



Test report No. : 10195552-001H-B-R1  
Page : 1 of 39  
Issued date : March 20, 2014  
Revised date : March 25, 2014  
FCC ID : N6C-SDMAN

This test report only includes WLAN test data with new antenna, and the module will be controlled not to use Bluetooth function and 802.11n-HT40 mode by software of host device.

# **RADIO TEST REPORT**

**Test Report No. : 10195552-001H-B-R1**

**Applicant** : silex technology, Inc.  
**Type of Equipment** : SDIO Wireless Module  
**Model No.** : SX-SDMAN  
**FCC ID** : N6C-SDMAN  
**Test regulation** : **FCC Part 15 Subpart E: 2013**  
**(Permissive Change Class II Application)**  
**\*Conducted emission and Spurious Emission**  
**Restricted Band Edge test only**  
**Test Result** : **Complied**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This report is a revised version of 10195552-001H-B. 10195552-001H-B is replaced with this report.

**Date of test:** March 5 to 13, 2014

**Representative test engineer:**

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**Approved by:**

*T. Hatahara*

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Leader of WiSE Japan,  
UL Verification Service



NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.  
\*As for the range of Accreditation in NVLAP, you may refer to the WEB address,  
<http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

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13-EM-F0429



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## **SECTION 1: Customer information**

|                  |   |                                                   |
|------------------|---|---------------------------------------------------|
| Company Name     | : | silex technology, Inc.                            |
| Address          | : | 2-3-1 Hikaridai, Seika-cho, Kyoto 619-0237, Japan |
| Telephone Number | : | +81-774-98-3878                                   |
| Facsimile Number | : | +81-774-98-3758                                   |
| Contact Person   | : | Toshiro Kometani                                  |

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

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

|                            |   |                                 |
|----------------------------|---|---------------------------------|
| Type of Equipment          | : | SDIO Wireless Module            |
| Model No.                  | : | SX-SDMAN                        |
| Serial No.                 | : | Refer to Section 4, Clause 4.2  |
| Rating                     | : | DC3.3V                          |
| Receipt Date of Sample     | : | January 18, 2014                |
| Country of Mass-production | : | Japan                           |
| Condition of EUT           | : | Production model                |
| Modification of EUT        | : | No Modification by the test lab |

## 2.2 Product Description

Model No: SX-SDMAN (referred to as the EUT in this report) is the SDIO Wireless Module.

### General Specification

Clock frequency(ies) in the system : 26MHz

### Radio Specification

Radio Type : Transceiver  
Method of Frequency Generation : Synthesizer  
Power Supply (inner) : DC1.2V

### Specification of Wireless LAN (IEEE802.11b/g/a/n-20/n-40)

| Type of radio          | IEEE802.11b                                                                                                   | IEEE802.11g                            | IEEE802.11a                        | IEEE802.11n (20 M band)                               | IEEE802.11n (40 M band)              |
|------------------------|---------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------------|-------------------------------------------------------|--------------------------------------|
| Frequency of operation | 2412-2462MHz*1)                                                                                               | 2412-2462MHz*1)                        | 5180-5320MHz<br>5745-5825MHz*2)    | 2412 - 2462MHz*1)<br>5180-5320MHz<br>5745-5825MHz *2) | 5190 - 5310MHz<br>5755 - 5795MHz *2) |
| Type of modulation     | DSSS<br>(CCK, DQPSK, DBPSK)                                                                                   | OFDM-CCK<br>(64QAM, 16QAM, QPSK, BPSK) | OFDM<br>(64QAM, 16QAM, QPSK, BPSK) |                                                       |                                      |
| Channel spacing        | 5MHz                                                                                                          |                                        | 20MHz                              | 2.4GHz band<br>5MHz<br>5GHz band<br>20MHz             | 40MHz                                |
| Antenna type           | Mini-Nanoblade antenna: Laird Technologies<br>Stand Alone antenna: Molex                                      |                                        |                                    |                                                       |                                      |
| Antenna Gain           | Mini-Nanoblade antenna: 2.5dBi (2.4GHz), 4.8dBi (5GHz)<br>Stand Alone antenna: 3.0dBi (2.4GHz), 4.6dBi (5GHz) |                                        |                                    |                                                       |                                      |
| Antenna Connector type | U.FL Alternative connector                                                                                    |                                        |                                    |                                                       |                                      |

\*1) 2412 - 2462MHz is applied for other test report.(Test Report No.: 1019552-001H-A)

\*2) 5745 - 5825MHz is applied for other test report.(Test Report No.: 1019552-001H-A)

### Specification of Bluetooth (Ver.4.0 + EDR)

| Type of radio          | Bluetooth                                                                                                     |
|------------------------|---------------------------------------------------------------------------------------------------------------|
| Frequency of Operation | 2402-2480MHz                                                                                                  |
| Type of Modulation     | FHSS                                                                                                          |
| Channel spacing        | 1MHz                                                                                                          |
| Antenna type           | Mini-Nanoblade antenna: Laird Technologies<br>Stand Alone antenna: Molex                                      |
| Antenna Gain           | Mini-Nanoblade antenna: 2.5dBi (2.4GHz), 4.8dBi (5GHz)<br>Stand Alone antenna: 3.0dBi (2.4GHz), 4.6dBi (5GHz) |
| Antenna Connector Type | U.FL Alternative connector                                                                                    |

### Specification of Low Energy (Ver.4.0 + EDR/LE Dual mode)

| Type of radio          | Low Energy                                                                                                    |
|------------------------|---------------------------------------------------------------------------------------------------------------|
| Frequency of Operation | 2402-2480MHz                                                                                                  |
| Type of Modulation     | DSSS                                                                                                          |
| Channel spacing        | 2MHz                                                                                                          |
| Antenna type           | Mini-Nanoblade antenna: Laird Technologies<br>Stand Alone antenna: Molex                                      |
| Antenna Gain           | Mini-Nanoblade antenna: 2.5dBi (2.4GHz), 4.8dBi (5GHz)<br>Stand Alone antenna: 3.0dBi (2.4GHz), 4.6dBi (5GHz) |
| Antenna Connector Type | U.FL Alternative connector                                                                                    |

\*This test report applies for Wireless LAN (IEEE802.11a/n-20/n-40).

Wireless LAN and Bluetooth do not transmit simultaneously.

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<Contents of the change from original model>

Test Report Number of original model is 32IE0154-HO-01-C-R1.

Specification was changed from the original model as follows:

\*Antenna of the EUT was modified. The radio specification is identical to the original.

Therefore only Conducted emission test and Spurious Emission Restricted Band Edge test were performed in this report.

Additionally, only the information of modified antenna is described in this report.

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

### **3.1 Test Specification**

Test Specification : FCC Part 15 Subpart E: 2013, final revised on September 30, 2013 and effective October 30, 2013

Title : FCC 47CFR Part15 Radio Frequency Device Subpart E  
Unlicensed National Information Infrastructure Devices  
Section 15.407 General technical requirements

### **3.2 Procedures and results**

| Item                                                                                                                                                                      | Test Procedure                                    | Specification                         | Worst margin                    | Results  | Remarks  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|---------------------------------------|---------------------------------|----------|----------|
| Conducted Emission                                                                                                                                                        | FCC :ANSI C63.4:2003                              | FCC: 15.407(b)(6) / 15.207            | QP<br>18.0dB, 0.16843MHz, L     | Complied | -        |
|                                                                                                                                                                           | IC: RSS-Gen 7.2.4                                 | IC: RSS-Gen 7.2.4                     | AV<br>24.7dB, 4.39254MHz, L     |          |          |
| Spurious Emission<br>Restricted Band Edge                                                                                                                                 | FCC: ANSI C63.4:2003<br>FCC KDB 789033 D01 v01r01 | FCC : 15.407(b), 15.205 and<br>15.209 | 2.4dB<br>5350.000MHz, AV, Hori. | Complied | Radiated |
|                                                                                                                                                                           | IC: -                                             | IC: RSS-210 A.9.2(1)(2)(3)            |                                 |          |          |
| Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.<br>For DFS tests, please see the test report number 32IE0154-HO-01-D issued by UL Japan, Inc. |                                                   |                                       |                                 |          |          |

#### **FCC 15.31 (e)**

The RF Module has own regulator.

The RF Module is constantly provided voltage through own regulator regardless of input voltage (DC3.3V).

Therefore, this EUT complies with the requirement.

#### **FCC Part 15.203/212 Antenna requirement**

The EUT has a unique antenna connector (U.FL).

Therefore the equipment complies with the requirement of 15.203/212.

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### 3.3 Addition to standard

No addition, exclusion nor deviation has been made from the standard.

### 3.4 Uncertainty

#### EMI

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

| Test room<br>(semi-anechoic chamber) | Conducted emission<br>(+dB) |
|--------------------------------------|-----------------------------|
|                                      | 150kHz-30MHz                |
| No.1                                 | 3.5dB                       |
| No.2                                 | 3.5dB                       |
| No.3                                 | 3.6dB                       |
| No.4                                 | 3.5dB                       |

| Test room<br>(semi-anechoic chamber) | Radiated emission |                  |                 |                |                 |                   |                   |
|--------------------------------------|-------------------|------------------|-----------------|----------------|-----------------|-------------------|-------------------|
|                                      | (3m*)(+dB)        |                  |                 |                | (1m*)(+dB)      |                   | (0.5m*)(+dB)      |
|                                      | 9kHz<br>-30MHz    | 30MHz<br>-300MHz | 300MHz<br>-1GHz | 1GHz<br>-10GHz | 10GHz<br>-18GHz | 18GHz<br>-26.5GHz | 26.5GHz<br>-40GHz |
| No.1                                 | 4.0dB             | 5.1dB            | 5.0dB           | 5.1dB          | 6.0dB           | 4.9dB             | 4.3dB             |
| No.2                                 | 3.9dB             | 5.2dB            | 5.0dB           | 4.9dB          | 5.9dB           | 4.7dB             | 4.2dB             |
| No.3                                 | 4.3dB             | 5.1dB            | 5.2dB           | 5.2dB          | 6.0dB           | 4.8dB             | 4.2dB             |
| No.4                                 | 4.6dB             | 5.2dB            | 5.0dB           | 5.2dB          | 6.0dB           | 5.7dB             | 4.2dB             |

