



RADIO TEST REPORT

Test Report No. : 10994201M-A-R1

Applicant : Sony Corporation
Type of Equipment : Wireless Noise Canceling Stereo Headset
Model No. : MDR-100ABN
FCC ID : AK8MDR100ABN
Test regulation : FCC Part 15 Subpart C: 2015
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. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
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 10994201M-A. 10994201M-A is replaced with this report.

Date of test: October 20, 21, 28, November 1, 3, 2015

Representative test engineer:



Kazuhiro Ando
Engineer
Consumer Technology Division

Approved by:



Masanori Nishiyama
Manager
Consumer Technology Division



TESTING
CERTIFICATE 1266.01

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

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13-EM-F0429

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SECTION 1: Customer information

Company Name : Sony Corporation
Address : 2-10-1 Osaki, Shinagawa-ku, Tokyo 141-8610 Japan
Telephone Number : +81 50 3750 7634
Facsimile Number : +81 50 3750 6574
Contact Person : Shigeru Higai

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

2.1 Identification of E.U.T.

Type of Equipment : Wireless Noise Canceling Stereo Headset
Model No. : MDR-100ABN
Serial No. : Refer to Section 4, Clause 4.2
Rating : DC 3.6 V, Rechargeable Battery
Receipt Date of Sample : October 16, 2015
Country of Mass-production : Malaysia
Condition of EUT : Engineering prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT : No Modification by the test lab

2.2 Product Description

Model: MDR-100ABN (referred to as the EUT in this report) is a Wireless Noise Canceling Stereo Headset. The EUT play the sound from external audio equipment through the bluetooth function.

General Specification

Clock frequencies in the system : Oscillator frequency: 26 MHz (Bluetooth)

Radio Specification

[Bluetooth (Ver. 4.0 with EDR function)]

Radio Type : Transceiver
Frequency of Operation : 2402 MHz - 2480 MHz
Modulation : FHSS
Power Supply (radio part input) : DC 1.35 V
Antenna type : CHIP MULTILAYER ANTENNA
Antenna Gain : 1.6 dBi
Operation temperature range : 0 to +40 deg. C

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2015, final revised on September 8, 2015

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.247 Operation within the bands 902-928MHz,
2400-2483.5MHz, and 5725-5850MHz

3.2 Procedures and results

| Item | Test Procedure | Specification | Worst Margin | Results | Remarks |
|--|---|--|--|------------|------------------------|
| Conducted Emission | FCC: ANSI C63.4-2009 7. AC powerline conducted emission measurements | FCC: Section 15.207 | N/A | N/A *1) | - |
| | IC: RSS-Gen 8.8 | IC: RSS-Gen 8.8 | | | |
| Carrier Frequency Separation | FCC: FCC Public Notice DA 00-705 | FCC: Section15.247(a)(1) | See data. | Complied | Conducted |
| | IC: - | IC: RSS-247 5.1 (2) | | | |
| 20dB Bandwidth | FCC: FCC Public Notice DA 00-705 | FCC: Section15.247(a)(1) | | Complied | Conducted |
| | IC: - | IC: RSS-247 5.1 (1) | | | |
| Number of Hopping Frequency | FCC: FCC Public Notice DA 00-705 | FCC: Section15.247(a)(1)(iii) | | Complied | Conducted |
| | IC: - | IC: RSS-247 5.1 (4) | | | |
| Dwell time | FCC: FCC Public Notice DA 00-705 | FCC: Section15.247(a)(1)(iii) | | Complied | Conducted |
| | IC: - | IC: RSS-247 5.1 (4) | | | |
| Maximum Peak Output Power | FCC: FCC Public Notice DA 00-705 | FCC: Section15.247(a)(b)(1) | Complied | Conducted | |
| | IC: RSS-Gen 6.12 | IC: RSS-247 5.4 (2) | | | |
| Spurious Emission & Band Edge Compliance | FCC: FCC Public Notice DA 00-705 | FCC: Section15.247(d) | 11.4 dB 4804.00 MHz,AV, Vert. (DH5, 2402MHz) | Complied | Conducted/ Radiated |
| | IC: RSS-Gen 6.13 | IC: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10 | | | |

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

*1) The test is not applicable since the EUT has no AC mains. During charging, the EUT does not perform BT operation.

* In case any questions arise about test procedure, ANSI C63.4: 2009 is also referred.

FCC Part 15.31 (e)

The EUT is a battery-operated device and test was performed with the full-charged battery. Therefore, the equipment complies with the requirement.

FCC Part 15.203 Antenna requirement

The equipment and its antenna comply with the requirement since the antenna is built in the equipment and it cannot be replaced by end users.

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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 $k = 2$.

Kashima EMC Lab.

| Item | Frequency range | Uncertainty (+/-) |
|-------------------|-----------------|-------------------|
| Radiated emission | 30MHz - 300MHz | 5.1dB |
| | 300MHz - 1GHz | 6.3dB |
| | 1GHz - 6GHz | 4.5dB |
| | 6GHz - 18GHz | 4.8dB |
| | 18GHz - 26.5GHz | 4.9dB |

| Antenna terminal test | Uncertainty (+/-) |
|---|-------------------|
| Power Measurement above 1GHz | 0.7dB |
| Spurious emission (Conducted) below 1GHz | 1.6dB |
| Spurious emission (Conducted) 1GHz - 3GHz | 1.4dB |
| Spurious emission (Conducted) 3GHz - 18GHz | 2.8dB |
| Spurious emission (Conducted) 18GHz - 26.5GHz | 2.5dB |
| Bandwidth Measurement | 5.4% |

Radiated emission test

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

3.5 Test Location

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 Telephone number : +81 478 88 6500
 Facsimile number : +81 478 82 3373
 A2LA Accreditation No. : 1266-01

| Test room | Width*Depth*Height (m) | Test room | Width*Depth*Height (m) |
|-----------------------|---|-----------------------------|--|
| No.1 Open site | 6.0 * 5.5 * 2.5 Measurement distance: 3, 10 m | No.4 Shielded Room | 6.1 * 6.1 * 3.1 |
| No.2 Open site | 4.4 * 4.4 * 2.15 Measurement distance: 3, 10 m | No.5 Shielded Room | 4.2 * 3.1 * 2.5 |
| No.5 Open site | 8.6 * 7.1 * 2.4 Measurement distance: 3, 10 m | No.3 Fully Anechoic Chamber | 7.0 * 3.5 * 3.5 |
| No.1 Shielded room | 5.4 * 4.5 * 2.3 | No.6 Semi-anechoic Chamber | 8.5 * 5.5 * 5.2 Maximum measurement distance: 3 m |
| No.2 Shielded room | 3.6 * 2.7 * 2.3 | No.10 Semi-anechoic Chamber | 18.4 * 9.9 * 7.7 Maximum measurement distance: 10 m |
| No.3 Shielded room | 5.4 * 3.6 * 2.3 | No.11 Semi-anechoic Chamber | 9.0 * 6.5 * 5.2 Maximum measurement distance: 3 m |
| No.1 Measurement room | 5.0 * 3.7 * 2.6 | | |
| No.2 Measurement room | 4.3 * 4.4 * 2.7 | | |
| No.3 Measurement room | 4.5 * 5.3 * 2.7 | | |

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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

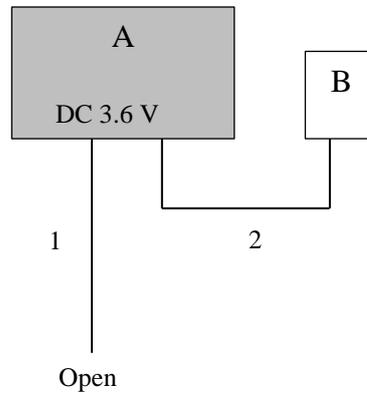
4.1 Operating Mode(s)

Bluetooth (BT): Transmitting (Tx), Payload: PRBS9
Inquiry

Details of Operating Mode(s)

| Test Item | Mode | Tested frequency |
|--|--|----------------------------------|
| Spurious Emission (Conducted/Radiated) | Tx (Hopping Off) DH5, 3DH5 | 2402 MHz 2441 MHz 2480 MHz |
| Carrier Frequency Separation | Tx (Hopping On) DH5, 3DH5 Inquiry | 2402 MHz 2441 MHz 2480 MHz |
| 20dB Bandwidth | Tx (Hopping Off) DH5, 3DH5 Inquiry | 2402 MHz 2441 MHz 2480 MHz |
| Number of Hopping Frequency | Tx (Hopping On) DH5, 3DH5 Inquiry | - |
| Dwell time | Tx (Hopping On), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5 Inquiry | - |
| Maximum Peak Output Power | Tx (Hopping Off) DH5, 2DH5, 3DH5 Inquiry | 2402 MHz 2441 MHz 2480 MHz |
| Band Edge Compliance (Conducted) | Tx DH5, 3DH5 -Hopping On -Hopping Off | 2402 MHz 2480 MHz |
| 99% Occupied Bandwidth | Tx DH5, 3DH5 -Hopping On -Hopping Off -Inquiry | 2402 MHz 2441 MHz 2480 MHz |
| <p>*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length (except Dwell time test) *2DH mode (2Mb/s EDR: pi/4DQPSK) was excluded for other tests than power measurement by using 3DH mode (3 Mb/s EDR: 8DPSK) as a representative. *EUT has the power settings by the software as follows; Power settings: DH5: Ext.=23, Int.=40 2DH5: Ext.=56, Int.=42 3DH5: Ext.=56, Int.=42 Software: CSR BlueSuite BlueTest Version 2.5.0.93 CSR BlueSuite BtCliCtrl Version 2.5.0.93 (Inquiry mode only) *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.</p> | | |

4.2 Configuration and peripherals



* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

| No. | Item | Model number | Serial number | Manufacturer | Remarks |
|-----|---|--------------|----------------------------|------------------|---------|
| A | Wireless Noise Canceling Stereo Headset | MDR-100ABN | 1000105 *1) 1000008 *2) | Sony Corporation | EUT |
| B | Digital Media Player | NW-E083 | 5184222 | Sony Corporation | - |

*1) Used for Antenna Terminal conducted test

*2) Used for Conducted Emission test and Radiated Emission test

List of cables used

| No. | Name | Length (m) | Shield | | Remarks |
|-----|-------------|------------|----------|-----------|---------|
| | | | Cable | Connector | |
| 1 | USB Cable | 0.5 | Shielded | Shielded | - |
| 2 | Audio Cable | 1.2 | Shielded | Shielded | - |

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SECTION 5: Radiated Spurious Emission

Test Procedure

EUT was placed on a polystyrene foam of nominal size, 0.5 m by 0.5 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.

The height of the measuring antenna varied between 1 m 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 1 GHz | Above 1 GHz |
| Antenna Type | Hybrid | 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 | PK |
| IF Bandwidth | BW 120 kHz | RBW: 1 MHz VBW: 3 MHz | RBW: 1 MHz VBW: 10 Hz *1) | RBW: 100 kHz VBW: 300 kHz |
| Test Distance | 3 m | 3 m (below 10 GHz), 1 m*2) (above 10 GHz) | | 3 m (below 10 GHz), 1 m*2) (above 10 GHz) |

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

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

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT 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 GHz
Test data : APPENDIX
Test result : Pass

SECTION 6: 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 |
|--|---|-----------------|--------------------|--|------------------|-------------|---------------------------------|
| 20dB Bandwidth | 2.5MHz or 3 MHz | 30 kHz | 100 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 | Sample | Max Hold | Spectrum Analyzer |
| Maximum Peak Output Power | - | - | - | Auto | Peak Average *3) | - | Power Meter (Sensor: 160MHz BW) |
| Carrier Frequency Separation | 5 MHz | 100 kHz | 300 kHz | Auto | Peak | Max Hold | Spectrum Analyzer |
| Number of Hopping Frequency | 30 MHz | 300 kHz | 1 MHz | Auto | Peak | Max Hold | Spectrum Analyzer |
| Dwell Time | Zero Span | 100 kHz, 1 MHz | 300 kHz, 3 MHz | As necessary capture the entire dwell time per hopping channel | Peak | Clear Write | Spectrum Analyzer |
| Conducted Spurious Emission *2) | 9 kHz to 150 kHz | 200 Hz | 620 Hz | Auto | Peak | Max Hold | Spectrum Analyzer |
| | 150 kHz to 30 MHz | 10 kHz | 30 kHz | | | | |
| | 30 MHz to 25 GHz | 100 kHz | 300 kHz | | | | |
| Conducted Spurious Emission Band Edge compliance | 10 MHz | 100 kHz | 300 kHz | Auto | Peak | Max Hold | Spectrum Analyzer |

*1) The measurement was performed with Max Hold since the duty cycle was not 100 %.

*2) 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 = 10 kHz)

