# RADIO TEST REPORT

## Test Report No.: 10656952S-B

**(Original test report: 10315698S-F)**

| | | |
|---|---|---|
| **Applicant** | : | **FUJIFILM Corporation** |
| **Type of Equipment** | : | **Flat Panel Sensor** |
| **Model No.** | : | **DR-ID 1200 FLAT PANEL SENSOR DR-ID 1213SE** |
| **FCC ID** | : | **W2Z-01000006** |
| **Test regulation** | : | **FCC Part 15 Subpart E: 2015** |
| **Test item** | : | **Radiated Spurious emission** |
| **Test result** | : | **Complied** |

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

**Date of test:** January 25 to 30, 2015

**Representative test engineer:**

S. Takano

Shinichi Takano
Engineer
Consumer Technology Division

**Approved by :**

T. Imamura

Toyokazu Imamura
Leader
Consumer Technology Division

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

RTL02610

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# REVISION HISTORY

## Original Test Report No.: 10656952S-B

| Revision | Test report No. | Date | Page revised | Contents |
|---|---|---|---|---|
| - (Original) | 10656952S-B | February 26, 2015 | - | - |
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## SECTION 1: Customer information

| | | |
|---|---|---|
| Company Name | : | FUJIFILM Corporation |
| Address | : | 2-26-30 Nishiazabu Minatoku Tokyo 106-8620, Japan |
| Telephone Number | : | 81-3-6271-1975 |
| Facsimile Number | : | 81-3-6271-1189 |
| Contact Person | : | Mitsuyuki Komiya |

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

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

| | | |
|---|---|---|
| Type of equipment | : | Flat Panel Sensor |
| Model No. | : | DR-ID 1200 FLAT PANEL SENSOR DR-ID 1213SE |
| Serial No. | : | Refer to Clause 4.2 |
| Rating | : | DC 8V (Battery) |
| Country of Mass-production | : | Japan |
| Condition of EUT | : | Engineering prototype<br>(Not for Sale: This sample is equivalent to mass-produced items.) |
| Modification of EUT | : | No modification by the test lab. |
| Receipt Date of Sample | : | January 23, 2015 |

### 2.2 Product description

Model: DR-ID 1200 FLAT PANEL SENSOR DR-ID 1213SE (referred to as the EUT in this report) is Flat Panel Sensor.

General specification:
Clock frequency(ies) in the system : 40MHz

Radio specification:

| | | |
|---|---|---|
| Radio Type | : | Transceiver |
| Method of Frequency Generation | : | Synthesizer |
| Power Supply (inner) | : | DC3.3V |

| | **IEEE802.11b** | **IEEE802.11g** | **IEEE802.11a** | **IEEE802.11n (20M band)** | **IEEE802.11n (40M band)** |
|---|---|---|---|---|---|
| Frequency of operation *1) | 2412-2462MHz | 2412-2462MHz | 5180-5320MHz<br>5500-5700MHz<br>5745-5825MHz | 2412-2462MHz<br>5180-5320MHz<br>5500-5700MHz<br>5745-5825MHz | 2422-2452MHz<br>5190-5310MHz<br>5510-5670MHz<br>5755-5795MHz |
| Type of modulation | DSSS (CCK, DQPSK, DBPSK) | OFDM-CCK (64QAM, 16QAM, QPSK, BPSK) | OFDM (64QAM, 16QAM, QPSK, BPSK) | | |
| Channel spacing | 5MHz | | 20MHz | 2.4GHz band<br>5MHz<br>5GHz band<br>20MHz | 2.4GHz band<br>5MHz<br>5GHz band<br>40MHz |

| **Antenna** | **antenna #0 (Bottom, short edge side)** | **antenna #1 (Left, long edge side)** |
|---|---|---|
| Antenna quantity | 2 pcs. (*. Separation distance between the antenna 1 and the antenna 0: 315mm )<br>11b,g,a: One selected Tx antenna operation.<br>11n(20HT),n(40HT): One selected Tx antenna operation (MCS0~7)<br>11n(20HT),n(40HT): Two Tx antenna operation (MCS8~13) | |
| Antenna model | 113Y120216 (cable length: 300mm) | |
| Antenna type / connector type | λ/2 dipole antenna / Connector; PCB side: U.FL, Antenna side: soldered | |
| Antenna gain (max.peak) (excluding cable loss) | -7.3(2.4GHz), -7.7(2.5GHz),<br>-2.3(5.2GHz), -2.7(5.3GHz), -4.3(5.6GHz),<br>-5.0(5.8GHz) | -7.1(2.4GHz), -6.5(2.5GHz),<br>-0.3(5.2GHz), -1.1(5.3GHz), -4.4(5.6GHz),<br>-4.5(5.8GHz) |
| | (*.including cable loss, It has built-in in a frame of EUT.) | |

*1) Refer to the test reports: 10656952S-A for FCC 15.407.
* The EUT do not use the special transmitting technique such as “beam-forming” and “time-space code diversity.”

FCC 15.31 (e)
The EUT is a battery-operated device and test was performed with the full-charged battery.
Therefore, the EUT complies with the requirement.

FCC 15.203
It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore the EUT complies with the requirement.

# SECTION 3: Test specification, procedures & results

## 3.1 Test specification

Test specification : FCC Part 15 Subpart E: 2015, final revised on January 21, 2015
Title : FCC 47CFR Part15 Radio Frequency Device Subpart E Unlicensed National Information Infrastructure Devices
Section 15.207 Conducted limits
Section 15.209 Radiated emission limits, general requirements
Section 15.407 General technical requirements

## 3.2 Procedures & Results

| Item | Test Procedure *1) | Specification | Remarks | Deviation | Worst Margin | Results |
|---|---|---|---|---|---|---|
| Conducted emission | ANSI C63.4:2009 7. AC powerline conducted emission measurements | FCC 15.407 (b)(6) & 15.207 | - | N/A *2) | - | - |
| 6dB, 26dB & 20dB emission bandwidth | ANSI C63.4:2009 13. Measurement of intentional radiators | FCC 15.407 (a)(1)(2)(3) FCC 15.215 (c) | Conducted | *3) | - | - |
| Maximum conducted output power | ANSI C63.4:2009 13. Measurement of intentional radiators | FCC 15.407 (a)(1)(2)(3) | Conducted | *3) | | - |
| Peak power spectral density | ANSI C63.4:2009 13. Measurement of intentional radiators | FCC 15.407 (a)(1)(2)(3) | Conducted | *3) | | - |
| Spurious emission & Restricted band edges | ANSI C63.4:2009 13. Measurement of intentional radiators | FCC 15.109, 15.407 (b), 15.205 & 15.209 | Radiated | N/A | 6.9dB Freq.: 5725.000MHz Detector: Peak Polarization: Horizontal Mode: Tx 5700MHz, IEEE 802.11n (HT20), MIMO | Complied |
| Dynamic frequency selection | FCC 06-96 APPENDIX | FCC 15.407 (h) | Conducted | *3) | - | - |

*1) These tests were also referred to KDB 789033 (FCC), "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E".
*2) The test is not applicable since the radio function does not operate during charging.
*3) Refer to the test report: 10315698S-E, 10315698S-G (Tested model: DR-ID1201SE)
Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422

## 3.3 Addition to standard

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

### 3.4 Uncertainty

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

| Item | Frequency range | No.1 SAC*1/SR*2 (±) | No.2 SAC/SR (±) | No.3 SAC/SR (±) |
|---|---|---|---|---|
| **Radiated emission (Measurement distance: 3m)** | 9kHz-30MHz | 3.7 dB | 3.5 dB | 3.5 dB |
| | 30MHz-300MHz | 4.9 dB | 4.9 dB | 4.7 dB |
| | 300MHz-1GHz | 5.0 dB | 5.0 dB | 4.8 dB |
| | 1GHz-15GHz | 4.9 dB | 4.9 dB | 4.9 dB |
| **Radiated emission (Measurement distance: 1m)** | 15GHz-18GHz | 5.7 dB | 5.7 dB | 5.7 dB |
| | 18GHz-40GHz | 4.5 dB | 4.3 dB | 4.3 dB |

*1: SAC=Semi-Anechoic Chamber
*2: SR= Shielded Room is applied besides radiated emission

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

### 3.5 Test location

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JAB Accreditation No. : RTL02610

| | IC Registration No. | Width x Depth x Height (m) | Size of reference ground plane (m) / horizontal conducting plane | Maximum measurement distance |
|---|---|---|---|---|
| ☒ No.1 semi-anechoic chamber | 2973D-1 | 20.6 x 11.3 x 7.65 | 20.6 x 11.3 | 10m |
| ☒ No.2 semi-anechoic chamber | 2973D-2 | 20.6 x 11.3 x 7.65 | 20.6 x 11.3 | 10m |
| ☐ No.3 semi-anechoic chamber | 2973D-3 | 12.7 x 7.7 x 5.35 | 12.7 x 7.7 | 5m |
| ☐ No.4 semi-anechoic chamber | - | 8.1 x 5.1 x 3.55 | 8.1 x 5.1 | - |
| ☐ No.1 shielded room | - | 6.8 x 4.1 x 2.7 | 6.8 x 4.1 | - |
| ☐ No.2 shielded room | - | 6.8 x 4.1 x 2.7 | 6.8 x 4.1 | - |
| ☐ No.3 shielded room | - | 6.3 x 4.7 x 2.7 | 6.3 x 4.7 | - |
| ☐ No.4 shielded room | - | 4.4 x 4.7 x 2.7 | 4.4 x 4.7 | - |
| ☐ No.5 shielded room | - | 7.8 x 6.4 x 2.7 | 7.8 x 6.4 | - |
| ☐ No.6 shielded room | - | 7.8 x 6.4 x 2.7 | 7.8 x 6.4 | - |
| ☐ No.1 measurement room | - | 2.55 x 4.1 x 2.5 | - | - |

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

Refer to APPENDIX 1 to 3.