\*3m/1m/0.5m = Measurement distance

#### Conducted Emission test

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

#### Radiated emission test(3m)

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

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### 3.5 Test Location

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|                            | FCC Registration Number | IC Registration Number | Width x Depth x Height (m) | Size of reference ground plane (m) / horizontal conducting plane | Other rooms            |
|----------------------------|-------------------------|------------------------|----------------------------|------------------------------------------------------------------|------------------------|
| No.1 semi-anechoic chamber | 313583                  | 2973C-1                | 19.2 x 11.2 x 7.7m         | 7.0 x 6.0m                                                       | No.1 Power source room |
| No.2 semi-anechoic chamber | 655103                  | 2973C-2                | 7.5 x 5.8 x 5.2m           | 4.0 x 4.0m                                                       | -                      |
| No.3 semi-anechoic chamber | 148738                  | 2973C-3                | 12.0 x 8.5 x 5.9m          | 6.8 x 5.75m                                                      | No.3 Preparation room  |
| No.3 shielded room         | -                       | -                      | 4.0 x 6.0 x 2.7m           | N/A                                                              | -                      |
| No.4 semi-anechoic chamber | 134570                  | 2973C-4                | 12.0 x 8.5 x 5.9m          | 6.8 x 5.75m                                                      | No.4 Preparation room  |
| No.4 shielded room         | -                       | -                      | 4.0 x 6.0 x 2.7m           | N/A                                                              | -                      |
| No.5 semi-anechoic chamber | -                       | -                      | 6.0 x 6.0 x 3.9m           | 6.0 x 6.0m                                                       | -                      |
| No.6 shielded room         | -                       | -                      | 4.0 x 4.5 x 2.7m           | 4.0 x 4.5 m                                                      | -                      |
| No.6 measurement room      | -                       | -                      | 4.75 x 5.4 x 3.0m          | 4.75 x 4.15 m                                                    | -                      |
| No.7 shielded room         | -                       | -                      | 4.7 x 7.5 x 2.7m           | 4.7 x 7.5m                                                       | -                      |
| No.8 measurement room      | -                       | -                      | 3.1 x 5.0 x 2.7m           | N/A                                                              | -                      |
| No.9 measurement room      | -                       | -                      | 8.8 x 4.6 x 2.8m           | 2.4 x 2.4m                                                       | -                      |
| No.11 measurement room     | -                       | -                      | 6.2 x 4.7 x 3.0m           | 2.4 x 3.4m                                                       | -                      |

\* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

### 3.6 Data of EMI, Test instruments, and Test set up

Refer to APPENDIX.

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

### 4.1 Operating Modes

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

| Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Remarks*             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| IEEE 802.11a (11a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 24Mbps, PN9          |
| IEEE 802.11n 20MHz BW (11n-20)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | MCS 1 (Long GI), PN9 |
| IEEE 802.11n 40MHz BW (11n-40)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | MCS 3 (Long GI), PN9 |
| <p>*The worst condition was determined based on the test result of Maximum Peak Output Power.</p> <p>*EUT has the power settings by the software as follows;</p> <p>Power settings:</p> <p>11a W52, W53(24Mbps, Long GI): 5180MHz: 13.0dBm, others: 14.0dBm</p> <p>11n-20 W52, W53(MCS 1, Long GI): 5180MHz: 13.0dBm, others: 14.0dBm</p> <p>11n-40 W52, W53(MCS 3, Long GI): 5190MHz: 9.5dBm, 5310MHz: 11.5dBm, others: 14.0dBm</p> <p>Software: Atheros Test Command (Athtestcmd) v3.1.1 Build 563</p> <p>*This setting of software is the worst case.</p> <p>Any conditions under the normal use do not exceed the condition of setting.</p> <p>In addition, end users cannot change the settings of the output power of the product.</p> |                      |

\*The details of Operating mode(s)

| Test Item                   | Operating Mode | Tested Antenna port | Tested Frequency   |             |
|-----------------------------|----------------|---------------------|--------------------|-------------|
|                             |                |                     | Low Band           | Middle Band |
| Conducted emission          | 11n-20 Tx *1)  | 2 *3)               | -                  | 5320MHz     |
| Spurious Emission(Radiated) | 11n-20 Tx *2)  | 2 *3)               | 5180MHz<br>5240MHz | 5320MHz     |
|                             | 11n-40 Tx      | 2 *3)               | 5190MHz<br>5230MHz | 5310MHz     |

\*1) The mode was tested as a representative, because it had the highest power at antenna terminal test (Test Report Number of original model is 32IE0154-HO-01-C-R1).

\*2) Since 11a and 11n-20 have the same modulation method and no differences in transmitting specification, test was performed on the representative mode that had the highest peak output power (Test Report Number of original model is 32IE0154-HO-01-C-R1).

\*3) After the comparison between Antenna port 1 and Antenna port 2, test was performed with the antenna that had higher power as a representative.

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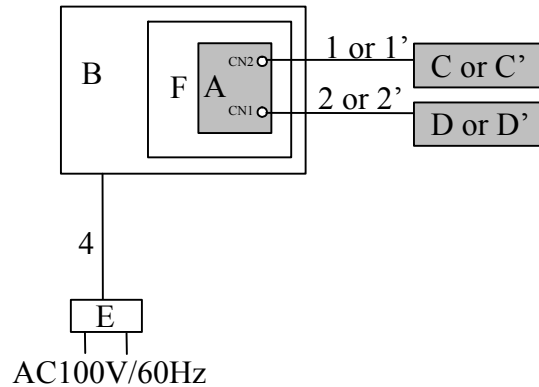
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## 4.2 Configuration and peripherals



- \* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.
- \* Radiated emission was tested with the EUT on a single jig board in original application. For this testing, the antenna radiation was focused, and different jig boards were used.
- \* EUT has Molex antenna and Laird antenna. The test was performed with below worst configurations.
- CN1 and CN2 were connected to Molex antenna.
- CN1 and CN2 were connected to Laird antenna.

### Description of EUT

| No. | Item                   | Model number   | Serial number | Manufacturer           | Remarks |
|-----|------------------------|----------------|---------------|------------------------|---------|
| A   | SDIO Wireless Module   | SX-SDMAN       | 008092-5099DA | silex technology, Inc. | EUT     |
| B   | Jig Board              | -              | -             | silex technology, Inc. | -       |
| C   | Stand Alone antenna    | 47950-0001     | 001           | Molex                  | EUT     |
| C'  | Mini-Nanoblade antenna | Mini-Nanoblade | 001           | Laird Technologies     | EUT     |
| D   | Stand Alone antenna    | 47950-0001     | 002           | Molex                  | EUT     |
| D'  | Mini-Nanoblade antenna | Mini-Nanoblade | 002           | Laird Technologies     | EUT     |
| E   | AC Adaptor             | US115-05       | C08-0259307   | UNIFIVE                | -       |
| F   | Jig                    | -              | -             | silex technology, Inc. | -       |

### List of cables used

| No. | Name                  | Length (m) | Shield     |            | Remarks |
|-----|-----------------------|------------|------------|------------|---------|
|     |                       |            | Cable      | Connector  |         |
| 1   | Antenna Cable (Molex) | 0.08       | Shielded   | Shielded   | -       |
| 1'  | Antenna Cable (Laird) | 0.08       | Shielded   | Shielded   | -       |
| 2   | Antenna Cable (Molex) | 0.08       | Shielded   | Shielded   | -       |
| 2'  | Antenna Cable (Laird) | 0.08       | Shielded   | Shielded   | -       |
| 3   | DC Cable              | 1.8        | Unshielded | Unshielded | -       |
| 4   | DC Cable              | 1.8        | Unshielded | Unshielded | -       |

## **SECTION 5: Conducted Emission**

### **Test Procedure**

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 0.8m above the conducting ground plane.

The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and 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 a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

#### **For the tests on EUT with other peripherals (as a whole system)**

I/O cable and AC cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. All unused 50ohm connectors of the LISN(AMN) were resistivity terminated in 50ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber or a Measurement Room.

The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

|                          |                     |
|--------------------------|---------------------|
| <b>Detector</b>          | <b>: QP and AV</b>  |
| <b>Measurement range</b> | <b>: 0.15-30MHz</b> |
| <b>Test data</b>         | <b>: APPENDIX</b>   |
| <b>Test result</b>       | <b>: Pass</b>       |

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## **SECTION 6: Radiated Spurious Emission and Band Edge Compliance**

### **Test Procedure**

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 0.8m above the conducting ground plane.

The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

The height of the measuring antenna varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.

The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).

The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.

The test was made with the detector (RBW/VBW) in the following table.

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

Below 1GHz

The result also satisfied with the general limits specified in section 15.209(a).

Above 1GHz

Inside of restricted bands(Section 15.205): Apply to limit in the Section 15.209(a).

Outside of the restricted bands: Apply to limit 68.2dBuV/m(−27dBm e.i.r.p. \*)  
in the Section 15.407(b)(1)(2)(3).

\*Electric Field Strength to e.i.r.p. Conversion

$$E = \frac{1000000\sqrt{30P}}{3} \text{ (uV/m)} \quad : P \text{ is the e.i.r.p. (Watts)}$$

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**Test Antennas are used as below;**

|              |                 |                |            |
|--------------|-----------------|----------------|------------|
| Frequency    | 30MHz to 300MHz | 300MHz to 1GHz | Above 1GHz |
| Antenna Type | Biconical       | Logperiodic    | Horn       |

|                 |                |                                                                     |                                                                                                                     |
|-----------------|----------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Frequency       | Below 1GHz     | Above 1GHz                                                          |                                                                                                                     |
| Instrument used | Test Receiver  | Spectrum Analyzer                                                   |                                                                                                                     |
| Detector        | QP             | PK                                                                  | AV                                                                                                                  |
| IF Bandwidth    | BW 120kHz(T/R) | RBW: 1MHz<br>VBW: 3MHz                                              | Method AD *1)<br>RBW: 1MHz<br>VBW: 3MHz<br>Detector: Power Averaging (RMS)<br>Duty factor was added to the results. |
| Test Distance   | 3m             | 3m (below 10GHz),<br>1m*2) (above 10GHz)<br>0.5m*3) (above 26.5GHz) |                                                                                                                     |

\*1) The test method was also referred to KDB 789033 D01 General UNII Test Procedures v01r03 "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E (Issued on April 8, 2013)".

\*2) Distance Factor:  $20 \times \log (3.0\text{m}/1.0\text{m}) = 9.5\text{dB}$

\*3) Distance Factor:  $20 \times \log (3.0\text{m}/0.5\text{m}) = 15.6\text{dB}$

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

The test results and limit are rounded off to one decimal place, so some differences might be observed.

