# RADIO TEST REPORT

## Test Report No. : 11155194H-B-R3

| | | |
|---|---|---|
| **Applicant** | : | **Sony Interactive Entertainment Inc.** |
| **Type of Equipment** | : | **Wireless communication module** |
| **Model No.** | : | **J20H091** |
| **FCC ID** | : | **AK8M16DFL1** |
| **Test regulation** | : | **FCC Part 15 Subpart C: 2015**<br>***WLAN, Bluetooth Low Energy parts** |
| **Test Result** | : | **Complied** |

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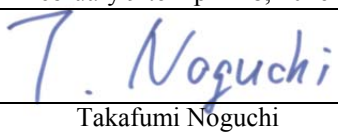
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. This report is a revised version of 11155194H-B-R2. 11155194H-B-R2 is replaced with this report.

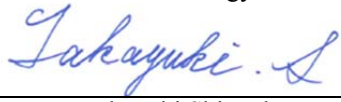
**Date of test:** February 9 to April 28, 2016

**Representative test engineer:**



Takafumi Noguchi
Engineer
Consumer Technology Division

**Approved by:**



Takayuki Shimada
Engineer
Consumer Technology Division

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://japan.ul.com/resources/emc_accredited/

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# REVISION HISTORY

## Original Test Report No.: 11155194H-B

| Revision | Test report No. | Date | Page revised | Contents |
|---|---|---|---|---|
| - (Original) | 11155194H-B | April 6, 2016 | - | - |
| 1 | 11155194H-B-R1 | April 8, 2016 | P.9 | Correction of explanatory note for software |
| 1 | 11155194H-B-R1 | April 8, 2016 | P.76 | Correction of Test Configuration and peripherals |
| 2 | 11155194H-B-R2 | April 25, 2016 | P.5 | Correction of antenna gain (Antenna port WC for 5GHz) |
| 2 | 11155194H-B-R2 | April 25, 2016 | P.5 | Correction of directional gain of 5GHz |
| 2 | 11155194H-B-R2 | April 25, 2016 | P.6, 13, 14, 15 | Updated KDB version |
| 2 | 11155194H-B-R2 | April 25, 2016 | P.10, 50-52 | Deletion of word “Reference data” |
| 2 | 11155194H-B-R2 | April 25, 2016 | P.24-26 | Correction of test data |
| 3 | 11155194H-B-R3 | April 28, 2016 | P.5 | Correction of formula for directional antenna gain |
| 3 | 11155194H-B-R3 | April 28, 2016 | P.50-52 | Change of test data due to retest |
| 3 | 11155194H-B-R3 | April 28, 2016 | P.68 | Correction of test instruments |
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**CONTENTS** **PAGE**

# SECTION 1: Customer information

| | |
|---|---|
| Company Name | Sony Interactive Entertainment Inc. |
| Brand Name | SONY |
| Address | 1-7-1 Konan, Minato-ku, Tokyo, 108-0075 Japan |
| Telephone Number | +81-3-6748-6333 |
| Facsimile Number | +81-3-6748-6383 |
| Contact Person | Kiyoto Sasaki |

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

## 2.1 Identification of E.U.T.

| | |
|---|---|
| Type of Equipment | Wireless communication module |
| Model No | J20H091 |
| Serial No | Refer to Clause 4.2 |
| Country of Manufacture | China/Japan |
| Receipt Date of Sample | February 6, 2016 |
| Condition of EUT | Production prototype<br>(Not for Sale: This sample is equivalent to mass-produced items.) |
| Modification of EUT | No modification by the test lab. |

## 2.2 Product Description

J20H091 is the Wireless communication module.

**Product Specification**

| | |
|---|---|
| Clock frequency in the system (radio part) | 40MHz |
| Operating Temperature | -10 - +85 deg. C |
| Power Supply | DC 3.3 V, DC 1.8 V |
| Size | 20 x 18 x 3.6 mm, 55pin LGA |

**Radio Specification**

**WLAN (IEEE802.11b/g/n-20)**

| | |
|---|---|
| Equipment Type | Transceiver |
| Frequency of Operation | 2412-2462MHz |
| Type of Modulation | DSSS, OFDM |
| Bandwidth & Channel spacing | Less than 20MHz & 5MHz |
| Method of frequency generation | Synthesizer |
| Power Supply (inner) | DC 3.3 V / DC 1.8 V / DC 1.1 V |
| Antenna Type | PIFA (Antenna port WA for 2.4GHz / Antenna port WB) |
| Antenna Gain: $G_{ANT}$ | 5.6dBi (Antenna port WA for 2.4GHz / Antenna port WB) |
| Directional Gain *1) | 8.61dBi |

**WLAN (IEEE802.11a/11n-20/11ac-20/11n-40/11ac-40/11ac-80)**

| | |
|---|---|
| Equipment Type | Transceiver |
| Frequency of Operation | W52: 5180-5240MHz<br>W53: 5260-5320MHz<br>W56: 5500-5700MHz<br>W58: 5745-5825MHz |
| Type of Modulation | OFDM |
| Bandwidth & Channel spacing | Less than 20MHz/40MHz/80MHz&20MHz/40MHz/80MHz |
| Method of frequency generation | Synthesizer |
| Power Supply (inner) | DC 3.3 V / DC 1.8 V / DC 1.1 V |
| Antenna Type | PIFA (Antenna port WA for 5GHz / Antenna port WC for 5GHz) |
| Antenna Gain: $G_{ANT}$ | 5.0dBi (Antenna port WA for 5GHz) |
| | 3.5dBi (Antenna port WC for 5GHz) |
| Directional Gain *1) | 7.29dBi |

**Bluetooth (BDR/EDR)**

| | |
|---|---|
| Equipment Type | Transceiver |
| Frequency of Operation | 2402-2480MHz |
| Type of Modulation | FHSS (GFSK, π/4DQPSK, 8DPSK) |
| Bandwidth & Channel spacing | 79MHz & 1MHz |
| Method of frequency generation | Synthesizer |
| Power Supply (inner) | DC 3.3 V / DC 1.8 V / DC 1.1 V |
| Antenna Type | PIFA (Antenna port WC for 2.4 GHz) |
| Antenna Gain | 6.4dBi (Antenna port WC for 2.4 GHz) |

**Bluetooth (Low Energy)**

| | |
|---|---|
| Equipment Type | Transceiver |
| Frequency of Operation | 2402-2480MHz |
| Type of Modulation | GFSK |
| Bandwidth & Channel spacing | 1MHz & 2MHz |
| Method of frequency generation | Synthesizer |
| Power Supply (inner) | DC 3.3 V / DC 1.8 V / DC 1.1 V |
| Antenna Type | PIFA (Antenna port WC for 2.4 GHz) |
| Antenna Gain | 6.4dBi (Antenna port WC for 2.4 GHz) |

*1) Directional antenna gain = $10\log\left(\left(10^{\frac{G_{ANT1}}{20}}+10^{\frac{G_{ANT2}}{20}}\right)^2/2\right)$

*This test report applies to WLAN (2.4 GHz band) and Bluetooth Low Energy.

# SECTION 3: Test specification, procedures & results

## 3.1 Test Specification

| | | |
|---|---|---|
| Test Specification | : | FCC Part 15 Subpart C: 2015, final revised on November 23, 2015<br>*Some parts are effective on and after December 17, 2015 or December 23, 2015. The revision does not affect the test specification applied to the EUT. |
| Title | : | FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators<br>Section 15.207 Conducted limits<br>Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz |

* The EUT complies with FCC Part 15 Subpart B: 2015, final revised on November 23, 2015

## 3.2 Procedures and results

| Item | Test Procedure | Specification | Worst margin | Results | Remarks |
|---|---|---|---|---|---|
| Conducted Emission | **FCC:** ANSI C63.10-2013<br>6. Standard test methods<br>**IC:** RSS-Gen 8.8 | **FCC:** Section 15.207<br>**IC:** RSS-Gen 8.8 | **QP**<br>26.3dB, 0.15000 MHz, N<br>**AV**<br>30.1 dB, 0.15000 MHz, L | Complied | - |
| 6dB Bandwidth | **FCC:** KDB 558074 D01 DTS Meas Guidance v03r05<br>**IC:** - | **FCC:** Section 15.247(a)(2)<br>**IC:** RSS-247 5.2(1) | See data. | Complied | Conducted |
| Maximum Peak Output Power | **FCC:** KDB 558074 D01 DTS Meas Guidance v03r05<br>**IC:** RSS-Gen 6.12 | **FCC:** Section 15.247(b)(3)<br>**IC:** RSS-247 5.4(4) | | Complied | Conducted |
| Power Density | **FCC:** KDB 558074 D01 DTS Meas Guidance v03r05<br>**IC:** - | **FCC:** Section 15.247(e)<br>**IC:** RSS-247 5.2(2) | | Complied | Conducted |
| Spurious Emission Restricted Band Edges | **FCC:** KDB 558074 D01 DTS Meas Guidance v03r05<br>**IC:** RSS-Gen 6.13 | **FCC:** Section15.247(d)<br>**IC:** RSS-247 5.5<br>RSS-Gen 8.9<br>RSS-Gen 8.10 | 4.3 dB<br>2483.500 MHz, AV, Hori. | Complied | Conducted (below 30 MHz)/ Radiated (above 30 MHz) *1) |

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.
*1) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 DTS Meas Guidance v03r05 12.2.7.

* In case any questions arise about test procedure, ANSI C63.10: 2013 is also referred.

**FCC Part 15.31 (e)**

The EUT has the power supply regulator. However one of the input voltages to RF part doesn't go through the regulator. The stable voltage will be supplied by the end product, which will be required to have a power supply regulator. Therefore, the EUT complies with the requirement.

**FCC Part 15.203/212 Antenna requirement**

The EUT has a unique coupling/antenna connector (U.FL). Therefore the equipment complies with the requirement of 15.203/212.

## 3.3 Addition to standard

| Item | Test Procedure | Specification | Worst margin | Results | Remarks |
|---|---|---|---|---|---|
| 99% Occupied Bandwidth | **IC:** RSS-Gen 6.6 | **IC:** - | N/A | - | Conducted |

Other than above, 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 $k = 2$.

Ise EMC Lab.

| Antenna terminal test Uncertainty (+/-) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Power meter | | Conducted emission and Power density | | | Conducted emission | | Channel power |
| Below 1 GHz | Above 1 GHz | Below 1 GHz | 1 GHz -3 GHz | 3 GHz -18 GHz | 18 GHz -26.5 GHz | 26.5 GHz -40 GHz | |
| 0.9 dB | 1.0 dB | 1.4 dB | 1.7 dB | 2.8 dB | 2.8 dB | 2.9 dB | 2.6 dB |

| Frequency range | Conducted emission using AMN(LISN) (±dB) |
|---|---|
| 0.009 – 0.15MHz | 3.5 dB |
| 0.15 – 30MHz | 2.9 dB |

| Test distance | Radiated emission (±dB) 9 kHz - 30 MHz |
|---|---|
| 3m | 3.8 dB |
| 10m | 3.7 dB |

| Polarity | Radiated emission (Below 1GHz) | | | |
|---|---|---|---|---|
| | (3 m*)(±dB) | | (10 m*)(±dB) | |
| | 30 – 300 MHz | 300 – 1000MHz | 30 – 300 MHz | 300 – 1000MHz |
| Horizontal | 4.8 dB | 5.2 dB | 4.8 dB | 5.0 dB |
| Vertical | 4.5 dB | 5.9 dB | 4.8 dB | 5.1 dB |

| Radiated emission | | | | |
|---|---|---|---|---|
| (3 m*)(±dB) | | (1 m*)(±dB) | (0.5 m*)(±dB) | (10 m*)(±dB) |
| 1 – 6GHz | 6 – 18GHz | 10 – 26.5 GHz | 26.5 – 40GHz | 1 -18 GHz |
| 5.1 dB | 5.3 dB | 5.1 dB | 5.1 dB | 5.3 dB |

*Measurement distance

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

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

## 3.5 Test Location

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| Test site | IC Registration Number | Width x Depth x Height (m) | Size of reference ground plane (m) / horizontal conducting plane | Other rooms | Maximum measurement distance |
|---|---|---|---|---|---|
| No.1 semi-anechoic chamber | 2973C-1 | 19.2 x 11.2 x 7.7 | 7.0 x 6.0 | No.1 Power source room | 10 m |
| No.2 semi-anechoic chamber | 2973C-2 | 7.5 x 5.8 x 5.2 | 4.0 x 4.0 | - | 3 m |
| No.3 semi-anechoic chamber | 2973C-3 | 12.0 x 8.5 x 5.9 | 6.8 x 5.75 | No.3 Preparation room | 3 m |
| No.3 shielded room | - | 4.0 x 6.0 x 2.7 | N/A | - | - |
| No.4 semi-anechoic chamber | 2973C-4 | 12.0 x 8.5 x 5.9 | 6.8 x 5.75 | No.4 Preparation room | 3 m |
| No.4 shielded room | - | 4.0 x 6.0 x 2.7 | N/A | - | - |
| No.5 semi-anechoic chamber | - | 6.0 x 6.0 x 3.9 | 6.0 x 6.0 | - | - |
| No.6 shielded room | - | 4.0 x 4.5 x 2.7 | 4.0 x 4.5 | - | - |
| No.6 measurement room | - | 4.75 x 5.4 x 3.0 | 4.75 x 4.15 | - | - |
| No.7 shielded room | - | 4.7 x 7.5 x 2.7 | 4.7 x 7.5 | - | - |
| No.8 measurement room | - | 3.1 x 5.0 x 2.7 | N/A | - | - |
| No.9 measurement room | - | 8.8 x 4.6 x 2.8 | 2.4 x 2.4 | - | - |
| No.11 measurement room | - | 6.2 x 4.7 x 3.0 | 4.8 x 4.6 | - | - |

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 m 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 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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

## 4.1 Operating Mode(s)

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 802.11b (11b) | 2Mbps, PN9 |
| IEEE 802.11g (11g) | 9Mbps, PN9 |
| IEEE 802.11n MIMO 20MHz BW (11n-20) | MCS 0, PN9 |
| Bluetooth Low Energy(BT LE) | Maximum Packet Size, PRBS9 |
| *The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel) | |
| *The power value of the EUT was set for testing as follows (setting value might be different from product specification value);<br>Power settings: WLAN 8(dBm)<br>Bluetooth (LE) Same as production model<br>Software: Opro_DOS_Labtool_Ver2.0.0.84<br>*This setting of software is the worst case.<br>Any conditions under the normal use do not exceed the condition of setting.<br>In addition, end users cannot change the settings of the output power of the product. | |

*Details of Operating mode for WLAN

| Test Item | Operating Mode | Used Antenna port | Tested frequency |
|---|---|---|---|
| Conducted Emission | 11n-20 Tx *1) | WA + WB | 2437MHz |
| Spurious Emission (Conducted) | 11n-20 Tx *1) | WA | 2437MHz |
| 6dB Bandwidth,<br>99% Occupied Bandwidth | 11b Tx<br>11g Tx<br>11n-20 Tx | WA | 2412MHz<br>2437MHz<br>2462MHz |
| Maximum Peak Output Power,<br>Power Density | 11b Tx<br>11g Tx<br>11n-20 Tx | WA + WB,<br>WA, WB | 2412MHz<br>2437MHz<br>2462MHz |
| Spurious Emission (Radiated) | 11b Tx<br>11n-20 Tx *2) | WA + WB | 2412MHz<br>2437MHz<br>2462MHz |
| *1) The test was performed on the mode as a representative, because it had the highest power at antenna terminal test.<br>*2) The test was performed on 11n-20 Tx mode according to "Section 1 of 6 802.11 a/b/g/n testing-Managing Complex Regulatory Approvals - " of TCB Council Workshop October 2009, as the 11n-20 Tx mode had higher power than 11g mode at antenna terminal test. | | | |

*Details of Operating mode for BT LE

| Test Item | Operating Mode | Tested frequency |
|---|---|---|
| Conducted Emission,<br>6dB Bandwidth,<br>Maximum Peak Output Power,<br>Power Density,<br>99% Occupied Bandwidth,<br>Spurious Emission (Radiated / Conducted) | BT LE | 2402MHz<br>2440MHz<br>2480MHz |

*Simultaneously transmission

| Test Item | Mode *1) |
|---|---|
| Spurious Emission (Radiated) | Tx BT LE 2402 MHz + 11n-20 5180 MHz<br>Tx BT LE 2440 MHz + 11n-20 5180 MHz<br>Tx BT LE 2480 MHz + 11n-20 5180 MHz |
| *1) The test was performed on the mode as a representative, because it had the highest power of 5GHz band at antenna terminal test. | |

## 4.2 Configuration and peripherals

**This page has been submitted for a separate exhibit.**

## SECTION 5: Conducted Emission

**Test Procedure and conditions**

EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 m, raised 0.8 m above the conducting ground plane.
The rear of tabletop was located 40 cm 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 80 cm 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 cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane. All unused 50ohm connectors of the LISN (AMN) were resistivity terminated in 50 ohm 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.
The EUT was connected to a LISN (AMN).
An overview sweep with peak detection has been performed.

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

| | |
|---|---|
| **Detector** | **: QP and CISPR AV** |
| **Measurement range** | **: 0.15 MHz – 30 MHz** |
| **Test data** | **: APPENDIX** |
| **Test result** | **: Pass** |

## SECTION 6: Radiated Spurious Emission

**Test Procedure**

It was measured based on "11.0 Emissions in non-restricted frequency bands" of "558074 D01 DTS Meas Guidance v03r05".

[For below 1GHz]
EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1GHz]
EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 m, raised 1.5 m above the conducting ground plane.
The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

The height of the measuring antenna varied between 1 and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.
The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.
The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).
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.

**Test Antennas are used as below;**

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

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

**20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9(IC) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (IC).**

| Frequency | Below 1 GHz | Above 1 GHz | | 20 dBc |
|---|---|---|---|---|
| Instrument used | Test Receiver | Spectrum Analyzer | | Spectrum Analyzer |
| Detector | QP | PK | AV *1) | PK |
| IF Bandwidth | BW 120 kHz | RBW: 1 MHz<br>VBW: 3 MHz | Average Power Method:<br>12.2.5.1 (11b/g/n-20)<br>RBW: 1 MHz<br>VBW: 3 MHz<br>Detector:<br>Power Averaging (RMS)<br>Trace: 100 traces<br>12.2.5.2 (BT LE)<br>RBW: 1 MHz<br>VBW: 3 MHz<br>Detector:<br>Power Averaging (RMS)<br>Trace: 100 traces<br>Duty factor was added to the results. | RBW: 100 kHz<br>VBW: 300kHz |
| Test Distance | 3m | 3 m (below 1 GHz),<br>4.45 m / 4.5 m *2) (1 GHz – 10GHz),<br>1 m *3) (10 GHz – 26.5 GHz) | | 3 m (below 1 GHz),<br>4.45 m / 4.5 m *2) (1 GHz – 10GHz),<br>1 m *3) (10 GHz – 26.5 GHz) |

*1) Average Power Measurement was performed based on 6.0 & 12.2.5 of "KDB 558074 D01 DTS Meas Guidance v03r05"
*2) Distance Factor: 20 x log (4.45 m / 3.0 m) = 3.42 dB (for WLAN) / 20 x log (4.5 m / 3.0 m) = 3.52 dB (for BT LE)
*3) Distance Factor: 20 x log (1.0 m / 3.0 m) = -9.5 dB

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT (Antenna and Module) 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 : 30 M - 26.5 GHz**
**Test data : APPENDIX**
**Test result : Pass**

# SECTION 7: Antenna Terminal Conducted Tests

**Test Procedure**

The tests were made with below setting connected to the antenna port.

| Test | Span | RBW | VBW | Sweep time | Detector | Trace | Instrument used |
|---|---|---|---|---|---|---|---|
| 6dB Bandwidth | 2 MHz / 20 MHz | 100 kHz | 300 kHz | Auto | Peak | Max Hold | Spectrum Analyzer |
| 99% Occupied Bandwidth *1) | Enough width to display emission skirts | 1 to 5 % of OBW | Three times of RBW | Auto | Peak | Max Hold | Spectrum Analyzer |
| Maximum Peak Output Power | - | - | - | Auto | Peak/ Average *2) | - | Power Meter (Sensor: 50 MHz BW) |
| Peak Power Density | 1.5 times the 6dB Bandwidth | 3 kHz | 10 kHz | Auto | Peak | Max Hold | Spectrum Analyzer *3) |
| Conducted Spurious Emission *4) | 9kHz to 150kHz | 200 Hz | 620 Hz | Auto | Peak | Max Hold | Spectrum Analyzer |
| | 150kHz to 30MHz | 9.1 kHz | 27 kHz | | | | |

*1) Peak hold was applied as Worst-case measurement.
*2) Reference data
*3) Section 10.2 Method PKPSD (peak PSD) of "KDB 558074 D01 DTS Meas Guidance v03r05".
*4) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.
Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.
(9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 9.1 kHz)

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

**Test data : APPENDIX**
**Test result : Pass**

# APPENDIX 1: Test data

## Conducted Emission

### DATA OF CONDUCTED EMISSION TEST

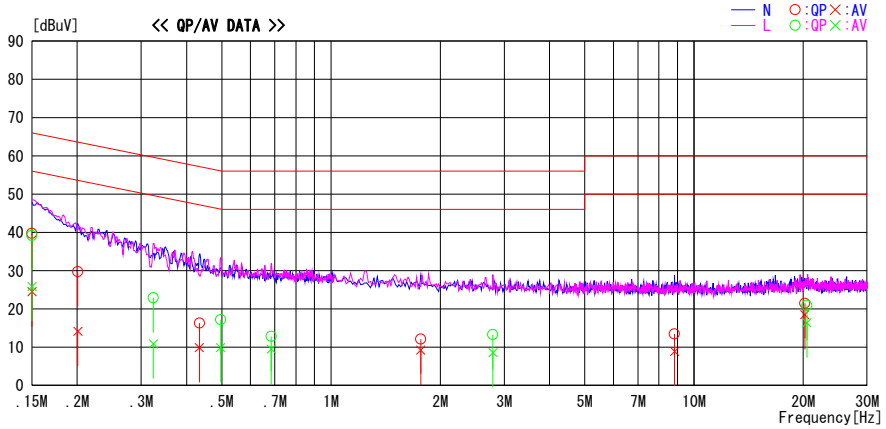
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2016/02/16

Report No. : 11155194H

Temp./Humi. : 20deg. C / 27% RH
Engineer : Tomoki Matsui

Mode / Remarks : WLAN 2.4GHz Tx 11n-20 2437 MHz

LIMIT : FCC15.207 QP
FCC15.207 AV




| Frequency | Reading Level | | Corr. | Results | | Limit | | Margin | | Phase | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | QP | AV | Factor | QP | AV | QP | AV | QP | AV | | |
| [MHz] | [dBuV] | [dBuV] | [dB] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dB] | [dB] | | |
| 0.15000 | 26.5 | 11.3 | 13.2 | 39.7 | 24.5 | 66.0 | 56.0 | 26.3 | 31.5 | N | |
| 0.20075 | 16.5 | 1.0 | 13.2 | 29.7 | 14.2 | 63.6 | 53.6 | 33.9 | 39.4 | N | |
| 0.43420 | 3.0 | -3.4 | 13.3 | 16.3 | 9.9 | 57.2 | 47.2 | 40.9 | 37.3 | N | |
| 1.76607 | -1.3 | -4.2 | 13.4 | 12.1 | 9.2 | 56.0 | 46.0 | 43.9 | 36.8 | N | |
| 8.84068 | -0.5 | -5.1 | 14.0 | 13.5 | 8.9 | 60.0 | 50.0 | 46.5 | 41.1 | N | |
| 20.18600 | 7.0 | 4.0 | 14.5 | 21.5 | 18.5 | 60.0 | 50.0 | 38.5 | 31.5 | N | |
| 0.15000 | 26.0 | 12.7 | 13.2 | 39.2 | 25.9 | 66.0 | 56.0 | 26.8 | 30.1 | L | |
| 0.32400 | 9.7 | -2.4 | 13.3 | 23.0 | 10.9 | 59.6 | 49.6 | 36.6 | 38.7 | L | |
| 0.49655 | 3.9 | -3.4 | 13.3 | 17.2 | 9.9 | 56.1 | 46.1 | 38.9 | 36.2 | L | |
| 0.68505 | -0.5 | -3.8 | 13.3 | 12.8 | 9.5 | 56.0 | 46.0 | 43.2 | 36.5 | L | |
| 2.79400 | -0.3 | -5.0 | 13.6 | 13.3 | 8.6 | 56.0 | 46.0 | 42.7 | 37.4 | L | |
| 20.46800 | 6.3 | 1.8 | 14.6 | 20.9 | 16.4 | 60.0 | 50.0 | 39.1 | 33.6 | L | |

