



Test report No. : 10028551S-G  
Page : 1 of 88  
Issued date : August 5, 2013  
Revised date : September 10, 2013  
FCC ID : CWTUGZZF1

# **RADIO TEST REPORT**

**Test Report No.: 10028551S-G**

**Applicant** : ALPS ELECTRIC CO., LTD.  
**Type of Equipment** : Wi-Fi™ and BLUETOOTH™ Combination Module  
**Model No.** : UGZZF-1  
**FCC ID** : CWTUGZZF1  
**Test regulation** : FCC Part15 Subpart C: 2013  
**Test result** : Complied

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

**Date of test:** July 11 to 18, 2013

**Tested by:**   
Tatsuya Arai  
Engineer of WiSE Japan,  
UL Verification Service

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



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

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13-EM-F0429

## REVISION HISTORY

**Original Test Report No.: 10028551S-G**

[illegible]

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## **SECTION 1: Customer information**

Company Name : ALPS ELECTRIC CO., LTD.  
Address : 6-3-36 Furukawa-nakazato, Osaki-shi, Miyagi-ken, 989-6181 Japan  
Telephone Number : +81 229 24 6341  
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Contact Person : Yuji Ouchi

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

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

Type of Equipment : Wi-Fi™ and BLUETOOTH™ Combination Module  
Model Number : UGZZF-1  
Serial Number : 3  
Rating : DC3.3V / 1.25V  
Country of Mass-production : Japan  
Condition of EUT : Production prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Receipt Date of Sample : July 6, 2013  
Modification of EUT : No modification by the test lab.

### **2.2 Product description**

Model: UGZZF-1 (referred to as the EUT in this report) is a Wi-Fi™ and BLUETOOTH™ Combination Module.

Clock frequency(ies) in the system : 26MHz, 12.288MHz, 48MHz

#### **<Radio part>**

Equipment type : Transceiver  
Frequency of operation : 2402-2480MHz  
Bandwidth & channel spacing : 1MHz & 1MHz  
Type of modulation : FHSS  
Operation temperature range : -40 to +85 deg.C.  
Antenna type & Antenna gain : Printed antenna ( $\lambda/2$  Dipole), 2.6dBi max  
Printed antenna ( $\lambda/4$  PIFA), 2.8dBi max  
Chip antenna (Monopole), 1.7dBi max  
Printed antenna ( $\lambda/4$  PIFA, Internal of module), 1.2dBi max  
Antenna connector type : 60pin Connector, M/N: 60P3.0-JMCS-G-B-TF (N)

\* For Wireless LAN part, Refer to the test report: 10028551S-F.

#### **FCC 15.31 (e) / 212**

The stable voltage (DC3.3V / 1.25V) is constantly provided to RF Module from the host device regardless of input voltage. Therefore, the EUT complies with the requirement.

#### **FCC 15.203 / 212**

The EUT has a unique coupling/antenna connector (60pin Connector, M/N: 60P3.0-JMCS-G-B-TF (N)). Therefore, the equipment complies with the antenna requirement.

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**SECTION 3: Test specification, procedures & results****3.1 Test specification**

Test specification : FCC Part 15 Subpart C: 2013, final revised on June 11, 2013 and effective July 11, 2013

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

**3.2 Procedures & Results**

| Item                                     | Test Procedure                                                                                     | Specification             | Remarks                | Deviation | Worst Margin                                                                                                                                                                                                         | Results  |
|------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------|------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Conducted emission                       | ANSI C63.4:2009<br>7. AC powerline<br>conducted emission<br>measurements                           | FCC 15.207                | -                      | N/A       | 13.1dB<br>Freq.: 0.55698MHz<br>Detection: Quasi-Peak<br>Phase: N<br>Mode: Tx 2402MHz, DH5<br>Antenna: Dipole<br>Freq.: 0.55711MHz<br>Detection: Quasi-Peak<br>Phase: N<br>Mode: Tx 2402MHz, 3-DH5<br>Antenna: Dipole | Complied |
| Carrier frequency separation             | FCC Public Notice<br>DA 00-705 &<br>ANSI C63.4:2009<br>13. Measurement of<br>intentional radiators | FCC 15.247<br>(a)(1)      | Conducted              | N/A       | *See data.                                                                                                                                                                                                           | Complied |
| 20dB bandwidth                           | FCC Public Notice<br>DA 00-705 &<br>ANSI C63.4:2009<br>13. Measurement of<br>intentional radiators | FCC 15.247<br>(a)(1)      | Conducted              | N/A       |                                                                                                                                                                                                                      | -        |
| Number of hopping frequency              | FCC Public Notice<br>DA 00-705 &<br>ANSI C63.4:2009<br>13. Measurement of<br>intentional radiators | FCC 15.247<br>(a)(1)(iii) | Conducted              | N/A       |                                                                                                                                                                                                                      | Complied |
| Dwell time                               | FCC Public Notice<br>DA 00-705 &<br>ANSI C63.4:2009<br>13. Measurement of<br>intentional radiators | FCC 15.247<br>(a)(1)(iii) | Conducted              | N/A       |                                                                                                                                                                                                                      | Complied |
| Maximum peak output power                | FCC Public Notice<br>DA 00-705 &<br>ANSI C63.4:2009<br>13. Measurement of<br>intentional radiators | FCC 15.247<br>(b)(1)      | Conducted              | N/A       |                                                                                                                                                                                                                      | Complied |
| Band edge compliance & Spurious emission | FCC Public Notice<br>DA 00-705 &<br>ANSI C63.4:2009<br>13. Measurement of<br>intentional radiators | FCC 15.247 (d)<br>15.209  | Conducted/<br>Radiated | N/A       | 6.1dB<br>Freq.: 4960.000MHz<br>Polarization: Vertical<br>Detection: Average<br>Mode: Tx 2480MHz, DH5<br>Antenna: Dipole                                                                                              | Complied |

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

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### 3.3 Addition to standard

| Item                                                             | Test Procedure                                                             | Specification | Remarks   | Worst Margin | Results |
|------------------------------------------------------------------|----------------------------------------------------------------------------|---------------|-----------|--------------|---------|
| Occupied Bandwidth (99%)                                         | ANSI C63.4:2009<br>13. Measurement of intentional radiators, RSS-Gen 4.6.1 | -             | Conducted | -            | -       |
| Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422 |                                                                            |               |           |              |         |

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

### 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>(±) |
|-------------------------------------------------|-----------------|-------------------------------------------------|--------------------|--------------------|
| Conducted emission<br>(AC Mains) AMN/LISN       | 150kHz-30MHz    | 3.6 dB                                          | 3.6 dB             | 3.5 dB             |
| Radiated emission<br>(Measurement distance: 3m) | 9kHz-30MHz      | 3.7 dB                                          | 3.7 dB             | 3.6 dB             |
|                                                 | 30MHz-300MHz    | 4.9 dB                                          | 5.1 dB             | 4.9 dB             |
|                                                 | 300MHz-1GHz     | 5.0 dB                                          | 5.2 dB             | 4.9 dB             |
|                                                 | 1GHz-15GHz      | 4.8 dB                                          | 4.8 dB             | 4.9 dB             |
| Radiated emission<br>(Measurement distance: 1m) | 15GHz-18GHz     | 5.6 dB                                          | 5.6 dB             | 5.6 dB             |
|                                                 | 18GHz-40GHz     | 4.6 dB                                          | 4.3 dB             | 4.4 dB             |

\*1: SAC=Semi-Anechoic Chamber

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

#### Conducted emission

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

#### Radiated emission

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

#### Antenna port conducted test

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

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

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

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

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

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<br>(m) / horizontal<br>conducting plane | Maximum<br>measurement<br>distance |
|----------------------------------------------------------------|----------------------------|---------------------------|-------------------------------|---------------------------------------------------------------------------|------------------------------------|
| <input type="checkbox"/> No.1 semi-anechoic chamber            | 697847                     | 2973D-1                   | 20.6 x 11.3 x 7.65            | 20.6 x 11.3                                                               | 10m                                |
| <input type="checkbox"/> No.2 semi-anechoic chamber            | 697847                     | 2973D-2                   | 20.6 x 11.3 x 7.65            | 20.6 x 11.3                                                               | 10m                                |
| <input checked="" type="checkbox"/> No.3 semi-anechoic chamber | 697847                     | 2973D-3                   | 12.7 x 7.7 x 5.35             | 12.7 x 7.7                                                                | 5m                                 |
| <input type="checkbox"/> No.4 semi-anechoic chamber            | -                          | -                         | 8.1 x 5.1 x 3.55              | 8.1 x 5.1                                                                 | -                                  |
| <input type="checkbox"/> No.1 shielded room                    | -                          | -                         | 6.8 x 4.1 x 2.7               | 6.8 x 4.1                                                                 | -                                  |
| <input type="checkbox"/> No.2 shielded room                    | -                          | -                         | 6.8 x 4.1 x 2.7               | 6.8 x 4.1                                                                 | -                                  |
| <input checked="" type="checkbox"/> No.3 shielded room         | -                          | -                         | 6.3 x 4.7 x 2.7               | 6.3 x 4.7                                                                 | -                                  |
| <input type="checkbox"/> No.4 shielded room                    | -                          | -                         | 4.4 x 4.7 x 2.7               | 4.4 x 4.7                                                                 | -                                  |
| <input checked="" type="checkbox"/> No.5 shielded room         | -                          | -                         | 7.8 x 6.4 x 2.7               | 7.8 x 6.4                                                                 | -                                  |
| <input type="checkbox"/> No.6 shielded room                    | -                          | -                         | 7.8 x 6.4 x 2.7               | 7.8 x 6.4                                                                 | -                                  |

### 3.6 Test setup, Data of test & Test instruments

Refer to APPENDIX 1 to 3.

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

| Test item                                            | Operating mode                                                                                            | Tested frequency                                   |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| Conducted emission                                   | Transmitting Hopping OFF (DH5 / 3-DH5)<br>Payload: PRBS9                                                  | 2402MHz, 2441MHz,<br>2480MHz                       |
| Carrier frequency separation                         | Transmitting Hopping ON (DH5 / 3-DH5) / Inquiry,<br>Payload: PRBS9                                        | -                                                  |
| 20dB bandwidth                                       | Transmitting Hopping OFF (DH5 / 3-DH5) / Inquiry,<br>Payload: PRBS9                                       | 2402MHz, 2441MHz,<br>2480MHz                       |
| Number of hopping frequency                          | Transmitting Hopping ON (DH5 / 3-DH5) / Inquiry,<br>Payload: PRBS9                                        | -                                                  |
| Dwell time                                           | Transmitting (Hopping ON), Payload: PRBS9<br>- DH1, - DH3, - DH5<br>- 3-DH1, - 3-DH3, - 3-DH5<br>-Inquiry | -                                                  |
| Maximum peak output power                            | Transmitting Hopping OFF, Payload: PRBS9<br>- DH5, - 2-DH5, - 3-DH5                                       | 2402MHz, 2441MHz,<br>2480MHz                       |
| Band edge compliance & Spurious emission (Conducted) | Transmitting (DH5 / 3-DH5), Payload: PRBS9<br>-Hopping ON<br>-Hopping OFF                                 | Band edge compliance:<br>2402MHz, 2480MHz          |
| (Radiated)                                           | Transmitting (DH5 / 3-DH5), Payload: PRBS9<br>-Hopping OFF                                                | Spurious emission:<br>2402MHz, 2441MHz,<br>2480MHz |
| 99% occupied bandwidth                               | Transmitting (DH5 / 3-DH5), Payload: PRBS9 / Inquiry<br>-Hopping ON<br>-Hopping OFF                       | 2402MHz, 2441MHz,<br>2480MHz                       |

\*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload (except Dwell time test).

\*Remarks: Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not affect the output power and bandwidth of the EUT.

As this device had AFH mode and frequency separation could not meet the requirement of over 20dB BW without 2/3 relaxation, 125mW power limit was applied to it.

Software: CSR Blue Test3 Ver.2.5.0  
(Power target: 0dBm)

| Used antenna   | Data of Conducted emission | Data of Radiated emission                         |
|----------------|----------------------------|---------------------------------------------------|
| Dipole antenna | Full operation mode        | Full data                                         |
| Other antennas | Transmitting, DH5, 2402MHz | Band edge<br>Second order harmonics (worst point) |

\* There is 4-type of antenna. The carrier level was checked with each antenna, and full data was obtained with Dipole antenna, which output the highest power. For other antennas, the above data was obtained to show the compliance.

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

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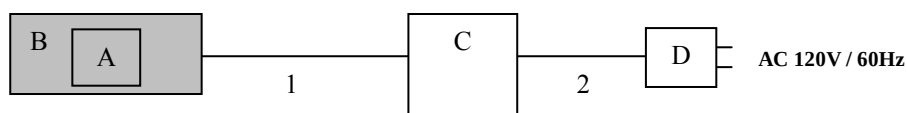
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## 4.2 Configuration and peripherals



\* Test data was taken under worst case conditions.

### Description of EUT and support equipment

| No. | Item                                           | Model number | Serial number | Manufacturer             | Remarks |
|-----|------------------------------------------------|--------------|---------------|--------------------------|---------|
| A   | Wi-Fi™ and<br>BLUETOOTH™<br>Combination Module | UGZZF-1      | 3             | ALPS                     | EUT     |
| B1  | $\lambda/2$ Dipole Antenna                     | FZ164Z15-3   | 001           | ALPS                     | EUT     |
| B2  | PIFA Antenna                                   | FZ164Z15-2   | 001           | ALPS                     | EUT     |
| B3  | Chip Antenna                                   | FZ164Z15-1   | 001           | TAIYO YUDEN              | EUT     |
| B4  | Board for Internal Antenna                     | FZ164Z15-4   | 001           | ALPS                     | EUT     |
| C   | Jig                                            | -            | -             | ALPS                     | -       |
| D   | AC Adaptor                                     | GF12-US0520  | 120704-54     | GO FORWARD<br>ENTERPRISE | -       |

### List of cables used

| No. | Cable       | Length (m) | Shield-Cable | Shield-Connector | Remarks |
|-----|-------------|------------|--------------|------------------|---------|
| 1   | Signal / DC | 0.3        | Unshielded   | Unshielded       | -       |
| 2   | DC          | 1.5        | 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. Photographs of the setup 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, a CISPR average detector. The conducted emission measurements were made with the following detection of the test receiver.

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

### **5.5 Results**

Summary of the test results : Pass  
Refer to APPENDIX 1.

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## **SECTION 6: Carrier frequency separation**

### **Test procedure**

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass

Refer to APPENDIX 1.

## **SECTION 7: 20dB bandwidth & Occupied bandwidth (99%)**

### **Test procedure**

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

Summary of the test results: Pass

Refer to APPENDIX 1.

## **SECTION 8: Number of hopping frequency**

### **Test procedure**

The Number of Hopping Frequency was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass

Refer to APPENDIX 1.

## **SECTION 9: Dwell time**

### **Test procedure**

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

Summary of the test results: Pass

Refer to APPENDIX 1.

## **SECTION 10: Maximum peak output power**

### **Test procedure**

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

Summary of the test results: Pass

Refer to APPENDIX 1.

## **SECTION 11: Spurious emissions (Antenna port conducted)**

### **Test procedure**

The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port.

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating,

the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.

Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart. (9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=10kHz)

Summary of the test results: Pass

Refer to APPENDIX 1.

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## SECTION 12: Radiated emission

### 12.1 Operating environment

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

### 12.2 Test configuration

EUT was placed on a polyurethane platform of nominal size, 1m by 1.5m, raised 0.8m above the conducting ground plane. Photographs of the setup are shown in APPENDIX 3.

### 12.3 Test conditions

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

### 12.4 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 | Peak        |
| IF Bandwidth   | : 120kHz     | RBW:1MHz  | RBW:1MHz  | RBW: 100kHz |
|                |              | VBW:3MHz  | VBW:10Hz  | VBW: 300kHz |

\* When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold. Although 00-705 accepts VBW=10Hz for AV measurements, confirmed that superfluous smoothing was not performed.

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

#### Worst case:

| Subject                     | Antenna polarization | Carrier (Band edge) | Spurious   |            |           |          |
|-----------------------------|----------------------|---------------------|------------|------------|-----------|----------|
|                             |                      |                     | Below 1GHz | Above 1GHz |           |          |
|                             |                      |                     |            | 1-2.8GHz   | 2.8-15GHz | 15-25GHz |
| Module and Dipole antenna   | Horizontal           | X                   | Y          | Y          | Y         | Y        |
|                             | Vertical             | Z                   | Y          | Z          | Z         | Z        |
| Module and PIFA antenna     | Horizontal           | X                   | Y          | Y          | Y         | Y        |
|                             | Vertical             | Y                   | Y          | Y          | Y         | Y        |
| Module and Chip antenna     | Horizontal           | X                   | Y          | Y          | Y         | Y        |
|                             | Vertical             | Y                   | Y          | Z          | Z         | Z        |
| Module and Internal antenna | Horizontal           | X                   | Y          | Y          | Y         | Y        |
|                             | Vertical             | Y                   | Y          | Z          | Z         | Z        |

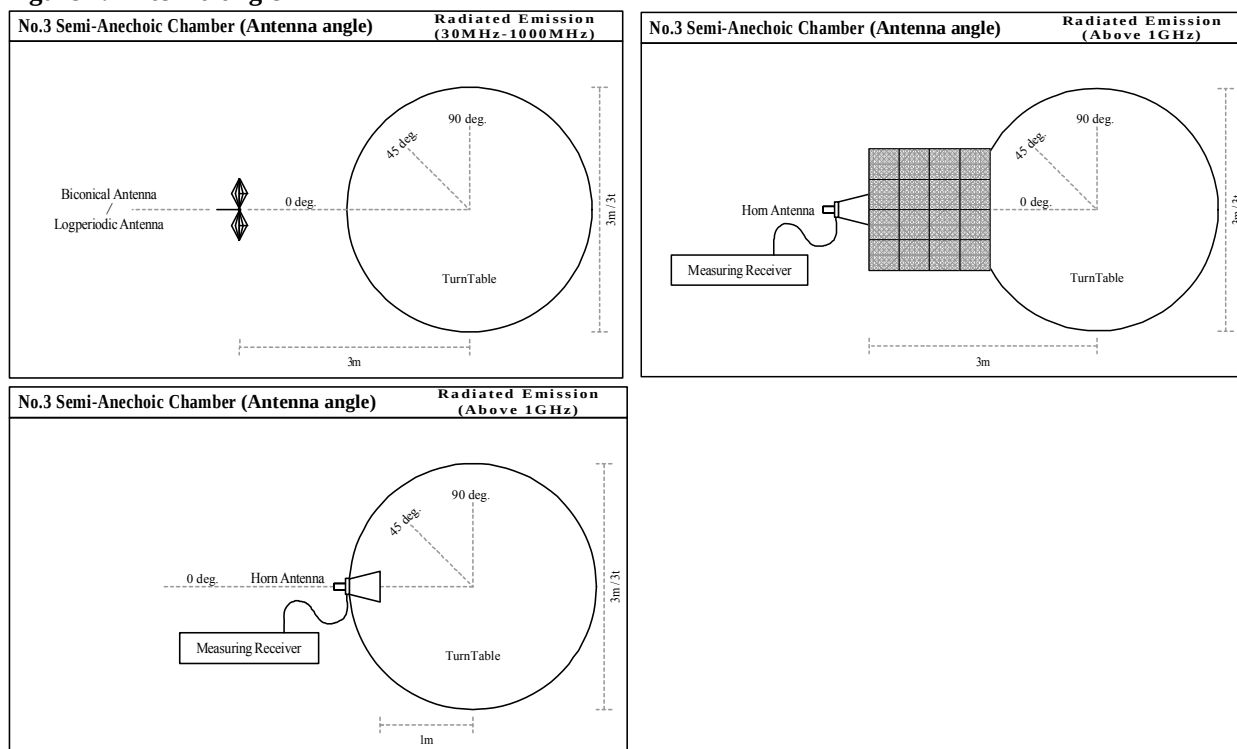
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**Figure 1. Antenna angle**

## 12.5 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.

## 12.6 Results

Summary of the test results: Pass \*No noise was detected above the 3<sup>rd</sup> order harmonics.

Refer to APPENDIX 1.

**UL Japan, Inc.**

**Shonan EMC Lab.**

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

Telephone: +81 463 50 6400

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Test instruments

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# DATA OF CONDUCTED EMISSION TEST

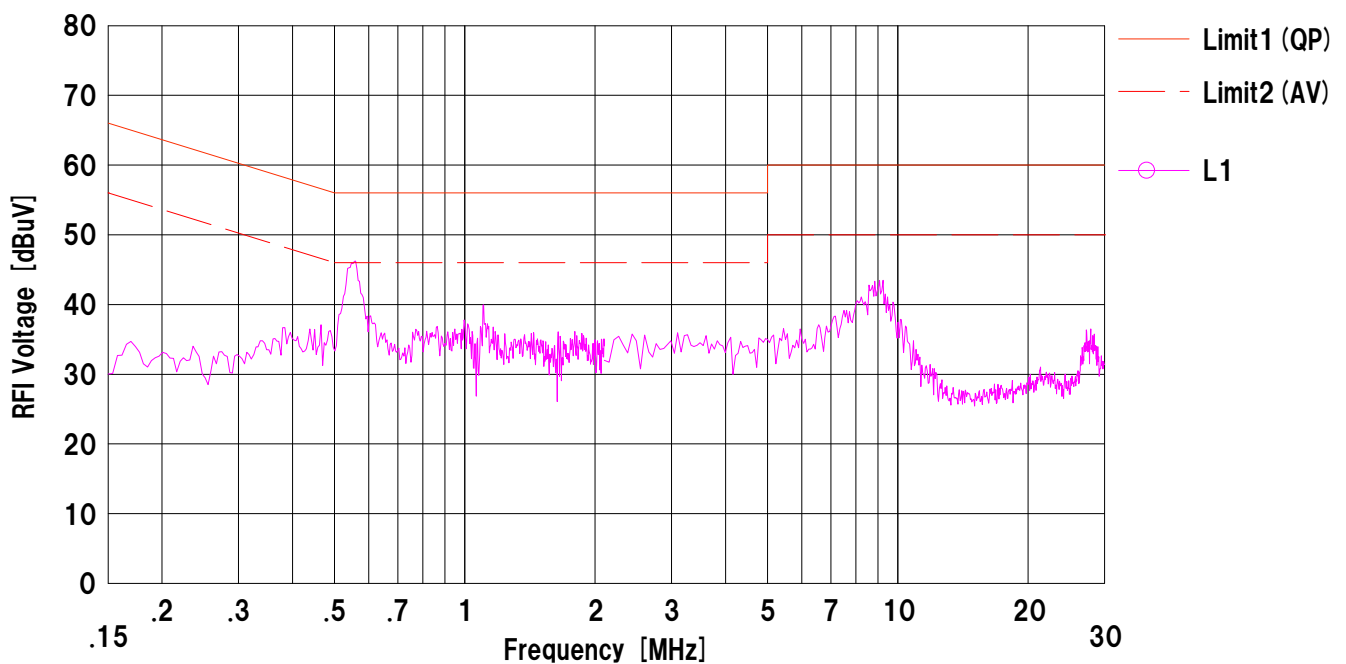
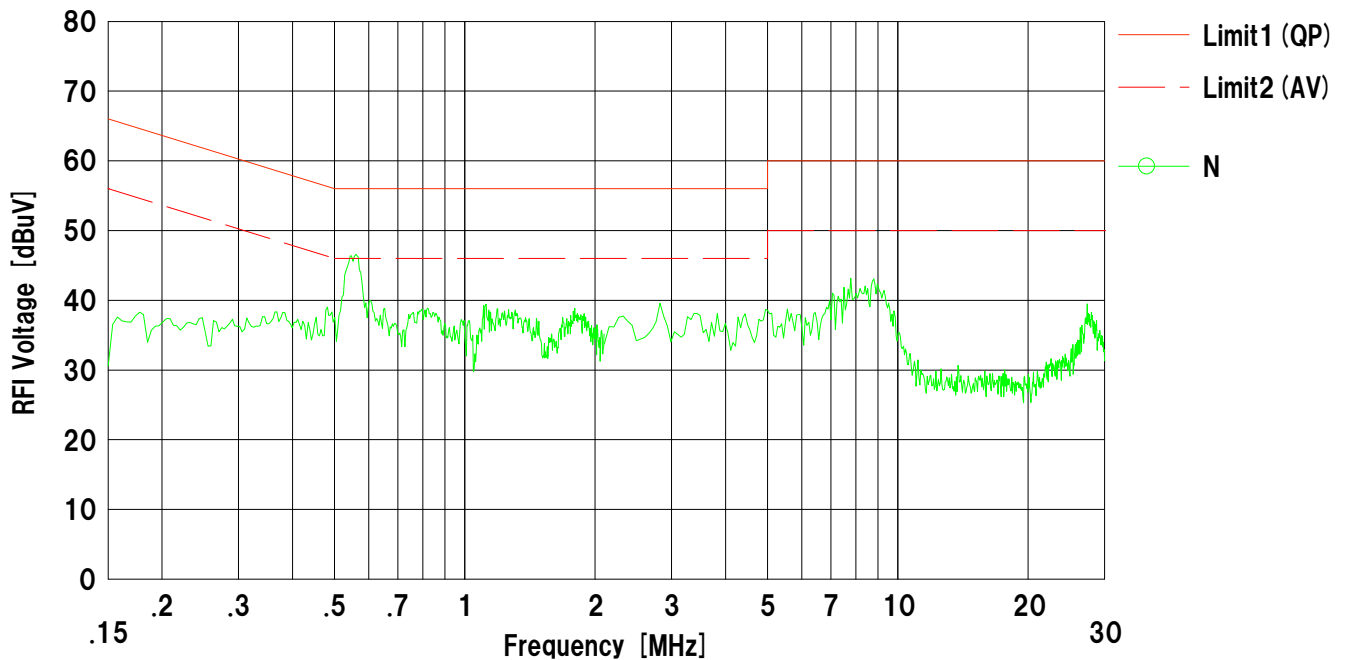
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room  
Date : 2013/07/15

Mode : Tx DH5 2402MHz  
Report No. : 10028551S  
Power : DC3.3V/1.25V (adapter:AC120V/60Hz)  
Temp./Humi. : 26deg.C / 43%RH

Remarks : Dipole Antenna

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

Engineer : Kenichi Adachi



Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]  
LISN: SLS-02 with AC extension cable

# DATA OF CONDUCTED EMISSION TEST

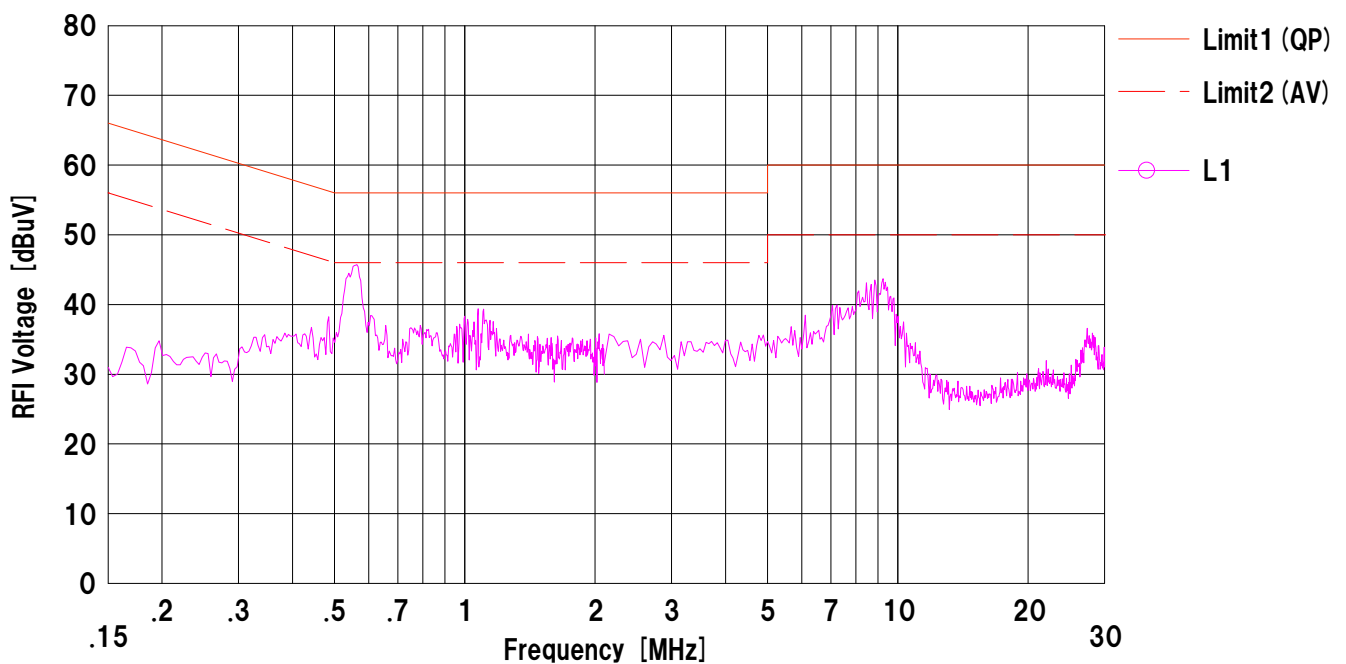
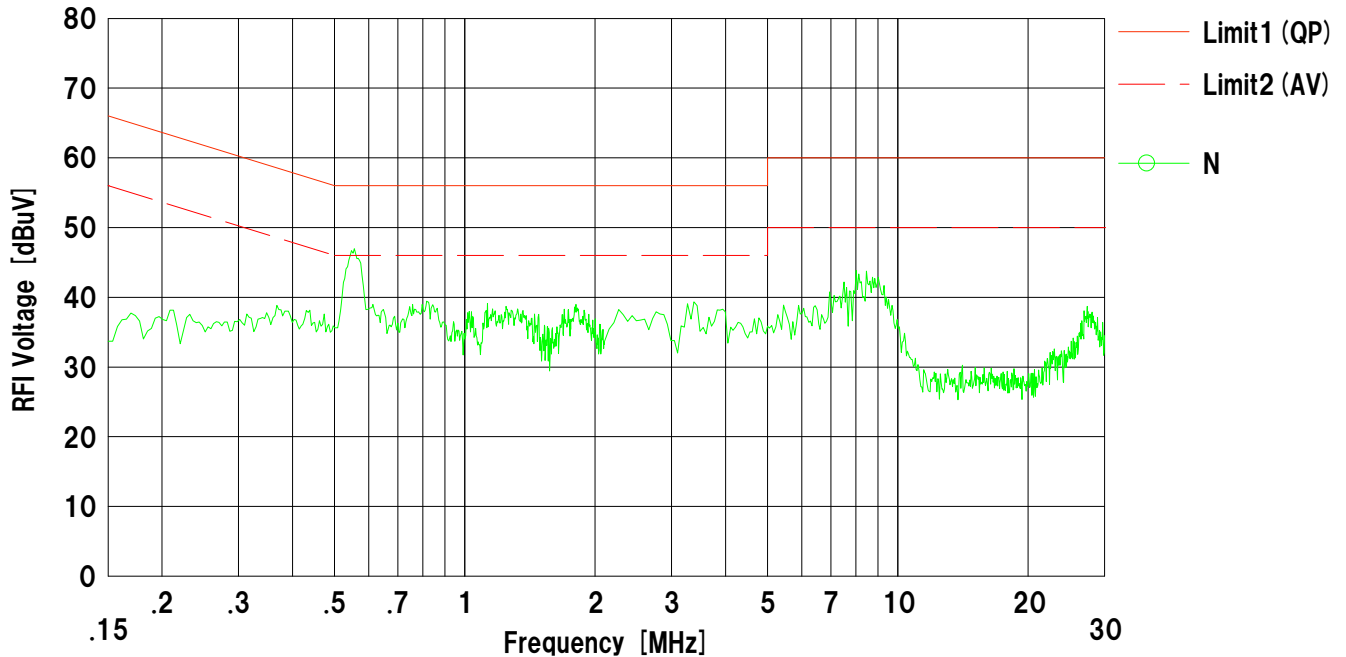
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room  
Date : 2013/07/15

Mode : Tx DH5 2441MHz  
Report No. : 10028551S  
Power : DC3.3V/1.25V (adapter:AC120V/60Hz)  
Temp./Humi. : 26deg.C / 43%RH

Remarks : Dipole Antenna

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

Engineer : Kenichi Adachi



Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]  
LISN: SLS-02 with AC extension cable

