

# RADIO TEST REPORT

(for Bluetooth classic)

Project No. : JB-Z0539-B  
Client : Sony Corporation  
Client's Address : 1-7-1 Konan Minato-ku Tokyo, 108-0075 Japan  
Product Name : Digital Media Player  
Model No. : NW-A105  
FCC ID : AK8NWA100  
Test Standard : 47 CFR Part 15 Subpart C  
Sample Receipt Date : May 21, 2019  
Test Date : May 22, 2019 to July 31, 2019  
Original Report Date : July 5, 2019  
Amend Report Date : August 1, 2019  
Test Result : Complied

Notice:

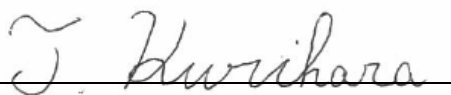
- \* These test results relate only to the items (combination equipment, test configuration, operation condition etc.) tested.
- \* This report shall not be reproduced except in full, without written approval of the laboratory.
- \* This report must not be used by the client to claim product endorsement by A2LA or any agency of the U.S.
- \* Hereby certify that no party is subject to a denial of federal benefits pursuant to section 5301 of the Anti-Drug Abuse Act.
- \* All test results are traceable to the national and /or international standards.
- \* The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in Sony Global Manufacturing & Operations Corporation EMC/RF Test Laboratory.
- \* This report replaces and supersedes all previous versions. Refer to Revision History on the following page.

Reported by:



Takanori Oho  
Technical Manager  
EMC/RF Test Laboratory, Main Lab.  
Design Technology Division

Approved Signatory:



Teruki Kurihara  
Technical Manager  
EMC/RF Test Laboratory, Main Lab.  
Design Technology Division



Format No.: NV1-1-01 Version 5.0

**Sony Global Manufacturing & Operations Corporation EMC/RF Test Laboratory, Main Lab.**

A2LA Cert. #3203.01

8-4 Shiomi Kisarazu-shi Chiba-ken, 292-0834, Japan  
PHONE +81 438 37 2750 FAX +81 438 37 1021

## TABLE OF CONTENTS

|      |                                                    |    |
|------|----------------------------------------------------|----|
| 1.   | General Information.....                           | 3  |
| 1.1. | Description of Equipment Under Test (EUT).....     | 3  |
| 1.2. | Summary of Test Result.....                        | 4  |
| 1.3. | Tested Methodology .....                           | 5  |
| 1.4. | Measurement Procedures .....                       | 5  |
| 1.5. | Test Location.....                                 | 8  |
| 1.6. | Uncertainty .....                                  | 8  |
| 2.   | Test Specification .....                           | 9  |
| 2.1. | Validation .....                                   | 9  |
| 2.2. | Operating Condition.....                           | 9  |
| 2.3. | Special Accessories .....                          | 9  |
| 2.4. | EUT Modifications .....                            | 10 |
| 2.5. | Configuration of EUT System .....                  | 11 |
| 2.6. | View of Measurement Facility.....                  | 13 |
| 3.   | Test Data.....                                     | 14 |
| 3.1. | AC Power-line Conducted Emissions .....            | 14 |
| 3.2. | 20dB Bandwidth.....                                | 16 |
| 3.3. | Carrier Frequency Separation.....                  | 18 |
| 3.4. | Number of Hopping Frequencies .....                | 19 |
| 3.5. | Time of Occupancy (Dwell Time).....                | 20 |
| 3.6. | Maximum Peak Conducted Output Power.....           | 23 |
| 3.7. | Radiated Spurious Emissions.....                   | 24 |
| 3.8. | Conducted Spurious Emissions for Band Edge.....    | 65 |
| 4.   | Method of Calculation .....                        | 66 |
| 4.1. | AC Power-line Conducted Emissions .....            | 66 |
| 4.2. | Time of Occupancy (Dwell Time).....                | 66 |
| 4.3. | Maximum Peak Conducted Output Power.....           | 66 |
| 4.4. | Radiated Spurious Emissions.....                   | 67 |
| 4.5. | Conducted Spurious Emissions for Band Edge.....    | 67 |
| 5.   | List of Test Equipment.....                        | 68 |
| 5.1. | AC Power-line Conducted Emissions .....            | 68 |
| 5.2. | Antenna-port Conducted Measurements.....           | 68 |
| 5.3. | Radiated Spurious Emissions.....                   | 68 |
| 6.   | Photographs of test setup.....                     | 69 |
| 6.1. | AC Power-line Conducted Emissions Photo(s) .....   | 69 |
| 6.2. | Antenna-port Conducted Measurements Photo(s) ..... | 69 |
| 6.3. | Radiated Spurious Emissions Photo(s).....          | 70 |

### Note

- ☒-indicates that the listed condition, standard or equipment is applicable for this report.  
☐-indicates that the listed condition, standard or equipment is not applicable for this report.