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

# Conducted Emission

## DATA OF CONDUCTED EMISSION TEST

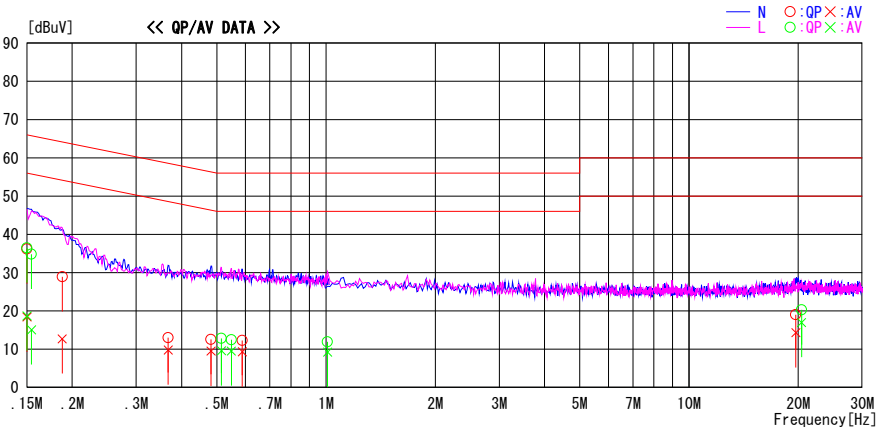
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2016/02/16

Report No. : 11155194H

Temp./Humi. : 20deg. C / 27% RH
Engineer : Tomoki Matsui

Mode / Remarks : Tx BT LE 2480MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



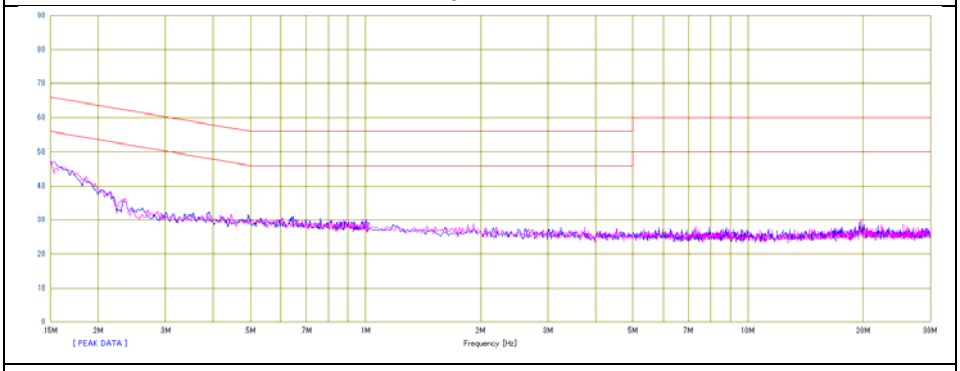

| Frequency | Reading Level | | Corr. | Results | | Limit | | Margin | | Phase | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | QP | AV | Factor | QP | AV | QP | AV | QP | AV | | |
| [MHz] | [dBuV] | [dBuV] | [dB] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dB] | [dB] | | |
| 0.15000 | 23.0 | 5.2 | 13.2 | 36.2 | 18.4 | 66.0 | 56.0 | 29.8 | 37.6 | N | |
| 0.18770 | 15.7 | -0.5 | 13.2 | 28.9 | 12.7 | 64.1 | 54.1 | 35.2 | 41.4 | N | |
| 0.36750 | -0.3 | -3.5 | 13.3 | 13.0 | 9.8 | 58.6 | 48.6 | 45.6 | 38.8 | N | |
| 0.48205 | -0.8 | -3.8 | 13.3 | 12.5 | 9.5 | 56.3 | 46.3 | 43.8 | 36.8 | N | |
| 0.58790 | -1.0 | -4.0 | 13.3 | 12.3 | 9.3 | 56.0 | 46.0 | 43.7 | 36.7 | N | |
| 19.69600 | 4.6 | -0.1 | 14.4 | 19.0 | 14.3 | 60.0 | 50.0 | 41.0 | 35.7 | N | |
| 0.15000 | 23.3 | 5.5 | 13.2 | 36.5 | 18.7 | 66.0 | 56.0 | 29.5 | 37.3 | L | |
| 0.15435 | 21.6 | 1.9 | 13.2 | 34.8 | 15.1 | 65.8 | 55.8 | 31.0 | 40.7 | L | |
| 0.51540 | -0.5 | -3.7 | 13.3 | 12.8 | 9.6 | 56.0 | 46.0 | 43.2 | 36.4 | L | |
| 0.54875 | -0.8 | -3.8 | 13.3 | 12.5 | 9.5 | 56.0 | 46.0 | 43.5 | 36.5 | L | |
| 1.00985 | -1.4 | -4.1 | 13.3 | 11.9 | 9.2 | 56.0 | 46.0 | 44.1 | 36.8 | L | |
| 20.41000 | 5.7 | 2.4 | 14.6 | 20.3 | 17.0 | 60.0 | 50.0 | 39.7 | 33.0 | L | |

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

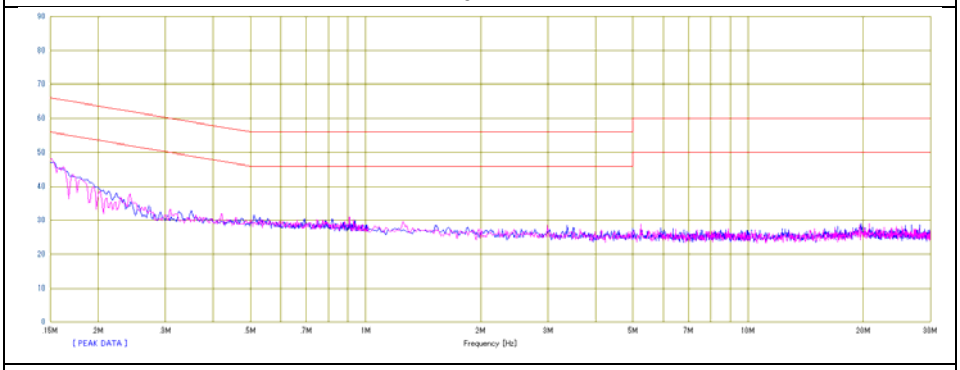
# Conducted Emission

| | |
|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber |
| Report No. | 11155194H |
| Date | February 16, 2016 |
| Temperature / Humidity | 20 deg. C / 27 % RH |
| Engineer | Tomoki Matsui |
| Mode | Tx BT LE |

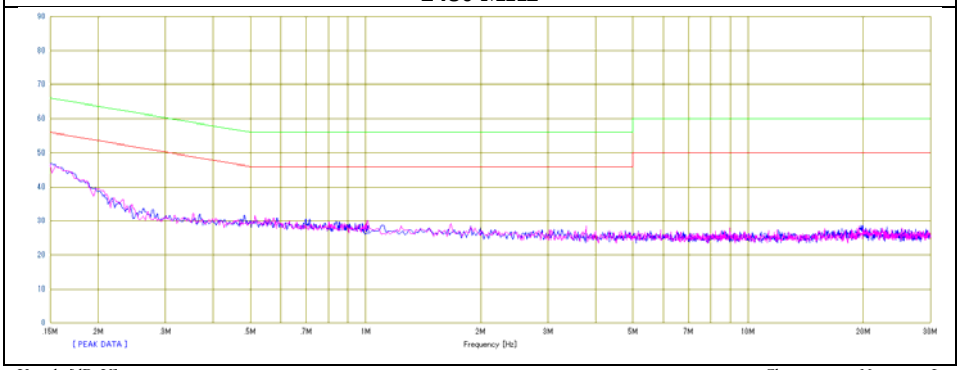
**2402 MHz**




**2440 MHz**




**2480 MHz**




Y scale [dBuV] Chart — N — L

# 6dB Bandwidth

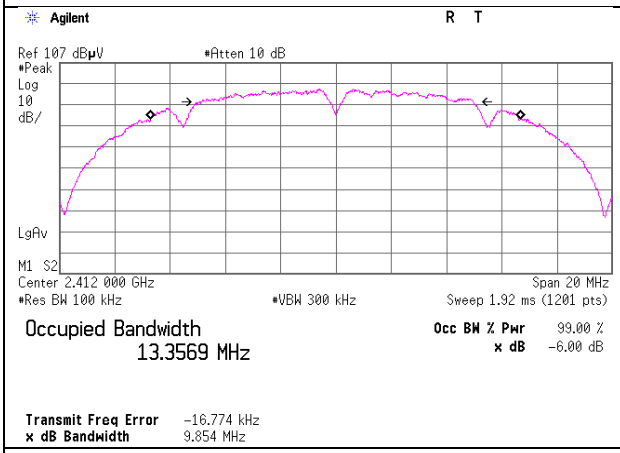
| | |
|---|---|
| Test place | Ise EMC Lab. No.11 Measurement Room |
| Report No. | 11155194H |
| Date | February 12, 2016 |
| Temperature / Humidity | 23deg. C / 52% RH |
| Engineer | Takafumi Noguchi |
| Mode | Tx |

| Mode | Frequency [MHz] | 6dB Bandwidth [MHz] | Limit [kHz] |
|---|---|---|---|
| 11b | 2412 | 9.854 | > 500 |
| | 2437 | 9.877 | > 500 |
| | 2462 | 9.879 | > 500 |
| 11g | 2412 | 16.365 | > 500 |
| | 2437 | 16.338 | > 500 |
| | 2462 | 16.385 | > 500 |
| 11n-20 | 2412 | 17.560 | > 500 |
| | 2437 | 17.550 | > 500 |
| | 2462 | 17.581 | > 500 |

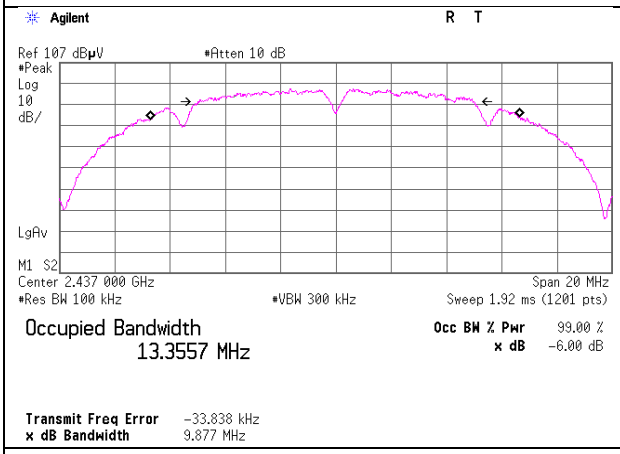
# 6dB Bandwidth

## 11b

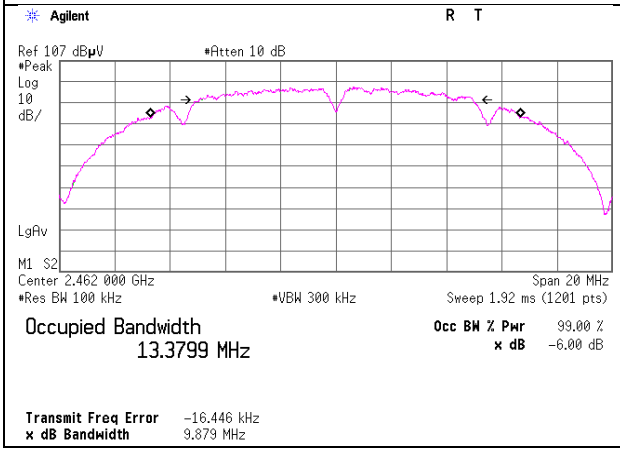
### 2412 MHz




### 2437 MHz

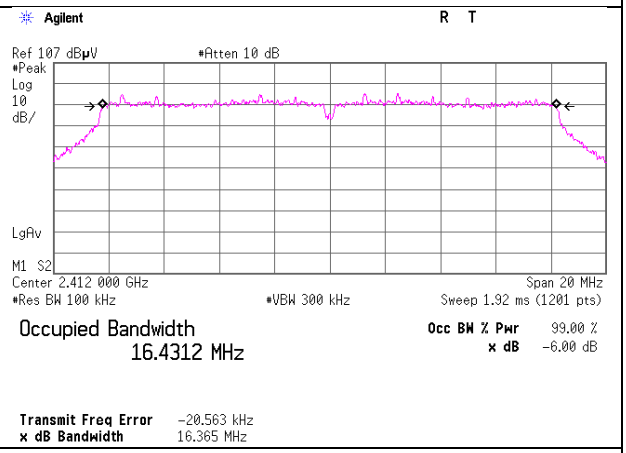



### 2462 MHz

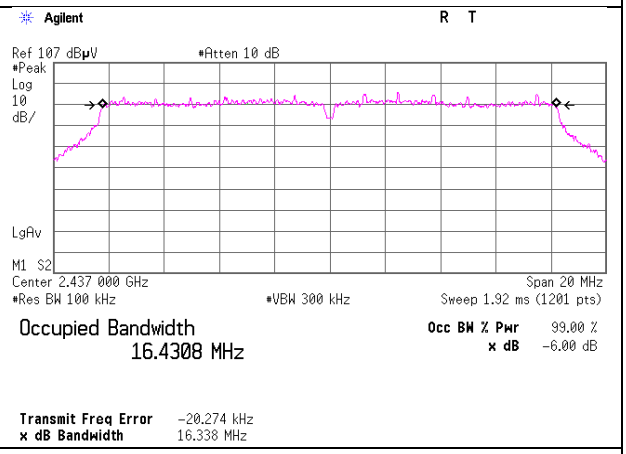



## 11g

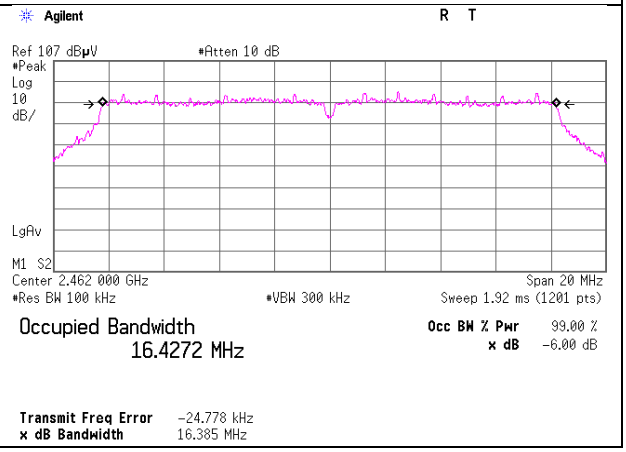
### 2412 MHz




### 2437 MHz



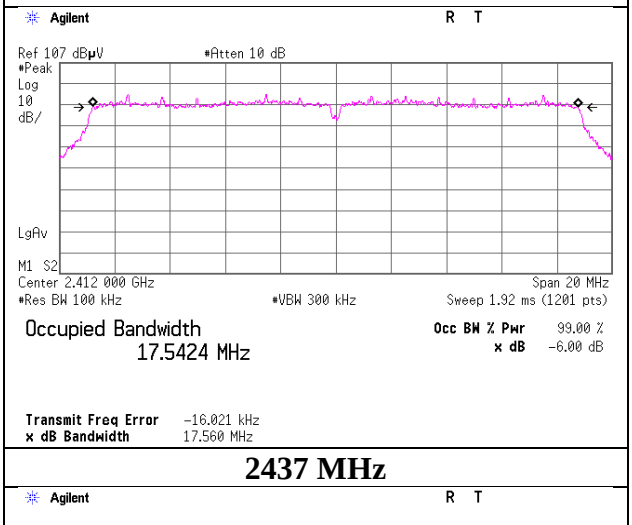

### 2462 MHz



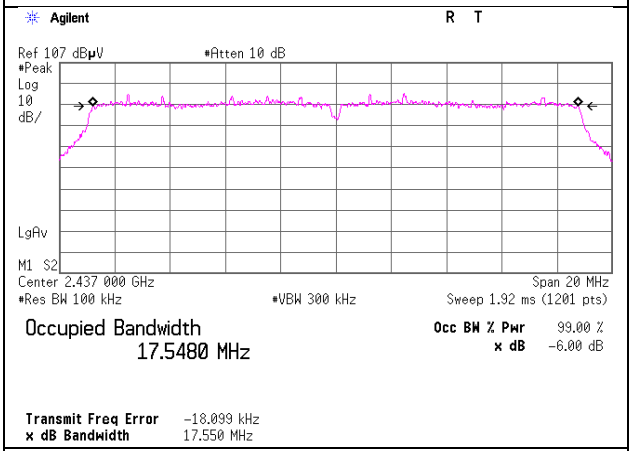
# 6dB Bandwidth

## 11n-20

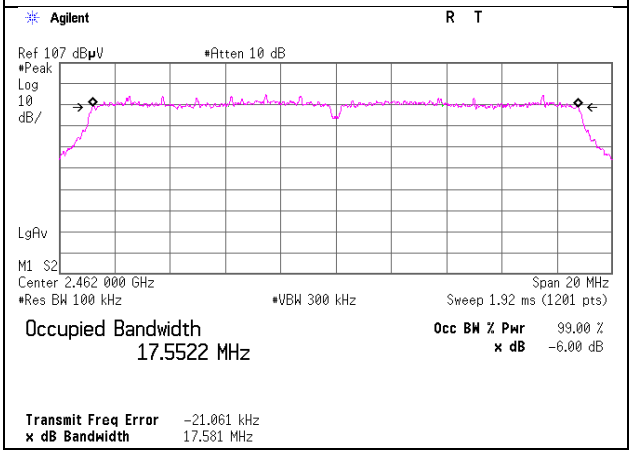
### 2412 MHz




### 2437 MHz




### 2462 MHz



# 6dB Bandwidth

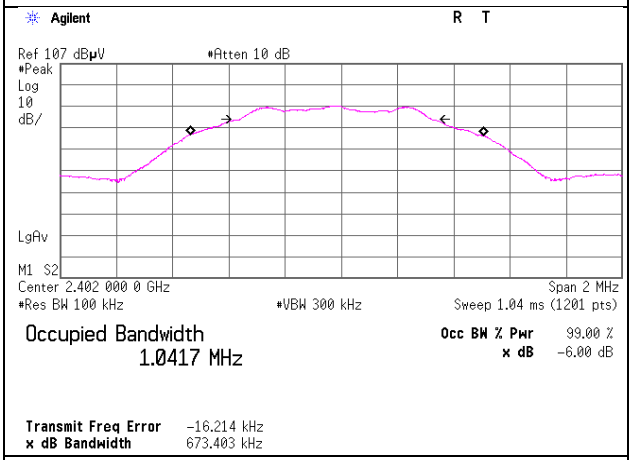
| | |
|---|---|
| Test place | Ise EMC Lab. No.3 Preparation Room |
| Report No. | 11155194H |
| Date | February 16, 2016 |
| Temperature / Humidity | 23deg. C / 34% RH |
| Engineer | Tomoki Matsui |
| Mode | Tx BT LE |

| Mode | Frequency [MHz] | 6dB Bandwidth [MHz] | Limit [kHz] |
|---|---|---|---|
| BT LE | 2402 | 0.673 | > 500 |
| | 2440 | 0.674 | > 500 |
| | 2480 | 0.675 | > 500 |

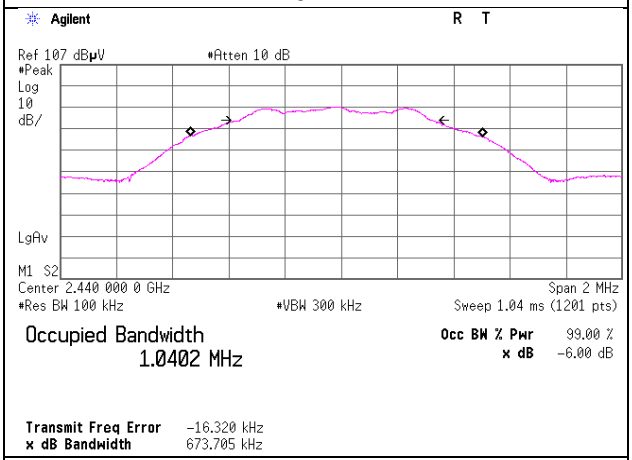
# 6dB Bandwidth

## BT LE

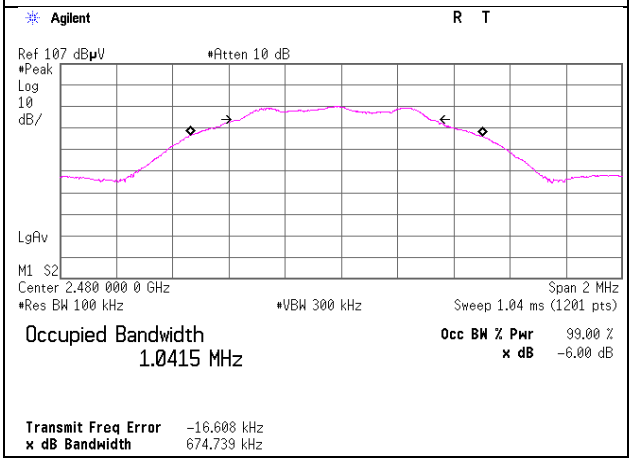
### 2402 MHz




### 2440 MHz




### 2480 MHz



# Maximum Peak Output Power

| | |
|---|---|
| Test place | Ise EMC Lab. No.11 Measurement Room |
| Report No. | 11155194H |
| Date | February 9, 2016 |
| Temperature/ Humidity | 23deg. C / 38% RH |
| Engineer | Takumi Shimada |
| Mode | 11b Tx |

Antenna port WA + WB

| Freq. | Antenna port WA Result | Antenna port WB Result | Result | | Limit | | Margin |
|---|---|---|---|---|---|---|---|
| [MHz] | [mW] | [mW] | [dBm] | [mW] | [dBm] | [mW] | [dB] |
| 2412 | 14.86 | 10.67 | 14.07 | 25.53 | 27.39 | 794.32 | 13.32 |
| 2437 | 15.07 | 10.76 | 14.12 | 25.83 | 27.39 | 794.32 | 13.27 |
| 2462 | 14.29 | 11.04 | 14.04 | 25.33 | 27.39 | 794.32 | 13.35 |

Sample Calculation:
Result = Antenna port WA + WB
*This Limit was reduced by 2.61dB for directional gain of the antenna/antenna array exceeding 6 dBi.

Antenna port WA

| Freq. | Reading | Cable Loss | Atten. | Result | |
|---|---|---|---|---|---|
| [MHz] | [dBm] | [dB] | [dB] | [dBm] | [mW] |
| 2412 | 1.13 | 0.50 | 10.09 | 11.72 | 14.86 |
| 2437 | 1.19 | 0.50 | 10.09 | 11.78 | 15.07 |
| 2462 | 0.96 | 0.50 | 10.09 | 11.55 | 14.29 |

Antenna port WB

| Freq. | Reading | Cable Loss | Atten. | Result | |
|---|---|---|---|---|---|
| [MHz] | [dBm] | [dB] | [dB] | [dBm] | [mW] |
| 2412 | -0.31 | 0.50 | 10.09 | 10.28 | 10.67 |
| 2437 | -0.27 | 0.50 | 10.09 | 10.32 | 10.76 |
| 2462 | -0.16 | 0.50 | 10.09 | 10.43 | 11.04 |

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

| Rate | Antenna port WA Reading Peak | | Antenna port WB Reading Peak | | Total Reading Power | | Remark |
|---|---|---|---|---|---|---|---|
| [Mbps] | [dBm] | [mW] | [dBm] | [mW] | [dBm] | [mW] | [dB] |
| 1 | 1.16 | 1.31 | -0.38 | 0.92 | 3.47 | 2.22 | |
| 2 | 1.19 | 1.32 | -0.27 | 0.94 | 3.53 | 2.25 | * |
| 5.5 | 0.50 | 1.12 | -0.91 | 0.81 | 2.86 | 1.93 | |
| 11 | 0.69 | 1.17 | -0.81 | 0.83 | 3.01 | 2.00 | |

*: Worst Rate
All comparison were carried out on same frequency and measurement factors.