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

## 4.1 Operating mode

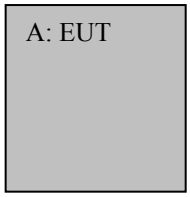
| Test item | Mode | Tested frequency | Worst data rate *1) | Antenna *1) |
|---|---|---|---|---|
| Radiated emission (below 1GHz) *2) | Transmitting IEEE 802.11n (HT20), MIMO | 5580MHz | MCS8, PN9 | Side & Bottom |
| Radiated emission (above 1GHz) *3) | Transmitting IEEE 802.11n (HT20), MIMO | 5180MHz, 5240MHz, 5320MHz | MCS8, PN9 | Side & Bottom |
| | | 5500MHz, 5580MHz, 5700MHz | MCS8, PN9 | Side & Bottom |
| | | 5745MHz, 5785MHz, 5825MHz | MCS8, PN9 | Side & Bottom |
| | Transmitting IEEE 802.11n (HT40), MIMO | 5190MHz, 5230MHz, 5310MHz | MCS8, PN9 | Side & Bottom |
| | | 5510MHz, 5550MHz, 5670MHz | MCS8, PN9 | Side & Bottom |
| | | 5755MHz, 5795MHz | MCS8, PN9 | Side & Bottom |
| *1) The worst condition was determined based on the original test report.<br>*2) Test operating mode was determined as follows according to "Section 1 of 6 802.11 a/b/g/n testing- Managing Complex Regulatory Approvals - "of TCB Council Workshop October 2009.<br>*3) 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. | | | | |

EUT has the power settings by the software as follows;

| | |
|---|---|
| Power settings | IEEE 802.11a: 12.5dBm (5180-5320MHz), 15.0dBm (5500-5700MHz)<br>IEEE 802.11n (HT20): 11.0dBm (5180-5320MHz), 13.5dBm (5500-5700MHz)<br>IEEE 802.11n (HT40): 10.0dBm (5190, 5310MHz), 11.0dBm (5230, 5270, 5510-5670MHz) |
| Software | Atheros Radio Test (ART)<br>- Revision 0.9 BUILD #27 ART_11n<br>- Customer Version (ANWI BUILD) |

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

## 4.2 Configuration and peripherals




* Test data was taken under worse case conditions.

**Description of EUT and support equipment**

| No. | Item | Model number | Serial number | Manufacturer | Remarks |
|---|---|---|---|---|---|
| **A** | Flat Panel Sensor | DR-ID 1200 FLAT PANEL SENSOR<br>DR-ID 1213SE | #107 | FUJIFILM | EUT |

# SECTION 5: Radiated emission

## 5.1 Operating environment

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

## 5.2 Test configuration

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

## 5.3 Test conditions

Frequency range : 30MHz to 40GHz *
EUT position : Table top
* Measurement in 9kHz to 30MHz was not performed since the EUT does not use the clock frequency below 30MHz.

## 5.4 Test procedure

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

| Frequency | 30-1000MHz | 1-40GHz | |
|---|---|---|---|
| Detection type | Quasi-Peak | Peak | Average *1) |
| IF Bandwidth | 120kHz | RBW: 1MHz<br>VBW: 3MHz | RBW: 1MHz<br>VBW: *2) |

*1) The test method was referred to Section H) 6) d) Method VB (Averaging using reduced video bandwidth) of FCC KDB 789033 D01 "Guidelines for Compliance Testing of unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E"
*2) When duty cycle > 98 percent, VBW was set at 10Hz.
When duty cycle < 98 percent, VBW (Average) calculation sheet in APPENDIX 1.

Detector and averaging type set for linear voltage averaging.

Below 1GHz
The result also satisfied with the general limits specified in FCC 15.209 (a).

Above 1GHz
Inside of restricted bands (FCC 15.205): Limit in FCC 15.209 (a)
Outside of the restricted bands:
Limit 68.2dBuV/m(–27dBm e.i.r.p.*) or 78.2dBuV/m(-17dBm e.i.r.p.*) in the Section 15.407(b).

Restricted band edge: Limit in FCC 15.209(a)
Since this limit is severer than the limit of the inside of restricted bands.

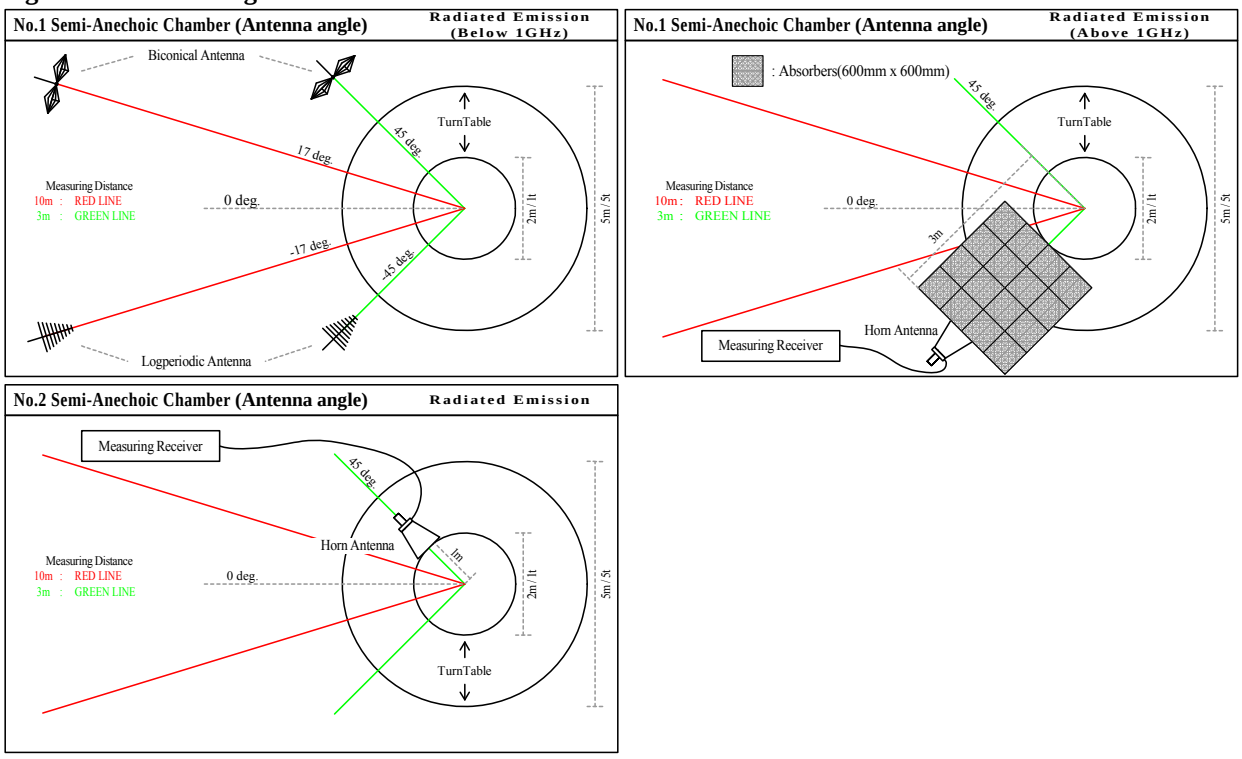
*Electric Field Strength to e.i.r.p. conversion
P [dBm] = E [dBuV/m] -95.2 [dB]
P [dBm] = 10 x LOG ( ({ (10 ^ ( E [dBuV/m] / 20 ) * 10 ^ (-6) * (Distance = 3[m]) ) ^ 2 } / 30) x 10^3) (uV/m):
P is the e.i.r.p. (Watts)

* Distance Factor for the measurement at 1m: 20 x log (3.0m/1.0m) = 9.5dB

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

| Antenna polarization | Carrier | Spurious (30M-1GHz) | Spurious (1-6.4GHz) | Spurious (6.4-15GHz) | Spurious (15-18GHz) | Spurious (18-26.5GHz) | Spurious (26.5-40GHz) |
|---|---|---|---|---|---|---|---|
| Horizontal | Y | Y | Y | Y | Y | Y | Y |
| Vertical | Y | Y | Y | Y | Y | Y | Y |

**Figure 1. Antenna angle**




## 5.5 Band edge

Band edge level at 5150MHz, 5350MHz, 5460MHz and 5725MHz is below the limits of FCC 15.209.
Band edge level at 5470MHz, 5725MHz and 5850MHz is below the limits of FCC 15.407(b).