*3) Reference data

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

Test data : APPENDIX
Test result : Pass

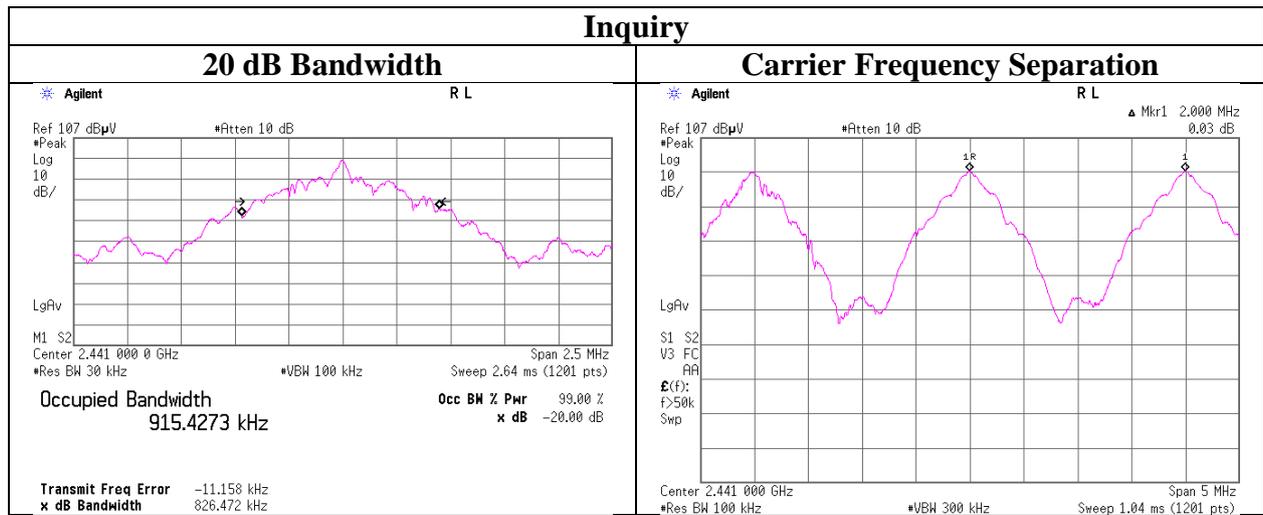
APPENDIX 1: Test data

20dB Bandwidth and Carrier Frequency Separation

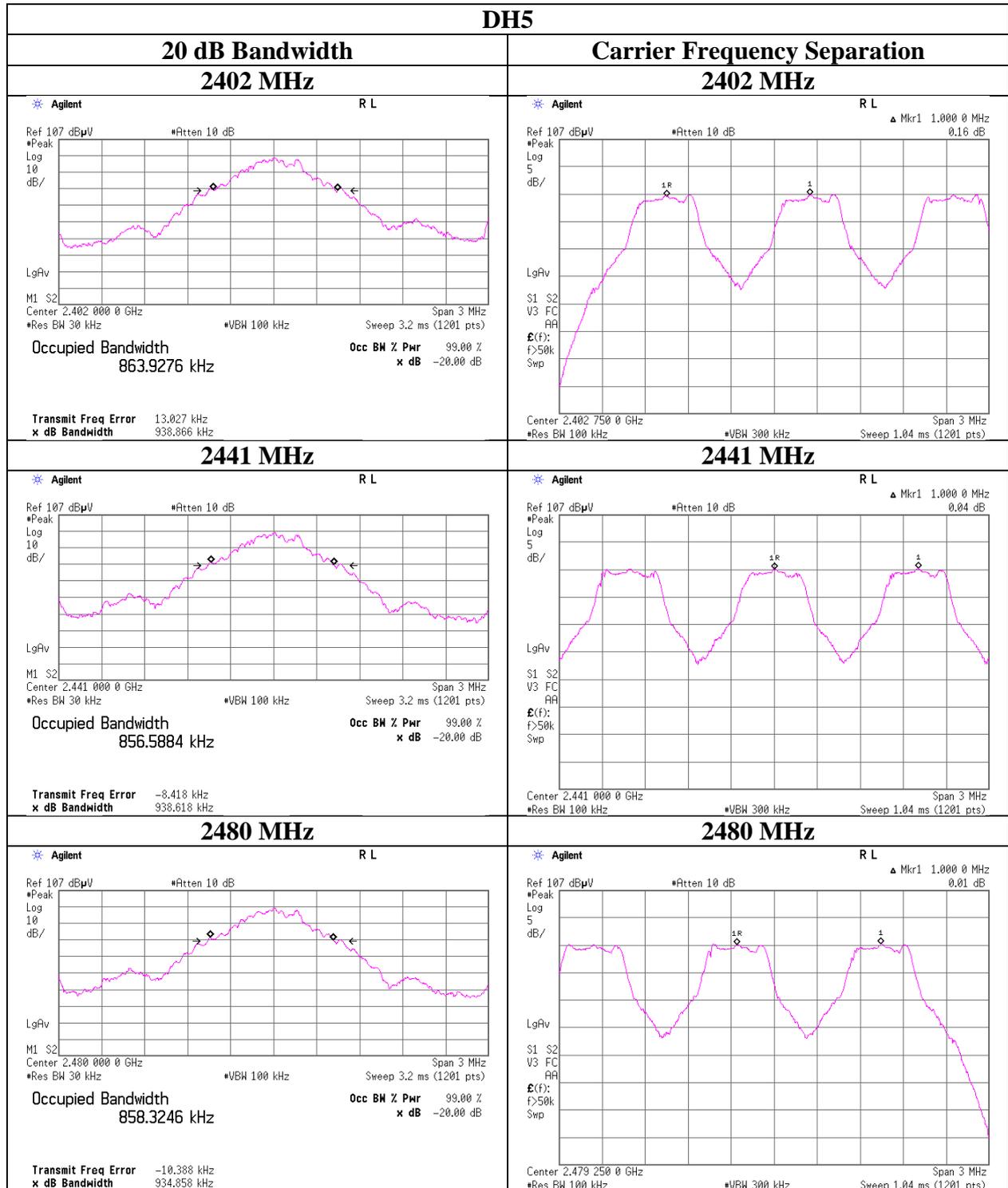
Test place : Kashima EMC Lab. No.2 Measurement Room
 Report No. : 10994201M-A-R1
 Date : October 20, 2015 October 21, 2015
 Temperature / Humidity : 22 deg. C / 44 % RH 23 deg. C / 50 % RH
 Engineer : Kazuhiro Ando
 Mode : Tx, Hopping On / Off

| Mode | Freq. [MHz] | 20dB Bandwidth [MHz] | Carrier Frequency Separation [MHz] | Limit for Carrier Frequency separation [MHz] |
|---------|----------------|-------------------------|--|--|
| DH5 | 2402.0 | 0.939 | 1.000 | >= 0.626 |
| DH5 | 2441.0 | 0.939 | 1.000 | >= 0.626 |
| DH5 | 2480.0 | 0.935 | 1.000 | >= 0.623 |
| 3DH5 | 2402.0 | 1.266 | 1.000 | >= 0.844 |
| 3DH5 | 2441.0 | 1.258 | 1.000 | >= 0.839 |
| 3DH5 | 2480.0 | 1.259 | 1.000 | >= 0.839 |
| Inquiry | 2441.0 | 0.826 | 2.000 | >= 0.551 |

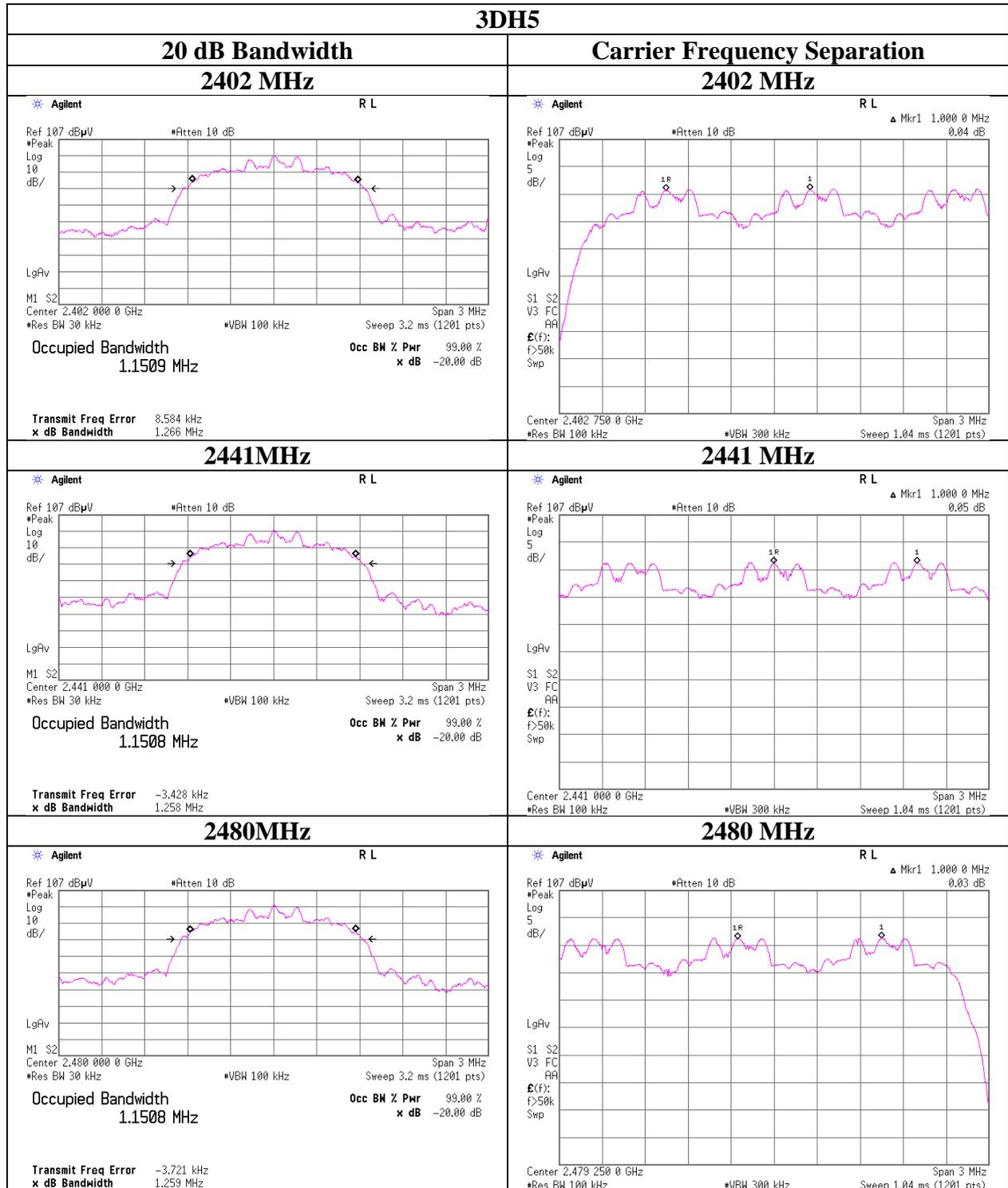
Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).
 No limit applies to 20dB Bandwidth.



20dB Bandwidth and Carrier Frequency Separation



20dB Bandwidth and Carrier Frequency Separation

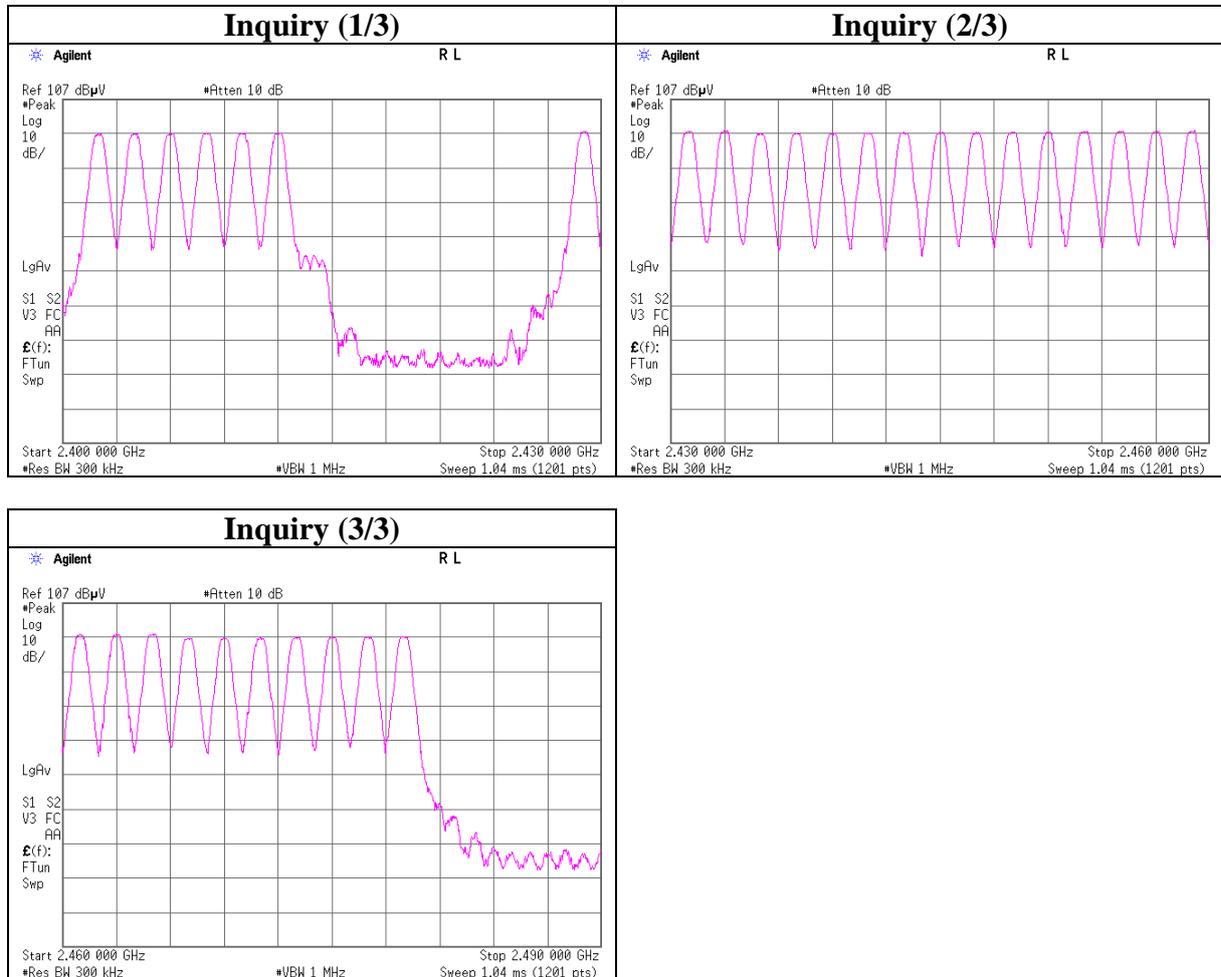


Number of Hopping Frequency

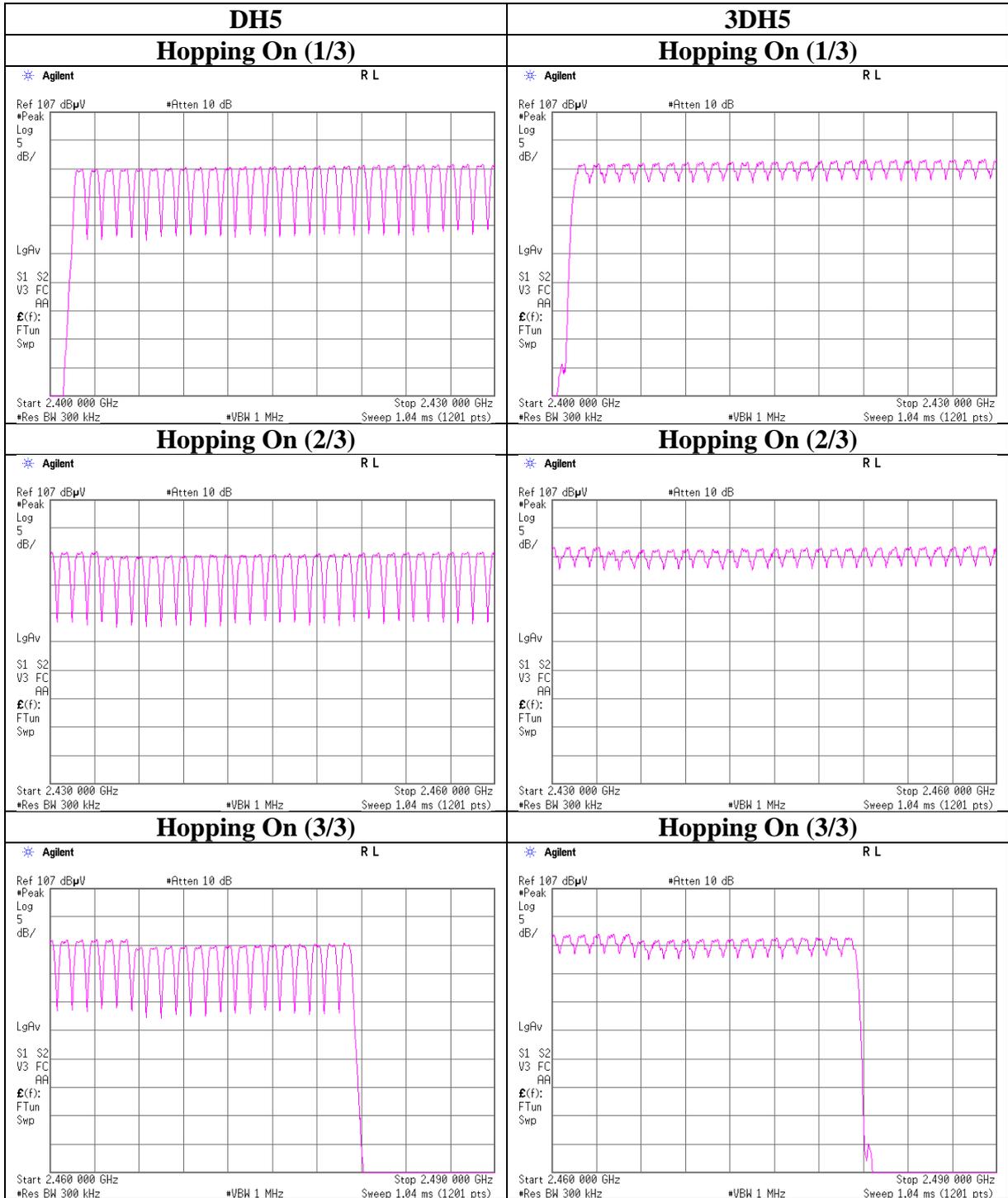
| | |
|------------------------|--|
| Test place | Kashima EMC Lab. No.2 Measurement Room |
| Report No. | 10994201M-A-R1 |
| Date | October 20, 2015 |
| Temperature / Humidity | 22 deg. C / 44 % RH |
| Engineer | Kazuhiro Ando |
| Mode | Tx, Hopping On |

| Mode | Number of channel [channels] | Limit [channels] |
|---------|---------------------------------|---------------------|
| DH5 | 79 | >= 15 |
| 3DH5 | 79 | >= 15 |
| Inquiry | 32 | >= 15 |

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



Number of Hopping Frequency



Dwell time

| | | |
|------------------------|--|---------------------|
| Test place | Kashima EMC Lab. No.2 Measurement Room | |
| Report No. | 10994201M-A-R1 | |
| Date | October 20, 2015 | October 21, 2015 |
| Temperature / Humidity | 22 deg. C / 44 % RH | 23 deg. C / 50 % RH |
| Engineer | Kazuhiro Ando | |
| Mode | Tx, Hopping On | |

| Mode | Number of transmission in a 31.6(79 Hopping x 0.4) / 12.8 (32 Hopping x 0.4) second period | Length of transmission [msec] | Result [msec] | Limit [msec] |
|---------|--|-------------------------------------|------------------|-----------------|
| DH1 | 51.0 times / 5 sec. x 31.6 sec. = 323 times | 0.417 | 135 | 400 |
| DH3 | 26.0 times / 5 sec. x 31.6 sec. = 165 times | 1.672 | 276 | 400 |
| DH5 | 17.0 times / 5 sec. x 31.6 sec. = 108 times | 2.921 | 315 | 400 |
| 3DH1 | 51.0 times / 5 sec. x 31.6 sec. = 323 times | 0.435 | 141 | 400 |
| 3DH3 | 26.0 times / 5 sec. x 31.6 sec. = 165 times | 1.686 | 278 | 400 |
| 3DH5 | 17.0 times / 5 sec. x 31.6 sec. = 108 times | 2.937 | 317 | 400 |
| Inquiry | 100.0 times / 1 sec. x 12.8 sec. = 1280 times | 0.122 | 156 | 400 |

