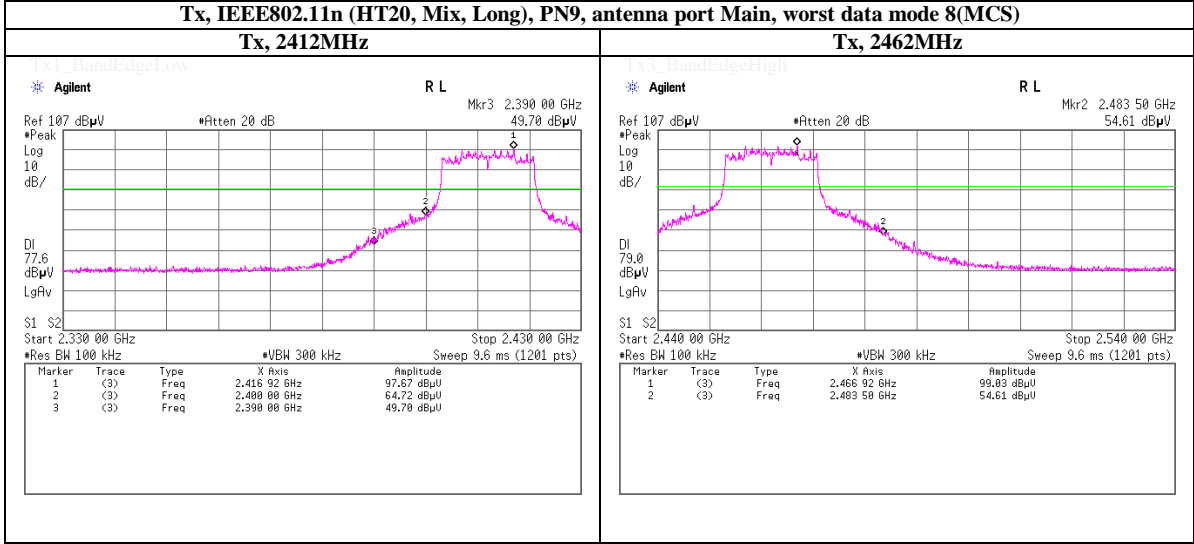
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**(Reference chart) Spurious emission (Conducted)**

**Band Edge compliance**



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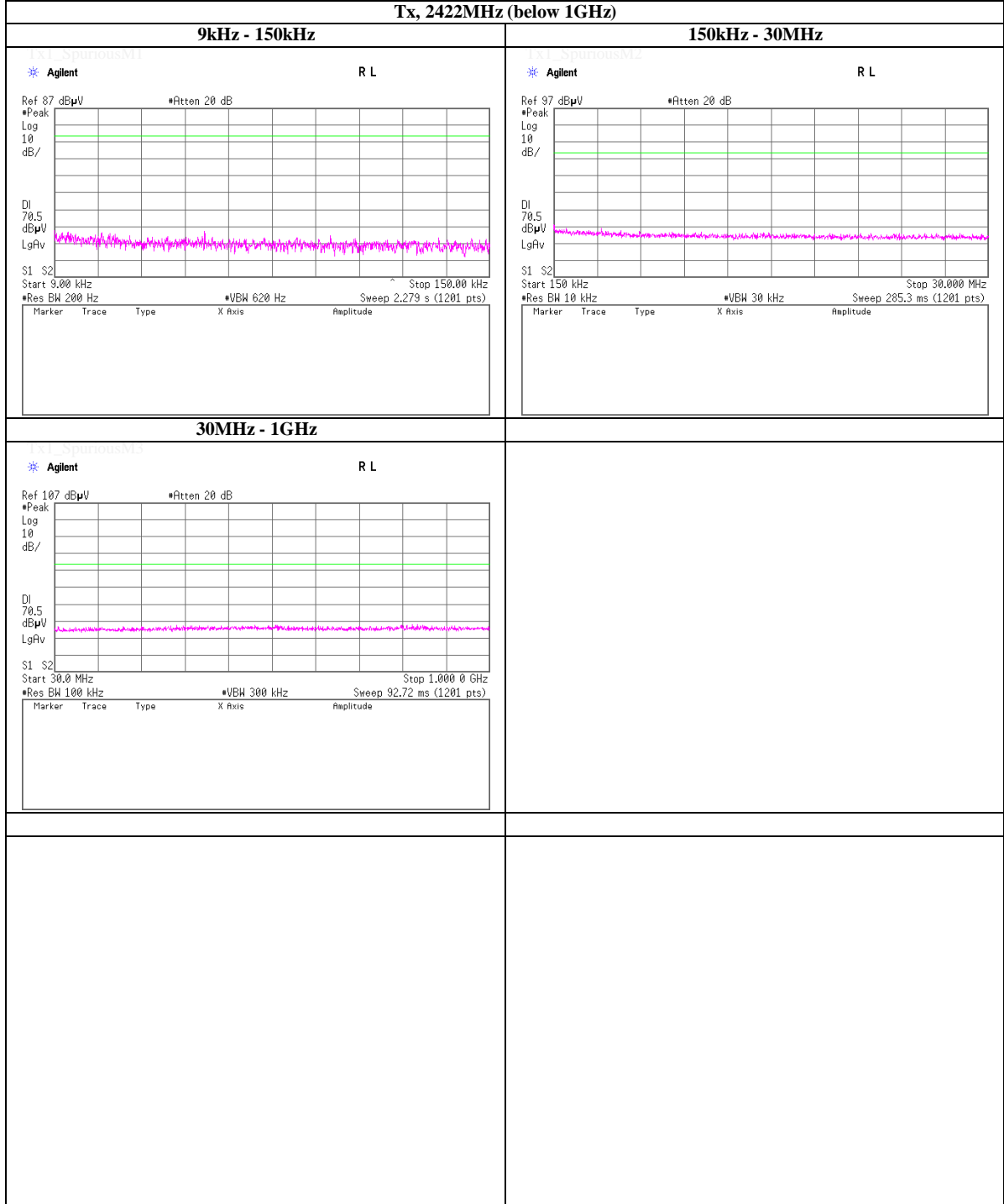
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Tx, 11n (HT40, Wide, Mix, Long), PN9, antenna port Main, worst data mode 8(MCS)**

**Tx, 2422MHz (below 1GHz)**



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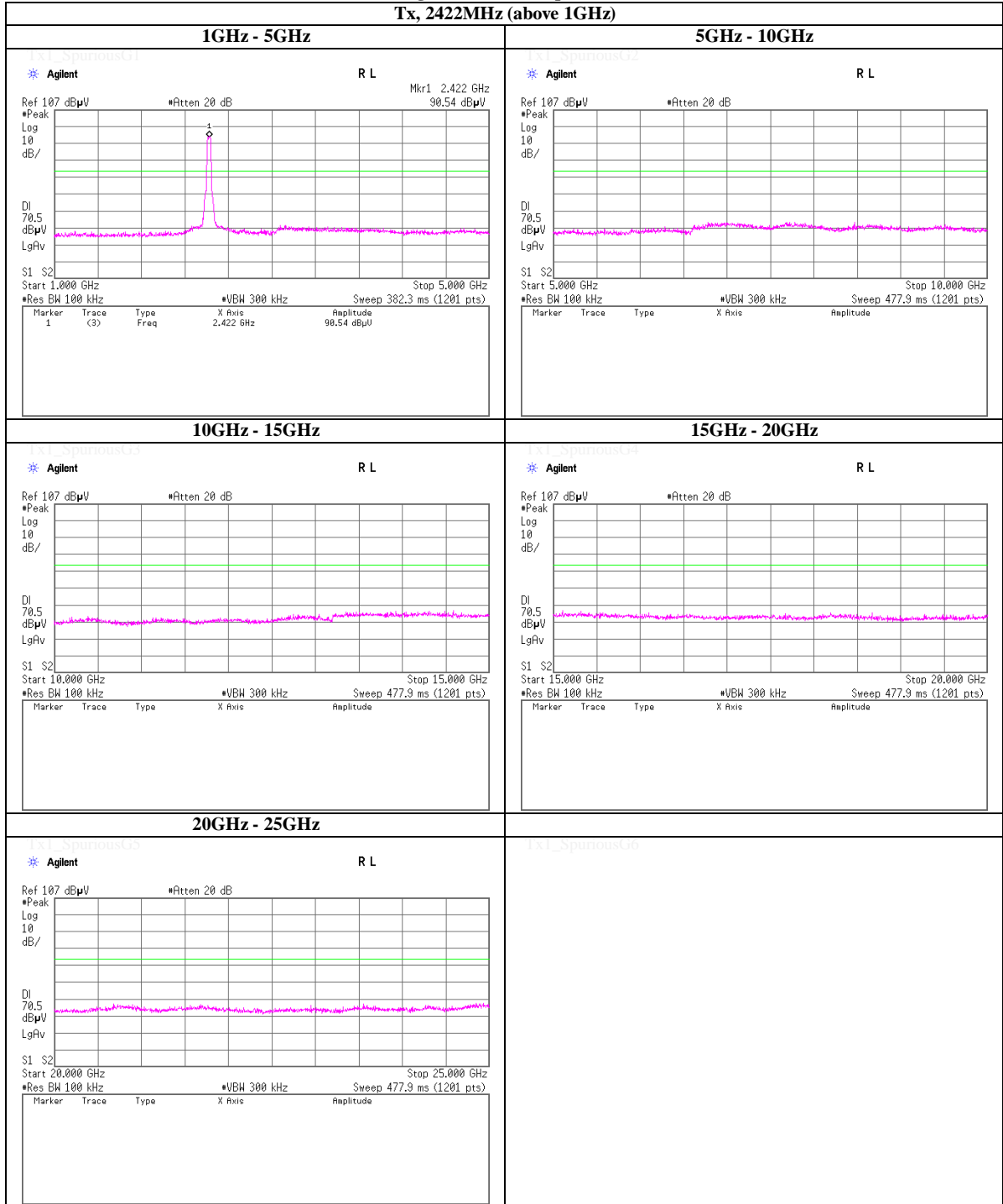
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Tx, 11n (HT40, Wide, Mix, Long), PN9, antenna port Main, worst data mode 8(MCS)**

**Tx, 2422MHz (above 1GHz)**



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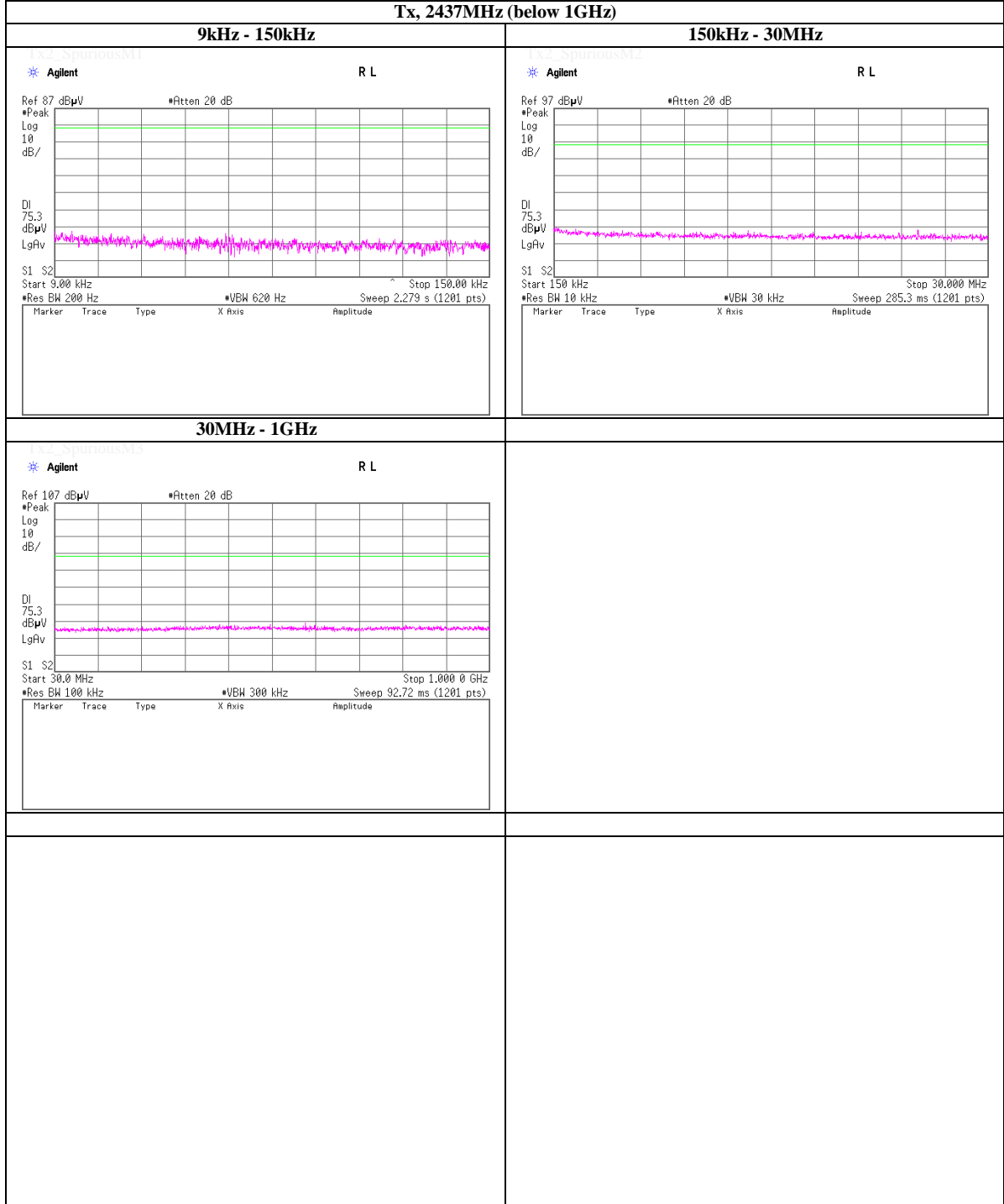
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Tx, 11n (HT40, Wide, Mix, Long), PN9, antenna port Main, worst data mode 8(MCS)**