## 5.6 Results

Summary of the test results : Pass
* No noise was detected other than listed points.

Refer to APPENDIX 1

## Contents of APPENDIXES

**APPENDIX 1: Data of Radio tests**

Radiated emission

**APPENDIX 2: Test instruments**

Test instruments

**APPENDIX 3: Photographs of test setup**

Radiated emission
Pre-check of the worst position

# APPENDIX 1: Data of Radio tests

## Radiated Emission

| | | | |
|---|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | | No.1 and 2 Semi Anechoic Chamber |
| Date | January 26, 2015 | January 28, 2015 | January 30, 2015 |
| Temperature / Humidity | 23 deg.C , 31 %RH | 24 deg.C , 35 %RH | 22 deg.C , 34 %RH |
| Engineer | Akira Sato | Shinichi Takano | Akio Hayashi |
| | (No.1 SAC) | (No.1 SAC) | (No.2 SAC) |
| Mode | Tx, 5180 MHz | | |
| | Tx, IEEE802.11n(HT20), PN9, antenna port 0+1, worst data mode MCS8 | | |

### (above 1GHz Inside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 5150.000 | PK | 48.2 | 31.4 | 16.7 | 41.2 | 55.1 | 73.9 | 18.8 | 100 | 149 | |
| Hori. | 15540.000 | PK | 47.4 | 39.7 | 2.0 | 37.6 | 51.5 | 73.9 | 22.4 | 100 | 0 | |
| Hori. | 5150.000 | AV | 34.6 | 31.4 | 16.7 | 41.2 | 41.5 | 53.9 | 12.4 | 100 | 149 | VBW:10Hz |
| Hori. | 15540.000 | AV | 34.6 | 39.7 | 2.0 | 37.6 | 38.7 | 53.9 | 15.2 | 100 | 0 | VBW:10Hz |
| Vert. | 5150.000 | PK | 47.7 | 31.4 | 16.7 | 41.2 | 54.6 | 73.9 | 19.3 | 100 | 112 | |
| Vert. | 15540.000 | PK | 46.7 | 39.7 | 2.0 | 37.6 | 50.8 | 73.9 | 23.1 | 100 | 0 | |
| Vert. | 5150.000 | AV | 34.4 | 31.4 | 16.7 | 41.2 | 41.3 | 53.9 | 12.6 | 100 | 112 | VBW:10Hz |
| Vert. | 15540.000 | AV | 33.8 | 39.7 | 2.0 | 37.6 | 37.9 | 53.9 | 16.0 | 100 | 0 | VBW:10Hz |

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

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

*The 4th harmonic was not seen so the result was its base noise level.

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

### (Calculation) (above 1GHz Outside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Result (EIRP) [dBm] | Limit [dBm] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 10360.000 | PK | 47.0 | 39.1 | 9.2 | 40.5 | 54.8 | -40.43 | -27.00 | 13.4 | 100 | 0 | |
| Vert. | 10360.000 | PK | 46.6 | 39.1 | 9.2 | 40.5 | 54.4 | -40.83 | -27.00 | 13.8 | 100 | 0 | |

Result[dBuV/m] = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)

Resrult(EIRP[dBm])=10*LOG（({ ( 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) * 10 ^ (-6) * Distance:3[m] ) ^ 2 } / 30) *10^3)

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

*The 4th harmonic was not seen so the result was its base noise level.

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

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# Radiated Emission

| | | | |
|---|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | | No.1 and 2 Semi Anechoic Chamber |
| Date | January 26, 2015 | January 28, 2015 | January 30, 2015 |
| Temperature / Humidity | 23 deg.C , 31 %RH | 24 deg.C , 35 %RH | 22 deg.C , 34 %RH |
| Engineer | Akira Sato | Shinichi Takano | Akio Hayashi |
| | (No.1 SAC) | (No.1 SAC) | (No.2 SAC) |
| Mode | Tx, 5240 MHz | | |
| | Tx, IEEE802.11n(HT20), PN9, antenna port 0+1, worst data mode MCS8 | | |

## (above 1GHz Inside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 15720.000 | PK | 44.3 | 39.1 | 2.2 | 37.7 | 47.9 | 73.9 | 26.0 | 100 | 0 | |
| Hori. | 15720.000 | AV | 32.7 | 39.1 | 2.2 | 37.7 | 36.3 | 53.9 | 17.6 | 100 | 0 | VBW:10Hz |
| Vert. | 15720.000 | PK | 43.9 | 39.1 | 2.2 | 37.7 | 47.5 | 73.9 | 26.4 | 100 | 0 | |
| Vert. | 15720.000 | AV | 32.1 | 39.1 | 2.2 | 37.7 | 35.7 | 53.9 | 18.2 | 100 | 0 | VBW:10Hz |

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

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

*The 4th harmonic was not seen so the result was its base noise level.

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

## (Calculation) (above 1GHz Outside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Result (EIRP) [dBm] | Limit [dBm] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 10480.000 | PK | 47.2 | 39.4 | 9.3 | 40.6 | 55.3 | -39.93 | -27.00 | 12.9 | 100 | 0 | |
| Vert. | 10480.000 | PK | 46.6 | 39.4 | 9.3 | 40.6 | 54.7 | -40.53 | -27.00 | 13.5 | 100 | 0 | |

Result[dBuV/m] = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)

Resrult(EIRP[dBm])=10*LOG（{ ( 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) * 10 ^ (-6) * Distance:3[m] ) ^ 2 } / 30) *10^3)

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

*The 4th harmonic was not seen so the result was its base noise level.

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

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**Facsimile : +81 463 50 6401**

# Radiated Emission

| | | | |
|---|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | | No.1 and 2 Semi Anechoic Chamber |
| Date | January 26, 2015 | January 28, 2015 | January 30, 2015 |
| Temperature / Humidity | 23 deg.C , 31 %RH | 24 deg.C , 35 %RH | 22 deg.C , 34 %RH |
| Engineer | Akira Sato | Shinichi Takano | Akio Hayashi |
| | (No.1 SAC) | (No.1 SAC) | (No.2 SAC) |
| Mode | Tx, 5320 MHz | | |
| | Tx, IEEE802.11n(HT20), PN9, antenna port 0+1, worst data mode MCS8 | | |

## (above 1GHz Inside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 5350.000 | PK | 49.4 | 31.5 | 16.8 | 40.9 | 56.8 | 73.9 | 17.1 | 100 | 140 | |
| Hori. | 10640.000 | PK | 46.7 | 39.6 | 9.3 | 40.6 | 55.0 | 73.9 | 18.9 | 100 | 0 | |
| Hori. | 15960.000 | PK | 45.2 | 38.3 | 2.7 | 37.8 | 48.4 | 73.9 | 25.5 | 100 | 0 | |
| Hori. | 5350.000 | AV | 34.7 | 31.5 | 16.8 | 40.9 | 42.1 | 53.9 | 11.8 | 100 | 140 | VBW:10Hz |
| Hori. | 10640.000 | AV | 34.9 | 39.6 | 9.3 | 40.6 | 43.2 | 53.9 | 10.7 | 100 | 0 | VBW:10Hz |
| Hori. | 15960.000 | AV | 34.0 | 38.3 | 2.7 | 37.8 | 37.2 | 53.9 | 16.7 | 100 | 0 | VBW:10Hz |
| Vert. | 5350.000 | PK | 47.6 | 31.5 | 16.8 | 40.9 | 55.0 | 73.9 | 18.9 | 100 | 165 | |
| Vert. | 10640.000 | PK | 46.4 | 39.6 | 9.3 | 40.6 | 54.7 | 73.9 | 19.2 | 100 | 0 | |
| Vert. | 15960.000 | PK | 46.0 | 38.3 | 2.7 | 37.8 | 49.2 | 73.9 | 24.7 | 100 | 0 | |
| Vert. | 5350.000 | AV | 34.6 | 31.5 | 16.8 | 40.9 | 42.0 | 53.9 | 11.9 | 100 | 165 | VBW:10Hz |
| Vert. | 10640.000 | AV | 34.8 | 39.6 | 9.3 | 40.6 | 43.1 | 53.9 | 10.8 | 100 | 0 | VBW:10Hz |
| Vert. | 15960.000 | AV | 33.0 | 38.3 | 2.7 | 37.8 | 36.2 | 53.9 | 17.7 | 100 | 0 | VBW:10Hz |

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

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

*The 4th harmonic was not seen so the result was its base noise level.

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

## (Calculation) (above 1GHz Outside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Result (EIRP) [dBm] | Limit [dBm] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Result[dBuV/m] = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)

Resrult(EIRP[dBm])=10*LOG（{ ( 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) * 10 ^ (-6) * Distance:3[m] ) ^ 2 } / 30) *10^3)

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

*The 4th harmonic was not seen so the result was its base noise level.