# Maximum Peak Output Power

| | |
|---|---|
| Test place | Ise EMC Lab. No.11 Measurement Room |
| Report No. | 11155194H |
| Date | February 9, 2016 |
| Temperature/ Humidity | 23deg. C / 38% RH |
| Engineer | Takumi Shimada |
| Mode | 11g Tx |

Antenna port WA + WB

| Freq. | Antenna port WA Result | Antenna port WB Result | Result | | Limit | | Margin |
|---|---|---|---|---|---|---|---|
| [MHz] | [mW] | [mW] | [dBm] | [mW] | [dBm] | [mW] | [dB] |
| 2412 | 89.54 | 83.95 | 22.39 | 173.48 | 27.39 | 794.32 | 5.00 |
| 2437 | 97.27 | 84.33 | 22.59 | 181.61 | 27.39 | 794.32 | 4.80 |
| 2462 | 100.69 | 82.22 | 22.62 | 182.92 | 27.39 | 794.32 | 4.77 |

Sample Calculation:
Result = Antenna port WA + WB
*This Limit was reduced by 2.61dB for directional gain of the antenna/antenna array exceeding 6 dBi.

Antenna port WA

| Freq. | Reading | Cable Loss | Atten. | Result | |
|---|---|---|---|---|---|
| [MHz] | [dBm] | [dB] | [dB] | [dBm] | [mW] |
| 2412 | 8.93 | 0.50 | 10.09 | 19.52 | 89.54 |
| 2437 | 9.29 | 0.50 | 10.09 | 19.88 | 97.27 |
| 2462 | 9.44 | 0.50 | 10.09 | 20.03 | 100.69 |

Antenna port WB

| Freq. | Reading | Cable Loss | Atten. | Result | |
|---|---|---|---|---|---|
| [MHz] | [dBm] | [dB] | [dB] | [dBm] | [mW] |
| 2412 | 8.65 | 0.50 | 10.09 | 19.24 | 83.95 |
| 2437 | 8.67 | 0.50 | 10.09 | 19.26 | 84.33 |
| 2462 | 8.56 | 0.50 | 10.09 | 19.15 | 82.22 |

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

| Rate | Antenna port WA Reading Peak | | Antenna port WB Reading Peak | | Total Reading Power | | Remark |
|---|---|---|---|---|---|---|---|
| [Mbps] | [dBm] | [mW] | [dBm] | [mW] | [dBm] | [mW] | [dB] |
| 6 | 8.93 | 7.82 | 8.22 | 6.64 | 11.60 | 14.45 | |
| 9 | 9.29 | 8.49 | 8.67 | 7.36 | 12.00 | 15.85 | * |
| 12 | 7.83 | 6.07 | 7.23 | 5.28 | 10.55 | 11.35 | |
| 18 | 8.06 | 6.40 | 7.66 | 5.83 | 10.87 | 12.23 | |
| 24 | 8.51 | 7.10 | 7.50 | 5.62 | 11.04 | 12.72 | |
| 36 | 7.97 | 6.27 | 7.32 | 5.40 | 10.67 | 11.66 | |
| 48 | 8.55 | 7.16 | 7.90 | 6.17 | 11.25 | 13.33 | |
| 54 | 8.39 | 6.90 | 7.79 | 6.01 | 11.11 | 12.91 | |

*: Worst Rate
All comparison were carried out on same frequency and measurement factors.

# Maximum Peak Output Power

| | |
|---|---|
| Test place | Ise EMC Lab. No.1 Measurement Room |
| Report No. | 11155194H |
| Date | February 9, 2016 |
| Temperature/ Humidity | 23deg. C / 38% RH |
| Engineer | Takumi Shimada |
| Mode | 11n-20 Tx |

Antenna port WA + WB

| Freq. | Antenna port WA Result | Antenna port WB Result | Result | | Limit | | Margin |
|---|---|---|---|---|---|---|---|
| [MHz] | [mW] | [mW] | [dBm] | [mW] | [dBm] | [mW] | [dB] |
| 2412 | 95.06 | 91.41 | 22.71 | 186.47 | 27.39 | 794.32 | 4.68 |
| 2437 | 100.46 | 96.16 | 22.94 | 196.62 | 27.39 | 794.32 | 4.45 |
| 2462 | 105.20 | 87.50 | 22.85 | 192.69 | 27.39 | 794.32 | 4.54 |

Sample Calculation:
Result = Antenna port WA + WB
*This Limit was reduced by 2.61dB for directional gain of the antenna/antenna array exceeding 6 dBi.

Antenna port WA

| Freq. | Reading | Cable Loss | Atten. | Result | |
|---|---|---|---|---|---|
| [MHz] | [dBm] | [dB] | [dB] | [dBm] | [mW] |
| 2412 | 9.19 | 0.50 | 10.09 | 19.78 | 95.06 |
| 2437 | 9.43 | 0.50 | 10.09 | 20.02 | 100.46 |
| 2462 | 9.63 | 0.50 | 10.09 | 20.22 | 105.20 |

Antenna port WB

| Freq. | Reading | Cable Loss | Atten. | Result | |
|---|---|---|---|---|---|
| [MHz] | [dBm] | [dB] | [dB] | [dBm] | [mW] |
| 2412 | 9.02 | 0.50 | 10.09 | 19.61 | 91.41 |
| 2437 | 9.24 | 0.50 | 10.09 | 19.83 | 96.16 |
| 2462 | 8.83 | 0.50 | 10.09 | 19.42 | 87.50 |

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

| MCS Number | Antenna port WA Reading Peak | | Antenna port WB Reading Peak | | Total Reading Power | | Remark |
|---|---|---|---|---|---|---|---|
| | [dBm] | [mW] | [dBm] | [mW] | [dBm] | [mW] | |
| 0 | 9.43 | 8.77 | 9.24 | 8.39 | 12.35 | 17.16 | * |
| 1 | 9.19 | 8.30 | 8.66 | 7.35 | 11.94 | 15.64 | |
| 2 | 9.04 | 8.02 | 8.41 | 6.93 | 11.75 | 14.95 | |
| 3 | 8.62 | 7.28 | 8.19 | 6.59 | 11.42 | 13.87 | |
| 4 | 8.46 | 7.01 | 8.25 | 6.68 | 11.37 | 13.70 | |
| 5 | 8.56 | 7.18 | 8.35 | 6.84 | 11.47 | 14.02 | |
| 6 | 8.55 | 7.16 | 8.21 | 6.62 | 11.39 | 13.78 | |
| 7 | 8.63 | 7.29 | 8.49 | 7.06 | 11.57 | 14.36 | |
| 8 | 8.73 | 7.46 | 7.97 | 6.27 | 11.38 | 13.73 | |
| 9 | 7.80 | 6.03 | 7.76 | 5.97 | 10.79 | 12.00 | |
| 10 | 8.33 | 6.81 | 8.06 | 6.40 | 11.21 | 13.21 | |
| 11 | 8.79 | 7.57 | 8.69 | 7.40 | 11.75 | 14.96 | |
| 12 | 8.97 | 7.89 | 8.24 | 6.67 | 11.63 | 14.56 | |
| 13 | 8.16 | 6.55 | 7.34 | 5.42 | 10.78 | 11.97 | |
| 14 | 8.58 | 7.21 | 7.71 | 5.90 | 11.18 | 13.11 | |
| 15 | 8.09 | 6.44 | 7.61 | 5.77 | 10.87 | 12.21 | |

*Worst MCS
All comparison were carried out on same frequency and measurement factors.

# Maximum Peak Output Power

| | |
|---|---|
| Test place | Ise EMC Lab. No.3 Preparation Room |
| Report No. | 11155194H |
| Date | February 16, 2016 |
| Temperature/ Humidity | 23deg. C / 34% RH |
| Engineer | Tomoki Matsui |
| Mode | Tx BT LE |

| Freq. | Reading Peak | Cable Loss | Atten. | Result | | Limit | | Margin |
|---|---|---|---|---|---|---|---|---|
| [MHz] | [dBm] | [dB] | [dB] | [dBm] | [mW] | [dBm] | [mW] | [dB] |
| 2402 | -9.63 | 1.77 | 10.03 | 2.17 | 1.65 | 29.60 | 912 | 27.43 |
| 2440 | -9.69 | 1.78 | 10.03 | 2.12 | 1.63 | 29.60 | 912 | 27.48 |
| 2480 | -9.75 | 1.79 | 10.03 | 2.07 | 1.61 | 29.60 | 912 | 27.53 |

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator
*This Limit was reduced by 0.4 dB for directional gain of the antenna/antenna array exceeding 6 dBi.

# Maximum Average Output Power (Reference data for RF EXposure)

| | |
|---|---|
| Test place | Ise EMC Lab. No.11 Measurement Room |
| Report No. | 11155194H |
| Date | February 12, 2016 |
| Temperature/ Humidity | 23deg. C / 52% RH |
| Engineer | Takafumi Noguchi |
| Mode | 11b Tx |

Antenna port WA + WB

| Freq. [MHz] | Antenna port WA Result [mW] | Antenna port WB Result [mW] | Result (Frame) [dBm] | Result (Frame) [mW] |
|---|---|---|---|---|
| 2412 | 8.07 | 6.65 | 11.68 | 14.73 |
| 2437 | 8.38 | 6.38 | 11.69 | 14.76 |
| 2462 | 7.98 | 6.25 | 12.87 | 19.35 |

Sample Calculation:
Result = Antenna port WA + WB

Antenna port WA

| Freq. [MHz] | Reading [dBm] | Cable Loss [dB] | Atten. [dB] | Result (Frame) [dBm] | Result (Frame) [mW] |
|---|---|---|---|---|---|
| 2412 | -2.90 | 1.86 | 10.11 | 9.07 | 8.07 |
| 2437 | -2.75 | 1.87 | 10.11 | 9.23 | 8.38 |
| 2462 | -2.96 | 1.87 | 10.11 | 9.02 | 7.98 |

Antenna port WB

| Freq. [MHz] | Reading [dBm] | Cable Loss [dB] | Atten. [dB] | Result (Frame) [dBm] | Result (Frame) [mW] |
|---|---|---|---|---|---|
| 2412 | -3.74 | 1.86 | 10.11 | 8.23 | 6.65 |
| 2437 | -3.93 | 1.87 | 10.11 | 8.05 | 6.38 |
| 2462 | -4.02 | 1.87 | 10.11 | 7.96 | 6.25 |

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

# Maximum Average Output Power (Reference data for RF EXposure)

| | |
|---|---|
| Test place | Ise EMC Lab. No.11 Measurement Room |
| Report No. | 11155194H |
| Date | February 12, 2016 |
| Temperature/ Humidity | 23deg. C / 52% RH |
| Engineer | Takafumi Noguchi |
| Mode | 11g Tx |

Antenna port WA + WB

| Freq. | Antenna port WA Result | Antenna port WB Result | Result (Frame) | |
|---|---|---|---|---|
| [MHz] | [mW] | [mW] | [dBm] | [mW] |
| 2412 | 5.89 | 6.25 | 10.84 | 12.14 |
| 2437 | 5.93 | 6.08 | 10.80 | 12.01 |
| 2462 | 6.12 | 6.22 | 10.92 | 12.35 |

Sample Calculation:
Result = Antenna port WA + WB

Antenna port WA

| Freq. | Reading | Cable Loss | Atten. | Result (Frame) | |
|---|---|---|---|---|---|
| [MHz] | [dBm] | [dB] | [dB] | [dBm] | [mW] |
| 2412 | -4.27 | 1.86 | 10.11 | 7.70 | 5.89 |
| 2437 | -4.25 | 1.87 | 10.11 | 7.73 | 5.93 |
| 2462 | -4.11 | 1.87 | 10.11 | 7.87 | 6.12 |

Antenna port WB

| Freq. | Reading | Cable Loss | Atten. | Result (Frame) | |
|---|---|---|---|---|---|
| [MHz] | [dBm] | [dB] | [dB] | [dBm] | [mW] |
| 2412 | -4.01 | 1.86 | 10.11 | 7.96 | 6.25 |
| 2437 | -4.14 | 1.87 | 10.11 | 7.84 | 6.08 |
| 2462 | -4.04 | 1.87 | 10.11 | 7.94 | 6.22 |

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

# Maximum Average Output Power (Reference data for RF EXposure)

| | |
|---|---|
| Test place | Ise EMC Lab. No.11 Measurement Room |
| Report No. | 11155194H |
| Date | February 12, 2016 |
| Temperature/ Humidity | 23deg. C / 52% RH |
| Engineer | Takafumi Noguchi |
| Mode | 11n-20 Tx |

Antenna port WA + WB

| Freq. [MHz] | Antenna port WA Result [mW] | Antenna port WB Result [mW] | Result (Frame) [dBm] | Result (Frame) [mW] |
|---|---|---|---|---|
| 2412 | 6.22 | 5.98 | 10.87 | 12.21 |
| 2437 | 6.05 | 6.12 | 10.86 | 12.18 |
| 2462 | 6.38 | 6.27 | 11.02 | 12.65 |

Sample Calculation:
Result = Antenna port WA + WB

Antenna port WA

| Freq. [MHz] | Reading [dBm] | Cable Loss [dB] | Atten. [dB] | Result (Frame) [dBm] | Result (Frame) [mW] |
|---|---|---|---|---|---|
| 2412 | -4.03 | 1.86 | 10.11 | 7.94 | 6.22 |
| 2437 | -4.16 | 1.87 | 10.11 | 7.82 | 6.05 |
| 2462 | -3.93 | 1.87 | 10.11 | 8.05 | 6.38 |

Antenna port WB

| Freq. [MHz] | Reading [dBm] | Cable Loss [dB] | Atten. [dB] | Result (Frame) [dBm] | Result (Frame) [mW] |
|---|---|---|---|---|---|
| 2412 | -4.20 | 1.86 | 10.11 | 7.77 | 5.98 |
| 2437 | -4.11 | 1.87 | 10.11 | 7.87 | 6.12 |
| 2462 | -4.01 | 1.87 | 10.11 | 7.97 | 6.27 |

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

## Maximum Average Output Power (Reference data for RF EXposure)

| | |
|---|---|
| Test place | Ise EMC Lab. No.3 Preparation Room |
| Report No. | 11155194H |
| Date | February 16, 2016 |
| Temperature/ Humidity | 23deg. C / 34% RH |
| Engineer | Tomoki Matsui |
| Mode | Tx BT LE |

| Freq. | Reading Average | Cable Loss | Atten. | Result (Frame) | |
|---|---|---|---|---|---|
| [MHz] | [dBm] | [dB] | [dB] | [dBm] | [mW] |
| 2402 | -11.84 | 1.77 | 10.03 | -0.04 | 0.99 |
| 2440 | -11.92 | 1.78 | 10.03 | -0.11 | 0.97 |
| 2480 | -12.02 | 1.79 | 10.03 | -0.20 | 0.95 |

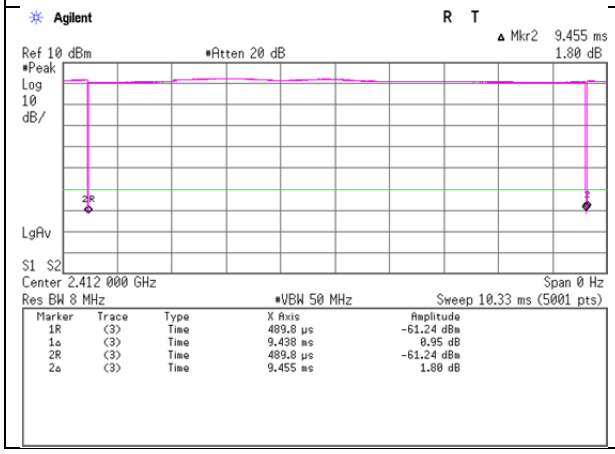
Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

# Burst rate confirmation

| | | |
|---|---|---|
| Test place | Ise EMC Lab. No.11 Measurement Room and No.3 Semi Anechoic Chamber | |
| Report No. | 11155194H | |
| Date | February 10, 2016 | February 12, 2016 |
| Temperature / Humidity | 19 deg. C / 29 % RH | 23deg. C / 52% RH |
| Engineer | Takafumi Noguchi | Takafumi Noguchi |
| Mode | Tx | |

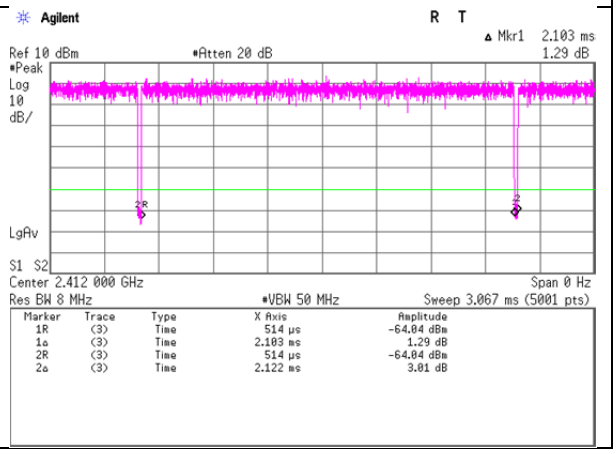
## 11b 2 Mbps

**Tx on / (Tx on + Tx off) = 0.998**
**Tx on / (Tx on + Tx off) * 100 = 99.8 %**
**Duty factor = 10 * log (9.455 / 9.438) = 0.01 dB**



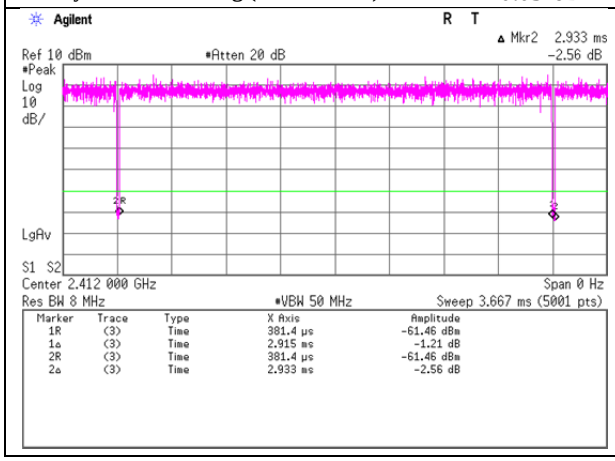

## 11g 9 Mbps

**Tx on / (Tx on + Tx off) = 0.991**
**Tx on / (Tx on + Tx off) * 100 = 99.1 %**
**Duty factor = 10 * log (2.122 / 2.103) = 0.04 dB**



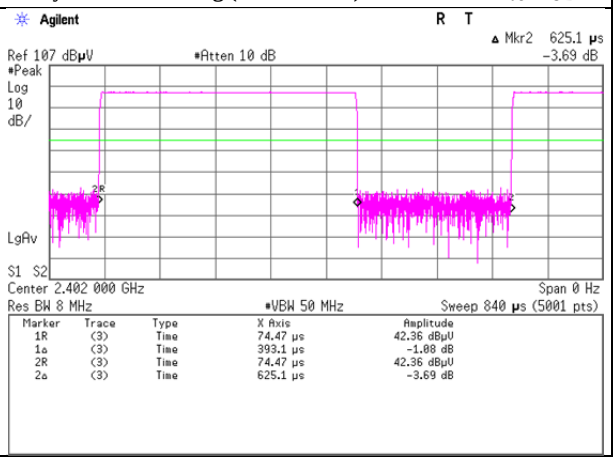

## 11n-20 MCS 0

**Tx on / (Tx on + Tx off) = 0.994**
**Tx on / (Tx on + Tx off) * 100 = 99.4 %**
**Duty factor = 10 * log (2.933 / 2.915) = 0.03 dB**




## BT LE

**Tx on / (Tx on + Tx off) = 0.629**
**Tx on / (Tx on + Tx off) * 100 = 62.9 %**
**Duty factor = 10 * log (625.1 / 393.1) = 2.01 dB**



# Radiated Spurious Emission

| | | |
|---|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber | |
| Report No. | 11155194H | |
| Date | February 10, 2016 | February 12, 2016 |
| Temperature / Humidity | 19 deg. C / 29 % RH | 24 deg. C / 30 % RH |
| Engineer | Takafumi Noguchi (1-10GHz) | Yuta Moriya (Above 10GHz) |
| Mode | Tx 11b 2412 MHz | |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori | 2390.000 | PK | 45.6 | 26.9 | 6.7 | 32.0 | - | 47.2 | 73.9 | 26.7 | |
| Hori | 4824.000 | PK | 41.4 | 31.8 | 8.9 | 31.3 | - | 50.8 | 73.9 | 23.1 | |
| Hori | 7236.000 | PK | 40.9 | 36.0 | 8.7 | 32.0 | - | 53.6 | 73.9 | 20.3 | Floor Noise |
| Hori | 9648.000 | PK | 41.4 | 38.2 | 9.5 | 32.4 | - | 56.7 | 73.9 | 17.2 | Floor Noise |
| Hori | 2390.000 | AV | 36.9 | 26.9 | 6.7 | 32.0 | - | 38.5 | 53.9 | 15.4 | |
| Hori | 4824.000 | AV | 33.1 | 31.8 | 8.9 | 31.3 | - | 42.5 | 53.9 | 11.4 | |
| Hori | 7236.000 | AV | 31.9 | 36.0 | 8.7 | 32.0 | - | 44.6 | 53.9 | 9.3 | Floor Noise |
| Hori | 9648.000 | AV | 32.4 | 38.2 | 9.5 | 32.4 | - | 47.7 | 53.9 | 6.2 | Floor Noise |
| Vert | 2390.000 | PK | 45.0 | 26.9 | 6.7 | 32.0 | - | 46.6 | 73.9 | 27.3 | |
| Vert | 4824.000 | PK | 42.2 | 31.8 | 8.9 | 31.3 | - | 51.6 | 73.9 | 22.3 | |
| Vert | 7236.000 | PK | 40.1 | 36.0 | 8.7 | 32.0 | - | 52.8 | 73.9 | 21.1 | Floor Noise |
| Vert | 9648.000 | PK | 40.9 | 38.2 | 9.5 | 32.4 | - | 56.2 | 73.9 | 17.7 | Floor Noise |
| Vert | 2390.000 | AV | 35.5 | 26.9 | 6.7 | 32.0 | - | 37.1 | 53.9 | 16.8 | |
| Vert | 4824.000 | AV | 33.5 | 31.8 | 8.9 | 31.3 | - | 42.9 | 53.9 | 11.0 | |
| Vert | 7236.000 | AV | 31.6 | 36.0 | 8.7 | 32.0 | - | 44.3 | 53.9 | 9.6 | Floor Noise |
| Vert | 9648.000 | AV | 32.3 | 38.2 | 9.5 | 32.4 | - | 47.6 | 53.9 | 6.3 | Floor Noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.45 m / 3.0 m) = 3.42 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

**20dBc Data Sheet**

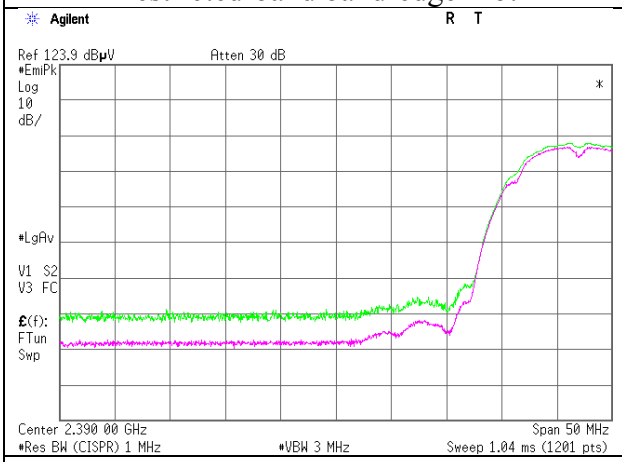
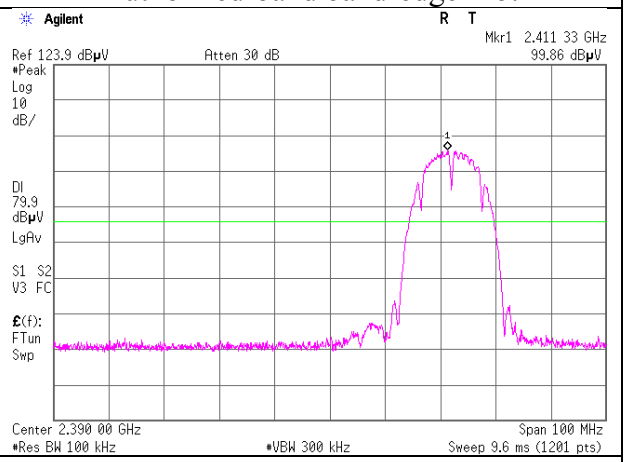
| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| Hori | 2412.000 | PK | 99.9 | 26.9 | 6.7 | 32.0 | 101.5 | - | - | Carrier |
| Hori | 2400.000 | PK | 43.2 | 26.9 | 6.7 | 32.0 | 44.8 | 81.5 | 36.7 | |
| Vert | 2412.000 | PK | 98.7 | 26.9 | 6.7 | 32.0 | 100.3 | - | - | Carrier |
| Vert | 2400.000 | PK | 41.7 | 26.9 | 6.7 | 32.0 | 43.3 | 80.3 | 37.0 | |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amprifier)

# Radiated Spurious Emission
## (Reference Plot for band-edge)

| | |
|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber |
| Report No. | 11155194H |
| Date | February 10, 2016 |
| Temperature / Humidity | 19 deg. C / 29 % RH |
| Engineer | Takafumi Noguchi (1-10GHz) |
| Mode | Tx 11b 2412 MHz |

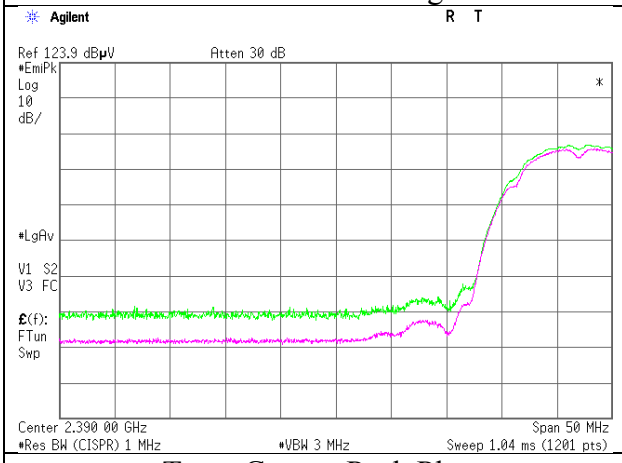
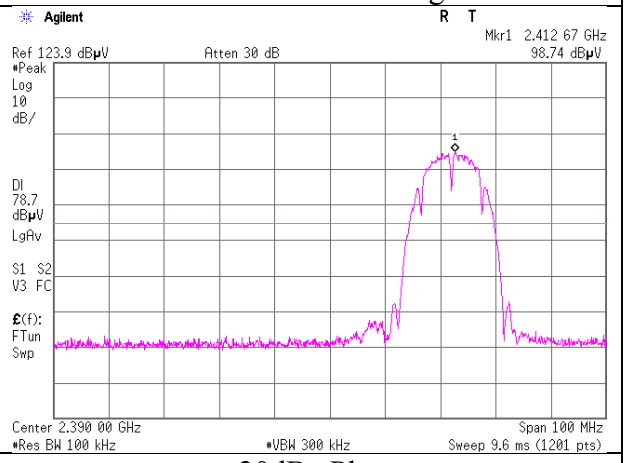
### Horizontal

| Restricted-band band-edge Plot | Authorized-band band-edge Plot |
|---|---|
|  |  |
| Trace Green : Peak Plot<br>Trace Purple : Average Plot | 20dBc Plot |





### Vertical

| Restricted-band band-edge Plot | Authorized-band band-edge Plot |
|---|---|
|  |  |
| Trace Green : Peak Plot<br>Trace Purple : Average Plot | 20dBc Plot |





* Final result of restricted band edge was shown in tabular data.