# DATA OF CONDUCTED EMISSION TEST

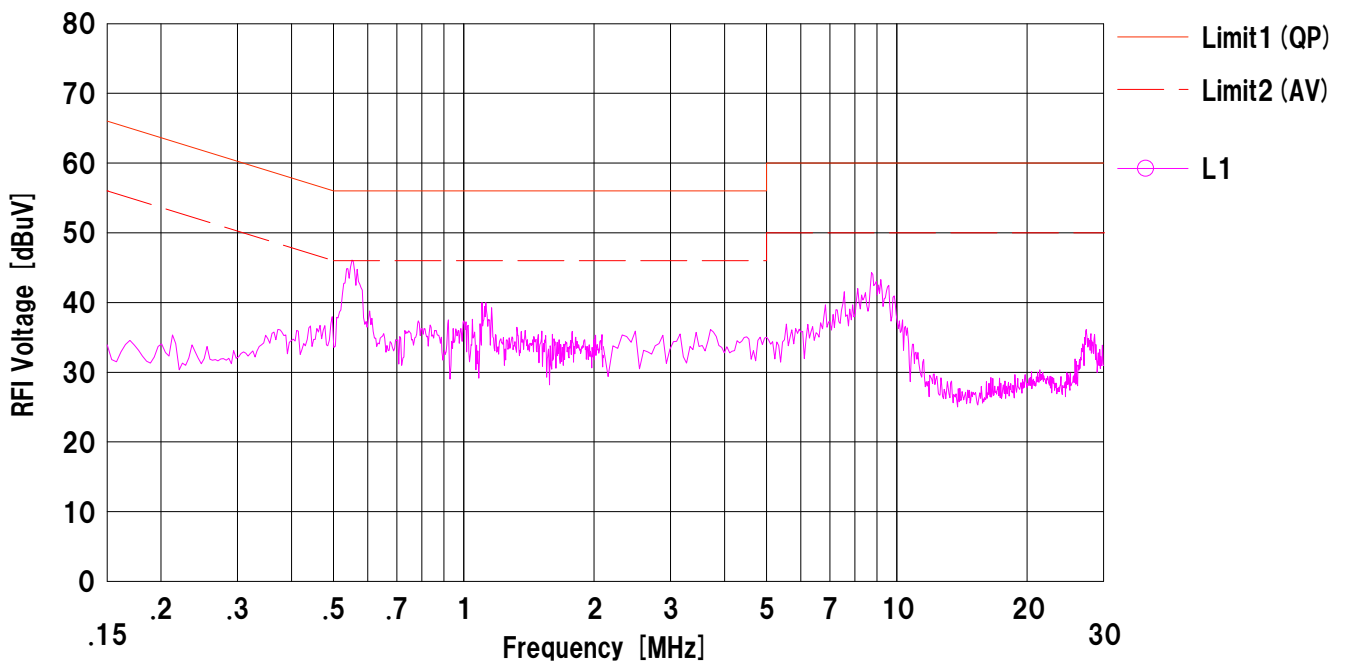
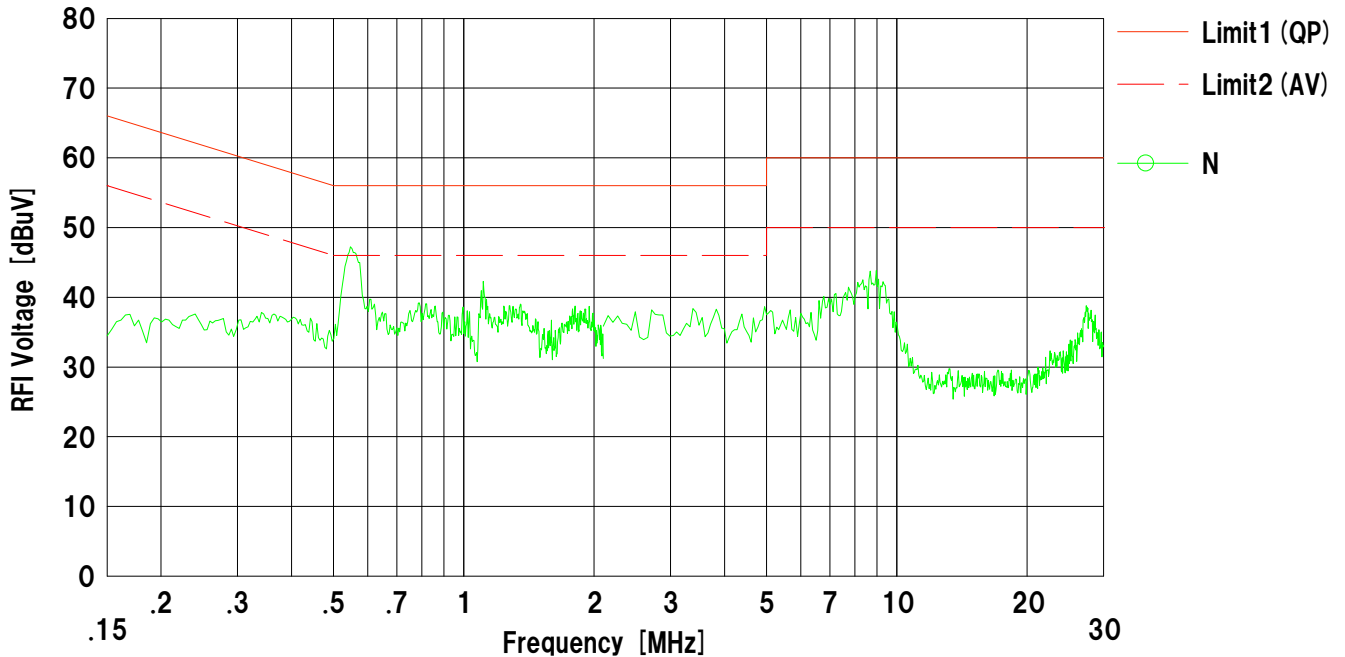
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room  
Date : 2013/07/15

Mode : Tx DH5 2480MHz  
Report No. : 10028551S  
Power : DC3.3V/1.25V (adapter:AC120V/60Hz)  
Temp./Humi. : 26deg.C / 43%RH

Remarks : Dipole Antenna

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

Engineer : Kenichi Adachi



Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]  
LISN: SLS-02 with AC extension cable

# DATA OF CONDUCTED EMISSION TEST

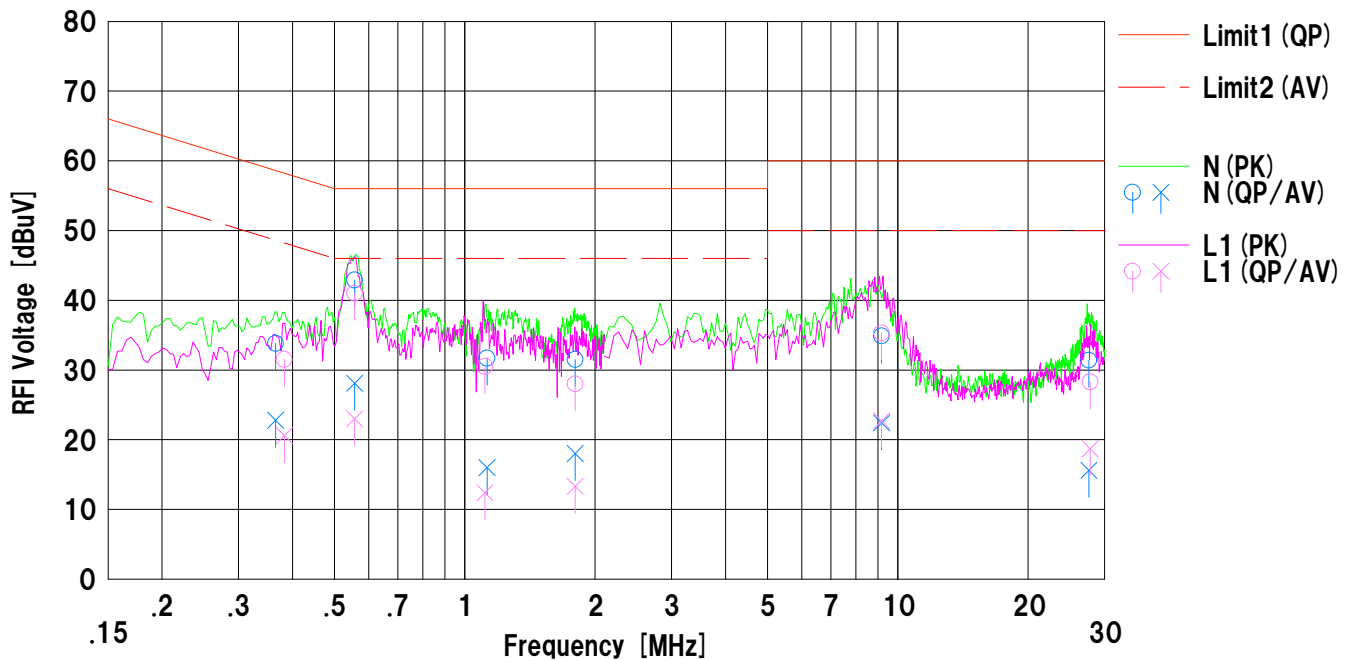
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room  
Date : 2013/07/15

Mode : Tx DH5 2402MHz  
Report No. : 10028551S  
Power : DC3.3V/1.25V (adapter:AC120V/60Hz)  
Temp./Humi. : 26deg.C / 43%RH

Remarks : Dipole Antenna

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   | 0.36590        | 20.9           | 9.9            | 12.9          | 33.8           | 22.8           | 58.5           | 48.5           | 24.7         | 25.7         | N     |         |
| 2   | 0.55698        | 30.0           | 15.2           | 12.9          | 42.9           | 28.1           | 56.0           | 46.0           | 13.1         | 17.9         | N     |         |
| 3   | 1.12559        | 18.8           | 3.1            | 12.9          | 31.7           | 16.0           | 56.0           | 46.0           | 24.3         | 30.0         | N     |         |
| 4   | 1.79986        | 18.5           | 5.0            | 13.0          | 31.5           | 18.0           | 56.0           | 46.0           | 24.5         | 28.0         | N     |         |
| 5   | 9.17248        | 21.0           | 8.5            | 13.9          | 34.9           | 22.4           | 60.0           | 50.0           | 25.1         | 27.6         | N     |         |
| 6   | 27.60957       | 16.1           | 0.3            | 15.3          | 31.4           | 15.6           | 60.0           | 50.0           | 28.6         | 34.4         | N     |         |
| 7   | 0.38339        | 18.6           | 7.7            | 12.9          | 31.5           | 20.6           | 58.2           | 48.2           | 26.7         | 27.6         | L1    |         |
| 8   | 0.55698        | 28.1           | 10.1           | 12.9          | 41.0           | 23.0           | 56.0           | 46.0           | 15.0         | 23.0         | L1    |         |
| 9   | 1.11359        | 17.6           | -0.5           | 12.9          | 30.5           | 12.4           | 56.0           | 46.0           | 25.5         | 33.6         | L1    |         |
| 10  | 1.79986        | 15.0           | 0.3            | 13.0          | 28.0           | 13.3           | 56.0           | 46.0           | 28.0         | 32.7         | L1    |         |
| 11  | 9.17248        | 21.4           | 8.8            | 13.9          | 35.3           | 22.7           | 60.0           | 50.0           | 24.7         | 27.3         | L1    |         |
| 12  | 27.79856       | 13.0           | 3.4            | 15.3          | 28.3           | 18.7           | 60.0           | 50.0           | 31.7         | 31.3         | L1    |         |

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]  
LISN: SLS-02 with AC extension cable

# DATA OF CONDUCTED EMISSION TEST

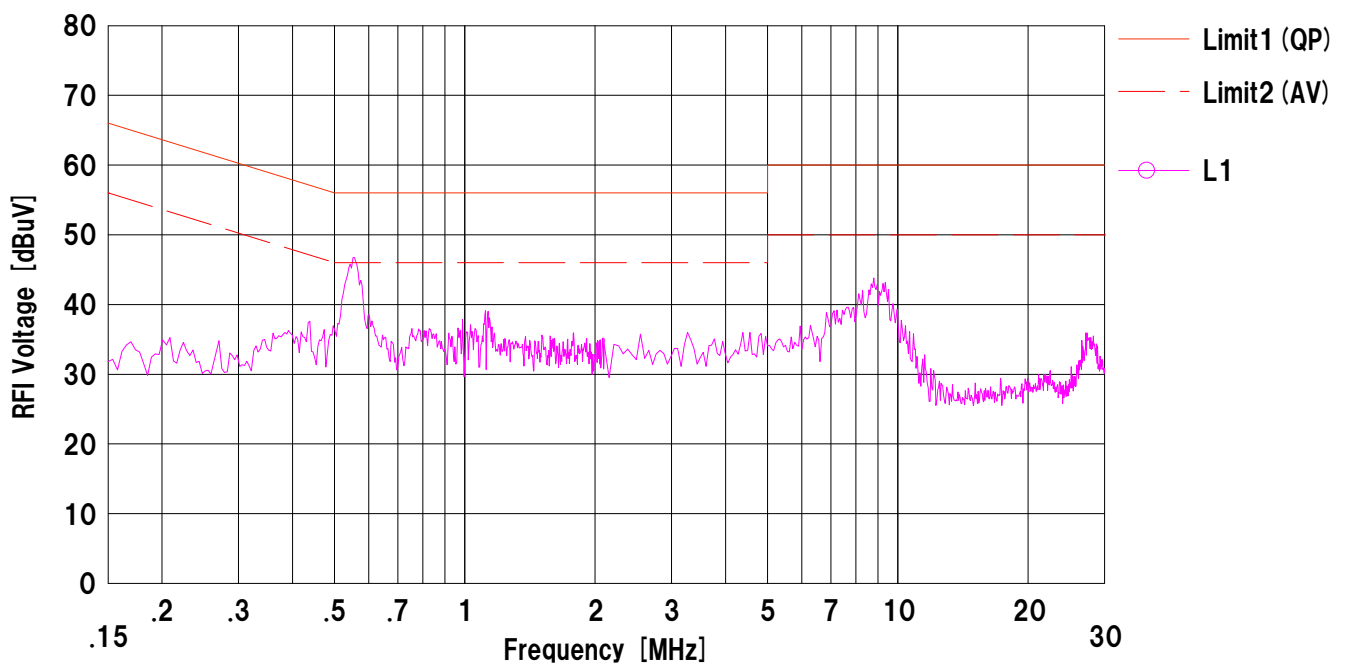
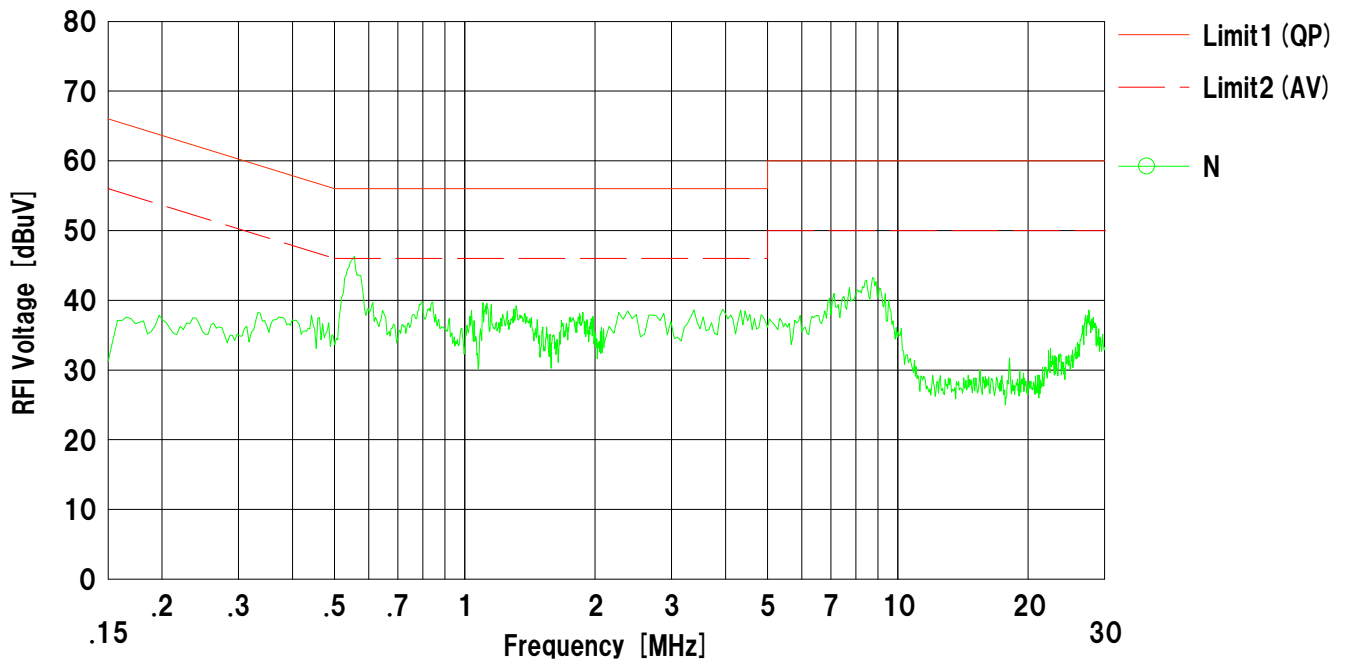
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room  
Date : 2013/07/15

Mode : Tx 3-DH5 2402MHz  
Report No. : 10028551S  
Power : DC3.3V/1.25V (adapter:AC120V/60Hz)  
Temp./Humi. : 26deg.C / 43%RH

Remarks : Dipole Antenna

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

Engineer : Kenichi Adachi



Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]  
LISN: SLS-02 with AC extension cable

# DATA OF CONDUCTED EMISSION TEST

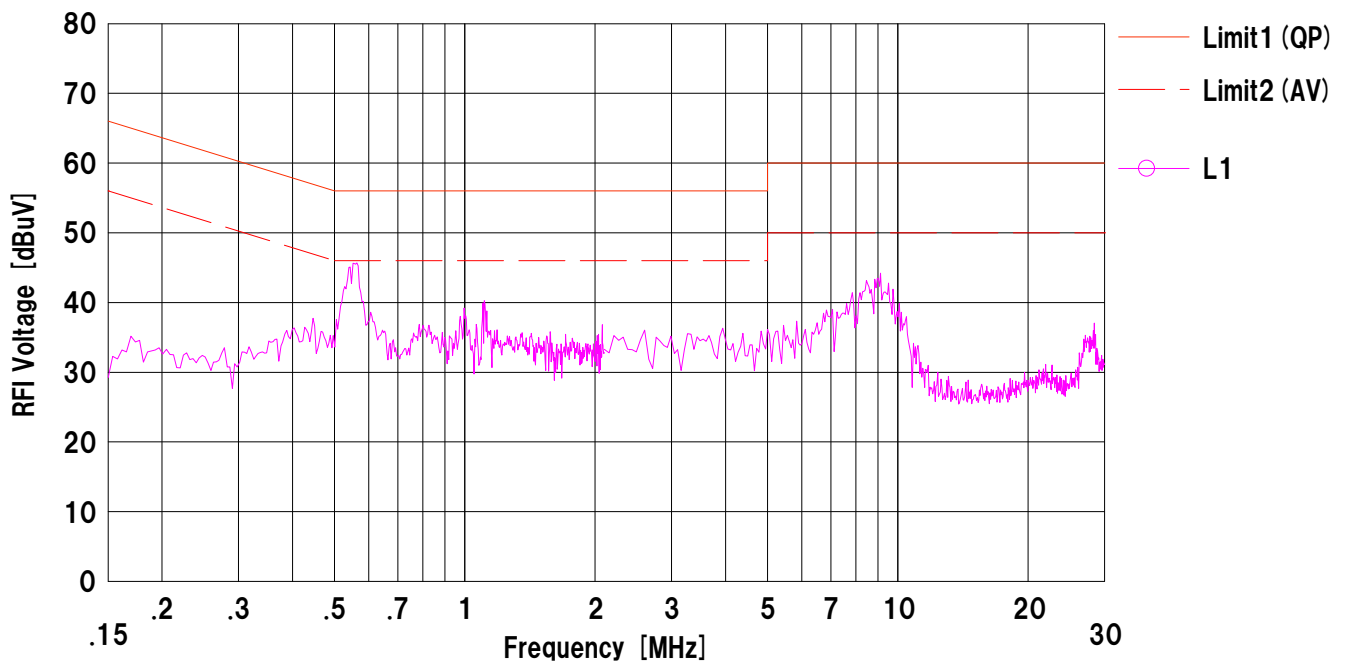
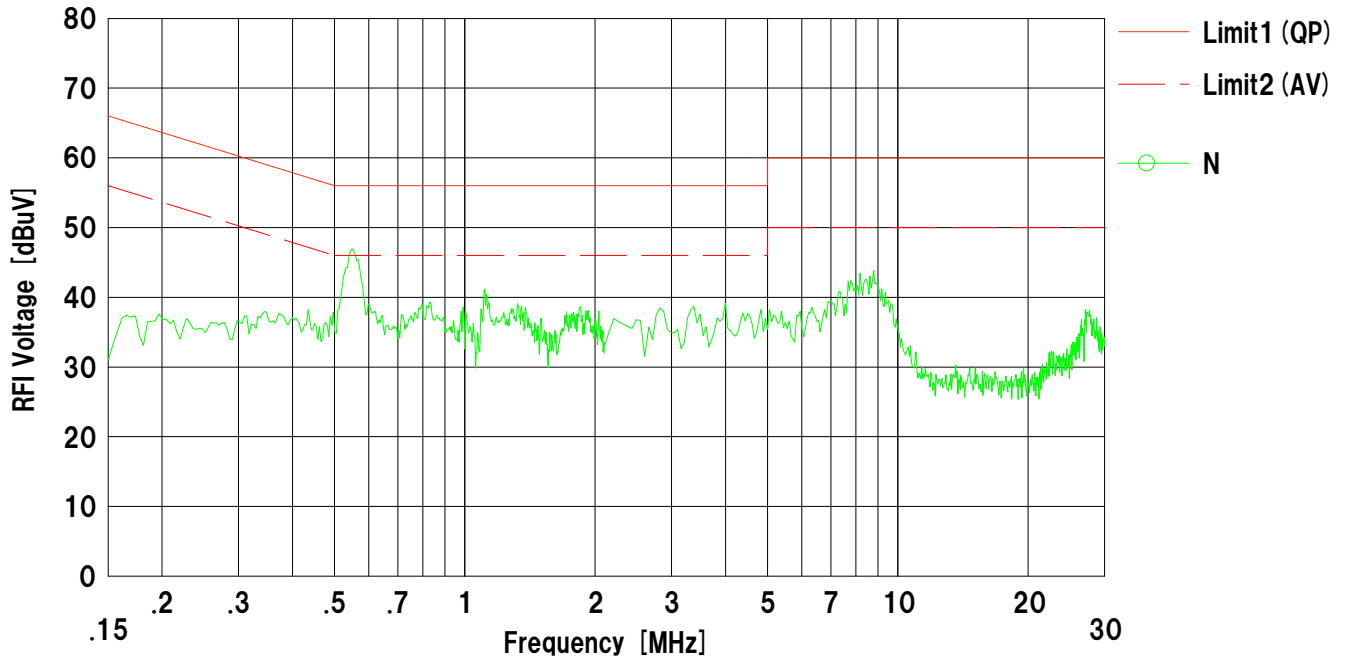
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room  
Date : 2013/07/15

Mode : Tx 3-DH5 2441MHz  
Report No. : 10028551S  
Power : DC3.3V/1.25V (adapter:AC120V/60Hz)  
Temp./Humi. : 26deg.C / 43%RH

Remarks : Dipole Antenna

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

Engineer : Kenichi Adachi



Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]  
LISN: SLS-02 with AC extension cable

# DATA OF CONDUCTED EMISSION TEST

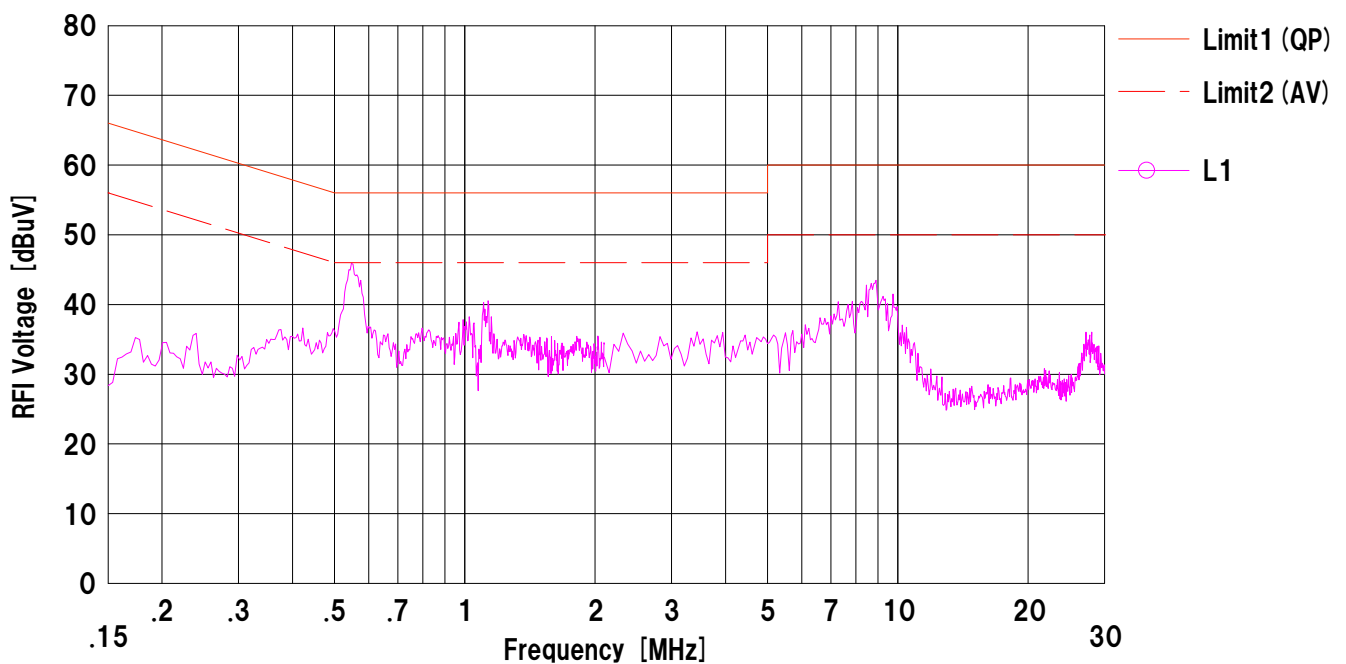
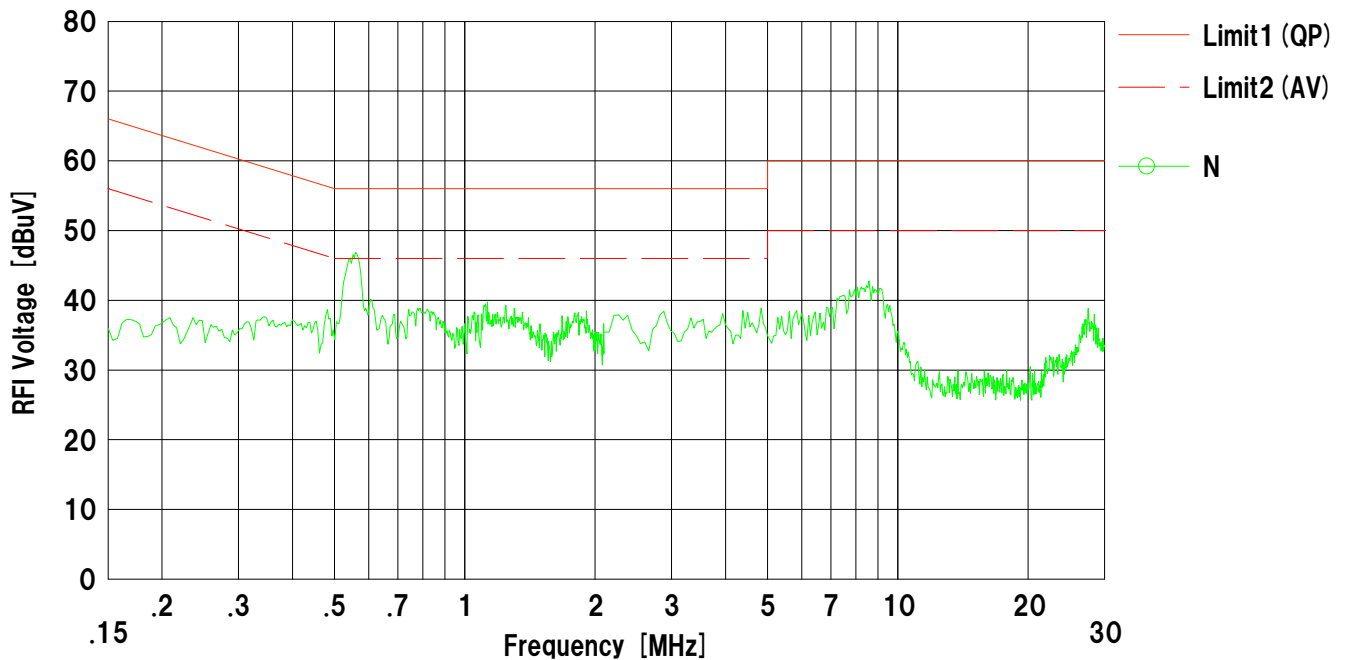
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room  
Date : 2013/07/15

Mode : Tx 3-DH5 2480MHz  
Report No. : 10028551S  
Power : DC3.3V/1.25V (adapter:AC120V/60Hz)  
Temp./Humi. : 26deg.C / 43%RH

Remarks : Dipole Antenna

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

Engineer : Kenichi Adachi



Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]  
LISN: SLS-02 with AC extension cable

# DATA OF CONDUCTED EMISSION TEST

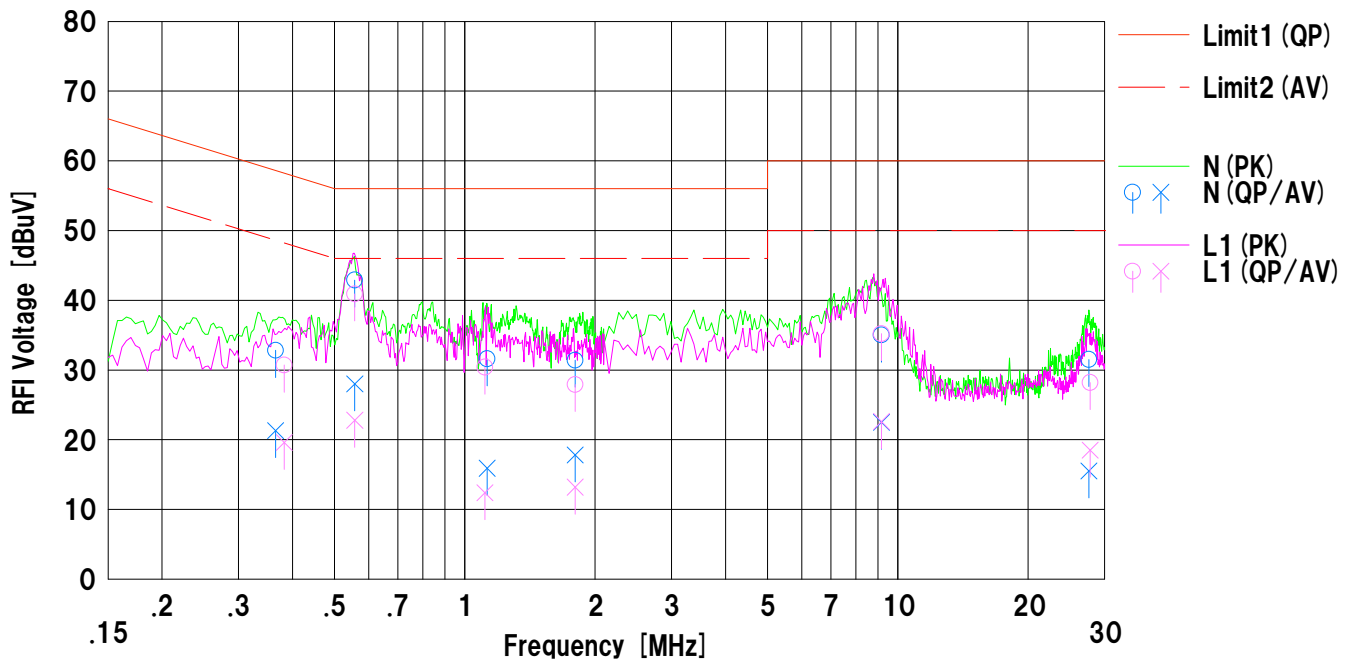
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room  
Date : 2013/07/15

Mode : Tx 3-DH5 2402MHz  
Report No. : 10028551S  
Power : DC3.3V/1.25V (adapter:AC120V/60Hz)  
Temp./Humi. : 26deg.C / 43%RH

Remarks : Dipole Antenna

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   | 0.36582        | 19.9           | 8.4            | 12.9          | 32.8           | 21.3           | 58.5           | 48.5           | 25.7         | 27.2         | N     |         |
| 2   | 0.55711        | 30.0           | 15.1           | 12.9          | 42.9           | 28.0           | 56.0           | 46.0           | 13.1         | 18.0         | N     |         |
| 3   | 1.12659        | 18.7           | 3.0            | 12.9          | 31.6           | 15.9           | 56.0           | 46.0           | 24.4         | 30.1         | N     |         |
| 4   | 1.79893        | 18.4           | 4.8            | 13.0          | 31.4           | 17.8           | 56.0           | 46.0           | 24.6         | 28.2         | N     |         |
| 5   | 9.16894        | 21.1           | 8.6            | 13.9          | 35.0           | 22.5           | 60.0           | 50.0           | 25.0         | 27.5         | N     |         |
| 6   | 27.60976       | 16.2           | 0.2            | 15.3          | 31.5           | 15.5           | 60.0           | 50.0           | 28.5         | 34.5         | N     |         |
| 7   | 0.38260        | 17.8           | 6.7            | 12.9          | 30.7           | 19.6           | 58.2           | 48.2           | 27.5         | 28.6         | L1    |         |
| 8   | 0.55711        | 28.0           | 9.9            | 12.9          | 40.9           | 22.8           | 56.0           | 46.0           | 15.1         | 23.2         | L1    |         |
| 9   | 1.11412        | 17.5           | -0.5           | 12.9          | 30.4           | 12.4           | 56.0           | 46.0           | 25.6         | 33.6         | L1    |         |
| 10  | 1.79893        | 14.9           | 0.2            | 13.0          | 27.9           | 13.2           | 56.0           | 46.0           | 28.1         | 32.8         | L1    |         |
| 11  | 9.16894        | 21.3           | 8.7            | 13.9          | 35.2           | 22.6           | 60.0           | 50.0           | 24.8         | 27.4         | L1    |         |
| 12  | 27.79865       | 12.9           | 3.2            | 15.3          | 28.2           | 18.5           | 60.0           | 50.0           | 31.8         | 31.5         | L1    |         |