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

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# Radiated Emission

| | | | |
|---|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | | No.1 and 2 Semi Anechoic Chamber |
| Date | January 26, 2015 | January 28, 2015 | January 30, 2015 |
| Temperature / Humidity | 23 deg.C , 31 %RH | 24 deg.C , 35 %RH | 22 deg.C , 34 %RH |
| Engineer | Akira Sato | Shinichi Takano | Akio Hayashi |
| | (No.1 SAC) | (No.1 SAC) | (No.2 SAC) |
| Mode | Tx, 5500 MHz | | |
| | Tx, IEEE802.11n(HT20), PN9, antenna port 0+1, worst data mode MCS8 | | |

## (above 1GHz Inside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 5460.000 | PK | 47.2 | 31.6 | 16.9 | 40.7 | 55.0 | 73.9 | 18.9 | 100 | 168 | |
| Hori. | 11000.000 | PK | 45.9 | 40.0 | 9.7 | 40.7 | 54.9 | 73.9 | 19.0 | 100 | 0 | |
| Hori. | 5460.000 | AV | 34.9 | 31.6 | 16.9 | 40.7 | 42.7 | 53.9 | 11.2 | 100 | 168 | VBW:10Hz |
| Hori. | 11000.000 | AV | 34.2 | 40.0 | 9.7 | 40.7 | 43.2 | 53.9 | 10.7 | 100 | 0 | VBW:10Hz |
| Vert. | 5460.000 | PK | 49.0 | 31.6 | 16.9 | 40.7 | 56.8 | 73.9 | 17.1 | 100 | 78 | |
| Vert. | 11000.000 | PK | 46.6 | 40.0 | 9.7 | 40.7 | 55.6 | 73.9 | 18.3 | 100 | 0 | |
| Vert. | 5460.000 | AV | 34.6 | 31.6 | 16.9 | 40.7 | 42.4 | 53.9 | 11.5 | 100 | 78 | VBW:10Hz |
| Vert. | 11000.000 | AV | 34.2 | 40.0 | 9.7 | 40.7 | 43.2 | 53.9 | 10.7 | 100 | 0 | VBW:10Hz |

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

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

*The 4th harmonic was not seen so the result was its base noise level.

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

## (Calculation) (above 1GHz Outside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Result (EIRP) [dBm] | Limit [dBm] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 5470.000 | PK | 51.4 | 31.6 | 16.9 | 40.7 | 59.2 | -36.03 | -27.00 | 9.0 | 100 | 118 | |
| Hori. | 16500.000 | PK | 50.3 | 39.3 | 3.1 | 37.8 | 54.9 | -40.33 | -27.00 | 13.3 | 100 | 285 | |
| Vert. | 5470.000 | PK | 49.0 | 31.6 | 16.9 | 40.7 | 56.8 | -38.43 | -27.00 | 11.4 | 100 | 101 | |
| Vert. | 16500.000 | PK | 47.0 | 39.3 | 3.1 | 37.8 | 51.6 | -43.63 | -27.00 | 16.6 | 100 | 272 | |

Result[dBuV/m] = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)

Resrult(EIRP[dBm])=10*LOG（({ ( 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) * 10 ^ (-6) * Distance:3[m] ) ^ 2 } / 30) *10^3)

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

*The 4th harmonic was not seen so the result was its base noise level.

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

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# Radiated Emission

| | | | | |
|---|---|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | | No.1 and 2 Semi Anechoic Chamber | |
| Date | January 25, 2015 | January 26, 2015 | January 28, 2015 | January 30, 2015 |
| Temperature / Humidity | 20 deg.C , 31 %RH | 23 deg.C , 31 %RH | 24 deg.C , 35 %RH | 22 deg.C , 34 %RH |
| Engineer | Tatsuya Arai | Akira Sato | Shinichi Takano | Akio Hayashi |
| | (No.1 SAC) | (No.1 SAC) | (No.1 SAC) | (No.2 SAC) |
| Mode | Tx, 5580 MHz | | | |
| | Tx, IEEE802.11n(HT20), PN9, antenna port 0+1, worst data mode MCS8 | | | |

## (below 1GHz and above 1GHz Inside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 32.183 | QP | 23.8 | 16.8 | 7.0 | 31.8 | 15.8 | 40.0 | 24.2 | 150 | 0 | |
| Hori. | 366.664 | QP | 31.0 | 15.6 | 6.8 | 31.8 | 21.6 | 46.0 | 24.4 | 100 | 157 | |
| Hori. | 799.995 | QP | 29.7 | 21.2 | 9.0 | 31.9 | 28.0 | 46.0 | 18.0 | 158 | 176 | |
| Hori. | 939.188 | QP | 22.5 | 22.4 | 9.6 | 31.1 | 23.4 | 46.0 | 22.6 | 150 | 13 | |
| Hori. | 11160.000 | PK | 46.1 | 40.1 | 9.7 | 40.5 | 55.4 | 73.9 | 18.5 | 100 | 0 | |
| Hori. | 11160.000 | AV | 34.4 | 40.1 | 9.7 | 40.5 | 43.7 | 53.9 | 10.2 | 100 | 0 | VBW:10Hz |
| Vert. | 32.976 | QP | 23.9 | 16.6 | 7.1 | 31.8 | 15.8 | 40.0 | 24.2 | 100 | 0 | |
| Vert. | 366.667 | QP | 30.0 | 15.6 | 6.8 | 31.8 | 20.6 | 46.0 | 25.4 | 100 | 133 | |
| Vert. | 11160.000 | PK | 45.8 | 40.1 | 9.7 | 40.5 | 55.1 | 73.9 | 18.8 | 100 | 0 | |
| Vert. | 11160.000 | AV | 34.4 | 40.1 | 9.7 | 40.5 | 43.7 | 53.9 | 10.2 | 100 | 0 | VBW:10Hz |

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

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

*The 4th harmonic was not seen so the result was its base noise level.

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

## (Calculation) (above 1GHz Outside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Result (EIRP) [dBm] | Limit [dBm] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 16740.000 | PK | 51.8 | 39.8 | 2.9 | 37.8 | 56.7 | -38.53 | -27.00 | 11.5 | 100 | 292 | |
| Vert. | 16740.000 | PK | 50.2 | 39.8 | 2.9 | 37.8 | 55.1 | -40.13 | -27.00 | 13.1 | 100 | 287 | |

Result[dBuV/m] = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)

Resrult(EIRP[dBm])=10*LOG（{ ( 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) * 10 ^ (-6) * Distance:3[m] ) ^ 2 } / 30) *10^3)

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

*The 4th harmonic was not seen so the result was its base noise level.

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

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# Radiated Emission

| | | | |
|---|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | | No.1 and 2 Semi Anechoic Chamber |
| Date | January 26, 2015 | January 28, 2015 | January 30, 2015 |
| Temperature / Humidity | 23 deg.C , 31 %RH | 24 deg.C , 35 %RH | 22 deg.C , 34 %RH |
| Engineer | Akira Sato | Shinichi Takano | Akio Hayashi |
| | (No.1 SAC) | (No.1 SAC) | (No.2 SAC) |
| Mode | Tx, 5700 MHz | | |
| | Tx, IEEE802.11n(HT20), PN9, antenna port 0+1, worst data mode MCS8 | | |

## (above 1GHz Inside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 11400.000 | PK | 46.8 | 40.2 | 9.7 | 40.3 | 56.4 | 73.9 | 17.5 | 100 | 0 | |
| Hori. | 11400.000 | AV | 34.2 | 40.2 | 9.7 | 40.3 | 43.8 | 53.9 | 10.1 | 100 | 0 | VBW:10Hz |
| Vert. | 11400.000 | PK | 45.9 | 40.2 | 9.7 | 40.3 | 55.5 | 73.9 | 18.4 | 100 | 0 | |
| Vert. | 11400.000 | AV | 34.3 | 40.2 | 9.7 | 40.3 | 43.9 | 53.9 | 10.0 | 100 | 0 | VBW:10Hz |

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

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

*The 4th harmonic was not seen so the result was its base noise level.

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

## (Calculation) (above 1GHz Outside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Result (EIRP) [dBm] | Limit [dBm] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 5725.000 | PK | 52.9 | 32.2 | 17.1 | 40.9 | 61.3 | -33.93 | -27.00 | 6.9 | 100 | 130 | |
| Hori. | 17100.000 | PK | 46.6 | 40.9 | 2.9 | 37.8 | 52.6 | -42.63 | -27.00 | 15.6 | 100 | 270 | |
| Vert. | 5725.000 | PK | 51.9 | 32.2 | 17.1 | 40.9 | 60.3 | -34.93 | -27.00 | 7.9 | 100 | 108 | |
| Vert. | 17100.000 | PK | 43.2 | 40.9 | 2.9 | 37.8 | 49.2 | -46.03 | -27.00 | 19.0 | 100 | 0 | |

Result[dBuV/m] = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)

Resrult(EIRP[dBm])=10*LOG（({ ( 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) * 10 ^ (-6) * Distance:3[m] ) ^ 2 } / 30) *10^3)

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

*The 4th harmonic was not seen so the result was its base noise level.