# Radiated Spurious Emission

| | | |
|---|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber | |
| Report No. | 11155194H | |
| Date | February 10, 2016 | February 12, 2016 |
| Temperature / Humidity | 19 deg. C / 29 % RH | 24 deg. C / 30 % RH |
| Engineer | Takafumi Noguchi (1-10GHz) | Yuta Moriya (Above 10GHz) |
| Mode | Tx 11b 2437 MHz | |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori | 4874.000 | PK | 42.1 | 31.9 | 8.9 | 31.3 | - | 51.6 | 73.9 | 22.3 | |
| Hori | 7311.000 | PK | 41.0 | 36.0 | 8.8 | 32.0 | - | 53.8 | 73.9 | 20.1 | Floor Noise |
| Hori | 9748.000 | PK | 41.5 | 38.2 | 9.5 | 32.4 | - | 56.8 | 73.9 | 17.1 | Floor Noise |
| Hori | 4874.000 | AV | 34.0 | 31.9 | 8.9 | 31.3 | - | 43.5 | 53.9 | 10.4 | |
| Hori | 7311.000 | AV | 31.9 | 36.0 | 8.8 | 32.0 | - | 44.7 | 53.9 | 9.2 | Floor Noise |
| Hori | 9748.000 | AV | 32.4 | 38.2 | 9.5 | 32.4 | - | 47.7 | 53.9 | 6.2 | Floor Noise |
| Vert | 4874.000 | PK | 42.1 | 31.9 | 8.9 | 31.3 | - | 51.6 | 73.9 | 22.3 | |
| Vert | 7311.000 | PK | 40.2 | 36.0 | 8.8 | 32.0 | - | 53.0 | 73.9 | 20.9 | Floor Noise |
| Vert | 9748.000 | PK | 40.9 | 38.2 | 9.5 | 32.4 | - | 56.2 | 73.9 | 17.7 | Floor Noise |
| Vert | 4874.000 | AV | 34.2 | 31.9 | 8.9 | 31.3 | - | 43.7 | 53.9 | 10.2 | |
| Vert | 7311.000 | AV | 31.6 | 36.0 | 8.8 | 32.0 | - | 44.4 | 53.9 | 9.5 | Floor Noise |
| Vert | 9748.000 | AV | 32.3 | 38.2 | 9.5 | 32.4 | - | 47.6 | 53.9 | 6.3 | Floor Noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.45 m / 3.0 m) = 3.42 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

# Radiated Spurious Emission

| | | |
|---|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber | |
| Report No. | 11155194H | |
| Date | February 10, 2016 | February 12, 2016 |
| Temperature / Humidity | 19 deg. C / 29 % RH | 24 deg. C / 30 % RH |
| Engineer | Takafumi Noguchi (1-10GHz) | Yuta Moriya (Above 10GHz) |
| Mode | Tx 11b 2462 MHz | |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori | 2483.500 | PK | 47.3 | 26.9 | 6.7 | 32.0 | - | 48.9 | 73.9 | 25.0 | |
| Hori | 4924.000 | PK | 42.9 | 32.0 | 8.8 | 31.3 | - | 52.4 | 73.9 | 21.5 | |
| Hori | 7386.000 | PK | 41.0 | 36.0 | 8.8 | 32.1 | - | 53.7 | 73.9 | 20.2 | Floor Noise |
| Hori | 9848.000 | PK | 41.2 | 38.2 | 9.5 | 32.5 | - | 56.4 | 73.9 | 17.5 | Floor Noise |
| Hori | 2483.500 | AV | 37.1 | 26.9 | 6.7 | 32.0 | - | 38.7 | 53.9 | 15.2 | |
| Hori | 4924.000 | AV | 34.9 | 32.0 | 8.8 | 31.3 | - | 44.4 | 53.9 | 9.5 | |
| Hori | 7386.000 | AV | 31.9 | 36.0 | 8.8 | 32.1 | - | 44.6 | 53.9 | 9.3 | Floor Noise |
| Hori | 9848.000 | AV | 32.4 | 38.2 | 9.5 | 32.5 | - | 47.6 | 53.9 | 6.3 | Floor Noise |
| Vert | 2483.500 | PK | 47.6 | 26.9 | 6.7 | 32.0 | - | 49.2 | 73.9 | 24.7 | |
| Vert | 4924.000 | PK | 42.7 | 32.0 | 8.8 | 31.3 | - | 52.2 | 73.9 | 21.7 | |
| Vert | 7386.000 | PK | 40.2 | 36.0 | 8.8 | 32.1 | - | 52.9 | 73.9 | 21.0 | Floor Noise |
| Vert | 9848.000 | PK | 41.0 | 38.2 | 9.5 | 32.5 | - | 56.2 | 73.9 | 17.7 | Floor Noise |
| Vert | 2483.500 | AV | 37.2 | 26.9 | 6.7 | 32.0 | - | 38.8 | 53.9 | 15.1 | |
| Vert | 4924.000 | AV | 35.5 | 32.0 | 8.8 | 31.3 | - | 45.0 | 53.9 | 8.9 | |
| Vert | 7386.000 | AV | 31.6 | 36.0 | 8.8 | 32.1 | - | 44.3 | 53.9 | 9.6 | Floor Noise |
| Vert | 9848.000 | AV | 32.3 | 38.2 | 9.5 | 32.5 | - | 47.5 | 53.9 | 6.4 | Floor Noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

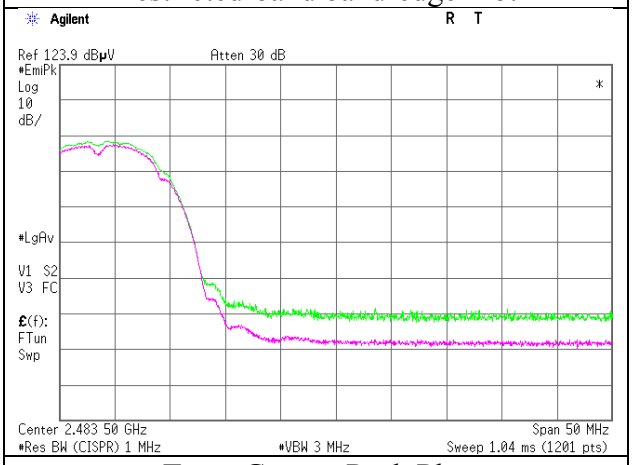
Distance factor: 1 GHz - 10 GHz 20log (4.45 m / 3.0 m) = 3.42 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

# Radiated Spurious Emission
## (Reference Plot for band-edge)

| | |
|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber |
| Report No. | 11155194H |
| Date | February 10, 2016 |
| Temperature / Humidity | 19 deg. C / 29 % RH |
| Engineer | Takafumi Noguchi |
| | (1-10GHz) |
| Mode | Tx 11b 2462 MHz |

Horizontal

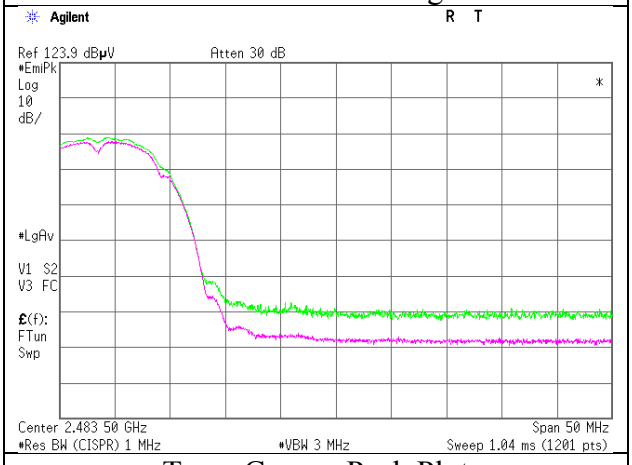
Restricted-band band-edge Plot




Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot




Trace Green : Peak Plot
Trace Purple : Average Plot

* Final result of restricted band edge was shown in tabular data.

# Radiated Spurious Emission

| | | |
|---|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber | |
| Report No. | 11155194H | |
| Date | February 10, 2016 | February 12, 2016 |
| Temperature / Humidity | 19 deg. C / 29 % RH | 24 deg. C / 30 % RH |
| Engineer | Takafumi Noguchi (1-10GHz) | Yuta Moriya (Above 10GHz) |
| Mode | Tx 11n-20 2412 MHz | |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori | 2390.000 | PK | 60.7 | 26.9 | 6.7 | 32.0 | - | 62.3 | 73.9 | 11.6 | |
| Hori | 4824.000 | PK | 39.7 | 31.8 | 8.0 | 31.3 | - | 48.2 | 73.9 | 25.7 | Floor Noise |
| Hori | 7236.000 | PK | 40.9 | 36.0 | 8.7 | 32.0 | - | 53.6 | 73.9 | 20.3 | Floor Noise |
| Hori | 9648.000 | PK | 41.4 | 38.2 | 9.5 | 32.4 | - | 56.7 | 73.9 | 17.2 | Floor Noise |
| Hori | 2390.000 | AV | 45.7 | 26.9 | 6.7 | 32.0 | - | 47.3 | 53.9 | 6.6 | |
| Hori | 4824.000 | AV | 31.4 | 31.8 | 8.0 | 31.3 | - | 39.9 | 53.9 | 14.0 | Floor Noise |
| Hori | 7236.000 | AV | 31.9 | 36.0 | 8.7 | 32.0 | - | 44.6 | 53.9 | 9.3 | Floor Noise |
| Hori | 9648.000 | AV | 32.4 | 38.2 | 9.5 | 32.4 | - | 47.7 | 53.9 | 6.2 | Floor Noise |
| Vert | 2390.000 | PK | 60.4 | 26.9 | 6.7 | 32.0 | - | 62.0 | 73.9 | 11.9 | |
| Vert | 4824.000 | PK | 40.7 | 31.8 | 8.0 | 31.3 | - | 49.2 | 73.9 | 24.7 | Floor Noise |
| Vert | 7236.000 | PK | 40.1 | 36.0 | 8.7 | 32.0 | - | 52.8 | 73.9 | 21.1 | Floor Noise |
| Vert | 9648.000 | PK | 40.9 | 38.2 | 9.5 | 32.4 | - | 56.2 | 73.9 | 17.7 | Floor Noise |
| Vert | 2390.000 | AV | 42.1 | 26.9 | 6.7 | 32.0 | - | 43.7 | 53.9 | 10.2 | |
| Vert | 4824.000 | AV | 30.8 | 31.8 | 8.0 | 31.3 | - | 39.3 | 53.9 | 14.6 | Floor Noise |
| Vert | 7236.000 | AV | 31.6 | 36.0 | 8.7 | 32.0 | - | 44.3 | 53.9 | 9.6 | Floor Noise |
| Vert | 9648.000 | AV | 32.3 | 38.2 | 9.5 | 32.4 | - | 47.6 | 53.9 | 6.3 | Floor Noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.45 m / 3.0 m) = 3.42 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

**20dBc Data Sheet**

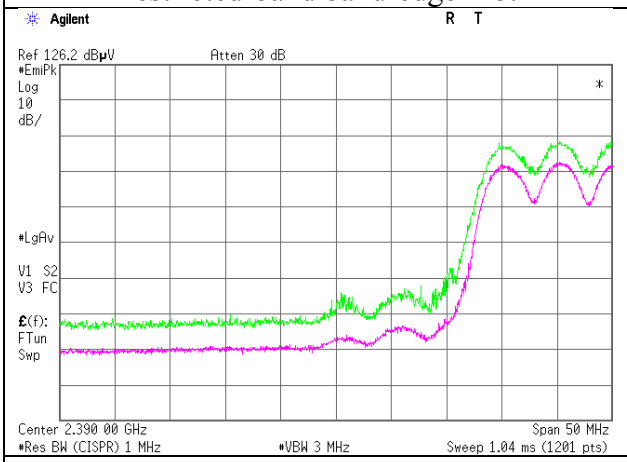
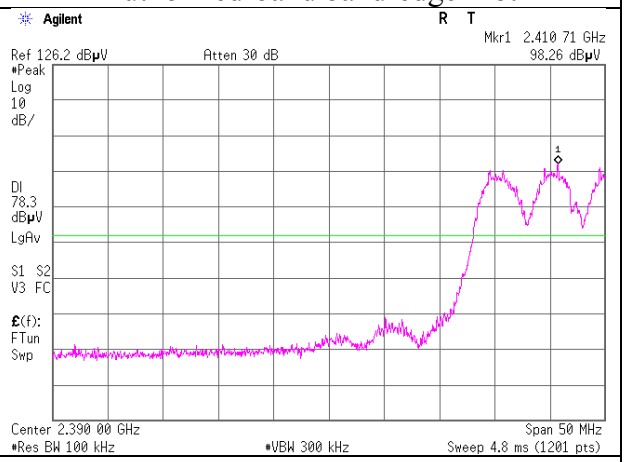
| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| Hori | 2412.000 | PK | 98.3 | 26.9 | 6.7 | 32.0 | 99.9 | - | - | Carrier |
| Hori | 2400.000 | PK | 53.7 | 26.9 | 6.7 | 32.0 | 55.3 | 79.9 | 24.6 | |
| Vert | 2412.000 | PK | 96.8 | 26.9 | 6.7 | 32.0 | 98.4 | - | - | Carrier |
| Vert | 2400.000 | PK | 51.4 | 26.9 | 6.7 | 32.0 | 53.0 | 78.4 | 25.4 | |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amprifier)

# Radiated Spurious Emission
## (Reference Plot for band-edge)

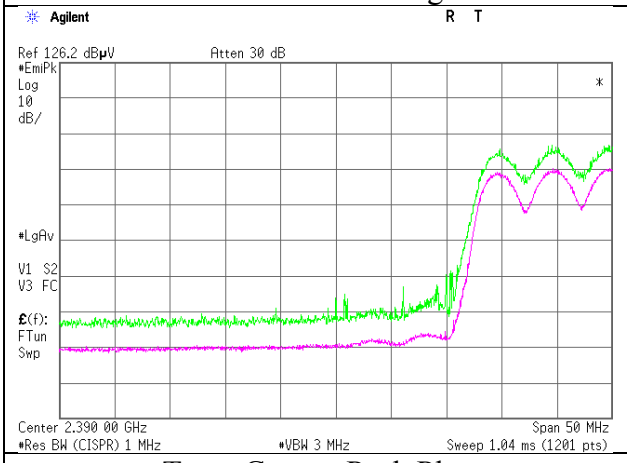
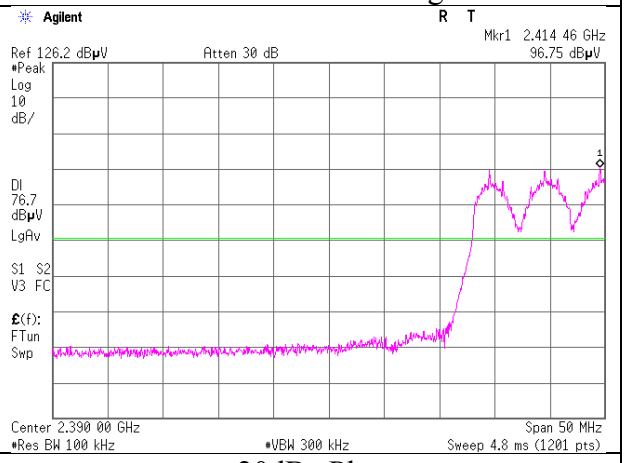
| | |
|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber |
| Report No. | 11155194H |
| Date | February 10, 2016 |
| Temperature / Humidity | 19 deg. C / 29 % RH |
| Engineer | Takafumi Noguchi (1-10GHz) |
| Mode | Tx 11n-20 2412 MHz |

### Horizontal

| Restricted-band band-edge Plot | Authorized-band band-edge Plot |
|---|---|
|  |  |
| Trace Green : Peak Plot<br>Trace Purple : Average Plot | 20dBc Plot |



### Vertical

| Restricted-band band-edge Plot | Authorized-band band-edge Plot |
|---|---|
|  |  |
| Trace Green : Peak Plot<br>Trace Purple : Average Plot | 20dBc Plot |



* Final result of restricted band edge was shown in tabular data.

# Radiated Spurious Emission

| | | | |
|---|---|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber | | |
| Report No. | 11155194H | | |
| Date | February 10, 2016 | February 12, 2016 | February 15, 2016 |
| Temperature / Humidity | 19 deg. C / 29 % RH | 24 deg. C / 30 % RH | 18 deg. C / 41 % RH |
| Engineer | Takafumi Noguchi (1-10GHz) | Yuta Moriya (Above 10GHz) | Takafumi Noguchi (Below 1 GHz) |
| Mode | Tx 11n-20 2437 MHz | | |

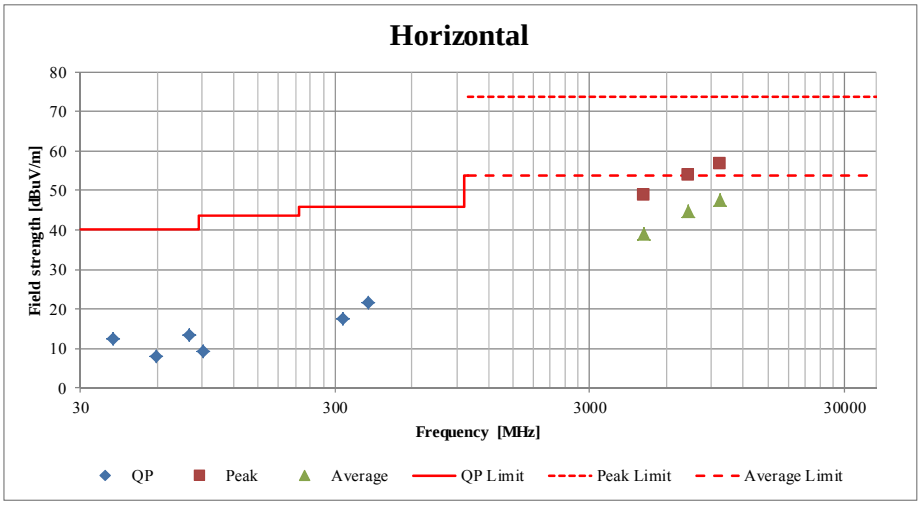
| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori | 40.329 | QP | 23.6 | 13.8 | 7.2 | 32.2 | - | 12.4 | 40.0 | 27.6 | |
| Hori | 59.315 | QP | 25.5 | 7.2 | 7.5 | 32.1 | - | 8.1 | 40.0 | 31.9 | |
| Hori | 80.674 | QP | 31.0 | 6.5 | 7.8 | 32.0 | - | 13.3 | 40.0 | 26.7 | |
| Hori | 91.349 | QP | 25.0 | 8.4 | 7.9 | 32.2 | - | 9.1 | 43.5 | 34.4 | |
| Hori | 322.167 | QP | 24.2 | 15.2 | 10.1 | 32.0 | - | 17.5 | 46.0 | 28.5 | |
| Hori | 403.079 | QP | 25.5 | 17.4 | 10.6 | 32.0 | - | 21.5 | 46.0 | 24.5 | |
| Hori | 4874.000 | PK | 40.2 | 31.9 | 8.0 | 31.3 | - | 48.8 | 73.9 | 25.1 | Floor Noise |
| Hori | 7311.000 | PK | 41.0 | 36.0 | 8.8 | 32.0 | - | 53.8 | 73.9 | 20.1 | Floor Noise |
| Hori | 9748.000 | PK | 41.5 | 38.2 | 9.5 | 32.4 | - | 56.8 | 73.9 | 17.1 | Floor Noise |
| Hori | 4874.000 | AV | 30.6 | 31.9 | 8.0 | 31.3 | - | 39.2 | 53.9 | 14.7 | Floor Noise |
| Hori | 7311.000 | AV | 31.9 | 36.0 | 8.8 | 32.0 | - | 44.7 | 53.9 | 9.2 | Floor Noise |
| Hori | 9748.000 | AV | 32.4 | 38.2 | 9.5 | 32.4 | - | 47.7 | 53.9 | 6.2 | Floor Noise |
| Vert | 40.329 | QP | 29.0 | 13.8 | 7.2 | 32.2 | - | 17.8 | 40.0 | 22.2 | |
| Vert | 59.315 | QP | 30.3 | 7.2 | 7.5 | 32.1 | - | 12.9 | 40.0 | 27.1 | |
| Vert | 80.674 | QP | 28.5 | 6.5 | 7.8 | 32.0 | - | 10.8 | 40.0 | 29.2 | |
| Vert | 91.349 | QP | 28.1 | 8.4 | 7.9 | 32.2 | - | 12.2 | 43.5 | 31.3 | |
| Vert | 322.167 | QP | 23.3 | 15.2 | 10.1 | 32.0 | - | 16.6 | 46.0 | 29.4 | |
| Vert | 403.079 | QP | 25.4 | 17.4 | 10.6 | 32.0 | - | 21.4 | 46.0 | 24.6 | |
| Vert | 4874.000 | PK | 40.3 | 31.9 | 8.0 | 31.3 | - | 48.9 | 73.9 | 25.0 | Floor Noise |
| Vert | 7311.000 | PK | 40.1 | 36.0 | 8.8 | 32.0 | - | 52.9 | 73.9 | 21.0 | Floor Noise |
| Vert | 9748.000 | PK | 40.9 | 38.2 | 9.5 | 32.4 | - | 56.2 | 73.9 | 17.7 | Floor Noise |
| Vert | 4874.000 | AV | 30.6 | 31.9 | 8.0 | 31.3 | - | 39.2 | 53.9 | 14.7 | Floor Noise |
| Vert | 7311.000 | AV | 31.6 | 36.0 | 8.8 | 32.0 | - | 44.4 | 53.9 | 9.5 | Floor Noise |
| Vert | 9748.000 | AV | 32.3 | 38.2 | 9.5 | 32.4 | - | 47.6 | 53.9 | 6.3 | Floor Noise |

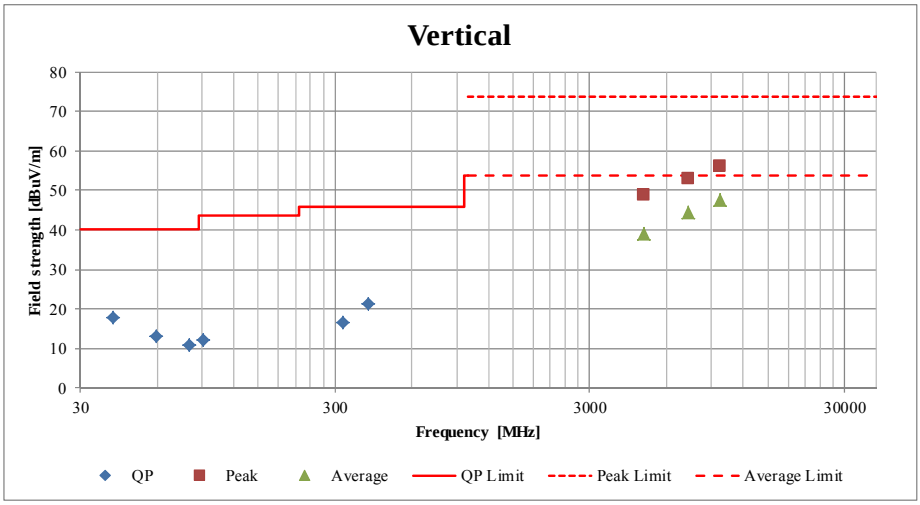
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.45 m / 3.0 m) = 3.42 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

# Radiated Spurious Emission
## (Plot data, Worst case)

| | | | |
|---|---|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber | | |
| Report No. | 11155194H | | |
| Date | February 10, 2016 | February 12, 2016 | February 15, 2016 |
| Temperature / Humidity | 19 deg. C / 29 % RH | 24 deg. C / 30 % RH | 18 deg. C / 41 % RH |
| Engineer | Takafumi Noguchi (1-10GHz) | Yuta Moriya (Above 10GHz) | Takafumi Noguchi (Below 1 GHz) |
| Mode | Tx 11n-20 2437 MHz | | |




*These plots data contains sufficient number to show the trend of characteristic features for EUT.