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]  
LISN: SLS-02 with AC extension cable

# DATA OF CONDUCTED EMISSION TEST

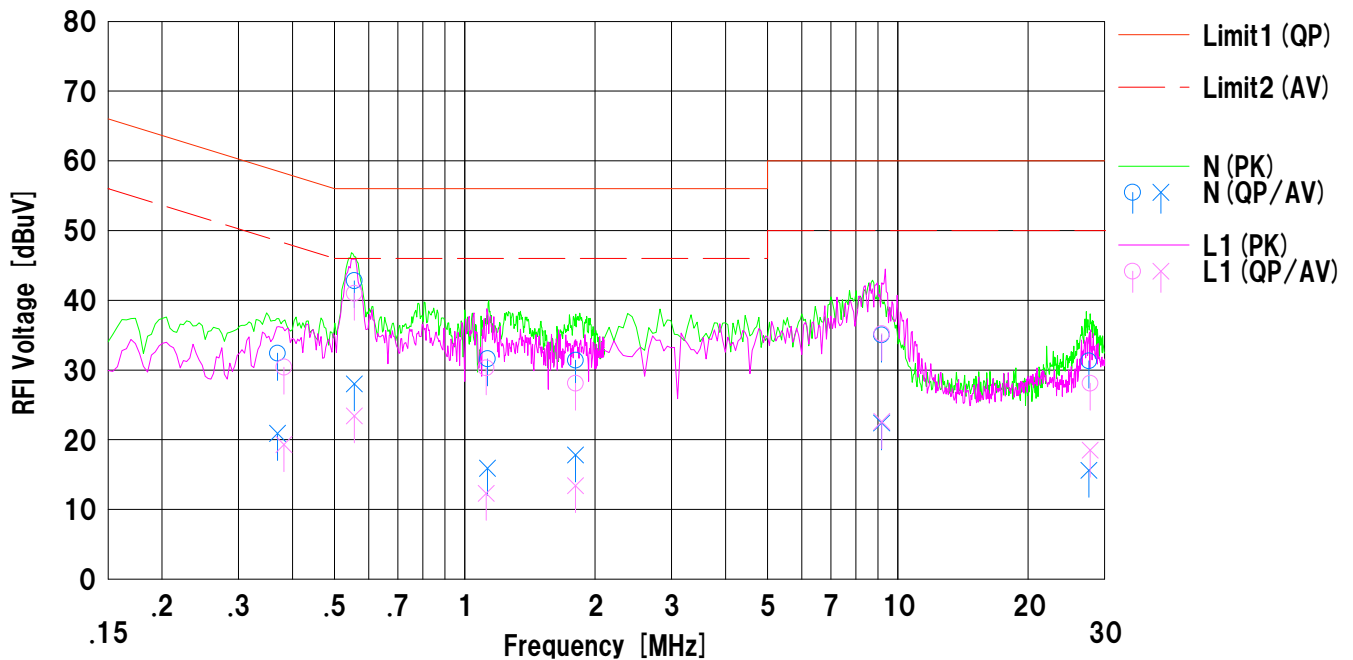
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room  
Date : 2013/07/15

Mode : Tx DH5 2402MHz  
Report No. : 10028551S  
Power : DC3.3V/1.25V (adapter:AC120V/60Hz)  
Temp./Humi. : 26deg.C / 43%RH

Remarks : PIFA Antenna

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   | 0.36958        | 19.5           | 8.0            | 12.9          | 32.4           | 20.9           | 58.5           | 48.5           | 26.1         | 27.6         | N     |         |
| 2   | 0.55570        | 29.9           | 15.1           | 12.9          | 42.8           | 28.0           | 56.0           | 46.0           | 13.2         | 18.0         | N     |         |
| 3   | 1.12873        | 18.7           | 3.0            | 12.9          | 31.6           | 15.9           | 56.0           | 46.0           | 24.4         | 30.1         | N     |         |
| 4   | 1.80232        | 18.4           | 4.8            | 13.0          | 31.4           | 17.8           | 56.0           | 46.0           | 24.6         | 28.2         | N     |         |
| 5   | 9.17224        | 21.1           | 8.5            | 13.9          | 35.0           | 22.4           | 60.0           | 50.0           | 25.0         | 27.6         | N     |         |
| 6   | 27.61128       | 16.0           | 0.3            | 15.3          | 31.3           | 15.6           | 60.0           | 50.0           | 28.7         | 34.4         | N     |         |
| 7   | 0.38239        | 17.5           | 6.4            | 12.9          | 30.4           | 19.3           | 58.2           | 48.2           | 27.8         | 28.9         | L1    |         |
| 8   | 0.55570        | 28.1           | 10.5           | 12.9          | 41.0           | 23.4           | 56.0           | 46.0           | 15.0         | 22.6         | L1    |         |
| 9   | 1.11984        | 17.4           | -0.6           | 12.9          | 30.3           | 12.3           | 56.0           | 46.0           | 25.7         | 33.7         | L1    |         |
| 10  | 1.80244        | 15.1           | 0.4            | 13.0          | 28.1           | 13.4           | 56.0           | 46.0           | 27.9         | 32.6         | L1    |         |
| 11  | 9.17983        | 21.3           | 8.7            | 13.9          | 35.2           | 22.6           | 60.0           | 50.0           | 24.8         | 27.4         | L1    |         |
| 12  | 27.79734       | 12.8           | 3.2            | 15.3          | 28.1           | 18.5           | 60.0           | 50.0           | 31.9         | 31.5         | L1    |         |

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]  
LISN: SLS-02 with AC extension cable

# DATA OF CONDUCTED EMISSION TEST

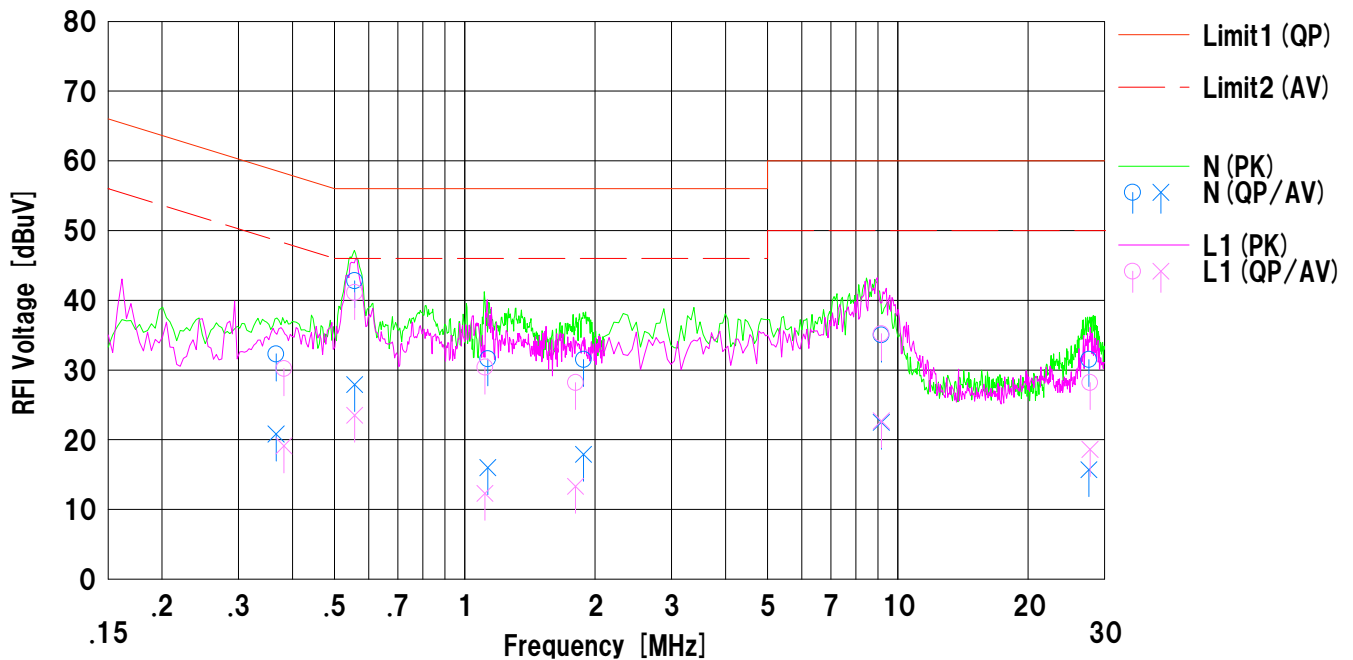
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room  
Date : 2013/07/15

Mode : Tx DH5 2402MHz  
Report No. : 10028551S  
Power : DC3.3V/1.25V (adapter:AC120V/60Hz)  
Temp./Humi. : 26deg.C / 43%RH

Remarks : Chip Antenna

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   | 0.36665        | 19.4           | 7.9            | 12.9          | 32.3           | 20.8           | 58.5           | 48.5           | 26.2         | 27.7         | N     |         |
| 2   | 0.55635        | 29.9           | 15.0           | 12.9          | 42.8           | 27.9           | 56.0           | 46.0           | 13.2         | 18.1         | N     |         |
| 3   | 1.12983        | 18.7           | 3.1            | 12.9          | 31.6           | 16.0           | 56.0           | 46.0           | 24.4         | 30.0         | N     |         |
| 4   | 1.88133        | 18.5           | 4.9            | 13.0          | 31.5           | 17.9           | 56.0           | 46.0           | 24.5         | 28.1         | N     |         |
| 5   | 9.15889        | 21.1           | 8.6            | 13.9          | 35.0           | 22.5           | 60.0           | 50.0           | 25.0         | 27.5         | N     |         |
| 6   | 27.61133       | 16.2           | 0.4            | 15.3          | 31.5           | 15.7           | 60.0           | 50.0           | 28.5         | 34.3         | N     |         |
| 7   | 0.38242        | 17.3           | 6.2            | 12.9          | 30.2           | 19.1           | 58.2           | 48.2           | 28.0         | 29.1         | L1    |         |
| 8   | 0.55635        | 28.2           | 10.6           | 12.9          | 41.1           | 23.5           | 56.0           | 46.0           | 14.9         | 22.5         | L1    |         |
| 9   | 1.11385        | 17.5           | -0.6           | 12.9          | 30.4           | 12.3           | 56.0           | 46.0           | 25.6         | 33.7         | L1    |         |
| 10  | 1.80189        | 15.2           | 0.3            | 13.0          | 28.2           | 13.3           | 56.0           | 46.0           | 27.8         | 32.7         | L1    |         |
| 11  | 9.15889        | 21.3           | 8.8            | 13.9          | 35.2           | 22.7           | 60.0           | 50.0           | 24.8         | 27.3         | L1    |         |
| 12  | 27.78738       | 12.9           | 3.3            | 15.3          | 28.2           | 18.6           | 60.0           | 50.0           | 31.8         | 31.4         | L1    |         |

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]  
LISN: SLS-02 with AC extension cable

# DATA OF CONDUCTED EMISSION TEST

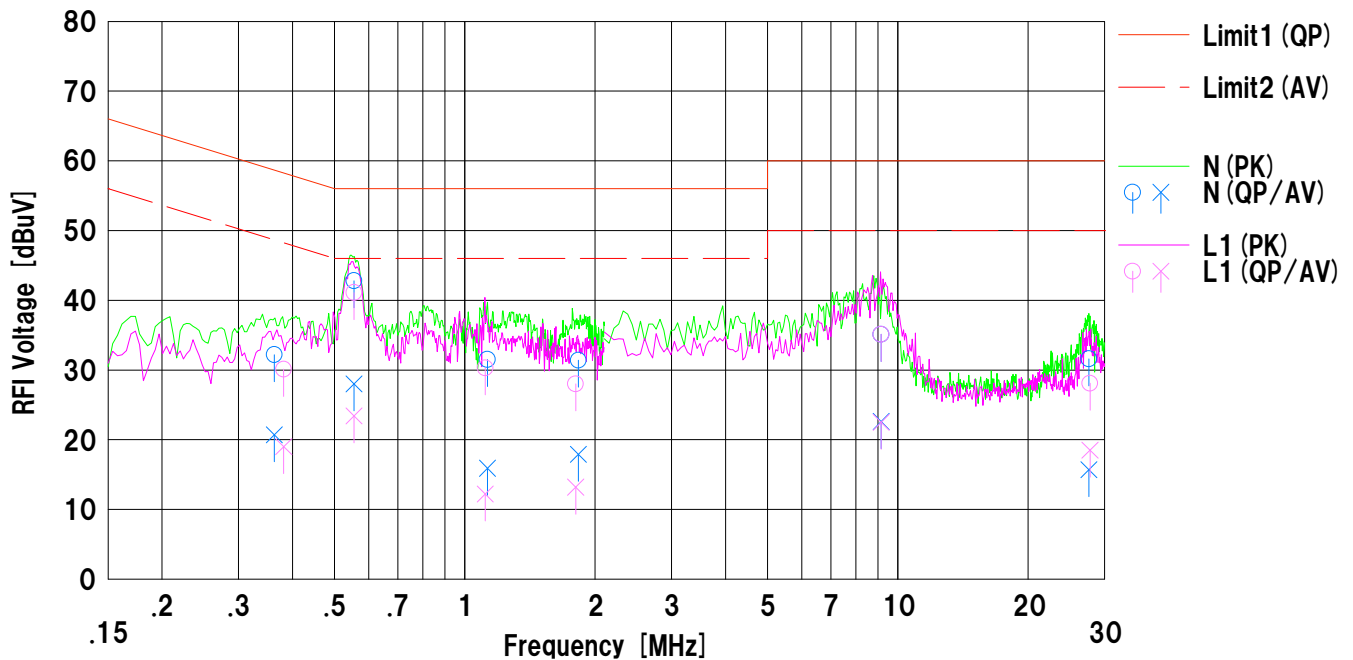
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room  
Date : 2013/07/15

Mode : Tx DH5 2402MHz  
Report No. : 10028551S  
Power : DC3.3V/1.25V (adapter:AC120V/60Hz)  
Temp./Humi. : 26deg.C / 43%RH

Remarks : Internal Antenna

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   | 0.36325        | 19.3           | 7.8            | 12.9          | 32.2           | 20.7           | 58.6           | 48.6           | 26.4         | 27.9         | N     |         |
| 2   | 0.55490        | 29.9           | 15.1           | 12.9          | 42.8           | 28.0           | 56.0           | 46.0           | 13.2         | 18.0         | N     |         |
| 3   | 1.12793        | 18.6           | 3.0            | 12.9          | 31.5           | 15.9           | 56.0           | 46.0           | 24.5         | 30.1         | N     |         |
| 4   | 1.82983        | 18.4           | 4.9            | 13.0          | 31.4           | 17.9           | 56.0           | 46.0           | 24.6         | 28.1         | N     |         |
| 5   | 9.14896        | 21.2           | 8.7            | 13.9          | 35.1           | 22.6           | 60.0           | 50.0           | 24.9         | 27.4         | N     |         |
| 6   | 27.61130       | 16.3           | 0.4            | 15.3          | 31.6           | 15.7           | 60.0           | 50.0           | 28.4         | 34.3         | N     |         |
| 7   | 0.38178        | 17.2           | 6.1            | 12.9          | 30.1           | 19.0           | 58.2           | 48.2           | 28.1         | 29.2         | L1    |         |
| 8   | 0.55490        | 28.2           | 10.5           | 12.9          | 41.1           | 23.4           | 56.0           | 46.0           | 14.9         | 22.6         | L1    |         |
| 9   | 1.11494        | 17.4           | -0.7           | 12.9          | 30.3           | 12.2           | 56.0           | 46.0           | 25.7         | 33.8         | L1    |         |
| 10  | 1.80385        | 15.0           | 0.2            | 13.0          | 28.0           | 13.2           | 56.0           | 46.0           | 28.0         | 32.8         | L1    |         |
| 11  | 9.14896        | 21.2           | 8.6            | 13.9          | 35.1           | 22.5           | 60.0           | 50.0           | 24.9         | 27.5         | L1    |         |
| 12  | 27.77895       | 12.8           | 3.2            | 15.3          | 28.1           | 18.5           | 60.0           | 50.0           | 31.9         | 31.5         | L1    |         |

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]  
LISN: SLS-02 with AC extension cable

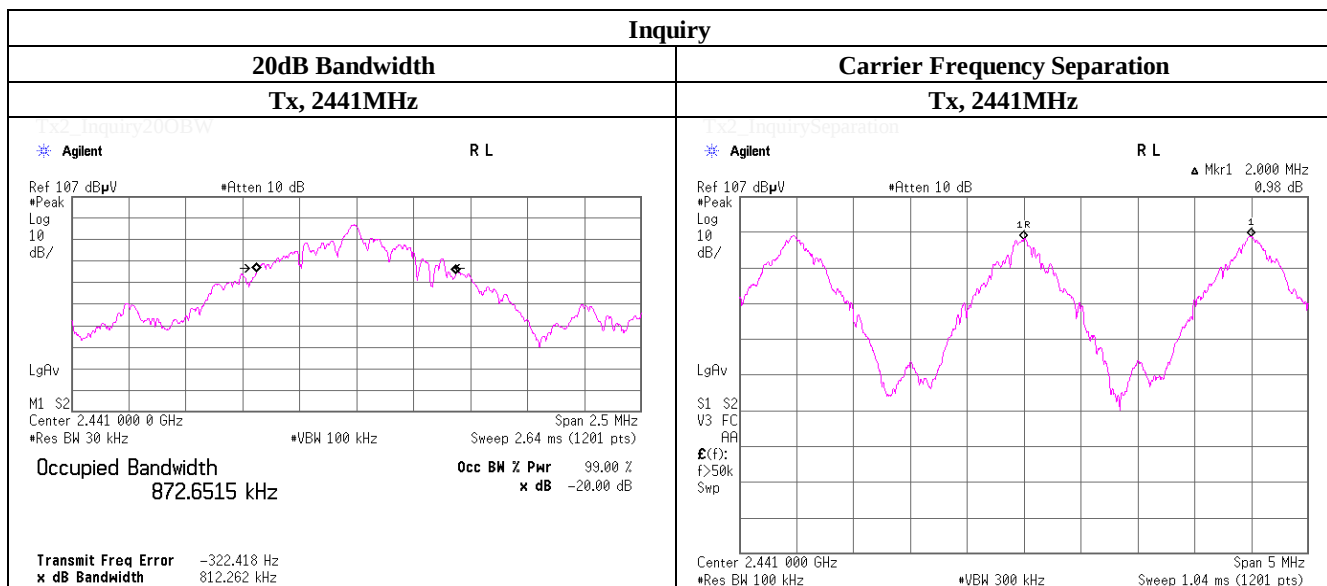
## 20dB Bandwidth and Carrier Frequency Separation

|                        |                                |                    |
|------------------------|--------------------------------|--------------------|
| Test place             | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date                   | July 18, 2013                  |                    |
| Temperature / Humidity | 27 deg.C , 57 %RH              |                    |
| Engineer               | Kenichi Adachi                 |                    |
| Mode                   | Tx, Bluetooth, BDR, PRBS9      |                    |

| Mode    | Freq.<br>[MHz] | 20dB<br>Bandwidth<br>[MHz] | Carrier<br>Frequency<br>Separation<br>[MHz] | Limit for<br>Carrier<br>Frequency<br>Separation<br>[MHz] |
|---------|----------------|----------------------------|---------------------------------------------|----------------------------------------------------------|
| DH5     | 2402.0         | 0.958                      | 0.995                                       | >= 0.638                                                 |
| DH5     | 2441.0         | 0.959                      | 1.000                                       | >= 0.640                                                 |
| DH5     | 2480.0         | 0.958                      | 1.008                                       | >= 0.638                                                 |
| Inquiry | 2441.0         | 0.812                      | 2.000                                       | >= 0.542                                                 |

Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).

No limit applies to 20dB Bandwidth.



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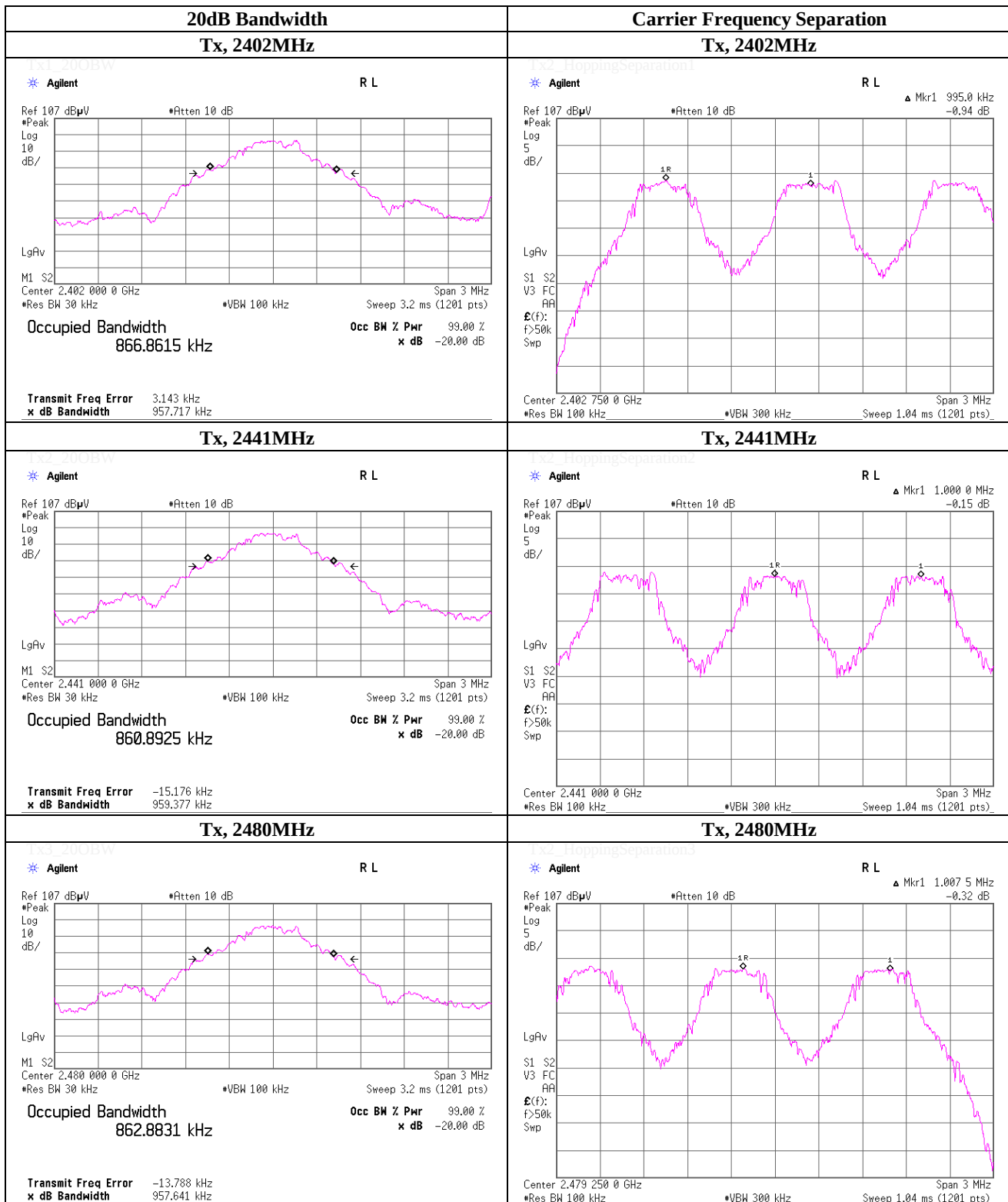
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## 20dB Bandwidth and Carrier Frequency Separation

**Tx, Bluetooth, BDR, PRBS9**



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## **20dB Bandwidth and Carrier Frequency Separation**

Test place                      UL Japan, Inc. Shonan EMC Lab.                      No.5 Shielded Room  
Date                              July 18, 2013  
Temperature / Humidity        27 deg.C        , 57 %RH  
Engineer                        Kenichi Adachi  
Mode                              Tx, Bluetooth, EDR, PRBS9

| Mode  | Freq.<br>[MHz] | 20dB<br>Bandwidth<br>[MHz] | Carrier<br>Frequency<br>Separation<br>[MHz] | Limit for<br>Carrier<br>Frequency<br>Separation<br>[MHz] |
|-------|----------------|----------------------------|---------------------------------------------|----------------------------------------------------------|
| 3-DH5 | 2402.0         | 1.267                      | 1.000                                       | >= 0.844                                                 |
| 3-DH5 | 2441.0         | 1.266                      | 1.000                                       | >= 0.844                                                 |
| 3-DH5 | 2480.0         | 1.280                      | 0.998                                       | >= 0.853                                                 |

Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).  
No limit applies to 20dB Bandwidth.

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**Shonan EMC Lab.**

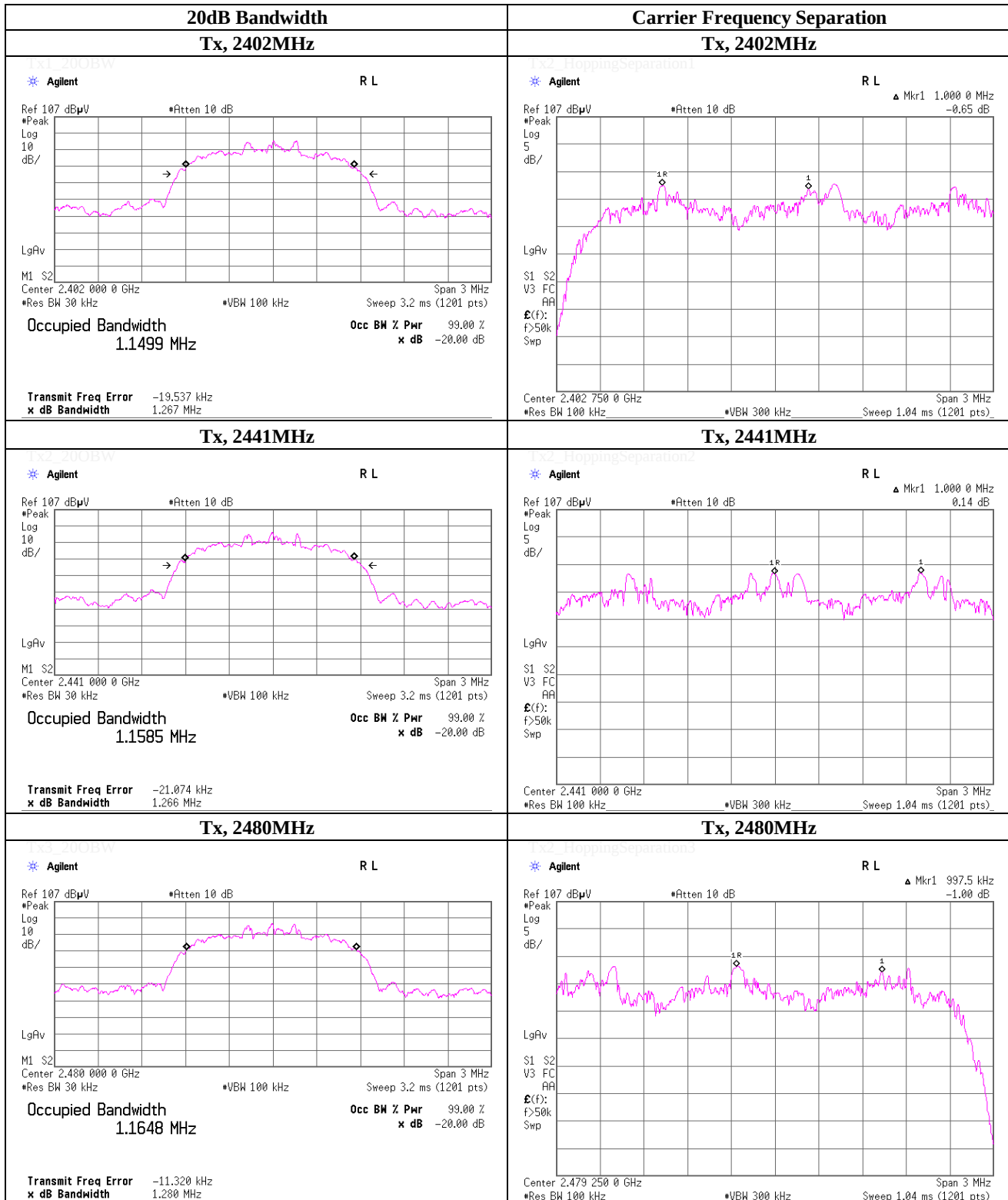
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## 20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, EDR, PRBS9



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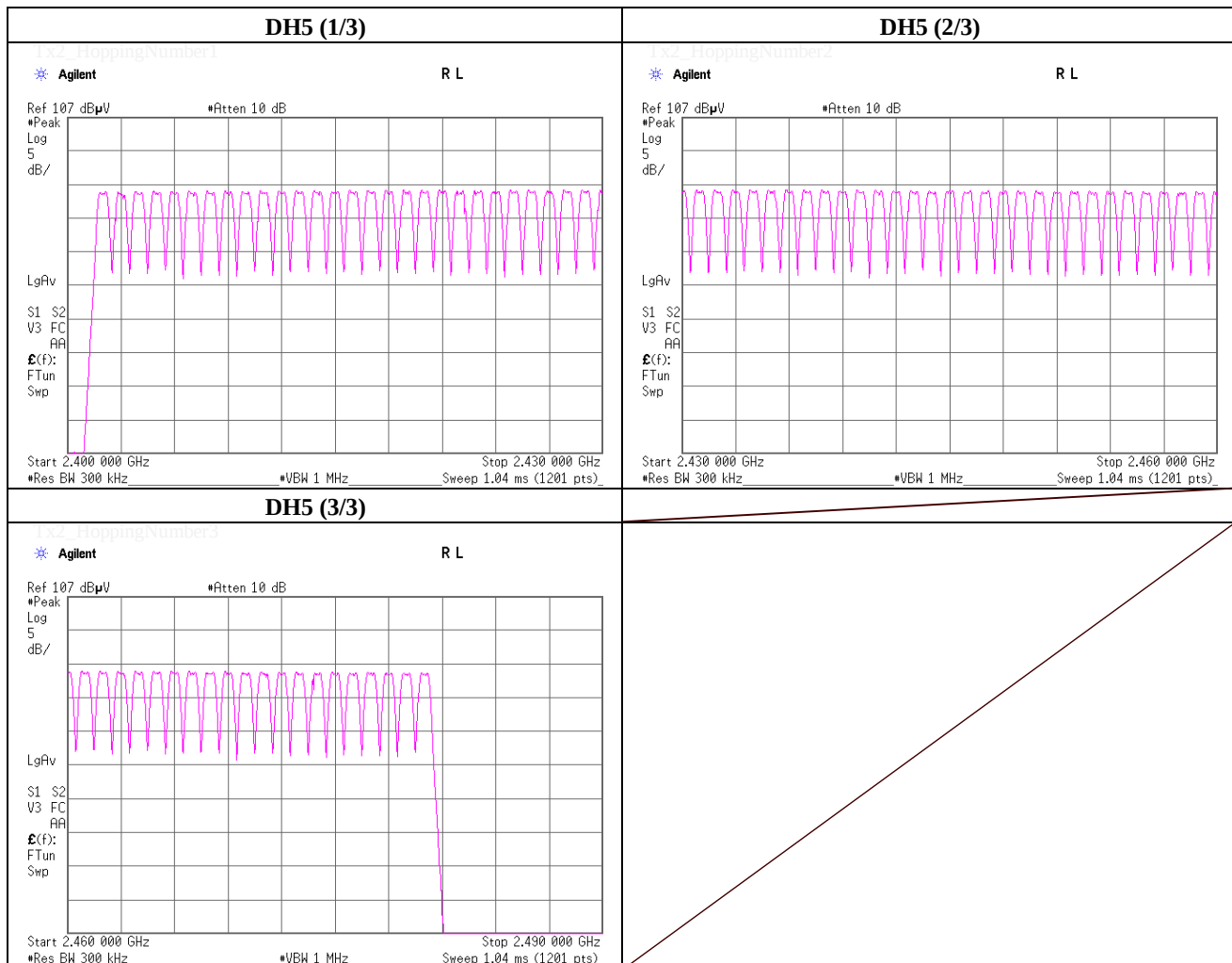
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## Number of Hopping Frequency

|                        |                                |                    |
|------------------------|--------------------------------|--------------------|
| Test place             | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date                   | July 18, 2013                  |                    |
| Temperature / Humidity | 27 deg.C , 57 %RH              |                    |
| Engineer               | Kenichi Adachi                 |                    |
| Mode                   | Tx, Bluetooth, BDR, PRBS9      |                    |

| Mode | Number of Channel [times] | Limit [times] |
|------|---------------------------|---------------|
| DH5  | 79                        | >= 15         |

\* Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth Specification.