**Tx, 2437MHz (below 1GHz)**



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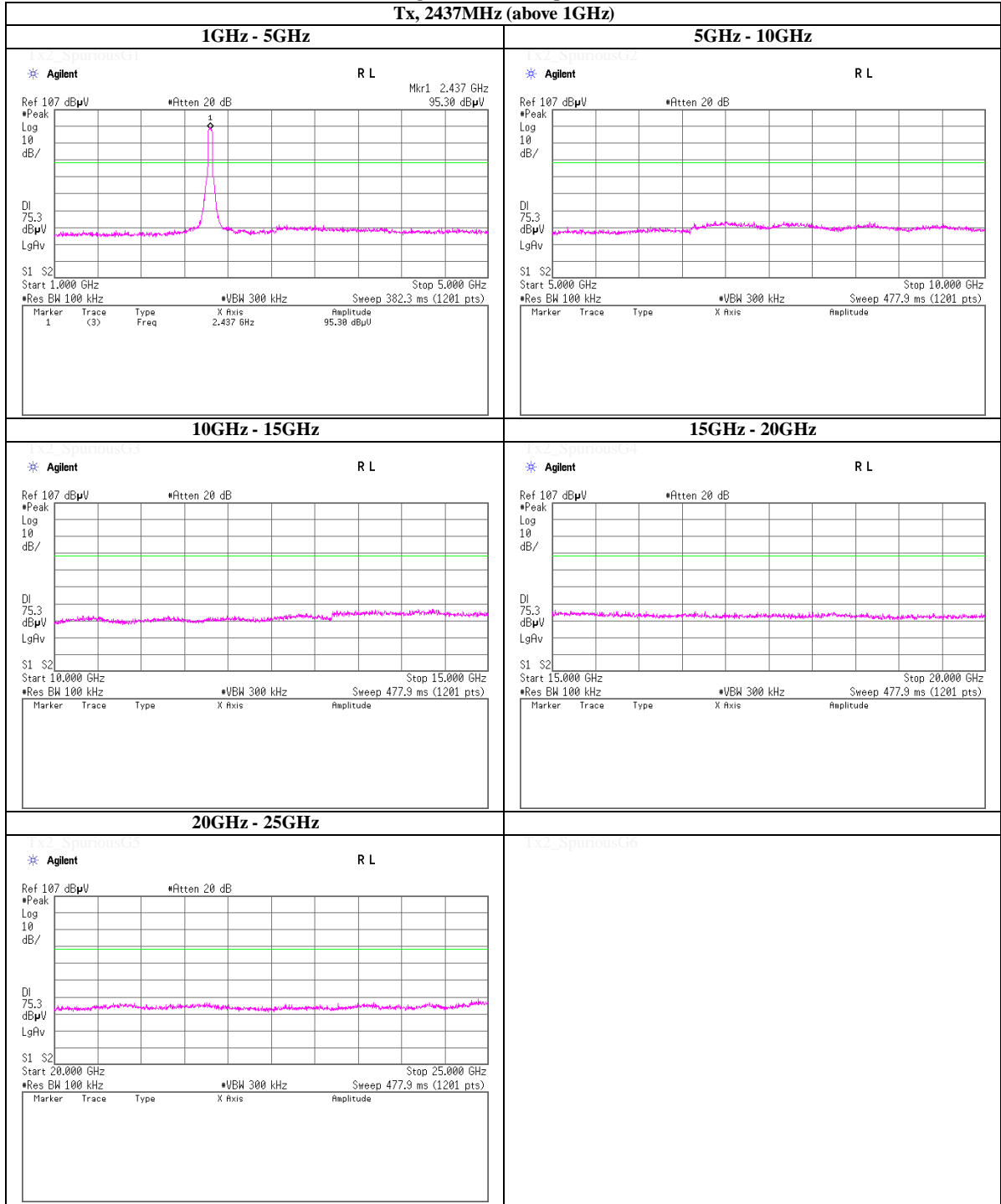
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Tx, 11n (HT40, Wide, Mix, Long), PN9, antenna port Main, worst data mode 8(MCS)**

**Tx, 2437MHz (above 1GHz)**



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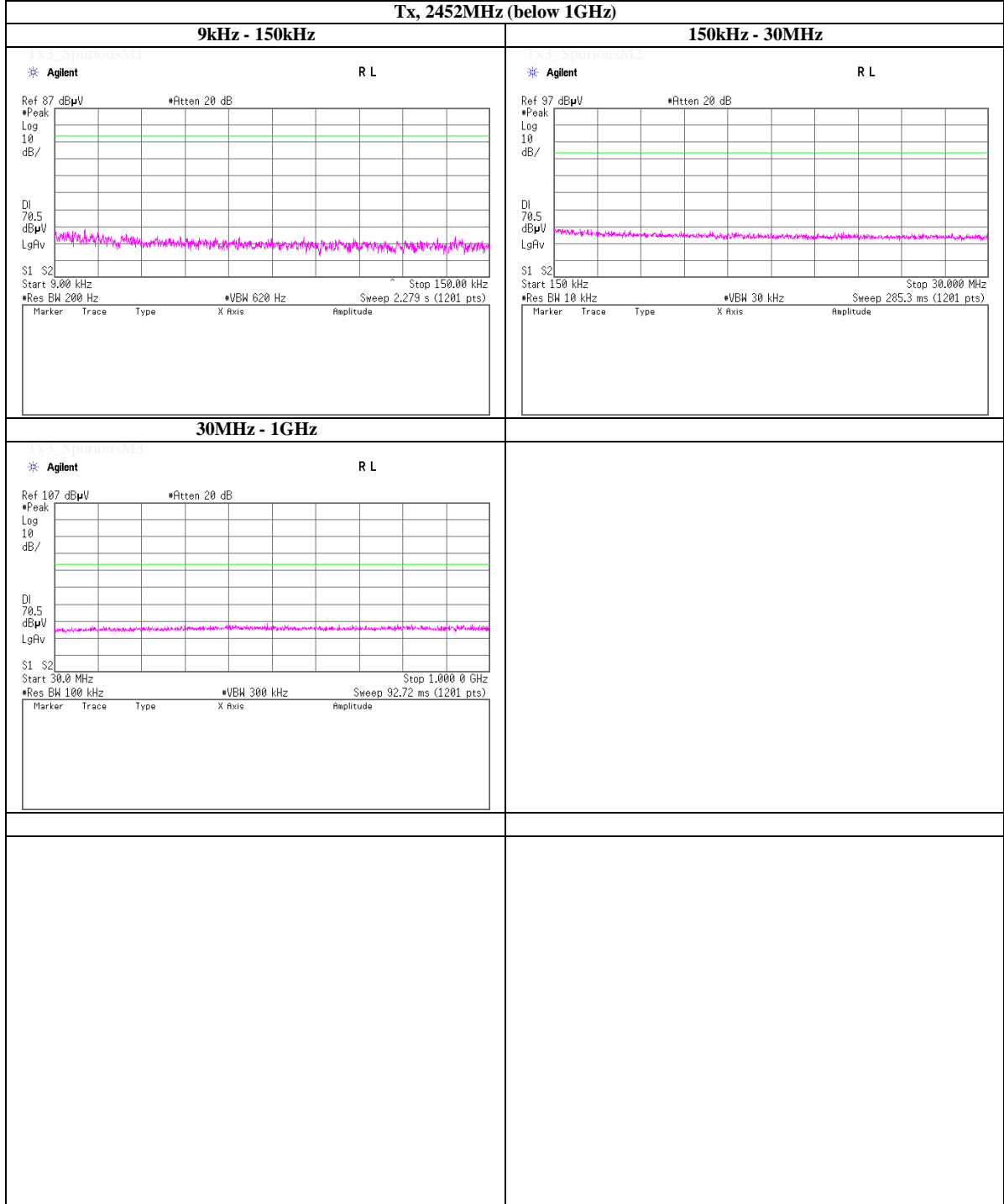
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Tx, 11n (HT40, Wide, Mix, Long), PN9, antenna port Main, worst data mode 8(MCS)**

**Tx, 2452MHz (below 1GHz)**



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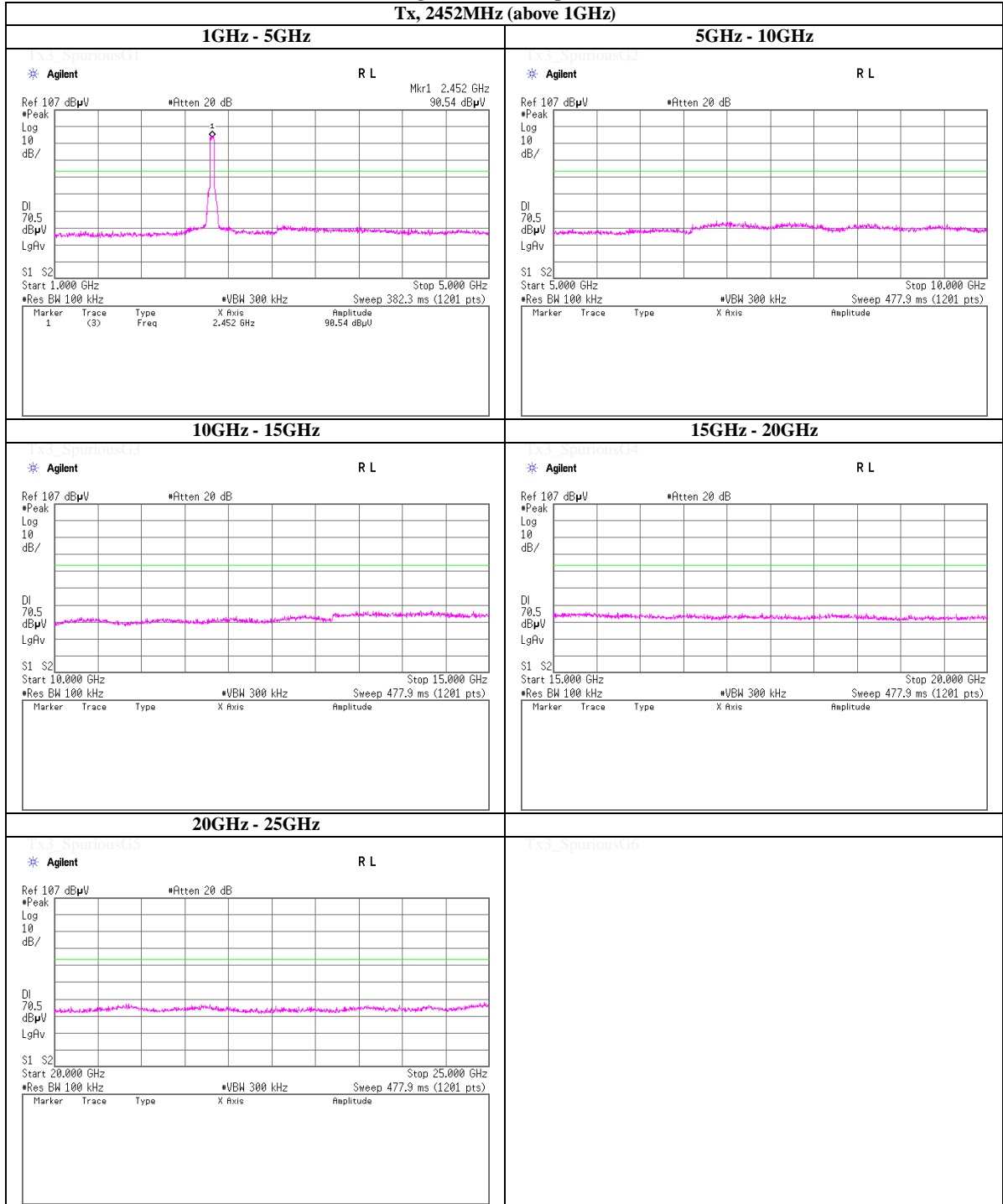
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**(Reference chart) Spurious emission (Conducted)**

**Tx, 11n (HT40, Wide, Mix, Long), PN9, antenna port Main, worst data mode 8(MCS)**

**Tx, 2452MHz (above 1GHz)**



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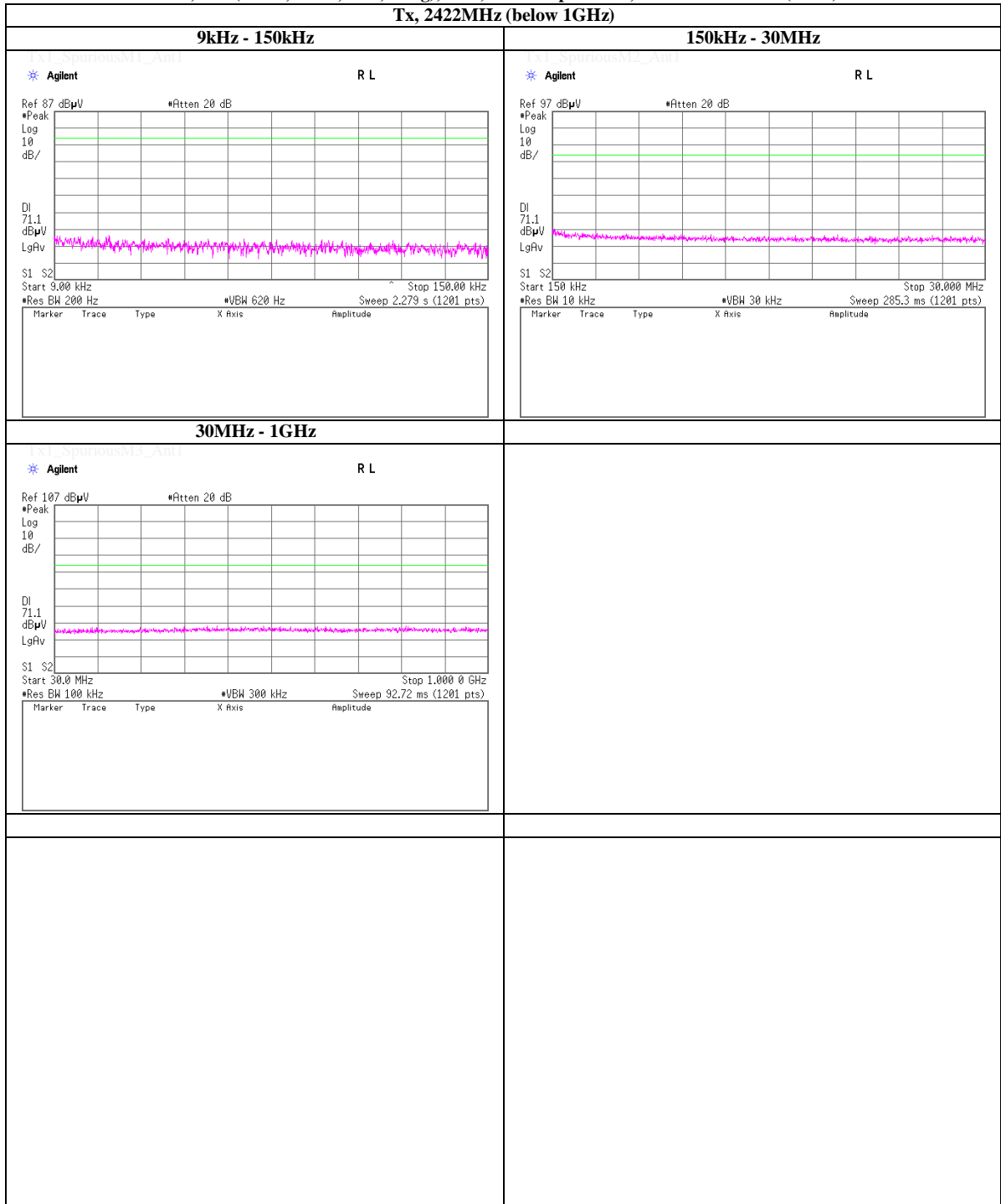
Facsimile : +81 463 50 6401