# Radiated Spurious Emission

| | | |
|---|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber | |
| Report No. | 11155194H | |
| Date | February 10, 2016 | February 12, 2016 |
| Temperature / Humidity | 19 deg. C / 29 % RH | 24 deg. C / 30 % RH |
| Engineer | Takafumi Noguchi (1-10GHz) | Yuta Moriya (Above 10GHz) |
| Mode | Tx 11n-20 2462 MHz | |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori | 2483.500 | PK | 60.4 | 26.9 | 6.7 | 32.0 | - | 62.0 | 73.9 | 11.9 | |
| Hori | 4924.000 | PK | 39.7 | 32.0 | 7.9 | 31.3 | - | 48.3 | 73.9 | 25.6 | Floor Noise |
| Hori | 7386.000 | PK | 41.1 | 36.0 | 8.8 | 32.1 | - | 53.8 | 73.9 | 20.1 | Floor Noise |
| Hori | 9848.000 | PK | 41.2 | 38.2 | 9.5 | 32.5 | - | 56.4 | 73.9 | 17.5 | Floor Noise |
| Hori | 2483.500 | AV | 44.7 | 26.9 | 6.7 | 32.0 | - | 46.3 | 53.9 | 7.6 | |
| Hori | 4924.000 | AV | 30.6 | 32.0 | 7.9 | 31.3 | - | 39.2 | 53.9 | 14.7 | Floor Noise |
| Hori | 7386.000 | AV | 31.9 | 36.0 | 8.8 | 32.1 | - | 44.6 | 53.9 | 9.3 | Floor Noise |
| Hori | 9848.000 | AV | 32.4 | 38.2 | 9.5 | 32.5 | - | 47.6 | 53.9 | 6.3 | Floor Noise |
| Vert | 2483.500 | PK | 60.1 | 26.9 | 6.7 | 32.0 | - | 61.7 | 73.9 | 12.2 | |
| Vert | 4924.000 | PK | 39.6 | 32.0 | 7.9 | 31.3 | - | 48.2 | 73.9 | 25.7 | Floor Noise |
| Vert | 7386.000 | PK | 40.2 | 36.0 | 8.8 | 32.1 | - | 52.9 | 73.9 | 21.0 | Floor Noise |
| Vert | 9848.000 | PK | 41.0 | 38.2 | 9.5 | 32.5 | - | 56.2 | 73.9 | 17.7 | Floor Noise |
| Vert | 2483.500 | AV | 44.4 | 26.9 | 6.7 | 32.0 | - | 46.0 | 53.9 | 7.9 | |
| Vert | 4924.000 | AV | 30.6 | 32.0 | 7.9 | 31.3 | - | 39.2 | 53.9 | 14.7 | Floor Noise |
| Vert | 7386.000 | AV | 31.6 | 36.0 | 8.8 | 32.1 | - | 44.3 | 53.9 | 9.6 | Floor Noise |
| Vert | 9848.000 | AV | 32.3 | 38.2 | 9.5 | 32.5 | - | 47.5 | 53.9 | 6.4 | Floor Noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

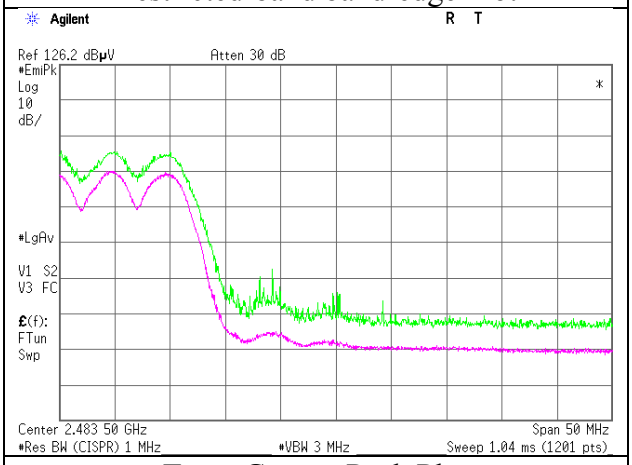
Distance factor: 1 GHz - 10 GHz 20log (4.45 m / 3.0 m) = 3.42 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

# Radiated Spurious Emission
## (Reference Plot for band-edge)

| | |
|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber |
| Report No. | 11155194H |
| Date | February 10, 2016 |
| Temperature / Humidity | 19 deg. C / 29 % RH |
| Engineer | Takafumi Noguchi<br>(1-10GHz) |
| Mode | Tx 11n-20 2462 MHz |

Horizontal

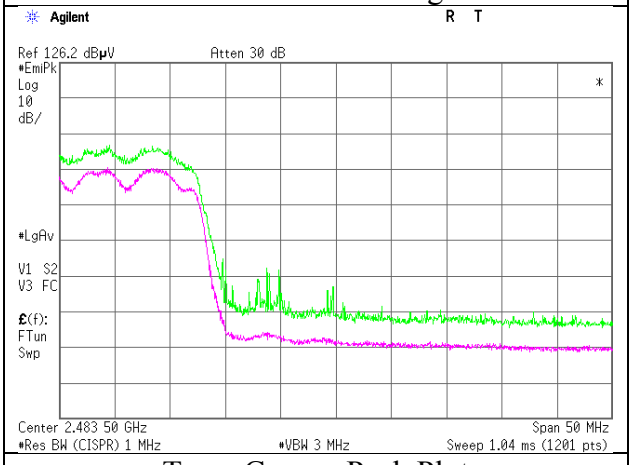
Restricted-band band-edge Plot




Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot




Trace Green : Peak Plot
Trace Purple : Average Plot

* Final result of restricted band edge was shown in tabular data.

# Radiated Spurious Emission

| | | | |
|---|---|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber | | |
| Report No. | 11155194H | | |
| Date | February 10, 2016 | February 12, 2016 | February 15, 2016 |
| Temperature / Humidity | 24 deg. C / 26 % RH | 24 deg. C / 30 % RH | 18 deg. C / 41 % RH |
| Engineer | Yuta Moriya (1-10GHz) | Yuta Moriya (Above 10GHz) | Takafumi Noguchi (Below 1 GHz) |
| Mode | Tx BT LE 2402 MHz | | |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori | 40.329 | QP | 23.2 | 13.8 | 7.2 | 32.2 | - | 12.0 | 40.0 | 28.0 | |
| Hori | 59.315 | QP | 23.4 | 7.2 | 7.5 | 32.1 | - | 6.0 | 40.0 | 34.0 | |
| Hori | 80.004 | QP | 35.0 | 6.3 | 7.8 | 32.0 | - | 17.1 | 40.0 | 22.9 | |
| Hori | 89.479 | QP | 27.0 | 8.1 | 7.9 | 32.1 | - | 10.9 | 43.5 | 32.6 | |
| Hori | 320.006 | QP | 27.4 | 15.2 | 10.1 | 32.0 | - | 20.7 | 46.0 | 25.3 | |
| Hori | 403.079 | QP | 22.3 | 17.4 | 10.6 | 32.0 | - | 18.3 | 46.0 | 27.7 | |
| Hori | 2390.000 | PK | 48.5 | 26.9 | 6.8 | 32.0 | - | 50.2 | 73.9 | 23.7 | |
| Hori | 4804.000 | PK | 39.4 | 31.8 | 8.1 | 31.3 | - | 48.0 | 73.9 | 25.9 | Floor Noise |
| Hori | 7206.000 | PK | 40.5 | 36.0 | 8.8 | 32.0 | - | 53.3 | 73.9 | 20.6 | Floor Noise |
| Hori | 9608.000 | PK | 40.1 | 38.2 | 9.6 | 32.4 | - | 55.5 | 73.9 | 18.4 | Floor Noise |
| Hori | 2390.000 | AV | 35.6 | 26.9 | 6.8 | 32.0 | 2.0 | 39.3 | 53.9 | 14.6 | *1) |
| Hori | 4804.000 | AV | 30.9 | 31.8 | 8.1 | 31.3 | - | 39.5 | 53.9 | 14.4 | Floor Noise |
| Hori | 7206.000 | AV | 32.2 | 36.0 | 8.8 | 32.0 | - | 45.0 | 53.9 | 8.9 | Floor Noise |
| Hori | 9608.000 | AV | 32.4 | 38.2 | 9.6 | 32.4 | - | 47.8 | 53.9 | 6.1 | Floor Noise |
| Vert | 40.329 | QP | 23.4 | 13.8 | 7.2 | 32.2 | - | 12.2 | 40.0 | 27.8 | |
| Vert | 59.315 | QP | 23.6 | 7.2 | 7.5 | 32.1 | - | 6.2 | 40.0 | 33.8 | |
| Vert | 80.004 | QP | 32.1 | 6.3 | 7.8 | 32.0 | - | 14.2 | 40.0 | 25.8 | |
| Vert | 89.479 | QP | 31.7 | 8.1 | 7.9 | 32.1 | - | 15.6 | 43.5 | 27.9 | |
| Vert | 320.006 | QP | 25.3 | 15.2 | 10.1 | 32.0 | - | 18.6 | 46.0 | 27.4 | |
| Vert | 403.079 | QP | 23.1 | 17.4 | 10.6 | 32.0 | - | 19.1 | 46.0 | 26.9 | |
| Vert | 2390.000 | PK | 47.4 | 26.9 | 6.8 | 32.0 | - | 49.1 | 73.9 | 24.8 | |
| Vert | 4804.000 | PK | 39.5 | 31.8 | 8.1 | 31.3 | - | 48.1 | 73.9 | 25.8 | Floor Noise |
| Vert | 7206.000 | PK | 40.4 | 36.0 | 8.8 | 32.0 | - | 53.2 | 73.9 | 20.7 | Floor Noise |
| Vert | 9608.000 | PK | 40.0 | 38.2 | 9.6 | 32.4 | - | 55.4 | 73.9 | 18.5 | Floor Noise |
| Vert | 2390.000 | AV | 34.6 | 26.9 | 6.8 | 32.0 | 2.0 | 38.3 | 53.9 | 15.6 | *1) |
| Vert | 4804.000 | AV | 30.8 | 31.8 | 8.1 | 31.3 | - | 39.4 | 53.9 | 14.5 | Floor Noise |
| Vert | 7206.000 | AV | 32.1 | 36.0 | 8.8 | 32.0 | - | 44.9 | 53.9 | 9.0 | Floor Noise |
| Vert | 9608.000 | AV | 32.1 | 38.2 | 9.6 | 32.4 | - | 47.5 | 53.9 | 6.4 | Floor Noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

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

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.52 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

*1) Not Out of Band emission(Leakage Power)

**20dBc Data Sheet**

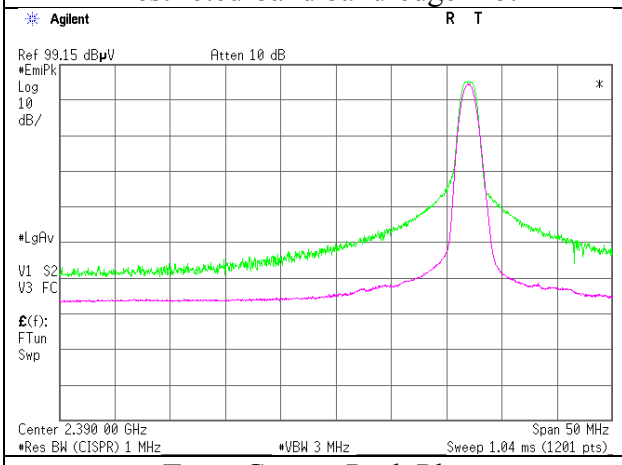
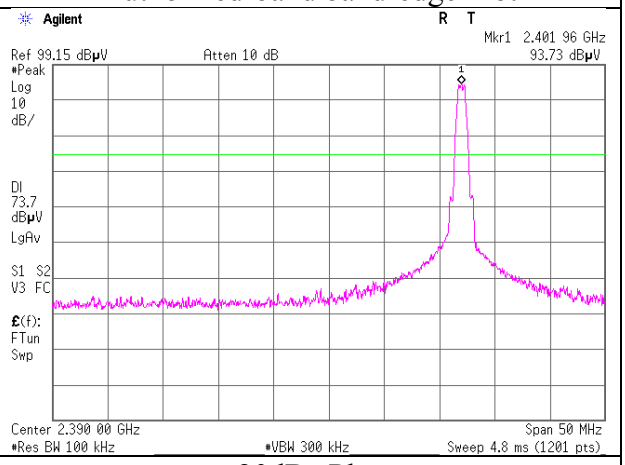
| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| Hori | 2402.000 | PK | 93.7 | 26.9 | 6.8 | 32.0 | 95.4 | - | - | Carrier |
| Hori | 2400.000 | PK | 47.5 | 26.9 | 6.8 | 32.0 | 49.2 | 75.4 | 26.2 | |
| Vert | 2402.000 | PK | 92.3 | 26.9 | 6.8 | 32.0 | 94.0 | - | - | Carrier |
| Vert | 2400.000 | PK | 46.2 | 26.9 | 6.8 | 32.0 | 47.9 | 74.0 | 26.1 | |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amprifier)

# Radiated Spurious Emission
## (Reference Plot for band-edge)

| | | |
|---|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber | |
| Report No. | 11155194H | |
| Date | February 10, 2016 | February 12, 2016 |
| Temperature / Humidity | 24 deg. C / 26 % RH | 24 deg. C / 30 % RH |
| Engineer | Yuta Moriya (1-10GHz) | Yuta Moriya (Above 10GHz) |
| Mode | Tx BT LE 2402 MHz | |

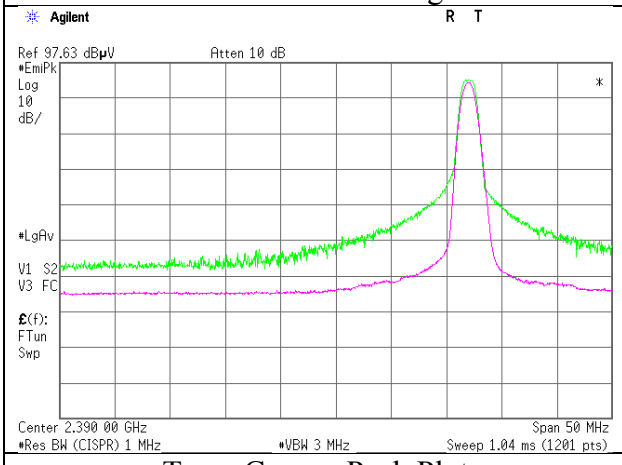
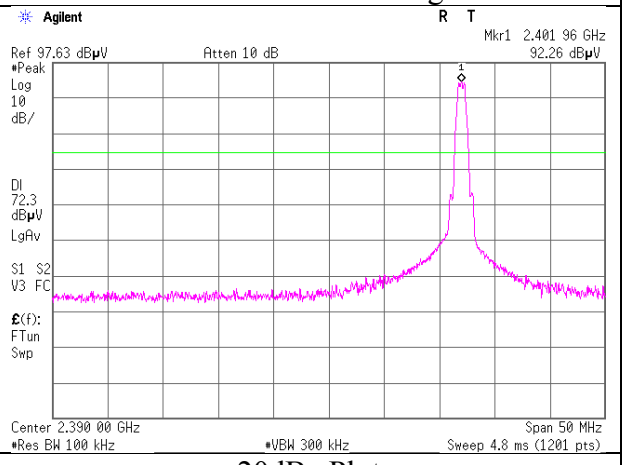
### Horizontal

| Restricted-band band-edge Plot | Authorized-band band-edge Plot |
|---|---|
|  |  |
| Trace Green : Peak Plot<br>Trace Purple : Average Plot | 20dBc Plot |





### Vertical

| Restricted-band band-edge Plot | Authorized-band band-edge Plot |
|---|---|
|  |  |
| Trace Green : Peak Plot<br>Trace Purple : Average Plot | 20dBc Plot |





* Final result of restricted band edge was shown in tabular data.

# Radiated Spurious Emission

| | | | |
|---|---|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber | | |
| Report No. | 11155194H | | |
| Date | February 10, 2016 | February 12, 2016 | February 15, 2016 |
| Temperature / Humidity | 24 deg. C / 26 % RH | 24 deg. C / 30 % RH | 18 deg. C / 41 % RH |
| Engineer | Yuta Moriya (1-10GHz) | Yuta Moriya (Above 10GHz) | Takafumi Noguchi (Below 1 GHz) |
| Mode | Tx BT LE 2440 MHz | | |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori | 40.329 | QP | 23.3 | 13.8 | 7.2 | 32.2 | - | 12.1 | 40.0 | 27.9 | |
| Hori | 59.315 | QP | 23.5 | 7.2 | 7.5 | 32.1 | - | 6.1 | 40.0 | 33.9 | |
| Hori | 80.004 | QP | 35.0 | 6.3 | 7.8 | 32.0 | - | 17.1 | 40.0 | 22.9 | |
| Hori | 89.479 | QP | 27.1 | 8.1 | 7.9 | 32.1 | - | 11.0 | 43.5 | 32.5 | |
| Hori | 320.006 | QP | 27.4 | 15.2 | 10.1 | 32.0 | - | 20.7 | 46.0 | 25.3 | |
| Hori | 403.079 | QP | 22.2 | 17.4 | 10.6 | 32.0 | - | 18.2 | 46.0 | 27.8 | |
| Hori | 4880.000 | PK | 39.3 | 31.9 | 8.1 | 31.3 | - | 48.0 | 73.9 | 25.9 | Floor Noise |
| Hori | 7320.000 | PK | 40.4 | 36.0 | 8.9 | 32.0 | - | 53.3 | 73.9 | 20.6 | Floor Noise |
| Hori | 9760.000 | PK | 40.2 | 38.2 | 10.4 | 32.5 | - | 56.3 | 73.9 | 17.6 | Floor Noise |
| Hori | 4880.000 | AV | 30.6 | 31.9 | 8.1 | 31.3 | - | 39.3 | 53.9 | 14.6 | Floor Noise |
| Hori | 7320.000 | AV | 32.1 | 36.0 | 8.9 | 32.0 | - | 45.0 | 53.9 | 8.9 | Floor Noise |
| Hori | 9760.000 | AV | 32.2 | 38.2 | 9.6 | 32.5 | - | 47.5 | 53.9 | 6.4 | Floor Noise |
| Vert | 40.329 | QP | 23.3 | 13.8 | 7.2 | 32.2 | - | 12.1 | 40.0 | 27.9 | |
| Vert | 59.315 | QP | 23.5 | 7.2 | 7.5 | 32.1 | - | 6.1 | 40.0 | 33.9 | |
| Vert | 80.004 | QP | 32.3 | 6.3 | 7.8 | 32.0 | - | 14.4 | 40.0 | 25.6 | |
| Vert | 89.479 | QP | 31.6 | 8.1 | 7.9 | 32.1 | - | 15.5 | 43.5 | 28.0 | |
| Vert | 320.006 | QP | 25.4 | 15.2 | 10.1 | 32.0 | - | 18.7 | 46.0 | 27.3 | |
| Vert | 403.079 | QP | 23.2 | 17.4 | 10.6 | 32.0 | - | 19.2 | 46.0 | 26.8 | |
| Vert | 4880.000 | PK | 39.4 | 31.9 | 8.1 | 31.3 | - | 48.1 | 73.9 | 25.8 | Floor Noise |
| Vert | 7320.000 | PK | 40.3 | 36.0 | 8.9 | 32.0 | - | 53.2 | 73.9 | 20.7 | Floor Noise |
| Vert | 9760.000 | PK | 40.1 | 38.2 | 9.6 | 32.5 | - | 55.4 | 73.9 | 18.5 | Floor Noise |
| Vert | 4880.000 | AV | 30.9 | 31.9 | 8.1 | 31.3 | - | 39.6 | 53.9 | 14.3 | Floor Noise |
| Vert | 7320.000 | AV | 32.1 | 36.0 | 8.9 | 32.0 | - | 45.0 | 53.9 | 8.9 | Floor Noise |
| Vert | 9760.000 | AV | 32.0 | 38.2 | 9.6 | 32.5 | - | 47.3 | 53.9 | 6.6 | Floor Noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.53 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

# Radiated Spurious Emission

| | | | |
|---|---|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber | | |
| Report No. | 11155194H | | |
| Date | February 10, 2016 | February 12, 2016 | February 15, 2016 |
| Temperature / Humidity | 24 deg. C / 26 % RH | 24 deg. C / 30 % RH | 18 deg. C / 41 % RH |
| Engineer | Yuta Moriya (1-10GHz) | Yuta Moriya (Above 10GHz) | Takafumi Noguchi (Below 1 GHz) |
| Mode | Tx BT LE 2480 MHz | | |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori | 40.329 | QP | 23.0 | 13.8 | 7.2 | 32.2 | - | 11.8 | 40.0 | 28.2 | |
| Hori | 59.315 | QP | 23.5 | 7.2 | 7.5 | 32.1 | - | 6.1 | 40.0 | 33.9 | |
| Hori | 80.004 | QP | 34.8 | 6.3 | 7.8 | 32.0 | - | 16.9 | 40.0 | 23.1 | |
| Hori | 89.479 | QP | 26.5 | 8.1 | 7.9 | 32.1 | - | 10.4 | 43.5 | 33.1 | |
| Hori | 320.006 | QP | 27.7 | 15.2 | 10.1 | 32.0 | - | 21.0 | 46.0 | 25.0 | |
| Hori | 403.079 | QP | 22.3 | 17.4 | 10.6 | 32.0 | - | 18.3 | 46.0 | 27.7 | |
| Hori | 2483.500 | PK | 60.8 | 26.9 | 6.8 | 32.0 | - | 62.5 | 73.9 | 11.4 | |
| Hori | 4960.000 | PK | 39.4 | 32.1 | 8.0 | 31.2 | - | 48.3 | 73.9 | 25.6 | Floor Noise |
| Hori | 7440.000 | PK | 40.3 | 36.0 | 8.9 | 32.1 | - | 53.1 | 73.9 | 20.8 | Floor Noise |
| Hori | 9920.000 | PK | 40.2 | 38.2 | 9.6 | 32.5 | - | 55.5 | 73.9 | 18.4 | Floor Noise |
| Hori | 2483.500 | AV | 45.9 | 26.9 | 6.8 | 32.0 | 2.0 | 49.6 | 53.9 | 4.3 | *1) |
| Hori | 4960.000 | AV | 30.6 | 32.1 | 8.0 | 31.2 | - | 39.5 | 53.9 | 14.4 | Floor Noise |
| Hori | 7440.000 | AV | 32.1 | 36.0 | 8.9 | 32.1 | - | 44.9 | 53.9 | 9.0 | Floor Noise |
| Hori | 9920.000 | AV | 32.2 | 38.2 | 9.6 | 32.5 | - | 47.5 | 53.9 | 6.4 | Floor Noise |
| Vert | 40.329 | QP | 23.4 | 13.8 | 7.2 | 32.2 | - | 12.2 | 40.0 | 27.8 | |
| Vert | 59.315 | QP | 23.7 | 7.2 | 7.5 | 32.1 | - | 6.3 | 40.0 | 33.7 | |
| Vert | 80.004 | QP | 32.6 | 6.3 | 7.8 | 32.0 | - | 14.7 | 40.0 | 25.3 | |
| Vert | 89.479 | QP | 29.0 | 8.1 | 7.9 | 32.1 | - | 12.9 | 43.5 | 30.6 | |
| Vert | 320.006 | QP | 25.0 | 15.2 | 10.1 | 32.0 | - | 18.3 | 46.0 | 27.7 | |
| Vert | 403.079 | QP | 23.0 | 17.4 | 10.6 | 32.0 | - | 19.0 | 46.0 | 27.0 | |
| Vert | 2483.500 | PK | 60.4 | 26.9 | 6.8 | 32.0 | - | 62.1 | 73.9 | 11.8 | |
| Vert | 4960.000 | PK | 39.8 | 32.1 | 8.0 | 31.2 | - | 48.7 | 73.9 | 25.2 | Floor Noise |
| Vert | 7440.000 | PK | 40.2 | 36.0 | 8.9 | 32.1 | - | 53.0 | 73.9 | 20.9 | Floor Noise |
| Vert | 9920.000 | PK | 40.2 | 38.2 | 9.6 | 32.5 | - | 55.5 | 73.9 | 18.4 | Floor Noise |
| Vert | 2483.500 | AV | 44.4 | 26.9 | 6.8 | 32.0 | 2.0 | 48.1 | 53.9 | 5.8 | *1) |
| Vert | 4960.000 | AV | 30.8 | 32.1 | 8.0 | 31.2 | - | 39.7 | 53.9 | 14.2 | Floor Noise |
| Vert | 7440.000 | AV | 32.0 | 36.0 | 8.9 | 32.1 | - | 44.8 | 53.9 | 9.1 | Floor Noise |
| Vert | 9920.000 | AV | 32.2 | 38.2 | 9.6 | 32.5 | - | 47.5 | 53.9 | 6.4 | Floor Noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