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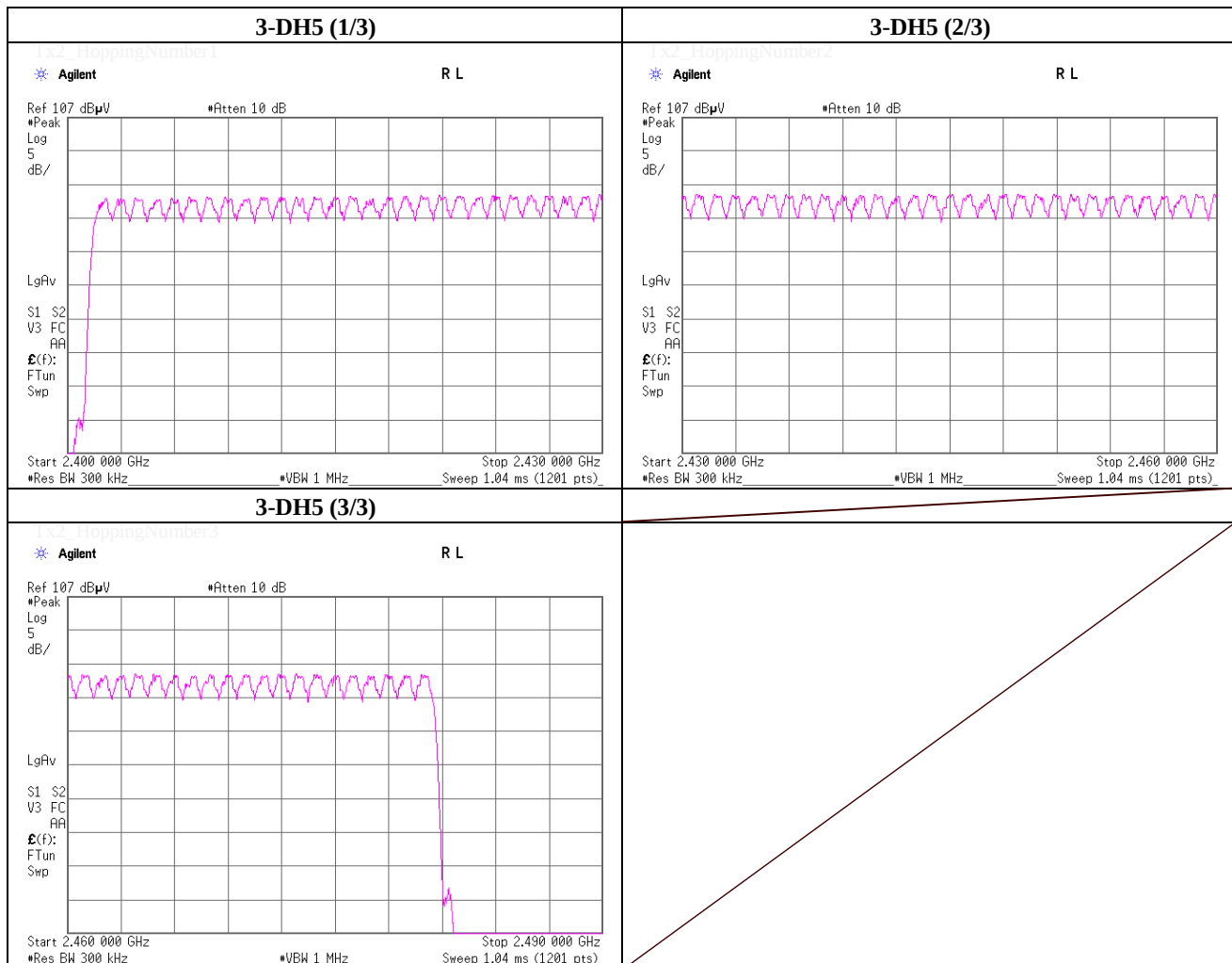
Facsimile : +81 463 50 6401

## Number of Hopping Frequency

|                        |                                |                    |
|------------------------|--------------------------------|--------------------|
| Test place             | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date                   | July 18, 2013                  |                    |
| Temperature / Humidity | 27 deg.C , 57 %RH              |                    |
| Engineer               | Kenichi Adachi                 |                    |
| Mode                   | Tx, Bluetooth, EDR, PRBS9      |                    |

| Mode  | Number of Channel [times] | Limit [times] |
|-------|---------------------------|---------------|
| 3-DH5 | 79                        | >= 15         |

\* Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth Specification.



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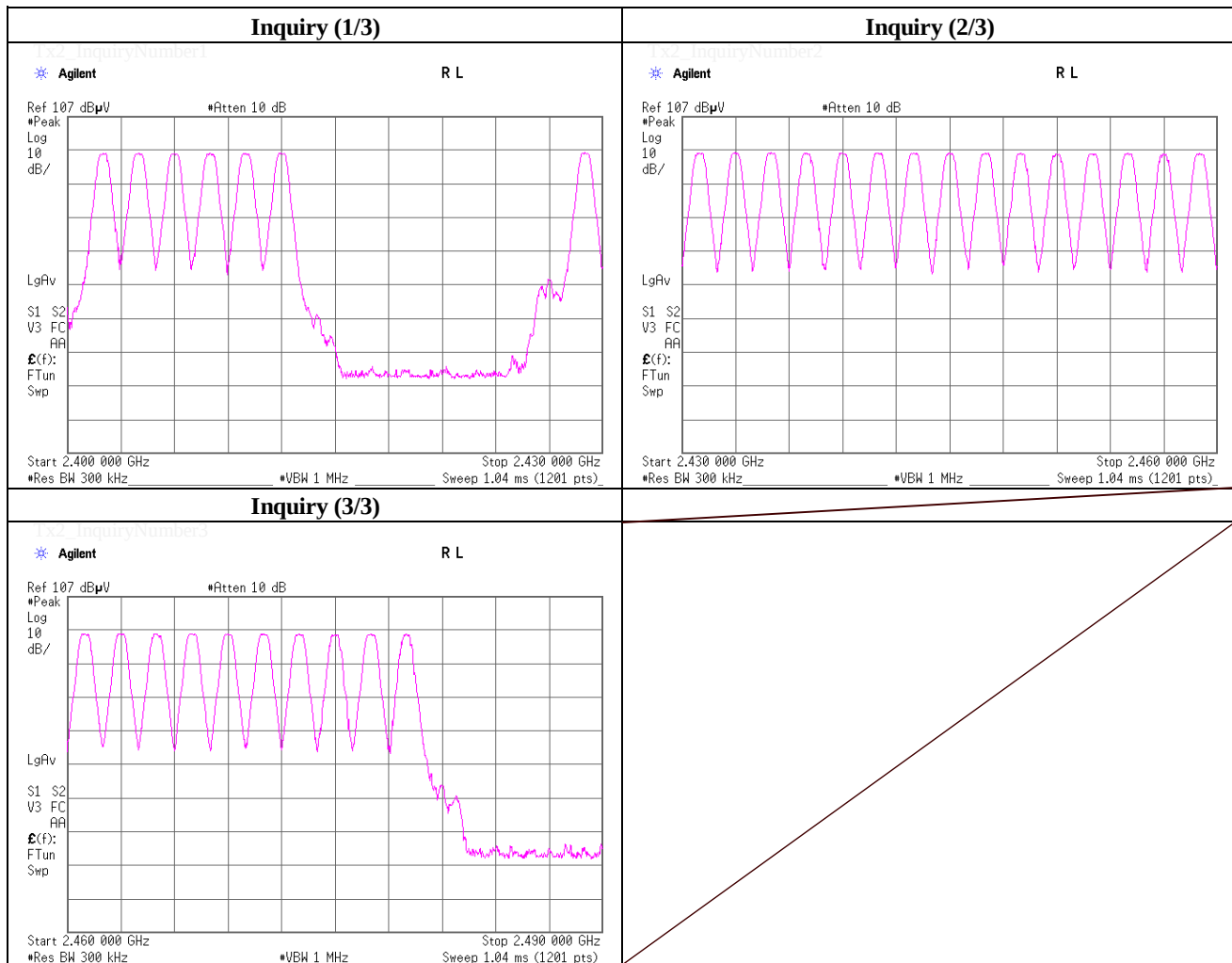
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## Number of Hopping Frequency

|                        |                                |                    |
|------------------------|--------------------------------|--------------------|
| Test place             | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date                   | July 18, 2013                  |                    |
| Temperature / Humidity | 27 deg.C , 57 %RH              |                    |
| Engineer               | Kenichi Adachi                 |                    |
| Mode                   | Tx, Bluetooth, Inquiry         |                    |

| Mode    | Number of Channel [times] | Limit [times] |
|---------|---------------------------|---------------|
| Inquiry | 32                        | >= 15         |



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## Dwell Time

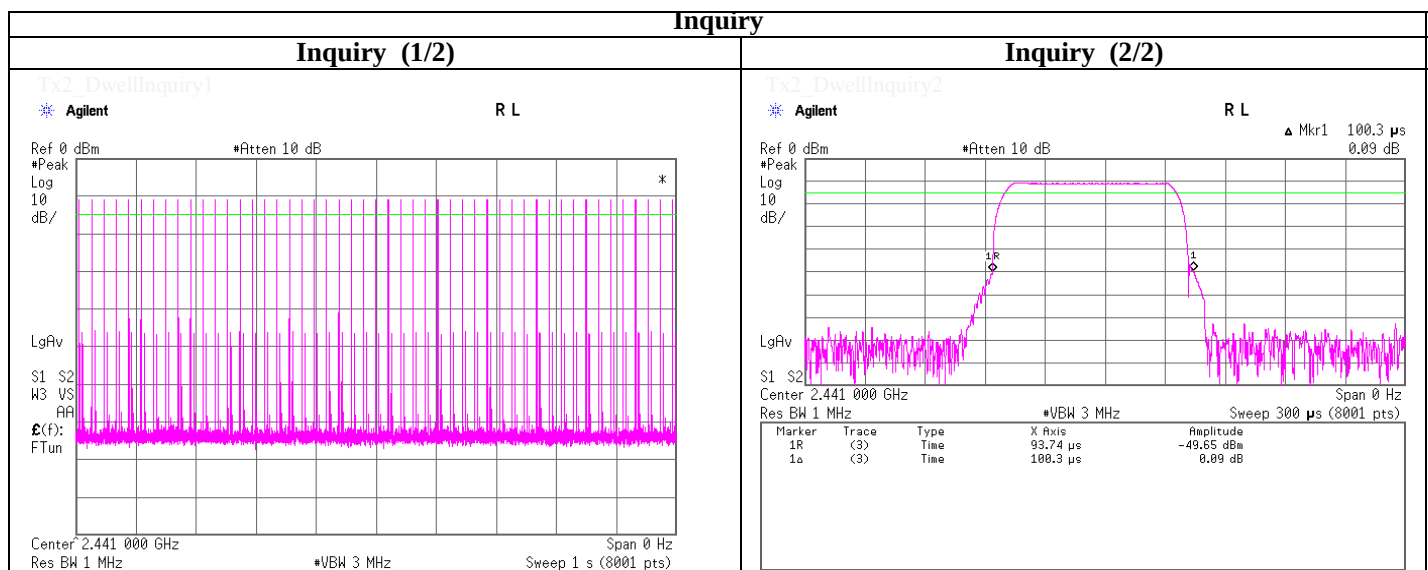
|                        |                                |                    |
|------------------------|--------------------------------|--------------------|
| Test place             | UL Japan, Inc. Shonan EMC Lab. | No.5 Shielded Room |
| Date                   | July 18, 2013                  |                    |
| Temperature / Humidity | 27 deg.C , 57 %RH              |                    |
| Engineer               | Kenichi Adachi                 |                    |
| Mode                   | Tx, Bluetooth, BDR, PRBS9      |                    |

| Mode    | Number of transmission<br>in a 31.6 (79 Hopping x 0.4)<br>/ 12.8 (32 Hopping x 0.4) second period |                                     | Length of<br>transmission<br>time [msec] | Result<br>[msec] | Limit<br>[msec] |
|---------|---------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------|------------------|-----------------|
| DH1     | 51.0                                                                                              | / 5.0 sec. x 31.6 sec. = 323 times  | 0.400                                    | 129              | 400             |
| DH3     | 26.0                                                                                              | / 5.0 sec. x 31.6 sec. = 165 times  | 1.657                                    | 273              | 400             |
| DH5     | 17.0                                                                                              | / 5.0 sec. x 31.6 sec. = 108 times  | 2.901                                    | 313              | 400             |
| Inquiry | 100.0                                                                                             | / 1.0 sec. x 12.8 sec. = 1280 times | 0.100                                    | 128              | 400             |

Sample Calculation

Result = Number of transmission x Length of transmission time

\* This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in  $N \times 0.4s$ , where  $N$  is the number of channels being used in the hopping sequence ( $20 \leq N \leq 79$ ), is always less than 0.4s regardless of packet size (DH1, DH3 or DH5). This is confirmed in the test report for  $N=79$ .



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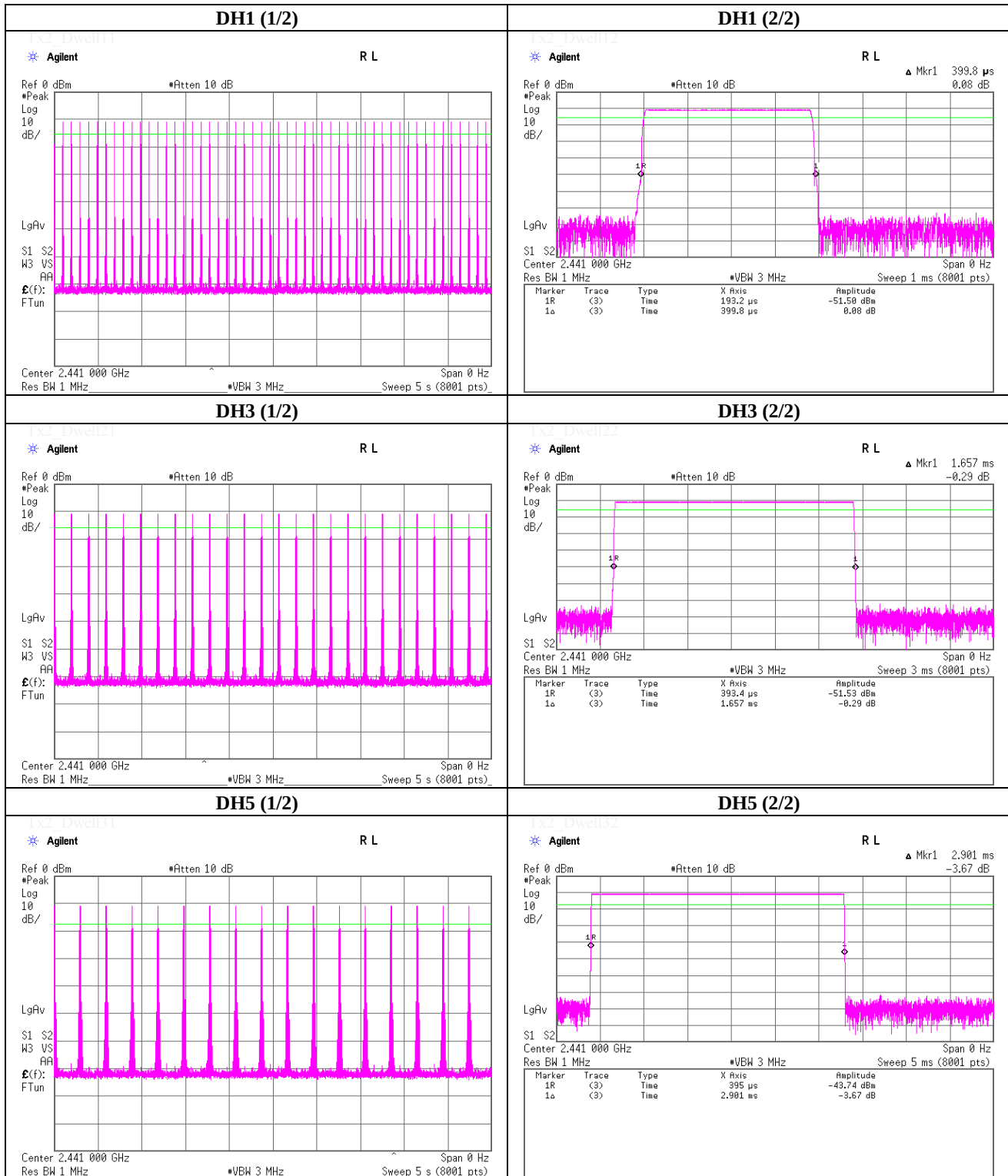
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## Dwell time

**Tx, Bluetooth, BDR, PRBS9**



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## Dwell Time

Test place                    UL Japan, Inc. Shonan EMC Lab.                    No.5 Shielded Room  
 Date                            July 18, 2013  
 Temperature / Humidity    27 deg.C    , 57 %RH  
 Engineer                      Kenichi Adachi  
 Mode                           Tx, Bluetooth, EDR, PRBS9

| Mode  | Number of transmission<br>in a 31.6 (79 Hopping x 0.4) second |            |                         | Length of<br>transmission<br>time [msec] | Result<br>[msec] | Limit<br>[msec] |
|-------|---------------------------------------------------------------|------------|-------------------------|------------------------------------------|------------------|-----------------|
| 3-DH1 | 51.0                                                          | / 5.0 sec. | x 31.6 sec. = 323 times | 0.416                                    | 134              | 400             |
| 3-DH3 | 26.0                                                          | / 5.0 sec. | x 31.6 sec. = 165 times | 1.667                                    | 275              | 400             |
| 3-DH5 | 17.0                                                          | / 5.0 sec. | x 31.6 sec. = 108 times | 2.917                                    | 315              | 400             |

Sample Calculation

Result = Number of transmission x Length of transmission time

\* This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in  $N \times 0.4s$ , where  $N$  is the number of channels being used in the hopping sequence ( $20 \leq N \leq 79$ ), is always less than 0.4s regardless of packet size (3-DH1, 3-DH3 or 3-DH5). This is confirmed in the test report for  $N=79$ .

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**Shonan EMC Lab.**

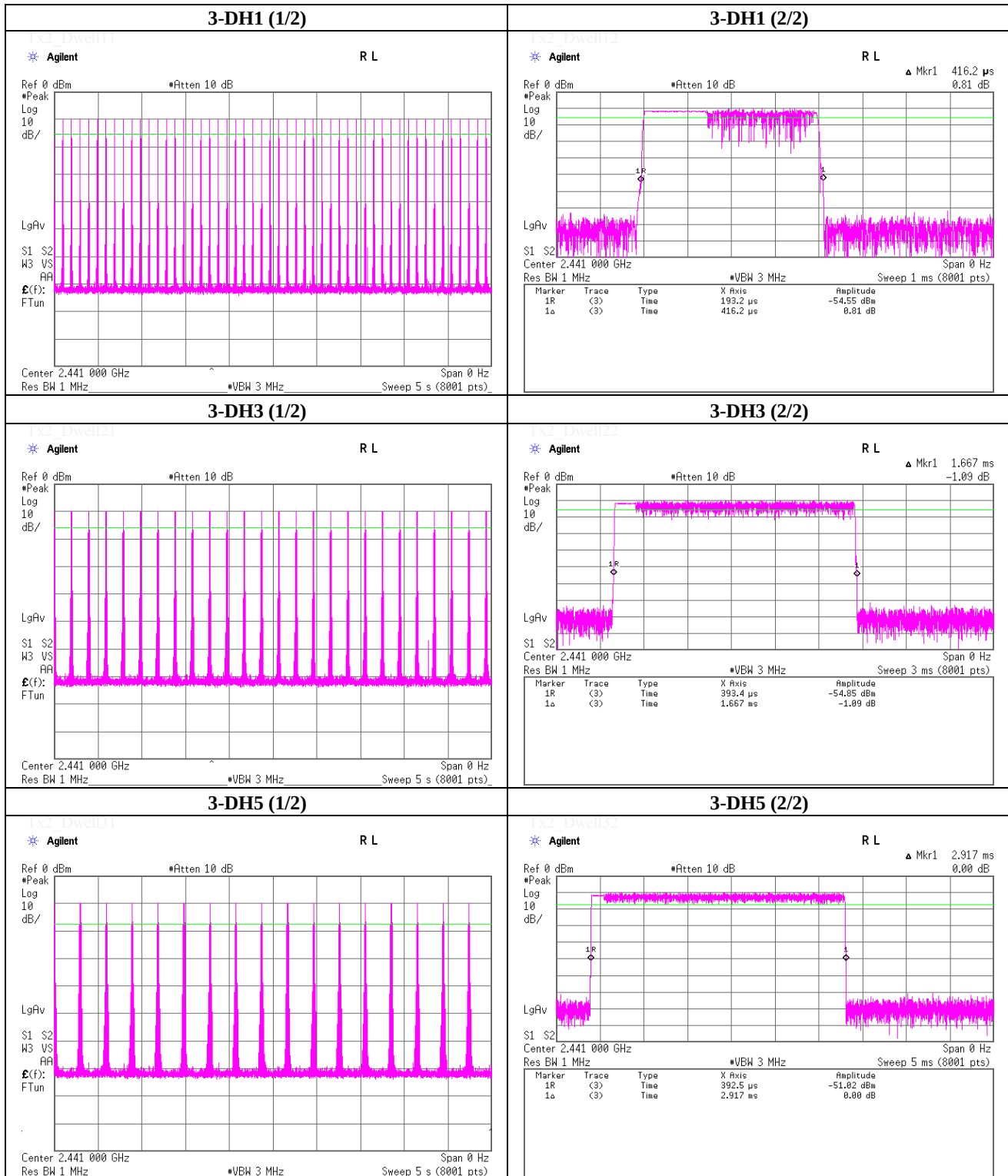
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## Dwell time

Tx, Bluetooth, EDR, PRBS9



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## Maximum Peak Conducted Output Power (Conducted)

Test place                      UL Japan, Inc. Shonan EMC Lab.                      No.5 Shielded Room  
 Date                              July 18, 2013  
 Temperature / Humidity        27 deg.C        , 57 %RH  
 Engineer                        Kenichi Adachi  
 Mode                              Tx, Bluetooth

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

|       | Freq.<br>[MHz] | P/M (Peak)<br>Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result      |             | Limit |      | Margin<br>[dB] |
|-------|----------------|--------------------------------|-----------------------|------------------------|-------------|-------------|-------|------|----------------|
|       |                |                                |                       |                        | [dBm]       | [mW]        | [dBm] | [mW] |                |
| DH5   | 2402.0         | -10.65                         | 1.54                  | 9.62                   | 0.51        | 1.12        | 20.97 | 125  | 20.46          |
| DH5   | 2441.0         | -10.46                         | 1.51                  | 9.63                   | 0.68        | 1.17        | 20.97 | 125  | 20.29          |
| DH5   | 2480.0         | -10.95                         | 1.52                  | 9.63                   | 0.20        | 1.05        | 20.97 | 125  | 20.77          |
| 2-DH5 | 2402.0         | -10.16                         | 1.54                  | 9.62                   | 1.00        | 1.26        | 20.97 | 125  | 19.97          |
| 2-DH5 | 2441.0         | -9.69                          | 1.51                  | 9.63                   | 1.45        | 1.40        | 20.97 | 125  | 19.52          |
| 2-DH5 | 2480.0         | -9.91                          | 1.52                  | 9.63                   | 1.24        | 1.33        | 20.97 | 125  | 19.73          |
| 3-DH5 | 2402.0         | -9.79                          | 1.54                  | 9.62                   | 1.37        | 1.37        | 20.97 | 125  | 19.60          |
| 3-DH5 | 2441.0         | -9.24                          | 1.51                  | 9.63                   | <b>1.90</b> | <b>1.55</b> | 20.97 | 125  | 19.07          |
| 3-DH5 | 2480.0         | -9.42                          | 1.52                  | 9.63                   | 1.73        | 1.49        | 20.97 | 125  | 19.24          |

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss

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## Radiated Emission

|                        |                                        |                 |                 |                 |
|------------------------|----------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber             |                 |                 |                 |
| Date                   | July 11, 2013                          | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                        | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                           | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2402 MHz                           |                 |                 |                 |
|                        | Bluetooth, DH5, PRBS9, Antenna: Dipole |                 |                 |                 |

(\* 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.    | 216.002         | QP       | 34.7           | 16.6            | 8.0       | 32.0      | 27.3            | 46.0           | 18.7        | 150         | 277         |        |
| Hori.    | 2390.000        | PK       | 44.6           | 27.4            | 14.7      | 41.4      | 45.3            | 73.9           | 28.6        | 100         | 354         |        |
| Hori.    | 2558.706        | PK       | 48.1           | 27.7            | 15.0      | 41.4      | 49.4            | 73.9           | 24.5        | 100         | 23          |        |
| Hori.    | 4804.000        | PK       | 53.8           | 31.1            | 7.5       | 41.2      | 51.2            | 73.9           | 22.7        | 100         | 137         |        |
| Hori.    | 7206.000        | PK       | 46.1           | 36.6            | 9.1       | 41.4      | 50.4            | 73.9           | 23.5        | 100         | 0           |        |
| Hori.    | 9608.000        | PK       | 44.2           | 38.5            | 10.2      | 38.9      | 54.0            | 73.9           | 19.9        | 100         | 0           |        |
| Hori.    | 2390.000        | AV       | 34.4           | 27.4            | 14.7      | 41.4      | 35.1            | 53.9           | 18.8        | 100         | 354         |        |
| Hori.    | 2558.706        | AV       | 39.4           | 27.7            | 15.0      | 41.4      | 40.7            | 53.9           | 13.2        | 100         | 23          |        |
| Hori.    | 4804.000        | AV       | 47.5           | 31.1            | 7.5       | 41.2      | 44.9            | 53.9           | 9.0         | 100         | 137         |        |
| Hori.    | 7206.000        | AV       | 35.4           | 36.6            | 9.1       | 41.4      | 39.7            | 53.9           | 14.2        | 100         | 0           |        |
| Hori.    | 9608.000        | AV       | 31.0           | 38.5            | 10.2      | 38.9      | 40.8            | 53.9           | 13.1        | 100         | 0           |        |
| Vert.    | 30.143          | QP       | 27.1           | 17.9            | 6.4       | 32.2      | 19.2            | 40.0           | 20.8        | 100         | 70          |        |
| Vert.    | 87.257          | QP       | 36.4           | 7.7             | 7.5       | 32.1      | 19.5            | 40.0           | 20.5        | 100         | 345         |        |
| Vert.    | 216.002         | QP       | 33.3           | 16.6            | 8.0       | 32.0      | 25.9            | 46.0           | 20.1        | 100         | 8           |        |
| Vert.    | 2390.000        | PK       | 43.4           | 27.4            | 14.7      | 41.4      | 44.1            | 73.9           | 29.8        | 100         | 129         |        |
| Vert.    | 2558.706        | PK       | 48.2           | 27.7            | 15.0      | 41.4      | 49.5            | 73.9           | 24.4        | 100         | 152         |        |
| Vert.    | 4804.000        | PK       | 53.6           | 31.1            | 7.5       | 41.2      | 51.0            | 73.9           | 22.9        | 100         | 165         |        |
| Vert.    | 7206.000        | PK       | 45.8           | 36.6            | 9.1       | 41.4      | 50.1            | 73.9           | 23.8        | 100         | 0           |        |
| Vert.    | 9608.000        | PK       | 44.3           | 38.5            | 10.2      | 38.9      | 54.1            | 73.9           | 19.8        | 100         | 0           |        |
| Vert.    | 2390.000        | AV       | 34.4           | 27.4            | 14.7      | 41.4      | 35.1            | 53.9           | 18.8        | 100         | 129         |        |
| Vert.    | 2558.706        | AV       | 39.9           | 27.7            | 15.0      | 41.4      | 41.2            | 53.9           | 12.7        | 100         | 152         |        |
| Vert.    | 4804.000        | AV       | 48.7           | 31.1            | 7.5       | 41.2      | 46.1            | 53.9           | 7.8         | 100         | 165         |        |
| Vert.    | 7206.000        | AV       | 35.6           | 36.6            | 9.1       | 41.4      | 39.9            | 53.9           | 14.0        | 100         | 0           |        |
| Vert.    | 9608.000        | AV       | 31.2           | 38.5            | 10.2      | 38.9      | 41.0            | 53.9           | 12.9        | 100         | 0           |        |

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

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.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg] | Remark  |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|-------------|---------|
| Hori.    | 2402.000        | PK       | 96.4           | 27.4            | 14.7      | 41.4      | 97.1            | -              | -           | 100         | 354         | Carrier |
| Hori.    | 2400.000        | PK       | 50.1           | 27.4            | 14.7      | 41.4      | 50.8            | 77.1           | 26.3        | 100         | 354         |         |
| Vert.    | 2402.000        | PK       | 97.5           | 27.4            | 14.7      | 41.4      | 98.2            | -              | -           | 100         | 129         | Carrier |
| Vert.    | 2400.000        | PK       | 51.7           | 27.4            | 14.7      | 41.4      | 52.4            | 78.2           | 25.8        | 100         | 129         |         |

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

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## Radiated Emission

|                        |                                        |                 |                 |                 |
|------------------------|----------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber             |                 |                 |                 |
| Date                   | July 11, 2013                          | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                        | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                           | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2441 MHz                           |                 |                 |                 |
|                        | Bluetooth, DH5, PRBS9, Antenna: Dipole |                 |                 |                 |

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

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|----------------|--------|
| Hori.    | 216.004            | QP       | 35.1              | 16.6               | 8.0          | 32.0         | 27.7               | 46.0              | 18.3           | 149            | 274            |        |
| Hori.    | 4882.000           | PK       | 53.3              | 31.3               | 7.5          | 41.1         | 51.0               | 73.9              | 22.9           | 100            | 23             |        |
| Hori.    | 7323.000           | PK       | 46.4              | 36.6               | 9.0          | 41.4         | 50.6               | 73.9              | 23.3           | 100            | 0              |        |
| Hori.    | 9764.000           | PK       | 43.5              | 38.7               | 10.1         | 38.9         | 53.4               | 73.9              | 20.5           | 100            | 0              |        |
| Hori.    | 4882.000           | AV       | 46.5              | 31.3               | 7.5          | 41.1         | 44.2               | 53.9              | 9.7            | 100            | 23             |        |
| Hori.    | 7323.000           | AV       | 35.6              | 36.6               | 9.0          | 41.4         | 39.8               | 53.9              | 14.1           | 100            | 0              |        |
| Hori.    | 9764.000           | AV       | 33.2              | 38.7               | 10.1         | 38.9         | 43.1               | 53.9              | 10.8           | 100            | 0              |        |
| Vert.    | 30.098             | QP       | 26.9              | 17.9               | 6.4          | 32.2         | 19.0               | 40.0              | 21.0           | 100            | 85             |        |
| Vert.    | 87.890             | QP       | 36.7              | 7.8                | 7.5          | 32.1         | 19.9               | 40.0              | 20.1           | 100            | 207            |        |
| Vert.    | 216.004            | QP       | 33.4              | 16.6               | 8.0          | 32.0         | 26.0               | 46.0              | 20.0           | 100            | 24             |        |
| Vert.    | 4882.000           | PK       | 54.3              | 31.3               | 7.5          | 41.1         | 52.0               | 73.9              | 21.9           | 100            | 178            |        |
| Vert.    | 7323.000           | PK       | 46.9              | 36.6               | 9.0          | 41.4         | 51.1               | 73.9              | 22.8           | 100            | 0              |        |
| Vert.    | 9764.000           | PK       | 43.4              | 38.7               | 10.1         | 38.9         | 53.3               | 73.9              | 20.6           | 100            | 0              |        |
| Vert.    | 4882.000           | AV       | 48.4              | 31.3               | 7.5          | 41.1         | 46.1               | 53.9              | <b>7.8</b>     | 100            | 178            |        |
| Vert.    | 7323.000           | AV       | 35.5              | 36.6               | 9.0          | 41.4         | 39.7               | 53.9              | 14.2           | 100            | 0              |        |
| Vert.    | 9764.000           | AV       | 31.8              | 38.7               | 10.1         | 38.9         | 41.7               | 53.9              | 12.2           | 100            | 0              |        |

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

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

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## Radiated Emission

|                        |                                        |                 |                 |                 |
|------------------------|----------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber             |                 |                 |                 |
| Date                   | July 11, 2013                          | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                        | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                           | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2480 MHz                           |                 |                 |                 |
|                        | Bluetooth, DH5, PRBS9, Antenna: Dipole |                 |                 |                 |