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

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# Radiated Emission

| | | | |
|---|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | | No.1 and 2 Semi Anechoic Chamber |
| Date | January 26, 2015 | January 28, 2015 | January 30, 2015 |
| Temperature / Humidity | 23 deg.C , 31 %RH | 24 deg.C , 35 %RH | 22 deg.C , 34 %RH |
| Engineer | Akira Sato | Shinichi Takano | Akio Hayashi |
| | (No.1 SAC) | (No.1 SAC) | (No.2 SAC) |
| Mode | Tx, 5745 MHz | | |
| | Tx, IEEE802.11n(HT20), PN9, antenna port 0+1, worst data mode MCS8 | | |

## (above 1GHz Inside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 11490.000 | PK | 45.2 | 40.3 | 9.6 | 40.2 | 54.9 | 73.9 | 19.0 | 100 | 0 | |
| Hori. | 11490.000 | AV | 33.7 | 40.3 | 9.6 | 40.2 | 43.4 | 53.9 | 10.5 | 100 | 0 | VBW:10Hz |
| Vert. | 11490.000 | PK | 45.4 | 40.3 | 9.6 | 40.2 | 55.1 | 73.9 | 18.8 | 100 | 0 | |
| Vert. | 11490.000 | AV | 33.7 | 40.3 | 9.6 | 40.2 | 43.4 | 53.9 | 10.5 | 100 | 0 | VBW:10Hz |

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

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

*The 4th harmonic was not seen so the result was its base noise level.

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

## (Calculation) (above 1GHz Outside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Result (EIRP) [dBm] | Limit [dBm] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 5715.000 | PK | 50.0 | 32.2 | 17.1 | 40.8 | 58.5 | -36.73 | -27.00 | 9.7 | 100 | 131 | |
| Hori. | 5725.000 | PK | 56.0 | 32.2 | 17.1 | 40.9 | 64.4 | -30.83 | -17.00 | 13.8 | 100 | 135 | |
| Vert. | 5715.000 | PK | 48.1 | 32.2 | 17.1 | 40.8 | 56.6 | -38.63 | -27.00 | 11.6 | 100 | 97 | |
| Vert. | 5725.000 | PK | 52.7 | 32.2 | 17.1 | 40.9 | 61.1 | -34.13 | -17.00 | 17.1 | 100 | 79 | |

Result[dBuV/m] = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)

Resrult(EIRP[dBm])=10*LOG（{ ( 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) * 10 ^ (-6) * Distance:3[m] ) ^ 2 } / 30) *10^3)

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

*The 4th harmonic was not seen so the result was its base noise level.

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

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# Radiated Emission

| | | | |
|---|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | | No.1 and 2 Semi Anechoic Chamber |
| Date | January 26, 2015 | January 28, 2015 | January 30, 2015 |
| Temperature / Humidity | 23 deg.C , 31 %RH | 24 deg.C , 35 %RH | 22 deg.C , 34 %RH |
| Engineer | Akira Sato | Shinichi Takano | Akio Hayashi |
| | (No.1 SAC) | (No.1 SAC) | (No.2 SAC) |
| Mode | Tx, 5785 MHz | | |
| | Tx, IEEE802.11n(HT20), PN9, antenna port 0+1, worst data mode MCS8 | | |

## (above 1GHz Inside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 11570.000 | PK | 45.3 | 40.2 | 9.8 | 40.1 | 55.2 | 73.9 | 18.7 | 100 | 0 | |
| Hori. | 11570.000 | AV | 33.5 | 40.2 | 9.8 | 40.1 | 43.4 | 53.9 | 10.5 | 100 | 0 | VBW:10Hz |
| Vert. | 11570.000 | PK | 45.1 | 40.2 | 9.8 | 40.1 | 55.0 | 73.9 | 18.9 | 100 | 0 | |
| Vert. | 11570.000 | AV | 33.6 | 40.2 | 9.8 | 40.1 | 43.5 | 53.9 | 10.4 | 100 | 0 | VBW:10Hz |

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

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

*The 4th harmonic was not seen so the result was its base noise level.

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

## (Calculation) (above 1GHz Outside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Result (EIRP) [dBm] | Limit [dBm] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 17355.000 | PK | 47.6 | 42.2 | 3.2 | 38.0 | 55.0 | -40.23 | -27.00 | 13.2 | 100 | 273 | |
| Vert. | 17355.000 | PK | 45.6 | 42.2 | 3.2 | 38.0 | 53.0 | -42.23 | -27.00 | 15.2 | 100 | 0 | |

Result[dBuV/m] = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)

Resrult(EIRP[dBm])=10*LOG（{ ( 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) * 10 ^ (-6) * Distance:3[m] ) ^ 2 } / 30) *10^3)

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

*The 4th harmonic was not seen so the result was its base noise level.

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

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

# Radiated Emission

| | | | |
|---|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | | No.1 and 2 Semi Anechoic Chamber |
| Date | January 26, 2015 | January 28, 2015 | January 30, 2015 |
| Temperature / Humidity | 23 deg.C , 31 %RH | 24 deg.C , 35 %RH | 22 deg.C , 34 %RH |
| Engineer | Akira Sato | Shinichi Takano | Akio Hayashi |
| | (No.1 SAC) | (No.1 SAC) | (No.2 SAC) |
| Mode | Tx, 5825 MHz | | |
| | Tx, IEEE802.11n(HT20), PN9, antenna port 0+1, worst data mode MCS8 | | |

## (above 1GHz Inside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 11650.000 | PK | 46.0 | 40.0 | 9.8 | 40.1 | 55.7 | 73.9 | 18.2 | 103 | 165 | |
| Hori. | 11650.000 | AV | 34.4 | 40.0 | 9.8 | 40.1 | 44.1 | 53.9 | 9.8 | 103 | 165 | VBW:10Hz |
| Vert. | 11650.000 | PK | 46.7 | 40.0 | 9.8 | 40.1 | 56.4 | 73.9 | 17.5 | 100 | 91 | |
| Vert. | 11650.000 | AV | 33.6 | 40.0 | 9.8 | 40.1 | 43.3 | 53.9 | 10.6 | 100 | 91 | VBW:10Hz |

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

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

*The 4th harmonic was not seen so the result was its base noise level.

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

## (Calculation) (above 1GHz Outside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Result (EIRP) [dBm] | Limit [dBm] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 5850.000 | PK | 55.4 | 32.6 | 17.1 | 41.0 | 64.1 | -31.13 | -17.00 | 14.1 | 100 | 137 | |
| Hori. | 5860.000 | PK | 49.4 | 32.6 | 17.1 | 41.0 | 58.1 | -37.13 | -27.00 | 10.1 | 100 | 134 | |
| Vert. | 5850.000 | PK | 51.7 | 32.6 | 17.1 | 41.0 | 60.4 | -34.83 | -17.00 | 17.8 | 100 | 112 | |
| Vert. | 5860.000 | PK | 48.7 | 32.6 | 17.1 | 41.0 | 57.4 | -37.83 | -27.00 | 10.8 | 100 | 95 | |

Result[dBuV/m] = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)

Resrult(EIRP[dBm])=10*LOG（({ ( 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) * 10 ^ (-6) * Distance:3[m] ) ^ 2 } / 30) *10^3)

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

*The 4th harmonic was not seen so the result was its base noise level.

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

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# Radiated Emission

| | | | |
|---|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | | No.1 and 2 Semi Anechoic Chamber |
| Date | January 27, 2015 | January 28, 2015 | January 30, 2015 |
| Temperature / Humidity | 23 deg.C , 37 %RH | 24 deg.C , 35 %RH | 22 deg.C , 34 %RH |
| Engineer | Akira Sato | Shinichi Takano | Akio Hayashi |
| | (No.1 SAC) | (No.1 SAC) | (No.2 SAC) |
| Mode | Tx, 5190 MHz | | |
| | Tx, IEEE802.11n(HT40), PN9, antenna port 0+1, worst data mode MCS8 | | |

## (above 1GHz Inside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 5150.000 | PK | 48.8 | 31.4 | 16.7 | 41.2 | 55.7 | 73.9 | 18.2 | 100 | 137 | |
| Hori. | 15570.000 | PK | 44.7 | 39.6 | 2.0 | 37.6 | 48.7 | 73.9 | 25.2 | 100 | 0 | |
| Hori. | 5150.000 | AV | 36.1 | 31.4 | 16.7 | 41.2 | 43.0 | 53.9 | 10.9 | 100 | 137 | VBW:10Hz |
| Hori. | 15570.000 | AV | 32.7 | 39.6 | 2.0 | 37.6 | 36.7 | 53.9 | 17.2 | 100 | 0 | VBW:10Hz |
| Vert. | 5150.000 | PK | 50.7 | 31.4 | 16.7 | 41.2 | 57.6 | 73.9 | 16.3 | 100 | 128 | |
| Vert. | 15570.000 | PK | 44.9 | 39.6 | 2.0 | 37.6 | 48.9 | 73.9 | 25.0 | 100 | 0 | |
| Vert. | 5150.000 | AV | 37.3 | 31.4 | 16.7 | 41.2 | 44.2 | 53.9 | 9.7 | 100 | 128 | VBW:10Hz |
| Vert. | 15570.000 | AV | 32.8 | 39.6 | 2.0 | 37.6 | 36.8 | 53.9 | 17.1 | 100 | 0 | VBW:10Hz |

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

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

*The 4th harmonic was not seen so the result was its base noise level.