**Measurement range** : 30M-40GHz  
**Test data** : APPENDIX  
**Test result** : Pass

## APPENDIX 1: Data of EMI test

### Conducted Emission [Molex antenna]

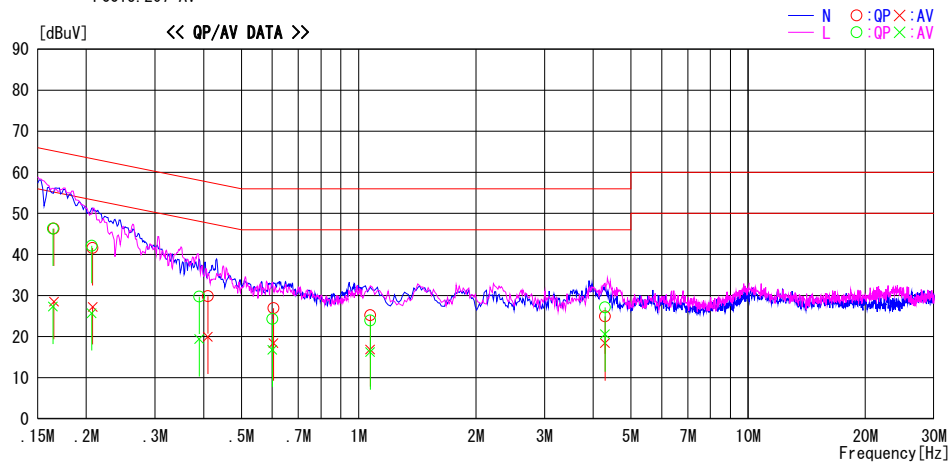
#### DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No. 2 Semi Anechoic Chamber  
Date : 2014/03/05

Report No. : 10195552-001H  
Power : AC 120V / 60Hz  
Temp./Humi. : 20deg. C / 31% RH  
Engineer : Takumi Shimada

Mode / Remarks : Tx 11n20\_MCS1\_5320MHz\_Ant (Molex)

LIMIT : FCC15.207 QP  
FCC15.207 AV



| Frequency<br>[MHz] | Reading Level |              | Corr.<br>Factor | 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] |       |         |
| 0.16502            | 33.1          | 15.3         | 13.2            | 46.3         | 28.5         | 65.2         | 55.2         | 18.9       | 26.7       | N     |         |
| 0.20743            | 28.4          | 14.0         | 13.2            | 41.6         | 27.2         | 63.3         | 53.3         | 21.7       | 26.1       | N     |         |
| 0.40999            | 16.6          | 6.8          | 13.2            | 29.8         | 20.0         | 57.6         | 47.6         | 27.8       | 27.6       | N     |         |
| 0.60457            | 13.6          | 5.1          | 13.3            | 26.9         | 18.4         | 56.0         | 46.0         | 29.1       | 27.6       | N     |         |
| 1.07038            | 11.8          | 3.5          | 13.4            | 25.2         | 16.9         | 56.0         | 46.0         | 30.8       | 29.1       | N     |         |
| 4.29113            | 11.1          | 4.6          | 13.8            | 24.9         | 18.4         | 56.0         | 46.0         | 31.1       | 27.6       | N     |         |
| 0.16410            | 33.1          | 14.1         | 13.2            | 46.3         | 27.3         | 65.3         | 55.3         | 19.0       | 28.0       | L     |         |
| 0.20642            | 28.9          | 12.5         | 13.2            | 42.1         | 25.7         | 63.3         | 53.3         | 21.2       | 27.6       | L     |         |
| 0.38959            | 16.5          | 6.2          | 13.2            | 29.7         | 19.4         | 58.1         | 48.1         | 28.4       | 28.7       | L     |         |
| 0.60024            | 11.0          | 3.5          | 13.3            | 24.3         | 16.8         | 56.0         | 46.0         | 31.7       | 29.2       | L     |         |
| 1.07003            | 10.5          | 2.8          | 13.4            | 23.9         | 16.2         | 56.0         | 46.0         | 32.1       | 29.8       | L     |         |
| 4.29086            | 13.3          | 6.8          | 13.8            | 27.1         | 20.6         | 56.0         | 46.0         | 28.9       | 25.4       | L     |         |

CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT=READING+C.F.(LISN LOSS + ATT LOSS + CABLE LOSS)  
Except for the above table : adequate margin data below the limits.

**Conducted Emission**  
**[Laird antenna]**

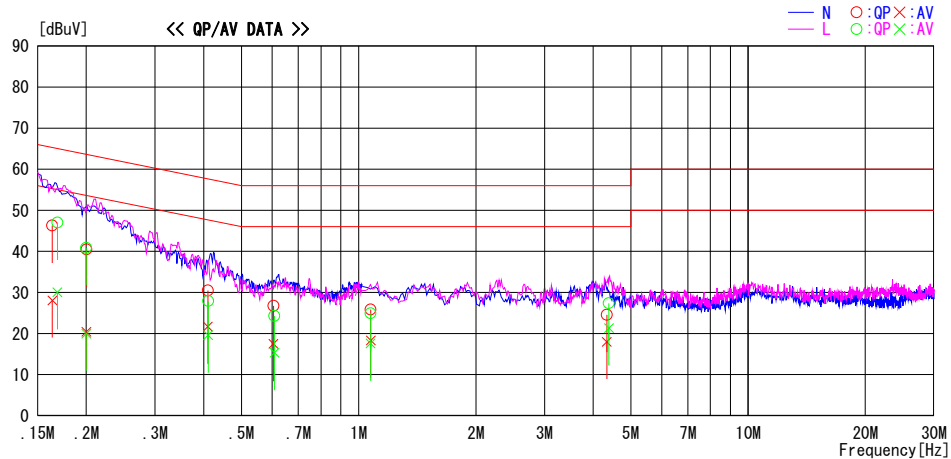
**DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No. 2 Semi Anechoic Chamber  
Date : 2014/03/05

Report No. : 10195552-001H  
Power : AC 120V / 60Hz  
Temp./Humi. : 20deg. C / 31% RH  
Engineer : Takumi Shimada

Mode / Remarks : Tx 11n20\_MCS1\_5320MHz\_Ant(Laird)

LIMIT : FCC15.207 QP  
FCC15.207 AV



| Frequency<br>[MHz] | Reading Level |              | Corr.<br>Factor<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] |       |         |
| 0.16355            | 33.1          | 14.9         | 13.2                    | 46.3         | 28.1         | 65.3         | 55.3         | 19.0       | 27.2       | N     |         |
| 0.20013            | 27.3          | 7.2          | 13.2                    | 40.5         | 20.4         | 63.6         | 53.6         | 23.1       | 33.2       | N     |         |
| 0.41010            | 17.3          | 8.5          | 13.2                    | 30.5         | 21.7         | 57.6         | 47.6         | 27.1       | 25.9       | N     |         |
| 0.60457            | 13.4          | 4.2          | 13.3                    | 26.7         | 17.5         | 56.0         | 46.0         | 29.3       | 28.5       | N     |         |
| 1.07413            | 12.4          | 4.9          | 13.4                    | 25.8         | 18.3         | 56.0         | 46.0         | 30.2       | 27.7       | N     |         |
| 4.33930            | 10.8          | 4.2          | 13.8                    | 24.6         | 18.0         | 56.0         | 46.0         | 31.4       | 28.0       | N     |         |
| 0.16843            | 33.8          | 16.9         | 13.2                    | 47.0         | 30.1         | 65.0         | 55.0         | 18.0       | 24.9       | L     |         |
| 0.20000            | 27.6          | 6.8          | 13.2                    | 40.8         | 20.0         | 63.6         | 53.6         | 22.8       | 33.6       | L     |         |
| 0.41100            | 14.7          | 6.4          | 13.2                    | 27.9         | 19.6         | 57.6         | 47.6         | 29.7       | 28.0       | L     |         |
| 0.60820            | 11.0          | 2.0          | 13.3                    | 24.3         | 15.3         | 56.0         | 46.0         | 31.7       | 30.7       | L     |         |
| 1.07246            | 11.5          | 4.2          | 13.4                    | 24.9         | 17.6         | 56.0         | 46.0         | 31.1       | 28.4       | L     |         |
| 4.39254            | 13.6          | 7.5          | 13.8                    | 27.4         | 21.3         | 56.0         | 46.0         | 28.6       | 24.7       | L     |         |

CHART:WITH FACTOR,Peak hold data. CALCULATION:RESULT=READING+C.F(LISN LOSS + ATT LOSS + CABLE LOSS)  
Except for the above table : adequate margin data below the limits.

## Radiated Spurious Emission [Molex antenna]

|                       |                                            |                   |                   |
|-----------------------|--------------------------------------------|-------------------|-------------------|
| Test place            | Head Office EMC Lab. No.2 Anechoic Chamber |                   |                   |
| Report No.            | 10195552-001H                              |                   |                   |
| Date                  | 3/6/2014                                   | 3/12/2014         | 3/13/2014         |
| Temperature/ Humidity | 20deg. C / 31% RH                          | 20deg. C / 32% RH | 20deg. C / 37% RH |
| Engineer              | Takumi Shimada                             | Hiroshi Kukita    | Keisuke Kawamura  |
|                       | (1-10GHz)                                  | (10-18GHz)        | (18-40GHz)        |
| Mode                  | 11n-20 Tx 5180MHz                          |                   |                   |