### Revision History

| Revision            | Date           | Overview                                                                | Page   |
|---------------------|----------------|-------------------------------------------------------------------------|--------|
| JB-Z0539 (Original) | July 5, 2019   | -                                                                       | -      |
| JB-Z0539-A          | July 26, 2019  | Add procedures and measurement facility drawings for spurious.          | P.7,13 |
| JB-Z0539-B          | August 1, 2019 | Add procedures and measurement facility drawings for spurious emission. | P.7,13 |
|                     |                | Correction result of Carrier Frequency Separation.                      | P18    |

## 1. General Information

### 1.1. Description of Equipment Under Test (EUT)

#### General Specification

Test Sample Condition : ☐ Prototype ☒ Pre-production ☐ Mass-production  
Product Name : Digital Media Player  
Trade Name : SONY  
Model No. : NW-A105  
Serial No. : 2, 3, 5  
Power Rating of the EUT : DC 3.7 V (Internal Battery) or DC 5 V (USB)

Similar model(s) to be covered by this report

Model No. : None

#### Radio Specification

Function of the Equipment : Transceiver  
Operating Frequency : 2402 - 2480 MHz  
Modulation Type : FHSS (GFSK,  $\pi/4$ DQPSK, 8DPSK)  
Channel Spacing : 1 MHz  
Channel Bandwidth : 1 MHz  
Number of channels : 79  
Antenna Type : Inverted-F Antenna  
Antenna Connector Type : None  
Antenna Gain : 2.0 dBi  
Operating Temperature : +5 to +35 deg.C

## 1.2. Summary of Test Result

| Test Item                                     | Test Method | Worst Margin                              | Results  | Note |
|-----------------------------------------------|-------------|-------------------------------------------|----------|------|
| AC Power-line Conducted Emissions             | Conducted   | 17.5 dB (QP)<br>0.156 MHz<br>N            | Complied | -    |
| 20dB Bandwidth                                | Conducted   | Refer to the test data                    | Complied | -    |
| Carrier Frequency Separation                  | Conducted   | Refer to the test data                    | Complied | -    |
| Number of Hopping Frequencies                 | Conducted   | Refer to the test data                    | Complied | -    |
| Time of Occupancy (Dwell Time)                | Conducted   | Refer to the test data                    | Complied | -    |
| Maximum Peak Conducted Output Power           | Conducted   | 11.92 dB                                  | Complied | -    |
| Radiated Spurious Emissions                   | Radiated    | 5.2 dB (AV)<br>4804.136 MHz<br>Horizontal | Complied | -    |
| Conducted Spurious Emissions<br>for Band Edge | Conducted   | 32.92 dB<br>2399.90 MHz                   | Complied | *1   |

Note

\*1: Conducted Spurious Emissions measurement was tested for the only frequencies in the non-restricted carrier band edges, since the spurious emissions in other non-restricted band were complied with Radiated Spurious Emissions measurement.

### Other requirements

Part 15.31(e) Supply voltage requirement

: Complied (The voltage supplied from USB or battery are converted to regulated DC voltage by the built-in power circuit of the EUT.)

Part 15.203 / 212 Antenna requirement

: Complied (The EUT has an internal antenna which cannot be replaced by users.)

### 1.3. Tested Methodology

Test Standard : 47 CFR Part15 Subpart C  
 Test Method : ANSI C63.10 - 2013  
 KDB 558074 D01 15.247 Meas Guidance v05r02

#### Test Condition

##### AC Power-line Conducted Emissions

Dimensions of the EUT table : 0.8 m height, 1.5 m width and 1 m depth.

##### Radiated Spurious Emissions

Test Distance : ☒ 3 m ☐ 10m (9 kHz to 30 MHz)  
☒ 3 m ☐ 10m (30 MHz to 1000 MHz)  
☒ 3 m (1 GHz to 26.5 GHz)

Dimensions of the EUT table : 0.8 m (below 1 GHz) or 1.5 m (above 1 GHz) height, 1.5 m width and 1 m depth.

Dimensions of validated test volume : 2 m diameter, 3 m top height, 0.5 m bottom height.

### 1.4. Measurement Procedures

We performed the measurements in accordance with NV3-12, available upon the request.