Sample Calculation

Result = Number of transmission x Length of transmission

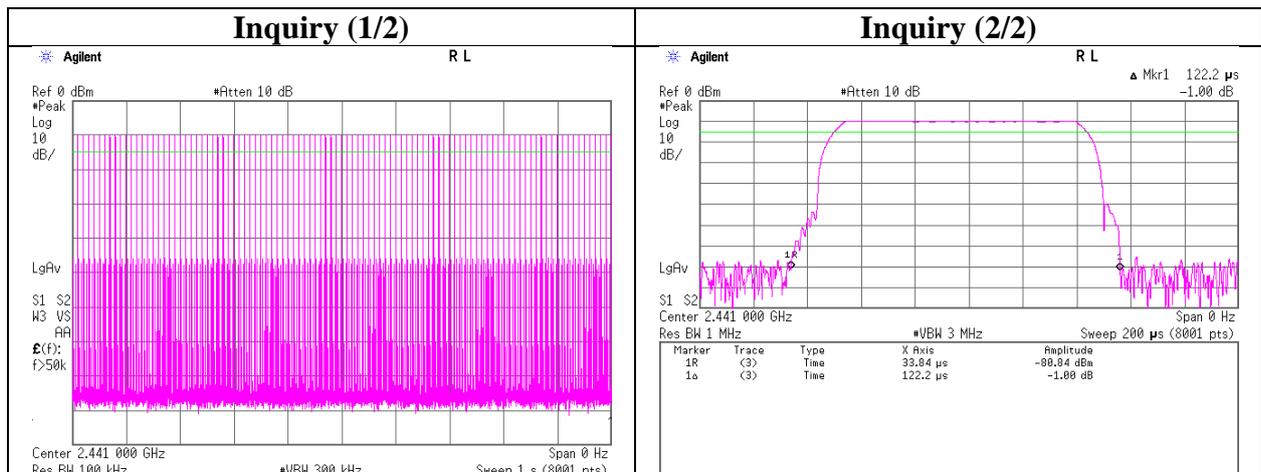
*Average data of 5 tests.(except Inquiry)

| Mode | Sampling [times] | | | | | Average [times] |
|------|------------------|----|----|----|----|--------------------|
| | 1 | 2 | 3 | 4 | 5 | |
| DH1 | 51 | 51 | 51 | 51 | 51 | 51 |
| DH3 | 26 | 26 | 26 | 26 | 26 | 26 |
| DH5 | 17 | 17 | 17 | 17 | 17 | 17 |
| 3DH1 | 51 | 51 | 51 | 51 | 51 | 51 |
| 3DH3 | 26 | 26 | 26 | 26 | 26 | 26 |
| 3DH5 | 17 | 17 | 17 | 17 | 17 | 17 |

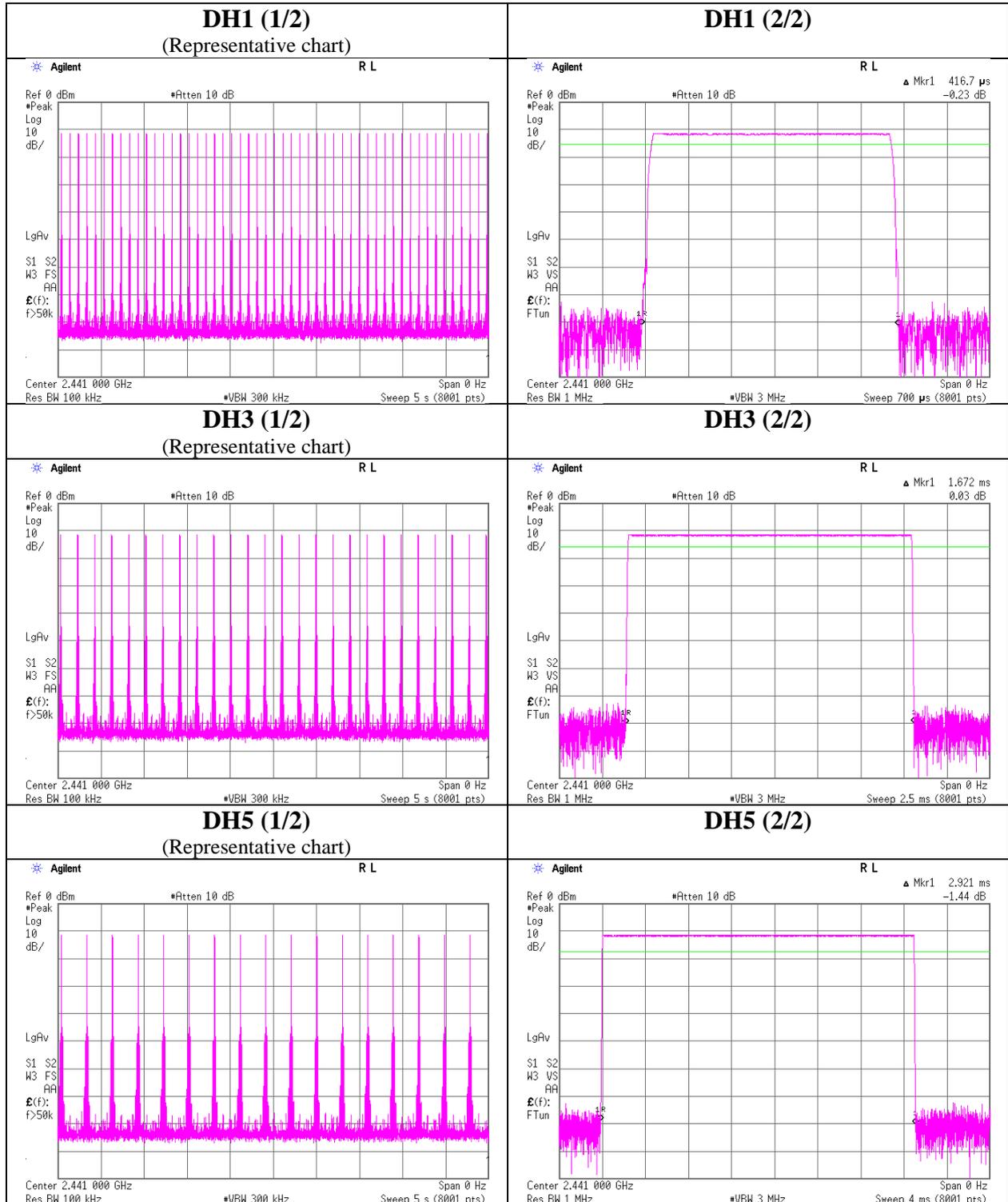
Sample Calculation

Average = Summation (Sampling 1 to 5) / 5

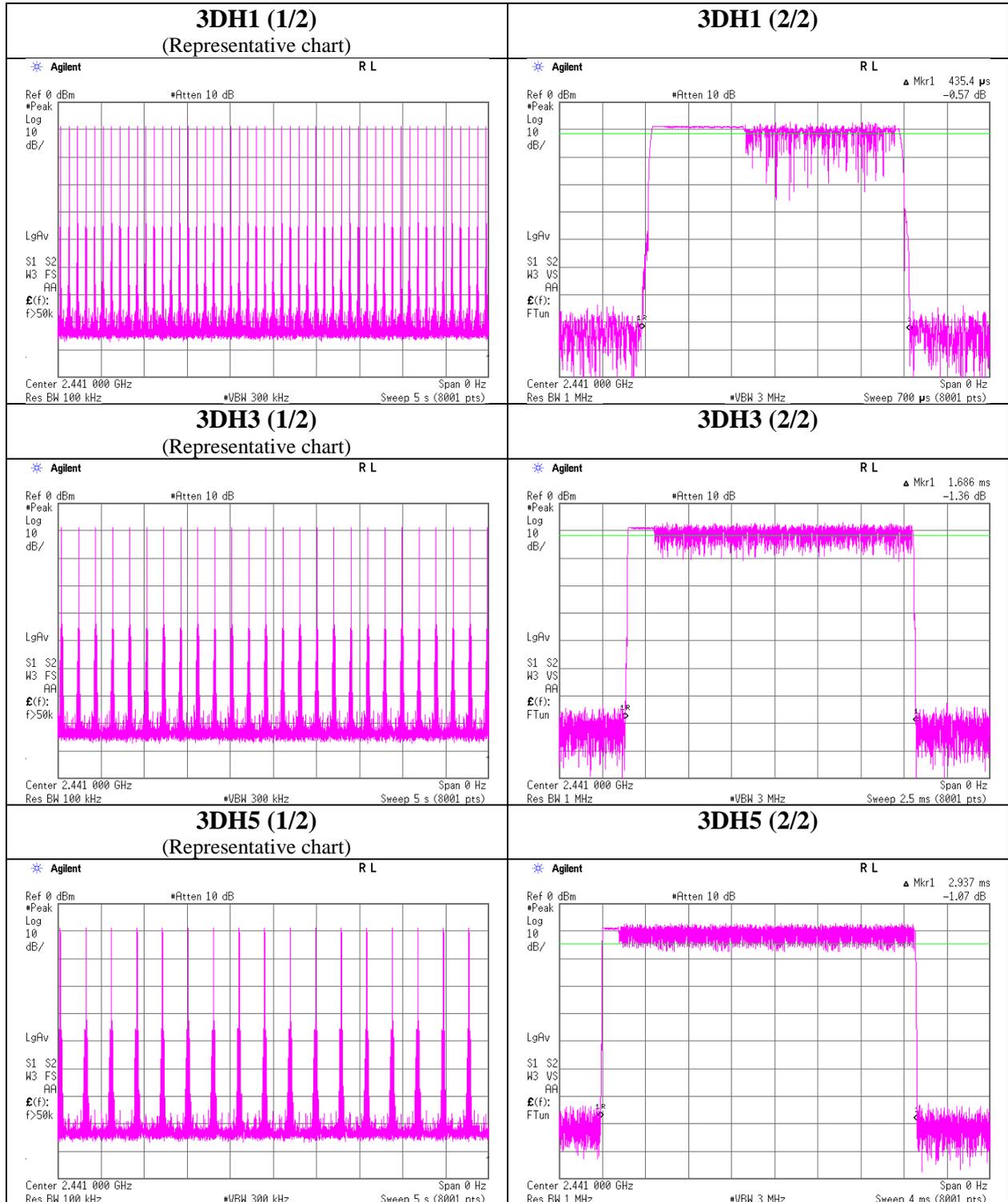
This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in $N \times 0.4s$, where N is the number of channels being used in the hopping sequence ($20 \leq N \leq 79$), is always less than 0.4s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



Dwell time



Dwell time



Maximum Peak Output Power

Test place : Kashima EMC Lab. No.2 Measurement Room
 Report No. : 10994201M-A-R1
 Date : October 20, 2015
 Temperature / Humidity : 22 deg. C / 44 % RH
 Engineer : Kazuhiro Ando
 Mode : Tx, Hopping Off

| Mode | Freq. [MHz] | Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result | | Limit | | Margin [dB] |
|---------|----------------|------------------|-----------------------|------------------------|--------|------|-------|------|----------------|
| | | | | | [dBm] | [mW] | [dBm] | [mW] | |
| DH5 | 2402.0 | -9.50 | 0.92 | 10.03 | 1.45 | 1.40 | 20.96 | 125 | 19.51 |
| DH5 | 2441.0 | -9.15 | 0.93 | 10.03 | 1.81 | 1.52 | 20.96 | 125 | 19.15 |
| DH5 | 2480.0 | -9.14 | 0.93 | 10.03 | 1.82 | 1.52 | 20.96 | 125 | 19.14 |
| 2DH5 | 2402.0 | -7.29 | 0.92 | 10.03 | 3.66 | 2.32 | 20.96 | 125 | 17.30 |
| 2DH5 | 2441.0 | -6.79 | 0.93 | 10.03 | 4.17 | 2.61 | 20.96 | 125 | 16.79 |
| 2DH5 | 2480.0 | -6.74 | 0.93 | 10.03 | 4.22 | 2.64 | 20.96 | 125 | 16.74 |
| 3DH5 | 2402.0 | -6.88 | 0.92 | 10.03 | 4.07 | 2.55 | 20.96 | 125 | 16.89 |
| 3DH5 | 2441.0 | -6.31 | 0.93 | 10.03 | 4.65 | 2.92 | 20.96 | 125 | 16.31 |
| 3DH5 | 2480.0 | -6.27 | 0.93 | 10.03 | 4.69 | 2.94 | 20.96 | 125 | 16.27 |
| Inquiry | 2441.0 | -8.72 | 0.93 | 10.03 | 2.24 | 1.67 | 20.96 | 125 | 18.72 |

Sample Calculation:

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

*The equipment and cables were not used for factor 0 dB of the data sheets.

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

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

Average Output Power
(Reference data)

Test place Kashima EMC Lab. No.2 Measurement Room
Report No. 10994201M-A-R1
Date October 20, 2015
Temperature / Humidity 22 deg. C / 44 % RH
Engineer Kazuhiro Ando
Mode Tx, Hopping Off

| Mode | Freq. [MHz] | Reading [dBm] | Cable Loss [dB] | Atten. Loss [dB] | Result (Frame power) | |
|------|----------------|------------------|-----------------------|------------------------|-------------------------|------|
| | | | | | [dBm] | [mW] |
| DH5 | 2402.0 | -11.33 | 0.92 | 10.03 | -0.38 | 0.92 |
| DH5 | 2441.0 | -10.94 | 0.93 | 10.03 | 0.02 | 1.00 |
| DH5 | 2480.0 | -10.93 | 0.93 | 10.03 | 0.03 | 1.01 |
| 2DH5 | 2402.0 | -11.55 | 0.92 | 10.03 | -0.60 | 0.87 |
| 2DH5 | 2441.0 | -11.07 | 0.93 | 10.03 | -0.11 | 0.97 |
| 2DH5 | 2480.0 | -10.96 | 0.93 | 10.03 | 0.00 | 1.00 |
| 3DH5 | 2402.0 | -11.57 | 0.92 | 10.03 | -0.62 | 0.87 |
| 3DH5 | 2441.0 | -11.08 | 0.93 | 10.03 | -0.12 | 0.97 |
| 3DH5 | 2480.0 | -10.97 | 0.93 | 10.03 | -0.01 | 1.00 |

Sample Calculation:

Result (Frame power) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

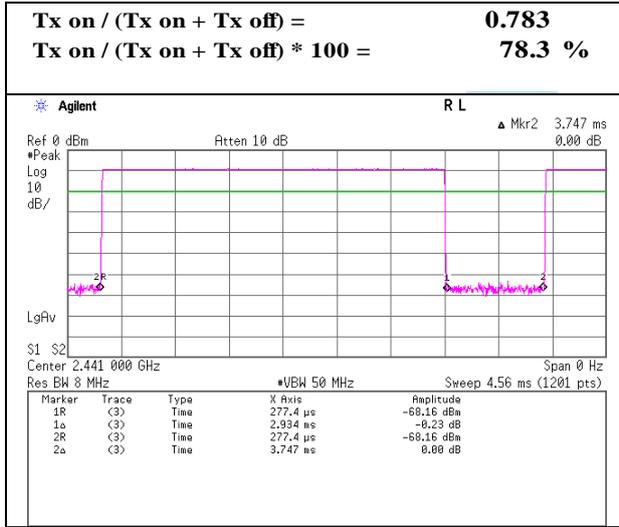
Result (Burst power) = Frame power + Duty factor

*The equipment and cables were not used for factor 0 dB of the data sheets.