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Inside or Outside<br>of Restricted Bands | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|------------------------------------------|--------|
| Hori     | 4731.997           | PK       | 47.0              | 31.7               | 3.6          | 33.9         | -                   | 48.4               | 73.9              | 25.5           | Inside                                   |        |
| Hori     | 5150.000           | PK       | 48.0              | 32.2               | 3.8          | 33.9         | -                   | 50.1               | 68.2              | 18.1           | Bandedge                                 |        |
| Hori     | 10360.000          | PK       | 44.6              | 39.1               | -2.5         | 34.2         | -                   | 47.0               | 68.2              | 21.2           | Outside                                  |        |
| Hori     | 15540.000          | PK       | 44.1              | 39.7               | -0.8         | 33.1         | -                   | 49.9               | 73.9              | 24.0           | Inside                                   |        |
| Hori     | 4731.997           | AV       | 40.1              | 31.7               | 3.6          | 33.9         | -                   | 41.5               | 53.9              | 12.4           | Inside                                   |        |
| Hori     | 5150.000           | AV       | 38.3              | 32.2               | 3.8          | 33.9         | 0.2                 | 40.6               | 53.9              | 13.3           | Bandedge                                 |        |
| Hori     | 15540.000          | AV       | 35.8              | 39.7               | -0.8         | 33.1         | 0.2                 | 41.8               | 53.9              | 12.1           | Inside                                   |        |
| Vert     | 4731.965           | PK       | 48.0              | 31.7               | 3.6          | 33.9         | -                   | 49.4               | 73.9              | 24.5           | Inside                                   |        |
| Vert     | 5150.000           | PK       | 50.3              | 32.2               | 3.8          | 33.9         | -                   | 52.4               | 68.2              | 15.8           | Bandedge                                 |        |
| Vert     | 10360.000          | PK       | 45.2              | 39.1               | -2.5         | 34.2         | -                   | 47.6               | 68.2              | 20.6           | Outside                                  |        |
| Vert     | 15540.000          | PK       | 44.7              | 39.7               | -0.8         | 33.1         | -                   | 50.5               | 73.9              | 23.4           | Inside                                   |        |
| Vert     | 4731.965           | AV       | 41.1              | 31.7               | 3.6          | 33.9         | -                   | 42.5               | 53.9              | 11.4           | Inside                                   |        |
| Vert     | 5150.000           | AV       | 38.6              | 32.2               | 3.8          | 33.9         | 0.2                 | 40.9               | 53.9              | 13.0           | Bandedge                                 |        |
| Vert     | 15540.000          | AV       | 36.1              | 39.7               | -0.8         | 33.1         | 0.2                 | 42.1               | 53.9              | 11.8           | Inside                                   |        |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier) + Duty Factor(AV)

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

Distance factor:      10GHz-26.5GHz    20log(3.0m/1.0m)= 9.5dB  
                                 26.5GHz-40GHz    20log(3.0m/0.5m)=15.6dB

## Radiated Spurious Emission [Molex antenna]

|                       |                                            |                              |                                |
|-----------------------|--------------------------------------------|------------------------------|--------------------------------|
| Test place            | Head Office EMC Lab. No.2 Anechoic Chamber |                              |                                |
| Report No.            | 10195552-001H                              |                              |                                |
| Date                  | 3/6/2014                                   | 3/12/2014                    | 3/13/2014                      |
| Temperature/ Humidity | 20deg. C / 31% RH                          | 20deg. C / 32% RH            | 20deg. C / 37% RH              |
| Engineer              | Takumi Shimada<br>(1-10GHz)                | Hiroshi Kukita<br>(10-18GHz) | Keisuke Kawamura<br>(18-40GHz) |
| Mode                  | 11n-20 Tx 5240MHz                          |                              |                                |

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Inside or Outside<br>of Restricted Bands | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|------------------------------------------|--------|
| Hori     | 4783.957           | PK       | 47.8              | 31.8               | 3.7          | 33.9         | -                   | 49.4               | 73.9              | 24.5           | Inside                                   |        |
| Hori     | 10480.000          | PK       | 44.2              | 39.2               | -2.3         | 34.1         | -                   | 47.0               | 68.2              | 21.2           | Outside                                  |        |
| Hori     | 15720.000          | PK       | 44.9              | 39.1               | -0.7         | 33.2         | -                   | 50.1               | 73.9              | 23.8           | Inside                                   |        |
| Hori     | 4783.957           | AV       | 40.9              | 31.8               | 3.7          | 33.9         | -                   | 42.5               | 53.9              | 11.4           | Inside                                   |        |
| Hori     | 15720.000          | AV       | 36.4              | 39.1               | -0.7         | 33.2         | 0.2                 | 41.8               | 53.9              | 12.1           | Inside                                   |        |
| Vert     | 4783.983           | PK       | 48.4              | 31.8               | 3.7          | 33.9         | -                   | 50.0               | 73.9              | 23.9           | Inside                                   |        |
| Vert     | 10480.000          | PK       | 44.2              | 39.2               | -2.3         | 34.1         | -                   | 47.0               | 68.2              | 21.2           | Outside                                  |        |
| Vert     | 15720.000          | PK       | 45.5              | 39.1               | -0.7         | 33.2         | -                   | 50.7               | 73.9              | 23.2           | Inside                                   |        |
| Vert     | 4783.983           | AV       | 40.8              | 31.8               | 3.7          | 33.9         | -                   | 42.4               | 53.9              | 11.5           | Inside                                   |        |
| Vert     | 15720.000          | AV       | 35.7              | 39.1               | -0.7         | 33.2         | 0.2                 | 41.1               | 53.9              | 12.8           | Inside                                   |        |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier) + Duty Factor(AV)

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

Distance factor:    10GHz-26.5GHz    20log(3.0m/1.0m)= 9.5dB  
                             26.5GHz-40GHz    20log(3.0m/0.5m)=15.6dB

## Radiated Spurious Emission [Molex antenna]

|                       |                                            |                              |                                              |
|-----------------------|--------------------------------------------|------------------------------|----------------------------------------------|
| Test place            | Head Office EMC Lab. No.2 Anechoic Chamber |                              |                                              |
| Report No.            | 10195552-001H                              |                              |                                              |
| Date                  | 3/6/2014                                   | 3/12/2014                    | 3/13/2014                                    |
| Temperature/ Humidity | 20deg. C / 31% RH                          | 20deg. C / 32% RH            | 20deg. C / 37% RH                            |
| Engineer              | Takumi Shimada<br>(1-10GHz)                | Hiroshi Kukita<br>(10-18GHz) | Keisuke Kawamura<br>(18-40GHz / 30M-1000MHz) |
| Mode                  | 11n-20 Tx 5320MHz                          |                              |                                              |

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Inside or Outside<br>of Restricted Bands | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|------------------------------------------|--------|
| Hori     | 52.551             | QP       | 27.8              | 10.0               | 7.0          | 28.5         | -                   | 16.3               | 40.0              | 23.7           | Outside                                  |        |
| Hori     | 164.999            | QP       | 22.5              | 15.5               | 7.9          | 28.1         | -                   | 17.8               | 43.5              | 25.7           | Inside                                   |        |
| Hori     | 367.666            | QP       | 21.9              | 16.4               | 9.0          | 28.1         | -                   | 19.2               | 46.0              | 26.8           | Outside                                  |        |
| Hori     | 411.427            | QP       | 28.4              | 17.4               | 9.2          | 28.4         | -                   | 26.6               | 46.0              | 19.4           | Outside                                  |        |
| Hori     | 499.995            | QP       | 31.7              | 18.1               | 9.5          | 28.8         | -                   | 30.5               | 46.0              | 15.5           | Outside                                  |        |
| Hori     | 639.767            | QP       | 34.6              | 19.8               | 10.1         | 28.8         | -                   | 35.7               | 46.0              | 10.3           | Outside                                  |        |
| Hori     | 4809.967           | PK       | 47.3              | 31.8               | 3.7          | 33.9         | -                   | 48.9               | 73.9              | 25.0           | Inside                                   |        |
| Hori     | 5350.000           | PK       | 52.6              | 32.2               | 3.8          | 33.7         | -                   | 54.9               | 68.2              | 13.3           | Bandedge                                 |        |
| Hori     | 10640.000          | PK       | 48.0              | 39.3               | -2.3         | 34.0         | -                   | 51.0               | 73.9              | 22.9           | Inside                                   |        |
| Hori     | 15960.000          | PK       | 45.4              | 38.4               | -0.7         | 33.3         | -                   | 49.8               | 73.9              | 24.1           | Inside                                   |        |
| Hori     | 4809.967           | AV       | 40.0              | 31.8               | 3.7          | 33.9         | -                   | 41.6               | 53.9              | 12.3           | Inside                                   |        |
| Hori     | 5350.000           | AV       | 42.7              | 32.2               | 3.8          | 33.7         | 0.2                 | 45.2               | 53.9              | 8.7            | Bandedge                                 |        |
| Hori     | 10640.000          | AV       | 39.6              | 39.3               | -2.3         | 34.0         | 0.2                 | 42.8               | 53.9              | 11.1           | Inside                                   |        |
| Hori     | 15960.000          | AV       | 36.1              | 38.4               | -0.7         | 33.3         | 0.2                 | 40.7               | 53.9              | 13.2           | Inside                                   |        |
| Vert     | 52.551             | QP       | 42.8              | 10.0               | 7.0          | 28.5         | -                   | 31.3               | 40.0              | 8.7            | Outside                                  |        |
| Vert     | 77.851             | QP       | 32.6              | 6.4                | 7.2          | 28.6         | -                   | 17.6               | 40.0              | 22.4           | Outside                                  |        |
| Vert     | 114.351            | QP       | 25.8              | 12.1               | 7.6          | 28.4         | -                   | 17.1               | 43.5              | 26.4           | Inside                                   |        |
| Vert     | 411.427            | QP       | 27.8              | 17.4               | 9.2          | 28.4         | -                   | 26.0               | 46.0              | 20.0           | Outside                                  |        |
| Vert     | 499.995            | QP       | 26.8              | 18.1               | 9.5          | 28.8         | -                   | 25.6               | 46.0              | 20.4           | Outside                                  |        |
| Vert     | 640.767            | QP       | 29.8              | 19.8               | 10.1         | 28.8         | -                   | 30.9               | 46.0              | 15.1           | Outside                                  |        |
| Vert     | 4809.966           | PK       | 47.3              | 31.8               | 3.7          | 33.9         | -                   | 48.9               | 73.9              | 25.0           | Inside                                   |        |
| Vert     | 5350.000           | PK       | 49.6              | 32.2               | 3.8          | 33.7         | -                   | 51.9               | 68.2              | 16.3           | Bandedge                                 |        |
| Vert     | 10640.000          | PK       | 52.5              | 39.3               | -2.3         | 34.0         | -                   | 55.5               | 73.9              | 18.4           | Inside                                   |        |
| Vert     | 15960.000          | PK       | 45.9              | 38.4               | -0.7         | 33.3         | -                   | 50.3               | 73.9              | 23.6           | Inside                                   |        |
| Vert     | 4809.966           | AV       | 39.2              | 31.8               | 3.7          | 33.9         | -                   | 40.8               | 53.9              | 13.1           | Inside                                   |        |
| Vert     | 5350.000           | AV       | 39.2              | 32.2               | 3.8          | 33.7         | 0.2                 | 41.7               | 53.9              | 12.2           | Bandedge                                 |        |
| Vert     | 10640.000          | AV       | 44.3              | 39.3               | -2.3         | 34.0         | 0.2                 | 47.5               | 53.9              | 6.4            | Inside                                   |        |
| Vert     | 15960.000          | AV       | 36.5              | 38.4               | -0.7         | 33.3         | 0.2                 | 41.1               | 53.9              | 12.8           | Inside                                   |        |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier) + Duty Factor(AV)