**(Reference chart) Spurious emission (Conducted)**

**Tx, 11n (HT40, Wide, Mix, Long), PN9, antenna port Aux, worst data mode 8(MCS)**

**Tx, 2422MHz (below 1GHz)**



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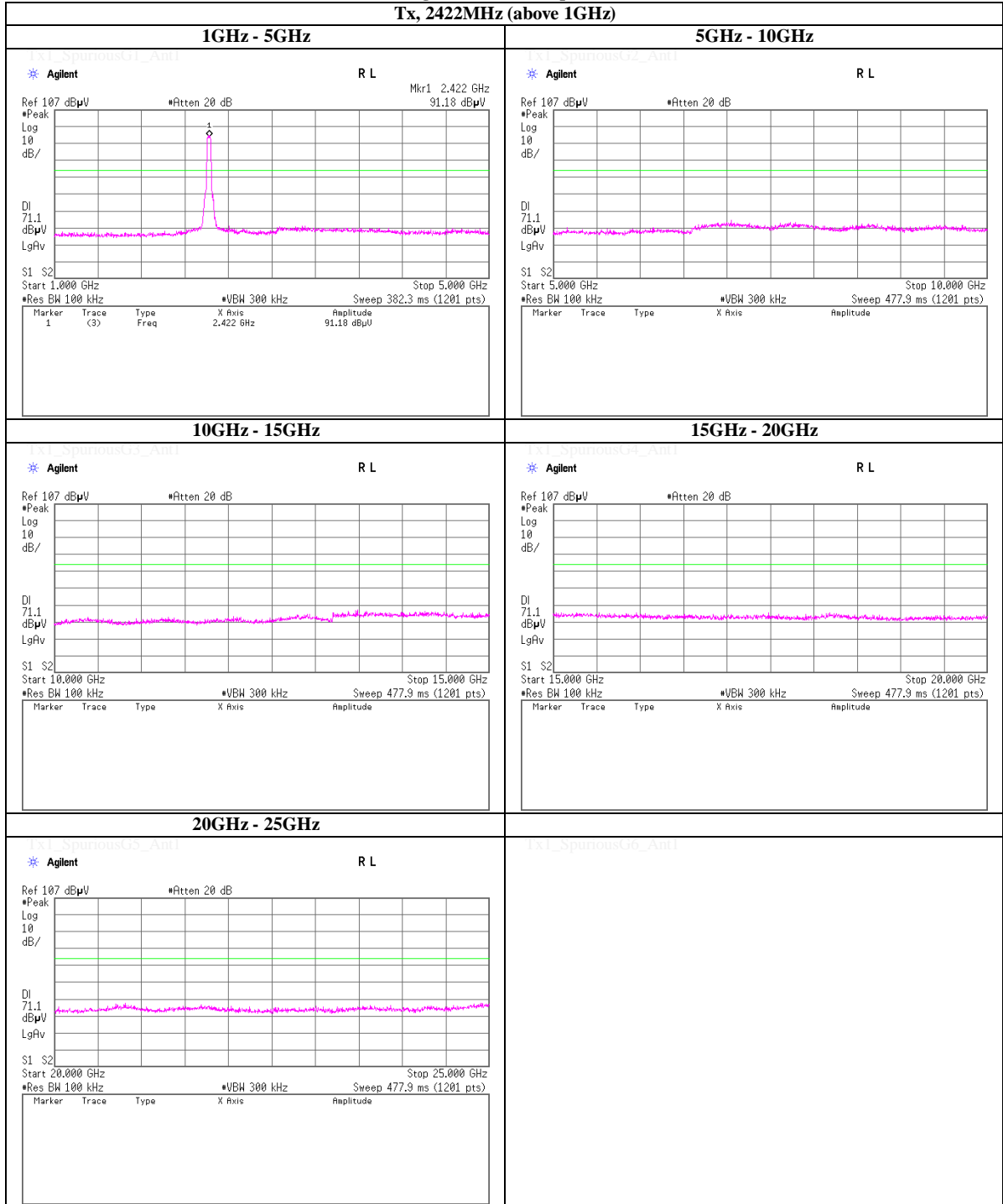
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Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Tx, 11n (HT40, Wide, Mix, Long), PN9, antenna port Aux, worst data mode 8(MCS)**

**Tx, 2422MHz (above 1GHz)**



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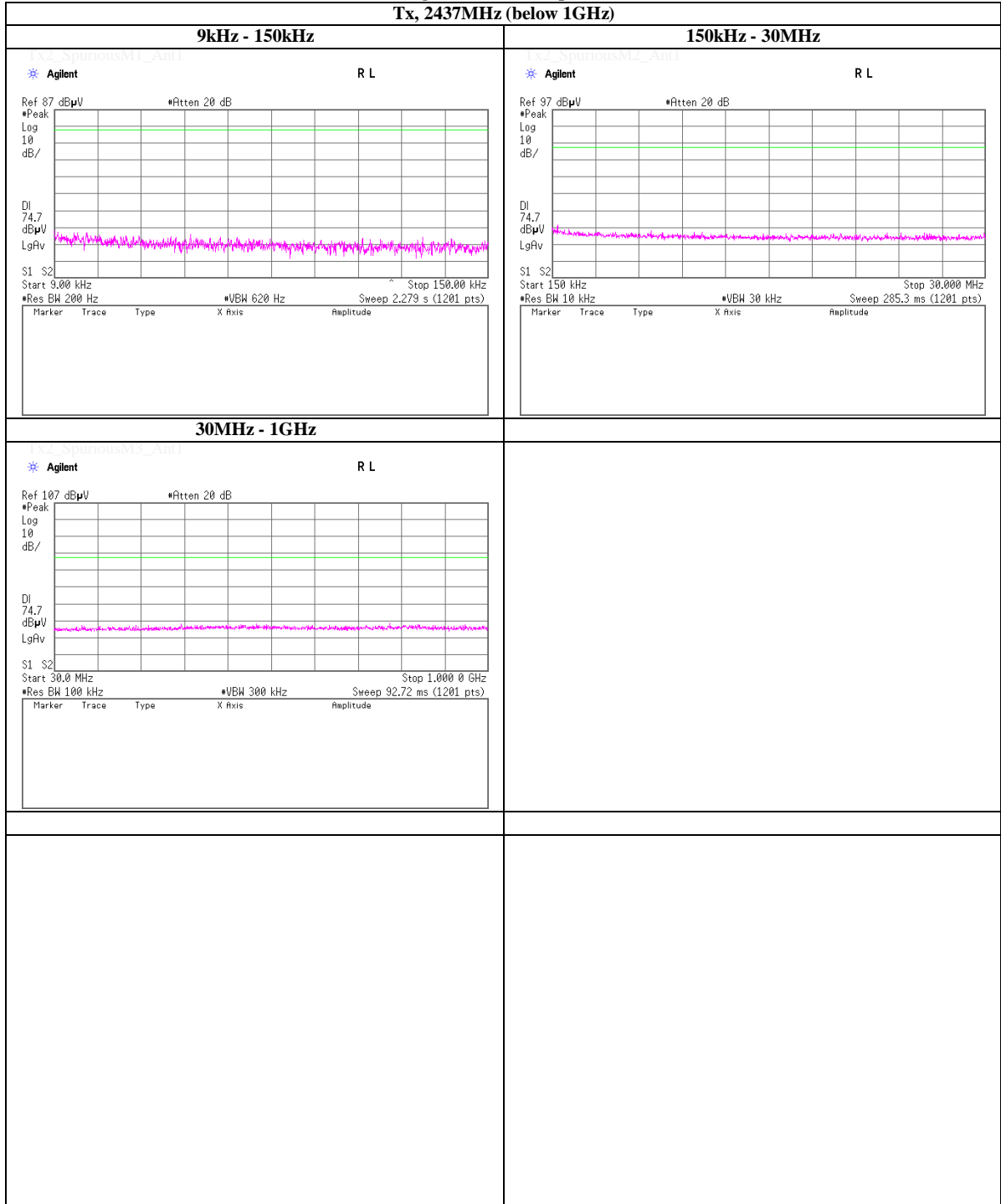
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**(Reference chart) Spurious emission (Conducted)**

**Tx, 11n (HT40, Wide, Mix, Long), PN9, antenna port Aux, worst data mode 8(MCS)**

**Tx, 2437MHz (below 1GHz)**

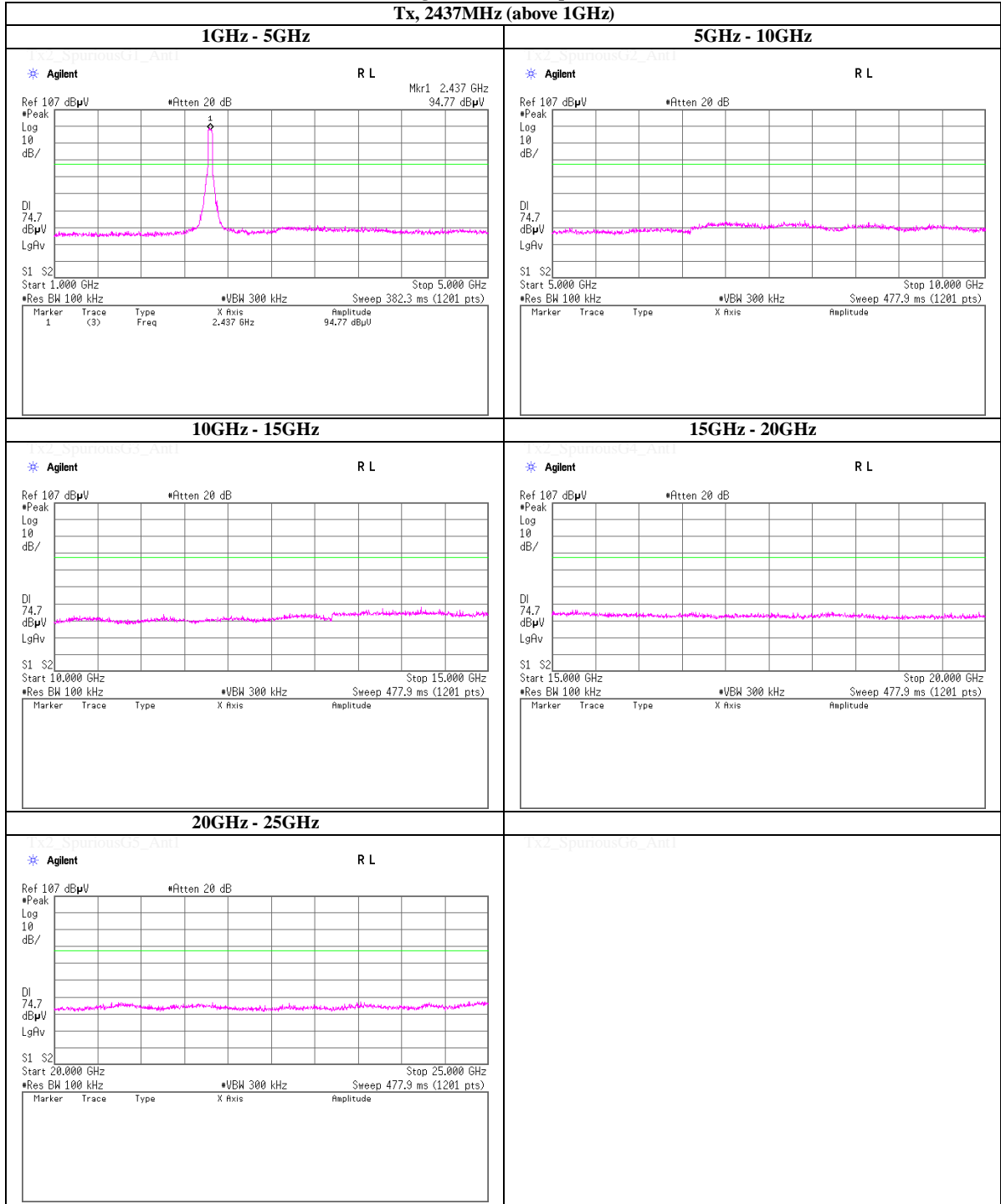


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**(Reference chart) Spurious emission (Conducted)**

**Tx, 11n (HT40, Wide, Mix, Long), PN9, antenna port Aux, worst data mode 8(MCS)**

**Tx, 2437MHz (above 1GHz)**



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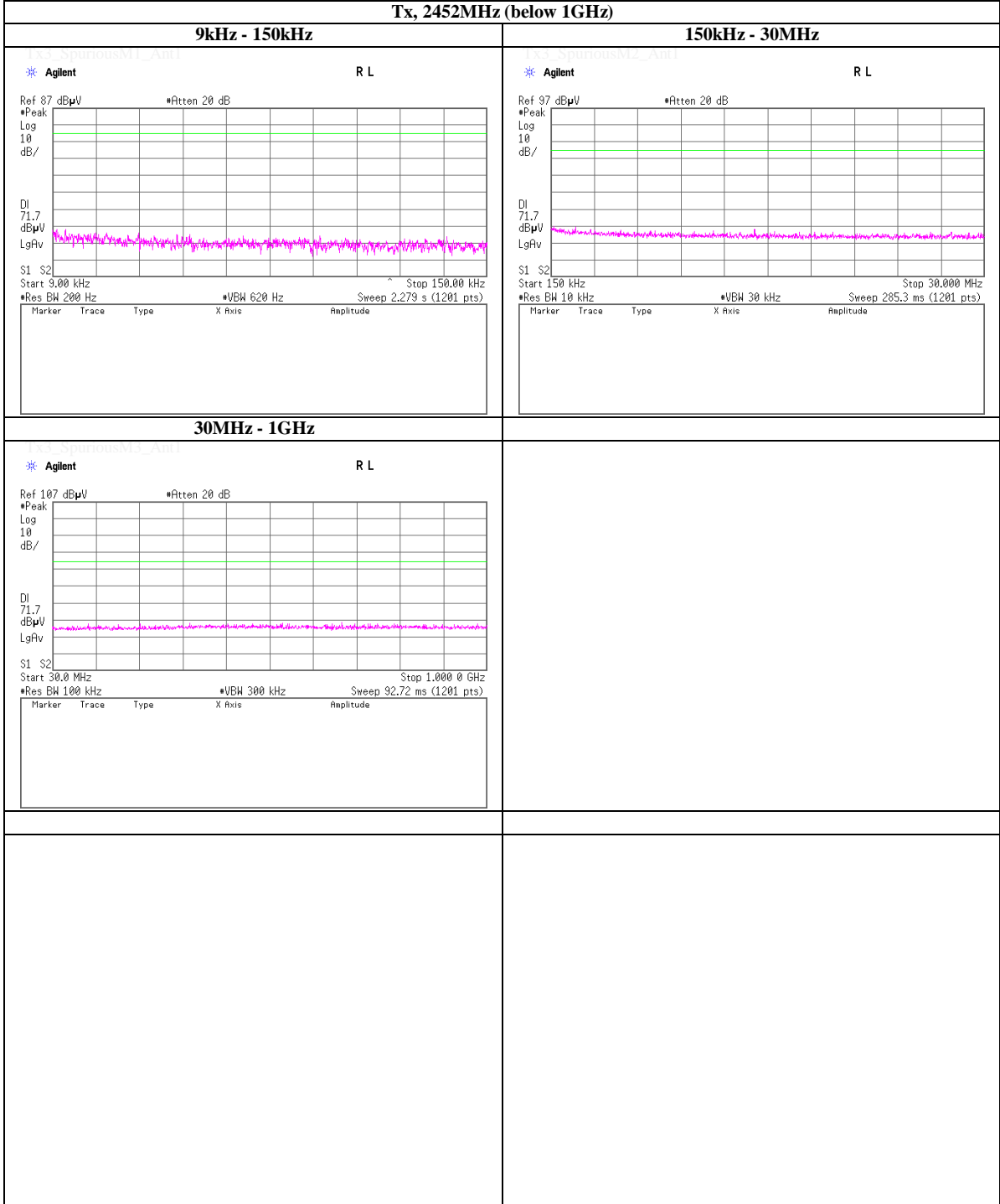
Telephone : +81 463 50 6400