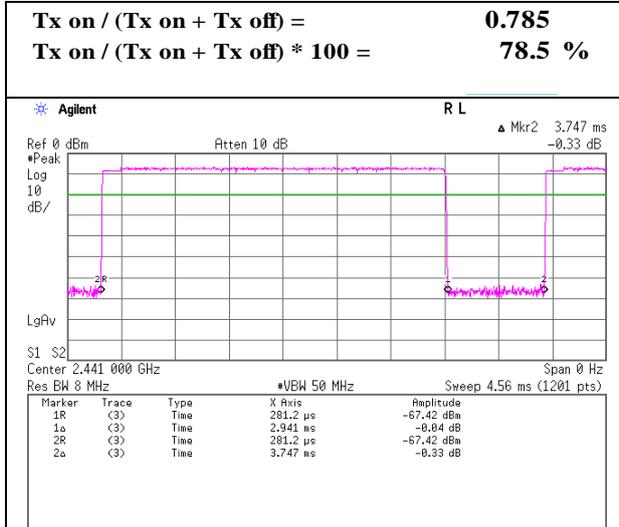
Burst Rate Confirmation

| | |
|------------------------|--|
| Test place | Kashima EMC Lab. No.2 Measurement Room |
| Report No. | 10994201M-A-R1 |
| Date | October 20, 2015 |
| Temperature / Humidity | 22 deg. C / 44 % RH |
| Engineer | Kazuhiro Ando |
| Mode | Tx, Hopping Off |

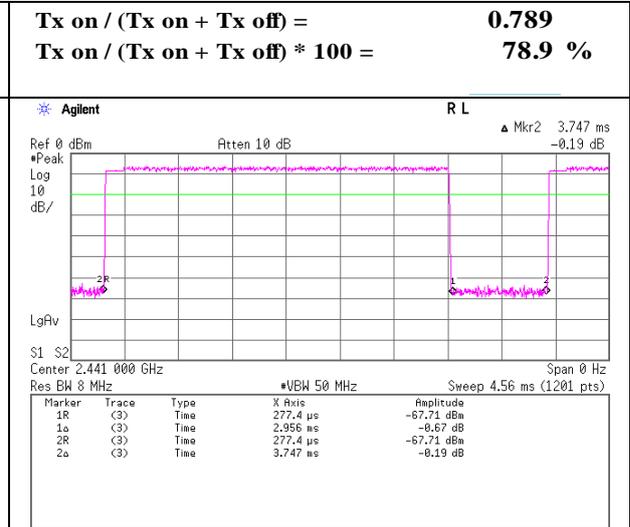
DH5



2DH5



3DH5



Radiated Spurious Emission

Test place : Kashima EMC Lab. No.10 Semi Anechoic Chamber
Report No. : 10994201M-A-R1
Date : October 28, 2015 November 1, 2015 November 3, 2015
Temperature / Humidity : 21 deg. C / 40 % RH 20 deg. C / 52 % RH 21 deg. C / 55 % RH
Engineer : Kazuhiro Ando Kazuhiro Ando Kazuhiro Ando
 (30-1000MHz) (1-10GHz) (10-26GHz)
Mode : Tx, Hopping Off, DH5, 2402 MHz, Y-axis

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|-------------|-------------|
| Hori. | 184.000 | QP | 21.2 | 11.6 | 6.2 | 26.3 | 12.7 | 43.5 | 30.8 | 145 | 275 | |
| Hori. | 272.000 | QP | 22.2 | 12.5 | 7.1 | 26.0 | 15.8 | 46.0 | 30.2 | 100 | 135 | |
| Hori. | 456.000 | QP | 22.7 | 16.8 | 8.8 | 27.2 | 21.1 | 46.0 | 24.9 | 100 | 145 | |
| Hori. | 2390.000 | PK | 43.6 | 27.6 | 14.0 | 38.3 | 46.9 | 73.9 | 27.0 | 122 | 263 | |
| Hori. | 4804.000 | PK | 50.0 | 31.3 | 6.1 | 39.3 | 48.1 | 73.9 | 25.8 | 111 | 75 | |
| Hori. | 7206.000 | PK | 43.0 | 36.3 | 7.5 | 38.4 | 48.4 | 73.9 | 25.5 | 100 | 0 | Floor Noise |
| Hori. | 2390.000 | AV | 31.4 | 27.6 | 14.0 | 38.3 | 34.7 | 53.9 | 19.2 | 122 | 263 | |
| Hori. | 4804.000 | AV | 41.8 | 31.3 | 6.1 | 39.3 | 39.9 | 53.9 | 14.0 | 111 | 75 | |
| Hori. | 7206.000 | AV | 30.5 | 36.3 | 7.5 | 38.4 | 35.9 | 53.9 | 18.0 | 100 | 0 | Floor Noise |
| Vert. | 2390.000 | PK | 43.2 | 27.6 | 14.0 | 38.3 | 46.5 | 73.9 | 27.4 | 105 | 204 | |
| Vert. | 2558.008 | PK | 47.4 | 27.6 | 14.2 | 38.4 | 50.8 | 73.9 | 23.1 | 100 | 202 | |
| Vert. | 4804.000 | PK | 51.1 | 31.3 | 6.1 | 39.3 | 49.2 | 73.9 | 24.7 | 105 | 145 | |
| Vert. | 7206.000 | PK | 42.7 | 36.3 | 7.5 | 38.4 | 48.1 | 73.9 | 25.8 | 100 | 0 | Floor Noise |
| Vert. | 2390.000 | AV | 31.4 | 27.6 | 14.0 | 38.3 | 34.7 | 53.9 | 19.2 | 105 | 204 | |
| Vert. | 2558.008 | AV | 38.2 | 27.6 | 14.2 | 38.4 | 41.6 | 53.9 | 12.3 | 100 | 202 | |
| Vert. | 4804.000 | AV | 44.4 | 31.3 | 6.1 | 39.3 | 42.5 | 53.9 | 11.4 | 105 | 145 | |
| Vert. | 7206.000 | AV | 30.5 | 36.3 | 7.5 | 38.4 | 35.9 | 53.9 | 18.0 | 100 | 0 | Floor Noise |

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 10GHz) - Gain(Amplifier)

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

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

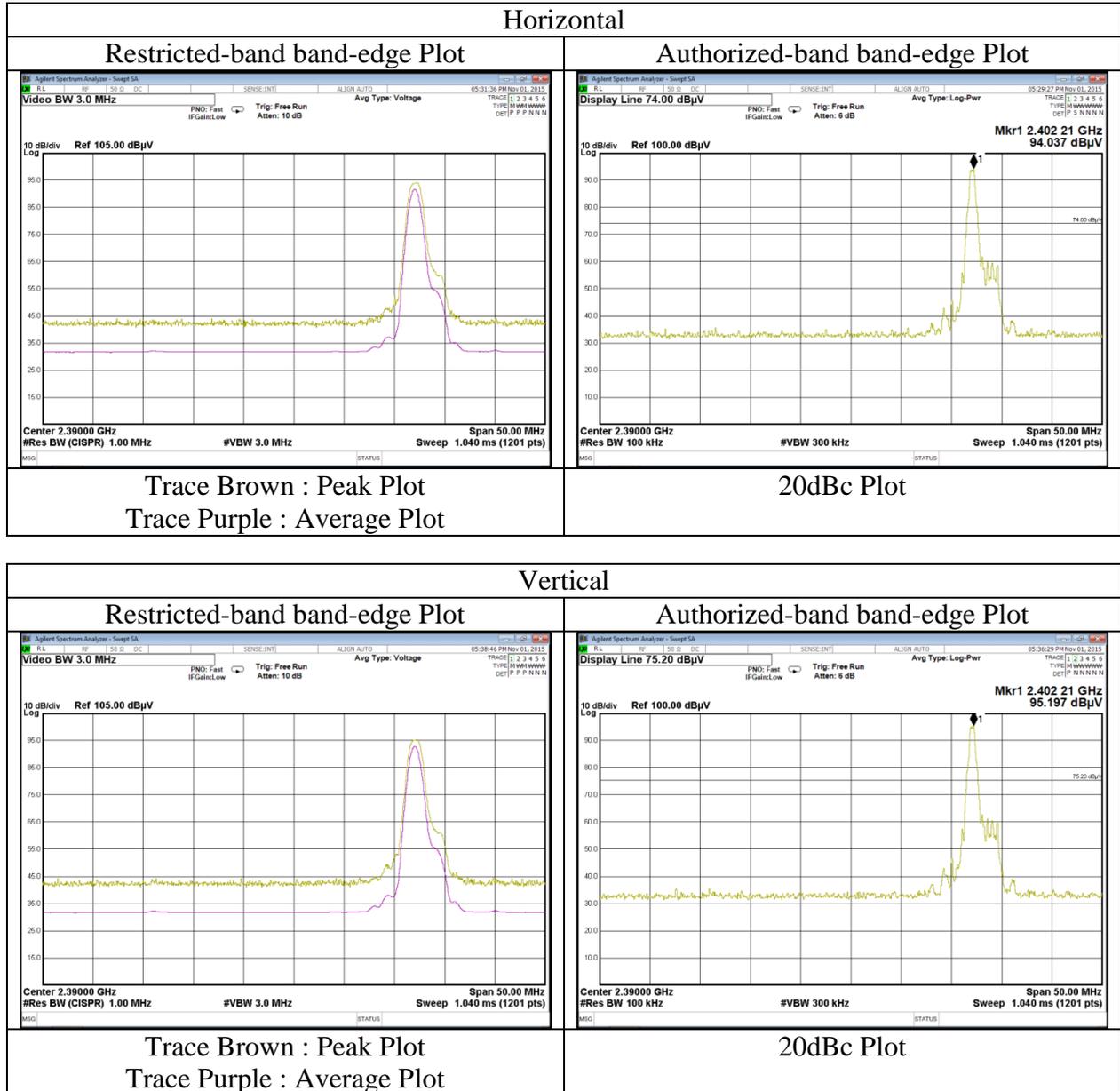
| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|---------|
| Hori. | 2402.000 | PK | 94.0 | 27.6 | 14.0 | 38.3 | 97.3 | - | - | Carrier |
| Hori. | 2400.000 | PK | 45.6 | 27.6 | 14.0 | 38.3 | 48.9 | 77.3 | 28.4 | |
| Vert. | 2402.000 | PK | 95.2 | 27.6 | 14.0 | 38.3 | 98.5 | - | - | Carrier |
| Vert. | 2400.000 | PK | 47.2 | 27.6 | 14.0 | 38.3 | 50.5 | 78.5 | 28.0 | |

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 10GHz) - Gain(Amplifier)

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

Radiated Spurious Emission (Reference Plot for band-edge)

| | |
|------------------------|--|
| Test place | Kashima EMC Lab. No.10 Semi Anechoic Chamber |
| Report No. | 10994201M-A-R1 |
| Date | November 1, 2015 |
| Temperature / Humidity | 20 deg. C / 52 % RH |
| Engineer | Kazuhiro Ando |
| | (1-10GHz) |
| Mode | Tx, Hopping Off, DH5, 2402 MHz, Y-axis |



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

Radiated Spurious Emission

| | | | |
|------------------------|--|---------------------|---------------------|
| Test place | Kashima EMC Lab. No.10 Semi Anechoic Chamber | | |
| Report No. | 10994201M-A-R1 | | |
| Date | October 28, 2015 | November 1, 2015 | November 3, 2015 |
| Temperature / Humidity | 21 deg. C / 40 % RH | 20 deg. C / 52 % RH | 21 deg. C / 55 % RH |
| Engineer | Kazuhiro Ando | Kazuhiro Ando | Kazuhiro Ando |
| | (30-1000MHz) | (1-10GHz) | (10-26GHz) |
| Mode | Tx, Hopping Off, DH5, 2441 MHz, Y-axis | | |

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|-------------|-------------|
| Hori. | 184.000 | QP | 21.8 | 11.6 | 6.2 | 26.3 | 13.3 | 43.5 | 30.2 | 140 | 280 | |
| Hori. | 272.000 | QP | 22.1 | 12.5 | 7.1 | 26.0 | 15.7 | 46.0 | 30.3 | 100 | 140 | |
| Hori. | 456.000 | QP | 23.2 | 16.8 | 8.8 | 27.2 | 21.6 | 46.0 | 24.4 | 100 | 140 | |
| Hori. | 4882.000 | PK | 48.9 | 31.2 | 6.2 | 39.3 | 47.0 | 73.9 | 26.9 | 110 | 73 | |
| Hori. | 7323.000 | PK | 42.3 | 36.5 | 7.8 | 38.4 | 48.2 | 73.9 | 25.7 | 100 | 0 | Floor Noise |
| Hori. | 4882.000 | AV | 41.0 | 31.2 | 6.2 | 39.3 | 39.1 | 53.9 | 14.8 | 110 | 73 | |
| Hori. | 7323.000 | AV | 30.3 | 36.5 | 7.8 | 38.4 | 36.2 | 53.9 | 17.7 | 100 | 0 | Floor Noise |
| Vert. | 2597.020 | PK | 46.2 | 27.6 | 14.2 | 38.4 | 49.6 | 73.9 | 24.3 | 100 | 210 | |
| Vert. | 4882.000 | PK | 51.0 | 31.2 | 6.2 | 39.3 | 49.1 | 73.9 | 24.8 | 104 | 140 | |
| Vert. | 7323.000 | PK | 42.3 | 36.5 | 7.8 | 38.4 | 48.2 | 73.9 | 25.7 | 100 | 0 | Floor Noise |
| Vert. | 2597.020 | AV | 37.0 | 27.6 | 14.2 | 38.4 | 40.4 | 53.9 | 13.5 | 100 | 210 | |
| Vert. | 4882.000 | AV | 43.6 | 31.2 | 6.2 | 39.3 | 41.7 | 53.9 | 12.2 | 104 | 140 | |
| Vert. | 7323.000 | AV | 30.3 | 36.5 | 7.8 | 38.4 | 36.2 | 53.9 | 17.7 | 100 | 0 | Floor Noise |

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 10GHz)) - Gain(Amplifier)

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

Radiated Spurious Emission

| | | | |
|------------------------|--|---------------------|---------------------|
| Test place | Kashima EMC Lab. No.10 Semi Anechoic Chamber | | |
| Report No. | 10994201M-A-R1 | | |
| Date | October 28, 2015 | November 1, 2015 | November 3, 2015 |
| Temperature / Humidity | 21 deg. C / 40 % RH | 20 deg. C / 52 % RH | 21 deg. C / 55 % RH |
| Engineer | Kazuhiro Ando | Kazuhiro Ando | Kazuhiro Ando |
| | (30-1000MHz) | (1-10GHz) | (10-26GHz) |
| Mode | Tx, Hopping Off, DH5, 2480 MHz, Y-axis | | |

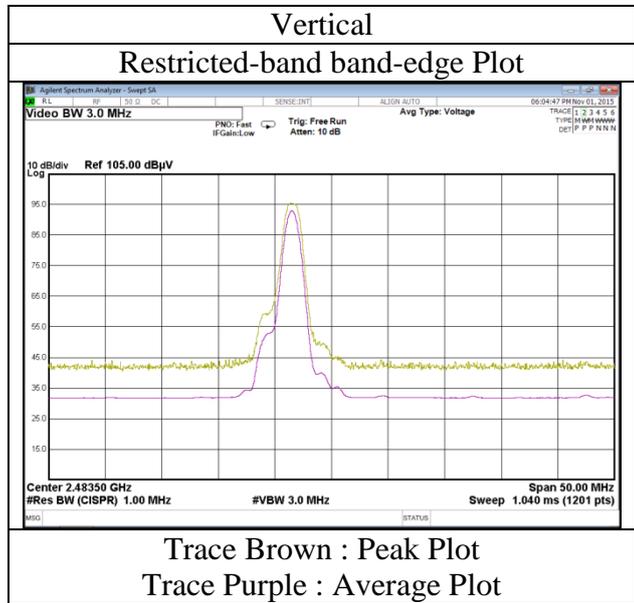
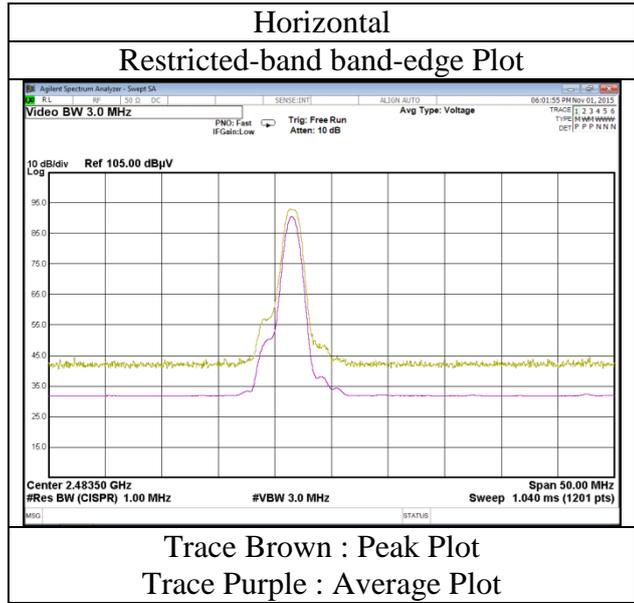
(* PK: Peak, AV: Average, QP: Quasi-Peak)