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

Distance factor:      10GHz-26.5GHz      20log(3.0m/1.0m)= 9.5dB  
                                 26.5GHz-40GHz      20log(3.0m/0.5m)=15.6dB

## Radiated Spurious Emission [Molex antenna]

Test place : Head Office EMC Lab. No.2 Anechoic Chamber  
Report No. : 10195552-001H  
Date : 3/6/2014                      3/12/2014                      3/13/2014  
Temperature/ Humidity : 20deg. C / 31% RH      20deg. C / 32% RH      20deg. C / 37% RH  
Engineer : Takumi Shimada      Hiroshi Kukita      Keisuke Kawamura  
              (1-10GHz)                      (10-18GHz)                      (18-40GHz)  
Mode : 11n-40 Tx 5190MHz

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Inside or Outside<br>of Restricted Bands | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|------------------------------------------|--------|
| Hori     | 4783.945           | PK       | 50.3              | 31.8               | 3.7          | 33.9         | -                   | 51.9               | 73.9              | 22.0           | Inside                                   |        |
| Hori     | 5150.000           | PK       | 50.3              | 32.2               | 3.8          | 33.9         | -                   | 52.4               | 68.2              | 15.8           | Bandedge                                 |        |
| Hori     | 10380.000          | PK       | 44.1              | 39.1               | -2.5         | 34.2         | -                   | 46.5               | 68.2              | 21.7           | Outside                                  |        |
| Hori     | 15570.000          | PK       | 44.5              | 39.6               | -0.8         | 33.2         | -                   | 50.1               | 73.9              | 23.8           | Inside                                   |        |
| Hori     | 4783.945           | AV       | 42.3              | 31.8               | 3.7          | 33.9         | -                   | 43.9               | 53.9              | 10.0           | Inside                                   |        |
| Hori     | 5150.000           | AV       | 39.3              | 32.2               | 3.8          | 33.9         | 0.8                 | 42.2               | 53.9              | 11.7           | Bandedge                                 |        |
| Hori     | 15570.000          | AV       | 36.2              | 39.6               | -0.8         | 33.2         | 0.8                 | 42.6               | 53.9              | 11.3           | Inside                                   |        |
| Vert     | 4783.962           | PK       | 51.3              | 31.8               | 3.7          | 33.9         | -                   | 52.9               | 73.9              | 21.0           | Inside                                   |        |
| Vert     | 5150.000           | PK       | 48.4              | 32.2               | 3.8          | 33.9         | -                   | 50.5               | 68.2              | 17.7           | Bandedge                                 |        |
| Vert     | 10380.000          | PK       | 43.8              | 39.1               | -2.5         | 34.2         | -                   | 46.2               | 68.2              | 22.0           | Outside                                  |        |
| Vert     | 15570.000          | PK       | 44.9              | 39.6               | -0.8         | 33.2         | -                   | 50.5               | 73.9              | 23.4           | Inside                                   |        |
| Vert     | 4783.962           | AV       | 44.5              | 31.8               | 3.7          | 33.9         | -                   | 46.1               | 53.9              | 7.8            | Inside                                   |        |
| Vert     | 5150.000           | AV       | 37.2              | 32.2               | 3.8          | 33.9         | 0.8                 | 40.1               | 53.9              | 13.8           | Bandedge                                 |        |
| Vert     | 15570.000          | AV       | 35.8              | 39.6               | -0.8         | 33.2         | 0.8                 | 42.2               | 53.9              | 11.7           | Inside                                   |        |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier) + Duty Factor(AV)

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

Distance factor:      10GHz-26.5GHz      20log(3.0m/1.0m)= 9.5dB  
                              26.5GHz-40GHz      20log(3.0m/0.5m)=15.6dB

## Radiated Spurious Emission [Molex antenna]

|                       |                                            |                   |                   |
|-----------------------|--------------------------------------------|-------------------|-------------------|
| Test place            | Head Office EMC Lab. No.2 Anechoic Chamber |                   |                   |
| Report No.            | 10195552-001H                              |                   |                   |
| Date                  | 3/6/2014                                   | 3/12/2014         | 3/13/2014         |
| Temperature/ Humidity | 20deg. C / 31% RH                          | 20deg. C / 32% RH | 20deg. C / 37% RH |
| Engineer              | Takumi Shimada                             | Hiroshi Kukita    | Keisuke Kawamura  |
|                       | (1-10GHz)                                  | (10-18GHz)        | (18-40GHz)        |
| Mode                  | 11n-40 Tx 5230MHz                          |                   |                   |

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Inside or Outside<br>of Restricted Bands | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|------------------------------------------|--------|
| Hori     | 4731.986           | PK       | 49.4              | 31.7               | 3.6          | 33.9         | -                   | 50.8               | 73.9              | 23.1           | Inside                                   |        |
| Hori     | 10460.000          | PK       | 44.6              | 39.2               | -2.3         | 34.1         | -                   | 47.4               | 68.2              | 20.8           | Outside                                  |        |
| Hori     | 15690.000          | PK       | 45.4              | 39.2               | -0.7         | 33.2         | -                   | 50.7               | 73.9              | 23.2           | Inside                                   |        |
| Hori     | 4731.986           | AV       | 41.9              | 31.7               | 3.6          | 33.9         | -                   | 43.3               | 53.9              | 10.6           | Inside                                   |        |
| Hori     | 15690.000          | AV       | 36.2              | 39.2               | -0.7         | 33.2         | 0.8                 | 42.3               | 53.9              | 11.6           | Inside                                   |        |
| Vert     | 4731.986           | PK       | 48.9              | 31.7               | 3.6          | 33.9         | -                   | 50.3               | 73.9              | 23.6           | Inside                                   |        |
| Vert     | 10460.000          | PK       | 47.2              | 39.2               | -2.3         | 34.1         | -                   | 50.0               | 68.2              | 18.2           | Outside                                  |        |
| Vert     | 15690.000          | PK       | 45.5              | 39.2               | -0.7         | 33.2         | -                   | 50.8               | 73.9              | 23.1           | Inside                                   |        |
| Vert     | 4731.986           | AV       | 42.1              | 31.7               | 3.6          | 33.9         | -                   | 43.5               | 53.9              | 10.4           | Inside                                   |        |
| Vert     | 15690.000          | AV       | 36.5              | 39.2               | -0.7         | 33.2         | 0.8                 | 42.6               | 53.9              | 11.3           | Inside                                   |        |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier) + Duty Factor(AV)

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

Distance factor:      10GHz-26.5GHz    20log(3.0m/1.0m)= 9.5dB  
                              26.5GHz-40GHz    20log(3.0m/0.5m)=15.6dB

## Radiated Spurious Emission [Molex antenna]

|                       |                                            |                   |                   |
|-----------------------|--------------------------------------------|-------------------|-------------------|
| Test place            | Head Office EMC Lab. No.2 Anechoic Chamber |                   |                   |
| Report No.            | 10195552-001H                              |                   |                   |
| Date                  | 3/6/2014                                   | 3/12/2014         | 3/13/2014         |
| Temperature/ Humidity | 20deg. C / 31% RH                          | 20deg. C / 32% RH | 20deg. C / 37% RH |
| Engineer              | Takumi Shimada                             | Hiroshi Kukita    | Keisuke Kawamura  |
|                       | (1-10GHz)                                  | (10-18GHz)        | (18-40GHz)        |
| Mode                  | 11n-40 Tx 5310MHz                          |                   |                   |

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Inside or Outside<br>of Restricted Bands | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|------------------------------------------|--------|
| Hori     | 4783.908           | PK       | 52.4              | 31.8               | 3.7          | 33.9         | -                   | 54.0               | 73.9              | 19.9           | Inside                                   |        |
| Hori     | 5350.000           | PK       | 60.8              | 32.2               | 3.8          | 33.7         | -                   | 63.1               | 68.2              | 5.1            | Bandedge                                 |        |
| Hori     | 10620.000          | PK       | 46.9              | 39.3               | -2.3         | 34.0         | -                   | 49.9               | 73.9              | 24.0           | Inside                                   |        |
| Hori     | 15930.000          | PK       | 45.7              | 38.5               | -0.8         | 33.3         | -                   | 50.1               | 73.9              | 23.8           | Inside                                   |        |
| Hori     | 4783.908           | AV       | 45.1              | 31.8               | 3.7          | 33.9         | -                   | 46.7               | 53.9              | 7.2            | Inside                                   |        |
| Hori     | 5350.000           | AV       | 48.4              | 32.2               | 3.8          | 33.7         | 0.8                 | 51.5               | 53.9              | 2.4            | Bandedge                                 |        |
| Hori     | 10620.000          | AV       | 37.6              | 39.3               | -2.3         | 34.0         | 0.8                 | 41.4               | 53.9              | 12.5           | Inside                                   |        |
| Hori     | 15930.000          | AV       | 36.4              | 38.5               | -0.8         | 33.3         | 0.8                 | 41.6               | 53.9              | 12.3           | Inside                                   |        |
| Vert     | 4783.908           | PK       | 49.8              | 31.8               | 3.7          | 33.9         | -                   | 51.4               | 73.9              | 22.5           | Inside                                   |        |
| Vert     | 5350.000           | PK       | 57.2              | 32.2               | 3.8          | 33.7         | -                   | 59.5               | 68.2              | 8.7            | Bandedge                                 |        |
| Vert     | 10620.000          | PK       | 48.5              | 39.3               | -2.3         | 34.0         | -                   | 51.5               | 73.9              | 22.4           | Inside                                   |        |
| Vert     | 15930.000          | PK       | 44.2              | 38.5               | -0.8         | 33.3         | -                   | 48.6               | 73.9              | 25.3           | Inside                                   |        |
| Vert     | 4783.908           | AV       | 43.0              | 31.8               | 3.7          | 33.9         | -                   | 44.6               | 53.9              | 9.3            | Inside                                   |        |
| Vert     | 5350.000           | AV       | 45.1              | 32.2               | 3.8          | 33.7         | 0.8                 | 47.4               | 53.9              | 6.5            | Bandedge                                 |        |
| Vert     | 10620.000          | AV       | 38.8              | 39.3               | -2.3         | 34.0         | 0.8                 | 42.6               | 53.9              | 11.3           | Inside                                   |        |
| Vert     | 15930.000          | AV       | 36.0              | 38.5               | -0.8         | 33.3         | 0.8                 | 41.2               | 53.9              | 12.7           | Inside                                   |        |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier) + Duty Factor(AV)