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

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|----------------|--------|
| Hori.    | 216.004            | QP       | 34.3              | 16.6               | 8.0          | 32.0         | 26.9               | 46.0              | 19.1           | 151            | 276            |        |
| Hori.    | 2324.870           | PK       | 48.9              | 27.3               | 14.6         | 41.4         | 49.4               | 73.9              | 24.5           | 100            | 324            |        |
| Hori.    | 2483.500           | PK       | 47.3              | 27.5               | 14.8         | 41.4         | 48.2               | 73.9              | 25.7           | 100            | 2              |        |
| Hori.    | 4960.000           | PK       | 53.1              | 31.6               | 7.5          | 41.0         | 51.2               | 73.9              | 22.7           | 126            | 224            |        |
| Hori.    | 7440.000           | PK       | 46.1              | 36.7               | 9.0          | 41.5         | 50.3               | 73.9              | 23.6           | 100            | 0              |        |
| Hori.    | 9920.000           | PK       | 42.6              | 39.0               | 10.0         | 38.9         | 52.7               | 73.9              | 21.2           | 100            | 0              |        |
| Hori.    | 2324.870           | AV       | 39.8              | 27.3               | 14.6         | 41.4         | 40.3               | 53.9              | 13.6           | 100            | 324            |        |
| Hori.    | 2483.500           | AV       | 36.7              | 27.5               | 14.8         | 41.4         | 37.6               | 53.9              | 16.3           | 100            | 2              |        |
| Hori.    | 4960.000           | AV       | 47.1              | 31.6               | 7.5          | 41.0         | 45.2               | 53.9              | 8.7            | 126            | 224            |        |
| Hori.    | 7440.000           | AV       | 35.4              | 36.7               | 9.0          | 41.5         | 39.6               | 53.9              | 14.3           | 100            | 0              |        |
| Hori.    | 9920.000           | AV       | 32.2              | 39.0               | 10.0         | 38.9         | 42.3               | 53.9              | 11.6           | 100            | 0              |        |
| Vert.    | 30.031             | QP       | 27.0              | 17.9               | 6.4          | 32.2         | 19.1               | 40.0              | 20.9           | 100            | 85             |        |
| Vert.    | 87.773             | QP       | 36.9              | 7.8                | 7.5          | 32.1         | 20.1               | 40.0              | 19.9           | 121            | 285            |        |
| Vert.    | 216.004            | QP       | 32.9              | 16.6               | 8.0          | 32.0         | 25.5               | 46.0              | 20.5           | 100            | 13             |        |
| Vert.    | 2324.870           | PK       | 48.4              | 27.3               | 14.6         | 41.4         | 48.9               | 73.9              | 25.0           | 100            | 127            |        |
| Vert.    | 2483.500           | PK       | 46.7              | 27.5               | 14.8         | 41.4         | 47.6               | 73.9              | 26.3           | 113            | 46             |        |
| Vert.    | 4960.000           | PK       | 54.9              | 31.6               | 7.5          | 41.0         | 53.0               | 73.9              | 20.9           | 100            | 183            |        |
| Vert.    | 7440.000           | PK       | 46.2              | 36.7               | 9.0          | 41.5         | 50.4               | 73.9              | 23.5           | 100            | 0              |        |
| Vert.    | 9920.000           | PK       | 42.7              | 39.0               | 10.0         | 38.9         | 52.8               | 73.9              | 21.1           | 100            | 0              |        |
| Vert.    | 2324.870           | AV       | 39.9              | 27.3               | 14.6         | 41.4         | 40.4               | 53.9              | 13.5           | 100            | 127            |        |
| Vert.    | 2483.500           | AV       | 36.8              | 27.5               | 14.8         | 41.4         | 37.7               | 53.9              | 16.2           | 113            | 46             |        |
| Vert.    | 4960.000           | AV       | 49.7              | 31.6               | 7.5          | 41.0         | 47.8               | 53.9              | <b>6.1</b>     | 100            | 183            |        |
| Vert.    | 7440.000           | AV       | 35.5              | 36.7               | 9.0          | 41.5         | 39.7               | 53.9              | 14.2           | 100            | 0              |        |
| Vert.    | 9920.000           | AV       | 32.2              | 39.0               | 10.0         | 38.9         | 42.3               | 53.9              | 11.6           | 100            | 0              |        |

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

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

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## Radiated Emission

|                        |                                          |                 |                 |                 |
|------------------------|------------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber               |                 |                 |                 |
| Date                   | July 11, 2013                            | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                          | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                             | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2402 MHz                             |                 |                 |                 |
|                        | Bluetooth, 3-DH5, PRBS9, Antenna: Dipole |                 |                 |                 |

(\* 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.    | 216.004         | QP       | 34.7           | 16.6            | 8.0       | 32.0      | 27.3            | 46.0           | 18.7        | 151         | 273         |        |
| Hori.    | 2390.000        | PK       | 45.2           | 27.4            | 14.7      | 41.4      | 45.9            | 73.9           | 28.0        | 100         | 358         |        |
| Hori.    | 2558.994        | PK       | 48.3           | 27.7            | 15.0      | 41.4      | 49.6            | 73.9           | 24.3        | 100         | 34          |        |
| Hori.    | 4804.000        | PK       | 52.6           | 31.1            | 7.5       | 41.2      | 50.0            | 73.9           | 23.9        | 100         | 126         |        |
| Hori.    | 7206.000        | PK       | 46.5           | 36.6            | 9.1       | 41.4      | 50.8            | 73.9           | 23.1        | 100         | 0           |        |
| Hori.    | 9608.000        | PK       | 44.0           | 38.5            | 10.2      | 38.9      | 53.8            | 73.9           | 20.1        | 100         | 0           |        |
| Hori.    | 2390.000        | AV       | 34.5           | 27.4            | 14.7      | 41.4      | 35.2            | 53.9           | 18.7        | 100         | 358         |        |
| Hori.    | 2558.994        | AV       | 37.3           | 27.7            | 15.0      | 41.4      | 38.6            | 53.9           | 15.3        | 100         | 34          |        |
| Hori.    | 4804.000        | AV       | 43.3           | 31.1            | 7.5       | 41.2      | 40.7            | 53.9           | 13.2        | 100         | 126         |        |
| Hori.    | 7206.000        | AV       | 34.4           | 36.6            | 9.1       | 41.4      | 38.7            | 53.9           | 15.2        | 100         | 0           |        |
| Hori.    | 9608.000        | AV       | 31.2           | 38.5            | 10.2      | 38.9      | 41.0            | 53.9           | 12.9        | 100         | 0           |        |
| Vert.    | 30.541          | QP       | 27.5           | 17.8            | 6.4       | 32.2      | 19.5            | 40.0           | 20.5        | 100         | 107         |        |
| Vert.    | 87.828          | QP       | 37.2           | 7.8             | 7.5       | 32.1      | 20.4            | 40.0           | 19.6        | 120         | 279         |        |
| Vert.    | 216.004         | QP       | 33.4           | 16.6            | 8.0       | 32.0      | 26.0            | 46.0           | 20.0        | 100         | 15          |        |
| Vert.    | 2390.000        | PK       | 45.2           | 27.4            | 14.7      | 41.4      | 45.9            | 73.9           | 28.0        | 100         | 93          |        |
| Vert.    | 2558.994        | PK       | 46.4           | 27.7            | 15.0      | 41.4      | 47.7            | 73.9           | 26.2        | 100         | 35          |        |
| Vert.    | 4804.000        | PK       | 53.2           | 31.1            | 7.5       | 41.2      | 50.6            | 73.9           | 23.3        | 100         | 176         |        |
| Vert.    | 7206.000        | PK       | 46.2           | 36.6            | 9.1       | 41.4      | 50.5            | 73.9           | 23.4        | 100         | 0           |        |
| Vert.    | 9608.000        | PK       | 43.1           | 38.5            | 10.2      | 38.9      | 52.9            | 73.9           | 21.0        | 100         | 0           |        |
| Vert.    | 2390.000        | AV       | 34.5           | 27.4            | 14.7      | 41.4      | 35.2            | 53.9           | 18.7        | 100         | 93          |        |
| Vert.    | 2558.994        | AV       | 38.6           | 27.7            | 15.0      | 41.4      | 39.9            | 53.9           | 14.0        | 100         | 35          |        |
| Vert.    | 4804.000        | AV       | 46.2           | 31.1            | 7.5       | 41.2      | 43.6            | 53.9           | <b>10.3</b> | 100         | 176         |        |
| Vert.    | 7206.000        | AV       | 35.4           | 36.6            | 9.1       | 41.4      | 39.7            | 53.9           | 14.2        | 100         | 0           |        |
| Vert.    | 9608.000        | AV       | 31.9           | 38.5            | 10.2      | 38.9      | 41.7            | 53.9           | 12.2        | 100         | 0           |        |

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

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.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg] | Remark  |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|-------------|---------|
| Hori.    | 2402.000        | PK       | 95.6           | 27.4            | 14.7      | 41.4      | 96.3            | -              | -           | 100         | 358         | Carrier |
| Hori.    | 2400.000        | PK       | 45.9           | 27.4            | 14.7      | 41.4      | 46.6            | 76.3           | 29.7        | 100         | 358         |         |
| Vert.    | 2402.000        | PK       | 96.5           | 27.4            | 14.7      | 41.4      | 97.2            | -              | -           | 100         | 93          | Carrier |
| Vert.    | 2400.000        | PK       | 47.2           | 27.4            | 14.7      | 41.4      | 47.9            | 77.2           | 29.3        | 100         | 93          |         |

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

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## Radiated Emission

|                        |                                          |                 |                 |                 |
|------------------------|------------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber               |                 |                 |                 |
| Date                   | July 11, 2013                            | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                          | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                             | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2441 MHz                             |                 |                 |                 |
|                        | Bluetooth, 3-DH5, PRBS9, Antenna: Dipole |                 |                 |                 |

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

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|----------------|--------|
| Hori.    | 216.004            | QP       | 34.9              | 16.6               | 8.0          | 32.0         | 27.5               | 46.0              | 18.5           | 151            | 277            |        |
| Hori.    | 4882.000           | PK       | 53.2              | 31.3               | 7.5          | 41.1         | 50.9               | 73.9              | 23.0           | 100            | 161            |        |
| Hori.    | 7323.000           | PK       | 46.1              | 36.6               | 9.0          | 41.4         | 50.3               | 73.9              | 23.6           | 100            | 0              |        |
| Hori.    | 9764.000           | PK       | 43.7              | 38.7               | 10.1         | 38.9         | 53.6               | 73.9              | 20.3           | 100            | 0              |        |
| Hori.    | 4882.000           | AV       | 44.7              | 31.3               | 7.5          | 41.1         | 42.4               | 53.9              | 11.5           | 100            | 161            |        |
| Hori.    | 7323.000           | AV       | 35.2              | 36.6               | 9.0          | 41.4         | 39.4               | 53.9              | 14.5           | 100            | 0              |        |
| Hori.    | 9764.000           | AV       | 33.0              | 38.7               | 10.1         | 38.9         | 42.9               | 53.9              | 11.0           | 100            | 0              |        |
| Vert.    | 30.146             | QP       | 27.3              | 17.9               | 6.4          | 32.2         | 19.4               | 40.0              | 20.6           | 100            | 133            |        |
| Vert.    | 87.922             | QP       | 37.2              | 7.8                | 7.5          | 32.1         | 20.4               | 40.0              | 19.6           | 120            | 281            |        |
| Vert.    | 216.004            | QP       | 33.6              | 16.6               | 8.0          | 32.0         | 26.2               | 46.0              | 19.8           | 100            | 17             |        |
| Vert.    | 4882.000           | PK       | 54.1              | 31.3               | 7.5          | 41.1         | 51.8               | 73.9              | 22.1           | 100            | 143            |        |
| Vert.    | 7323.000           | PK       | 46.5              | 36.6               | 9.0          | 41.4         | 50.7               | 73.9              | 23.2           | 100            | 0              |        |
| Vert.    | 9764.000           | PK       | 43.5              | 38.7               | 10.1         | 38.9         | 53.4               | 73.9              | 20.5           | 100            | 0              |        |
| Vert.    | 4882.000           | AV       | 45.4              | 31.3               | 7.5          | 41.1         | 43.1               | 53.9              | <b>10.8</b>    | 100            | 143            |        |
| Vert.    | 7323.000           | AV       | 35.7              | 36.6               | 9.0          | 41.4         | 39.9               | 53.9              | 14.0           | 100            | 0              |        |
| Vert.    | 9764.000           | AV       | 32.4              | 38.7               | 10.1         | 38.9         | 42.3               | 53.9              | 11.6           | 100            | 0              |        |

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

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

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## Radiated Emission

|                        |                                          |                 |                 |                 |
|------------------------|------------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber               |                 |                 |                 |
| Date                   | July 11, 2013                            | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                          | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                             | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2480 MHz                             |                 |                 |                 |
|                        | Bluetooth, 3-DH5, PRBS9, Antenna: Dipole |                 |                 |                 |

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

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|----------------|--------|
| Hori.    | 216.004            | QP       | 36.2              | 16.6               | 8.0          | 32.0         | 28.8               | 46.0              | 17.2           | 153            | 272            |        |
| Hori.    | 2483.500           | PK       | 49.2              | 27.5               | 14.8         | 41.4         | 50.1               | 73.9              | 23.8           | 100            | 2              |        |
| Hori.    | 4960.000           | PK       | 54.3              | 31.6               | 7.5          | 41.0         | 52.4               | 73.9              | 21.5           | 100            | 228            |        |
| Hori.    | 7440.000           | PK       | 47.5              | 36.7               | 9.0          | 41.5         | 51.7               | 73.9              | 22.2           | 100            | 0              |        |
| Hori.    | 9920.000           | PK       | 45.0              | 39.0               | 10.0         | 38.9         | 55.1               | 73.9              | 18.8           | 100            | 0              |        |
| Hori.    | 2483.500           | AV       | 37.6              | 27.5               | 14.8         | 41.4         | 38.5               | 53.9              | 15.4           | 100            | 2              |        |
| Hori.    | 4960.000           | AV       | 45.8              | 31.6               | 7.5          | 41.0         | 43.9               | 53.9              | 10.0           | 100            | 228            |        |
| Hori.    | 7440.000           | AV       | 35.2              | 36.7               | 9.0          | 41.5         | 39.4               | 53.9              | 14.5           | 100            | 0              |        |
| Hori.    | 9920.000           | AV       | 33.8              | 39.0               | 10.0         | 38.9         | 43.9               | 53.9              | 10.0           | 100            | 0              |        |
| Vert.    | 31.676             | QP       | 27.6              | 17.3               | 6.5          | 32.2         | 19.2               | 40.0              | 20.8           | 100            | 165            |        |
| Vert.    | 87.927             | QP       | 36.9              | 7.8                | 7.5          | 32.1         | 20.1               | 40.0              | 19.9           | 100            | 245            |        |
| Vert.    | 216.006            | QP       | 34.5              | 16.6               | 8.0          | 32.0         | 27.1               | 46.0              | 18.9           | 100            | 20             |        |
| Vert.    | 2483.500           | PK       | 48.9              | 27.5               | 14.8         | 41.4         | 49.8               | 73.9              | 24.1           | 100            | 161            |        |
| Vert.    | 4960.000           | PK       | 55.6              | 31.6               | 7.5          | 41.0         | 53.7               | 73.9              | 20.2           | 100            | 180            |        |
| Vert.    | 7440.000           | PK       | 47.2              | 36.7               | 9.0          | 41.5         | 51.4               | 73.9              | 22.5           | 100            | 0              |        |
| Vert.    | 9920.000           | PK       | 44.2              | 39.0               | 10.0         | 38.9         | 54.3               | 73.9              | 19.6           | 100            | 0              |        |
| Vert.    | 2483.500           | AV       | 36.8              | 27.5               | 14.8         | 41.4         | 37.7               | 53.9              | 16.2           | 100            | 161            |        |
| Vert.    | 4960.000           | AV       | 47.6              | 31.6               | 7.5          | 41.0         | 45.7               | 53.9              | <b>8.2</b>     | 100            | 180            |        |
| Vert.    | 7440.000           | AV       | 35.4              | 36.7               | 9.0          | 41.5         | 39.6               | 53.9              | 14.3           | 100            | 0              |        |
| Vert.    | 9920.000           | AV       | 33.2              | 39.0               | 10.0         | 38.9         | 43.3               | 53.9              | 10.6           | 100            | 0              |        |

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

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

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## Radiated Emission

|                        |                                      |                 |                 |                 |
|------------------------|--------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber           |                 |                 |                 |
| Date                   | July 11, 2013                        | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                      | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                         | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2402 MHz                         |                 |                 |                 |
|                        | Bluetooth, DH5, PRBS9, Antenna: PIFA |                 |                 |                 |

(\* 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.    | 216.004         | QP       | 35.8           | 16.6            | 8.0       | 32.0      | 28.4            | 46.0           | 17.6        | 150         | 275         |        |
| Hori.    | 2390.000        | PK       | 42.8           | 27.4            | 14.7      | 41.4      | 43.5            | 73.9           | 30.4        | 100         | 128         |        |
| Hori.    | 2558.000        | PK       | 47.9           | 27.7            | 15.0      | 41.4      | 49.2            | 73.9           | 24.7        | 100         | 12          |        |
| Hori.    | 4804.000        | PK       | 52.5           | 31.1            | 7.5       | 41.2      | 49.9            | 73.9           | 24.0        | 100         | 185         |        |
| Hori.    | 2390.000        | AV       | 34.5           | 27.4            | 14.7      | 41.4      | 35.2            | 53.9           | 18.7        | 100         | 128         |        |
| Hori.    | 2558.000        | AV       | 37.0           | 27.7            | 15.0      | 41.4      | 38.3            | 53.9           | 15.6        | 100         | 12          |        |
| Hori.    | 4804.000        | AV       | 46.3           | 31.1            | 7.5       | 41.2      | 43.7            | 53.9           | <b>10.2</b> | 100         | 185         |        |
| Vert.    | 30.550          | QP       | 27.2           | 17.8            | 6.4       | 32.2      | 19.2            | 40.0           | 20.8        | 100         | 111         |        |
| Vert.    | 87.298          | QP       | 36.5           | 7.7             | 7.5       | 32.1      | 19.6            | 40.0           | 20.4        | 116         | 265         |        |
| Vert.    | 216.004         | QP       | 34.9           | 16.6            | 8.0       | 32.0      | 27.5            | 46.0           | 18.5        | 100         | 19          |        |
| Vert.    | 2390.000        | PK       | 43.1           | 27.4            | 14.7      | 41.4      | 43.8            | 73.9           | 30.1        | 100         | 179         |        |
| Vert.    | 2558.000        | PK       | 47.2           | 27.7            | 15.0      | 41.4      | 48.5            | 73.9           | 25.4        | 100         | 23          |        |
| Vert.    | 4804.000        | PK       | 48.9           | 31.1            | 7.5       | 41.2      | 46.3            | 73.9           | 27.6        | 100         | 292         |        |
| Vert.    | 2390.000        | AV       | 34.6           | 27.4            | 14.7      | 41.4      | 35.3            | 53.9           | 18.6        | 100         | 179         |        |
| Vert.    | 2558.000        | AV       | 38.8           | 27.7            | 15.0      | 41.4      | 40.1            | 53.9           | 13.8        | 100         | 23          |        |
| Vert.    | 4804.000        | AV       | 40.0           | 31.1            | 7.5       | 41.2      | 37.4            | 53.9           | 16.5        | 100         | 292         |        |

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

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.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg] | Remark  |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|-------------|---------|
| Hori.    | 2402.000        | PK       | 94.0           | 27.4            | 14.7      | 41.4      | 94.7            | -              | -           | 100         | 128         | Carrier |
| Hori.    | 2400.000        | PK       | 48.0           | 27.4            | 14.7      | 41.4      | 48.7            | 74.7           | 26.0        | 100         | 128         |         |
| Vert.    | 2402.000        | PK       | 95.3           | 27.4            | 14.7      | 41.4      | 96.0            | -              | -           | 100         | 179         | Carrier |
| Vert.    | 2400.000        | PK       | 48.3           | 27.4            | 14.7      | 41.4      | 49.0            | 76.0           | 27.0        | 100         | 179         |         |

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

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## Radiated Emission

|                        |                                      |                 |                 |                 |
|------------------------|--------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber           |                 |                 |                 |
| Date                   | July 11, 2013                        | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                      | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                         | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2441 MHz                         |                 |                 |                 |
|                        | Bluetooth, DH5, PRBS9, Antenna: PIFA |                 |                 |                 |

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

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|----------------|--------|
| Hori.    | 4882.000           | PK       | 52.3              | 31.3               | 7.5          | 41.1         | 50.0               | 73.9              | 23.9           | 100            | 136            |        |
| Hori.    | 4882.000           | AV       | 46.5              | 31.3               | 7.5          | 41.1         | 44.2               | 53.9              | <b>9.7</b>     | 100            | 136            |        |
| Vert.    | 4882.000           | PK       | 49.8              | 31.3               | 7.5          | 41.1         | 47.5               | 73.9              | 26.4           | 100            | 231            |        |
| Vert.    | 4882.000           | AV       | 42.5              | 31.3               | 7.5          | 41.1         | 40.2               | 53.9              | 13.7           | 100            | 231            |        |

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

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

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## Radiated Emission

|                        |                                      |                 |                 |                 |
|------------------------|--------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber           |                 |                 |                 |
| Date                   | July 11, 2013                        | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                      | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                         | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2480 MHz                         |                 |                 |                 |
|                        | Bluetooth, DH5, PRBS9, Antenna: PIFA |                 |                 |                 |

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

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|----------------|--------|
| Hori.    | 2324.870           | PK       | 47.2              | 27.3               | 14.6         | 41.4         | 47.7               | 73.9              | 26.2           | 100            | 134            |        |
| Hori.    | 2483.500           | PK       | 44.2              | 27.5               | 14.8         | 41.4         | 45.1               | 73.9              | 28.8           | 100            | 34             |        |
| Hori.    | 4960.000           | PK       | 52.2              | 31.6               | 7.5          | 41.0         | 50.3               | 73.9              | 23.6           | 100            | 227            |        |
| Hori.    | 2324.870           | AV       | 37.3              | 27.3               | 14.6         | 41.4         | 37.8               | 53.9              | 16.1           | 100            | 134            |        |
| Hori.    | 2483.500           | AV       | 35.4              | 27.5               | 14.8         | 41.4         | 36.3               | 53.9              | 17.6           | 100            | 34             |        |
| Hori.    | 4960.000           | AV       | 45.5              | 31.6               | 7.5          | 41.0         | 43.6               | 53.9              | <b>10.3</b>    | 100            | 227            |        |
| Vert.    | 2324.870           | PK       | 48.7              | 27.3               | 14.6         | 41.4         | 49.2               | 73.9              | 24.7           | 100            | 33             |        |
| Vert.    | 2483.500           | PK       | 45.7              | 27.5               | 14.8         | 41.4         | 46.6               | 73.9              | 27.3           | 100            | 357            |        |
| Vert.    | 4960.000           | PK       | 51.3              | 31.6               | 7.5          | 41.0         | 49.4               | 73.9              | 24.5           | 100            | 34             |        |
| Vert.    | 2324.870           | AV       | 38.6              | 27.3               | 14.6         | 41.4         | 39.1               | 53.9              | 14.8           | 100            | 33             |        |
| Vert.    | 2483.500           | AV       | 36.8              | 27.5               | 14.8         | 41.4         | 37.7               | 53.9              | 16.2           | 100            | 357            |        |
| Vert.    | 4960.000           | AV       | 44.3              | 31.6               | 7.5          | 41.0         | 42.4               | 53.9              | 11.5           | 100            | 34             |        |

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

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

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## Radiated Emission

|                        |                                        |                 |                 |                 |
|------------------------|----------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber             |                 |                 |                 |
| Date                   | July 11, 2013                          | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                        | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                           | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2402 MHz                           |                 |                 |                 |
|                        | Bluetooth, 3-DH5, PRBS9, Antenna: PIFA |                 |                 |                 |

(\* 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       | 42.3           | 27.4            | 14.7      | 41.4      | 43.0            | 73.9           | 30.9        | 100         | 41          |        |
| Hori.    | 2558.000        | PK       | 45.2           | 27.7            | 15.0      | 41.4      | 46.5            | 73.9           | 27.4        | 100         | 23          |        |
| Hori.    | 4804.000        | PK       | 51.9           | 31.1            | 7.5       | 41.2      | 49.3            | 73.9           | 24.6        | 100         | 178         |        |
| Hori.    | 2390.000        | AV       | 34.5           | 27.4            | 14.7      | 41.4      | 35.2            | 53.9           | 18.7        | 100         | 41          |        |
| Hori.    | 2558.000        | AV       | 36.1           | 27.7            | 15.0      | 41.4      | 37.4            | 53.9           | 16.5        | 100         | 23          |        |
| Hori.    | 4804.000        | AV       | 44.3           | 31.1            | 7.5       | 41.2      | 41.7            | 53.9           | 12.2        | 100         | 178         |        |
| Vert.    | 2390.000        | PK       | 44.5           | 27.4            | 14.7      | 41.4      | 45.2            | 73.9           | 28.7        | 100         | 203         |        |
| Vert.    | 2558.000        | PK       | 47.0           | 27.7            | 15.0      | 41.4      | 48.3            | 73.9           | 25.6        | 100         | 43          |        |
| Vert.    | 4804.000        | PK       | 49.4           | 31.1            | 7.5       | 41.2      | 46.8            | 73.9           | 27.1        | 100         | 162         |        |
| Vert.    | 2390.000        | AV       | 34.5           | 27.4            | 14.7      | 41.4      | 35.2            | 53.9           | 18.7        | 100         | 203         |        |
| Vert.    | 2558.000        | AV       | 37.7           | 27.7            | 15.0      | 41.4      | 39.0            | 53.9           | 14.9        | 100         | 43          |        |
| Vert.    | 4804.000        | AV       | 39.4           | 31.1            | 7.5       | 41.2      | 36.8            | 53.9           | 17.1        | 100         | 162         |        |

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

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.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg] | Remark  |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|-------------|---------|
| Hori.    | 2402.000        | PK       | 94.1           | 27.4            | 14.7      | 41.4      | 94.8            | -              | -           | 100         | 41          | Carrier |
| Hori.    | 2400.000        | PK       | 45.3           | 27.4            | 14.7      | 41.4      | 46.0            | 74.8           | 28.8        | 100         | 41          |         |
| Vert.    | 2402.000        | PK       | 94.5           | 27.4            | 14.7      | 41.4      | 95.2            | -              | -           | 100         | 203         | Carrier |
| Vert.    | 2400.000        | PK       | 46.2           | 27.4            | 14.7      | 41.4      | 46.9            | 75.2           | 28.3        | 100         | 203         |         |

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

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## Radiated Emission

|                        |                                        |                 |                 |                 |
|------------------------|----------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber             |                 |                 |                 |
| Date                   | July 11, 2013                          | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                        | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                           | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2441 MHz                           |                 |                 |                 |
|                        | Bluetooth, 3-DH5, PRBS9, Antenna: PIFA |                 |                 |                 |

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

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|----------------|--------|
| Hori.    | 4882.000           | PK       | 52.2              | 31.3               | 7.5          | 41.1         | 49.9               | 73.9              | 24.0           | 100            | 214            |        |
| Hori.    | 4882.000           | AV       | 44.5              | 31.3               | 7.5          | 41.1         | 42.2               | 53.9              | 11.7           | 100            | 214            |        |
| Vert.    | 4882.000           | PK       | 49.8              | 31.3               | 7.5          | 41.1         | 47.5               | 73.9              | 26.4           | 100            | 348            |        |
| Vert.    | 4882.000           | AV       | 41.0              | 31.3               | 7.5          | 41.1         | 38.7               | 53.9              | 15.2           | 100            | 348            |        |

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

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

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## Radiated Emission

|                        |                                        |                 |                 |                 |
|------------------------|----------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber             |                 |                 |                 |
| Date                   | July 11, 2013                          | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                        | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                           | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2480 MHz                           |                 |                 |                 |
|                        | Bluetooth, 3-DH5, PRBS9, Antenna: PIFA |                 |                 |                 |

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

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|----------------|--------|
| Hori.    | 2324.870           | PK       | 48.0              | 27.3               | 14.6         | 41.4         | 48.5               | 73.9              | 25.4           | 100            | 121            |        |
| Hori.    | 2483.500           | PK       | 45.2              | 27.5               | 14.8         | 41.4         | 46.1               | 73.9              | 27.8           | 100            | 21             |        |
| Hori.    | 4960.000           | PK       | 52.1              | 31.6               | 7.5          | 41.0         | 50.2               | 73.9              | 23.7           | 100            | 321            |        |
| Hori.    | 2324.870           | AV       | 37.2              | 27.3               | 14.6         | 41.4         | 37.7               | 53.9              | 16.2           | 100            | 121            |        |
| Hori.    | 2483.500           | AV       | 34.9              | 27.5               | 14.8         | 41.4         | 35.8               | 53.9              | 18.1           | 100            | 21             |        |
| Hori.    | 4960.000           | AV       | 45.2              | 31.6               | 7.5          | 41.0         | 43.3               | 53.9              | <b>10.6</b>    | 100            | 321            |        |
| Vert.    | 2324.870           | PK       | 49.2              | 27.3               | 14.6         | 41.4         | 49.7               | 73.9              | 24.2           | 100            | 45             |        |
| Vert.    | 2483.500           | PK       | 46.0              | 27.5               | 14.8         | 41.4         | 46.9               | 73.9              | 27.0           | 100            | 53             |        |
| Vert.    | 4960.000           | PK       | 52.5              | 31.6               | 7.5          | 41.0         | 50.6               | 73.9              | 23.3           | 100            | 209            |        |
| Vert.    | 2324.870           | AV       | 38.9              | 27.3               | 14.6         | 41.4         | 39.4               | 53.9              | 14.5           | 100            | 45             |        |
| Vert.    | 2483.500           | AV       | 37.3              | 27.5               | 14.8         | 41.4         | 38.2               | 53.9              | 15.7           | 100            | 53             |        |
| Vert.    | 4960.000           | AV       | 44.2              | 31.6               | 7.5          | 41.0         | 42.3               | 53.9              | 11.6           | 100            | 209            |        |

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

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

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## Radiated Emission

|                        |                                      |                 |                 |                 |
|------------------------|--------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber           |                 |                 |                 |
| Date                   | July 11, 2013                        | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                      | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                         | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2402 MHz                         |                 |                 |                 |
|                        | Bluetooth, DH5, PRBS9, Antenna: Chip |                 |                 |                 |

(\* 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.    | 216.004         | QP       | 37.2           | 16.6            | 8.0       | 32.0      | 29.8            | 46.0           | 16.2        | 150         | 342         |        |
| Hori.    | 2390.000        | PK       | 44.2           | 27.4            | 14.7      | 41.4      | 44.9            | 73.9           | 29.0        | 100         | 243         |        |
| Hori.    | 2558.000        | PK       | 47.6           | 27.7            | 15.0      | 41.4      | 48.9            | 73.9           | 25.0        | 100         | 187         |        |
| Hori.    | 4804.000        | PK       | 53.4           | 31.1            | 7.5       | 41.2      | 50.8            | 73.9           | 23.1        | 100         | 142         |        |
| Hori.    | 2390.000        | AV       | 34.6           | 27.4            | 14.7      | 41.4      | 35.3            | 53.9           | 18.6        | 100         | 243         |        |
| Hori.    | 2558.000        | AV       | 40.3           | 27.7            | 15.0      | 41.4      | 41.6            | 53.9           | 12.3        | 100         | 187         |        |
| Hori.    | 4804.000        | AV       | 46.5           | 31.1            | 7.5       | 41.2      | 43.9            | 53.9           | 10.0        | 100         | 142         |        |
| Vert.    | 31.606          | QP       | 27.7           | 17.4            | 6.5       | 32.2      | 19.4            | 40.0           | 20.6        | 100         | 153         |        |
| Vert.    | 87.555          | QP       | 36.9           | 7.8             | 7.5       | 32.1      | 20.1            | 40.0           | 19.9        | 115         | 259         |        |
| Vert.    | 216.004         | QP       | 33.5           | 16.6            | 8.0       | 32.0      | 26.1            | 46.0           | 19.9        | 100         | 14          |        |
| Vert.    | 2390.000        | PK       | 44.2           | 27.4            | 14.7      | 41.4      | 44.9            | 73.9           | 29.0        | 100         | 234         |        |
| Vert.    | 2558.000        | PK       | 47.3           | 27.7            | 15.0      | 41.4      | 48.6            | 73.9           | 25.3        | 100         | 354         |        |
| Vert.    | 4804.000        | PK       | 53.8           | 31.1            | 7.5       | 41.2      | 51.2            | 73.9           | 22.7        | 100         | 164         |        |
| Vert.    | 2390.000        | AV       | 34.6           | 27.4            | 14.7      | 41.4      | 35.3            | 53.9           | 18.6        | 100         | 234         |        |
| Vert.    | 2558.000        | AV       | 39.1           | 27.7            | 15.0      | 41.4      | 40.4            | 53.9           | 13.5        | 100         | 354         |        |
| Vert.    | 4804.000        | AV       | 47.7           | 31.1            | 7.5       | 41.2      | 45.1            | 53.9           | <b>8.8</b>  | 100         | 164         |        |

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

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.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg] | Remark  |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|-------------|---------|
| Hori.    | 2402.000        | PK       | 93.7           | 27.4            | 14.7      | 41.4      | 94.4            | -              | -           | 100         | 243         | Carrier |
| Hori.    | 2400.000        | PK       | 48.0           | 27.4            | 14.7      | 41.4      | 48.7            | 74.4           | 25.7        | 100         | 243         |         |
| Vert.    | 2402.000        | PK       | 95.4           | 27.4            | 14.7      | 41.4      | 96.1            | -              | -           | 100         | 234         | Carrier |
| Vert.    | 2400.000        | PK       | 48.7           | 27.4            | 14.7      | 41.4      | 49.4            | 76.1           | 26.7        | 100         | 234         |         |

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

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## Radiated Emission

|                        |                                      |                 |                 |                 |
|------------------------|--------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber           |                 |                 |                 |
| Date                   | July 11, 2013                        | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                      | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                         | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2441 MHz                         |                 |                 |                 |
|                        | Bluetooth, DH5, PRBS9, Antenna: Chip |                 |                 |                 |

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

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|----------------|--------|
| Hori.    | 4882.000           | PK       | 52.8              | 31.3               | 7.5          | 41.1         | 50.5               | 73.9              | 23.4           | 100            | 167            |        |
| Hori.    | 4882.000           | AV       | 45.9              | 31.3               | 7.5          | 41.1         | 43.6               | 53.9              | 10.3           | 100            | 167            |        |
| Vert.    | 4882.000           | PK       | 55.3              | 31.3               | 7.5          | 41.1         | 53.0               | 73.9              | 20.9           | 100            | 222            |        |
| Vert.    | 4882.000           | AV       | 49.3              | 31.3               | 7.5          | 41.1         | 47.0               | 53.9              | <b>6.9</b>     | 100            | 222            |        |