- ☒ No deviation  
☐ Deviation from the above procedure

The summary of the above procedure is mentioned below

#### AC Power-line Conducted Emissions

1. The non-conductive table (EUT table) made of (☒ FRP, ☐ wood, ☐ other non-conductive material) was placed 0.4 m from its rear to the vertical reference ground plane.
2. The EUT was placed on the center of tabletop and its rear was flush with the rear of the table, connected through a LISN to the input power mains.
3. The LISN was placed in 80 cm from the nearest part of the EUT chassis.
4. The excess length of the AC cable between the EUT and the LISN receptacle, or an adaptor or extension cable connected to and measured with LISN, was folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
5. The connection of the all other equipment to the second LISN was performed. The second LISN was terminated with a 50-ohm terminator.
6. Interconnecting cables that hang closer than 40 cm to the horizontal reference ground plane was folded back and forth forming a bundle 30 to 40 cm long, hanging approximately in the middle between the horizontal reference ground plane and the tabletop.
7. Find the worst mode and arrangement of the EUT according to the follows;
  - Connecting all peripherals and change the position of peripherals and cables.
  - Changing the all test operation modes of the EUT.
  - On every condition, exploring the highest emissions with the spectrum analyzer.  
(150 kHz to 30 MHz, peak detector, RBW: 10 kHz)
8. On the worst condition of the EUT found in above, choose the six highest emissions on the spectrum data.  
 The final measurements carried out on these emissions with EMI test receiver.  
 (quasi-peak and average detector, RBW: 9 kHz)

**Antenna-port Conducted Measurements**

1. Antenna-port of the EUT was connected to the power sensor (Maximum Peak Conducted Output Power) or the spectrum analyzer. (other test items).
2. For each EUT operation mode, the Antenna-port Conducted Measurements were measured with the power sensor or the spectrum analyzer.

| Test Item<br>Antenna-port Conducted Measurements | Detector | RBW     |
|--------------------------------------------------|----------|---------|
| 20dB Bandwidth                                   | Peak     | 30 kHz  |
| Carrier Frequency Separation                     | Peak     | 100 kHz |
| Number of Hopping Frequencies                    | Peak     | 100 kHz |
| Time of Occupancy (Dwell Time)                   | Peak     | 1 MHz   |
| Maximum Peak Conducted Output Power              | Peak     | -       |
| Conducted Spurious Emissions for Band Edge       | Peak     | 100 kHz |

**Radiated Spurious Emissions**

1. The non-conductive table (EUT table) made of (☐ FRP, ☒ Styrene Foam, ☐ other non-conductive material) was placed in the center of the turntable.
2. The EUT was placed on the center of the tabletop.
3. The test antenna was placed away from the EUT at test distance.
4. The limits were compensated the distance factor with follows:  

$$9 \text{ kHz to } 490 \text{ kHz [Limit at 3 m]} = [\text{Limit at 300 m}] + 40\log(300[\text{m}] / 3[\text{m}])$$

$$490 \text{ kHz to } 30 \text{ MHz [Limit at 3 m]} = [\text{Limit at 30 m}] + 40\log(30[\text{m}] / 3[\text{m}])$$
5. Find the worst arrangement of the EUT according to follows:
  - Rotating the turntable and/or scanning the antenna.
  - On every condition, exploring the highest emissions with the spectrum analyzer.  
(9 kHz to 26.5 GHz, peak detector)
6. On the worst arrangement of the EUT found in above, choose the six highest harmonics or spurious emissions on the spectrum data.(\*excluding carrier band edges)  
 The final measurements of all test operating modes carried out on these emissions as follows;

The test antenna and the turntable were performed with follows;

|                          | 9 kHz to 30 MHz               | 30 MHz to 1000 MHz                          | 1 GHz to 26.5 GHz                        |
|--------------------------|-------------------------------|---------------------------------------------|------------------------------------------|
| Antenna                  | Loop Antenna                  | Bi-conical Antenna,<br>Log-periodic Antenna | Horn Antenna                             |
| Antenna scanning range   | 1 m,<br>Vertical, 360 degrees | 1 m to 4 m,<br>Horizontal and Vertical      | 1 m to 4 m *,<br>Horizontal and Vertical |
| Turntable rotating range | 360 degrees                   | 360 degrees                                 | 360 degrees                              |

\*: When the measurement frequencies above 1 GHz, final measurements are performed keeping the antenna in the "cone of radiation" from EUT area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.