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

Distance factor:      10GHz-26.5GHz      20log(3.0m/1.0m)= 9.5dB  
                             26.5GHz-40GHz      20log(3.0m/0.5m)=15.6dB

## Radiated Spurious Emission [Laird antenna]

|                       |                                            |                              |                                |
|-----------------------|--------------------------------------------|------------------------------|--------------------------------|
| Test place            | Head Office EMC Lab. No.2 Anechoic Chamber |                              |                                |
| Report No.            | 10195552-001H                              |                              |                                |
| Date                  | 3/6/2014                                   | 3/12/2014                    | 3/13/2014                      |
| Temperature/ Humidity | 20deg. C / 31% RH                          | 20deg. C / 32% RH            | 20deg. C / 37% RH              |
| Engineer              | Takumi Shimada<br>(1-10GHz)                | Hiroshi Kukita<br>(10-18GHz) | Keisuke Kawamura<br>(18-40GHz) |
| Mode                  | 11n-20 Tx 5180MHz                          |                              |                                |

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Inside or Outside<br>of Restricted Bands | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|------------------------------------------|--------|
| Hori     | 4731.930           | PK       | 49.5              | 31.7               | 3.6          | 33.9         | -                   | 50.9               | 73.9              | 23.0           | Inside                                   |        |
| Hori     | 5150.000           | PK       | 49.8              | 32.2               | 3.8          | 33.9         | -                   | 51.9               | 68.2              | 16.3           | Bandedge                                 |        |
| Hori     | 10360.000          | PK       | 45.0              | 39.1               | -2.5         | 34.2         | -                   | 47.4               | 68.2              | 20.8           | Outside                                  |        |
| Hori     | 15540.000          | PK       | 44.7              | 39.7               | -0.8         | 33.1         | -                   | 50.5               | 73.9              | 23.4           | Inside                                   |        |
| Hori     | 4731.930           | AV       | 41.8              | 31.7               | 3.6          | 33.9         | -                   | 43.2               | 53.9              | 10.7           | Inside                                   |        |
| Hori     | 5150.000           | AV       | 40.4              | 32.2               | 3.8          | 33.9         | 0.2                 | 42.7               | 53.9              | 11.2           | Bandedge                                 |        |
| Hori     | 15540.000          | AV       | 36.4              | 39.7               | -0.8         | 33.1         | 0.2                 | 42.4               | 53.9              | 11.5           | Inside                                   |        |
| Vert     | 4731.930           | PK       | 46.8              | 31.7               | 3.6          | 33.9         | -                   | 48.2               | 73.9              | 25.7           | Inside                                   |        |
| Vert     | 5150.000           | PK       | 48.8              | 32.2               | 3.8          | 33.9         | -                   | 50.9               | 68.2              | 17.3           | Bandedge                                 |        |
| Vert     | 10360.000          | PK       | 44.3              | 39.1               | -2.5         | 34.2         | -                   | 46.7               | 68.2              | 21.5           | Outside                                  |        |
| Vert     | 15540.000          | PK       | 44.6              | 39.7               | -0.8         | 33.1         | -                   | 50.4               | 73.9              | 23.5           | Inside                                   |        |
| Vert     | 4731.930           | AV       | 38.3              | 31.7               | 3.6          | 33.9         | -                   | 39.7               | 53.9              | 14.2           | Inside                                   |        |
| Vert     | 5150.000           | AV       | 39.2              | 32.2               | 3.8          | 33.9         | 0.2                 | 41.5               | 53.9              | 12.4           | Bandedge                                 |        |
| Vert     | 15540.000          | AV       | 36.3              | 39.7               | -0.8         | 33.1         | 0.2                 | 42.3               | 53.9              | 11.6           | Inside                                   |        |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier) + Duty Factor(AV)

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

Distance factor:    10GHz-26.5GHz    20log(3.0m/1.0m)= 9.5dB  
                             26.5GHz-40GHz    20log(3.0m/0.5m)=15.6dB

## Radiated Spurious Emission [Laird antenna]

|                       |                                            |                              |                                |
|-----------------------|--------------------------------------------|------------------------------|--------------------------------|
| Test place            | Head Office EMC Lab. No.2 Anechoic Chamber |                              |                                |
| Report No.            | 10195552-001H                              |                              |                                |
| Date                  | 3/6/2014                                   | 3/12/2014                    | 3/13/2014                      |
| Temperature/ Humidity | 20deg. C / 31% RH                          | 20deg. C / 32% RH            | 20deg. C / 37% RH              |
| Engineer              | Takumi Shimada<br>(1-10GHz)                | Hiroshi Kukita<br>(10-18GHz) | Keisuke Kawamura<br>(18-40GHz) |
| Mode                  | 11n-20 Tx 5240MHz                          |                              |                                |

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Inside or Outside<br>of Restricted Bands | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|------------------------------------------|--------|
| Hori     | 4783.978           | PK       | 49.0              | 31.8               | 3.7          | 33.9         | -                   | 50.6               | 73.9              | 23.3           | Inside                                   |        |
| Hori     | 10480.000          | PK       | 45.0              | 39.2               | -2.3         | 34.1         | -                   | 47.8               | 68.2              | 20.4           | Outside                                  |        |
| Hori     | 15720.000          | PK       | 45.5              | 39.1               | -0.7         | 33.2         | -                   | 50.7               | 73.9              | 23.2           | Inside                                   |        |
| Hori     | 4783.978           | AV       | 40.8              | 31.8               | 3.7          | 33.9         | -                   | 42.4               | 53.9              | 11.5           | Inside                                   |        |
| Hori     | 15720.000          | AV       | 36.5              | 39.1               | -0.7         | 33.2         | 0.2                 | 41.9               | 53.9              | 12.0           | Inside                                   |        |
| Vert     | 4783.980           | PK       | 47.7              | 31.8               | 3.7          | 33.9         | -                   | 49.3               | 73.9              | 24.6           | Inside                                   |        |
| Vert     | 10480.000          | PK       | 45.3              | 39.2               | -2.3         | 34.1         | -                   | 48.1               | 68.2              | 20.1           | Outside                                  |        |
| Vert     | 15720.000          | PK       | 45.6              | 39.1               | -0.7         | 33.2         | -                   | 50.8               | 73.9              | 23.1           | Inside                                   |        |
| Vert     | 4783.980           | AV       | 40.2              | 31.8               | 3.7          | 33.9         | -                   | 41.8               | 53.9              | 12.1           | Inside                                   |        |
| Vert     | 15720.000          | AV       | 36.2              | 39.1               | -0.7         | 33.2         | 0.2                 | 41.6               | 53.9              | 12.3           | Inside                                   |        |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier) + Duty Factor(AV)

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

Distance factor:    10GHz-26.5GHz    20log(3.0m/1.0m)= 9.5dB  
                             26.5GHz-40GHz    20log(3.0m/0.5m)=15.6dB

## Radiated Spurious Emission [Laird antenna]

|                       |                                            |                              |                                              |
|-----------------------|--------------------------------------------|------------------------------|----------------------------------------------|
| Test place            | Head Office EMC Lab. No.2 Anechoic Chamber |                              |                                              |
| Report No.            | 10195552-001H                              |                              |                                              |
| Date                  | 3/6/2014                                   | 3/12/2014                    | 3/13/2014                                    |
| Temperature/ Humidity | 20deg. C / 31% RH                          | 20deg. C / 32% RH            | 20deg. C / 37% RH                            |
| Engineer              | Takumi Shimada<br>(1-10GHz)                | Hiroshi Kukita<br>(10-18GHz) | Keisuke Kawamura<br>(18-40GHz / 30M-1000MHz) |
| Mode                  | 11n-20 Tx 5320MHz                          |                              |                                              |