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

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.52 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

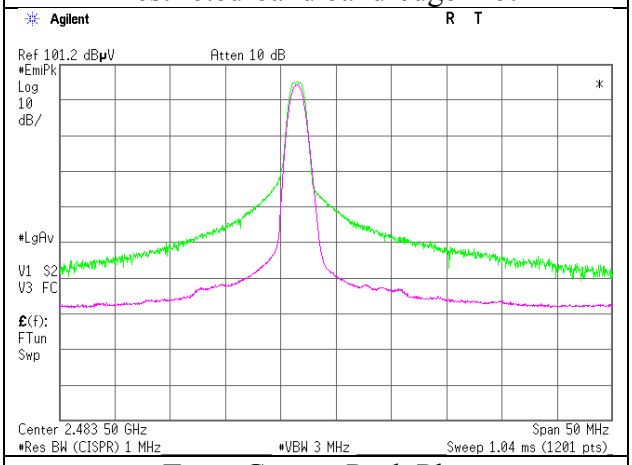
*1) Not Out of Band emission(Leakage Power)

# Radiated Spurious Emission
## (Reference Plot for band-edge)

| | |
|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber |
| Report No. | 11155194H |
| Date | February 10, 2016 |
| Temperature / Humidity | 24 deg. C / 26 % RH |
| Engineer | Yuta Moriya |
| | (1-10GHz) |
| Mode | Tx BT LE 2480 MHz |

Horizontal

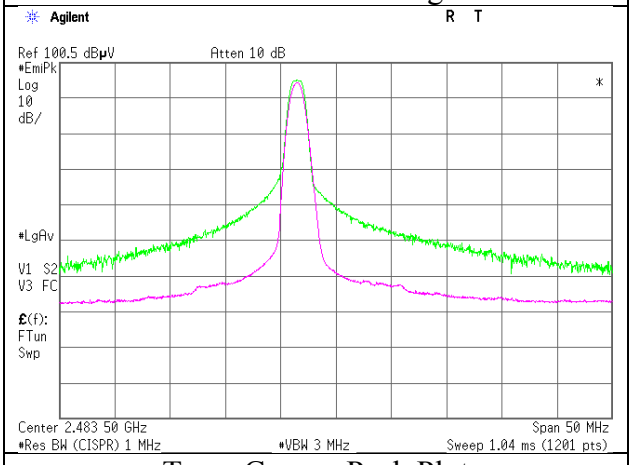
Restricted-band band-edge Plot




Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

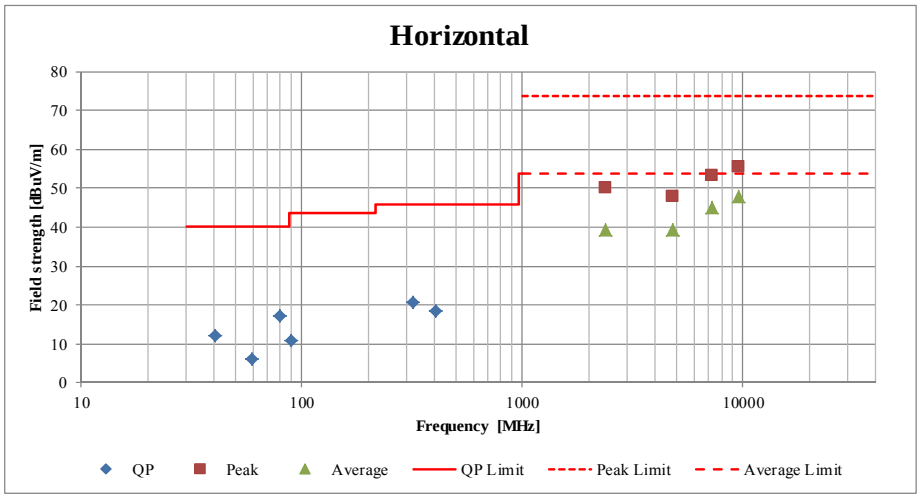


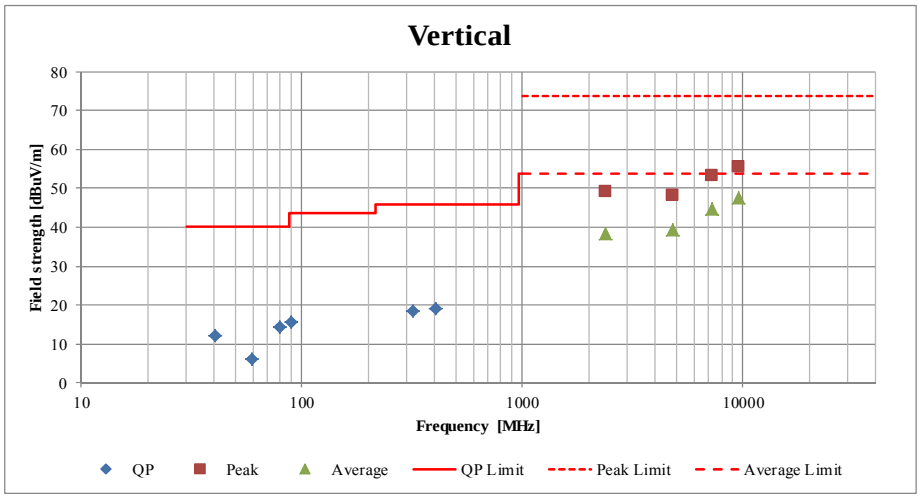

Trace Green : Peak Plot
Trace Purple : Average Plot

* Final result of restricted band edge was shown in tabular data.

# Radiated Spurious Emission
## (Plot data, Worst case)

| | | | |
|---|---|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber | | |
| Report No. | 11155194H | | |
| Date | February 10, 2016 | February 12, 2016 | February 15, 2016 |
| Temperature / Humidity | 24 deg. C / 26 % RH | 24 deg. C / 30 % RH | 18 deg. C / 41 % RH |
| Engineer | Yuta Moriya (1-10GHz) | Yuta Moriya (Above 10GHz) | Takafumi Noguchi (Below 1 GHz) |
| Mode | Tx BT LE 2402MHz | | |




*These plots data contains sufficient number to show the trend of characteristic features for EUT.

# Radiated Spurious Emission

| | |
|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber |
| Report No. | 11155194H |
| Date | April 27, 2016 |
| Temperature / Humidity | 23deg. C / 54 % RH |
| Engineer | Takumi Shimada |
| | (Above 1GHz) |
| Mode | Tx BT LE 2402 MHz and 11n-20 5180MHz |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori | 2390.000 | PK | 48.4 | 26.9 | 6.2 | 32.7 | - | 48.8 | 73.9 | 25.1 | |
| Hori | 2390.000 | AV | 34.0 | 26.9 | 6.2 | 32.7 | 2.0 | 36.4 | 53.9 | 17.5 | *1) |
| Vert | 2390.000 | PK | 47.5 | 26.9 | 6.2 | 32.7 | - | 47.9 | 73.9 | 26.0 | |
| Vert | 2390.000 | AV | 35.1 | 26.9 | 6.2 | 32.7 | 2.0 | 37.5 | 53.9 | 16.4 | *1) |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor: 1GHz-10GHz 20log(4.45m/3.0m)= 3.42dB
10GHz-26.5GHz 20log(1.0m/3.0m)= -9.5dB

*1) Not Out of Band emission(Leakage Power)

**20dBc Data Sheet**

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant Factor [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| Hori | 2402.000 | PK | 91.6 | 26.9 | 6.2 | 32.7 | 92.0 | - | - | Carrier |
| Hori | 2400.000 | PK | 47.3 | 26.9 | 6.2 | 32.7 | 47.7 | 72.0 | 24.3 | |
| Vert | 2402.000 | PK | 92.3 | 26.9 | 6.2 | 32.7 | 92.7 | - | - | Carrier |
| Vert | 2400.000 | PK | 46.1 | 26.9 | 6.2 | 32.7 | 46.5 | 72.7 | 26.2 | |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amprifier)

# Radiated Spurious Emission

| | | |
|---|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber | |
| Report No. | 11155194H | |
| Date | April 27, 2016 | April 28, 2016 |
| Temperature / Humidity | 23deg. C / 54 % RH | 23 deg. C / 61 % RH |
| Engineer | Takumi Shimada | Ken Fujita |
| | (Above 1GHz) | (Below 1GHz) |
| Mode | Tx BT LE 2440 MHz and 11n-20 5180MHz | |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori | 38.500 | QP | 22.7 | 14.4 | 7.2 | 32.2 | - | 12.1 | 40.0 | 27.9 | |
| Hori | 62.300 | QP | 22.2 | 6.7 | 7.5 | 32.2 | - | 4.2 | 40.0 | 35.8 | |
| Hori | 86.100 | QP | 25.4 | 7.5 | 7.9 | 32.2 | - | 8.6 | 40.0 | 31.4 | |
| Hori | 96.017 | QP | 23.2 | 9.1 | 8.0 | 32.2 | - | 8.1 | 43.5 | 35.4 | |
| Hori | 302.667 | QP | 31.5 | 13.6 | 9.9 | 31.9 | - | 23.1 | 46.0 | 22.9 | |
| Hori | 404.811 | QP | 24.7 | 15.7 | 10.6 | 31.9 | - | 19.1 | 46.0 | 26.9 | |
| Hori | 4880.000 | PK | 40.1 | 31.9 | 8.1 | 31.7 | - | 48.4 | 73.9 | 25.5 | Floor Noise |
| Hori | 7320.000 | PK | 41.2 | 36.0 | 8.9 | 32.6 | - | 53.5 | 73.9 | 20.4 | Floor Noise |
| Hori | 9760.000 | PK | 41.5 | 38.2 | 9.6 | 33.3 | - | 56.0 | 73.9 | 17.9 | Floor Noise |
| Hori | 4880.000 | AV | 31.6 | 31.9 | 8.1 | 31.7 | - | 39.9 | 53.9 | 14.0 | Floor Noise |
| Hori | 7320.000 | AV | 32.1 | 36.0 | 8.9 | 32.6 | - | 44.4 | 53.9 | 9.5 | Floor Noise |
| Hori | 9760.000 | AV | 32.8 | 38.2 | 9.6 | 33.3 | - | 47.3 | 53.9 | 6.6 | Floor Noise |
| Vert | 37.933 | QP | 27.7 | 14.6 | 7.2 | 32.2 | - | 17.3 | 40.0 | 22.7 | |
| Vert | 61.733 | QP | 33.2 | 6.8 | 7.5 | 32.2 | - | 15.3 | 40.0 | 24.7 | |
| Vert | 85.533 | QP | 26.6 | 7.4 | 7.9 | 32.2 | - | 9.7 | 40.0 | 30.3 | |
| Vert | 95.450 | QP | 24.4 | 9.0 | 8.0 | 32.2 | - | 9.2 | 43.5 | 34.3 | |
| Vert | 302.667 | QP | 27.2 | 13.6 | 9.9 | 31.9 | - | 18.8 | 46.0 | 27.2 | |
| Vert | 404.811 | QP | 24.4 | 15.7 | 10.6 | 31.9 | - | 18.8 | 46.0 | 27.2 | |
| Vert | 4880.000 | PK | 40.3 | 31.9 | 8.1 | 31.7 | - | 48.6 | 73.9 | 25.3 | Floor Noise |
| Vert | 7320.000 | PK | 41.0 | 36.0 | 8.9 | 32.6 | - | 53.3 | 73.9 | 20.6 | Floor Noise |
| Vert | 9760.000 | PK | 41.7 | 38.2 | 9.6 | 33.3 | - | 56.2 | 73.9 | 17.7 | Floor Noise |
| Vert | 4880.000 | AV | 31.4 | 31.9 | 8.1 | 31.7 | - | 39.7 | 53.9 | 14.2 | Floor Noise |
| Vert | 7320.000 | AV | 32.5 | 36.0 | 8.9 | 32.6 | - | 44.8 | 53.9 | 9.1 | Floor Noise |
| Vert | 9760.000 | AV | 32.5 | 38.2 | 9.6 | 33.3 | - | 47.0 | 53.9 | 6.9 | Floor Noise |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor: 1GHz-10GHz 20log(4.45m/3.0m)= 3.42dB
10GHz-26.5GHz 20log(1.0m/3.0m)= -9.5dB

# Radiated Spurious Emission

| | |
|---|---|
| Test place | Ise EMC Lab. No.3 Semi Anechoic Chamber |
| Report No. | 11155194H |
| Date | April 27, 2016 |
| Temperature / Humidity | 23deg. C / 54 % RH |
| Engineer | Takumi Shimada |
| | (Above 1GHz) |
| Mode | Tx BT LE 2480 MHz and 11n-20 5180MHz |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Duty Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori | 2483.500 | PK | 61.9 | 26.9 | 6.2 | 32.6 | - | 62.4 | 73.9 | 11.5 | |
| Hori | 2483.500 | AV | 46.2 | 26.9 | 6.2 | 32.6 | 2.0 | 48.7 | 53.9 | 5.2 | *1) |
| Vert | 2483.500 | PK | 60.0 | 26.9 | 6.2 | 32.6 | - | 60.5 | 73.9 | 13.4 | |
| Vert | 2483.500 | AV | 45.0 | 26.9 | 6.2 | 32.6 | 2.0 | 47.5 | 53.9 | 6.4 | *1) |

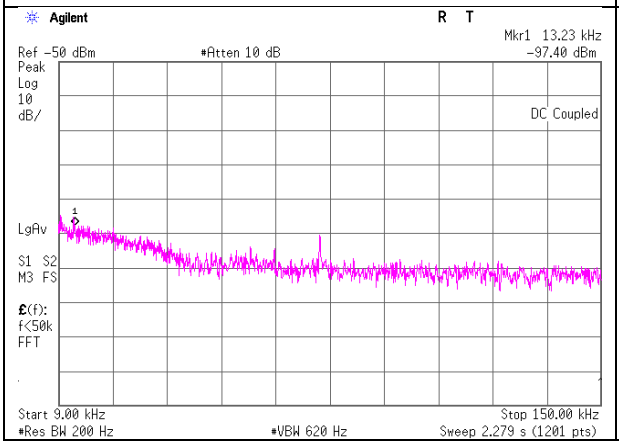
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor: 1GHz-10GHz 20log(4.45m/3.0m)= 3.42dB
10GHz-26.5GHz 20log(1.0m/3.0m)= -9.5dB
*1) Not Out of Band emission(Leakage Power)

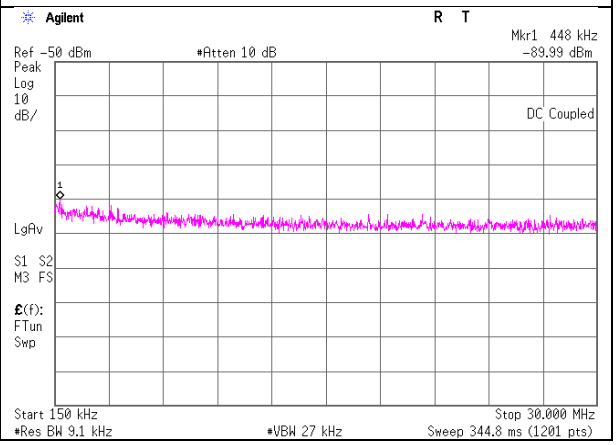
# Conducted Spurious Emission

| | |
|---|---|
| Test place | Ise EMC Lab. No.11 Measurement Room |
| Report No. | 11155194H |
| Date | February 12, 2016 |
| Temperature / Humidity | 23deg. C / 52% RH |
| Engineer | Takafumi Noguchi |
| Mode | Tx 11n-20 2437 MHz |

**9 kHz - 150 kHz**




**150 kHz - 30 MHz**




| Frequency [kHz] | Reading [dBm] | Cable Loss [dB] | Attenator Loss [dB] | Antenna Gain [dBi] | N (Number of Output | EIRP [dBm] | Distance [m] | Ground bounce [dB] | E (field strength) [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 13.23 | -97.4 | 0.50 | 10.0 | 8.6 | 2 | -75.3 | 300 | 6.0 | -14.0 | 45.1 | 59.1 | |
| 448.00 | -90.0 | 0.50 | 10.0 | 8.6 | 2 | -67.9 | 300 | 6.0 | -6.6 | 14.5 | 21.1 | |

E = EIRP - 20 log (D) + Ground bounce + 104.8 [dBuV/m]

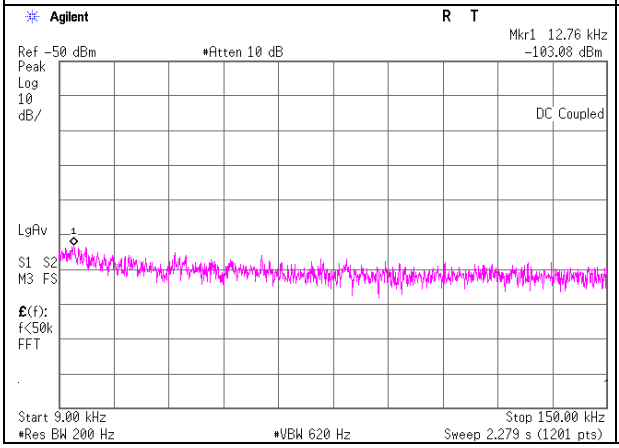
EIRP = Reading + Cable Loss + Attenator Loss + Antenna Gain + 10 * log (N)

# Conducted Spurious Emission

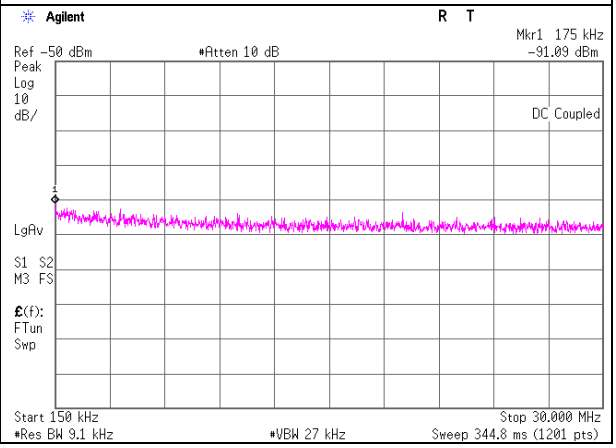
| | |
|---|---|
| Test place | Ise EMC Lab. No.3 Preparation Room |
| Report No. | 11155194H |
| Date | February 16, 2016 |
| Temperature / Humidity | 23deg. C / 34% RH |
| Engineer | Tomoki Matsui |
| Mode | Tx BT LE |

## 2402MHz

### 9 kHz - 150 kHz




### 150 kHz - 30 MHz




| Frequency [kHz] | Reading [dBm] | Cable Loss [dB] | Attenator Loss [dB] | Antenna Gain [dBi] | N (Number of Output | EIRP [dBm] | Distance [m] | Ground bounce [dB] | E (field strength) [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12.76 | -103.1 | 1.31 | 20.1 | 6.4 | 1 | -75.3 | 300 | 6.0 | -14.1 | 45.4 | 59.5 | |
| 175.00 | -91.1 | 1.31 | 20.1 | 6.4 | 1 | -63.3 | 300 | 6.0 | -2.0 | 22.7 | 24.7 | |

E = EIRP - 20 log (D) + Ground bounce + 104.8 [dBuV/m]

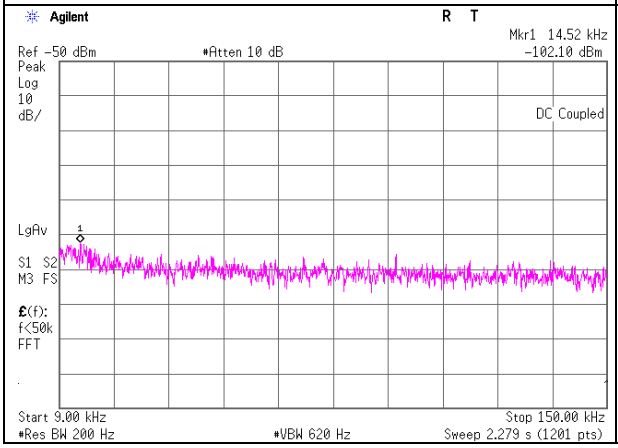
EIRP = Reading + Cable Loss + Attenator Loss + Antenna Gain + 10 * log (N)

# Conducted Spurious Emission

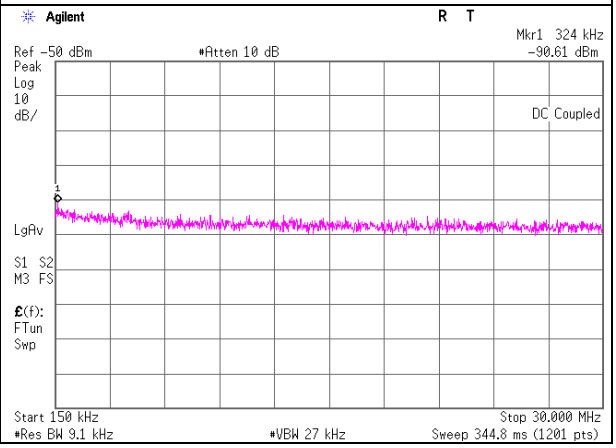
| | |
|---|---|
| Test place | Ise EMC Lab. No.3 Preparation Room |
| Report No. | 11155194H |
| Date | February 16, 2016 |
| Temperature / Humidity | 23deg. C / 34% RH |
| Engineer | Tomoki Matsui |
| Mode | Tx BT LE |

## 2440MHz

### 9 kHz - 150 kHz




### 150 kHz - 30 MHz




| Frequency [kHz] | Reading [dBm] | Cable Loss [dB] | Attenator Loss [dB] | Antenna Gain [dBi] | N (Number of Output | EIRP [dBm] | Distance [m] | Ground bounce [dB] | E (field strength) [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14.52 | -102.1 | 1.31 | 20.1 | 6.4 | 1 | -74.3 | 300 | 6.0 | -13.1 | 44.3 | 57.4 | |
| 324.00 | -90.6 | 1.31 | 20.1 | 6.4 | 1 | -62.8 | 300 | 6.0 | -1.5 | 17.3 | 18.8 | |

E = EIRP - 20 log (D) + Ground bounce + 104.8 [dBuV/m]