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|-------------|-------------|
| Hori. | 184.000 | QP | 21.0 | 11.6 | 6.2 | 26.3 | 12.5 | 43.5 | 31.0 | 140 | 260 | |
| Hori. | 272.000 | QP | 22.3 | 12.5 | 7.1 | 26.0 | 15.9 | 46.0 | 30.1 | 100 | 150 | |
| Hori. | 456.000 | QP | 22.8 | 16.8 | 8.8 | 27.2 | 21.2 | 46.0 | 24.8 | 100 | 155 | |
| Hori. | 2483.500 | PK | 45.1 | 27.5 | 14.1 | 38.4 | 48.3 | 73.9 | 25.6 | 119 | 262 | |
| Hori. | 4960.000 | PK | 48.3 | 31.4 | 6.2 | 39.3 | 46.6 | 73.9 | 27.3 | 112 | 168 | |
| Hori. | 7440.000 | PK | 42.8 | 36.7 | 7.7 | 38.3 | 48.9 | 73.9 | 25.0 | 100 | 0 | Floor Noise |
| Hori. | 2483.500 | AV | 33.8 | 27.5 | 14.1 | 38.4 | 37.0 | 53.9 | 16.9 | 119 | 262 | |
| Hori. | 4960.000 | AV | 39.3 | 31.4 | 6.2 | 39.3 | 37.6 | 53.9 | 16.3 | 112 | 168 | |
| Hori. | 7440.000 | AV | 30.5 | 36.7 | 7.7 | 38.3 | 36.6 | 53.9 | 17.3 | 100 | 0 | Floor Noise |
| Vert. | 2483.500 | PK | 45.0 | 27.5 | 14.1 | 38.4 | 48.2 | 73.9 | 25.7 | 100 | 210 | |
| Vert. | 2635.983 | PK | 45.2 | 27.6 | 14.2 | 38.4 | 48.6 | 73.9 | 25.3 | 100 | 210 | |
| Vert. | 4960.000 | PK | 49.8 | 31.4 | 6.2 | 39.3 | 48.1 | 73.9 | 25.8 | 100 | 138 | |
| Vert. | 7440.000 | PK | 43.6 | 36.7 | 7.7 | 38.3 | 49.7 | 73.9 | 24.2 | 100 | 0 | Floor Noise |
| Vert. | 2483.500 | AV | 34.6 | 27.5 | 14.1 | 38.4 | 37.8 | 53.9 | 16.1 | 100 | 210 | |
| Vert. | 2635.983 | AV | 35.3 | 27.6 | 14.2 | 38.4 | 38.7 | 53.9 | 15.2 | 100 | 210 | |
| Vert. | 4960.000 | AV | 41.8 | 31.4 | 6.2 | 39.3 | 40.1 | 53.9 | 13.8 | 100 | 138 | |
| Vert. | 7440.000 | AV | 30.5 | 36.7 | 7.7 | 38.3 | 36.6 | 53.9 | 17.3 | 100 | 0 | Floor Noise |

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 10GHz) - Gain(Amplifier)
 Distance factor : 10GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

Radiated Spurious Emission
(Reference Plot for band-edge)

| | |
|------------------------|--|
| Test place | Kashima EMC Lab. No.10 Semi Anechoic Chamber |
| Report No. | 10994201M-A-R1 |
| Date | November 1, 2015 |
| Temperature / Humidity | 20 deg. C / 52 % RH |
| Engineer | Kazuhiro Ando (1-10GHz) |
| Mode | Tx, Hopping Off, DH5, 2480 MHz, Y-axis |



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

Radiated Spurious Emission

Test place : Kashima EMC Lab. No.10 Semi Anechoic Chamber
Report No. : 10994201M-A-R1
Date : October 28, 2015 November 1, 2015 November 3, 2015
Temperature / Humidity : 21 deg. C / 40 % RH 20 deg. C / 52 % RH 21 deg. C / 55 % RH
Engineer : Kazuhiro Ando Kazuhiro Ando Kazuhiro Ando
(30-1000MHz) (1-10GHz) (10-26GHz)
Mode : Tx, Hopping Off, 3DH5, 2402 MHz, Y-axis

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|-------------|-------------|
| Hori. | 184.000 | QP | 21.3 | 11.6 | 6.2 | 26.3 | 12.8 | 43.5 | 30.7 | 145 | 280 | |
| Hori. | 272.000 | QP | 22.2 | 12.5 | 7.1 | 26.0 | 15.8 | 46.0 | 30.2 | 100 | 135 | |
| Hori. | 456.000 | QP | 22.4 | 16.8 | 8.8 | 27.2 | 20.8 | 46.0 | 25.2 | 100 | 135 | |
| Hori. | 2390.000 | PK | 43.8 | 27.6 | 14.0 | 38.3 | 47.1 | 73.9 | 26.8 | 126 | 266 | |
| Hori. | 4804.000 | PK | 48.7 | 31.3 | 6.1 | 39.3 | 46.8 | 73.9 | 27.1 | 100 | 70 | |
| Hori. | 7206.000 | PK | 42.7 | 36.3 | 7.5 | 38.4 | 48.1 | 73.9 | 25.8 | 100 | 0 | Floor Noise |
| Hori. | 2390.000 | AV | 31.3 | 27.6 | 14.0 | 38.3 | 34.6 | 53.9 | 19.3 | 126 | 266 | |
| Hori. | 4804.000 | AV | 37.2 | 31.3 | 6.1 | 39.3 | 35.3 | 53.9 | 18.6 | 100 | 70 | |
| Hori. | 7206.000 | AV | 30.5 | 36.3 | 7.5 | 38.4 | 35.9 | 53.9 | 18.0 | 100 | 0 | Floor Noise |
| Vert. | 2390.000 | PK | 43.3 | 27.6 | 14.0 | 38.3 | 46.6 | 73.9 | 27.3 | 107 | 209 | |
| Vert. | 2558.008 | PK | 47.4 | 27.6 | 14.2 | 38.4 | 50.8 | 73.9 | 23.1 | 100 | 202 | |
| Vert. | 4804.000 | PK | 47.6 | 31.3 | 6.1 | 39.3 | 45.7 | 73.9 | 28.2 | 100 | 130 | |
| Vert. | 7206.000 | PK | 42.6 | 36.3 | 7.5 | 38.4 | 48.0 | 73.9 | 25.9 | 100 | 0 | Floor Noise |
| Vert. | 2390.000 | AV | 31.4 | 27.6 | 14.0 | 38.3 | 34.7 | 53.9 | 19.2 | 107 | 209 | |
| Vert. | 2558.008 | AV | 38.2 | 27.6 | 14.2 | 38.4 | 41.6 | 53.9 | 12.3 | 100 | 202 | |
| Vert. | 4804.000 | AV | 39.7 | 31.3 | 6.1 | 39.3 | 37.8 | 53.9 | 16.1 | 100 | 130 | |
| Vert. | 7206.000 | AV | 30.5 | 36.3 | 7.5 | 38.4 | 35.9 | 53.9 | 18.0 | 100 | 0 | Floor Noise |

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 10GHz) - Gain(Amplifier)

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

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

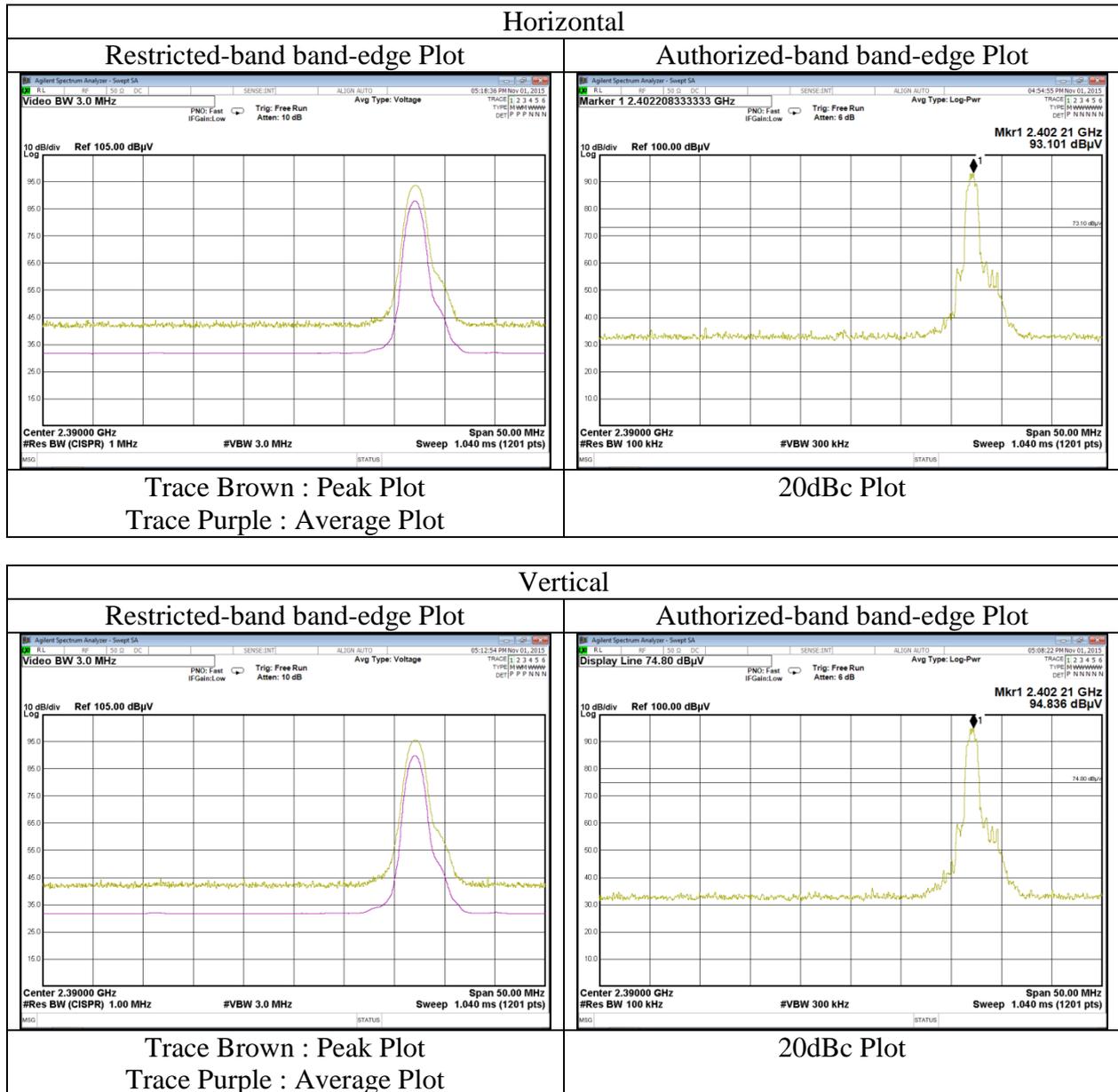
| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|---------|
| Hori. | 2402.000 | PK | 93.1 | 27.6 | 14.0 | 38.3 | 96.4 | - | - | Carrier |
| Hori. | 2400.000 | PK | 44.6 | 27.6 | 14.0 | 38.3 | 47.9 | 76.4 | 28.5 | |
| Vert. | 2402.000 | PK | 94.8 | 27.6 | 14.0 | 38.3 | 98.1 | - | - | Carrier |
| Vert. | 2400.000 | PK | 46.5 | 27.6 | 14.0 | 38.3 | 49.8 | 78.1 | 28.3 | |

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 10GHz) - Gain(Amplifier)

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

Radiated Spurious Emission (Reference Plot for band-edge)

| | |
|------------------------|--|
| Test place | Kashima EMC Lab. No.10 Semi Anechoic Chamber |
| Report No. | 10994201M-A-R1 |
| Date | November 1, 2015 |
| Temperature / Humidity | 20 deg. C / 52 % RH |
| Engineer | Kazuhiro Ando |
| | (1-10GHz) |
| Mode | Tx, Hopping Off, 3DH5, 2402 MHz, Y-axis |



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

Radiated Spurious Emission

| | | | |
|------------------------|--|---------------------|---------------------|
| Test place | Kashima EMC Lab. No.10 Semi Anechoic Chamber | | |
| Report No. | 10994201M-A-R1 | | |
| Date | October 28, 2015 | November 1, 2015 | November 3, 2015 |
| Temperature / Humidity | 21 deg. C / 40 % RH | 20 deg. C / 52 % RH | 21 deg. C / 55 % RH |
| Engineer | Kazuhiro Ando | Kazuhiro Ando | Kazuhiro Ando |
| | (30-1000MHz) | (1-10GHz) | (10-26GHz) |
| Mode | Tx, Hopping Off, 3DH5, 2441 MHz, Y-axis | | |

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

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|-------------|-------------|
| Hori. | 184.000 | QP | 21.2 | 11.6 | 6.2 | 26.3 | 12.7 | 43.5 | 30.8 | 140 | 280 | |
| Hori. | 272.000 | QP | 22.1 | 12.5 | 7.1 | 26.0 | 15.7 | 46.0 | 30.3 | 100 | 145 | |
| Hori. | 456.000 | QP | 22.3 | 16.8 | 8.8 | 27.2 | 20.7 | 46.0 | 25.3 | 100 | 150 | |
| Hori. | 4882.000 | PK | 48.7 | 31.2 | 6.2 | 39.3 | 46.8 | 73.9 | 27.1 | 112 | 75 | |
| Hori. | 7323.000 | PK | 42.4 | 36.5 | 7.8 | 38.4 | 48.3 | 73.9 | 25.6 | 100 | 0 | Floor Noise |
| Hori. | 4882.000 | AV | 38.1 | 31.2 | 6.2 | 39.3 | 36.2 | 53.9 | 17.7 | 112 | 75 | |
| Hori. | 7323.000 | AV | 30.3 | 36.5 | 7.8 | 38.4 | 36.2 | 53.9 | 17.7 | 100 | 0 | Floor Noise |
| Vert. | 2597.025 | PK | 45.3 | 27.6 | 14.2 | 38.4 | 48.7 | 73.9 | 25.2 | 100 | 353 | |
| Vert. | 4882.000 | PK | 50.1 | 31.2 | 6.2 | 39.3 | 48.2 | 73.9 | 25.7 | 105 | 139 | |
| Vert. | 7323.000 | PK | 41.9 | 36.5 | 7.8 | 38.4 | 47.8 | 73.9 | 26.1 | 100 | 0 | Floor Noise |
| Vert. | 2597.025 | AV | 34.5 | 27.6 | 14.2 | 38.4 | 37.9 | 53.9 | 16.0 | 100 | 353 | |
| Vert. | 4882.000 | AV | 40.4 | 31.2 | 6.2 | 39.3 | 38.5 | 53.9 | 15.4 | 105 | 139 | |
| Vert. | 7323.000 | AV | 30.3 | 36.5 | 7.8 | 38.4 | 36.2 | 53.9 | 17.7 | 100 | 0 | Floor Noise |

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 10GHz)) - Gain(Amplifier)

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

Radiated Spurious Emission

| | | | |
|------------------------|--|---------------------|---------------------|
| Test place | Kashima EMC Lab. No.10 Semi Anechoic Chamber | | |
| Report No. | 10994201M-A-R1 | | |
| Date | October 28, 2015 | November 1, 2015 | November 3, 2015 |
| Temperature / Humidity | 21 deg. C / 40 % RH | 20 deg. C / 52 % RH | 21 deg. C / 55 % RH |
| Engineer | Kazuhiro Ando | Kazuhiro Ando | Kazuhiro Ando |
| | (30-1000MHz) | (1-10GHz) | (10-26GHz) |
| Mode | Tx, Hopping Off, 3DH5, 2480 MHz, Y-axis | | |