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

## (Calculation) (above 1GHz Outside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Result (EIRP) [dBm] | Limit [dBm] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 10380.000 | PK | 46.3 | 39.1 | 9.2 | 40.5 | 54.1 | -41.13 | -27.00 | 14.1 | 100 | 0 | |
| Vert. | 10380.000 | PK | 46.2 | 39.1 | 9.2 | 40.5 | 54.0 | -41.23 | -27.00 | 14.2 | 100 | 0 | |

Result[dBuV/m] = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)

Resrult(EIRP[dBm])=10*LOG（({ ( 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) * 10 ^ (-6) * Distance:3[m] ) ^ 2 } / 30) *10^3)

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

*The 4th harmonic was not seen so the result was its base noise level.

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

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# Radiated Emission

| | | | |
|---|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | | No.1 and 2 Semi Anechoic Chamber |
| Date | January 27, 2015 | January 28, 2015 | January 30, 2015 |
| Temperature / Humidity | 23 deg.C , 37 %RH | 24 deg.C , 35 %RH | 22 deg.C , 34 %RH |
| Engineer | Akira Sato | Shinichi Takano | Akio Hayashi |
| | (No.1 SAC) | (No.1 SAC) | (No.2 SAC) |
| Mode | Tx, 5230 MHz | | |
| | Tx, IEEE802.11n(HT40), PN9, antenna port 0+1, worst data mode MCS8 | | |

## (above 1GHz Inside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 15690.000 | PK | 43.2 | 39.2 | 2.2 | 37.7 | 46.9 | 73.9 | 27.0 | 100 | 0 | |
| Hori. | 15690.000 | AV | 31.5 | 39.2 | 2.2 | 37.7 | 35.2 | 53.9 | 18.7 | 100 | 0 | VBW:10Hz |
| Vert. | 15690.000 | PK | 43.8 | 39.2 | 2.2 | 37.7 | 47.5 | 73.9 | 26.4 | 100 | 0 | |
| Vert. | 15690.000 | AV | 31.7 | 39.2 | 2.2 | 37.7 | 35.4 | 53.9 | 18.5 | 100 | 0 | VBW:10Hz |

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

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

*The 4th harmonic was not seen so the result was its base noise level.

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

## (Calculation) (above 1GHz Outside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Result (EIRP) [dBm] | Limit [dBm] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 10460.000 | PK | 47.3 | 39.3 | 9.3 | 40.6 | 55.3 | -39.93 | -27.00 | 12.9 | 100 | 0 | |
| Vert. | 10460.000 | PK | 46.5 | 39.3 | 9.3 | 40.6 | 54.5 | -40.73 | -27.00 | 13.7 | 100 | 0 | |

Result[dBuV/m] = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)

Resrult(EIRP[dBm])=10*LOG（{ ( 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) * 10 ^ (-6) * Distance:3[m] ) ^ 2 } / 30) *10^3)

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

*The 4th harmonic was not seen so the result was its base noise level.

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

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# Radiated Emission

| | | | |
|---|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | | No.1 and 2 Semi Anechoic Chamber |
| Date | January 27, 2015 | January 28, 2015 | January 30, 2015 |
| Temperature / Humidity | 23 deg.C , 37 %RH | 24 deg.C , 35 %RH | 22 deg.C , 34 %RH |
| Engineer | Akira Sato | Shinichi Takano | Akio Hayashi |
| | (No.1 SAC) | (No.1 SAC) | (No.2 SAC) |
| Mode | Tx, 5310 MHz | | |
| | Tx, IEEE802.11n(HT40), PN9, antenna port 0+1, worst data mode MCS8 | | |

## (above 1GHz Inside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 5350.000 | PK | 49.4 | 31.5 | 16.8 | 40.9 | 56.8 | 73.9 | 17.1 | 100 | 158 | |
| Hori. | 10620.000 | PK | 46.4 | 39.5 | 9.3 | 40.6 | 54.6 | 73.9 | 19.3 | 100 | 0 | |
| Hori. | 15930.000 | PK | 45.6 | 38.4 | 2.6 | 37.8 | 48.8 | 73.9 | 25.1 | 100 | 0 | |
| Hori. | 5350.000 | AV | 36.3 | 31.5 | 16.8 | 40.9 | 43.7 | 53.9 | 10.2 | 100 | 158 | VBW:10Hz |
| Hori. | 10620.000 | AV | 34.9 | 39.5 | 9.3 | 40.6 | 43.1 | 53.9 | 10.8 | 100 | 0 | VBW:10Hz |
| Hori. | 15930.000 | AV | 33.4 | 38.4 | 2.6 | 37.8 | 36.6 | 53.9 | 17.3 | 100 | 0 | VBW:10Hz |
| Vert. | 5350.000 | PK | 49.2 | 31.5 | 16.8 | 40.9 | 56.6 | 73.9 | 17.3 | 100 | 97 | |
| Vert. | 10620.000 | PK | 46.7 | 39.5 | 9.3 | 40.6 | 54.9 | 73.9 | 19.0 | 100 | 0 | |
| Vert. | 15930.000 | PK | 45.7 | 38.4 | 2.6 | 37.8 | 48.9 | 73.9 | 25.0 | 100 | 0 | |
| Vert. | 5350.000 | AV | 36.0 | 31.5 | 16.8 | 40.9 | 43.4 | 53.9 | 10.5 | 100 | 97 | VBW:10Hz |
| Vert. | 10620.000 | AV | 34.9 | 39.5 | 9.3 | 40.6 | 43.1 | 53.9 | 10.8 | 100 | 0 | VBW:10Hz |
| Vert. | 15930.000 | AV | 32.6 | 38.4 | 2.6 | 37.8 | 35.8 | 53.9 | 18.1 | 100 | 0 | VBW:10Hz |

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

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

*The 4th harmonic was not seen so the result was its base noise level.

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

## (Calculation) (above 1GHz Outside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Result (EIRP) [dBm] | Limit [dBm] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Result[dBuV/m] = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)

Resrult(EIRP[dBm])=10*LOG（{ ( 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) * 10 ^ (-6) * Distance:3[m] ) ^ 2 } / 30) *10^3)

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

*The 4th harmonic was not seen so the result was its base noise level.

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

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# Radiated Emission

| | | | |
|---|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | | No.1 and 2 Semi Anechoic Chamber |
| Date | January 27, 2015 | January 28, 2015 | January 30, 2015 |
| Temperature / Humidity | 23 deg.C , 37 %RH | 24 deg.C , 35 %RH | 22 deg.C , 34 %RH |
| Engineer | Akira Sato | Shinichi Takano | Akio Hayashi |
| | (No.1 SAC) | (No.1 SAC) | (No.2 SAC) |
| Mode | Tx, 5510 MHz | | |
| | Tx, IEEE802.11n(HT40), PN9, antenna port 0+1, worst data mode MCS8 | | |

## (above 1GHz Inside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 5460.000 | PK | 49.2 | 31.6 | 16.9 | 40.7 | 57.0 | 73.9 | 16.9 | 100 | 147 | |
| Hori. | 11020.000 | PK | 46.0 | 40.0 | 9.8 | 40.7 | 55.1 | 73.9 | 18.8 | 100 | 0 | |
| Hori. | 5460.000 | AV | 35.5 | 31.6 | 16.9 | 40.7 | 43.3 | 53.9 | 10.6 | 100 | 147 | VBW:10Hz |
| Hori. | 11020.000 | AV | 34.3 | 40.0 | 9.8 | 40.7 | 43.4 | 53.9 | 10.5 | 100 | 0 | VBW:10Hz |
| Vert. | 5460.000 | PK | 48.5 | 31.6 | 16.9 | 40.7 | 56.3 | 73.9 | 17.6 | 100 | 78 | |
| Vert. | 11020.000 | PK | 45.3 | 40.0 | 9.8 | 40.7 | 54.4 | 73.9 | 19.5 | 100 | 0 | |
| Vert. | 5460.000 | AV | 35.2 | 31.6 | 16.9 | 40.7 | 43.0 | 53.9 | 10.9 | 100 | 78 | VBW:10Hz |
| Vert. | 11020.000 | AV | 34.2 | 40.0 | 9.8 | 40.7 | 43.3 | 53.9 | 10.6 | 100 | 0 | VBW:10Hz |

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

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

*The 4th harmonic was not seen so the result was its base noise level.

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

## (Calculation) (above 1GHz Outside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Result (EIRP) [dBm] | Limit [dBm] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 5470.000 | PK | 51.2 | 31.6 | 16.9 | 40.7 | 59.0 | -36.23 | -27.00 | 9.2 | 100 | 152 | |
| Hori. | 16530.000 | PK | 44.3 | 39.3 | 3.0 | 37.8 | 48.8 | -46.43 | -27.00 | 19.4 | 100 | 0 | |
| Vert. | 5470.000 | PK | 49.4 | 31.6 | 16.9 | 40.7 | 57.2 | -38.03 | -27.00 | 11.0 | 100 | 102 | |
| Vert. | 16530.000 | PK | 44.5 | 39.3 | 3.0 | 37.8 | 49.0 | -46.23 | -27.00 | 19.2 | 100 | 0 | |

Result[dBuV/m] = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)

Resrult(EIRP[dBm])=10*LOG（({ ( 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) * 10 ^ (-6) * Distance:3[m] ) ^ 2 } / 30) *10^3)

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

*The 4th harmonic was not seen so the result was its base noise level.