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

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

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## Radiated Emission

|                        |                                      |                 |                 |                 |
|------------------------|--------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber           |                 |                 |                 |
| Date                   | July 11, 2013                        | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                      | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                         | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2480 MHz                         |                 |                 |                 |
|                        | Bluetooth, DH5, PRBS9, Antenna: Chip |                 |                 |                 |

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

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|----------------|--------|
| Hori.    | 2324.870           | PK       | 47.8              | 27.3               | 14.6         | 41.4         | 48.3               | 73.9              | 25.6           | 100            | 53             |        |
| Hori.    | 2483.500           | PK       | 45.7              | 27.5               | 14.8         | 41.4         | 46.6               | 73.9              | 27.3           | 100            | 60             |        |
| Hori.    | 4960.000           | PK       | 52.3              | 31.6               | 7.5          | 41.0         | 50.4               | 73.9              | 23.5           | 100            | 224            |        |
| Hori.    | 2324.870           | AV       | 39.7              | 27.3               | 14.6         | 41.4         | 40.2               | 53.9              | 13.7           | 100            | 53             |        |
| Hori.    | 2483.500           | AV       | 36.5              | 27.5               | 14.8         | 41.4         | 37.4               | 53.9              | 16.5           | 100            | 60             |        |
| Hori.    | 4960.000           | AV       | 45.7              | 31.6               | 7.5          | 41.0         | 43.8               | 53.9              | 10.1           | 100            | 224            |        |
| Vert.    | 2324.870           | PK       | 47.5              | 27.3               | 14.6         | 41.4         | 48.0               | 73.9              | 25.9           | 100            | 204            |        |
| Vert.    | 2483.500           | PK       | 46.9              | 27.5               | 14.8         | 41.4         | 47.8               | 73.9              | 26.1           | 100            | 181            |        |
| Vert.    | 4960.000           | PK       | 51.6              | 31.6               | 7.5          | 41.0         | 49.7               | 73.9              | 24.2           | 100            | 161            |        |
| Vert.    | 2324.870           | AV       | 39.2              | 27.3               | 14.6         | 41.4         | 39.7               | 53.9              | 14.2           | 100            | 204            |        |
| Vert.    | 2483.500           | AV       | 36.6              | 27.5               | 14.8         | 41.4         | 37.5               | 53.9              | 16.4           | 100            | 181            |        |
| Vert.    | 4960.000           | AV       | 46.6              | 31.6               | 7.5          | 41.0         | 44.7               | 53.9              | <b>9.2</b>     | 100            | 161            |        |

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

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

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## Radiated Emission

|                        |                                        |                 |                 |                 |
|------------------------|----------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber             |                 |                 |                 |
| Date                   | July 11, 2013                          | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                        | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                           | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2402 MHz                           |                 |                 |                 |
|                        | Bluetooth, 3-DH5, PRBS9, Antenna: Chip |                 |                 |                 |

(\* 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       | 44.6           | 27.4            | 14.7      | 41.4      | 45.3            | 73.9           | 28.6        | 100         | 72          |        |
| Hori.    | 2558.000        | PK       | 47.2           | 27.7            | 15.0      | 41.4      | 48.5            | 73.9           | 25.4        | 100         | 61          |        |
| Hori.    | 4804.000        | PK       | 52.5           | 31.1            | 7.5       | 41.2      | 49.9            | 73.9           | 24.0        | 100         | 124         |        |
| Hori.    | 2390.000        | AV       | 34.5           | 27.4            | 14.7      | 41.4      | 35.2            | 53.9           | 18.7        | 100         | 72          |        |
| Hori.    | 2558.000        | AV       | 39.2           | 27.7            | 15.0      | 41.4      | 40.5            | 53.9           | 13.4        | 100         | 61          |        |
| Hori.    | 4804.000        | AV       | 43.5           | 31.1            | 7.5       | 41.2      | 40.9            | 53.9           | 13.0        | 100         | 124         |        |
| Vert.    | 2390.000        | PK       | 44.3           | 27.4            | 14.7      | 41.4      | 45.0            | 73.9           | 28.9        | 100         | 357         |        |
| Vert.    | 2558.000        | PK       | 47.7           | 27.7            | 15.0      | 41.4      | 49.0            | 73.9           | 24.9        | 100         | 351         |        |
| Vert.    | 4804.000        | PK       | 53.1           | 31.1            | 7.5       | 41.2      | 50.5            | 73.9           | 23.4        | 100         | 179         |        |
| Vert.    | 2390.000        | AV       | 34.5           | 27.4            | 14.7      | 41.4      | 35.2            | 53.9           | 18.7        | 100         | 357         |        |
| Vert.    | 2558.000        | AV       | 38.4           | 27.7            | 15.0      | 41.4      | 39.7            | 53.9           | 14.2        | 100         | 351         |        |
| Vert.    | 4804.000        | AV       | 44.2           | 31.1            | 7.5       | 41.2      | 41.6            | 53.9           | 12.3        | 100         | 179         |        |

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

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.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg] | Remark  |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|-------------|---------|
| Hori.    | 2402.000        | PK       | 93.9           | 27.4            | 14.7      | 41.4      | 94.6            | -              | -           | 100         | 72          | Carrier |
| Hori.    | 2400.000        | PK       | 44.3           | 27.4            | 14.7      | 41.4      | 45.0            | 74.6           | 29.6        | 100         | 72          |         |
| Vert.    | 2402.000        | PK       | 93.6           | 27.4            | 14.7      | 41.4      | 94.3            | -              | -           | 100         | 357         | Carrier |
| Vert.    | 2400.000        | PK       | 44.4           | 27.4            | 14.7      | 41.4      | 45.1            | 74.3           | 29.2        | 100         | 357         |         |

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

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## Radiated Emission

|                        |                                        |                 |                 |                 |
|------------------------|----------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber             |                 |                 |                 |
| Date                   | July 11, 2013                          | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                        | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                           | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2441 MHz                           |                 |                 |                 |
|                        | Bluetooth, 3-DH5, PRBS9, Antenna: Chip |                 |                 |                 |

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

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|----------------|--------|
| Hori.    | 4882.000           | PK       | 54.2              | 31.3               | 7.5          | 41.1         | 51.9               | 73.9              | 22.0           | 100            | 154            |        |
| Hori.    | 4882.000           | AV       | 46.6              | 31.3               | 7.5          | 41.1         | 44.3               | 53.9              | 9.6            | 100            | 154            |        |
| Vert.    | 4882.000           | PK       | 55.2              | 31.3               | 7.5          | 41.1         | 52.9               | 73.9              | 21.0           | 100            | 170            |        |
| Vert.    | 4882.000           | AV       | 48.3              | 31.3               | 7.5          | 41.1         | 46.0               | 53.9              | 7.9            | 100            | 170            |        |

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

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

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## Radiated Emission

|                        |                                        |                 |                 |                 |
|------------------------|----------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber             |                 |                 |                 |
| Date                   | July 11, 2013                          | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                        | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                           | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2480 MHz                           |                 |                 |                 |
|                        | Bluetooth, 3-DH5, PRBS9, Antenna: Chip |                 |                 |                 |

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

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|----------------|--------|
| Hori.    | 2324.870           | PK       | 47.5              | 27.3               | 14.6         | 41.4         | 48.0               | 73.9              | 25.9           | 100            | 67             |        |
| Hori.    | 2483.500           | PK       | 48.3              | 27.5               | 14.8         | 41.4         | 49.2               | 73.9              | 24.7           | 100            | 66             |        |
| Hori.    | 4960.000           | PK       | 51.0              | 31.6               | 7.5          | 41.0         | 49.1               | 73.9              | 24.8           | 100            | 187            |        |
| Hori.    | 2324.870           | AV       | 39.3              | 27.3               | 14.6         | 41.4         | 39.8               | 53.9              | 14.1           | 100            | 67             |        |
| Hori.    | 2483.500           | AV       | 36.3              | 27.5               | 14.8         | 41.4         | 37.2               | 53.9              | 16.7           | 100            | 66             |        |
| Hori.    | 4960.000           | AV       | 44.1              | 31.6               | 7.5          | 41.0         | 42.2               | 53.9              | 11.7           | 100            | 187            |        |
| Vert.    | 2324.870           | PK       | 47.1              | 27.3               | 14.6         | 41.4         | 47.6               | 73.9              | 26.3           | 100            | 357            |        |
| Vert.    | 2483.500           | PK       | 48.9              | 27.5               | 14.8         | 41.4         | 49.8               | 73.9              | 24.1           | 100            | 185            |        |
| Vert.    | 4960.000           | PK       | 48.7              | 31.6               | 7.5          | 41.0         | 46.8               | 73.9              | 27.1           | 100            | 158            |        |
| Vert.    | 2324.870           | AV       | 36.8              | 27.3               | 14.6         | 41.4         | 37.3               | 53.9              | 16.6           | 100            | 357            |        |
| Vert.    | 2483.500           | AV       | 37.0              | 27.5               | 14.8         | 41.4         | 37.9               | 53.9              | 16.0           | 100            | 185            |        |
| Vert.    | 4960.000           | AV       | 46.7              | 31.6               | 7.5          | 41.0         | 44.8               | 53.9              | <b>9.1</b>     | 100            | 158            |        |

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

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

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## Radiated Emission

|                        |                                          |                 |                 |                 |
|------------------------|------------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber               |                 |                 |                 |
| Date                   | July 11, 2013                            | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                          | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                             | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2402 MHz                             |                 |                 |                 |
|                        | Bluetooth, DH5, PRBS9, Antenna: Internal |                 |                 |                 |

(\* 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.    | 216.004         | QP       | 36.9           | 16.6            | 8.0       | 32.0      | 29.5            | 46.0           | 16.5        | 148         | 271         |        |
| Hori.    | 2390.000        | PK       | 44.5           | 27.4            | 14.7      | 41.4      | 45.2            | 73.9           | 28.7        | 100         | 66          |        |
| Hori.    | 2558.000        | PK       | 47.1           | 27.7            | 15.0      | 41.4      | 48.4            | 73.9           | 25.5        | 100         | 61          |        |
| Hori.    | 4804.000        | PK       | 52.2           | 31.1            | 7.5       | 41.2      | 49.6            | 73.9           | 24.3        | 100         | 143         |        |
| Hori.    | 2390.000        | AV       | 34.4           | 27.4            | 14.7      | 41.4      | 35.1            | 53.9           | 18.8        | 100         | 66          |        |
| Hori.    | 2558.000        | AV       | 40.2           | 27.7            | 15.0      | 41.4      | 41.5            | 53.9           | 12.4        | 100         | 61          |        |
| Hori.    | 4804.000        | AV       | 44.5           | 31.1            | 7.5       | 41.2      | 41.9            | 53.9           | 12.0        | 100         | 143         |        |
| Vert.    | 30.041          | QP       | 26.8           | 17.9            | 6.4       | 32.2      | 18.9            | 40.0           | 21.1        | 100         | 114         |        |
| Vert.    | 86.711          | QP       | 36.5           | 7.6             | 7.5       | 32.1      | 19.5            | 40.0           | 20.5        | 112         | 287         |        |
| Vert.    | 216.004         | QP       | 35.3           | 16.6            | 8.0       | 32.0      | 27.9            | 46.0           | 18.1        | 100         | 15          |        |
| Vert.    | 2390.000        | PK       | 44.2           | 27.4            | 14.7      | 41.4      | 44.9            | 73.9           | 29.0        | 100         | 22          |        |
| Vert.    | 2558.000        | PK       | 47.4           | 27.7            | 15.0      | 41.4      | 48.7            | 73.9           | 25.2        | 100         | 343         |        |
| Vert.    | 4804.000        | PK       | 52.1           | 31.1            | 7.5       | 41.2      | 49.5            | 73.9           | 24.4        | 100         | 146         |        |
| Vert.    | 2390.000        | AV       | 34.2           | 27.4            | 14.7      | 41.4      | 34.9            | 53.9           | 19.0        | 100         | 22          |        |
| Vert.    | 2558.000        | AV       | 38.3           | 27.7            | 15.0      | 41.4      | 39.6            | 53.9           | 14.3        | 100         | 343         |        |
| Vert.    | 4804.000        | AV       | 45.3           | 31.1            | 7.5       | 41.2      | 42.7            | 53.9           | 11.2        | 100         | 146         |        |

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

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.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg] | Remark  |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|-------------|---------|
| Hori.    | 2402.000        | PK       | 93.4           | 27.4            | 14.7      | 41.4      | 94.1            | -              | -           | 100         | 66          | Carrier |
| Hori.    | 2400.000        | PK       | 45.3           | 27.4            | 14.7      | 41.4      | 46.0            | 74.1           | 28.1        | 100         | 66          |         |
| Vert.    | 2402.000        | PK       | 92.2           | 27.4            | 14.7      | 41.4      | 92.9            | -              | -           | 100         | 22          | Carrier |
| Vert.    | 2400.000        | PK       | 41.2           | 27.4            | 14.7      | 41.4      | 41.9            | 72.9           | 31.0        | 100         | 22          |         |

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

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## Radiated Emission

|                        |                                          |                 |                 |                 |
|------------------------|------------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber               |                 |                 |                 |
| Date                   | July 11, 2013                            | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                          | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                             | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2441 MHz                             |                 |                 |                 |
|                        | Bluetooth, DH5, PRBS9, Antenna: Internal |                 |                 |                 |

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

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|----------------|--------|
| Hori.    | 4882.000           | PK       | 52.3              | 31.3               | 7.5          | 41.1         | 50.0               | 73.9              | 23.9           | 100            | 247            |        |
| Hori.    | 4882.000           | AV       | 47.6              | 31.3               | 7.5          | 41.1         | 45.3               | 53.9              | 8.6            | 100            | 247            |        |
| Vert.    | 4882.000           | PK       | 52.1              | 31.3               | 7.5          | 41.1         | 49.8               | 73.9              | 24.1           | 100            | 134            |        |
| Vert.    | 4882.000           | AV       | 47.8              | 31.3               | 7.5          | 41.1         | 45.5               | 53.9              | 8.4            | 100            | 134            |        |

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

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

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## Radiated Emission

|                        |                                          |                 |                 |                 |
|------------------------|------------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber               |                 |                 |                 |
| Date                   | July 11, 2013                            | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                          | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                             | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2480 MHz                             |                 |                 |                 |
|                        | Bluetooth, DH5, PRBS9, Antenna: Internal |                 |                 |                 |

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

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|----------------|--------|
| Hori.    | 2324.870           | PK       | 46.5              | 27.3               | 14.6         | 41.4         | 47.0               | 73.9              | 26.9           | 100            | 25             |        |
| Hori.    | 2483.500           | PK       | 45.6              | 27.5               | 14.8         | 41.4         | 46.5               | 73.9              | 27.4           | 100            | 50             |        |
| Hori.    | 4960.000           | PK       | 52.5              | 31.6               | 7.5          | 41.0         | 50.6               | 73.9              | 23.3           | 100            | 243            |        |
| Hori.    | 2324.870           | AV       | 37.2              | 27.3               | 14.6         | 41.4         | 37.7               | 53.9              | 16.2           | 100            | 25             |        |
| Hori.    | 2483.500           | AV       | 35.4              | 27.5               | 14.8         | 41.4         | 36.3               | 53.9              | 17.6           | 100            | 50             |        |
| Hori.    | 4960.000           | AV       | 47.2              | 31.6               | 7.5          | 41.0         | 45.3               | 53.9              | 8.6            | 100            | 243            |        |
| Vert.    | 2324.870           | PK       | 47.2              | 27.3               | 14.6         | 41.4         | 47.7               | 73.9              | 26.2           | 100            | 256            |        |
| Vert.    | 2483.500           | PK       | 44.9              | 27.5               | 14.8         | 41.4         | 45.8               | 73.9              | 28.1           | 100            | 33             |        |
| Vert.    | 4960.000           | PK       | 53.2              | 31.6               | 7.5          | 41.0         | 51.3               | 73.9              | 22.6           | 100            | 165            |        |
| Vert.    | 2324.870           | AV       | 36.5              | 27.3               | 14.6         | 41.4         | 37.0               | 53.9              | 16.9           | 100            | 256            |        |
| Vert.    | 2483.500           | AV       | 35.4              | 27.5               | 14.8         | 41.4         | 36.3               | 53.9              | 17.6           | 100            | 33             |        |
| Vert.    | 4960.000           | AV       | 47.8              | 31.6               | 7.5          | 41.0         | 45.9               | 53.9              | <b>8.0</b>     | 100            | 165            |        |

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

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

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## Radiated Emission

|                        |                                            |                 |                 |                 |
|------------------------|--------------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber                 |                 |                 |                 |
| Date                   | July 11, 2013                              | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                            | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                               | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2402 MHz                               |                 |                 |                 |
|                        | Bluetooth, 3-DH5, PRBS9, Antenna: Internal |                 |                 |                 |

(\* 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       | 44.2           | 27.4            | 14.7      | 41.4      | 44.9            | 73.9           | 29.0        | 100         | 52          |        |
| Hori.    | 2558.000        | PK       | 47.7           | 27.7            | 15.0      | 41.4      | 49.0            | 73.9           | 24.9        | 100         | 76          |        |
| Hori.    | 4804.000        | PK       | 51.2           | 31.1            | 7.5       | 41.2      | 48.6            | 73.9           | 25.3        | 100         | 213         |        |
| Hori.    | 2390.000        | AV       | 34.7           | 27.4            | 14.7      | 41.4      | 35.4            | 53.9           | 18.5        | 100         | 52          |        |
| Hori.    | 2558.000        | AV       | 40.4           | 27.7            | 15.0      | 41.4      | 41.7            | 53.9           | 12.2        | 100         | 76          |        |
| Hori.    | 4804.000        | AV       | 43.5           | 31.1            | 7.5       | 41.2      | 40.9            | 53.9           | 13.0        | 100         | 213         |        |
| Vert.    | 2390.000        | PK       | 44.6           | 27.4            | 14.7      | 41.4      | 45.3            | 73.9           | 28.6        | 100         | 98          |        |
| Vert.    | 2558.000        | PK       | 47.6           | 27.7            | 15.0      | 41.4      | 48.9            | 73.9           | 25.0        | 100         | 332         |        |
| Vert.    | 4804.000        | PK       | 52.1           | 31.1            | 7.5       | 41.2      | 49.5            | 73.9           | 24.4        | 100         | 165         |        |
| Vert.    | 2390.000        | AV       | 34.9           | 27.4            | 14.7      | 41.4      | 35.6            | 53.9           | 18.3        | 100         | 98          |        |
| Vert.    | 2558.000        | AV       | 38.6           | 27.7            | 15.0      | 41.4      | 39.9            | 53.9           | 14.0        | 100         | 332         |        |
| Vert.    | 4804.000        | AV       | 43.9           | 31.1            | 7.5       | 41.2      | 41.3            | 53.9           | 12.6        | 100         | 165         |        |

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

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.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg] | Remark  |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|-------------|---------|
| Hori.    | 2402.000        | PK       | 92.4           | 27.4            | 14.7      | 41.4      | 93.1            | -              | -           | 100         | 52          | Carrier |
| Hori.    | 2400.000        | PK       | 43.6           | 27.4            | 14.7      | 41.4      | 44.3            | 73.1           | 28.8        | 100         | 52          |         |
| Vert.    | 2402.000        | PK       | 91.4           | 27.4            | 14.7      | 41.4      | 92.1            | -              | -           | 100         | 98          | Carrier |
| Vert.    | 2400.000        | PK       | 42.9           | 27.4            | 14.7      | 41.4      | 43.6            | 72.1           | 28.5        | 100         | 98          |         |

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

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## Radiated Emission

|                        |                                            |                 |                 |                 |
|------------------------|--------------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber                 |                 |                 |                 |
| Date                   | July 11, 2013                              | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                            | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                               | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2441 MHz                               |                 |                 |                 |
|                        | Bluetooth, 3-DH5, PRBS9, Antenna: Internal |                 |                 |                 |

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

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|----------------|--------|
| Hori.    | 4882.000           | PK       | 52.1              | 31.3               | 7.5          | 41.1         | 49.8               | 73.9              | 24.1           | 100            | 226            |        |
| Hori.    | 4882.000           | AV       | 47.3              | 31.3               | 7.5          | 41.1         | 45.0               | 53.9              | 8.9            | 100            | 226            |        |
| Vert.    | 4882.000           | PK       | 52.4              | 31.3               | 7.5          | 41.1         | 50.1               | 73.9              | 23.8           | 100            | 146            |        |
| Vert.    | 4882.000           | AV       | 47.4              | 31.3               | 7.5          | 41.1         | 45.1               | 53.9              | <b>8.8</b>     | 100            | 146            |        |

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

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

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## Radiated Emission

|                        |                                            |                 |                 |                 |
|------------------------|--------------------------------------------|-----------------|-----------------|-----------------|
| Test place             | No.3 Semi Anechoic Chamber                 |                 |                 |                 |
| Date                   | July 11, 2013                              | July 12, 2013   | July 14, 2013   | July 15, 2013   |
| Temperature / Humidity | 25deg.C / 53%RH                            | 24deg.C / 68%RH | 24deg.C / 43%RH | 25deg.C / 59%RH |
| Engineer               | Tatsuya Arai                               | Tatsuya Arai    | Tadaomi Yamano  | Kenichi Adachi  |
| Mode                   | Tx, 2480 MHz                               |                 |                 |                 |
|                        | Bluetooth, 3-DH5, PRBS9, Antenna: Internal |                 |                 |                 |

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

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|--------------------|-------------------|----------------|----------------|----------------|--------|
| Hori.    | 2324.870           | PK       | 46.2              | 27.3               | 14.6         | 41.4         | 46.7               | 73.9              | 27.2           | 100            | 44             |        |
| Hori.    | 2483.500           | PK       | 45.2              | 27.5               | 14.8         | 41.4         | 46.1               | 73.9              | 27.8           | 100            | 58             |        |
| Hori.    | 4960.000           | PK       | 51.7              | 31.6               | 7.5          | 41.0         | 49.8               | 73.9              | 24.1           | 100            | 222            |        |
| Hori.    | 2324.870           | AV       | 37.0              | 27.3               | 14.6         | 41.4         | 37.5               | 53.9              | 16.4           | 100            | 44             |        |
| Hori.    | 2483.500           | AV       | 35.8              | 27.5               | 14.8         | 41.4         | 36.7               | 53.9              | 17.2           | 100            | 58             |        |
| Hori.    | 4960.000           | AV       | 46.5              | 31.6               | 7.5          | 41.0         | 44.6               | 53.9              | 9.3            | 100            | 222            |        |
| Vert.    | 2324.870           | PK       | 47.1              | 27.3               | 14.6         | 41.4         | 47.6               | 73.9              | 26.3           | 100            | 212            |        |
| Vert.    | 2483.500           | PK       | 43.9              | 27.5               | 14.8         | 41.4         | 44.8               | 73.9              | 29.1           | 100            | 69             |        |
| Vert.    | 4960.000           | PK       | 52.4              | 31.6               | 7.5          | 41.0         | 50.5               | 73.9              | 23.4           | 100            | 143            |        |
| Vert.    | 2324.870           | AV       | 36.0              | 27.3               | 14.6         | 41.4         | 36.5               | 53.9              | 17.4           | 100            | 212            |        |
| Vert.    | 2483.500           | AV       | 34.7              | 27.5               | 14.8         | 41.4         | 35.6               | 53.9              | 18.3           | 100            | 69             |        |
| Vert.    | 4960.000           | AV       | 47.0              | 31.6               | 7.5          | 41.0         | 45.1               | 53.9              | <b>8.8</b>     | 100            | 143            |        |

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

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

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## Dwell time factor Calculation chart

### Dwell time factor Calculation

**Tx, Bluetooth, BDR, PRBS9**

| Tx, Bluetooth, BDR, PRBS9                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |             |            |        |           |    |     |      |             |            |    |     |      |          |          |
|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------|------------|--------|-----------|----|-----|------|-------------|------------|----|-----|------|----------|----------|
| Worst 100ms<br>Dwell time factor = $20\log((2.901 \times 2)/100) = -24.73\text{dB}$                                                  | 1cycle On time :<br>2.901ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |             |            |        |           |    |     |      |             |            |    |     |      |          |          |
| <div>1x2_duty2</div> <p>ON time of some channel during 100ms: Twice<br/>This is the worst case in hopping sequence of Bluetooth.</p> | <div>1x2_Dwell32</div> <div><div>Agilent</div><div>R L</div><div><div>Ref 0 dBm</div><div>#Atten 10 dB</div><div>#Peak</div><div>Log</div><div>10</div><div>dB/</div></div><div></div><div><div>LgAv</div><div>S1 S2</div><div>Center 2.441 000 GHz</div><div>Res BW 1 MHz</div><div>#VBW 3 MHz</div><div>Span 0 Hz</div><div>Sweep 5 ms (8001 pts)</div></div><table><thead><tr><th>Marker</th><th>Trace</th><th>Type</th><th>X Axis</th><th>Amplitude</th></tr></thead><tbody><tr><td>1R</td><td>(3)</td><td>Time</td><td>395 <math>\mu</math>s</td><td>-43.74 dBm</td></tr><tr><td>1a</td><td>(3)</td><td>Time</td><td>2.901 ms</td><td>-3.67 dB</td></tr></tbody></table></div> | Marker | Trace       | Type       | X Axis | Amplitude | 1R | (3) | Time | 395 $\mu$ s | -43.74 dBm | 1a | (3) | Time | 2.901 ms | -3.67 dB |
| Marker                                                                                                                               | Trace                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Type   | X Axis      | Amplitude  |        |           |    |     |      |             |            |    |     |      |          |          |
| 1R                                                                                                                                   | (3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Time   | 395 $\mu$ s | -43.74 dBm |        |           |    |     |      |             |            |    |     |      |          |          |
| 1a                                                                                                                                   | (3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Time   | 2.901 ms    | -3.67 dB   |        |           |    |     |      |             |            |    |     |      |          |          |

### VBW (Average) setting

**\*Although 00-705 accepts VBW=10Hz for AV measurements, confirmed that superfluous smoothing was not performed.**

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## Dwell time factor Calculation chart

### Dwell time factor Calculation

Tx, Bluetooth, EDR, PRBS9

| Tx, Bluetooth, EDR, PRBS9                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |               |            |        |           |    |     |      |               |            |    |     |      |          |         |
|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|------------|--------|-----------|----|-----|------|---------------|------------|----|-----|------|----------|---------|
| Worst 100ms<br>Dwell time factor = $20\log((2.917 \times 2)/100) = -24.68\text{dB}$                                      | 1cycle On time :<br>2.917ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |               |            |        |           |    |     |      |               |            |    |     |      |          |         |
| 1x2_duty2<br><br>ON time of some channel during 100ms: Twice<br>This is the worst case in hopping sequence of Bluetooth. | 1x2_Dwell32<br><br><div><div>Agilent</div><div>R L</div><div>Ref 0 dBm</div><div>Atten 10 dB</div><div>Peak</div><div>Log</div><div>10</div><div>dB/</div><div>LgAv</div><div>S1 S2</div><div>Center 2.441 000 GHz</div><div>Res BW 1 MHz</div><div>Span 0 Hz</div><div>Sweep 5 ms (8001 pts)</div><div><table><tr><td>Marker</td><td>Trace</td><td>Type</td><td>X Axis</td><td>Amplitude</td></tr><tr><td>1R</td><td>(3)</td><td>Time</td><td>392.5 <math>\mu</math>s</td><td>-51.02 dBm</td></tr><tr><td>1a</td><td>(3)</td><td>Time</td><td>2.917 ms</td><td>0.00 dB</td></tr></table></div></div> | Marker | Trace         | Type       | X Axis | Amplitude | 1R | (3) | Time | 392.5 $\mu$ s | -51.02 dBm | 1a | (3) | Time | 2.917 ms | 0.00 dB |
| Marker                                                                                                                   | Trace                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Type   | X Axis        | Amplitude  |        |           |    |     |      |               |            |    |     |      |          |         |
| 1R                                                                                                                       | (3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Time   | 392.5 $\mu$ s | -51.02 dBm |        |           |    |     |      |               |            |    |     |      |          |         |
| 1a                                                                                                                       | (3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Time   | 2.917 ms      | 0.00 dB    |        |           |    |     |      |               |            |    |     |      |          |         |

### VBW (Average) setting

\*Although 00-705 accepts VBW=10Hz for AV measurements, confirmed that superfluous smoothing was not performed.