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Inside or Outside<br>of Restricted Bands | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|------------------------------------------|--------|
| Hori     | 52.551             | QP       | 27.3              | 10.0               | 7.0          | 28.5         | -                   | 15.8               | 40.0              | 24.2           | Outside                                  |        |
| Hori     | 159.599            | QP       | 22.3              | 15.2               | 7.9          | 28.1         | -                   | 17.3               | 43.5              | 26.2           | Outside                                  |        |
| Hori     | 411.427            | QP       | 28.1              | 17.4               | 9.2          | 28.4         | -                   | 26.3               | 46.0              | 19.7           | Outside                                  |        |
| Hori     | 499.995            | QP       | 33.4              | 18.1               | 9.5          | 28.8         | -                   | 32.2               | 46.0              | 13.8           | Outside                                  |        |
| Hori     | 576.499            | QP       | 26.7              | 19.2               | 9.8          | 28.8         | -                   | 26.9               | 46.0              | 19.1           | Outside                                  |        |
| Hori     | 639.767            | QP       | 32.7              | 19.8               | 10.1         | 28.8         | -                   | 33.8               | 46.0              | 12.2           | Outside                                  |        |
| Hori     | 4809.980           | PK       | 45.9              | 31.8               | 3.7          | 33.9         | -                   | 47.5               | 73.9              | 26.4           | Inside                                   |        |
| Hori     | 5350.000           | PK       | 51.5              | 32.2               | 3.8          | 33.7         | -                   | 53.8               | 68.2              | 14.4           | Bandedge                                 |        |
| Hori     | 10640.000          | PK       | 48.0              | 39.3               | -2.3         | 34.0         | -                   | 51.0               | 73.9              | 22.9           | Inside                                   |        |
| Hori     | 15960.000          | PK       | 45.2              | 38.4               | -0.7         | 33.3         | -                   | 49.6               | 73.9              | 24.3           | Inside                                   |        |
| Hori     | 4809.980           | AV       | 37.1              | 31.8               | 3.7          | 33.9         | -                   | 38.7               | 53.9              | 15.2           | Inside                                   |        |
| Hori     | 5350.000           | AV       | 42.0              | 32.2               | 3.8          | 33.7         | 0.2                 | 44.5               | 53.9              | 9.4            | Bandedge                                 |        |
| Hori     | 10640.000          | AV       | 37.6              | 39.3               | -2.3         | 34.0         | 0.2                 | 40.6               | 53.9              | 13.3           | Inside                                   |        |
| Hori     | 15960.000          | AV       | 36.2              | 38.4               | -0.7         | 33.3         | 0.2                 | 40.6               | 53.9              | 13.3           | Inside                                   |        |
| Vert     | 52.551             | QP       | 42.3              | 10.0               | 7.0          | 28.5         | -                   | 30.8               | 40.0              | 9.2            | Outside                                  |        |
| Vert     | 77.851             | QP       | 32.1              | 6.4                | 7.2          | 28.6         | -                   | 17.1               | 40.0              | 22.9           | Outside                                  |        |
| Vert     | 112.031            | QP       | 26.2              | 11.8               | 7.5          | 28.4         | -                   | 17.1               | 43.5              | 26.4           | Inside                                   |        |
| Vert     | 411.427            | QP       | 27.6              | 17.4               | 9.2          | 28.4         | -                   | 25.8               | 46.0              | 20.2           | Outside                                  |        |
| Vert     | 499.995            | QP       | 28.0              | 18.1               | 9.5          | 28.8         | -                   | 26.8               | 46.0              | 19.2           | Outside                                  |        |
| Vert     | 641.834            | QP       | 27.6              | 19.8               | 10.1         | 28.7         | -                   | 28.8               | 46.0              | 17.2           | Outside                                  |        |
| Vert     | 4809.991           | PK       | 43.7              | 31.8               | 3.7          | 33.9         | -                   | 45.3               | 73.9              | 28.6           | Inside                                   |        |
| Vert     | 5350.000           | PK       | 50.8              | 32.2               | 3.8          | 33.7         | -                   | 53.1               | 68.2              | 15.1           | Bandedge                                 |        |
| Vert     | 10640.000          | PK       | 50.3              | 39.3               | -2.3         | 34.0         | -                   | 53.3               | 73.9              | 20.6           | Inside                                   |        |
| Vert     | 15960.000          | PK       | 45.2              | 38.4               | -0.7         | 33.3         | -                   | 49.6               | 73.9              | 24.3           | Inside                                   |        |
| Vert     | 4809.991           | AV       | 34.9              | 31.8               | 3.7          | 33.9         | -                   | 36.5               | 53.9              | 17.4           | Inside                                   |        |
| Vert     | 5350.000           | AV       | 41.7              | 32.2               | 3.8          | 33.7         | 0.2                 | 44.2               | 53.9              | 9.7            | Bandedge                                 |        |
| Vert     | 10640.000          | AV       | 42.2              | 39.3               | -2.3         | 34.0         | 0.2                 | 45.4               | 53.9              | 8.5            | Inside                                   |        |
| Vert     | 15960.000          | AV       | 36.3              | 38.4               | -0.7         | 33.3         | 0.2                 | 40.9               | 53.9              | 13.0           | Inside                                   |        |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier) + Duty Factor(AV)

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

Distance factor:      10GHz-26.5GHz    20log(3.0m/1.0m)= 9.5dB  
                              26.5GHz-40GHz    20log(3.0m/0.5m)=15.6dB

## Radiated Spurious Emission [Laird antenna]

Test place Head Office EMC Lab. No.2 Anechoic Chamber  
Report No. 10195552-001H  
Date 3/6/2014 3/12/2014 3/13/2014  
Temperature/ Humidity 20deg. C / 31% RH 20deg. C / 32% RH 20deg. C / 37% RH  
Engineer Takumi Shimada Hiroshi Kukita Keisuke Kawamura  
(1-10GHz) (10-18GHz) (18-40GHz)  
Mode 11n-40 Tx 5190MHz

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Inside or Outside<br>of Restricted Bands | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|------------------------------------------|--------|
| Hori     | 4783.857           | PK       | 49.2              | 31.8               | 3.7          | 33.9         | -                   | 50.8               | 73.9              | 23.1           | Inside                                   |        |
| Hori     | 5150.000           | PK       | 48.1              | 32.2               | 3.8          | 33.9         | -                   | 50.2               | 68.2              | 18.0           | Bandedge                                 |        |
| Hori     | 10380.000          | PK       | 43.9              | 39.1               | -2.5         | 34.2         | -                   | 46.3               | 68.2              | 21.9           | Outside                                  |        |
| Hori     | 15570.000          | PK       | 44.3              | 39.6               | -0.8         | 33.2         | -                   | 49.9               | 73.9              | 24.0           | Inside                                   |        |
| Hori     | 4783.857           | AV       | 42.1              | 31.8               | 3.7          | 33.9         | -                   | 43.7               | 53.9              | 10.2           | Inside                                   |        |
| Hori     | 5150.000           | AV       | 37.5              | 32.2               | 3.8          | 33.9         | 0.8                 | 40.4               | 53.9              | 13.5           | Bandedge                                 |        |
| Hori     | 15570.000          | AV       | 36.4              | 39.6               | -0.8         | 33.2         | 0.8                 | 42.8               | 53.9              | 11.1           | Inside                                   |        |
| Vert     | 4783.870           | PK       | 46.7              | 31.8               | 3.7          | 33.9         | -                   | 48.3               | 73.9              | 25.6           | Inside                                   |        |
| Vert     | 5150.000           | PK       | 48.4              | 32.2               | 3.8          | 33.9         | -                   | 50.5               | 68.2              | 17.7           | Bandedge                                 |        |
| Vert     | 10380.000          | PK       | 44.5              | 39.1               | -2.5         | 34.2         | -                   | 46.9               | 68.2              | 21.3           | Outside                                  |        |
| Vert     | 15570.000          | PK       | 44.3              | 39.6               | -0.8         | 33.2         | -                   | 49.9               | 73.9              | 24.0           | Inside                                   |        |
| Vert     | 4783.870           | AV       | 39.2              | 31.8               | 3.7          | 33.9         | -                   | 40.8               | 53.9              | 13.1           | Inside                                   |        |
| Vert     | 5150.000           | AV       | 38.2              | 32.2               | 3.8          | 33.9         | 0.8                 | 41.1               | 53.9              | 12.8           | Bandedge                                 |        |
| Vert     | 15570.000          | AV       | 36.2              | 39.6               | -0.8         | 33.2         | 0.8                 | 42.6               | 53.9              | 11.3           | Inside                                   |        |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier) + Duty Factor(AV)

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB  
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

## Radiated Spurious Emission [Laird antenna]

|                       |                                            |                              |                                |
|-----------------------|--------------------------------------------|------------------------------|--------------------------------|
| Test place            | Head Office EMC Lab. No.2 Anechoic Chamber |                              |                                |
| Report No.            | 10195552-001H                              |                              |                                |
| Date                  | 3/6/2014                                   | 3/12/2014                    | 3/13/2014                      |
| Temperature/ Humidity | 20deg. C / 31% RH                          | 20deg. C / 32% RH            | 20deg. C / 37% RH              |
| Engineer              | Takumi Shimada<br>(1-10GHz)                | Hiroshi Kukita<br>(10-18GHz) | Keisuke Kawamura<br>(18-40GHz) |
| Mode                  | 11n-40 Tx 5230MHz                          |                              |                                |

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Inside or Outside<br>of Restricted Bands | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|------------------------------------------|--------|
| Hori     | 4731.969           | PK       | 46.0              | 31.7               | 3.6          | 33.9         | -                   | 47.4               | 73.9              | 26.5           | Inside                                   |        |
| Hori     | 10460.000          | PK       | 44.5              | 39.2               | -2.3         | 34.1         | -                   | 47.3               | 68.2              | 20.9           | Outside                                  |        |
| Hori     | 15690.000          | PK       | 45.4              | 39.2               | -0.7         | 33.2         | -                   | 50.7               | 73.9              | 23.2           | Inside                                   |        |
| Hori     | 4731.969           | AV       | 38.3              | 31.7               | 3.6          | 33.9         | -                   | 39.7               | 53.9              | 14.2           | Inside                                   |        |
| Hori     | 15690.000          | AV       | 36.6              | 39.2               | -0.7         | 33.2         | 0.8                 | 42.7               | 53.9              | 11.2           | Inside                                   |        |
| Vert     | 4731.969           | PK       | 46.8              | 31.7               | 3.6          | 33.9         | -                   | 48.2               | 73.9              | 25.7           | Inside                                   |        |
| Vert     | 10460.000          | PK       | 47.2              | 39.2               | -2.3         | 34.1         | -                   | 50.0               | 68.2              | 18.2           | Outside                                  |        |
| Vert     | 15690.000          | PK       | 45.5              | 39.2               | -0.7         | 33.2         | -                   | 50.8               | 73.9              | 23.1           | Inside                                   |        |
| Vert     | 4731.969           | AV       | 38.8              | 31.7               | 3.6          | 33.9         | -                   | 40.2               | 53.9              | 13.7           | Inside                                   |        |
| Vert     | 15690.000          | AV       | 36.5              | 39.2               | -0.7         | 33.2         | 0.8                 | 42.6               | 53.9              | 11.3           | Inside                                   |        |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier) + Duty Factor(AV)

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

Distance factor:      10GHz-26.5GHz    20log(3.0m/1.0m)= 9.5dB  
                             26.5GHz-40GHz    20log(3.0m/0.5m)=15.6dB