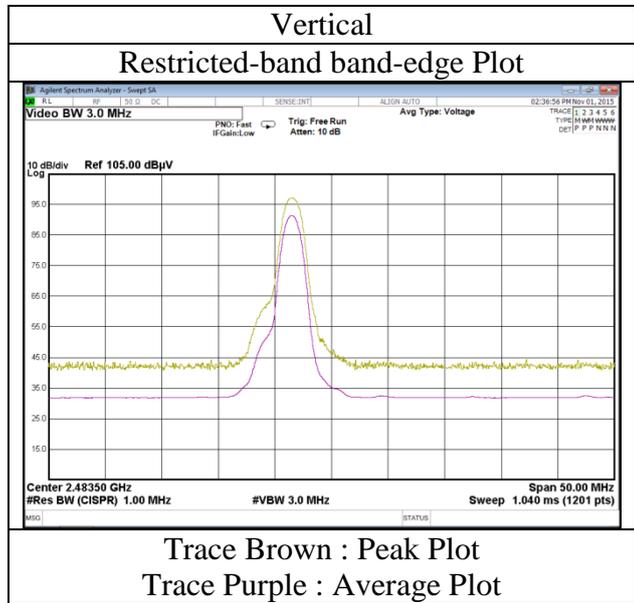
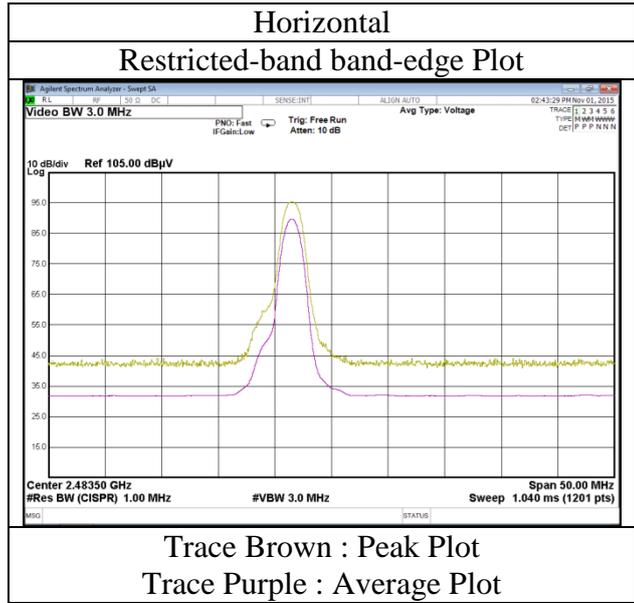
(* PK: Peak, AV: Average, QP: Quasi-Peak)

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg] | Remark |
|----------|-----------------|----------|----------------|-----------------|-----------|-----------|-----------------|----------------|-------------|-------------|-------------|-------------|
| Hori. | 184.000 | QP | 21.1 | 11.6 | 6.2 | 26.3 | 12.6 | 43.5 | 30.9 | 150 | 275 | |
| Hori. | 272.000 | QP | 21.9 | 12.5 | 7.1 | 26.0 | 15.5 | 46.0 | 30.5 | 100 | 140 | |
| Hori. | 456.000 | QP | 22.8 | 16.8 | 8.8 | 27.2 | 21.2 | 46.0 | 24.8 | 100 | 145 | |
| Hori. | 2483.500 | PK | 46.2 | 27.5 | 14.1 | 38.4 | 49.4 | 73.9 | 24.5 | 122 | 263 | |
| Hori. | 4960.000 | PK | 48.1 | 31.4 | 6.2 | 39.3 | 46.4 | 73.9 | 27.5 | 100 | 164 | |
| Hori. | 7440.000 | PK | 42.9 | 36.7 | 7.7 | 38.3 | 49.0 | 73.9 | 24.9 | 100 | 0 | Floor Noise |
| Hori. | 2483.500 | AV | 34.0 | 27.5 | 14.1 | 38.4 | 37.2 | 53.9 | 16.7 | 122 | 263 | |
| Hori. | 4960.000 | AV | 36.8 | 31.4 | 6.2 | 39.3 | 35.1 | 53.9 | 18.8 | 100 | 164 | |
| Hori. | 7440.000 | AV | 30.6 | 36.7 | 7.7 | 38.3 | 36.7 | 53.9 | 17.2 | 100 | 0 | Floor Noise |
| Vert. | 2483.500 | PK | 48.3 | 27.5 | 14.1 | 38.4 | 51.5 | 73.9 | 22.4 | 100 | 210 | |
| Vert. | 2636.005 | PK | 45.8 | 27.6 | 14.2 | 38.4 | 49.2 | 73.9 | 24.7 | 100 | 139 | |
| Vert. | 4960.000 | PK | 49.5 | 31.4 | 6.2 | 39.3 | 47.8 | 73.9 | 26.1 | 100 | 141 | |
| Vert. | 7440.000 | PK | 43.0 | 36.7 | 7.7 | 38.3 | 49.1 | 73.9 | 24.8 | 100 | 0 | Floor Noise |
| Vert. | 2483.500 | AV | 34.9 | 27.5 | 14.1 | 38.4 | 38.1 | 53.9 | 15.8 | 100 | 210 | |
| Vert. | 2636.005 | AV | 35.0 | 27.6 | 14.2 | 38.4 | 38.4 | 53.9 | 15.5 | 100 | 139 | |
| Vert. | 4960.000 | AV | 39.7 | 31.4 | 6.2 | 39.3 | 38.0 | 53.9 | 15.9 | 100 | 141 | |
| Vert. | 7440.000 | AV | 30.6 | 36.7 | 7.7 | 38.3 | 36.7 | 53.9 | 17.2 | 100 | 0 | Floor Noise |

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 10GHz) - Gain(Amplifier)
 Distance factor : 10GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

Radiated Spurious Emission
(Reference Plot for band-edge)

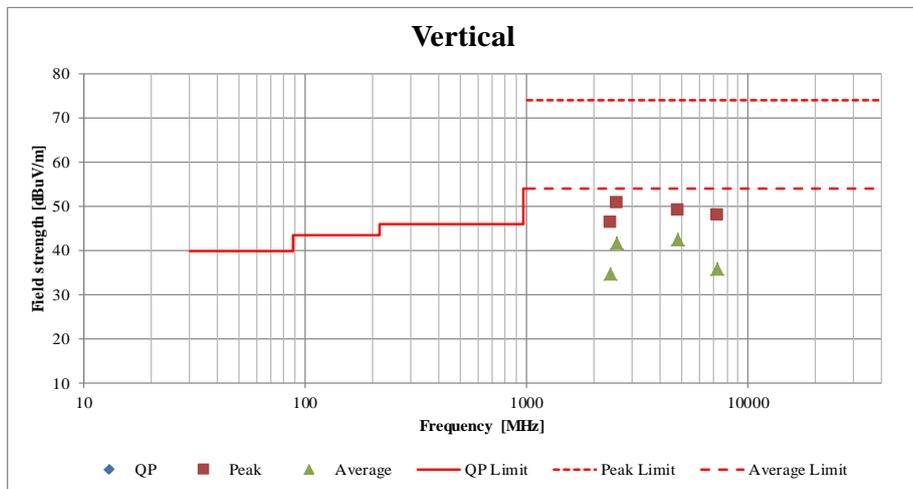
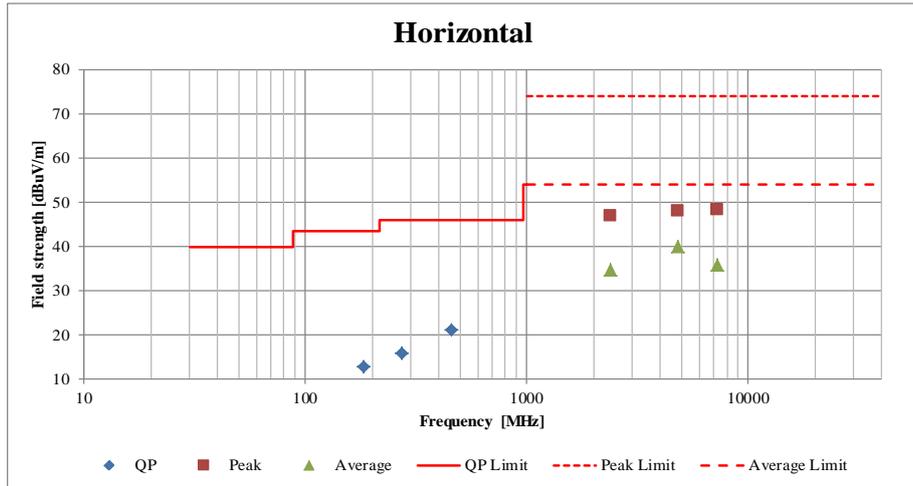
| | |
|------------------------|--|
| Test place | Kashima EMC Lab. No.10 Semi Anechoic Chamber |
| Report No. | 10994201M-A-R1 |
| Date | November 1, 2015 |
| Temperature / Humidity | 20 deg. C / 52 % RH |
| Engineer | Kazuhiro Ando |
| | (1-10GHz) |
| Mode | Tx, Hopping Off, 3DH5, 2480 MHz, Y-axis |



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

Radiated Spurious Emission
(Plot data, Worst case)

| | |
|------------------------|--|
| Test place | Kashima EMC Lab. No.10 Semi Anechoic Chamber |
| Report No. | 10994201M-A-R1 |
| Date | November 1, 2015 |
| Temperature / Humidity | 20 deg. C / 52 % RH |
| Engineer | Kazuhiro Ando (1-10GHz) |
| Mode | Tx, Hopping Off, DH5, 2402 MHz, Y-axis |

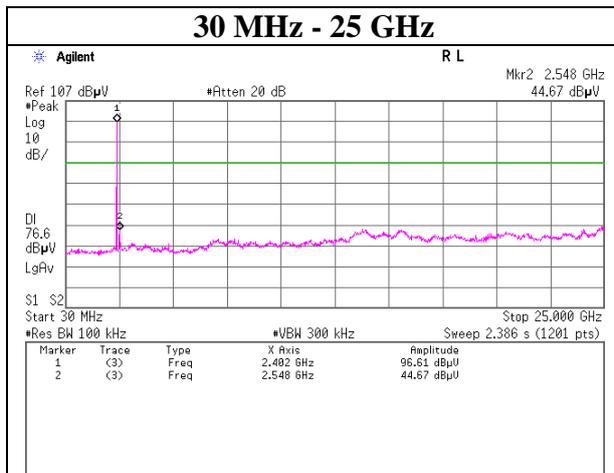
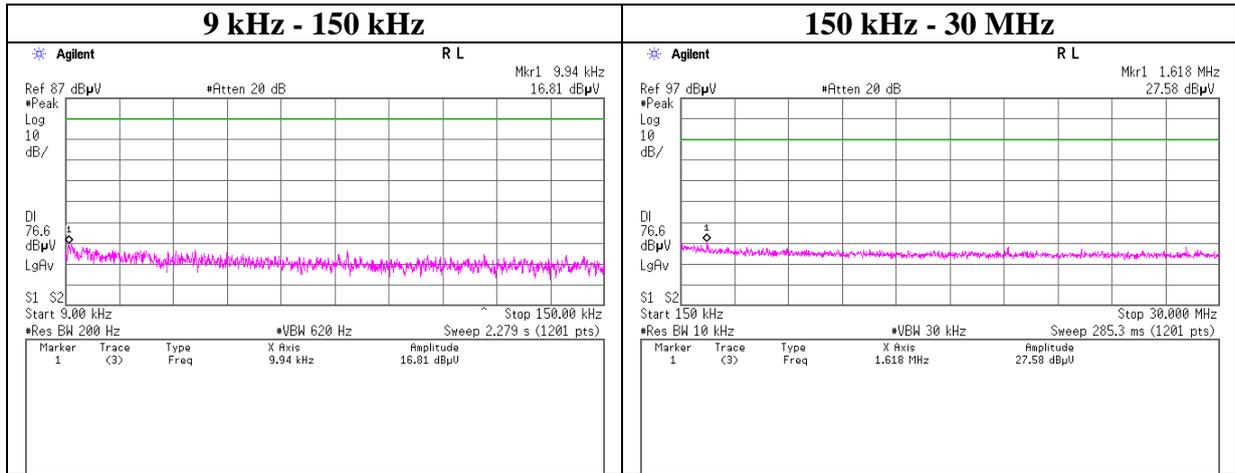


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

| | |
|------------------------|--|
| Test place | Kashima EMC Lab. No.2 Measurement Room |
| Report No. | 10994201M-A-R1 |
| Date | October 20, 2015 |
| Temperature / Humidity | 22 deg. C / 44 % RH |
| Engineer | Kazuhiro Ando |
| Mode | Tx, Hopping Off, DH5 |

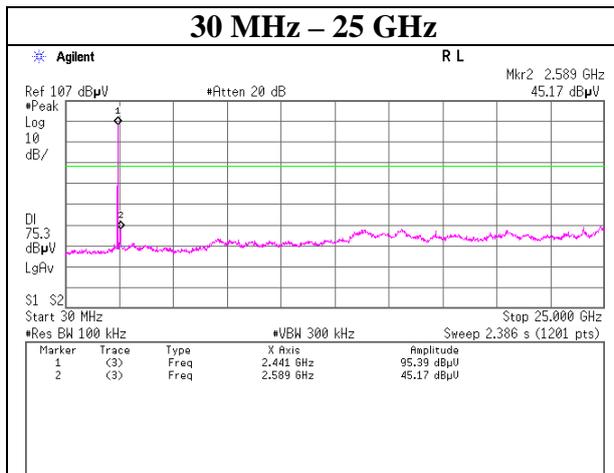
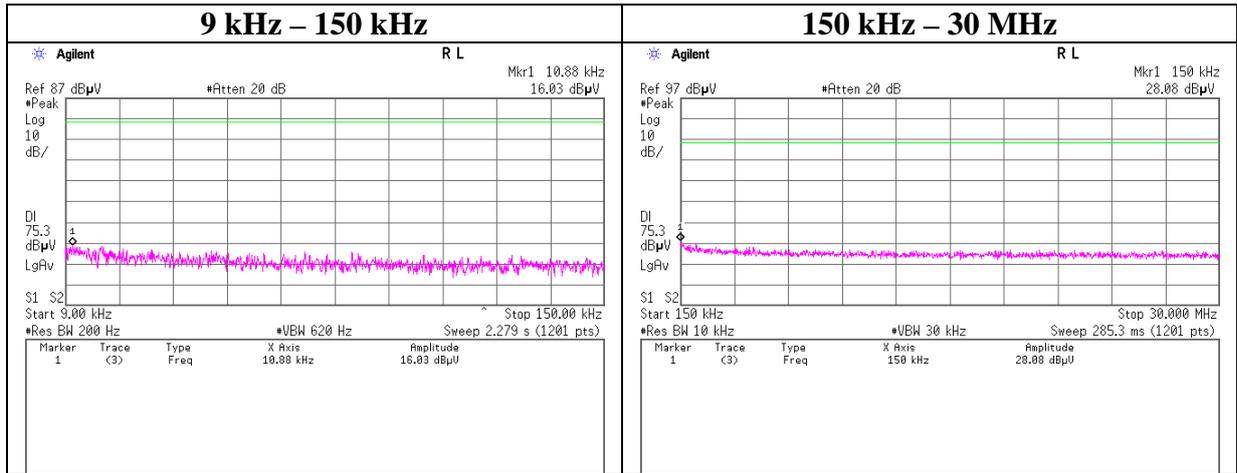
2402 MHz



Conducted Spurious Emission

| | |
|------------------------|--|
| Test place | Kashima EMC Lab. No.2 Measurement Room |
| Report No. | 10994201M-A-R1 |
| Date | October 20, 2015 |
| Temperature / Humidity | 22 deg. C / 44 % RH |
| Engineer | Kazuhiro Ando |
| Mode | Tx, Hopping Off, DH5 |