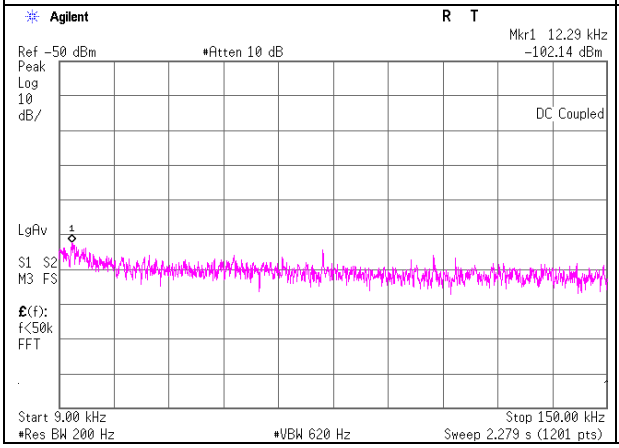
EIRP = Reading + Cable Loss + Attenator Loss + Antenna Gain + 10 * log (N)

# Conducted Spurious Emission

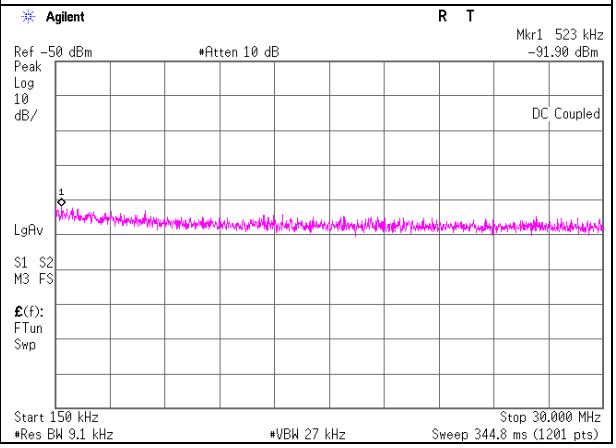
| | |
|---|---|
| Test place | Ise EMC Lab. No.3 Preparation Room |
| Report No. | 11155194H |
| Date | February 16, 2016 |
| Temperature / Humidity | 23deg. C / 34% RH |
| Engineer | Tomoki Matsui |
| Mode | Tx BT LE |

## 2480MHz

### 9 kHz - 150 kHz




### 150 kHz - 30 MHz




| Frequency [kHz] | Reading [dBm] | Cable Loss [dB] | Attenator Loss [dB] | Antenna Gain [dBi] | N (Number of Output | EIRP [dBm] | Distance [m] | Ground bounce [dB] | E (field strength) [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12.29 | -102.1 | 1.31 | 20.1 | 6.4 | 1 | -74.4 | 300 | 6.0 | -13.1 | 45.8 | 58.9 | |
| 523.00 | -91.9 | 1.31 | 20.1 | 6.4 | 1 | -64.1 | 30 | 6.0 | 17.2 | 33.2 | 16.0 | |

E = EIRP - 20 log (D) + Ground bounce + 104.8 [dBuV/m]

EIRP = Reading + Cable Loss + Attenator Loss + Antenna Gain + 10 * log (N)

# Power Density

| | |
|---|---|
| Test place | Ise EMC Lab. No.11 Measurement Room |
| Report No. | 11155194H |
| Date | February 12, 2016 |
| Temperature / Humidity | 23deg. C / 52% RH |
| Engineer | Takafumi Noguchi |
| Mode | Tx 11b |

Antenna port WA + WB

| Freq. [MHz] | Antenna port WA Result [mW] | Antenna port WB Result [mW] | Result [dBm] | Result [mW] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|
| 2412.00 | 0.041 | 0.034 | -11.28 | 0.074 | 8.00 | 19.28 |
| 2437.00 | 0.045 | 0.038 | -10.80 | 0.083 | 8.00 | 18.80 |
| 2462.00 | 0.045 | 0.034 | -11.02 | 0.079 | 8.00 | 19.02 |

Sample Calculation:
Result = Antenna port WA + WB

Antenna port WA

| Freq. [MHz] | Reading [dBm] | Cable Loss [dB] | Atten. [dB] | Result [dBm] | Result [mW] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 2412.00 | -25.88 | 1.86 | 10.11 | -13.91 | 0.04 | 8.00 | 21.91 |
| 2437.00 | -25.41 | 1.87 | 10.11 | -13.43 | 0.05 | 8.00 | 21.43 |
| 2462.00 | -25.40 | 1.87 | 10.11 | -13.42 | 0.05 | 8.00 | 21.42 |

Antenna port WB

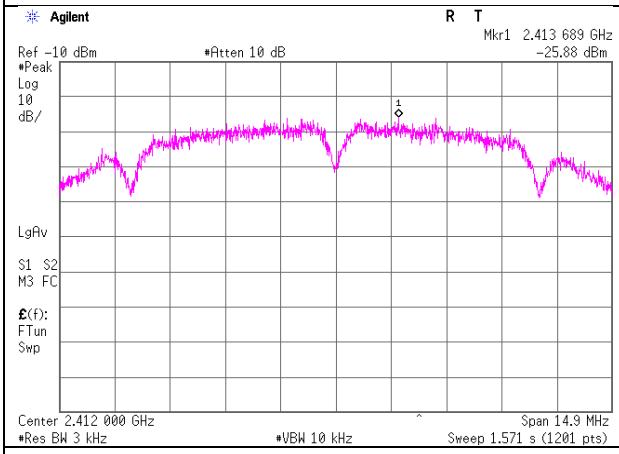
| Freq. [MHz] | Reading [dBm] | Cable Loss [dB] | Atten. [dB] | Result [dBm] | Result [mW] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 2412.00 | -26.68 | 1.86 | 10.11 | -14.71 | 0.03 | 8.00 | 22.71 |
| 2437.00 | -26.20 | 1.87 | 10.11 | -14.22 | 0.04 | 8.00 | 22.22 |
| 2462.00 | -26.71 | 1.87 | 10.11 | -14.73 | 0.03 | 8.00 | 22.73 |

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

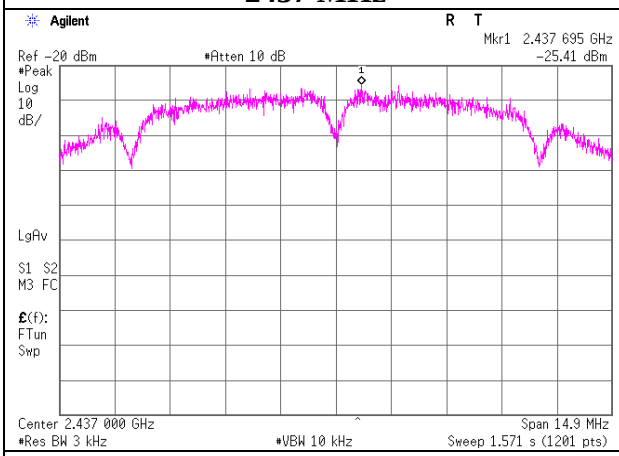
# Power Density

## 11b Antenna port WA

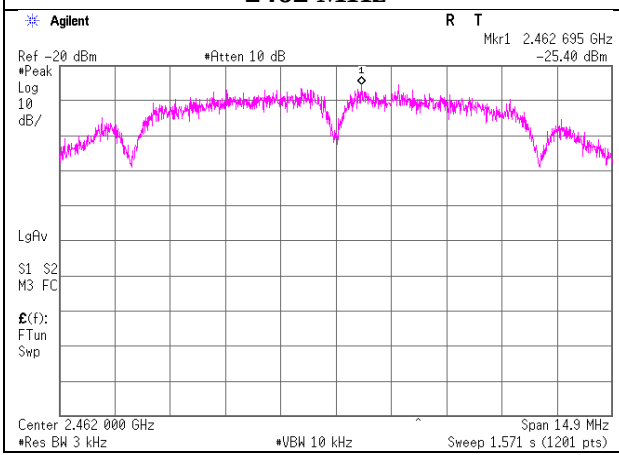
### 2412 MHz




### 2437 MHz

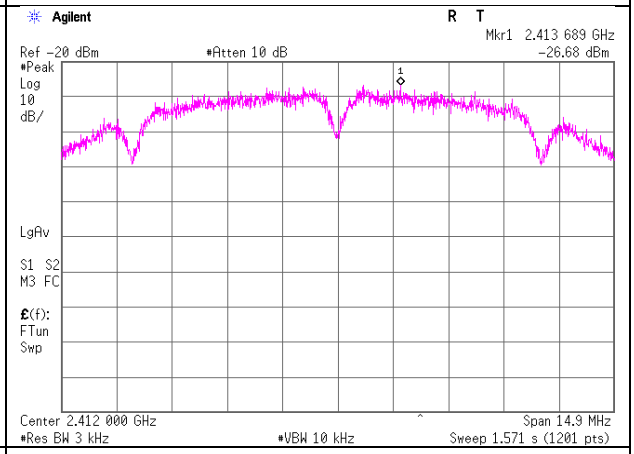



### 2462 MHz

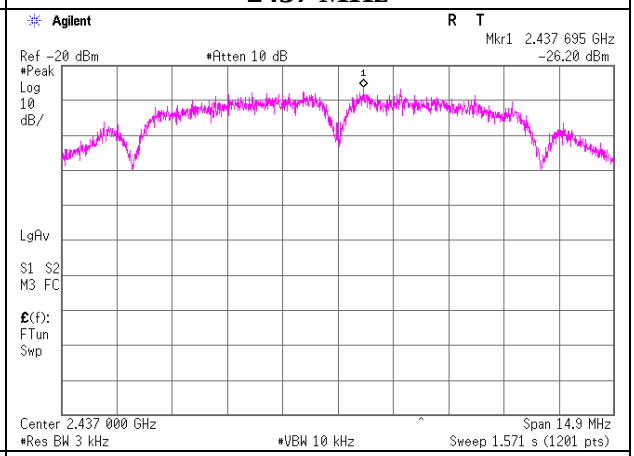



## 11b Antenna port WB

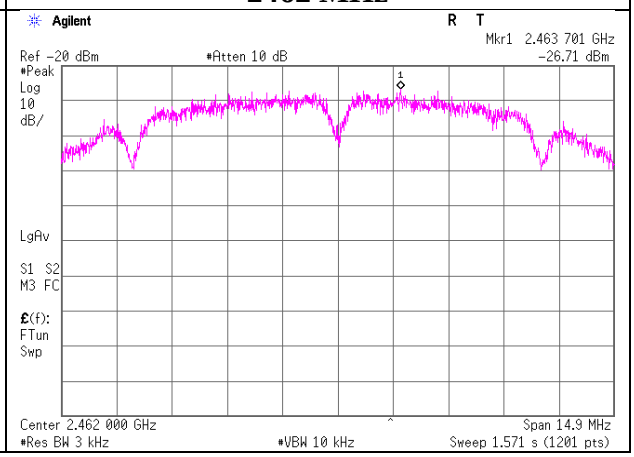
### 2412 MHz




### 2437 MHz




### 2462 MHz



# Power Density

| | |
|---|---|
| Test place | Ise EMC Lab. No.11 Measurement Room |
| Report No. | 11155194H |
| Date | February 12, 2016 |
| Temperature / Humidity | 23deg. C / 52% RH |
| Engineer | Takafumi Noguchi |
| Mode | Tx 11g |

Antenna port WA + WB

| Freq. | Antenna port WA Result | Antenna port WB Result | Result | | Limit | Margin |
|---|---|---|---|---|---|---|
| [MHz] | [mW] | [mW] | [dBm] | [mW] | [dBm] | [dB] |
| 2412.00 | 0.019 | 0.015 | -14.64 | 0.034 | 8.00 | 22.64 |
| 2437.00 | 0.019 | 0.015 | -14.73 | 0.034 | 8.00 | 22.73 |
| 2462.00 | 0.016 | 0.015 | -15.12 | 0.031 | 8.00 | 23.12 |

Sample Calculation:
Result = Antenna port WA + WB

Antenna port WA

| Freq. | Reading | Cable Loss | Atten. | Result | | Limit | Margin |
|---|---|---|---|---|---|---|---|
| [MHz] | [dBm] | [dB] | [dB] | [dBm] | [mW] | [dBm] | [dB] |
| 2412.00 | -29.17 | 1.86 | 10.11 | -17.20 | 0.02 | 8.00 | 25.20 |
| 2437.00 | -29.30 | 1.87 | 10.11 | -17.32 | 0.02 | 8.00 | 25.32 |
| 2462.00 | -29.98 | 1.87 | 10.11 | -18.00 | 0.02 | 8.00 | 26.00 |

Antenna port WB

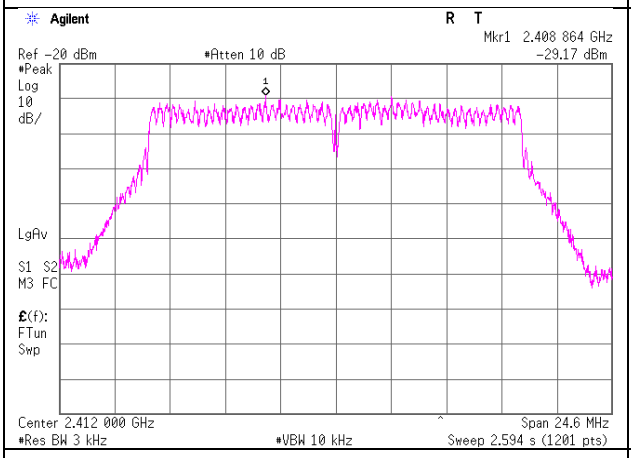
| Freq. | Reading | Cable Loss | Atten. | Result | | Limit | Margin |
|---|---|---|---|---|---|---|---|
| [MHz] | [dBm] | [dB] | [dB] | [dBm] | [mW] | [dBm] | [dB] |
| 2412.00 | -30.13 | 1.86 | 10.11 | -18.16 | 0.02 | 8.00 | 26.16 |
| 2437.00 | -30.18 | 1.87 | 10.11 | -18.20 | 0.02 | 8.00 | 26.20 |
| 2462.00 | -30.25 | 1.87 | 10.11 | -18.27 | 0.01 | 8.00 | 26.27 |

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

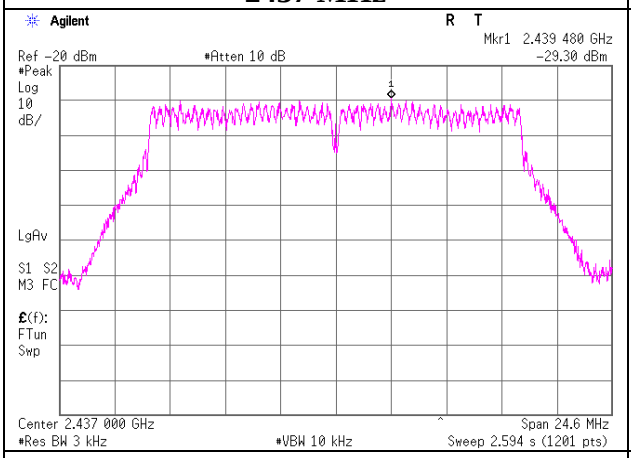
# Power Density

## 11g Antenna port WA

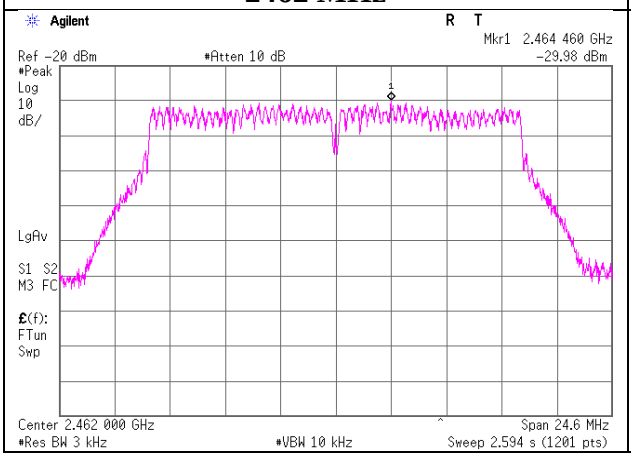
### 2412 MHz




### 2437 MHz

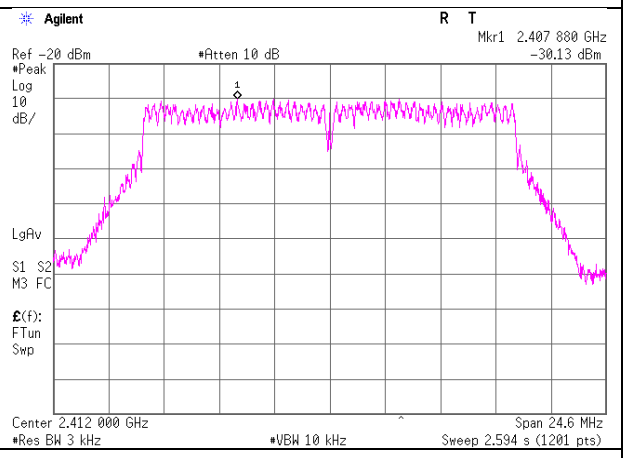



### 2462 MHz

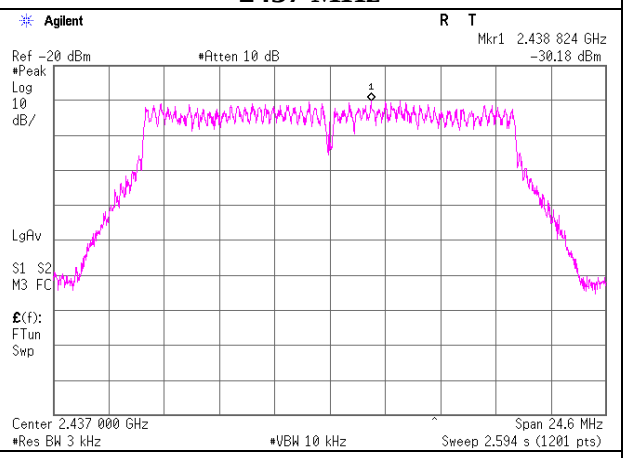



## 11g Antenna port WB

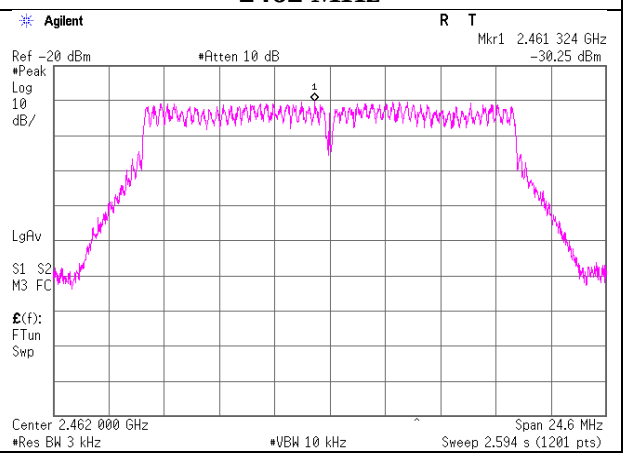
### 2412 MHz




### 2437 MHz




### 2462 MHz



# Power Density

| | |
|---|---|
| Test place | Ise EMC Lab. No.11 Measurement Room |
| Report No. | 11155194H |
| Date | February 12, 2016 |
| Temperature / Humidity | 23deg. C / 52% RH |
| Engineer | Takafumi Noguchi |
| Mode | Tx 11n-20 |

Antenna port WA + WB

| Freq. [MHz] | Antenna port WA Result [mW] | Antenna port WB Result [mW] | Result [dBm] | Result [mW] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|
| 2412.00 | 0.019 | 0.018 | -14.29 | 0.037 | 8.00 | 22.29 |
| 2437.00 | 0.022 | 0.016 | -14.11 | 0.039 | 8.00 | 22.11 |
| 2462.00 | 0.019 | 0.018 | -14.38 | 0.036 | 8.00 | 22.38 |

Sample Calculation:
Result = Antenna port WA + WB

Antenna port WA

| Freq. [MHz] | Reading [dBm] | Cable Loss [dB] | Atten. [dB] | Result [dBm] | Result [mW] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 2412.00 | -29.07 | 1.86 | 10.11 | -17.10 | 0.02 | 8.00 | 25.10 |
| 2437.00 | -28.48 | 1.87 | 10.11 | -16.50 | 0.02 | 8.00 | 24.50 |
| 2462.00 | -29.22 | 1.87 | 10.11 | -17.24 | 0.02 | 8.00 | 25.24 |

Antenna port WB

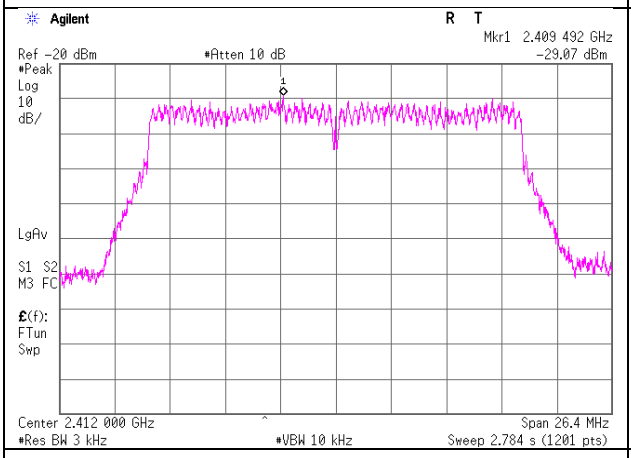
| Freq. [MHz] | Reading [dBm] | Cable Loss [dB] | Atten. [dB] | Result [dBm] | Result [mW] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 2412.00 | -29.48 | 1.86 | 10.11 | -17.51 | 0.02 | 8.00 | 25.51 |
| 2437.00 | -29.82 | 1.87 | 10.11 | -17.84 | 0.02 | 8.00 | 25.84 |
| 2462.00 | -29.53 | 1.87 | 10.11 | -17.55 | 0.02 | 8.00 | 25.55 |

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

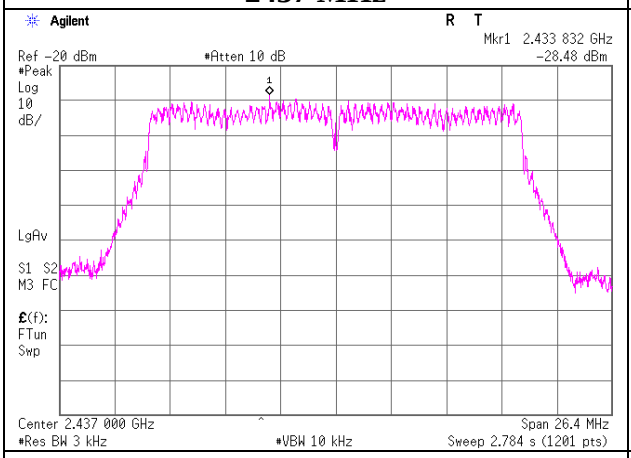
# Power Density

## 11n-20 Antenna port WA

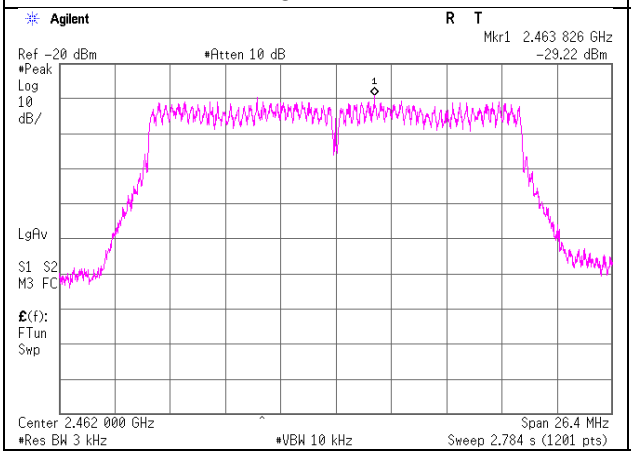
### 2412 MHz




### 2437 MHz

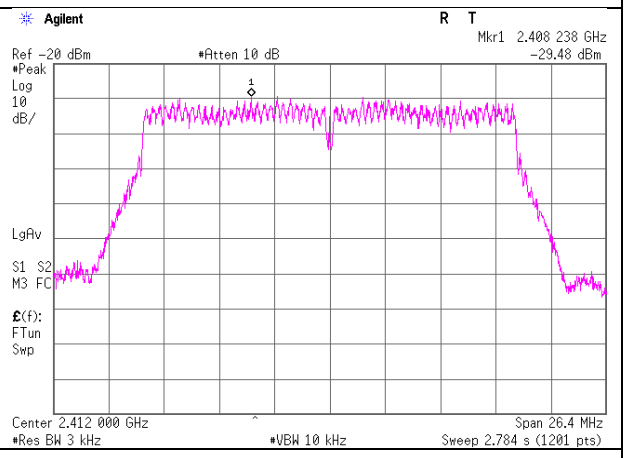



### 2462 MHz

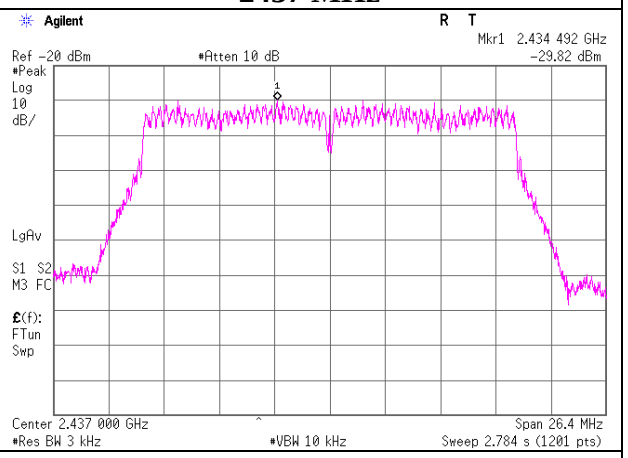



## 11n-20 Antenna port WB

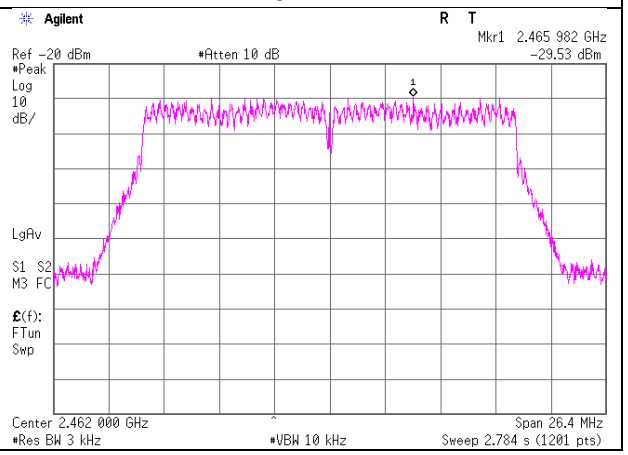
### 2412 MHz




### 2437 MHz




### 2462 MHz



# Power Density

| | |
|---|---|
| Test place | Ise EMC Lab. No.3 Preparation Room |
| Report No. | 11155194H |
| Date | February 16, 2016 |
| Temperature / Humidity | 23deg. C / 34% RH |
| Engineer | Tomoki Matsui |
| Mode | Tx BT LE |