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**(Reference chart) Spurious emission (Conducted)**

**Tx, 11n (HT40, Wide, Mix, Long), PN9, antenna port Aux, worst data mode 8(MCS)**

**Tx, 2452MHz (below 1GHz)**



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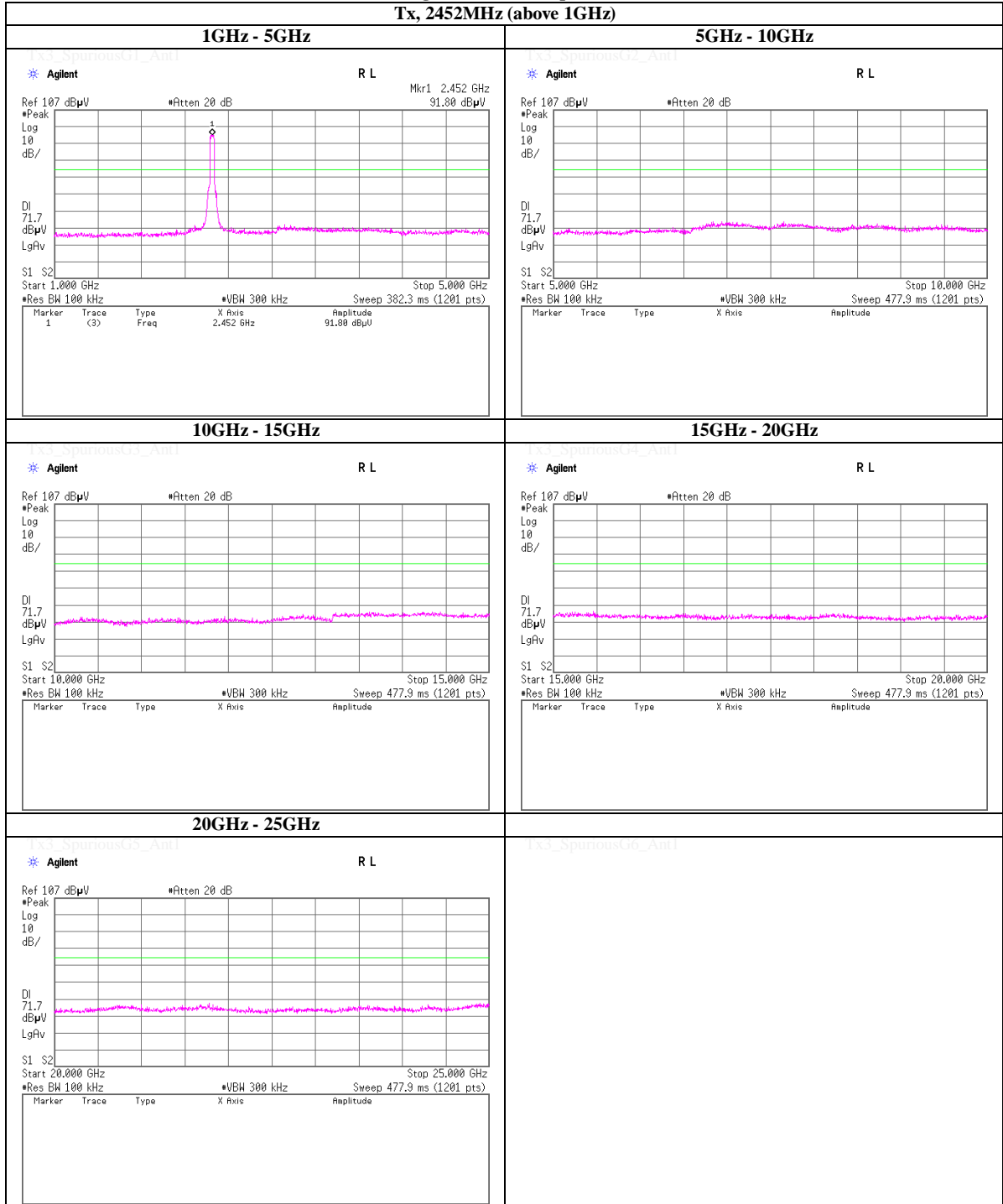
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Tx, 11n (HT40, Wide, Mix, Long), PN9, antenna port Aux, worst data mode 8(MCS)**

**Tx, 2452MHz (above 1GHz)**



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**Shonan EMC Lab.**

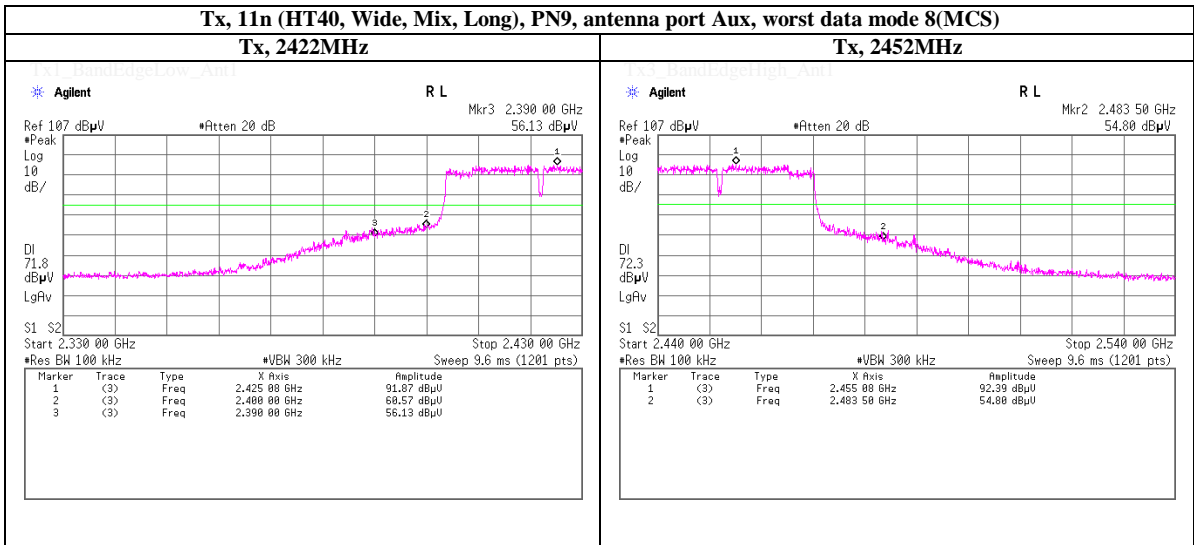
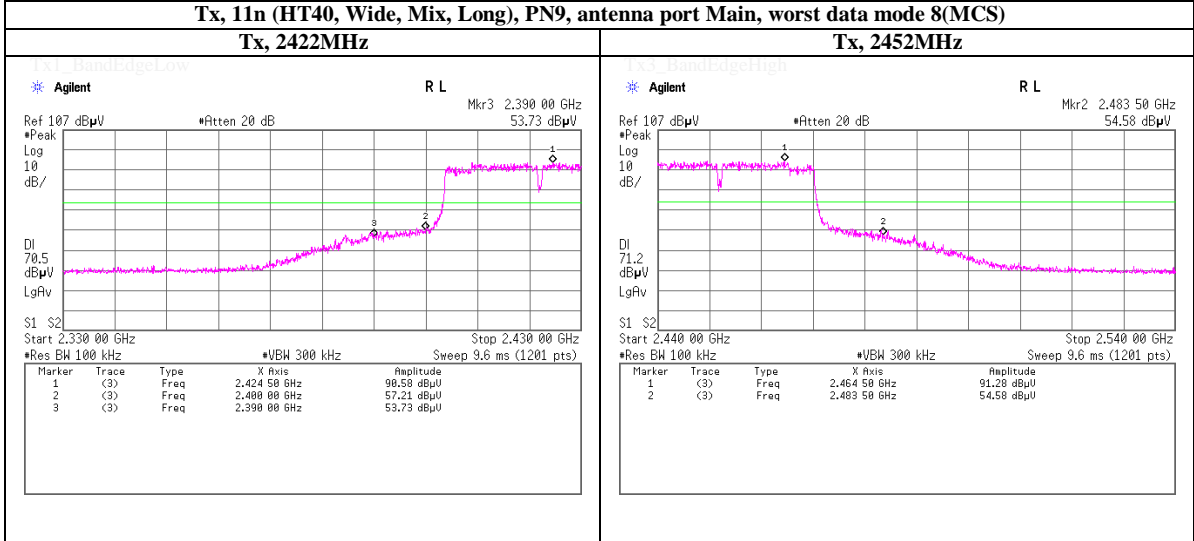
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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**(Reference chart) Spurious emission (Conducted)**

**Band Edge compliance**



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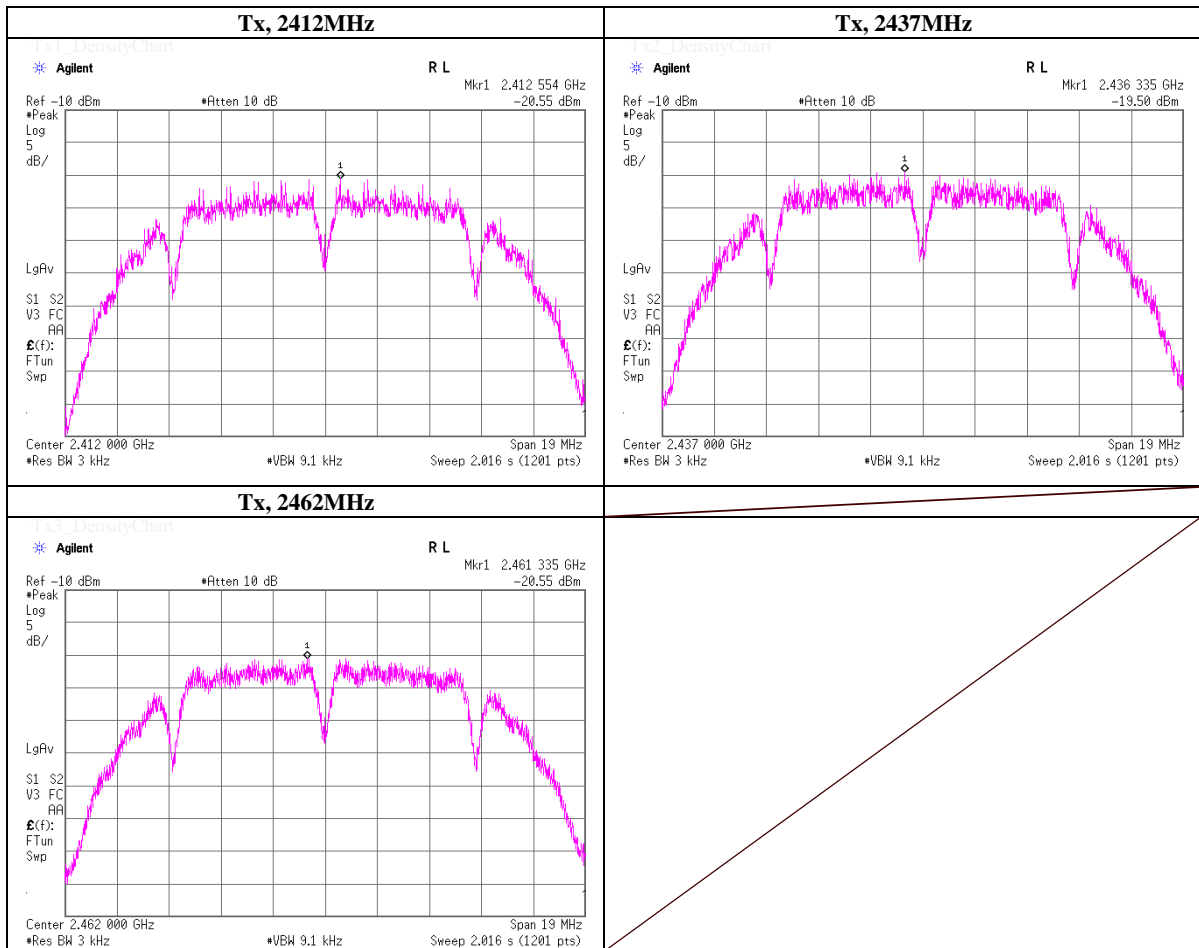
**Maximum Power Spectral Density**

(Option 1)

|                        |   |                    |
|------------------------|---|--------------------|
| Test place             | UL Japan, Inc. Shonan EMC Lab.                                      | No.5 Shielded Room |
| Date                   | November 19, 2012   |                    |
| Temperature / Humidity | 23deg.C , 38%RH   |                    |
| Engineer               | Kenichi Adachi  |                    |
| Mode                   | Tx, IEEE802.11b, PN9, worst antenna port Aux, worst data mode 1Mbps |                    |

| Ch. Freq.<br>[MHz] | Freq.<br>Reading<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>[dB] | Result<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] |
|--------------------|---------------------------|------------------|-----------------------|----------------|-----------------|----------------|----------------|
| 2412.0000          | 2412.55                   | -20.55           | 1.51                  | 10.00          | -9.04           | 8.00           | 17.04          |
| 2437.0000          | 2436.34                   | -19.50           | 1.50                  | 10.00          | -8.00           | 8.00           | 16.00          |
| 2462.0000          | 2461.34                   | -20.55           | 1.50                  | 10.00          | -9.05           | 8.00           | 17.05          |