Instruments settings were carried out with follows;

|            | 9 kHz to 90 kHz<br>110 kHz to 490 kHz | 90 kHz to 110 kHz<br>490 kHz to 30 MHz | 30 MHz to 1000 MHz | 1 GHz to 26.5 GHz                           |
|------------|---------------------------------------|----------------------------------------|--------------------|---------------------------------------------|
| Detector   | Peak / Average                        | Quasi-peak                             | Quasi-peak         | Peak / Average                              |
| RBW        | 200 Hz (6 dB) or<br>9 kHz (6 dB) *1   | 200 Hz (6 dB) or<br>9 kHz (6 dB) *1    | 120 kHz (6 dB)     | 1 MHz (6 dB)                                |
| VBW        | N/A                                   | N/A                                    | N/A                | 3 MHz (for peak)<br>10 kHz (for average) *2 |
| Instrument | EMI test receiver                     | EMI test receiver                      | EMI test receiver  | Spectrum analyzer                           |

\*1: When the measurement frequencies below 150 kHz, RBW: 200 Hz was used.

\*2: VBW setting (for average) was higher than 1/T. (T is the minimum transmission duration)

7. If the final measurement result exceeded the limit in non-restricted band(excluding carrier band edges), the measurement is carried out additionally with follows;

Measurement points

- Fundamental Frequency
- Frequency that exceeded the limit in non-restricted band (excluding carrier band edges)

|            | 9 kHz to 150 kHz  | 150 kHz to 30 MHz | 30 MHz to 26.5 GHz |
|------------|-------------------|-------------------|--------------------|
| Detector   | Peak              | Peak              | Peak               |
| RBW        | 300 Hz (6 dB) *   | 10 kHz (6 dB) *   | 100 kHz (6 dB)     |
| Instrument | Spectrum analyzer | Spectrum analyzer | Spectrum analyzer  |

\*: Correction factor of RBW was compensated to a measurement result by the following formula.

$$\text{C.F. of RBW [dB]} = 10 \cdot \log(100 \text{ kHz} / \text{used RBW})$$

8. Although these tests for below 30MHz were performed other than open field area test site, adequate comparison measurements were confirmed against 30 m open field area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788 D01.

Further these test for above 1GHz were performed test site complied with CISPR 16-1-4.

In the case of EUT size smaller than the validated test volume, the antenna position is adjusted such that the distance between the EUT and the antenna reference point is identical to the 3m used for the S-VSWR validation measurements. These method based on clause 7.3.1 of CISPR16-1-4 Edition 4, therefore correcting distance factor is not applied.

## 1.5. Test Location

Test Facility Name : Sony Global Manufacturing & Operations Corporation  
EMC/RF Test Laboratory, Main Lab.  
Address : 8-4 Shiomi Kisarazu-shi Chiba-ken, 292-0834, Japan  
Phone : +81 438 37 2750

A2LA Certificate No. : 3203.01  
Cert. Validated Date : Oct. 31, 2019

### AC Power-line Conducted Emissions

Shielded Room

☐ 4th Site    ☒ EMC Site

### Antenna-port Conducted Measurements

Shielded Room

☒ 4th Site SR1

### Radiated Spurious Emissions

Semi-Anechoic chamber

☐ 4th Site    ☒ EMC Site

## 1.6. Uncertainty

| Test Item                      | Frequency      | 4th Site SR1 |
|--------------------------------|----------------|--------------|
| Maximum Conducted Output Power | 1 GHz to 6 GHz | ± 0.84 dB    |
| Conducted Spurious Emissions   | below 6 GHz    | ± 1.25 dB    |

| Test Item                         | Frequency          | Distance | 4th Site  | EMC Site  |
|-----------------------------------|--------------------|----------|-----------|-----------|
| AC Power-line Conducted Emissions | 150 kHz to 30 MHz  | -        | ± 3.34 dB | ± 3.35 dB |
| Radiated Emissions                | 9 kHz to 30 MHz    | 3m       | ± 2.60 dB | ± 3.13 dB |
|                                   | 30 MHz to 1000 MHz | 3m       | ± 4.96 dB | ± 5.26 dB |
|                                   | 1 GHz to 18 GHz    | 3m       | ± 5.22 dB | ± 5.50 dB |
|                                   | 18 GHz to 26.5 GHz | 3m       | ± 5.36 dB | ± 5.63 dB |

## 2. Test Specification

### 2.1. Validation

The system was configured for testing in a typical (as a customer would normally use it).  
The tests were conducted with the worst-case modes as follows.

### 2.2. Operating Condition

The tests have been carried out the following conditions.