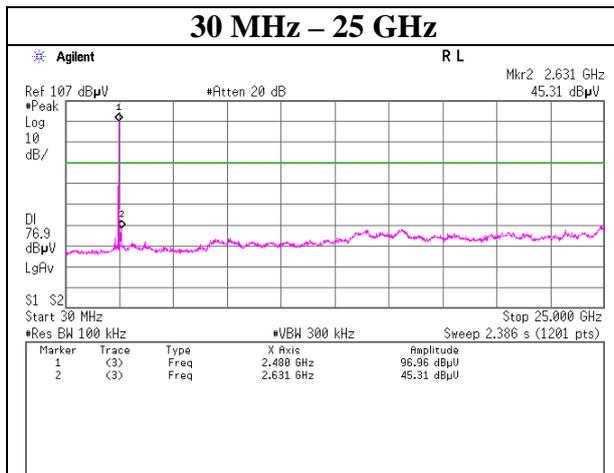
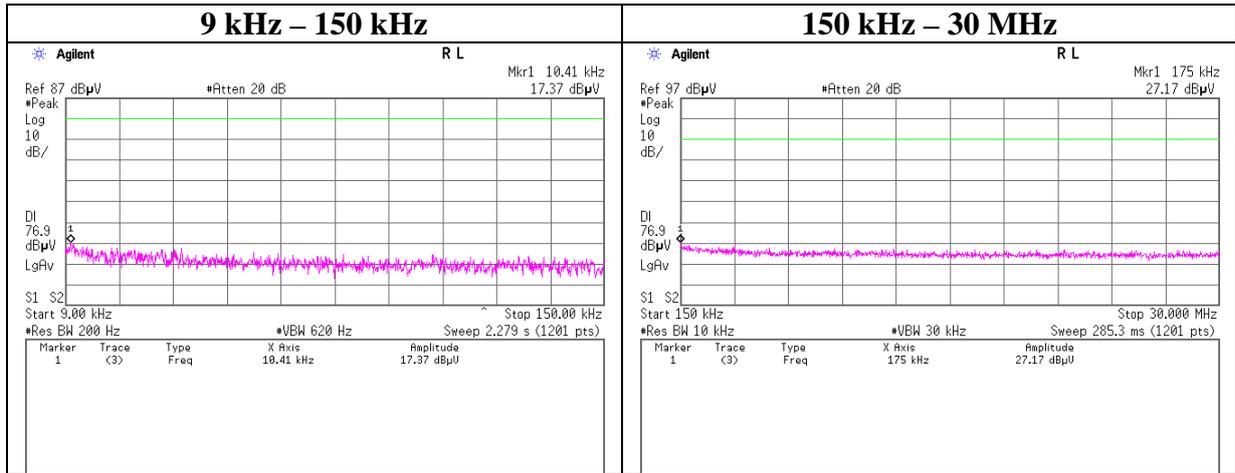
2441 MHz



Conducted Spurious Emission

| | |
|------------------------|--|
| Test place | Kashima EMC Lab. No.2 Measurement Room |
| Report No. | 10994201M-A-R1 |
| Date | October 20, 2015 |
| Temperature / Humidity | 22 deg. C / 44 % RH |
| Engineer | Kazuhiro Ando |
| Mode | Tx, Hopping Off, DH5 |

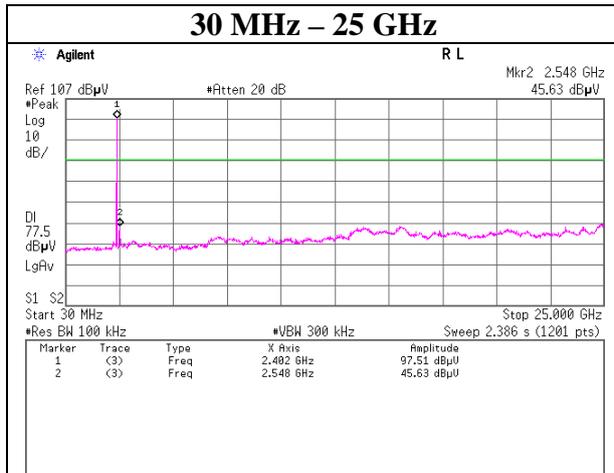
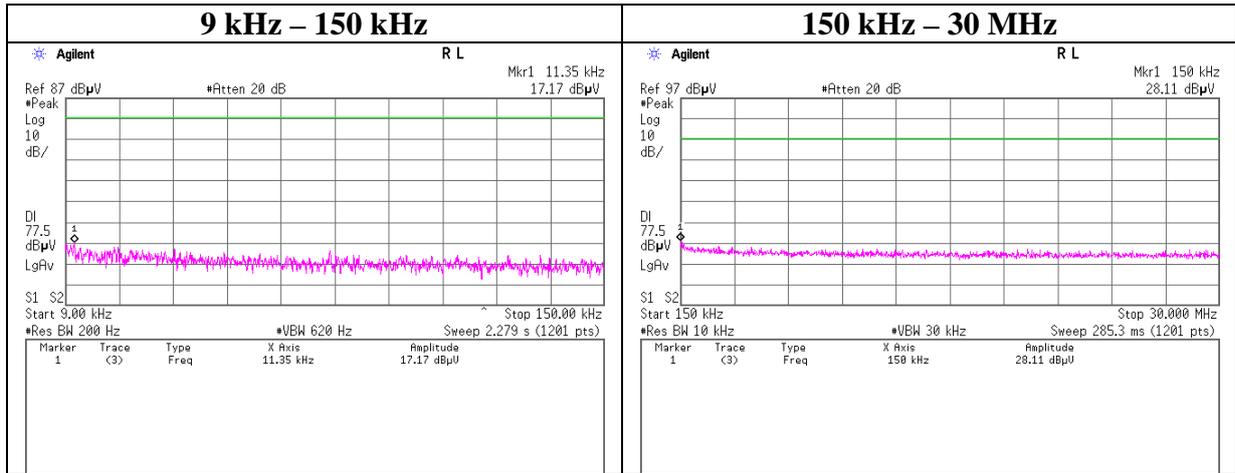
2480 MHz



Conducted Spurious Emission

| | |
|------------------------|--|
| Test place | Kashima EMC Lab. No.2 Measurement Room |
| Report No. | 10994201M-A-R1 |
| Date | October 21, 2015 |
| Temperature / Humidity | 23 deg. C / 50 % RH |
| Engineer | Kazuhiro Ando |
| Mode | Tx, Hopping Off, 3DH5 |

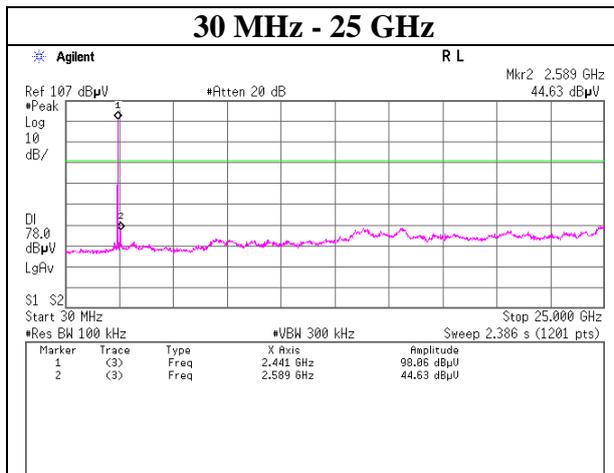
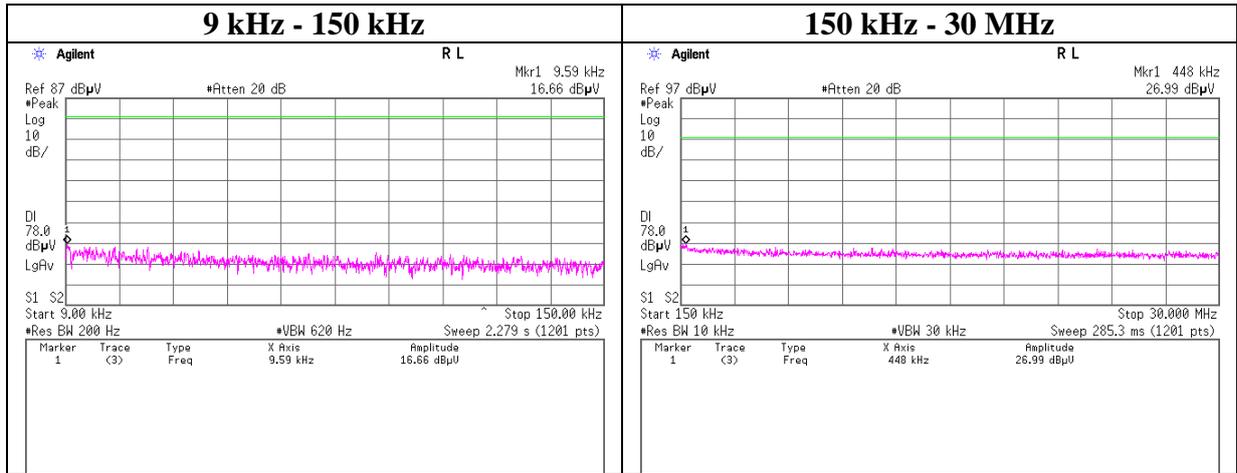
2402 MHz



Conducted Spurious Emission

| | |
|------------------------|--|
| Test place | Kashima EMC Lab. No.2 Measurement Room |
| Report No. | 10994201M-A-R1 |
| Date | October 21, 2015 |
| Temperature / Humidity | 23 deg. C / 50 % RH |
| Engineer | Kazuhiro Ando |
| Mode | Tx, Hopping Off, 3DH5 |

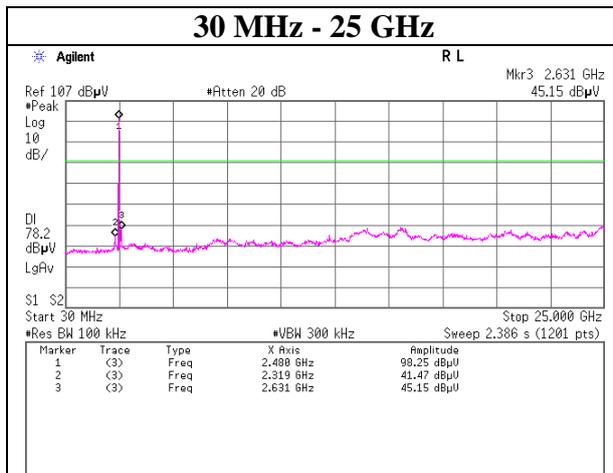
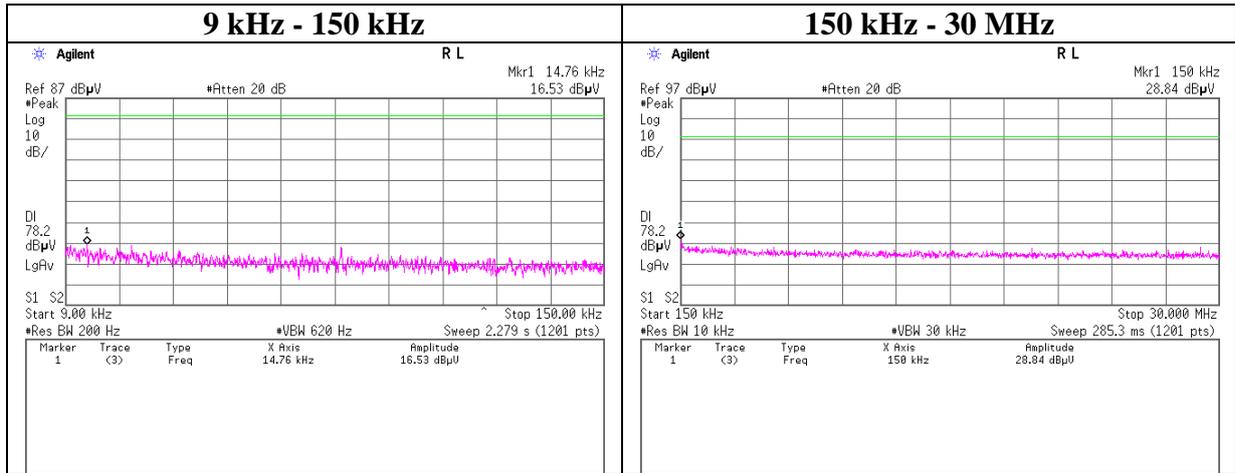
2441 MHz



Conducted Spurious Emission

| | |
|------------------------|--|
| Test place | Kashima EMC Lab. No.2 Measurement Room |
| Report No. | 10994201M-A-R1 |
| Date | October 21, 2015 |
| Temperature / Humidity | 23 deg. C / 50 % RH |
| Engineer | Kazuhiro Ando |
| Mode | Tx, Hopping Off, 3DH5 |

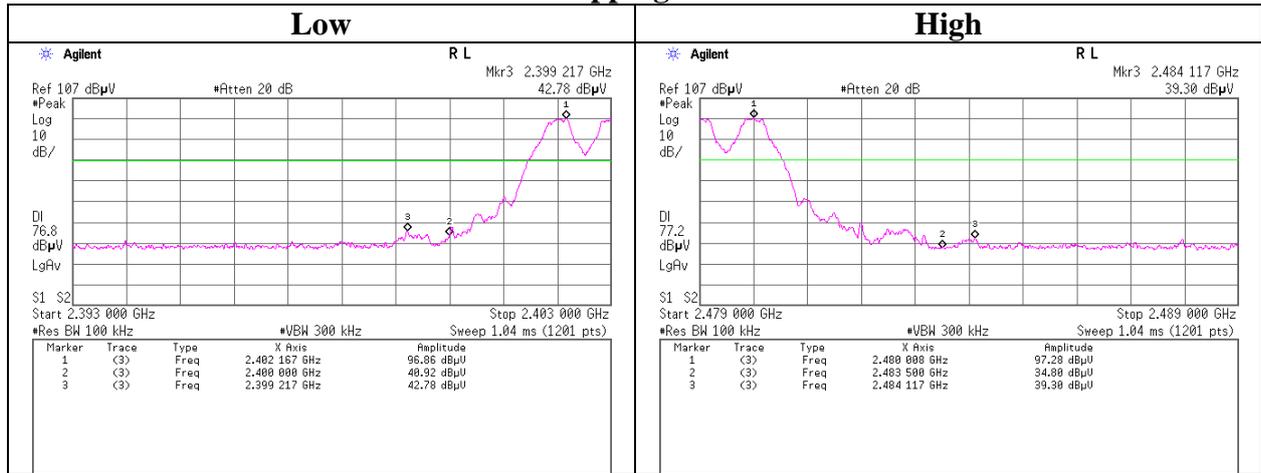
2480 MHz



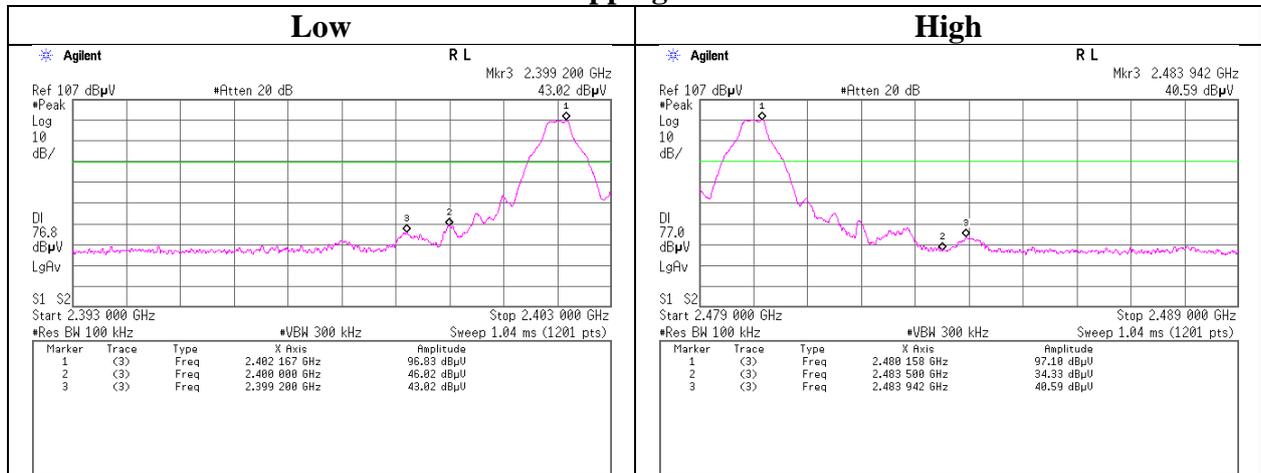
Conducted Emission Band Edge compliance

| | |
|------------------------|--|
| Test place | Kashima EMC Lab. No.2 Measurement Room |
| Report No. | 10994201M-A-R1 |
| Date | October 20, 2015 |
| Temperature / Humidity | 22 deg. C / 44 % RH |
| Engineer | Kazuhiro Ando |
| Mode | Tx DH5 |