## Radiated Spurious Emission [Laird antenna]

|                       |                                            |                   |                   |
|-----------------------|--------------------------------------------|-------------------|-------------------|
| Test place            | Head Office EMC Lab. No.2 Anechoic Chamber |                   |                   |
| Report No.            | 10195552-001H                              |                   |                   |
| Date                  | 3/6/2014                                   | 3/12/2014         | 3/13/2014         |
| Temperature/ Humidity | 20deg. C / 31% RH                          | 20deg. C / 32% RH | 20deg. C / 37% RH |
| Engineer              | Takumi Shimada                             | Hiroshi Kukita    | Keisuke Kawamura  |
|                       | (1-10GHz)                                  | (10-18GHz)        | (18-40GHz)        |
| Mode                  | 11n-40 Tx 5310MHz                          |                   |                   |

| Polarity | Frequency<br>[MHz] | Detector | Reading<br>[dBuV] | Ant.Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Duty Factor<br>[dB] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Inside or Outside<br>of Restricted Bands | Remark |
|----------|--------------------|----------|-------------------|--------------------|--------------|--------------|---------------------|--------------------|-------------------|----------------|------------------------------------------|--------|
| Hori     | 4783.979           | PK       | 50.2              | 31.8               | 3.7          | 33.9         | -                   | 51.8               | 73.9              | 22.1           | Inside                                   |        |
| Hori     | 5350.000           | PK       | 54.3              | 32.2               | 3.8          | 33.7         | -                   | 56.6               | 68.2              | 11.6           | Bandedge                                 |        |
| Hori     | 10620.000          | PK       | 43.9              | 39.3               | -2.3         | 34.0         | -                   | 46.9               | 73.9              | 27.0           | Inside                                   |        |
| Hori     | 15930.000          | PK       | 45.5              | 38.5               | -0.8         | 33.3         | -                   | 49.9               | 73.9              | 24.0           | Inside                                   |        |
| Hori     | 4783.979           | AV       | 44.1              | 31.8               | 3.7          | 33.9         | -                   | 45.7               | 53.9              | 8.2            | Inside                                   |        |
| Hori     | 5350.000           | AV       | 42.4              | 32.2               | 3.8          | 33.7         | 0.8                 | 45.5               | 53.9              | 8.4            | Bandedge                                 |        |
| Hori     | 10620.000          | AV       | 34.9              | 39.3               | -2.3         | 34.0         | 0.8                 | 38.7               | 53.9              | 15.2           | Inside                                   |        |
| Hori     | 15930.000          | AV       | 36.5              | 38.5               | -0.8         | 33.3         | 0.8                 | 41.7               | 53.9              | 12.2           | Inside                                   |        |
| Vert     | 4783.979           | PK       | 47.4              | 31.8               | 3.7          | 33.9         | -                   | 49.0               | 73.9              | 24.9           | Inside                                   |        |
| Vert     | 5350.000           | PK       | 58.6              | 32.2               | 3.8          | 33.7         | -                   | 60.9               | 68.2              | 7.3            | Bandedge                                 |        |
| Vert     | 10620.000          | PK       | 48.0              | 39.3               | -2.3         | 34.0         | -                   | 51.0               | 73.9              | 22.9           | Inside                                   |        |
| Vert     | 15930.000          | PK       | 44.9              | 38.5               | -0.8         | 33.3         | -                   | 49.3               | 73.9              | 24.6           | Inside                                   |        |
| Vert     | 4783.979           | AV       | 37.6              | 31.8               | 3.7          | 33.9         | -                   | 39.2               | 53.9              | 14.7           | Inside                                   |        |
| Vert     | 5350.000           | AV       | 47.9              | 32.2               | 3.8          | 33.7         | 0.8                 | 50.2               | 53.9              | 3.7            | Bandedge                                 |        |
| Vert     | 10620.000          | AV       | 38.5              | 39.3               | -2.3         | 34.0         | 0.8                 | 42.3               | 53.9              | 11.6           | Inside                                   |        |
| Vert     | 15930.000          | AV       | 36.7              | 38.5               | -0.8         | 33.3         | 0.8                 | 41.9               | 53.9              | 12.0           | Inside                                   |        |

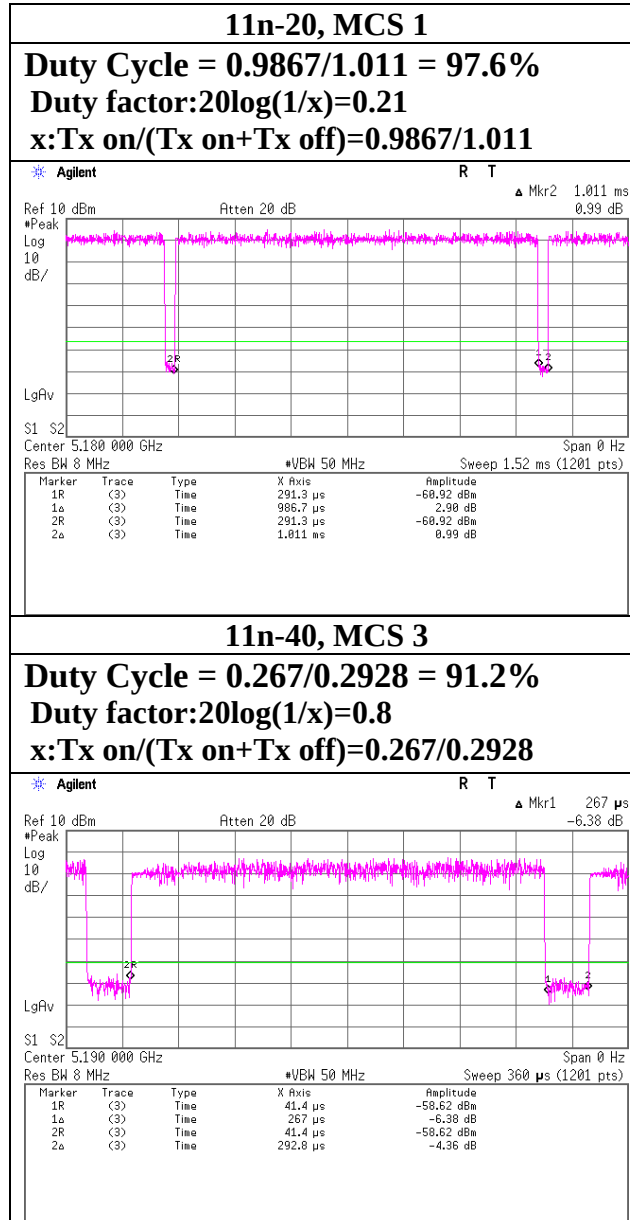
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier) + Duty Factor(AV)

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

Distance factor:      10GHz-26.5GHz      20log(3.0m/1.0m)= 9.5dB  
                             26.5GHz-40GHz      20log(3.0m/0.5m)=15.6dB

## Duty Cycle

Test place Head Office EMC Lab. No.2 Anechoic Chamber  
Report No. 10195552-001H  
Date 3/6/2014  
Temperature/ Humidity 20deg. C / 31% RH  
Engineer Takumi Shimada  
Mode 11n-20 Tx 5180MHz / 11n-40 Tx 5190MHz



## APPENDIX 2: Test instruments

### EMI test equipment

| Control No. | Instrument                       | Manufacturer         | Model No                                   | Serial No                   | Test Item | Calibration Date *<br>Interval(month) |
|-------------|----------------------------------|----------------------|--------------------------------------------|-----------------------------|-----------|---------------------------------------|
| MAEC-02     | Semi Anechoic Chamber(NSA)       | TDK                  | Semi Anechoic Chamber 3m                   | DA-06902                    | RE/CE     | 2013/06/30 * 12                       |
| MOS-22      | Thermo-Hygrometer                | Custom               | CTH-201                                    | 0003                        | RE/CE     | 2014/02/20 * 12                       |
| MJM-14      | Measure                          | KOMELON              | KMC-36                                     | -                           | RE/CE     | -                                     |
| COTS-MEMI   | EMI measurement program          | TSJ                  | TEPTO-DV                                   | -                           | RE/CE     | -                                     |
| MSA-10      | Spectrum Analyzer                | Agilent              | E4448A                                     | MY46180655                  | RE/CE     | 2014/02/20 * 12                       |
| MTR-03      | Test Receiver                    | Rohde & Schwarz      | ESCI                                       | 100300                      | CE/RE     | 2013/06/11 * 12                       |
| MLS-06      | LISN(AMN)                        | Schwarzbeck          | NSLK8127                                   | 8127363                     | CE(EUT)   | 2014/01/27 * 12                       |
| MCC-13      | Coaxial Cable                    | Fujikura             | 3D-2W(12m)/5D-2W(5m)/5D-2W(0.8m)/5D-2W(1m) | -                           | CE        | 2014/02/20 * 12                       |
| MAT-65      | Attenuator(13dB)                 | JFW Industries, Inc. | 50FP-013H2 N                               | -                           | CE        | 2014/01/29 * 12                       |
| MHA-06      | Horn Antenna 1-18GHz             | Schwarzbeck          | BBHA9120D                                  | 254                         | RE        | 2014/02/21 * 12                       |
| MCC-166     | Microwave Cable                  | Junkosha             | MWX221                                     | 1303S120(1m) / 1311S167(5m) | RE        | 2013/11/27 * 12                       |
| MPA-10      | Pre Amplifier                    | Agilent              | 8449B                                      | 3008A02142                  | RE        | 2014/01/21 * 12                       |
| MCC-76      | Microwave Cable 1G-26.5GHz       | Suhner               | SUCOFLEX104                                | 278967/4                    | RE        | 2013/12/24 * 12                       |
| MHF-16      | High Pass Filter 7-20GHz         | TOKIMEC              | TF37NCCA                                   | 7001                        | RE        | 2013/09/25 * 12                       |
| MSA-04      | Spectrum Analyzer                | Agilent              | E4448A                                     | US44300523                  | RE        | 2013/11/25 * 12                       |
| MBA-02      | Biconical Antenna                | Schwarzbeck          | BBA9106                                    | VHA91032008                 | RE        | 2013/10/13 * 12                       |
| MLA-02      | Logperiodic Antenna              | Schwarzbeck          | USLP9143                                   | 201                         | RE        | 2013/10/13 * 12                       |
| MCC-12      | Coaxial Cable                    | Fujikura/Agilent     | -                                          | -                           | RE        | 2014/02/20 * 12                       |
| MAT-07      | Attenuator(6dB)                  | Weinschel Corp       | 2                                          | BK7970                      | RE        | 2013/11/26 * 12                       |
| MPA-09      | Pre Amplifier                    | Agilent              | 8447D                                      | 2944A10845                  | RE        | 2013/09/12 * 12                       |
| MHA-04      | Horn Antenna 26.5-40GHz          | EMCO                 | 3160-10                                    | 1140                        | RE        | 2013/11/25 * 12                       |
| MCC-54      | Microwave Cable                  | Suhner               | SUCOFLEX101                                | 2873(1m) / 2876(5m)         | RE        | 2013/03/19 * 12                       |
| MPA-03      | Microwave System Power Amplifier | Agilent              | 83050A                                     | 3950M00205                  | RE        | 2013/06/20 * 12                       |
| MSA-13      | Spectrum Analyzer                | Agilent              | E4440A                                     | MY46185823                  | RE        | 2013/06/14 * 12                       |
| MHA-02      | Horn Antenna 18-26.5GHz          | EMCO                 | 3160-09                                    | 1265                        | RE        | 2014/02/21 * 12                       |

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

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

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

Test Item: CE: Conducted Emission  
RE: Radiated Emission

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