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



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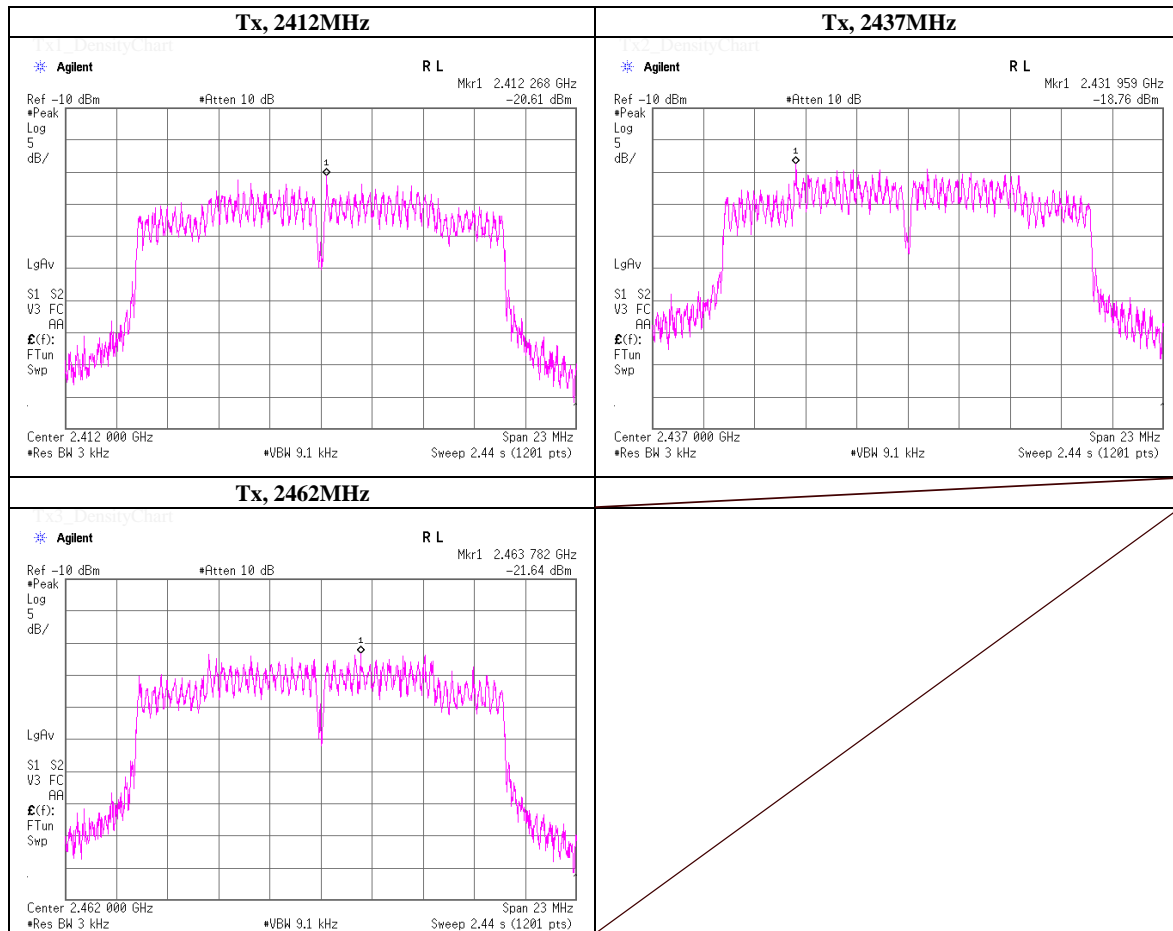
### Maximum Power Spectral Density

(Option 1)

|                        |   |                    |
|------------------------|---|--------------------|
| Test place             | UL Japan, Inc. Shonan EMC Lab.                                      | No.5 Shielded Room |
| Date                   | November 19, 2012   |                    |
| Temperature / Humidity | 23deg.C , 38%RH   |                    |
| Engineer               | Kenichi Adachi  |                    |
| Mode                   | Tx, IEEE802.11g, PN9, worst antenna port Aux, worst data mode 6Mbps |                    |

| Ch. Freq.<br>[MHz] | Freq.<br>Reading<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>[dB] | Result<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] |
|--------------------|---------------------------|------------------|-----------------------|----------------|-----------------|----------------|----------------|
| 2412.0000          | 2412.27                   | -20.61           | 1.51                  | 10.00          | -9.10           | 8.00           | 17.10          |
| 2437.0000          | 2431.96                   | -18.76           | 1.50                  | 10.00          | -7.26           | 8.00           | 15.26          |
| 2462.0000          | 2463.78                   | -21.64           | 1.50                  | 10.00          | -10.14          | 8.00           | 18.14          |

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



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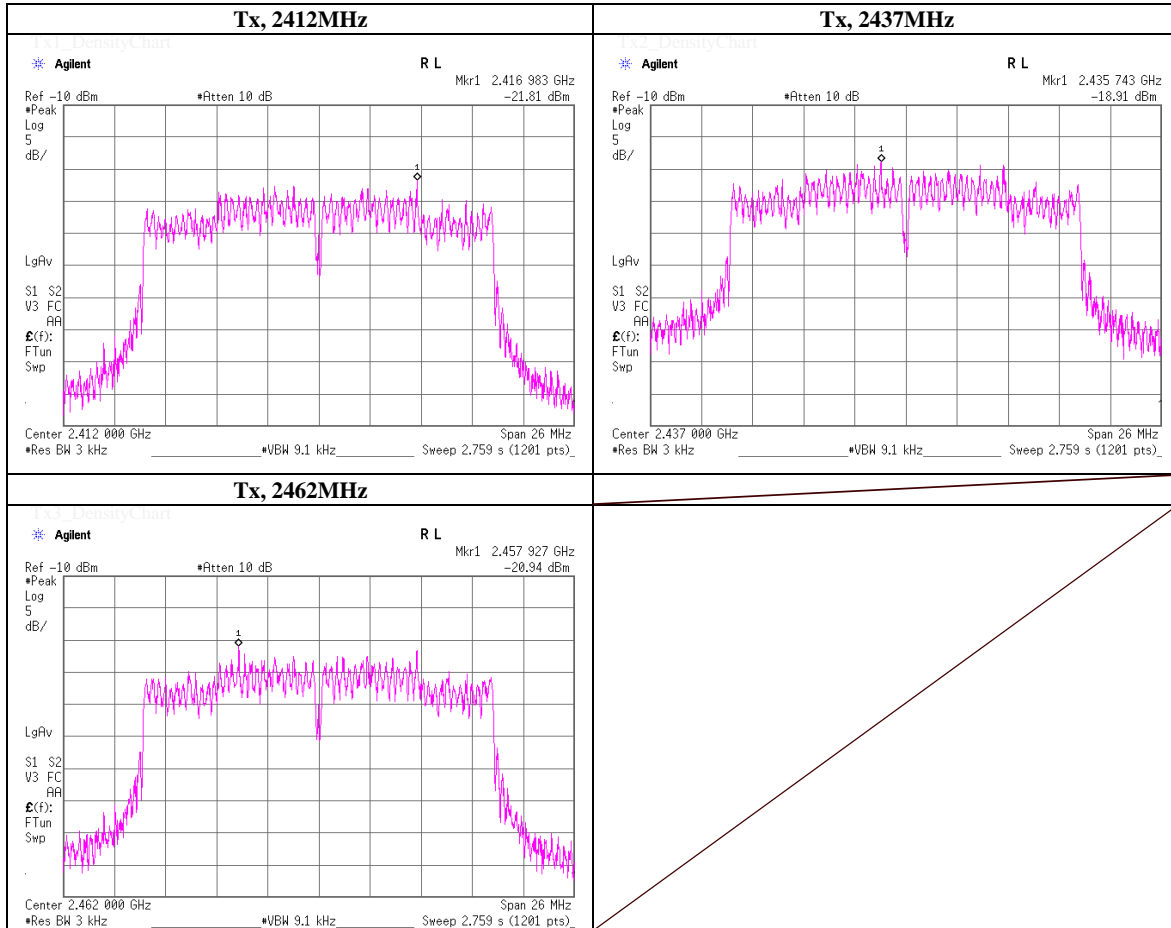
**Maximum Power Spectral Density**

(Option 1)

Test place                      UL Japan, Inc. Shonan EMC Lab.                      No.5 Shielded Room  
 Date                              November 19, 2012  
 Temperature / Humidity      23deg.C    , 38%RH  
 Engineer                        Kenichi Adachi  
 Mode                              Tx, IEEE802.11n (HT20, Mix, Long), PN9, worst antenna port Aux, worst data mode 0(MCS)

| Ch. Freq.<br>[MHz] | Freq.<br>Reading<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>[dB] | Result<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] |
|--------------------|---------------------------|------------------|-----------------------|----------------|-----------------|----------------|----------------|
| 2412.0000          | 2416.98                   | -21.81           | 1.51                  | 10.00          | -10.30          | 8.00           | 18.30          |
| 2437.0000          | 2435.74                   | -18.91           | 1.50                  | 10.00          | -7.41           | 8.00           | 15.41          |
| 2462.0000          | 2457.93                   | -20.94           | 1.50                  | 10.00          | -9.44           | 8.00           | 17.44          |

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



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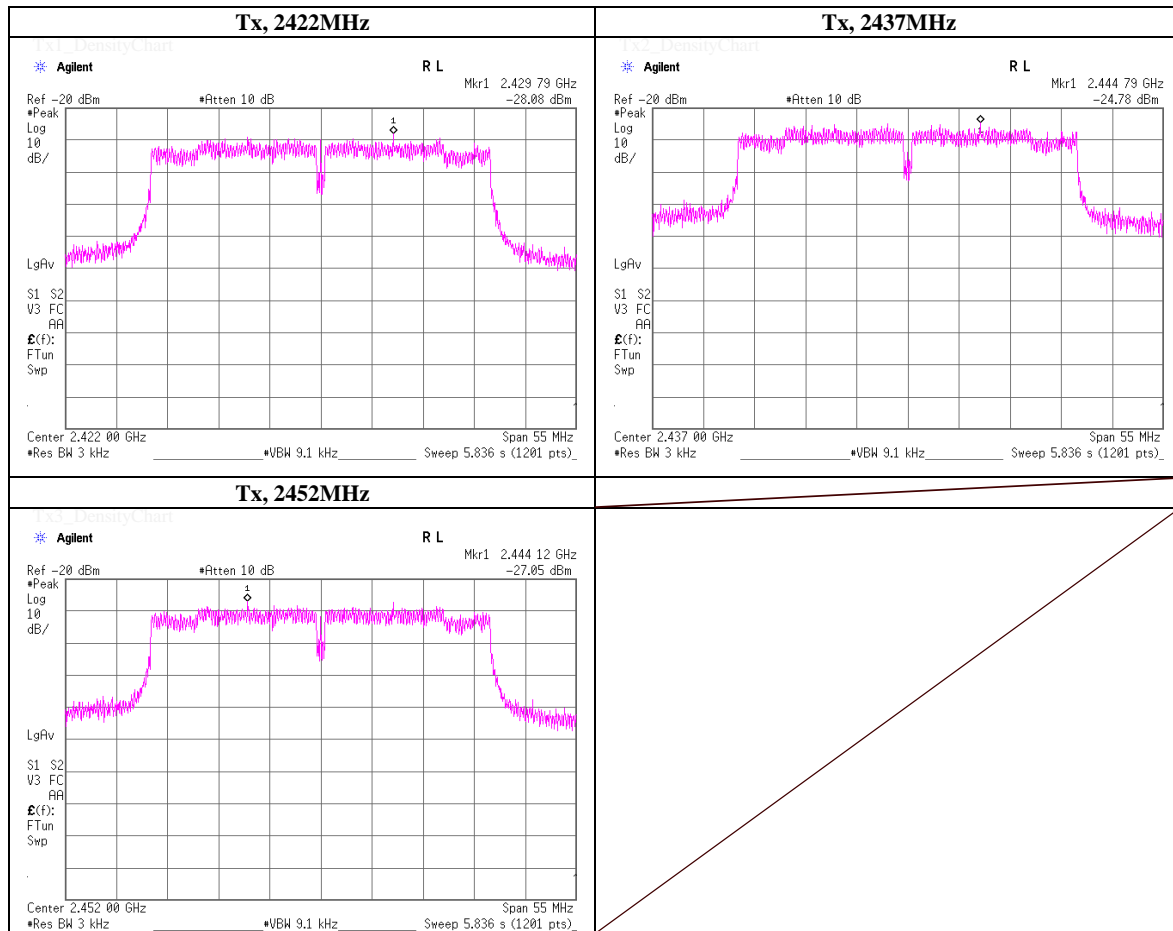
### Maximum Power Spectral Density

(Option 1)

|                        |  |                    |
|------------------------|--|--------------------|
| Test place             | UL Japan, Inc. Shonan EMC Lab.   | No.5 Shielded Room |
| Date                   | November 19, 2012  |                    |
| Temperature / Humidity | 23deg.C , 38%RH  |                    |
| Engineer               | Kenichi Adachi   |                    |
| Mode                   | Tx, 11n (HT40, Wide, Mix, Long), PN9, worst antenna port Aux, worst data mode 0(MCS) |                    |

| Ch. Freq.<br>[MHz] | Freq.<br>Reading<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>[dB] | Result<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] |
|--------------------|---------------------------|------------------|-----------------------|----------------|-----------------|----------------|----------------|
| 2422.0000          | 2429.79                   | -28.08           | 1.51                  | 10.00          | -16.57          | 8.00           | 24.57          |
| 2437.0000          | 2444.79                   | -24.78           | 1.50                  | 10.00          | -13.28          | 8.00           | 21.28          |
| 2452.0000          | 2444.12                   | -27.05           | 1.50                  | 10.00          | -15.55          | 8.00           | 23.55          |

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



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**Maximum Power Spectral Density**

(Option 1)

Test place                      UL Japan, Inc. Shonan EMC Lab.                      No.5 Shielded Room  
Date                                      Novemer 19, 2012  
Temperature / Humidity              23deg.C    , 38%RH  
Engineer                                  Kenichi Adachi  
Mode                                        Tx, IEEE802.11n (HT20, Mix, Long), PN9, worst data mode 8(MCS)

**Antenna Main**

| Ch. Freq.<br>[MHz] | Freq.<br>Reading<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>[dB] | 10log<br>(N <sub>ANT</sub> )*<br>[dB] | Result<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] |
|--------------------|---------------------------|------------------|-----------------------|----------------|---------------------------------------|-----------------|----------------|----------------|
| 2412.0000          | 2416.97                   | -23.97           | 1.51                  | 10.00          | 3.01                                  | -9.45           | 8.00           | 17.45          |
| 2437.0000          | 2436.66                   | -20.82           | 1.50                  | 10.00          | 3.01                                  | -6.31           | 8.00           | 14.31          |
| 2462.0000          | 2466.97                   | -21.97           | 1.50                  | 10.00          | 3.01                                  | -7.46           | 8.00           | 15.46          |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss + 10log(NANT)

**Antenna Aux**

| Ch. Freq.<br>[MHz] | Freq.<br>Reading<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>[dB] | 10log<br>(N <sub>ANT</sub> )*<br>[dB] | Result<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] |
|--------------------|---------------------------|------------------|-----------------------|----------------|---------------------------------------|-----------------|----------------|----------------|
| 2412.0000          | 2408.27                   | -23.42           | 1.51                  | 10.00          | 3.01                                  | -8.90           | 8.00           | 16.90          |
| 2437.0000          | 2441.07                   | -21.36           | 1.50                  | 10.00          | 3.01                                  | -6.85           | 8.00           | 14.85          |
| 2462.0000          | 2457.93                   | -23.07           | 1.50                  | 10.00          | 3.01                                  | -8.56           | 8.00           | 16.56          |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss + 10log(NANT)

\*) This test was measured based on Method In-Band Power Spectral Density (PSD) Measurements (2) of  
"Emissions Testing of Transmitters with Multiple Outputs in the Same Band (KDB662911 D1)"