[ Transmitting mode ]

| Test Items                                                                                          | Test Channels                    | Packet Type *1 *2 *3    |
|-----------------------------------------------------------------------------------------------------|----------------------------------|-------------------------|
| AC Power-line Conducted Emissions *4                                                                | 2402 MHz                         | BDR : DH5               |
| Radiated Spurious Emissions (below 1GHz) *4                                                         | 2402 MHz                         | BDR : DH5               |
| 20dB Bandwidth,<br>Maximum Peak Conducted Output Power,<br>Radiated Spurious Emissions (above 1GHz) | 2402 MHz<br>2441 MHz<br>2480 MHz | BDR : DH5<br>EDR : 3DH5 |
| Carrier Frequency Separation,<br>Number of Hopping Frequencies,<br>Time of Occupancy (Dwell Time)   | Hopping ON                       | BDR : DH5<br>EDR : 3DH5 |
| Conducted Spurious Emissions for Band Edge                                                          | 2402 MHz                         | BDR : DH5<br>EDR : 3DH5 |

Note

\*1: Inquiry mode was not performed based on the result of pre-compliance testing.

\*2: The worst packet type has been decided based on the result of maximum duty cycle and pre-compliance testing in the actual product specification.

\*3: Packet type for EDR has been decided based on the result of Maximum Peak Conducted Output Power.

\*4: The test was performed with the representative mode that had been found as the worst emissions while exploratory testing.

#### The Software for Operating Mode

Software Name : BT Test Tool  
Software Version : 3

### 2.3. Special Accessories

Special accessories needed for connecting the EUT to achieve compliance:

| Item | Manufacturer | Model No. | Serial No. | Remark |
|------|--------------|-----------|------------|--------|
| -    | -            | -         | -          | -      |

## 2.4. EUT Modifications

- ☒ No equipment modification to achieve compliance to the standard levels was done during the tests.  
☐ Equipment was modified to achieve compliance to the standard level as below.

Responsible Party Signature

---

Typed/ Print Name :  
Responsible Party :  
Position :  
Date :

## 2.5. Configuration of EUT System

### AC Power-line Conducted Emissions

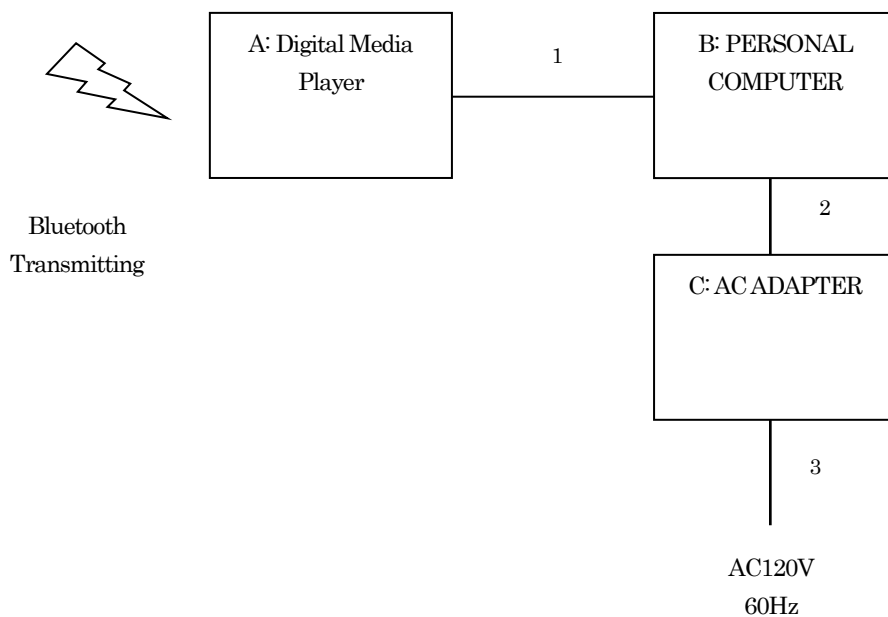
[ EUT and Associated Equipment (AE) ]

| Symbol | EUT/<br>AE | Item                 | Manufacturer | Model No.  | Serial No. |
|--------|------------|----------------------|--------------|------------|------------|
| A      | EUT        | Digital Media Player | SONY         | NW-A105    | 3          |
| B      | AE         | PERSONAL COMPUTER    | SONY         | VJS131C11N | 4120398    |
| C      | AE         | AC ADAPTER           | SONY         | VJ8AC10V9  | 274969     |

[ Type of Cable ]

| Symbol | Description | Identification<br>(Manufacturer etc.) | Shielded<br>Yes / No | Ferrite<br>Core | Length<br>(m) | Bundled |
|--------|-------------|---------------------------------------|----------------------|-----------------|---------------|---------|
| 1      | USB Cable   | Kailai                                | Yes                  | No              | 0.5           | No      |
| 2      | DC Cable    | -                                     | No                   | No              | 1.8           | Yes     |
| 3      | AC Cable    | -                                     | No                   | No              | 1.5           | Yes     |