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

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# Radiated Emission

| | | | |
|---|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | | No.1 and 2 Semi Anechoic Chamber |
| Date | January 27, 2015 | January 28, 2015 | January 30, 2015 |
| Temperature / Humidity | 23 deg.C , 37 %RH | 24 deg.C , 35 %RH | 22 deg.C , 34 %RH |
| Engineer | Akira Sato | Shinichi Takano | Akio Hayashi |
| | (No.1 SAC) | (No.1 SAC) | (No.2 SAC) |
| Mode | Tx, 5550 MHz | | |
| | Tx, IEEE802.11n(HT40), PN9, antenna port 0+1, worst data mode MCS8 | | |

## (above 1GHz Inside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 11100.000 | PK | 46.3 | 40.0 | 9.7 | 40.6 | 55.4 | 73.9 | 18.5 | 100 | 0 | |
| Hori. | 11100.000 | AV | 34.5 | 40.0 | 9.7 | 40.6 | 43.6 | 53.9 | 10.3 | 100 | 0 | VBW:10Hz |
| Vert. | 11100.000 | PK | 45.7 | 40.0 | 9.7 | 40.6 | 54.8 | 73.9 | 19.1 | 100 | 0 | |
| Vert. | 11100.000 | AV | 34.3 | 40.0 | 9.7 | 40.6 | 43.4 | 53.9 | 10.5 | 100 | 0 | VBW:10Hz |

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

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

*The 4th harmonic was not seen so the result was its base noise level.

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

## (Calculation) (above 1GHz Outside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Result (EIRP) [dBm] | Limit [dBm] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 16650.000 | PK | 48.0 | 39.6 | 2.9 | 37.8 | 52.7 | -42.53 | -27.00 | 15.5 | 100 | 295 | |
| Vert. | 16650.000 | PK | 47.6 | 39.6 | 2.9 | 37.8 | 52.3 | -42.93 | -27.00 | 15.9 | 100 | 289 | |

Result[dBuV/m] = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)

Resrult(EIRP[dBm])=10*LOG（{ ( 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) * 10 ^ (-6) * Distance:3[m] ) ^ 2 } / 30) *10^3)

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

*The 4th harmonic was not seen so the result was its base noise level.

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

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# Radiated Emission

| | | | |
|---|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | | No.1 and 2 Semi Anechoic Chamber |
| Date | January 27, 2015 | January 28, 2015 | January 30, 2015 |
| Temperature / Humidity | 23 deg.C , 37 %RH | 24 deg.C , 35 %RH | 22 deg.C , 34 %RH |
| Engineer | Akira Sato | Shinichi Takano | Akio Hayashi |
| | (No.1 SAC) | (No.1 SAC) | (No.2 SAC) |
| Mode | Tx, 5670 MHz | | |
| | Tx, IEEE802.11n(HT40), PN9, antenna port 0+1, worst data mode MCS8 | | |

## (above 1GHz Inside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 11340.000 | PK | 46.1 | 40.2 | 9.7 | 40.4 | 55.6 | 73.9 | 18.3 | 100 | 0 | |
| Hori. | 11340.000 | AV | 34.1 | 40.2 | 9.7 | 40.4 | 43.6 | 53.9 | 10.3 | 100 | 0 | VBW:10Hz |
| Vert. | 11340.000 | PK | 46.0 | 40.2 | 9.7 | 40.4 | 55.5 | 73.9 | 18.4 | 100 | 0 | |
| Vert. | 11340.000 | AV | 34.2 | 40.2 | 9.7 | 40.4 | 43.7 | 53.9 | 10.2 | 100 | 0 | VBW:10Hz |

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

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

*The 4th harmonic was not seen so the result was its base noise level.

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

## (Calculation) (above 1GHz Outside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Result (EIRP) [dBm] | Limit [dBm] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 5725.000 | PK | 48.9 | 32.2 | 17.1 | 40.9 | 57.3 | -37.93 | -27.00 | 10.9 | 100 | 121 | |
| Hori. | 17010.000 | PK | 46.5 | 40.4 | 2.9 | 37.7 | 52.1 | -43.13 | -27.00 | 16.1 | 100 | 258 | |
| Vert. | 5725.000 | PK | 47.9 | 32.2 | 17.1 | 40.9 | 56.3 | -38.93 | -27.00 | 11.9 | 100 | 88 | |
| Vert. | 17010.000 | PK | 45.8 | 40.4 | 2.9 | 37.7 | 51.4 | -43.83 | -27.00 | 16.8 | 100 | 254 | |

Result[dBuV/m] = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)

Resrult(EIRP[dBm])=10*LOG（({ ( 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) * 10 ^ (-6) * Distance:3[m] ) ^ 2 } / 30) *10^3)

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

*The 4th harmonic was not seen so the result was its base noise level.

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

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# Radiated Emission

| | | | |
|---|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | | No.1 and 2 Semi Anechoic Chamber |
| Date | January 27, 2015 | January 28, 2015 | January 30, 2015 |
| Temperature / Humidity | 23 deg.C , 37 %RH | 24 deg.C , 35 %RH | 22 deg.C , 34 %RH |
| Engineer | Akira Sato | Shinichi Takano | Akio Hayashi |
| | (No.1 SAC) | (No.1 SAC) | (No.2 SAC) |
| Mode | Tx, 5755 MHz | | |
| | Tx, IEEE802.11n(HT40), PN9, antenna port 0+1, worst data mode MCS8 | | |

## (above 1GHz Inside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 11510.000 | PK | 46.0 | 40.3 | 9.7 | 40.2 | 55.8 | 73.9 | 18.1 | 100 | 0 | |
| Hori. | 11510.000 | AV | 34.0 | 40.3 | 9.7 | 40.2 | 43.8 | 53.9 | 10.1 | 100 | 0 | VBW:10Hz |
| Vert. | 11510.000 | PK | 45.7 | 40.3 | 9.7 | 40.2 | 55.5 | 73.9 | 18.4 | 100 | 0 | |
| Vert. | 11510.000 | AV | 33.9 | 40.3 | 9.7 | 40.2 | 43.7 | 53.9 | 10.2 | 100 | 0 | VBW:10Hz |

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

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

*The 4th harmonic was not seen so the result was its base noise level.

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

## (Calculation) (above 1GHz Outside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Result (EIRP) [dBm] | Limit [dBm] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 5715.000 | PK | 49.2 | 32.2 | 17.1 | 40.8 | 57.7 | -37.53 | -27.00 | 10.5 | 100 | 126 | |
| Hori. | 5725.000 | PK | 54.2 | 32.2 | 17.1 | 40.9 | 62.6 | -32.63 | -17.00 | 15.6 | 100 | 126 | |
| Hori. | 17265.000 | PK | 44.8 | 41.7 | 3.1 | 37.9 | 51.7 | -43.53 | -27.00 | 16.5 | 100 | 0 | |
| Vert. | 5715.000 | PK | 49.5 | 32.2 | 17.1 | 40.8 | 58.0 | -37.23 | -27.00 | 10.2 | 100 | 112 | |
| Vert. | 5725.000 | PK | 52.4 | 32.2 | 17.1 | 40.9 | 60.8 | -34.43 | -17.00 | 17.4 | 100 | 105 | |
| Vert. | 17265.000 | PK | 44.9 | 41.7 | 3.1 | 37.9 | 51.8 | -43.43 | -27.00 | 16.4 | 100 | 0 | |

Result[dBuV/m] = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)

Resrult(EIRP[dBm])=10*LOG（{ ( 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) * 10 ^ (-6) * Distance:3[m] ) ^ 2 } / 30) *10^3)

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

*The 4th harmonic was not seen so the result was its base noise level.

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

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# Radiated Emission

| | | | |
|---|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | | No.1 and 2 Semi Anechoic Chamber |
| Date | January 27, 2015 | January 28, 2015 | January 30, 2015 |
| Temperature / Humidity | 23 deg.C , 37 %RH | 24 deg.C , 35 %RH | 22 deg.C , 34 %RH |
| Engineer | Akira Sato | Shinichi Takano | Akio Hayashi |
| | (No.1 SAC) | (No.1 SAC) | (No.2 SAC) |
| Mode | Tx, 5795 MHz | | |
| | Tx, IEEE802.11n(HT40), PN9, antenna port 0+1, worst data mode MCS8 | | |

## (above 1GHz Inside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 11590.000 | PK | 44.8 | 40.1 | 9.8 | 40.1 | 54.6 | 73.9 | 19.3 | 100 | 0 | |
| Hori. | 11590.000 | AV | 33.7 | 40.1 | 9.8 | 40.1 | 43.5 | 53.9 | 10.4 | 100 | 0 | VBW:10Hz |
| Vert. | 11590.000 | PK | 45.6 | 40.1 | 9.8 | 40.1 | 55.4 | 73.9 | 18.5 | 100 | 0 | |
| Vert. | 11590.000 | AV | 33.7 | 40.1 | 9.8 | 40.1 | 43.5 | 53.9 | 10.4 | 100 | 0 | VBW:10Hz |

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

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

*The 4th harmonic was not seen so the result was its base noise level.