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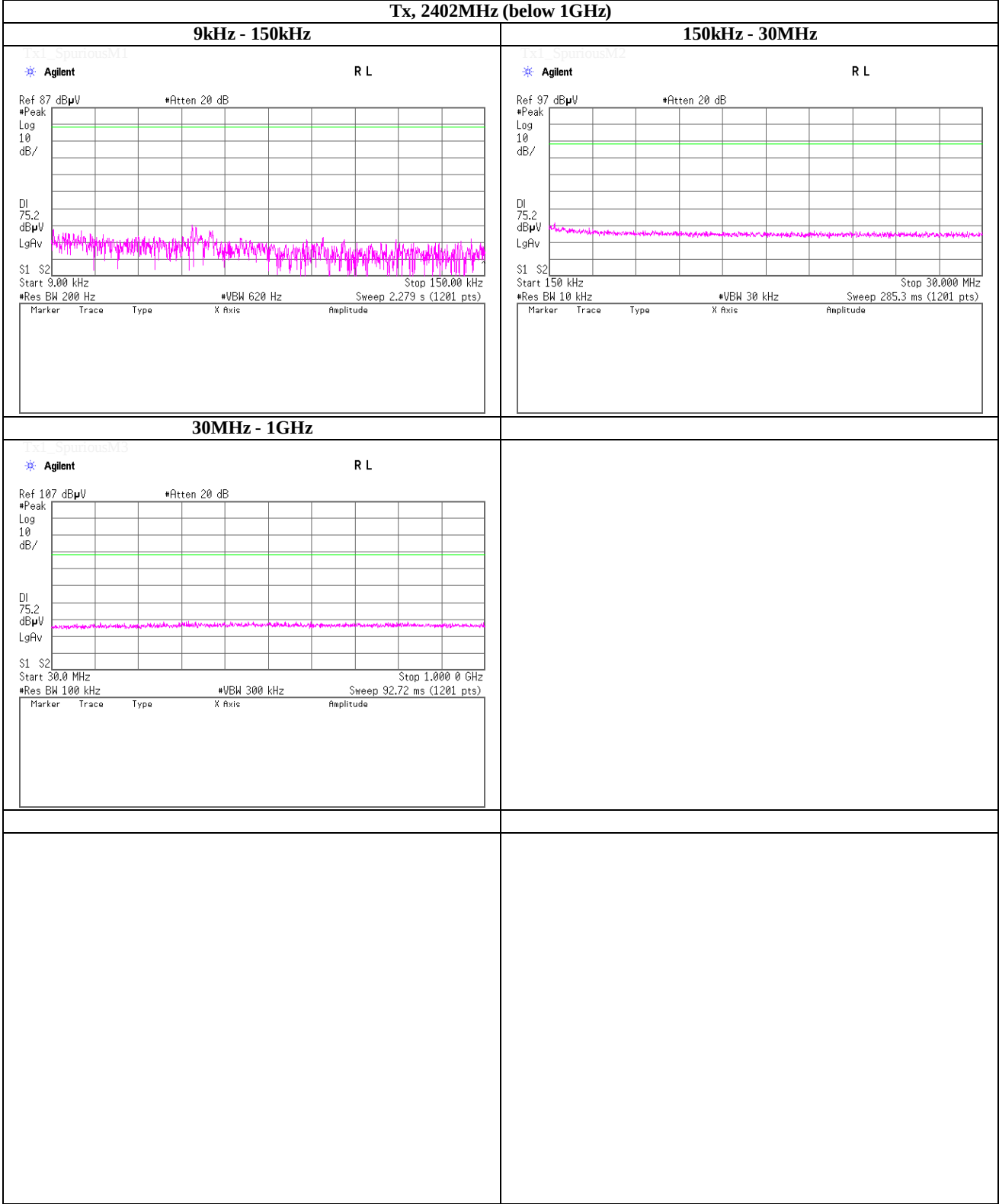
Telephone : +81 463 50 6400

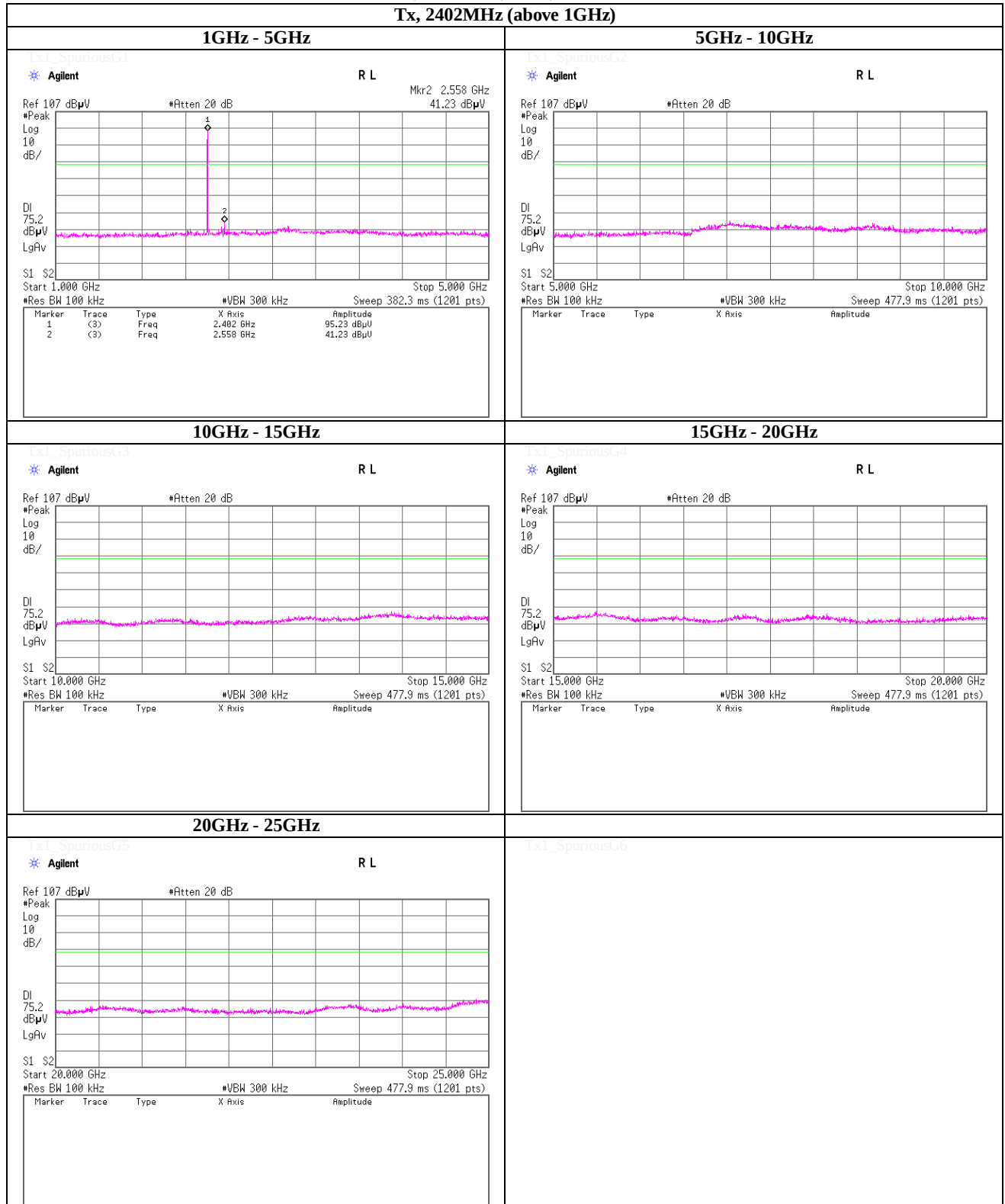
Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (below 1GHz)

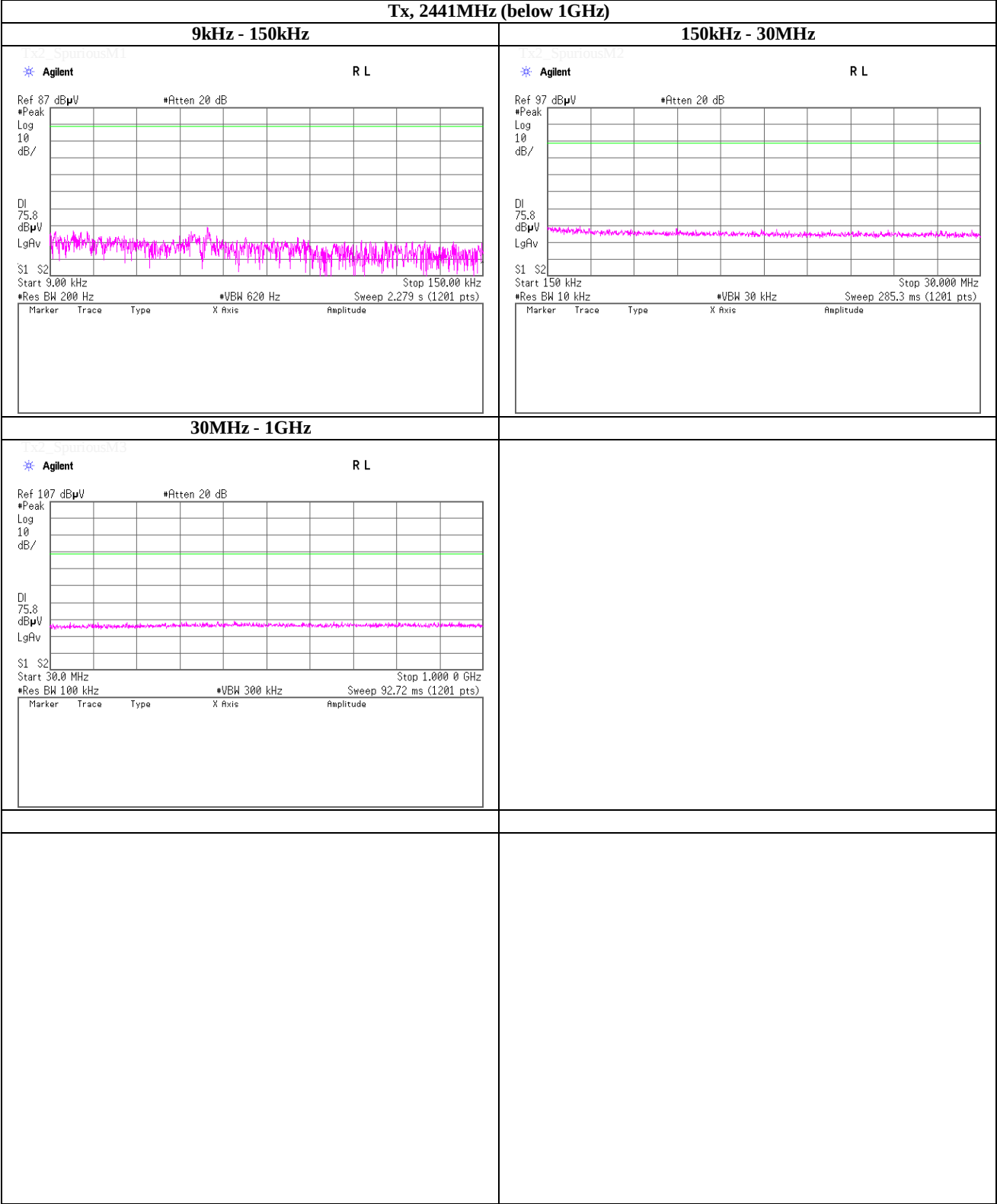


**Spurious emission (Conducted)****Tx, Bluetooth, BDR, PRBS9****Tx, 2402MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.****1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN****Telephone : +81 463 50 6400****Facsimile : +81 463 50 6401**

**Spurious emission (Conducted)**

**Tx, Bluetooth, BDR, PRBS9**

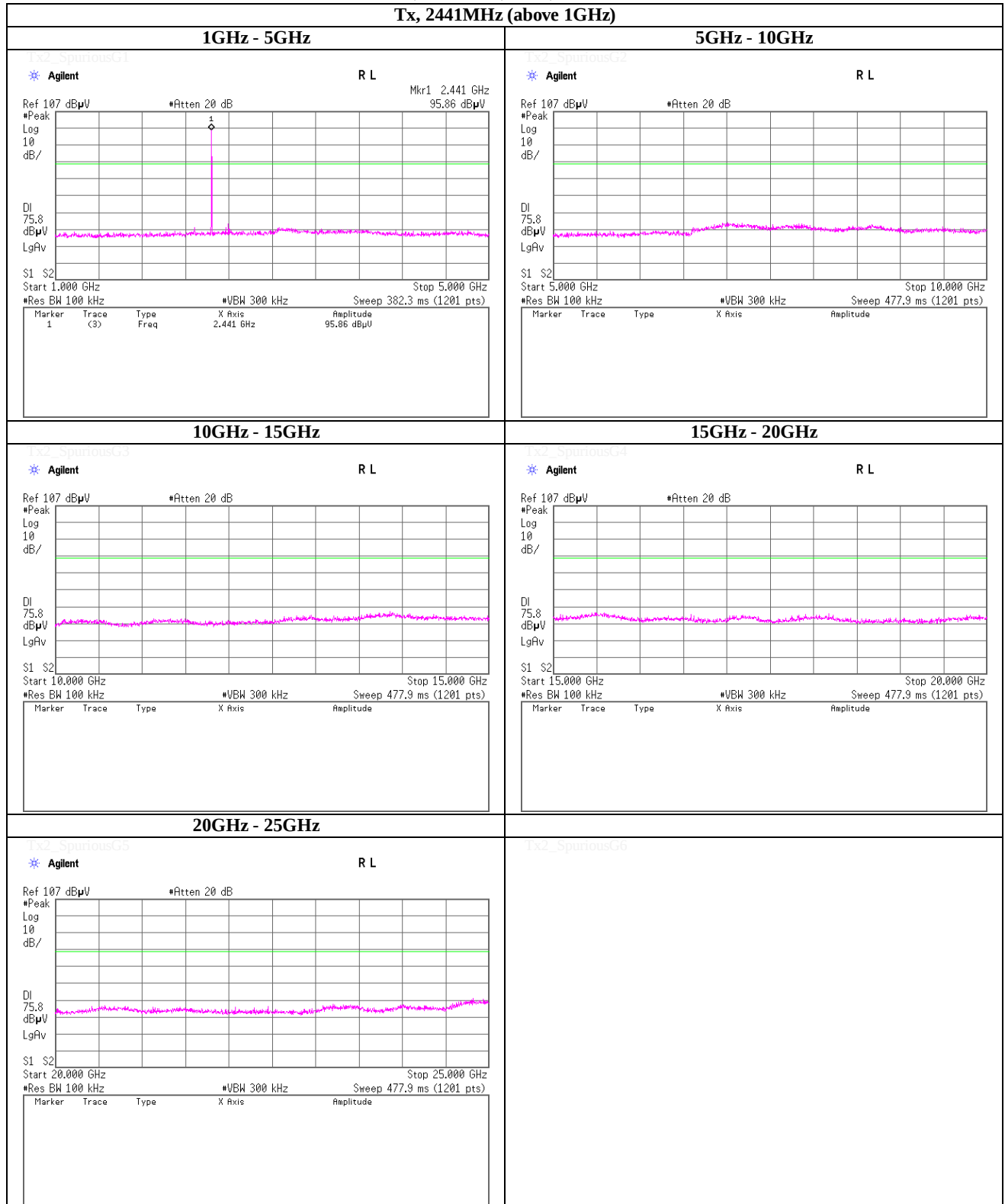
**Tx, 2441MHz (below 1GHz)**



**Spurious emission (Conducted)**

Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (above 1GHz)

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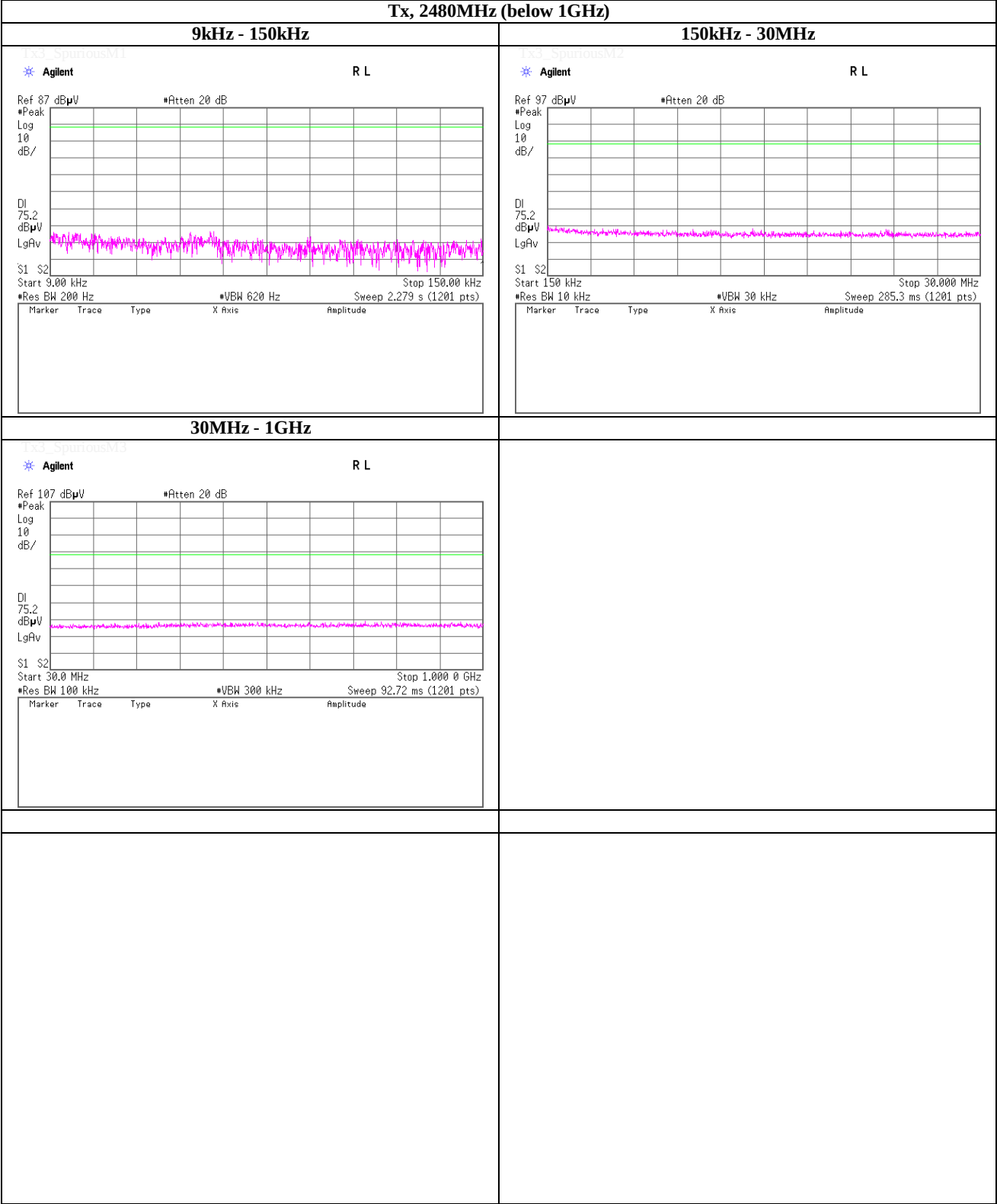
Telephone : +81 463 50 6400

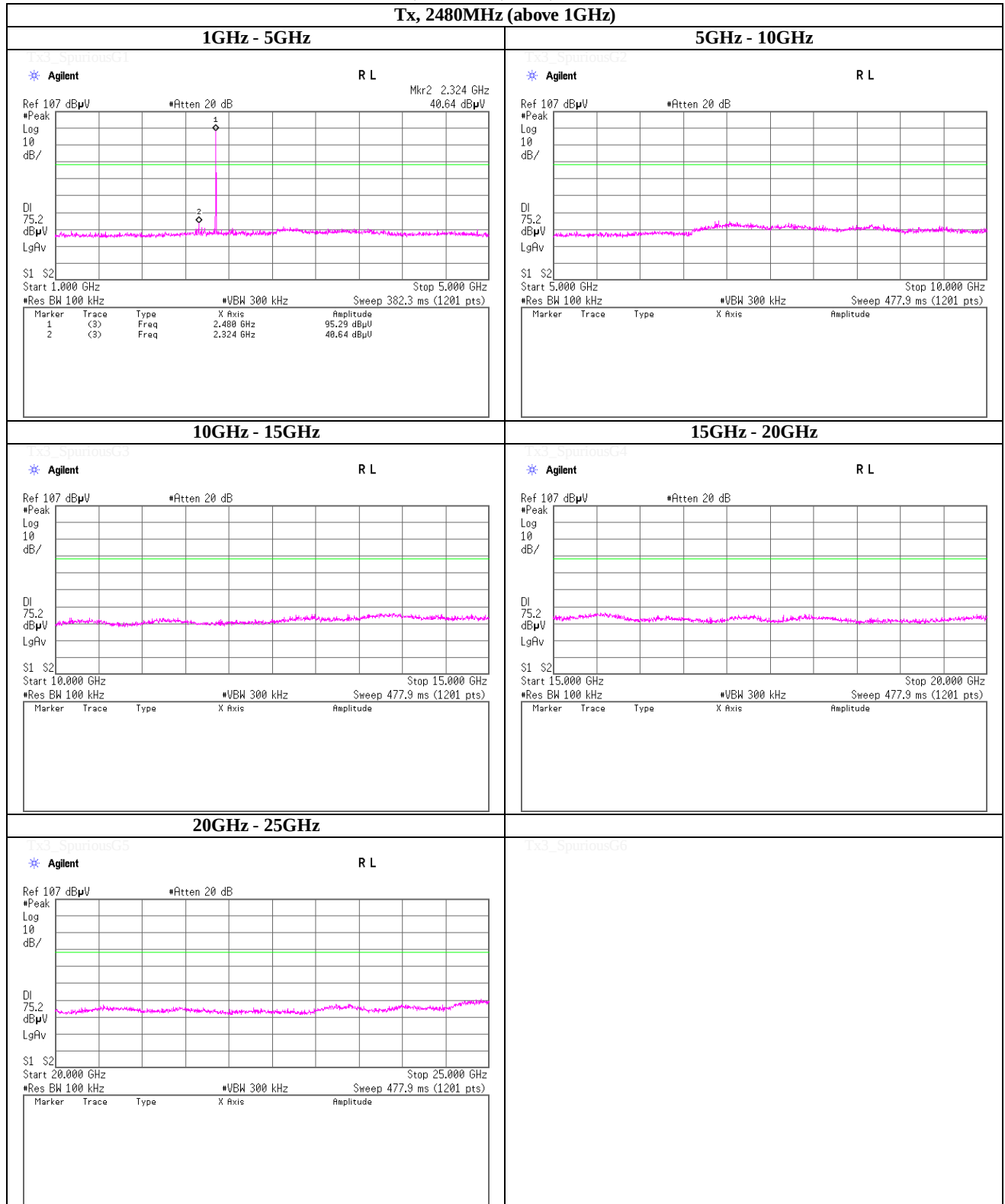
Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (below 1GHz)



**Spurious emission (Conducted)****Tx, Bluetooth, BDR, PRBS9****Tx, 2480MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.**

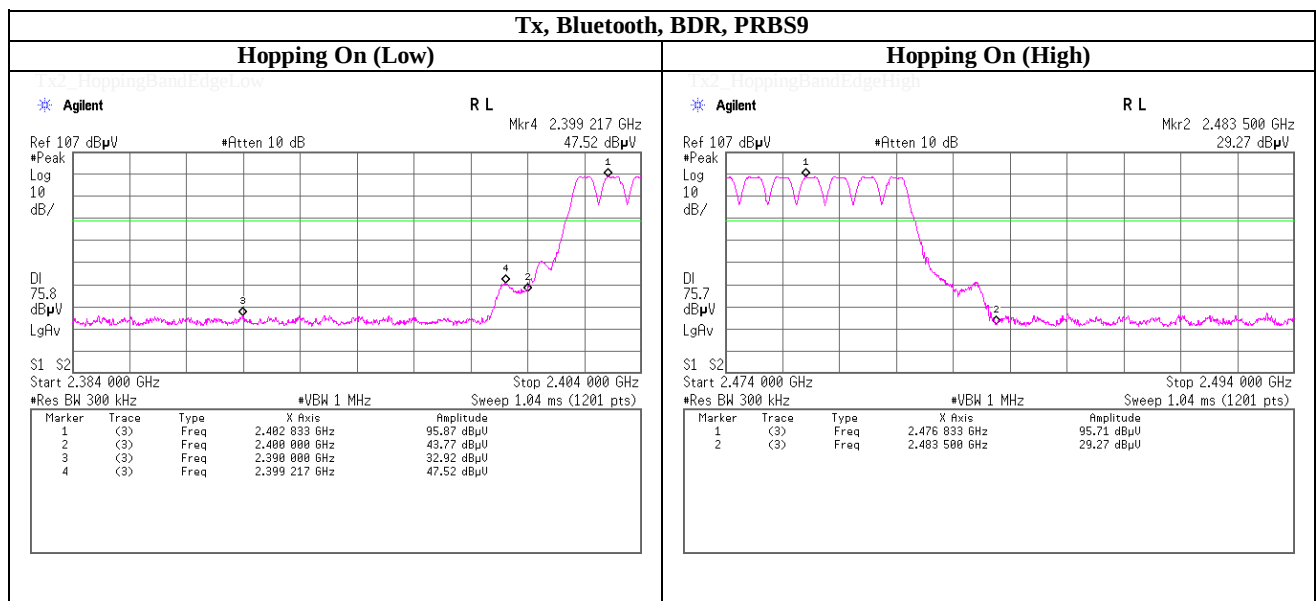
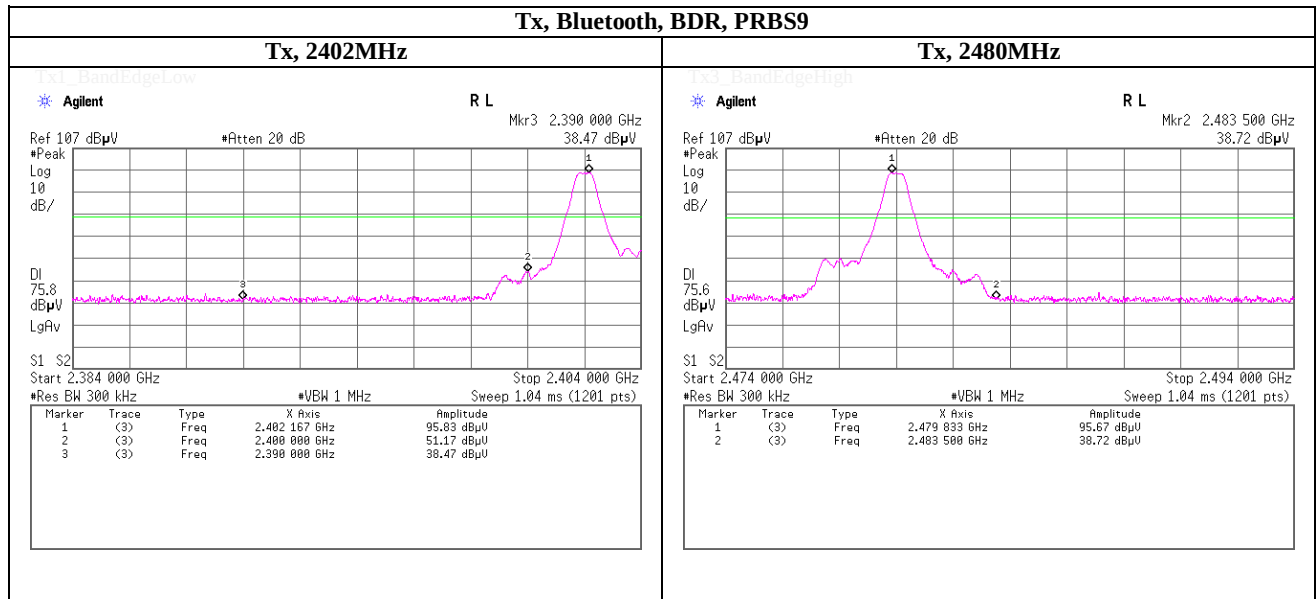
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## Spurious emission (Conducted)

### Band Edge compliance



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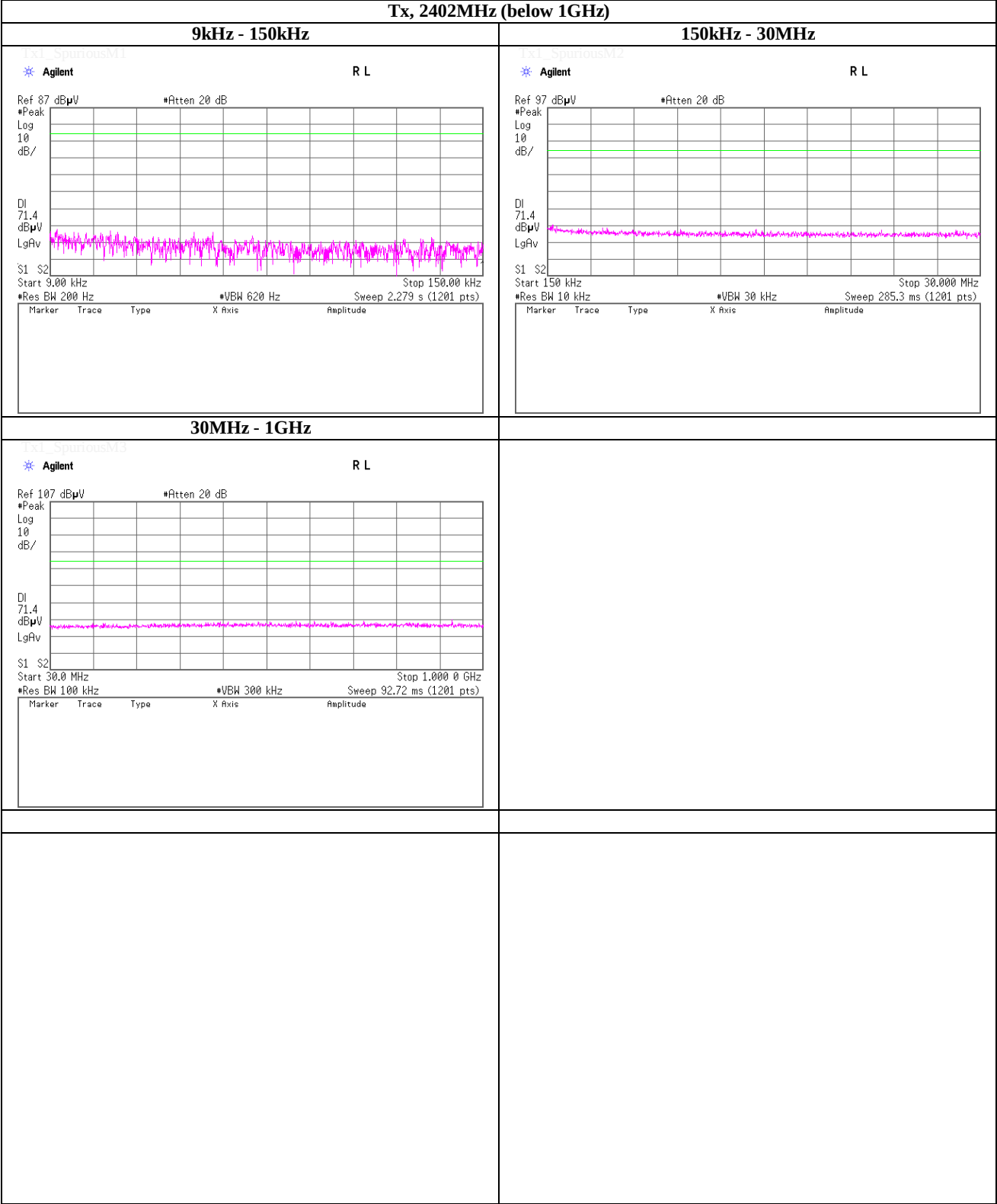
Telephone : +81 463 50 6400

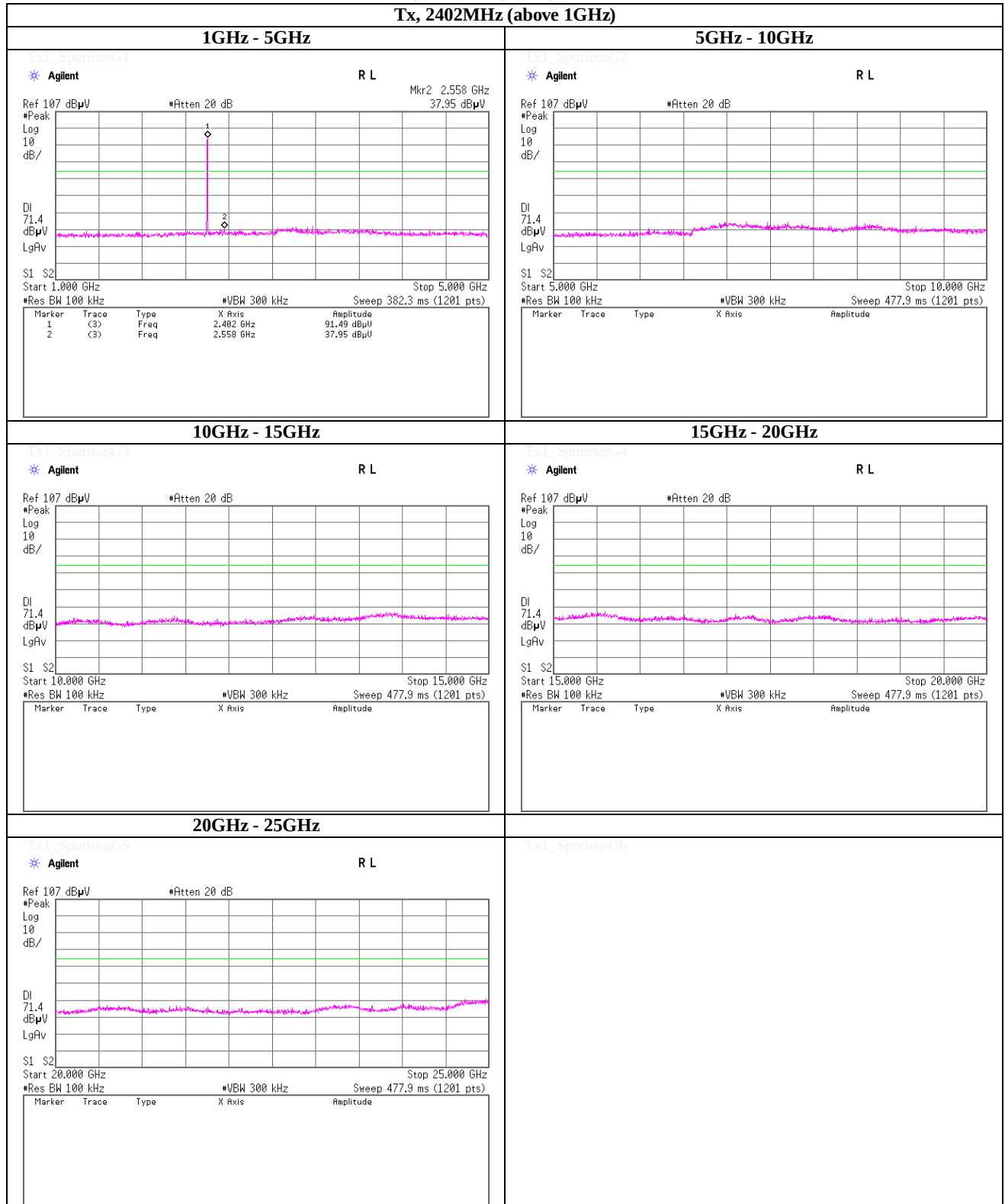
Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (below 1GHz)