[ Connecting Diagram ]



**Antenna-port Conducted Measurements**

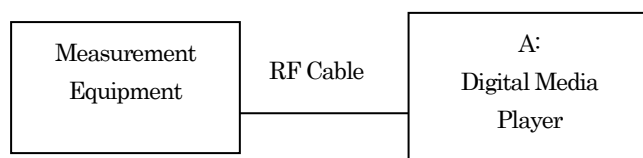
[ EUT and Associated Equipment (AE) ]

| Symbol | EUT/<br>AE | Item                 | Manufacturer | Model No. | Serial No. |
|--------|------------|----------------------|--------------|-----------|------------|
| A      | EUT        | Digital Media Player | SONY         | NW-A105   | 5          |

[ Type of Cable ]

| Symbol | Description | Identification<br>(Manufacturer etc.) | Shielded<br>Yes / No | Ferrite<br>Core | Length<br>(m) | Bundled |
|--------|-------------|---------------------------------------|----------------------|-----------------|---------------|---------|
| -      | -           | -                                     | -                    | -               | -             | -       |

[ Connecting Diagram ]

**Radiated Spurious Emissions**

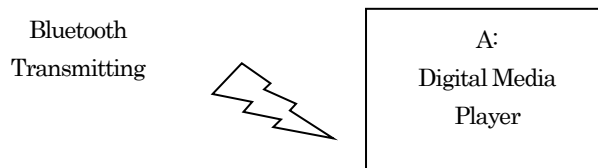
[ EUT and Associated Equipment (AE) ]

| Symbol | EUT/<br>AE | Item                 | Manufacturer | Model No. | Serial No. |
|--------|------------|----------------------|--------------|-----------|------------|
| A      | EUT        | Digital Media Player | SONY         | NW-A105   | 2          |

[ Type of Cable ]

| Symbol | Description | Identification<br>(Manufacturer etc.) | Shielded<br>Yes / No | Ferrite<br>Core | Length<br>(m) | Bundled |
|--------|-------------|---------------------------------------|----------------------|-----------------|---------------|---------|
| -      | -           | -                                     | -                    | -               | -             | -       |

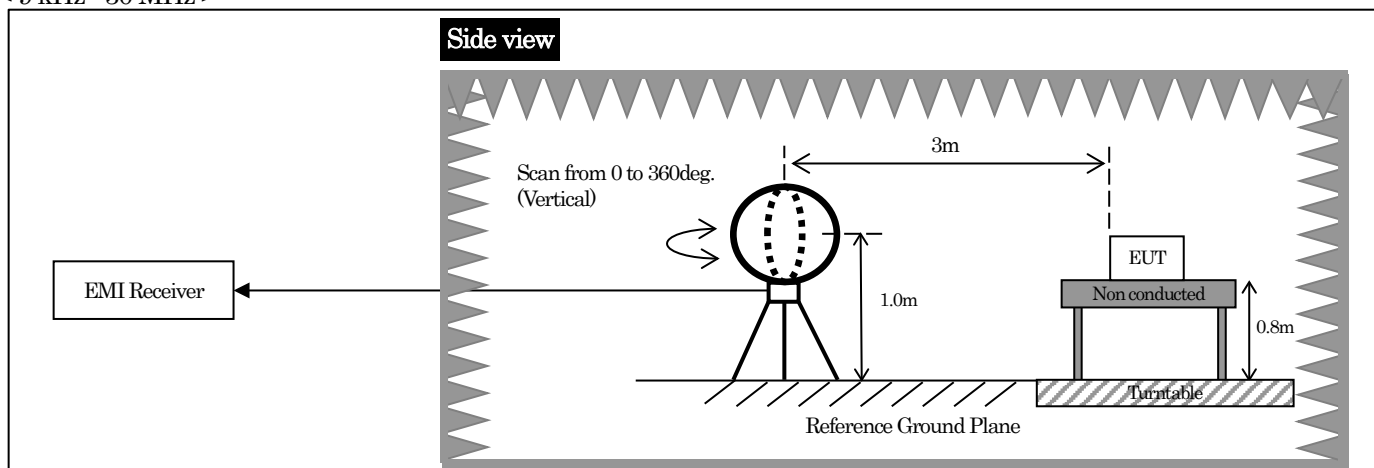
[ Connecting Diagram ]