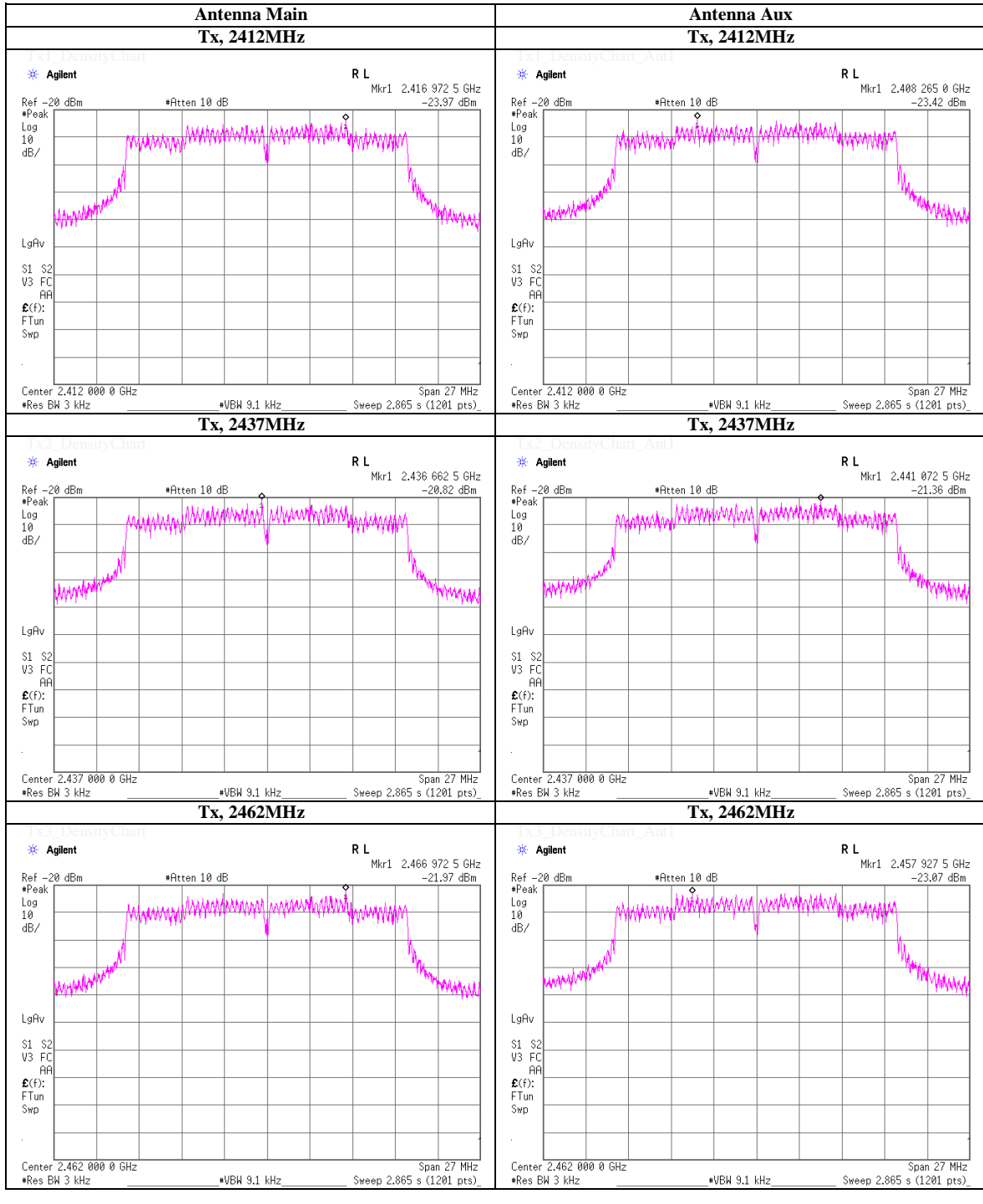
**UL Japan, Inc.****Shonan EMC Lab.**

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**Power Density**



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**Maximum Power Spectral Density**

(Option 1)

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.5 Shielded Room  
Date                            November 19, 2012  
Temperature / Humidity      23deg.C   , 38%RH  
Engineer                     Kenichi Adachi  
Mode                          Tx, 11n (HT40, Wide, Mix, Long), PN9, worst data mode 8(MCS)

**Antenna Main**

| Ch. Freq.<br>[MHz] | Freq.<br>Reading<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>[dB] | 10log<br>(N <sub>ANT</sub> )*<br>[dB] | Result<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] |
|--------------------|---------------------------|------------------|-----------------------|----------------|---------------------------------------|-----------------|----------------|----------------|
| 2422.0000          | 2419.85                   | -30.20           | 1.51                  | 10.00          | 3.01                                  | -15.68          | 8.00           | 23.68          |
| 2437.0000          | 2424.81                   | -24.99           | 1.50                  | 10.00          | 3.01                                  | -10.47          | 8.00           | 18.47          |
| 2452.0000          | 2449.20                   | -28.66           | 1.50                  | 10.00          | 3.01                                  | -14.15          | 8.00           | 22.15          |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss + 10log(NANT)

**Antenna Aux**

| Ch. Freq.<br>[MHz] | Freq.<br>Reading<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>[dB] | 10log<br>(N <sub>ANT</sub> )*<br>[dB] | Result<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] |
|--------------------|---------------------------|------------------|-----------------------|----------------|---------------------------------------|-----------------|----------------|----------------|
| 2422.0000          | 2434.74                   | -28.32           | 1.51                  | 10.00          | 3.01                                  | -13.80          | 8.00           | 21.80          |
| 2437.0000          | 2429.76                   | -24.08           | 1.50                  | 10.00          | 3.01                                  | -9.57           | 8.00           | 17.57          |
| 2452.0000          | 2454.75                   | -28.39           | 1.50                  | 10.00          | 3.01                                  | -13.87          | 8.00           | 21.87          |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss + 10log(NANT)

\*) This test was measured based on Method In-Band Power Spectral Density (PSD) Measurements (2) of "Emissions Testing of Transmitters with Multiple Outputs in the Same Band (KDB662911 D1)"

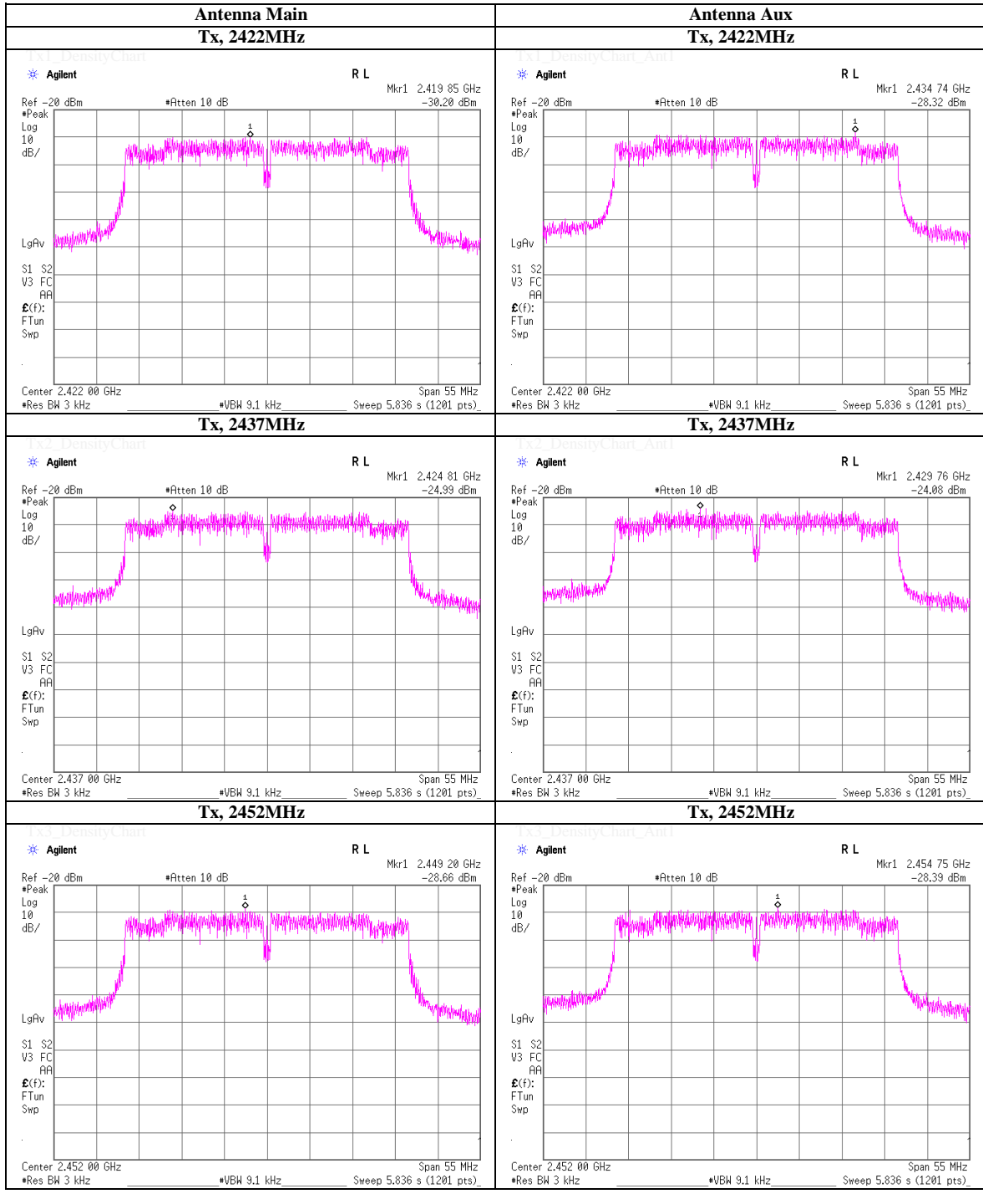
**UL Japan, Inc.****Shonan EMC Lab.**

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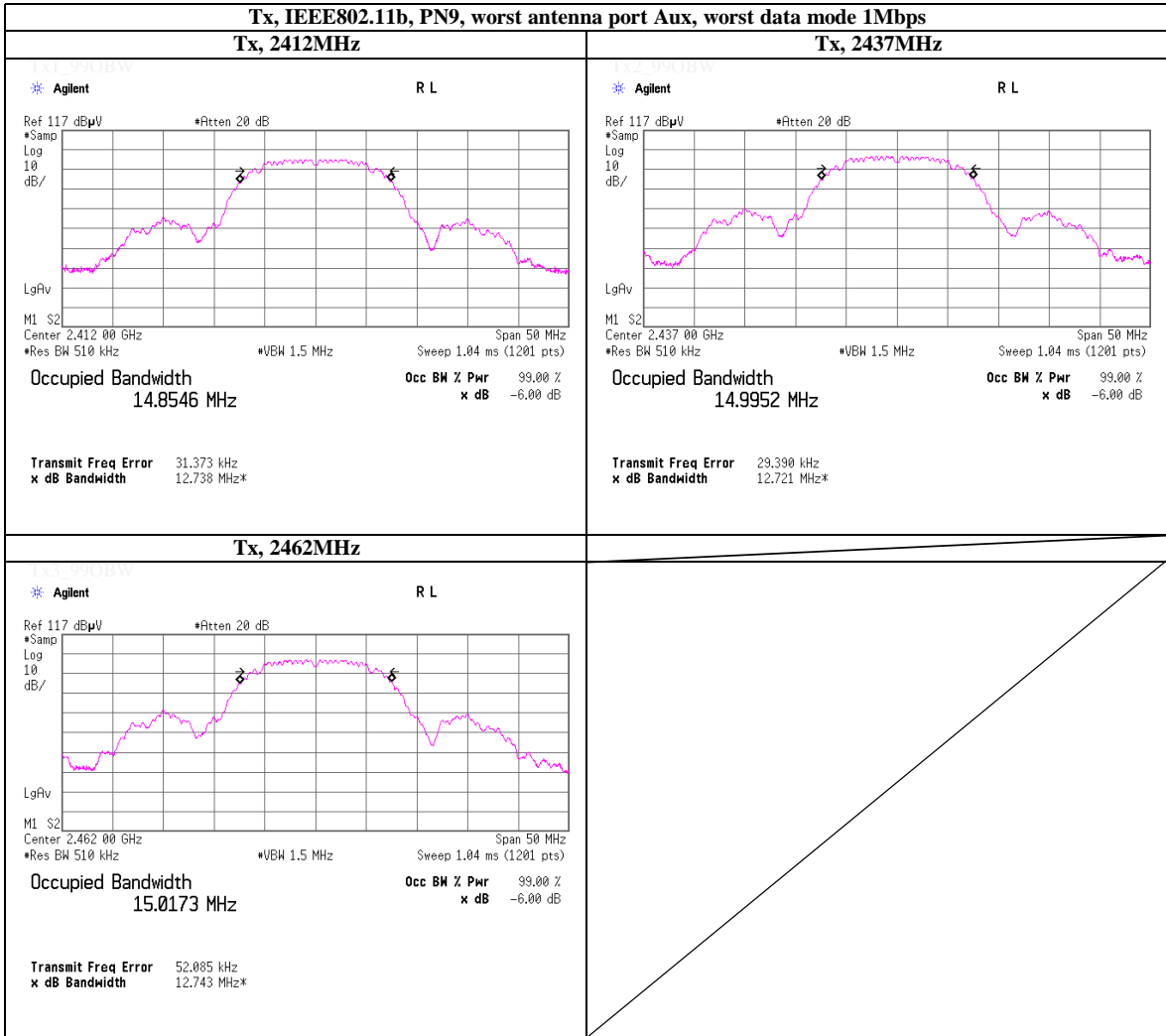
Facsimile : +81 463 50 6401

## Power Density



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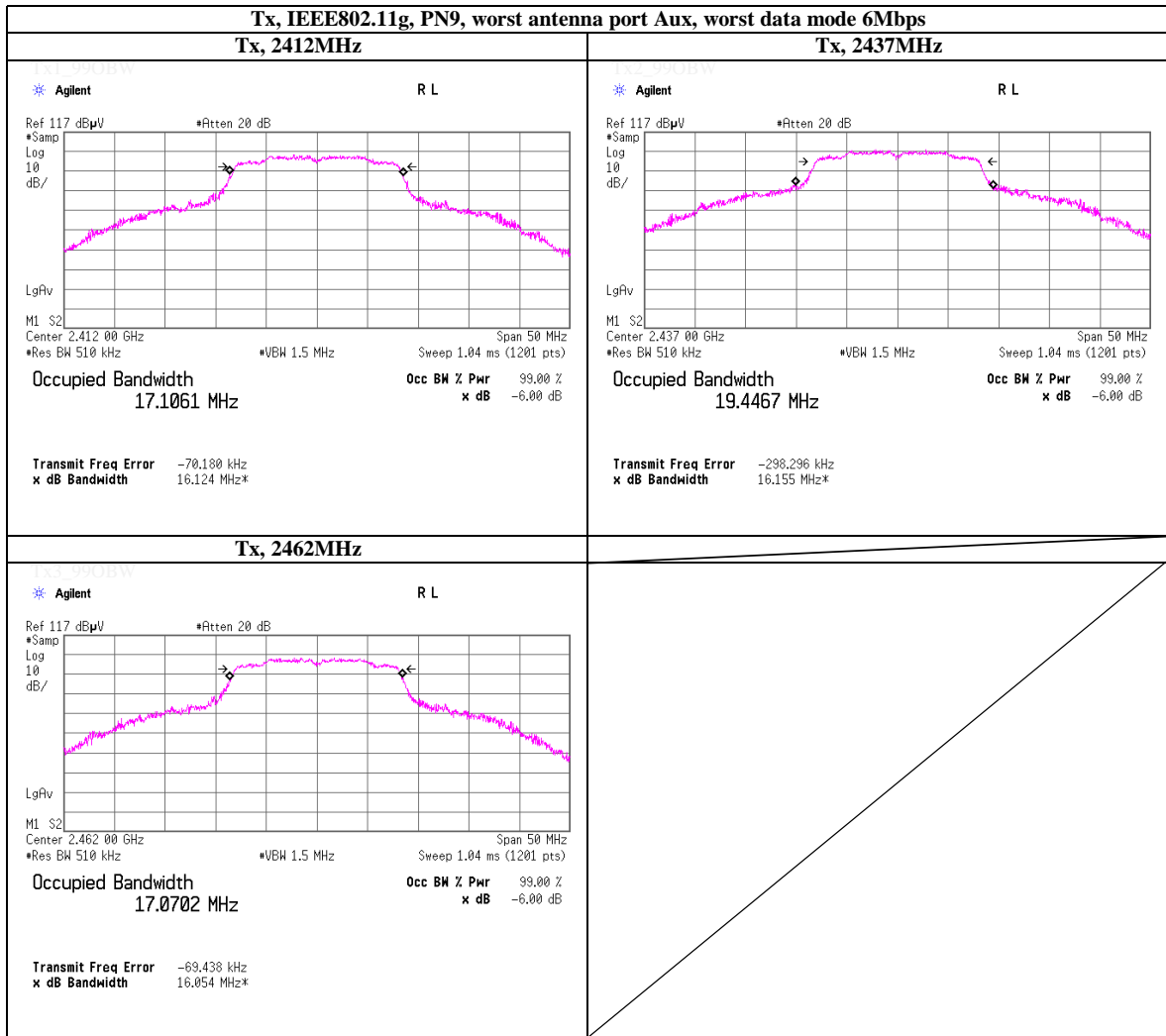
**99% Occupied Bandwidth**