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

## (Calculation) (above 1GHz Outside of the restricted band)

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Result (EIRP) [dBm] | Limit [dBm] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 5850.000 | PK | 48.7 | 32.6 | 17.1 | 41.0 | 57.4 | -37.83 | -17.00 | 20.8 | 100 | 135 | |
| Hori. | 5860.000 | PK | 48.0 | 32.6 | 17.1 | 41.0 | 56.7 | -38.53 | -27.00 | 11.5 | 100 | 135 | |
| Hori. | 17385.000 | PK | 45.7 | 42.3 | 3.1 | 38.0 | 53.1 | -42.13 | -27.00 | 15.1 | 100 | 0 | |
| Vert. | 5850.000 | PK | 48.5 | 32.6 | 17.1 | 41.0 | 57.2 | -38.03 | -17.00 | 21.0 | 100 | 76 | |
| Vert. | 5860.000 | PK | 47.8 | 32.6 | 17.1 | 41.0 | 56.5 | -38.73 | -27.00 | 11.7 | 100 | 82 | |
| Vert. | 17385.000 | PK | 46.2 | 42.3 | 3.1 | 38.0 | 53.6 | -41.63 | -27.00 | 14.6 | 100 | 0 | |

Result[dBuV/m] = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)

Resrult(EIRP[dBm])=10*LOG（{ ( 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) * 10 ^ (-6) * Distance:3[m] ) ^ 2 } / 30) *10^3)

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

*The 4th harmonic was not seen so the result was its base noise level.

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

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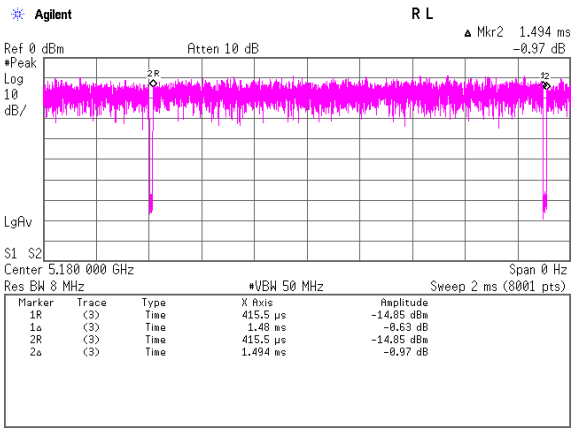
| | | |
|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.1 Semi Anechoic Chamber |
| Date | January 26, 2015 | |
| Temperature / Humidity | 23 deg.C , 31 %RH | |
| Engineer | Akira Sato | |

# Burst rate confirmation

**Tx, IEEE802.11n(HT20), PN9, antenna port 0+1, worst data mode MCS8**

| | |
|---|---|
| **duty cycle = 1.48 / 1.494 = 0.991 (99.1%)** | |
| Tx2_BurstRate1 | Tx2_BurstRate2 |

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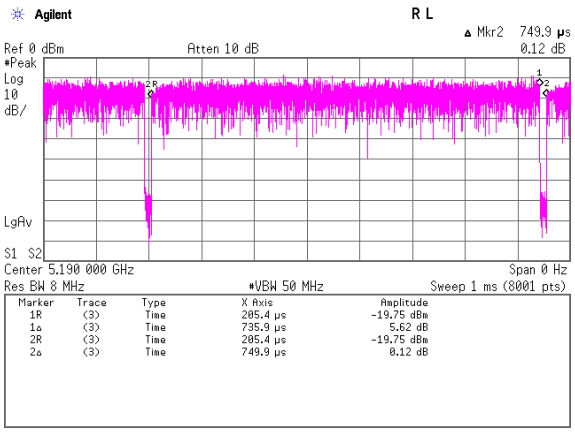
| | | |
|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | No.1 Semi Anechoic Chamber |
| Date | January 27, 2015 | |
| Temperature / Humidity | 23 deg.C , 37 %RH | |
| Engineer | Akira Sato | |

# Burst rate confirmation

**Tx, IEEE802.11n(HT40), PN9, antenna port 0+1, worst data mode MCS8**

| | |
|---|---|
| **duty cycle = 0.7359 / 0.7499 = 0.981 (98.1%)** | |
| Tx2_BurstRate1 | Tx2_BurstRate2 |

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## APPENDIX 2
## Test Instruments

### EMI test equipment

| Control No. | Instrument | Manufacturer | Model No | Serial No | Test Item | Calibration Date * Interval(month) |
|---|---|---|---|---|---|---|
| SAEC-01(NSA) | Semi-Anechoic Chamber | TDK | SAEC-01(NSA) | 1 | RE | 2014/07/09 * 12 |
| SAF-04 | Pre Amplifier | TOYO Corporation | TPA0118-36 | 1440489 | RE | 2014/03/14 * 12 |
| SCC-G01 | Coaxial Cable | Suhner | SUCOFLEX 104A | 46497/4A | RE | 2014/04/22 * 12 |
| SCC-G21 | Coaxial Cable | Suhner | SUCOFLEX 104 | 296169/4 | RE | 2014/05/15 * 12 |
| SHA-01 | Horn Antenna | Schwarzbeck | BBHA9120D | 9120D-725 | RE | 2014/08/12 * 12 |
| SOS-01 | Humidity Indicator | A&D | AD-5681 | 4062555 | RE | 2014/10/30 * 12 |
| STR-01 | Test Receiver | Rohde & Schwarz | ESU40 | 100093 | RE | 2014/11/11 * 12 |
| SJM-13 | Measure | ASKUL | - | - | RE | - |
| COTS-SEMI-1 | EMI Software | TSJ | TEPTO-DV(RE,CE,RFI,MF) | - | RE | - |
| SAT10-06 | Attenuator | Agilent | 8493C-010 | 74865 | RE | 2014/11/21 * 12 |
| SFL-03 | Highpass Filter | MICRO-TRONICS | HPM50112 | 028 | RE | 2014/11/21 * 12 |
| SSA-02 | Spectrum Analyzer | Agilent | E4448A | MY48250106 | RE | 2014/03/17 * 12 |
| SAEC-02(NSA) | Semi-Anechoic Chamber | TDK | SAEC-02(NSA) | 2 | RE | 2014/07/08 * 12 |
| SAF-05 | Pre Amplifier | TOYO Corporation | TPA0118-36 | 1440490 | RE | 2014/11/21 * 12 |
| SCC-G02 | Coaxial Cable | Suhner | SUCOFLEX 104A | 46498/4A | RE | 2014/04/22 * 12 |
| SCC-G22 | Coaxial Cable | Suhner | SUCOFLEX 104 | 296199/4 | RE | 2014/05/15 * 12 |
| SHA-02 | Horn Antenna | Schwarzbeck | BBHA9120D | 9120D-726 | RE | 2014/08/12 * 12 |
| SOS-03 | Humidity Indicator | A&D | AD-5681 | 4063325 | RE | 2014/10/30 * 12 |
| STR-07 | Test Receiver | Rohde & Schwarz | ESU26 | 100484 | RE | 2014/09/03 * 12 |
| SJM-14 | Measure | ASKUL | - | - | RE | - |
| KSA-08 | Spectrum Analyzer | Agilent | E4446A | MY46180525 | RE | 2014/03/04 * 12 |
| SHA-05 | Horn Antenna | ETS LINDGREN | 3160-09 | LM4210 | RE | 2014/03/15 * 12 |
| SCC-G18 | Coaxial Cable | Suhner | SUCOFLEX 104A | 46292/4A | RE | 2014/03/14 * 12 |
| SHA-06 | Horn Antenna | ETS LINDGREN | 3160-10 | LM3459 | RE | 2014/03/15 * 12 |
| SAF-10 | Pre Amplifier | TOYO Corporation | HAP26-40W | 00000010 | RE | 2014/03/14 * 12 |
| SCC-G19 | Coaxial Cable | Suhner | SUCOFLEX 102A | 1188/2A | RE | 2014/03/14 * 12 |
| SAF-01 | Pre Amplifier | SONOMA | 310N | 290211 | RE | 2014/02/17 * 12 |
| KAT6-04 | Attenuator | INMET | 18N-6dB | - | RE | 2014/12/19 * 12 |
| KAT3-09 | Attenuator | JFW IND. INC. | 50HF-003N | - | RE | 2014/08/27 * 12 |
| SBA-01 | Biconical Antenna | Schwarzbeck | BBA9106 | 91032664 | RE | 2014/10/18 * 12 |
| SCC-A1/A3/A5/A7/A8/A13/SRSE-01 | Coaxial Cable&RF Selector | Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO | 8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906 | -/0901-269(RF Selector) | RE | 2014/04/25 * 12 |
| SCC-A2/A4/A6/A7/A8/A13/SRSE-01 | Coaxial Cable&RF Selector | Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO | 8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906 | -/0901-269(RF Selector) | RE | 2014/04/25 * 12 |
| SLA-01 | Logperiodic Antenna | Schwarzbeck | UHALP9108A | UHALP 9108-A 0888 | RE | 2014/10/18 * 12 |
| | | | | | | |
| | | | | | | |

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

All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards .
Test Item :
RE: Radiated emission