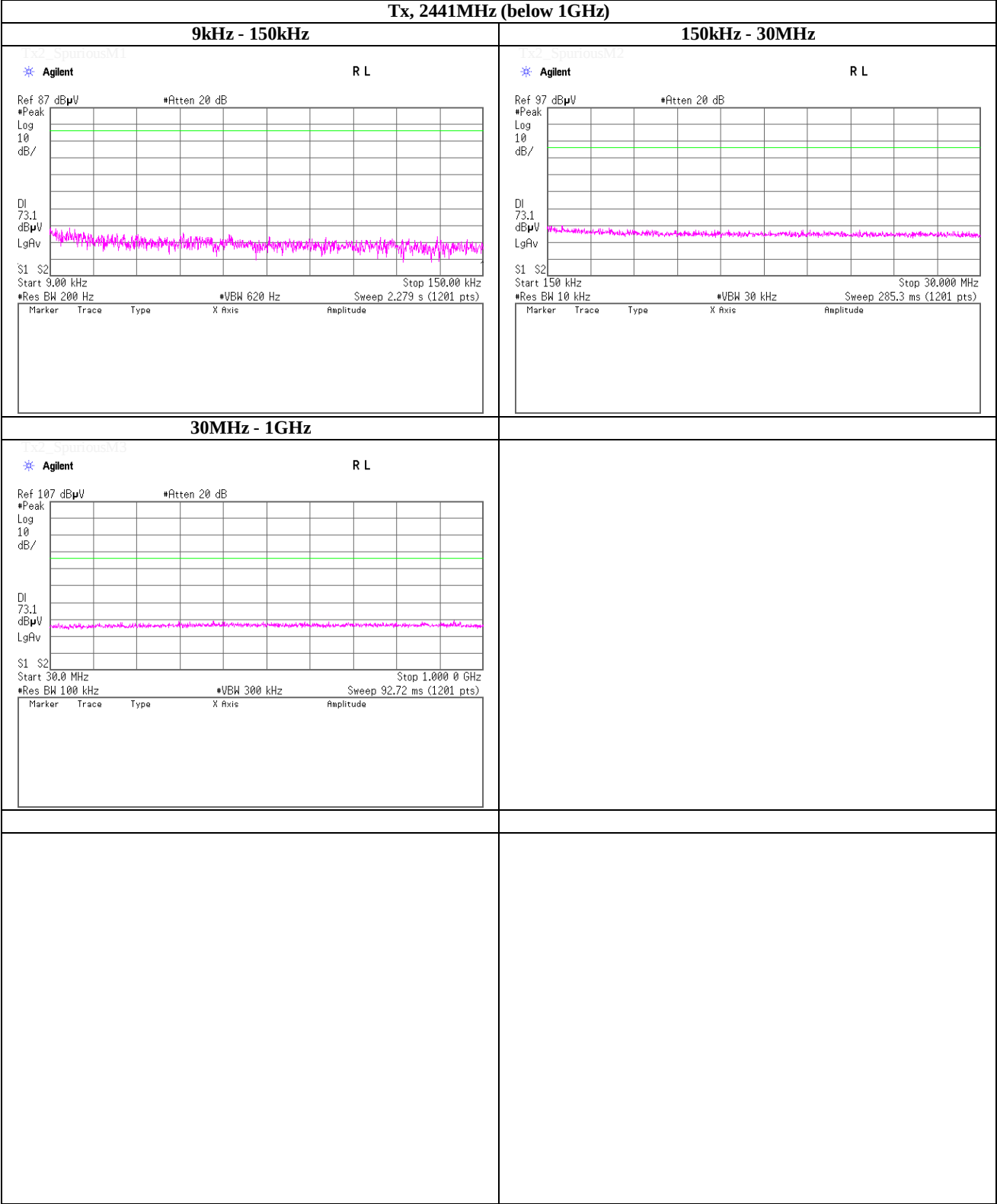


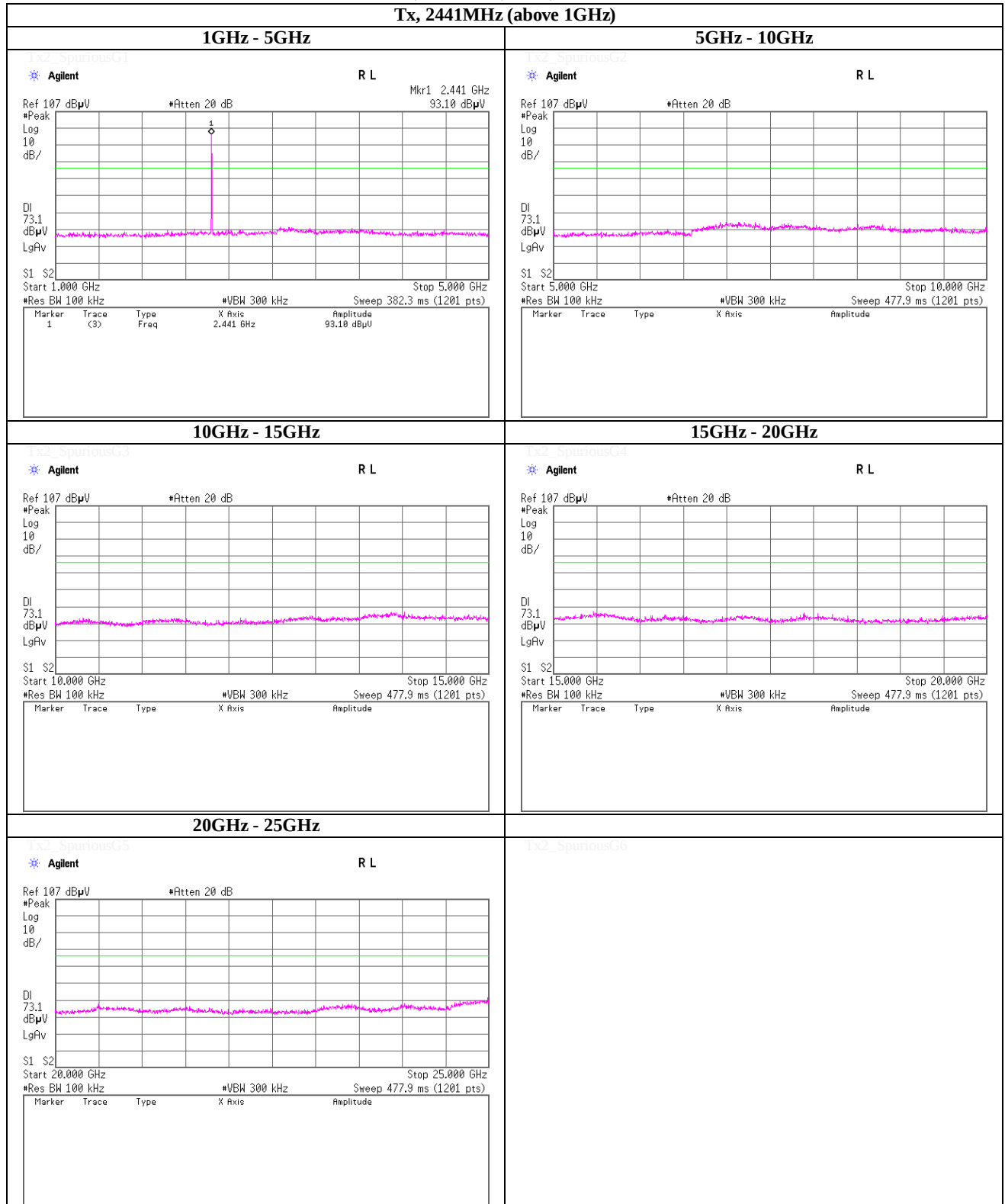
**Spurious emission (Conducted)****Tx, Bluetooth, EDR, PRBS9****Tx, 2402MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.****1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN****Telephone : +81 463 50 6400****Facsimile : +81 463 50 6401**

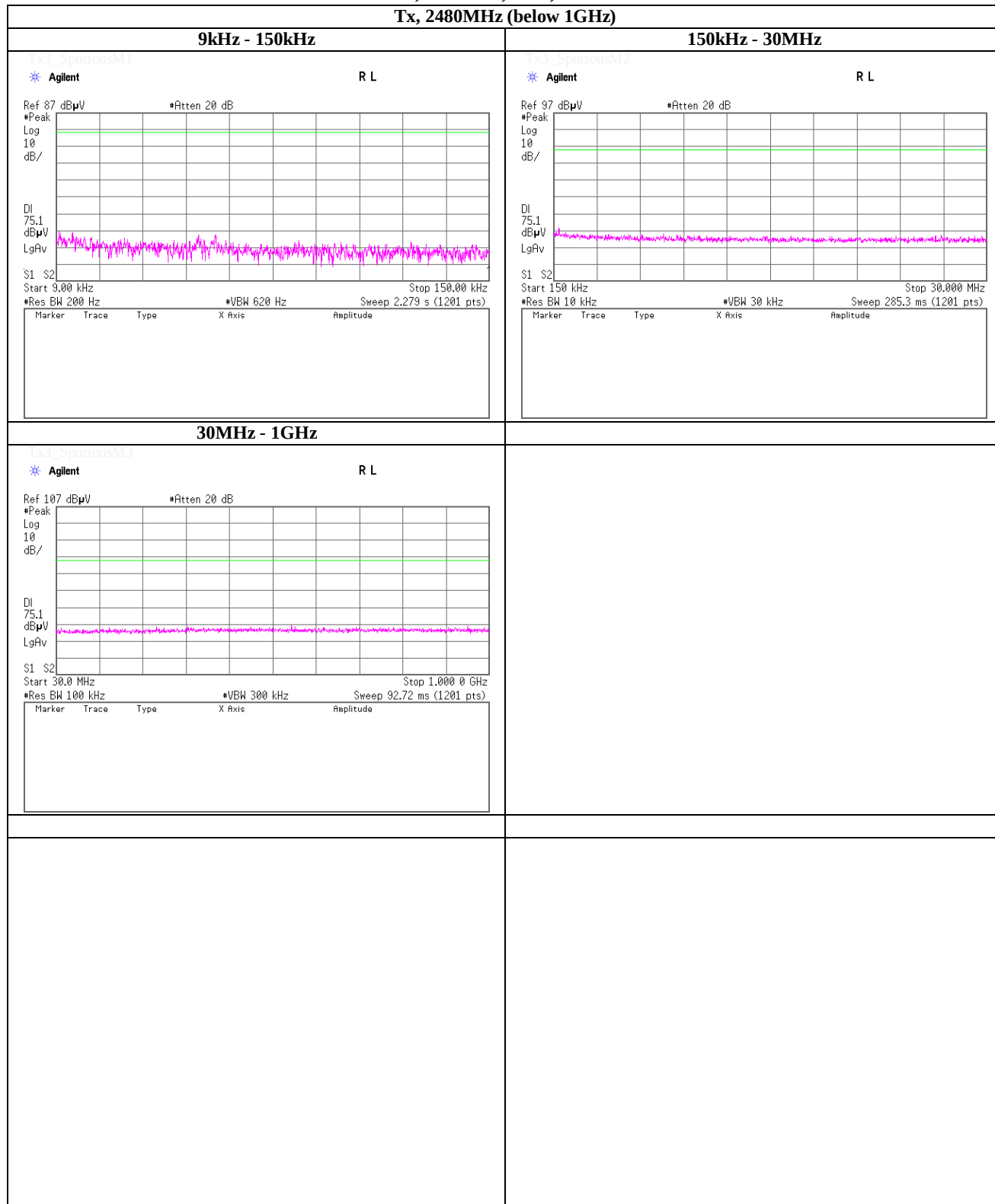
Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (below 1GHz)



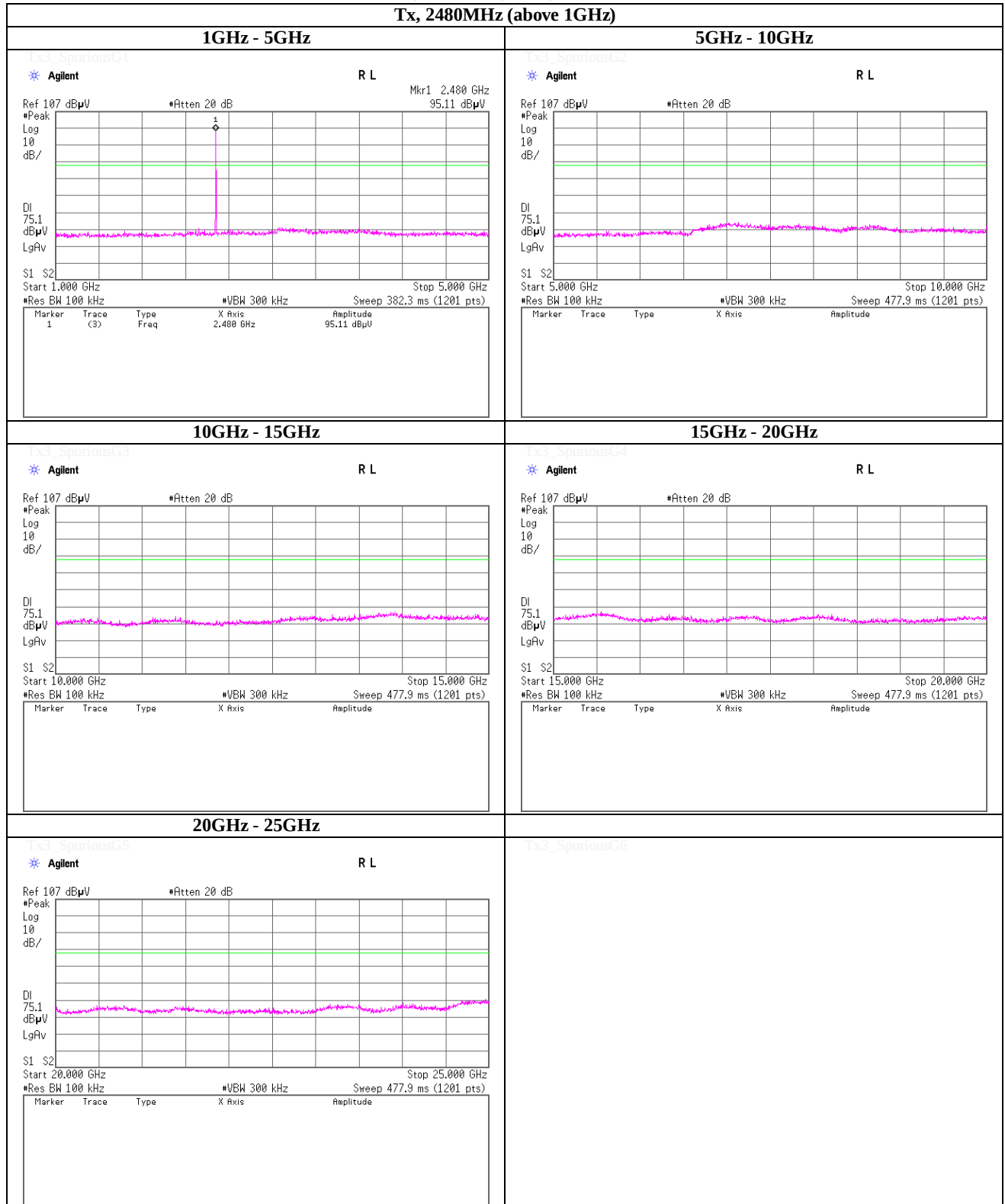
**Spurious emission (Conducted)****Tx, Bluetooth, EDR, PRBS9****Tx, 2441MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.****1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN****Telephone : +81 463 50 6400****Facsimile : +81 463 50 6401**

**Spurious emission (Conducted)****Tx, Bluetooth, EDR, PRBS9****Tx, 2480MHz (below 1GHz)****UL Japan, Inc.****Shonan EMC Lab.**

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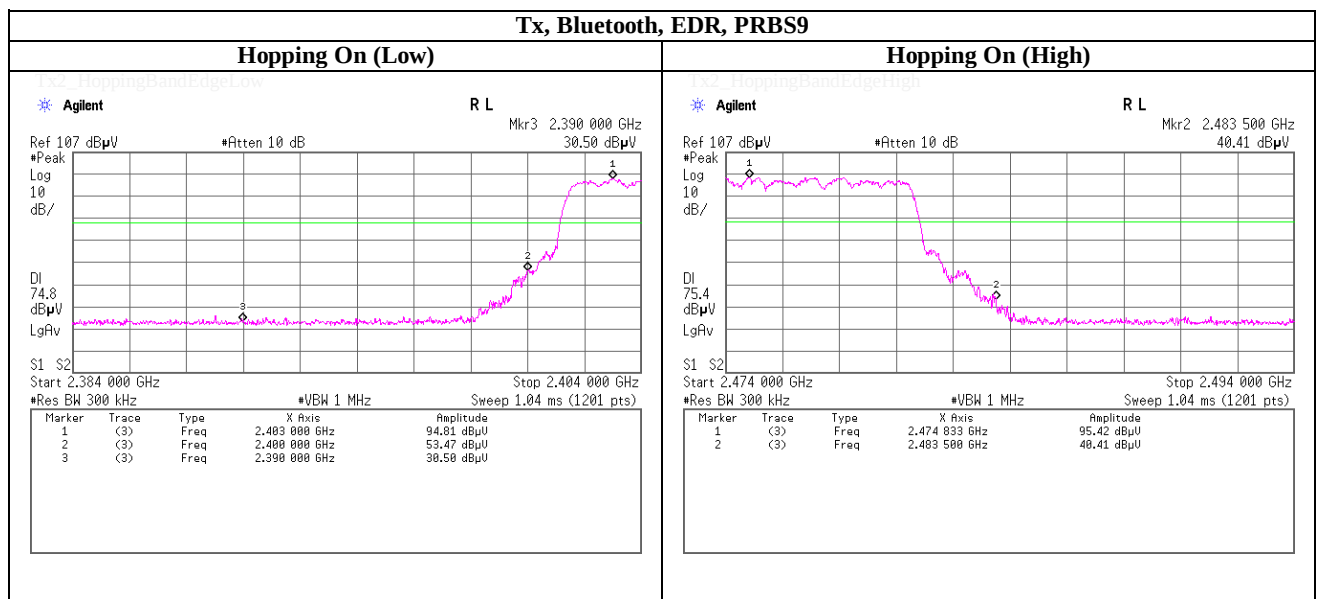
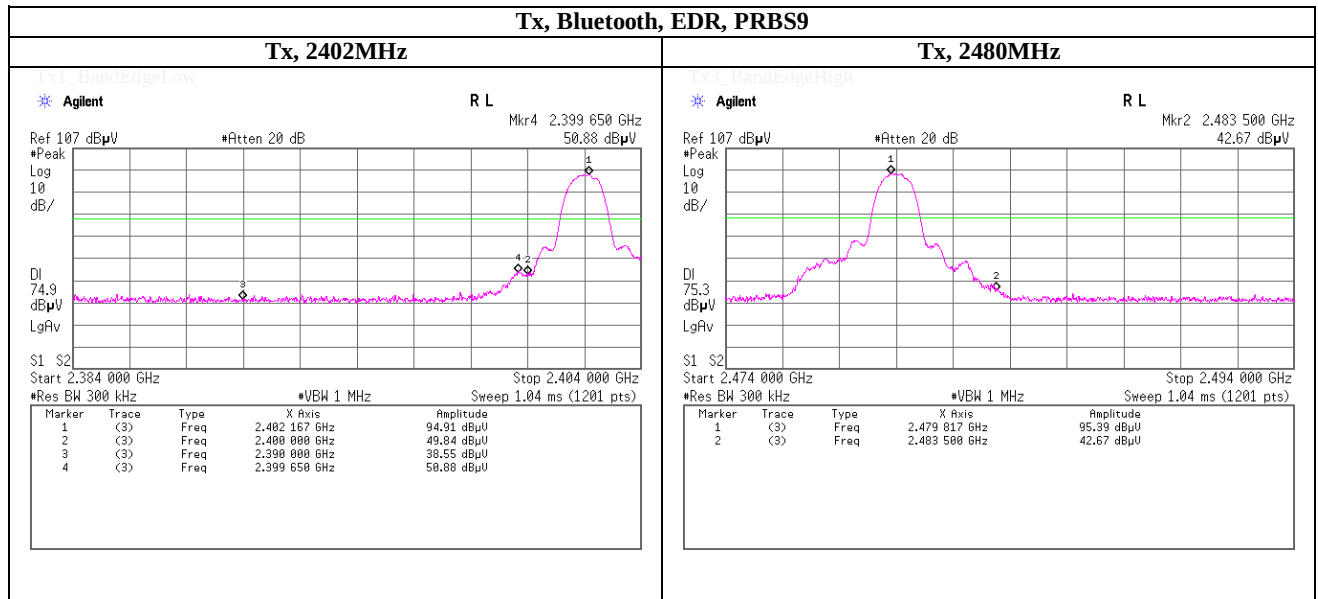
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**Spurious emission (Conducted)****Tx, Bluetooth, EDR, PRBS9****Tx, 2480MHz (above 1GHz)****UL Japan, Inc.****Shonan EMC Lab.****1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN****Telephone : +81 463 50 6400****Facsimile : +81 463 50 6401**

## Spurious emission (Conducted)

### Band Edge compliance



**UL Japan, Inc.**

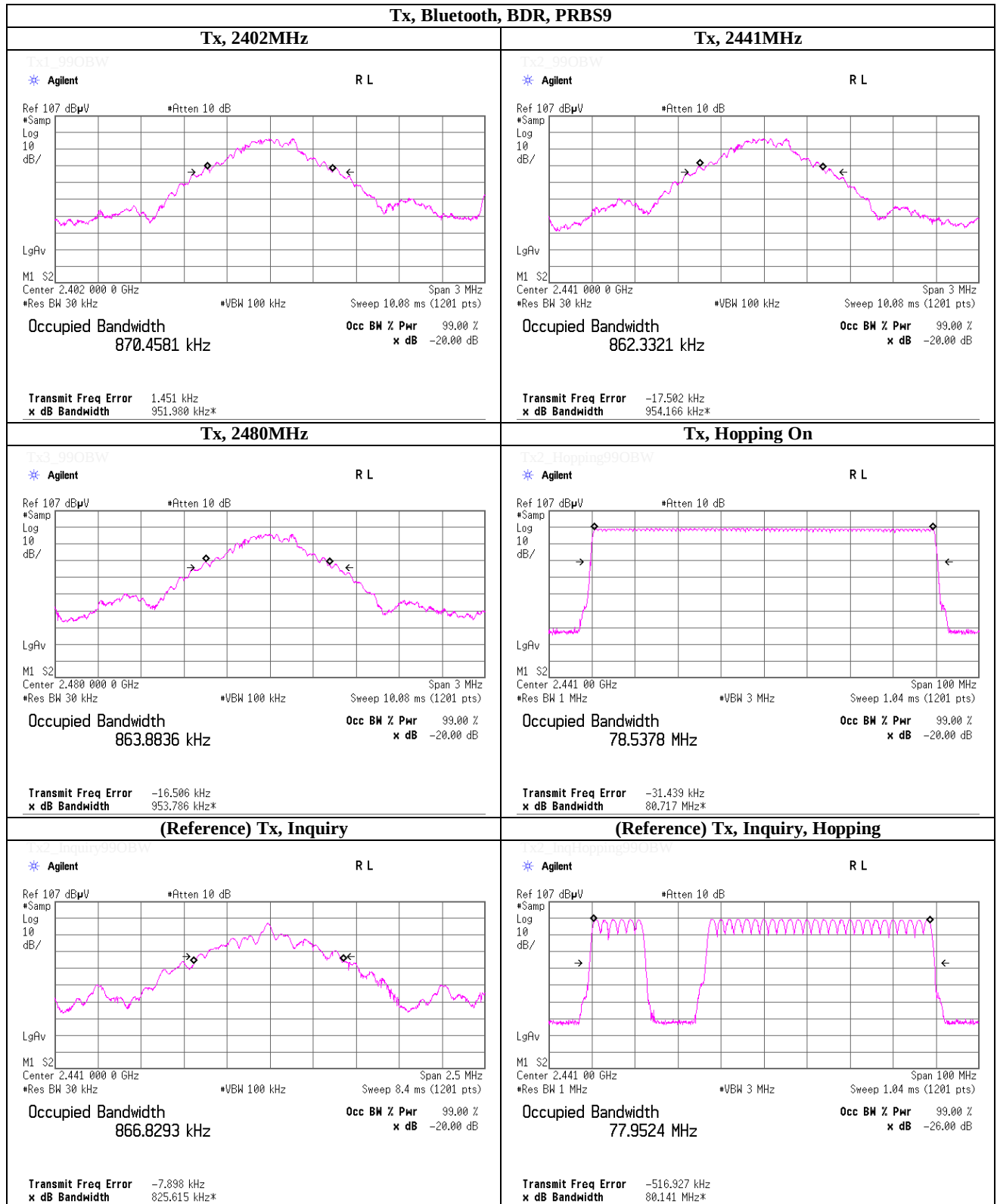
**Shonan EMC Lab.**

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## 99% Occupied Bandwidth



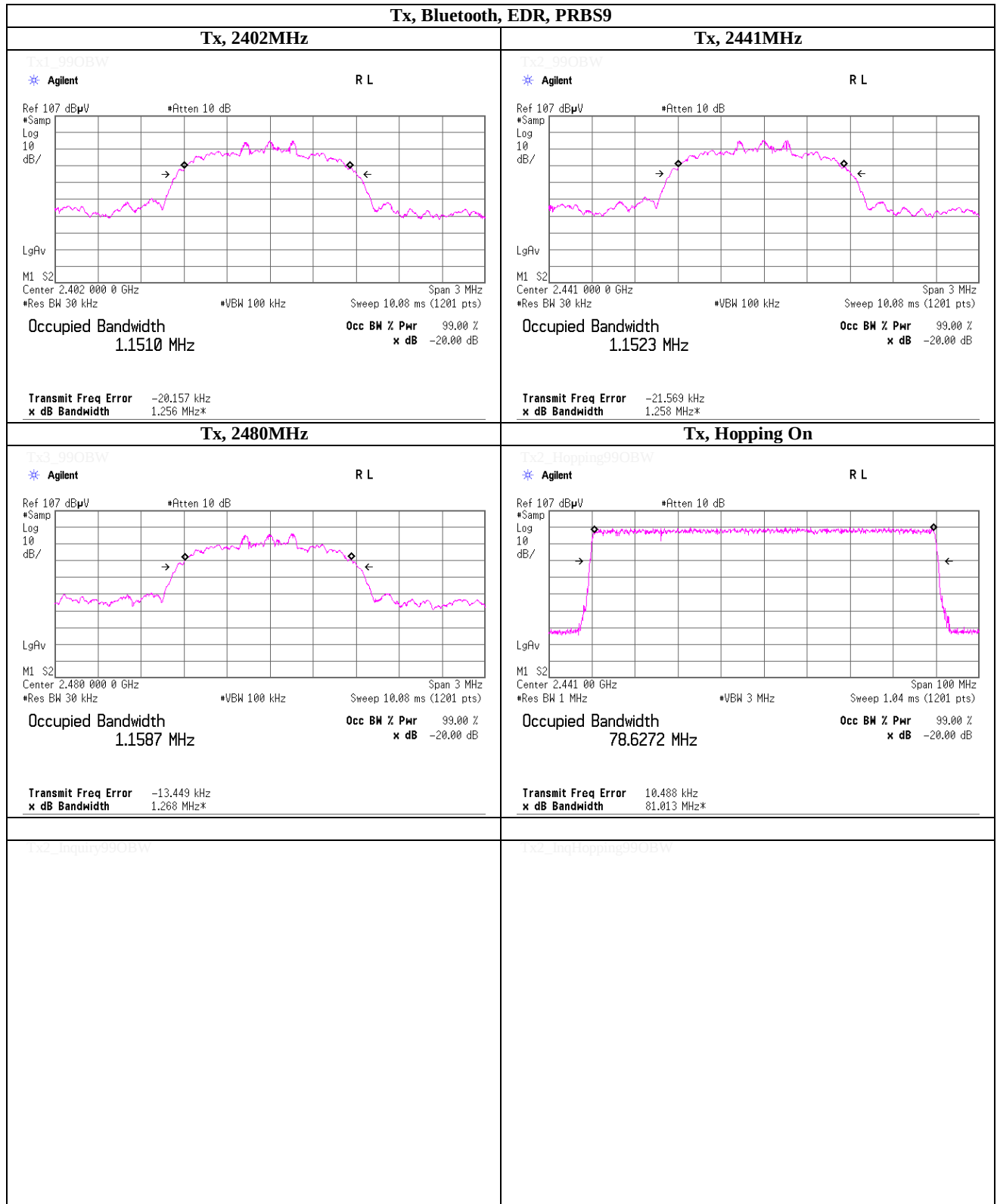
**UL Japan, Inc.**

**Shonan EMC Lab.**

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**99% Occupied Bandwidth****UL Japan, Inc.****Shonan EMC Lab.**

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## APPENDIX 2

### Test Instruments

#### EMI test equipment (1/2)

| Control No.  | Instrument            | Manufacturer     | Model No               | Serial No  | Test Item | Calibration Date<br>* Interval(month) |
|--------------|-----------------------|------------------|------------------------|------------|-----------|---------------------------------------|
| SPM-06       | Power Meter           | Anritsu          | ML2495A                | 0850009    | AT        | 2013/04/09 * 12                       |
| SPSS-03      | Power sensor          | Anritsu          | MA2411B                | 0917063    | AT        | 2013/04/09 * 12                       |
| SSA-03       | Spectrum Analyzer     | Agilent          | E4448A                 | MY48250152 | AT        | 2013/01/08 * 12                       |
| SAT10-09     | Attenuator            | Weinschel Corp.  | 54A-10                 | W5692      | AT        | 2012/11/15 * 12                       |
| SCC-G12      | Coaxial Cable         | Suhner           | SUCOFLEX 102           | 30790/2    | AT        | 2013/03/16 * 12                       |
| SCC-H1       | Microwave cable       | Hirose Electric  | U.FL-2LP-066J1-A-(200) | -          | AT        | Pre Check                             |
| SOS-09       | Humidity Indicator    | A&D              | AD-5681                | 4061484    | AT        | 2013/03/07 * 12                       |
| SAEC-01(NSA) | Semi-Anechoic Chamber | TDK              | SAEC-01(NSA)           | 1          | RE        | 2013/07/03 * 12                       |
| SAF-04       | Pre Amplifier         | TOYO Corporation | TPA0118-36             | 1440489    | RE        | 2013/03/19 * 12                       |
| SCC-G01      | Coaxial Cable         | Suhner           | SUCOFLEX 104A          | 46497/4A   | RE        | 2013/04/09 * 12                       |
| SCC-G21      | Coaxial Cable         | Suhner           | SUCOFLEX 104           | 296169/4   | RE        | 2013/05/22 * 12                       |
| SHA-01       | Horn Antenna          | Schwarzbeck      | BBHA9120D              | 9120D-725  | RE        | 2012/08/20 * 12                       |
| SOS-01       | Humidity Indicator    | A&D              | AD-5681                | 4062555    | RE        | 2013/02/27 * 12                       |
| KSA-08       | Spectrum Analyzer     | Agilent          | E4446A                 | MY46180525 | RE        | 2013/03/04 * 12                       |
| SJM-08       | Measure               | PROMART          | SEN1935                | -          | RE        | -                                     |
| COTS-SEMI-1  | EMI Software          | TSJ              | TEPTO-DV(RE,CE,RFI,MF) | -          | RE, CE    | -                                     |
| SAT20-01     | Attenuator(above1GHz) | Agilent          | 8493C-020              | 74889      | RE        | 2012/12/18 * 12                       |
| SFL-02       | Highpass Filter       | MICRO-TRONICS    | HPM50111               | 051        | RE        | 2012/12/18 * 12                       |
| SAEC-03(NSA) | Semi-Anechoic Chamber | TDK              | SAEC-03(NSA)           | 3          | RE        | 2013/07/09 * 12                       |
| SAF-06       | Pre Amplifier         | TOYO Corporation | TPA0118-36             | 1440491    | RE        | 2012/07/18 * 12                       |
| SCC-G03      | Coaxial Cable         | Suhner           | SUCOFLEX 104A          | 46499/4A   | RE        | 2013/04/11 * 12                       |
| SCC-G23      | Coaxial Cable         | Suhner           | SUCOFLEX 104           | 297342/4   | RE        | 2013/05/22 * 12                       |
| SHA-03       | Horn Antenna          | Schwarzbeck      | BBHA9120D              | 9120D-739  | RE        | 2012/08/17 * 12                       |
| SOS-05       | Humidity Indicator    | A&D              | AD-5681                | 4062518    | RE        | 2013/02/27 * 12                       |
| SSA-02       | Spectrum Analyzer     | Agilent          | E4448A                 | MY48250106 | RE        | 2013/03/28 * 12                       |
| SJM-11       | Measure               | PROMART          | SEN1935                | -          | RE, CE    | -                                     |
| SAT10-06     | Attenuator            | Agilent          | 8493C-010              | 74865      | RE        | 2012/12/18 * 12                       |
| SHA-04       | Horn Antenna          | ETS LINDGREN     | 3160-09                | LM3640     | RE        | 2013/03/14 * 12                       |
| SAF-08       | Pre Amplifier         | TOYO Corporation | HAP18-26W              | 00000019   | RE        | 2013/03/19 * 12                       |
| SCC-G15      | Coaxial Cable         | Suhner           | SUCOFLEX 102           | 32703/2    | RE        | 2013/03/16 * 12                       |
|              |                       |                  |                        |            |           |                                       |
|              |                       |                  |                        |            |           |                                       |

The expiration date of the calibration is the end of the expired month .

As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

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

Test Item :

CE: Conducted emission ,

RE: Radiated emission ,

AT: Antenna terminal conducted tests ,

## APPENDIX 2

### Test Instruments

#### EMI test equipment (2/2)

| Control No.                    | Instrument                | Manufacturer                                | Model No                                   | Serial No               | Test Item | Calibration Date *<br>Interval(month) |
|--------------------------------|---------------------------|---------------------------------------------|--------------------------------------------|-------------------------|-----------|---------------------------------------|
| SAF-03                         | Pre Amplifier             | SONOMA                                      | 310N                                       | 290213                  | RE        | 2013/02/12 * 12                       |
| SAT6-06                        | Attenuator                | JFW                                         | 50HF-006N                                  | -                       | RE        | 2013/02/12 * 12                       |
| SBA-03                         | Biconical Antenna         | Schwarzbeck                                 | BBA9106                                    | 91032666                | RE        | 2012/10/08 * 12                       |
| SCC-C1/C2/C3/C4/C5/C10/SRSE-03 | Coaxial Cable&RF Selector | Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO | 8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906 | -/0901-271(RF Selector) | RE        | 2013/04/03 * 12                       |
| SLA-03                         | Logperiodic Antenna       | Schwarzbeck                                 | UHALP9108A                                 | UHALP9108-A 0901        | RE        | 2012/10/08 * 12                       |
| STR-06                         | Test Receiver             | Rohde & Schwarz                             | ESCI                                       | 101259                  | RE, CE    | 2013/02/27 * 12                       |
| SCC-C9/C10/SRSE-03             | Coaxial Cable&RF Selector | Suhner/Suhner/TOYO                          | RG223U/141PE/NS4906                        | -/0901-271(RF Selector) | CE        | 2013/04/03 * 12                       |
| SAT3-05                        | Attenuator                | JFW                                         | 50HF-003N                                  | -                       | CE        | 2013/02/12 * 12                       |
| SLS-02                         | LISN                      | Rohde & Schwarz                             | ENV216                                     | 100512                  | CE        | 2013/02/21 * 12                       |
| SOS-06                         | Humidity Indicator        | A&D                                         | AD-5681                                    | 4062118                 | CE        | 2013/03/07 * 12                       |
|                                |                           |                                             |                                            |                         |           |                                       |
|                                |                           |                                             |                                            |                         |           |                                       |

The expiration date of the calibration is the end of the expired month .

As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

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

Test Item :

CE: Conducted emission ,

RE: Radiated emission ,

AT: Antenna terminal conducted tests ,