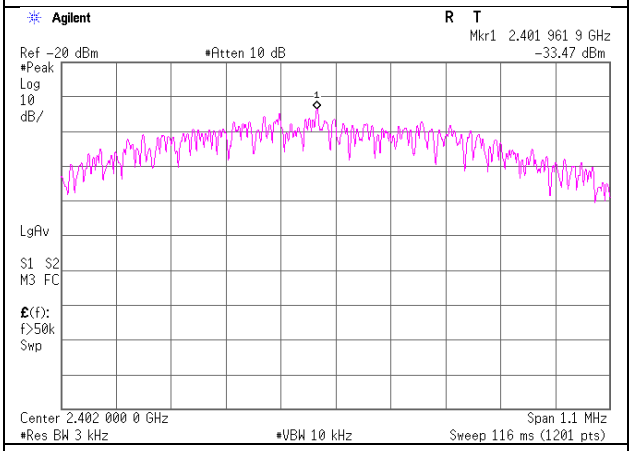
| Freq. | Reading | Cable Loss | Atten. | Result | | Limit | Margin |
|---|---|---|---|---|---|---|---|
| [MHz] | [dBm] | [dB] | [dB] | [dBm] | [mW] | [dBm] | [dB] |
| 2402 | -33.47 | 1.77 | 20.09 | -11.61 | 0.07 | 8.00 | 19.61 |
| 2440 | -33.62 | 1.78 | 20.09 | -11.75 | 0.07 | 8.00 | 19.75 |
| 2480 | -33.89 | 1.79 | 20.09 | -12.01 | 0.06 | 8.00 | 20.01 |

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

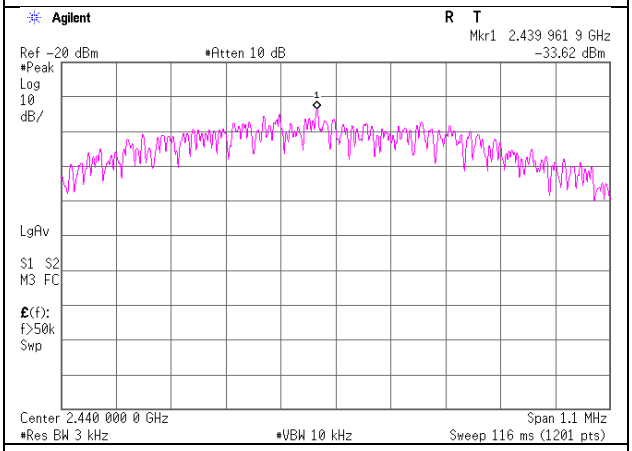
# Power Density

## BT LE

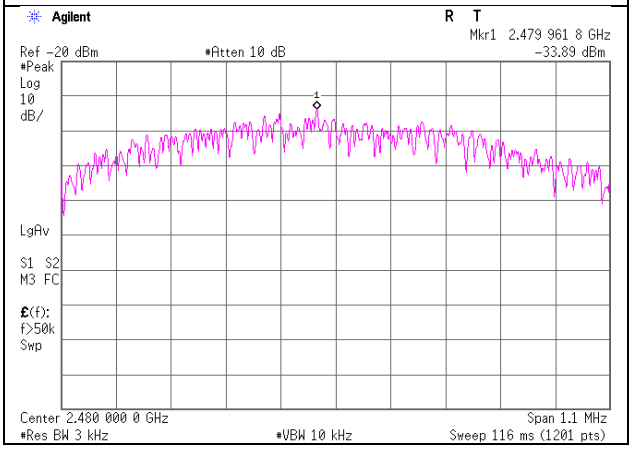
### 2402 MHz




### 2440 MHz

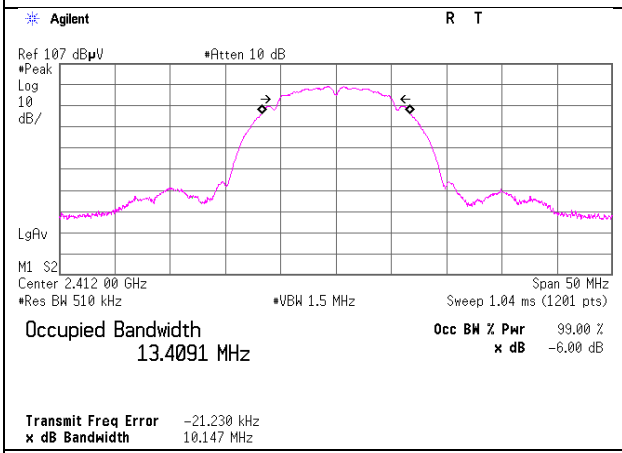
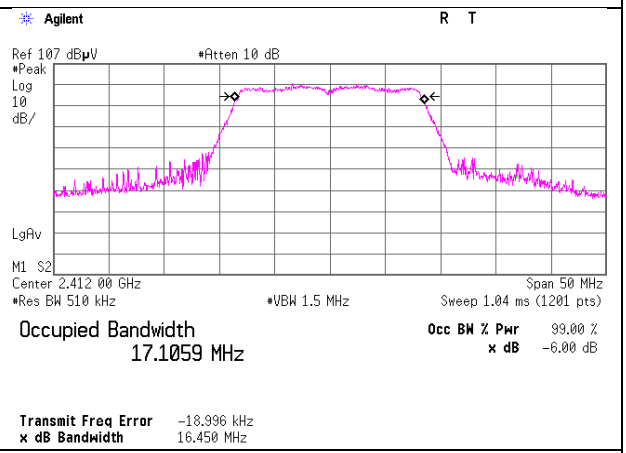
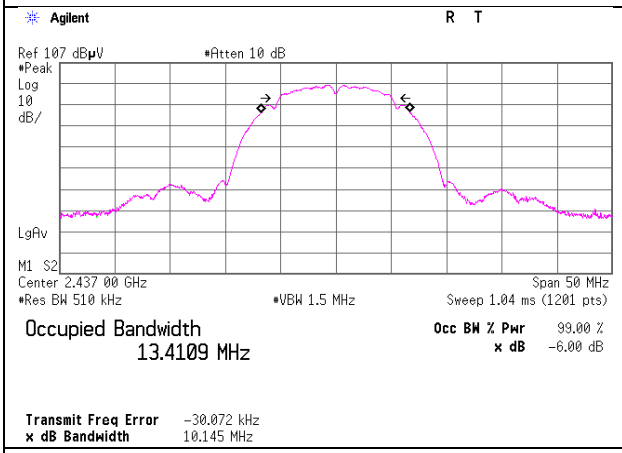
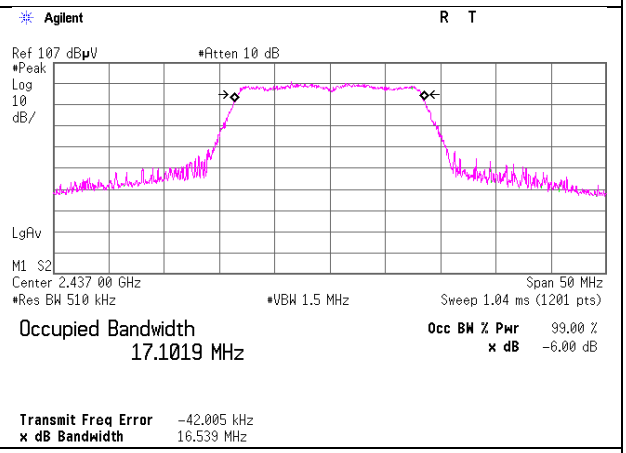
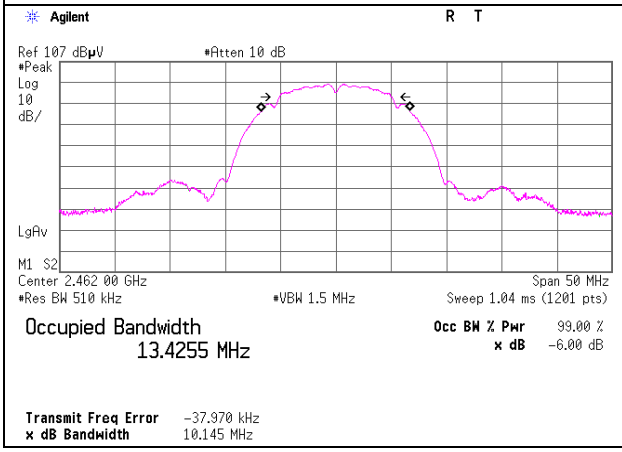
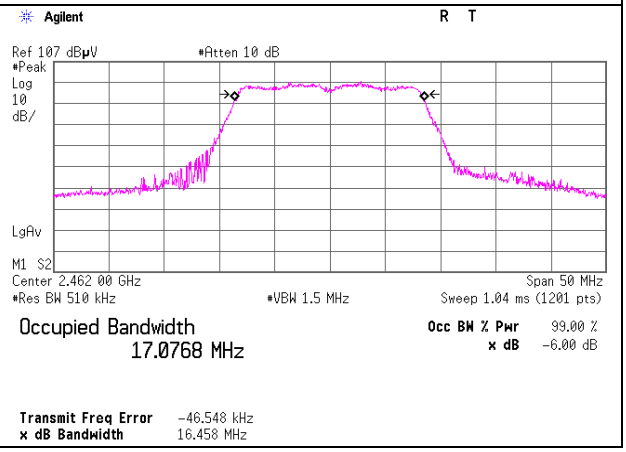



### 2480 MHz



# 99%Occupied Bandwidth

| | |
|---|---|
| Test place | Ise EMC Lab. No.11 Measurement Room |
| Report No. | 11155194H |
| Date | February 12, 2016 |
| Temperature / Humidity | 23deg. C / 52% RH |
| Engineer | Takafumi Noguchi |
| Mode | Tx |

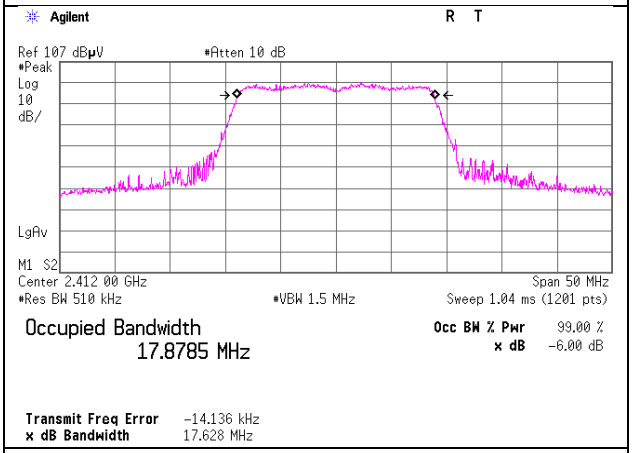
| 11b | 11g |
|---|---|
| **2412 MHz** | **2412 MHz** |
|  |  |
|  |  |
| **2437 MHz** | **2437 MHz** |
|  |  |
|  |  |
| **2462 MHz** | **2462 MHz** |
|  |  |
|  |  |

# 99% Occupied Bandwidth

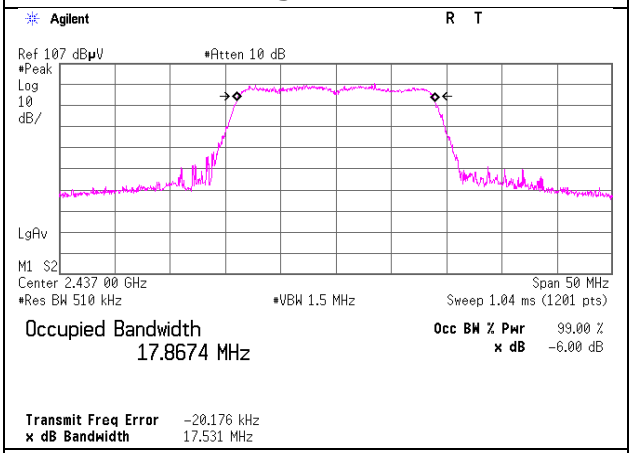
| | |
|---|---|
| Test place | Ise EMC Lab. No.11 Measurement Room |
| Report No. | 11155194H |
| Date | February 12, 2016 |
| Temperature / Humidity | 23deg. C / 52% RH |
| Engineer | Takafumi Noguchi |
| Mode | Tx |

## 11n-20

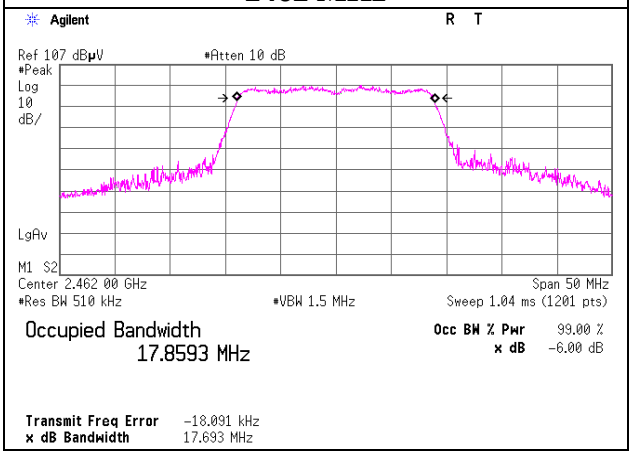
### 2412 MHz




### 2437 MHz




### 2462 MHz

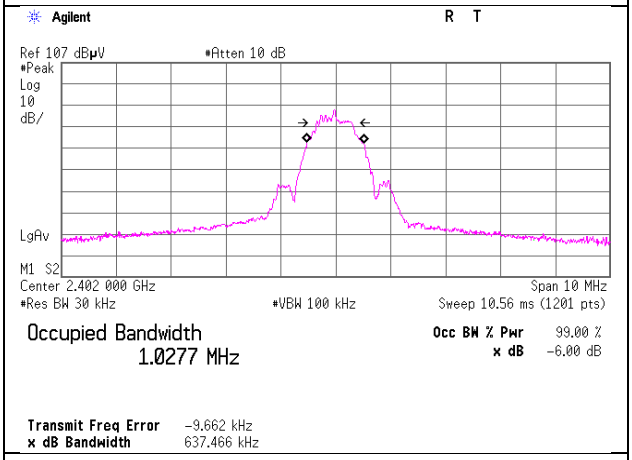


# 99% Occupied Bandwidth

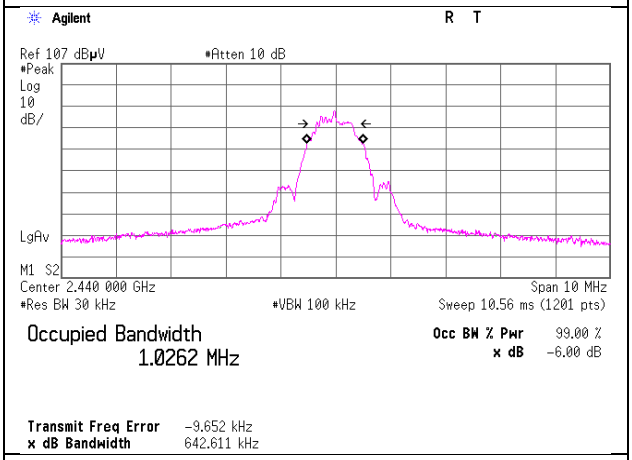
| | |
|---|---|
| Test place | Ise EMC Lab. No.3 Preparation Room |
| Report No. | 11155194H |
| Date | February 16, 2016 |
| Temperature / Humidity | 23deg. C / 34% RH |
| Engineer | Tomoki Matsui |
| Mode | Tx BT LE |

## BT LE

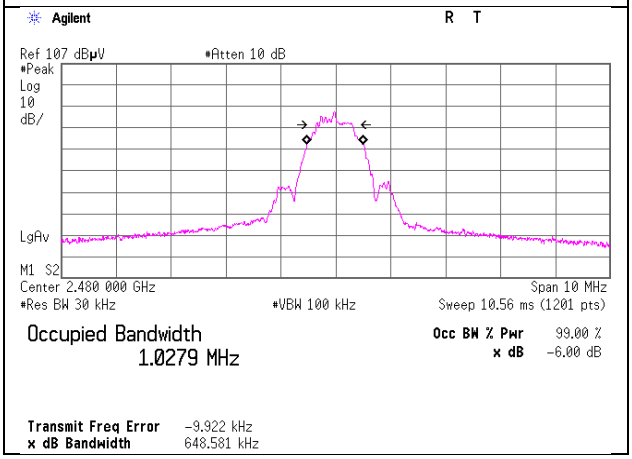
### 2402 MHz




### 2440 MHz




### 2480 MHz



# APPENDIX 2: Test instruments

**Test equipment**

| Control No. | Instrument | Manufacturer | Model No | Serial No | Test Item | Calibration Date * Interval(month) |
|---|---|---|---|---|---|---|
| MSA-14 | Spectrum Analyzer | Agilent | E4440A | MY48250080 | AT | 2015/10/07 * 12 |
| MAT-56 | Attenuator(10dB) | Suhner | 6810.19.A | - | AT | 2016/01/18 * 12 |
| MPM-08 | Power Meter | Anritsu | ML2495A | 6K00003338 | AT | 2015/10/08 * 12 |
| MPSE-11 | Power sensor | Anritsu | MA2411B | 011737 | AT | 2015/10/08 * 12 |
| MOS-19 | Thermo-Hygrometer | Custom | CTH-201 | 0001 | AT | 2015/12/08 * 12 |
| MAT-57 | Attenuator(10dB) | Suhner | 6810.19.A | - | AT | 2016/01/18 * 12 |
| MAT-58 | Attenuator(10dB) | Suhner | 6810.19.A | - | AT | 2016/01/18 * 12 |
| MCC-138 | Microwave cable | HUBER+SUHNER | SUCOFLEX 102 | 37953/2 | AT | 2015/10/08 * 12 |
| MTA-36 | Terminator | - | 50ΩSMA | - | AT | Pre Check |
| MTA-43 | Terminator | Mini-Circuits | ANNE-50X+ | MUU3460140 | AT | Pre Check |
| MAT-23 | Attenuator(10dB) 1-18GHz | Orient Microwave | BX10-0476-00 | - | AT | 2015/03/13 * 12 |
| MCC-137 | Microwave cable | HUBER+SUHNER | SUCOFLEX 102 | 37954/2 | AT | 2015/10/08 * 12 |
| MAEC-03 | Semi Anechoic Chamber(NSA) | TDK | Semi Anechoic Chamber 3m | DA-10005 | RE/CE | 2015/10/01 * 12 |
| MOS-13 | Thermo-Hygrometer | Custom | CTH-180 | 1301 | RE/CE | 2016/01/21 * 12 |
| MJM-16 | Measure | KOMELON | KMC-36 | - | RE/CE | - |
| COTS-MEMI | EMI measurement program | TSJ | TEPTO-DV | - | RE/CE | - |
| MSA-03 | Spectrum Analyzer | Agilent | E4448A | MY44020357 | RE/CE | 2015/05/18 * 12 |
| MHA-20 | Horn Antenna 1-18GHz | Schwarzbeck | BBHA9120D | 258 | RE | 2015/05/18 * 12 |
| MCC-167 | Microwave Cable | Junkosha | MWX221 | 1404S374(1m) / 1405S074(5m) | RE | 2015/05/21 * 12 |
| MPA-11 | MicroWave System Amplifier | Agilent | 83017A | MY39500779 | RE | 2015/03/19 * 12 |
| MMM-08 | DIGITAL HiTESTER | Hioki | 3805 | 051201197 | RE/CE | 2016/01/13 * 12 |
| MHF-25 | High Pass Filter 3.5-18.0GHz | UL Japan | HPF SELECTOR | 001 | RE | 2015/09/16 * 12 |
| MHF-06 | High Pass Filter 3.5-24GHz | TOKIMEC | TF323DCA | 601 | RE | 2015/05/15 * 12 |
| MHA-16 | Horn Antenna 15-40GHz | Schwarzbeck | BBHA9170 | BBHA9170306 | RE | 2015/05/19 * 12 |
| MTR-08 | Test Receiver | Rohde & Schwarz | ESCI | 100767 | RE/CE | 2015/09/02 * 12 |
| MBA-03 | Biconical Antenna | Schwarzbeck | BBA9106 | 1915 | RE | 2015/10/11 * 12 |
| MLA-03 | Logperiodic Antenna | Schwarzbeck | USLP9143 | 174 | RE | 2015/10/11 * 12 |
| MCC-51 | Coaxial cable | UL Japan | - | - | RE | 2015/07/13 * 12 |
| MCC-112 | Coaxial cable | Fujikura/Suhner/TSJ | 5D-2W(10m)/SFM141(3m)/sucoform141-PE(1m)/421-010(1.5m)/RFM-E321(Switcher) | -/00640 | CE | 2015/07/02 * 12 |
| MAT-66 | Attenuator(13dB) | JFW Industries, Inc. | 50FP-013H2 N | - | CE | 2016/01/14 * 12 |
| MSA-10 | Spectrum Analyzer | Agilent | E4448A | MY46180655 | RE/CE | 2016/02/24 * 12 |
| MPA-11 | MicroWave System Amplifier | Agilent | 83017A | MY39500779 | RE | 2016/03/24 * 12 |
| MHA-16 | Horn Antenna 15-40GHz | Schwarzbeck | BBHA9170 | BBHA9170306 | RE | 2015/05/19 * 12 |
| MHF-22 | High Pass Filter 7-20GHz | TOKIMEC | TF37NCCB | 602 | RE | 2016/01/19 * 12 |
| MCC-177 | Microwave Cable | Junkosha | MMX221-00500D MSDMS | 1502S304 | RE | 2016/03/10 * 12 |
| MLA-22 | Logperiodic Antenna(200-1000MHz) | Schwarzbeck | VUSLP9111B | 911B-191 | RE | 2016/01/30 * 12 |
| MAT-70 | Attenuator(6dB) | Agilent | 8491A-006 | MY52460153 | RE | 2016/04/05 * 12 |
| MPA-13 | Pre Amplifier | SONOMA INSTRUMENT | 310 | 260834 | RE | 2016/03/24 * 12 |
| MLS-23 | LISN(AMN) | Schwarzbeck | NSLK8127 | 8127-729 | CE(EUT) | 2015/07/10 * 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 test**
**RE: Radiated Emission test**
**AT: Antenna Terminal Conducted test**