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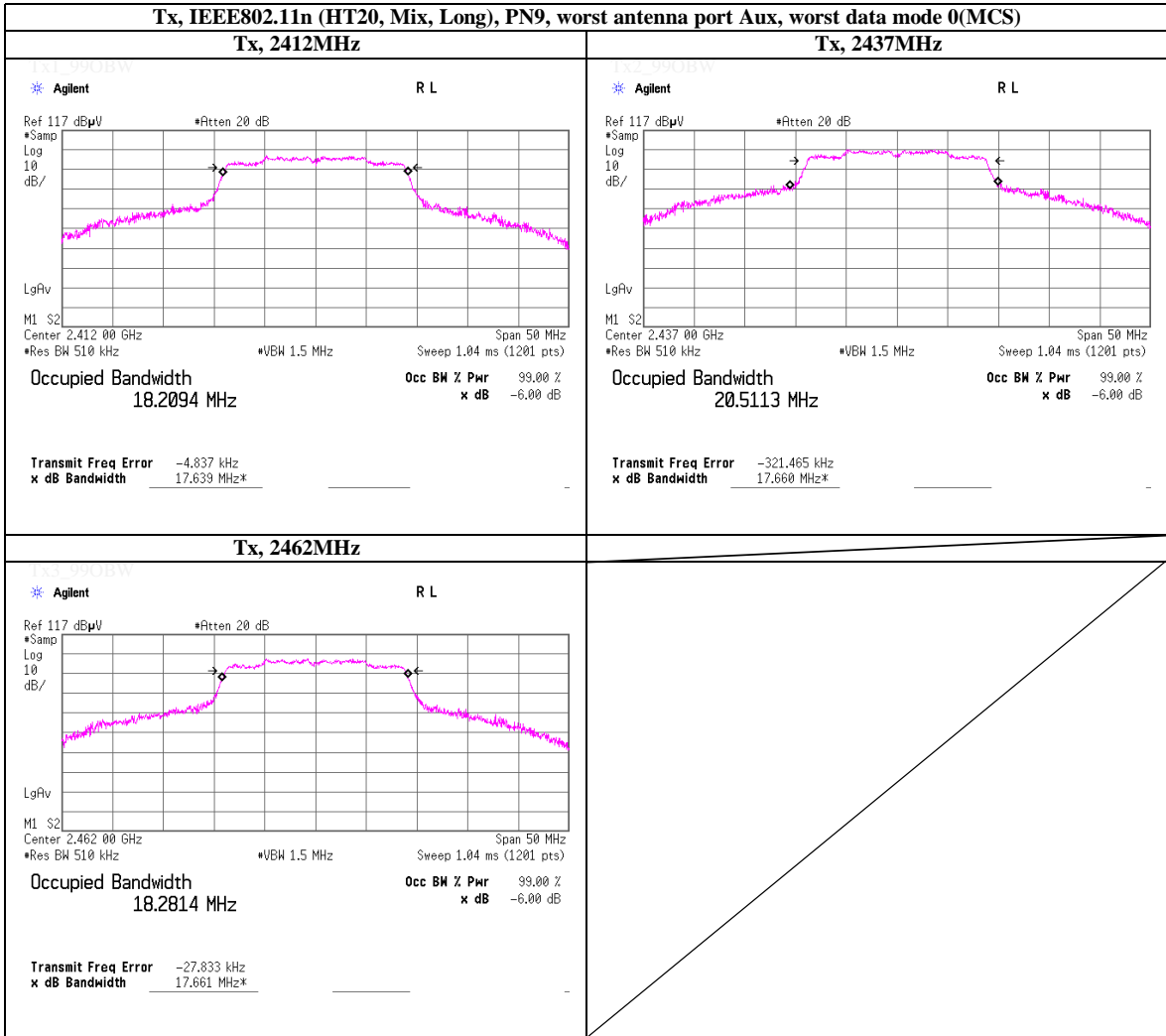


**99% Occupied Bandwidth**



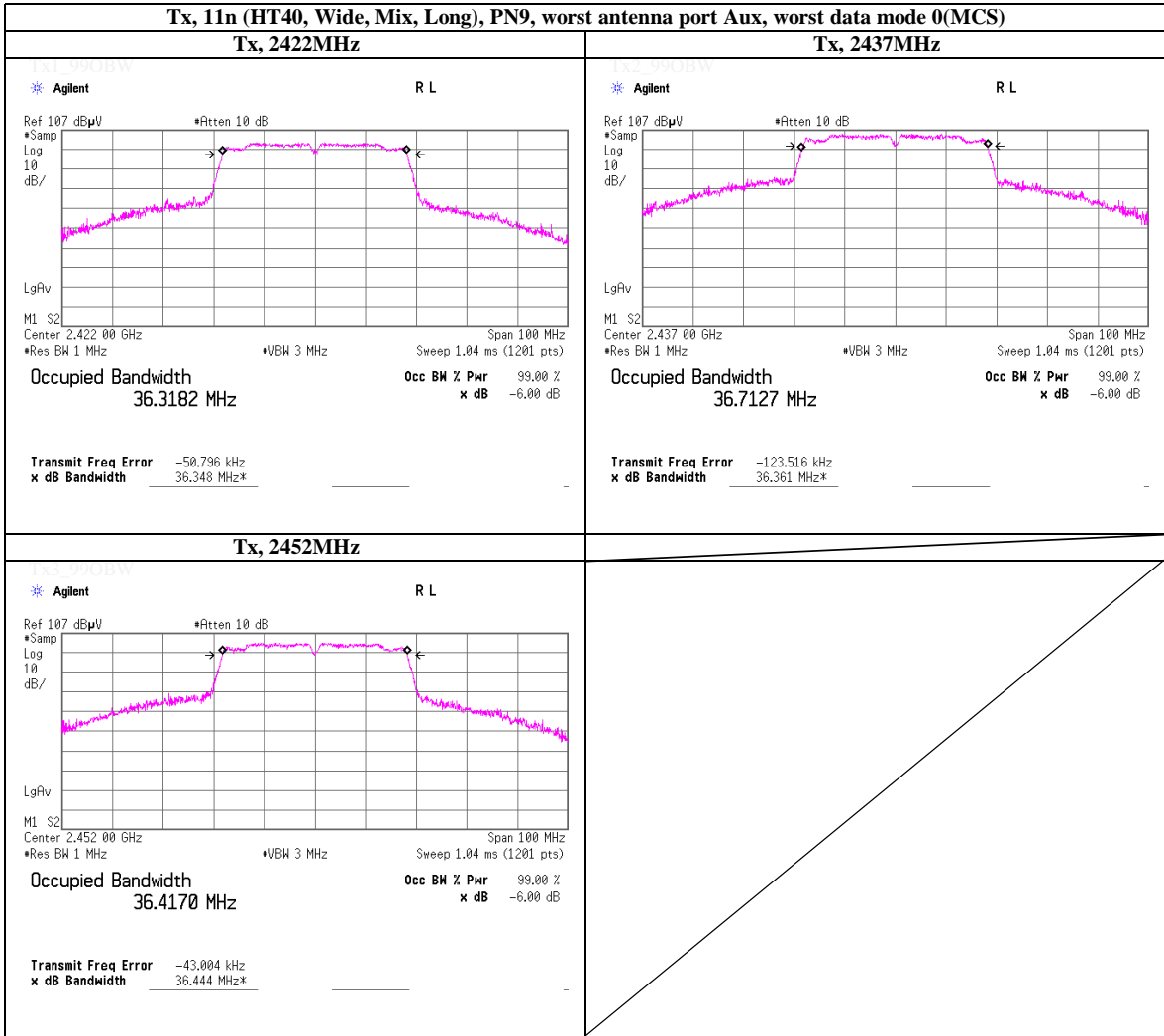
**UL Japan, Inc.**  
**Shonan EMC Lab.**  
 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN  
 Telephone : +81 463 50 6400  
 Facsimile : +81 463 50 6401

**99% Occupied Bandwidth**



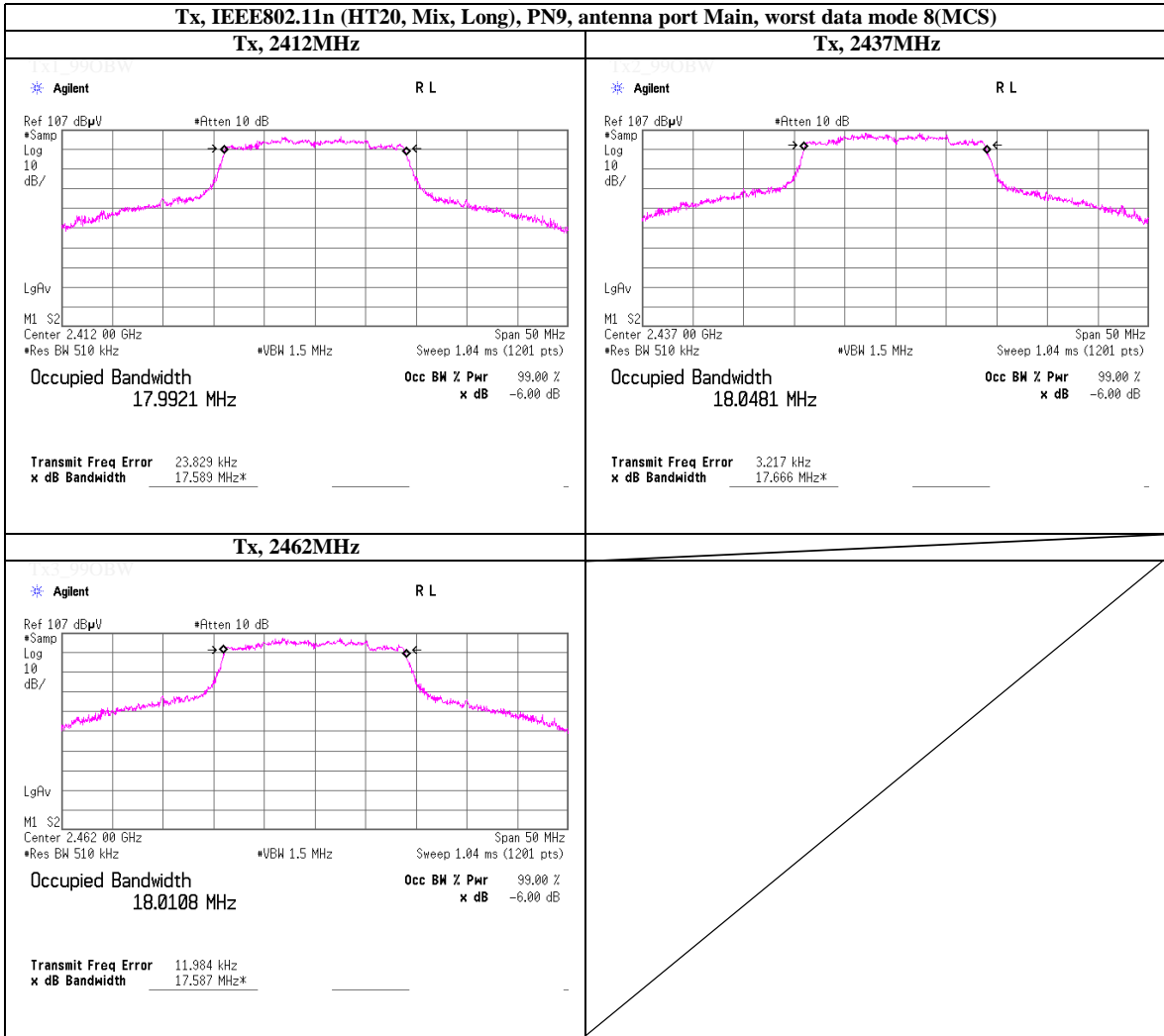
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**99% Occupied Bandwidth**