Hopping On



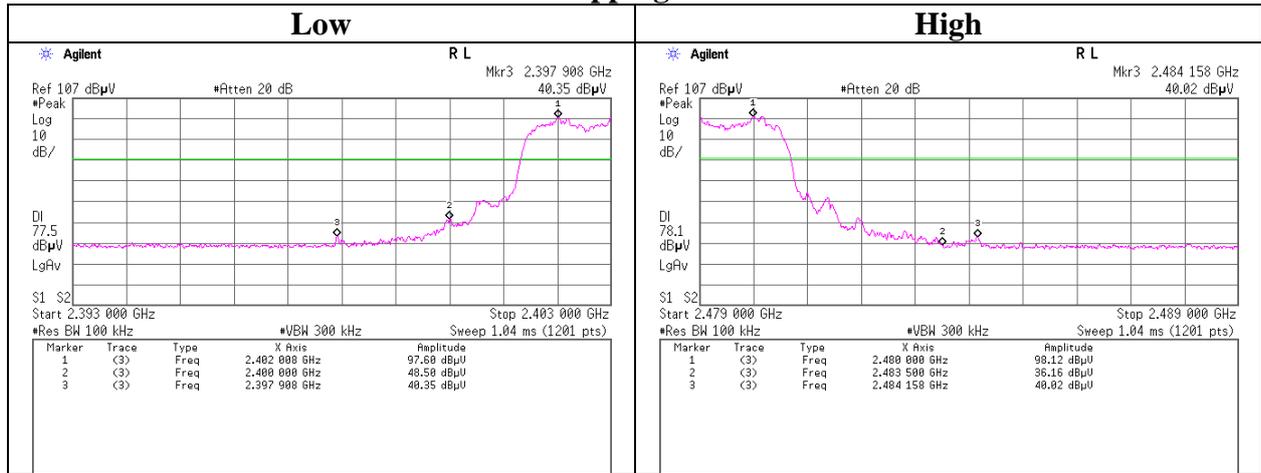
Hopping Off



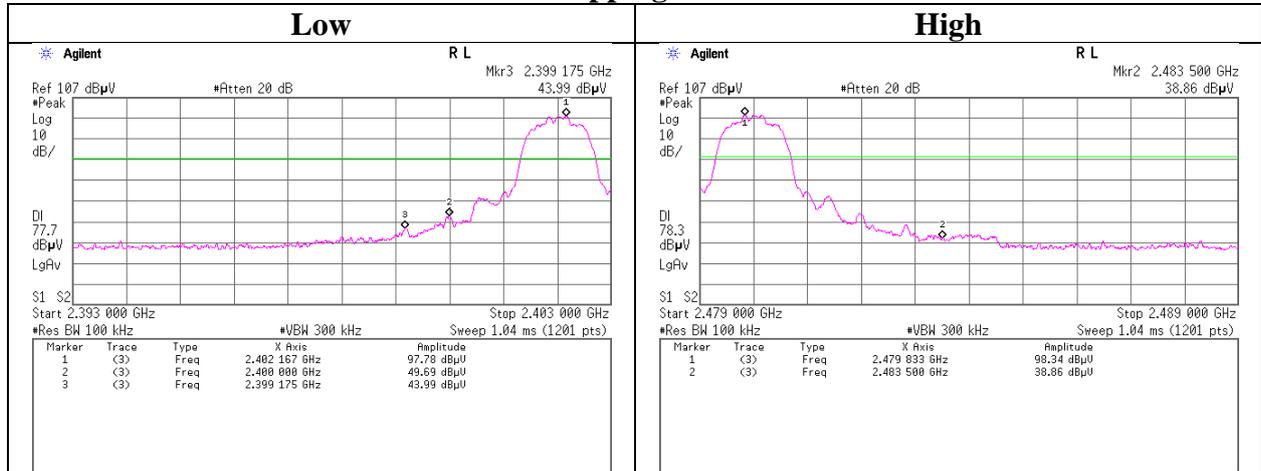
Conducted Emission Band Edge compliance

| | |
|------------------------|--|
| Test place | Kashima EMC Lab. No.2 Measurement Room |
| Report No. | 10994201M-A-R1 |
| Date | October 21, 2015 |
| Temperature / Humidity | 23 deg. C / 50 % RH |
| Engineer | Kazuhiro Ando |
| Mode | Tx 3DH5 |

Hopping On



Hopping Off

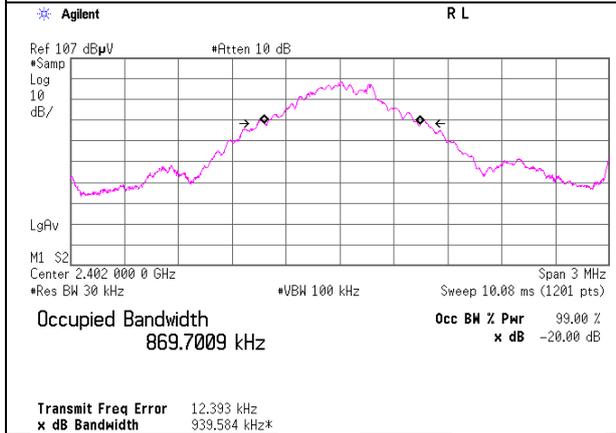


99% Occupied Bandwidth

| | | |
|------------------------|--|---------------------|
| Test place | Kashima EMC Lab. No.2 Measurement Room | |
| Report No. | 10994201M-A-R1 | |
| Date | October 20, 2015 | October 21, 2015 |
| Temperature / Humidity | 22 deg. C / 44 % RH | 23 deg. C / 50 % RH |
| Engineer | Kazuhiro Ando | |
| Mode | Tx Hopping Off | |

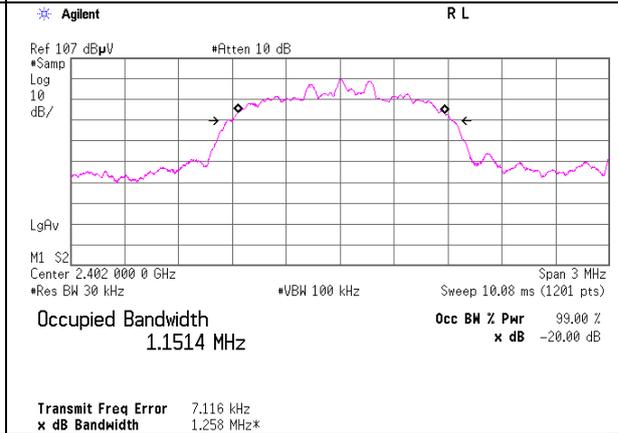
Hopping Off, DH5

2402 MHz

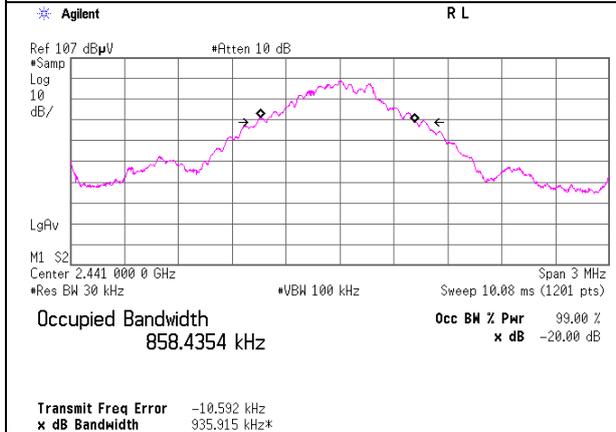


Hopping Off, 3DH5

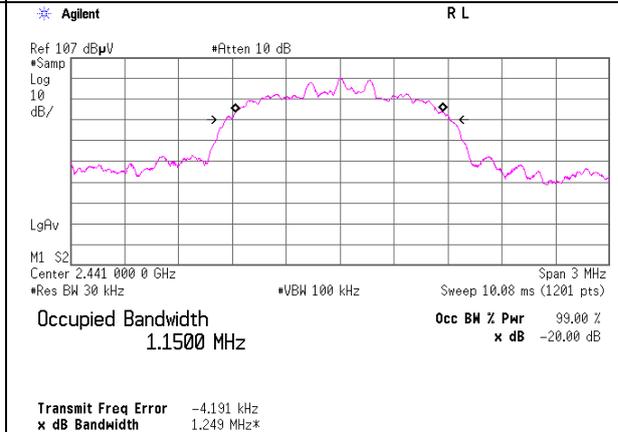
2402 MHz



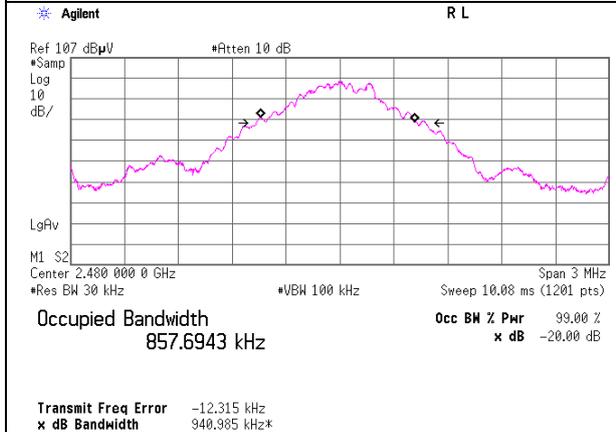
2441 MHz



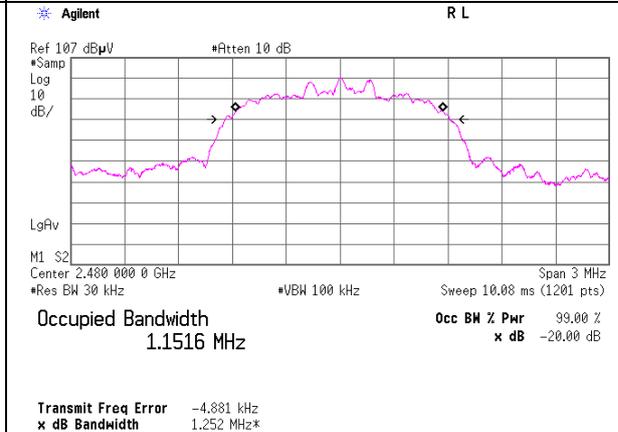
2441 MHz



2480 MHz

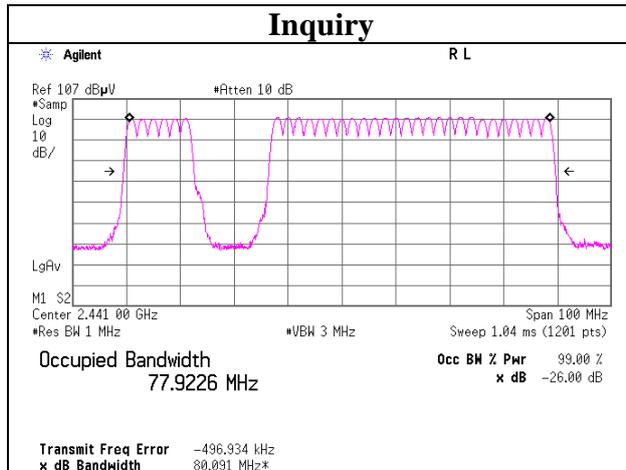
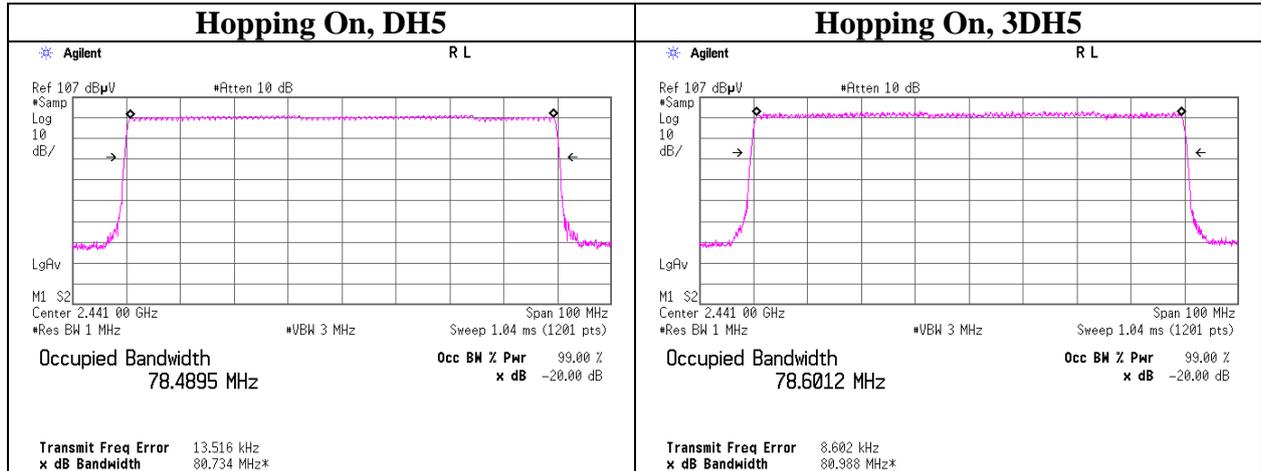


2480 MHz



99% Occupied Bandwidth

| | | |
|------------------------|--|---------------------|
| Test place | Kashima EMC Lab. No.2 Measurement Room | |
| Report No. | 10994201M-A-R1 | |
| Date | October 20, 2015 | October 21, 2015 |
| Temperature / Humidity | 22 deg. C / 44 % RH | 23 deg. C / 50 % RH |
| Engineer | Kazuhiro Ando | |
| Mode | Tx Hopping On | |



APPENDIX 2: Test instruments

Test equipment

| Control No. | Instrument | Manufacturer | Model No | Serial No | Test Item | Calibration Date * Interval(month) |
|--|----------------------------------|--|---|---|------------------|---|
| CSA-07 | Spectrum Analyzer | Agilent | E4448A | MY52490024 | AT | 2015/05/28 * 12 |
| CAT10-17 | 10dB Fixed Atten. | Weinschel | 54A-10 | 56251 | AT | 2015/05/26 * 12 |
| CCC-W06 | Micro Wave Cable | Junkosha | MWX241 | MRA-12-14-146 | AT | 2015/05/26 * 12 |
| CPM-16 | Peak Power Analyzer | Agilent | 8990B | MY51000276 | AT | 2015/06/16 * 12 |
| CPSO-24 | Power Sensor | Agilent | N1923A | MY54070024 | AT | 2015/06/16 * 12 |
| COS-12 | Temperature & Humidity Indicator | A&D | AD-5681 | 6876017 | AT | 2015/07/13 * 12 |
| CTR-09 | Test Receiver | Agilent | N9038A | MY53290016 | RE | 2015/06/28 * 12 |
| CBL-08 | LOGBICON | Schwarzbeck | VULB 9168 | 343 | RE | 2014/11/15 * 12 |
| CCC-S10-R(2/4 /CATS-11/5/6/7 /8/11/12) | Coaxial Cable | Fujikura,Fujikura,Agilent,Fujikura,Fujikura,Fujikura,Fuhjikura,Fujikura,Fujikura | 5D-2W,5D-2W,8494A,5D-2W,5D-2W,5D-2W,5D-2W,5D-2W | MY41110200(Ste p Att) | RE | 2015/08/11 * 12 |
| CAF-08 | Pre-Amplifier | Hewlett Packard | 8447D | 2944A09041 | RE | 2015/08/11 * 12 |
| CSCL-13 | Ruler | Tajima | L19-55 | none | RE | 2015/02/18 * 12 |
| COS-10 | Temperature & Humidity Indicator | HIOKI | 3641/9680-50 | 090999895/090905406 | RE | 2015/05/17 * 12 |
| COTS-CEMI-02 | EMI Software | TSJ | TEPTO-DV(RE,C E,MF,PE) | Ver, RE: 2.5.0131, CE: 2.5.0131, ME: 2.5.0129, PE: 2.5.0129 | RE | - |
| CSA-06 | Spectrum Analyzer | Agilent | N9030A | MY53310670 | RE | 2015/05/28 * 12 |
| CHA-20 | Broad Band Horn | Schwarzbeck | BBHA 9120D | 9120D-1270 | RE | 2015/07/31 * 12 |
| CHA-07 | Double Ridged Horn | ETS-Lindgren | 3160-09 | 00166043 | RE | 2015/06/28 * 12 |
| CAF-19 | Pre-Amplifier | TOYO | HAP18-26W | 00000035 | RE | 2015/06/28 * 12 |
| CAF-18 | Pre-Amplifier | TOYO | TPA0118-36 | A-1001 | RE | 2015/07/15 * 12 |
| CAT10-16 | 10dB Fixed Atten. | Weinschel | 54A-10 | 56246 | RE | 2015/05/26 * 12 |
| CHF-03 | HPF | Micro-Tronics | HPM50111-02 | 008 | RE | 2015/05/25 * 12 |
| CCC-W05 | Micro Wave Cable | Junkosha | MWX241 | MRA-12-14-145 | RE | 2015/05/26 * 12 |
| CCC-W07 | Micro Wave Cable | Junkosha | MWX221 | MRA-12-14-148 | RE | 2015/05/26 * 12 |
| CCC-W09 | Micro Wave Cable | SUHNER | SUCOFLEX104 | MY588/4 | RE | 2015/07/13 * 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: RE: Radiated Emission test
AT: Antenna Terminal Conducted test**

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Facsimile: +81-478-82-3373