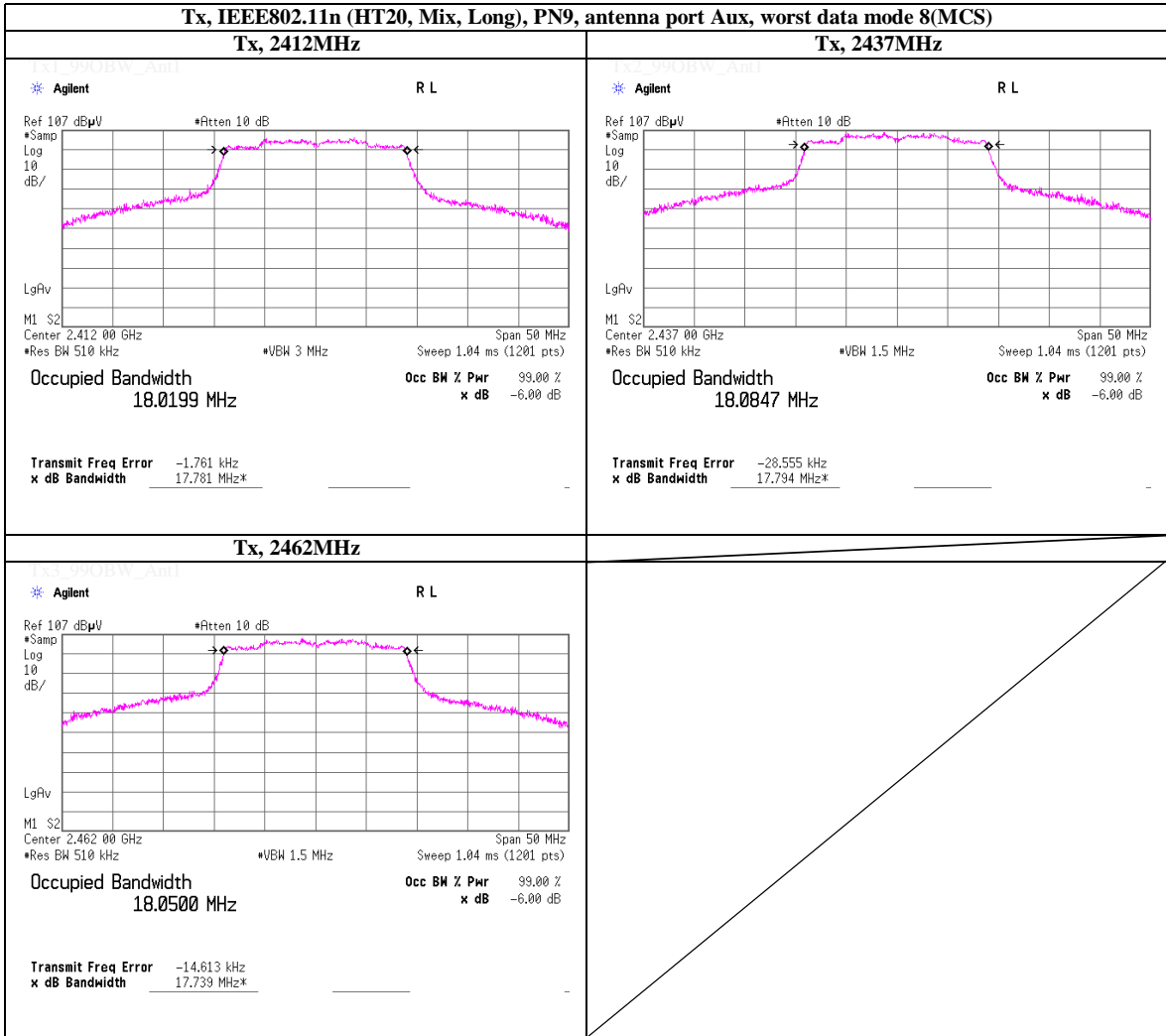
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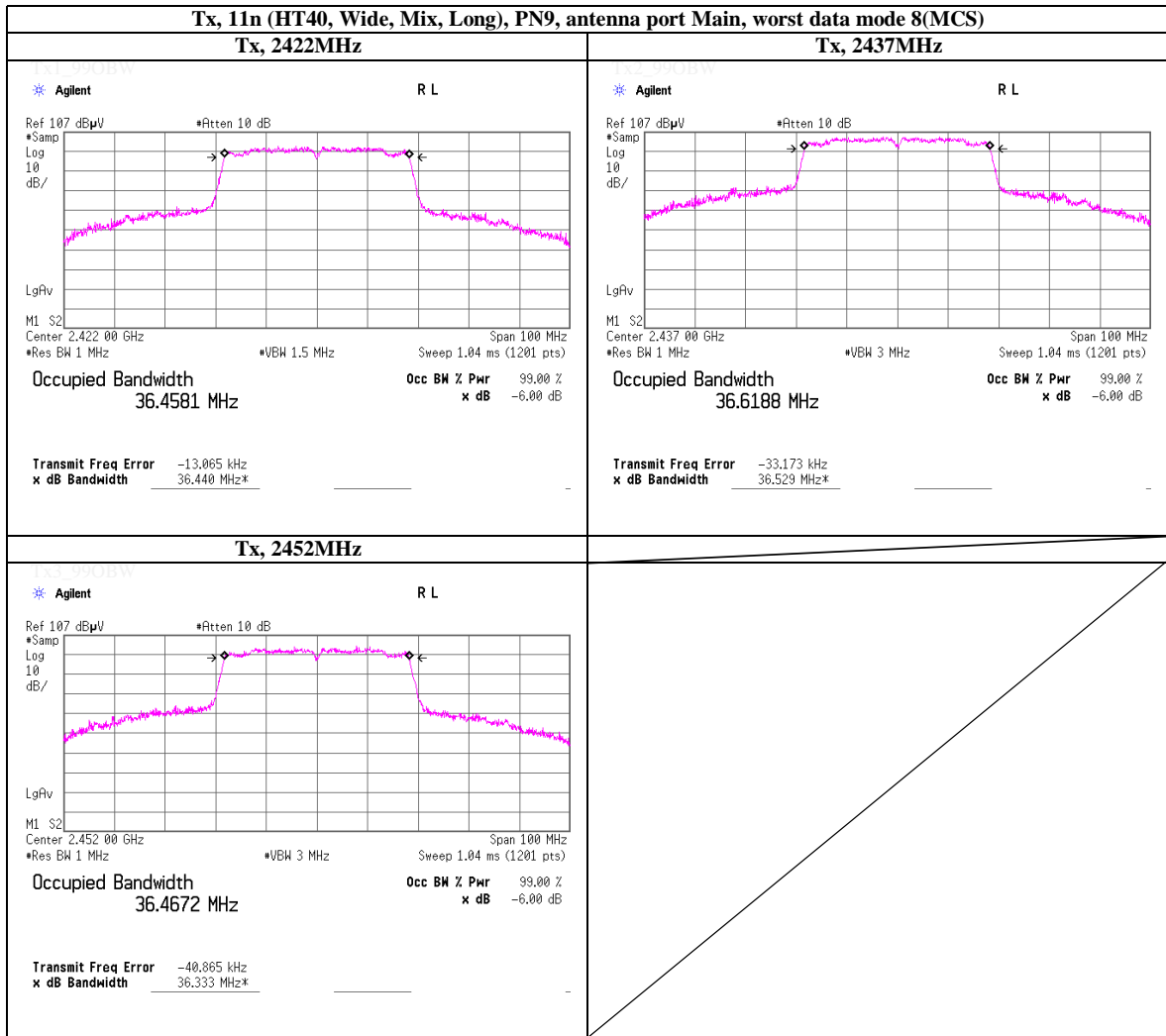
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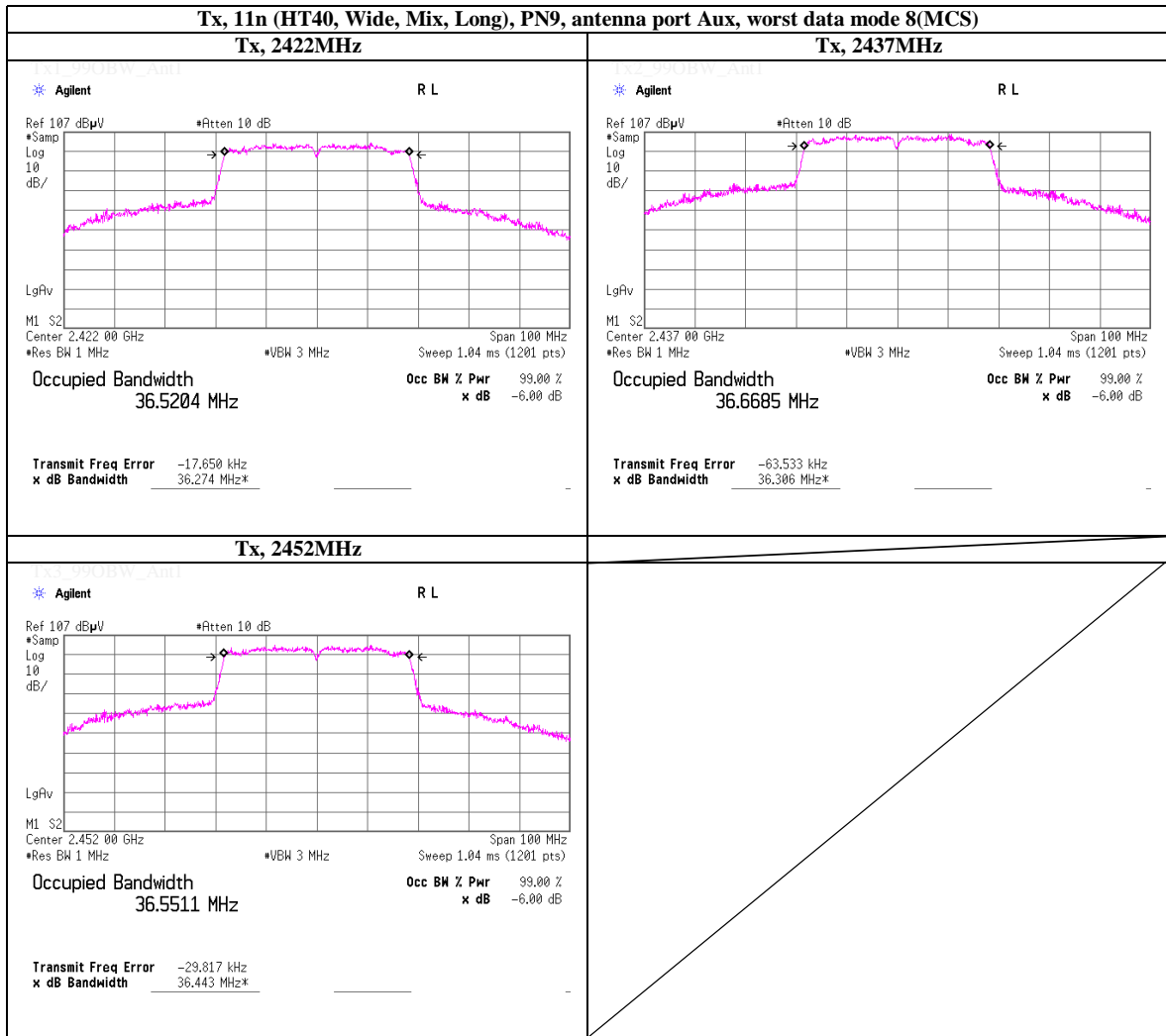
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**APPENDIX**  
**Test Instruments**

**EMI test equipment**

| Control No.  | Instrument            | Manufacturer     | Model No                | Serial No         | Test Item | Calibration Date * Interval(month) |
|--------------|-----------------------|------------------|-------------------------|-------------------|-----------|------------------------------------|
| SPM-06       | Power Meter           | Anritsu          | ML2495A                 | 0850009           | AT        | 2012/04/19 * 12                    |
| SPSS-03      | Power sensor          | Anritsu          | MA2411B                 | 0917063           | AT        | 2012/04/19 * 12                    |
| SSA-03       | Spectrum Analyzer     | Agilent          | E4448A                  | MY48250152        | AT        | 2011/12/05 * 12                    |
| SAT10-11     | Attenuator            | Weinschel Corp.  | 54A-10                  | 37588             | AT        | 2012/04/06 * 12                    |
| SCC-G28      | Coaxial Cable         | Junkosha         | MWX241-01000KM SKMS     | SEP-20-12-00<br>2 | AT        | 2012/09/26 * 12                    |
| SCC-H2       | Microwave cable       | Hirose Electric  | U.FL-2LP-066J1-A-(200)  | -                 | AT        | Pre Check                          |
| SOS-09       | Humidity Indicator    | A&D              | AD-5681                 | 4061484           | AT        | 2012/03/26 * 12                    |
| SAEC-03(NSA) | Semi-Anechoic Chamber | TDK              | SAEC-03(NSA)            | 3                 | RE        | 2012/09/21 * 12                    |
| SAF-06       | Pre Amplifier         | TOYO Corporation | TPA0118-36              | 1440491           | RE        | 2012/07/18 * 12                    |
| SAT10-06     | Attenuator            | Agilent          | 8493C-010               | 74865             | RE        | 2011/12/27 * 12                    |
| SFL-02       | Highpass Filter       | MICRO-TRONICS    | HPM50111                | 051               | RE        | 2011/12/27 * 12                    |
| 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-11       | Measure               | PROMART          | SEN1935                 | -                 | RE        | -                                  |
| COTS-SEMI-1  | EMI Software          | TSJ              | TEPTO-DV(RE,CE, RFI,MF) | -                 | RE        | -                                  |
|              |                       |                  |                         |                   |           |                                    |
|              |                       |                  |                         |                   |           |                                    |

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

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

Test Item :

- RE: Radiated emission ,
- AT: Antenna terminal conducted tests



**APPENDIX 2**  
**Test Instruments**

**EMI test equipment**

| Control No.                    | Instrument                | Manufacturer                                | Model No                                   | Serial No               | Test Item | Calibration Date * Interval(month) |
|--------------------------------|---------------------------|---|--|-------------------------|-----------|------------------------------------|
| SAF-01                         | Pre Amplifier             | SONOMA                                      | 310N                                       | 290211                  | RE        | 2012/02/10 * 12                    |
| SAT6-05                        | Attenuator                | JFW   | 50HF-006N                                  | -                       | RE        | 2012/02/10 * 12                    |
| SAT3-04                        | Attenuator                | JFW   | 50HF-003N                                  | -                       | RE        | 2012/02/10 * 12                    |
| SBA-01                         | Biconical Antenna         | Schwarzbeck                                 | BBA9106                                    | 91032664                | RE        | 2012/10/08 * 12                    |
| SCC-A1/A3/A5/A7/A8/A13/SRSE-01 | Coaxial Cable&RF Selector | Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO | 8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906 | -/0901-269(RF Selector) | RE        | 2012/04/10 * 12                    |
| SCC-A2/A4/A6/A7/A8/A13/SRSE-01 | Coaxial Cable&RF Selector | Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO | 8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906 | -/0901-269(RF Selector) | RE        | 2012/04/10 * 12                    |
| SLA-01                         | Logperiodic Antenna       | Schwarzbeck                                 | UHALP9108A                                 | UHALP9108-A 0888        | RE        | 2011/11/23 * 12                    |
| SOS-01                         | Humidity Indicator        | A&D   | AD-5681                                    | 4062555                 | RE        | 2012/02/06 * 12                    |
| STR-01                         | Test Receiver             | Rohde & Schwarz                             | ESU40                                      | 100093                  | RE, CE    | 2012/10/04 * 12                    |
| SJM-08                         | Measure                   | PROMART                                     | SEN1935                                    | -                       | RE, CE    | -                                  |
| SAEC-01(NSA)                   | Semi-Anechoic Chamber     | TDK   | SAEC-01(NSA)                               | 1                       | RE        | 2012/09/11 * 12                    |
| COTS-SEMI-1                    | EMI Software              | TSJ   | TEPTO-DV(RE,CE, RFLMF)                     | -                       | RE        | -                                  |
| SAF-04                         | Pre Amplifier             | TOYO Corporation                            | TPA0118-36                                 | 1440489                 | RE        | 2012/03/12 * 12                    |
| SCC-G01                        | Coaxial Cable             | Suhner                                      | SUCOFLEX 104A                              | 46497/4A                | RE        | 2012/04/10 * 12                    |
| SCC-G21                        | Coaxial Cable             | Suhner                                      | SUCOFLEX 104                               | 296169/4                | RE        | 2012/05/22 * 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                    |
| SHA-01                         | Horn Antenna              | Schwarzbeck                                 | BBHA9120D                                  | 9120D-725               | RE        | 2012/08/20 * 12                    |
| SCC-A12/A13/SRSE-01            | Coaxial Cable&RF Selector | Suhner/Suhner/TOYO                          | RG223U/141PE/NS4906                        | -/0901-269(RF Selector) | CE        | 2012/04/10 * 12                    |
| SLS-01                         | LISN                      | Rohde & Schwarz                             | ENV216                                     | 100511                  | CE        | 2012/02/20 * 12                    |
| SAT3-03                        | Attenuator                | JFW   | 50HF-003N                                  | -                       | CE        | 2012/02/17 * 12                    |
| SOS-02                         | Humidity Indicator        | A&D   | AD-5681                                    | 4063343                 | 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