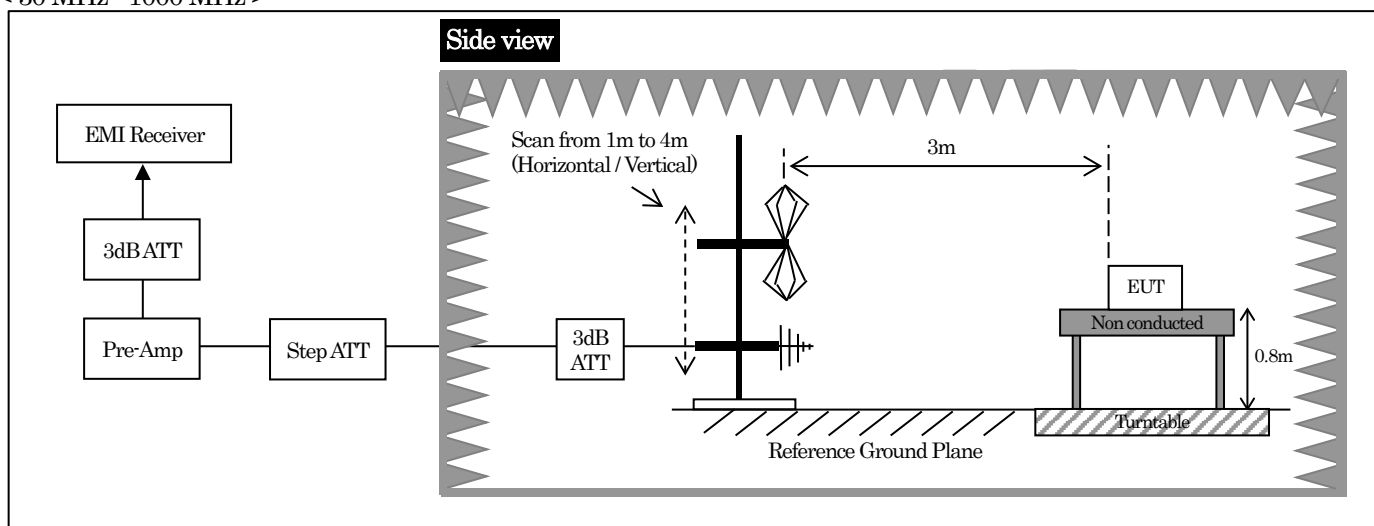
## 2.6. View of Measurement Facility

### Radiated spurious emissions

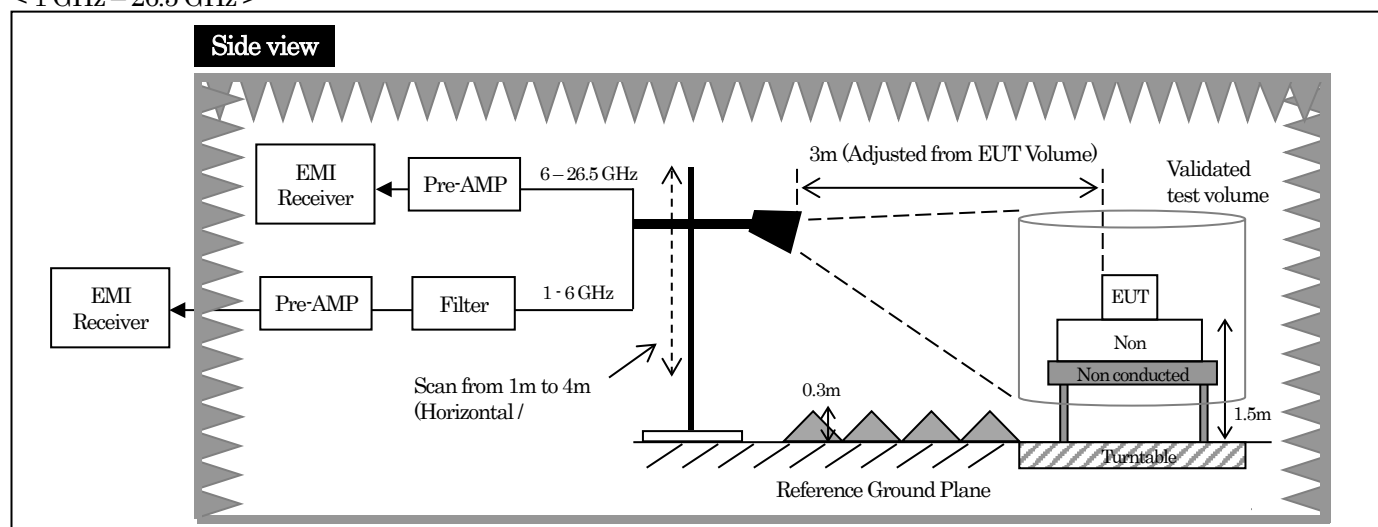
< 9 kHz - 30 MHz >



< 30 MHz - 1000 MHz >



< 1 GHz - 26.5 GHz >



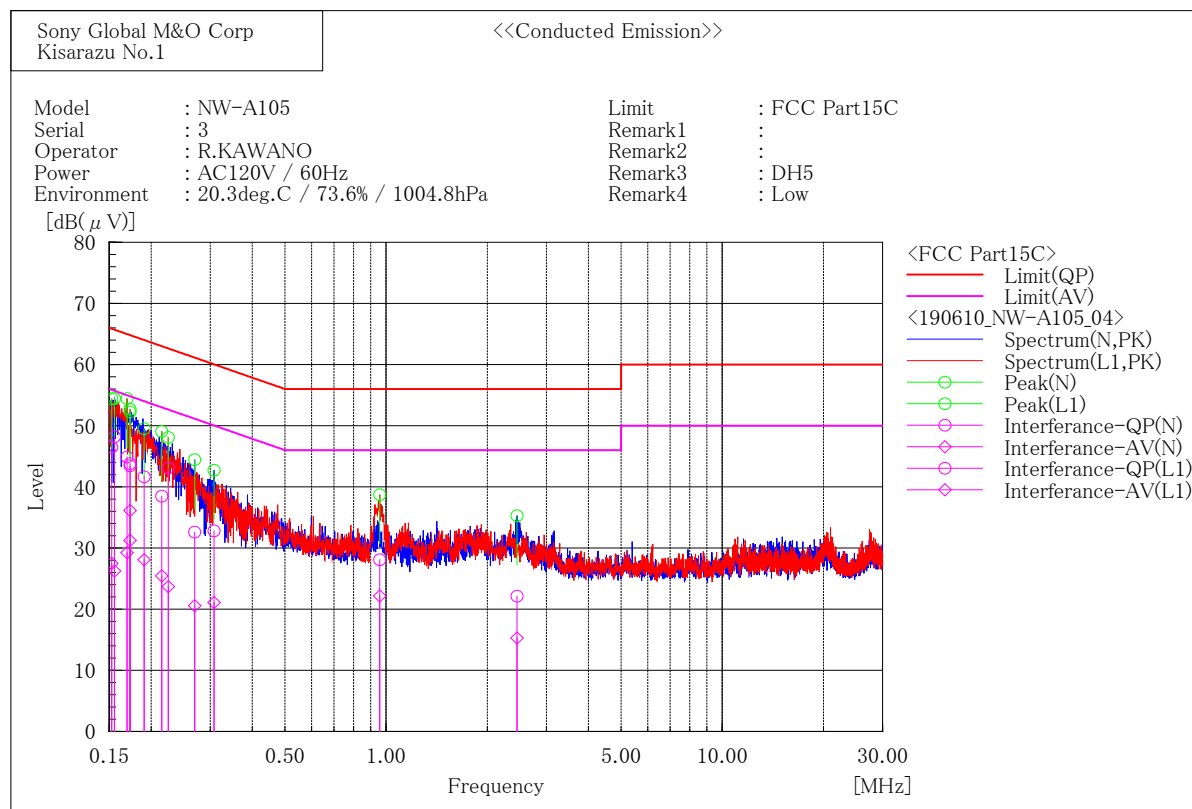
### 3. Test Data

#### 3.1. AC Power-line Conducted Emissions

1) Date of measurement : June 10, 2019

The test data is mentioned as follows.

[BDR / 2402 MHz]



## Final Result

--- N Phase ---

| No. | Frequency | Reading<br>QP | Reading<br>AV | c. f | Result<br>QP | Result<br>AV | Limit<br>QP | Limit<br>AV | Margin<br>QP | Margin<br>AV |
|-----|-----------|---------------|---------------|------|--------------|--------------|-------------|-------------|--------------|--------------|
|     | [MHz]     | [dB(μV)]      | [dB(μV)]      | [dB] | [dB(μV)]     | [dB(μV)]     | [dB(μV)]    | [dB(μV)]    | [dB]         | [dB]         |
| 1   | 0.156     | 32.1          | 10.1          | 16.1 | 48.2         | 26.2         | 65.7        | 55.7        | 17.5         | 29.5         |
| 2   | 0.173     | 27.5          | 19.8          | 16.3 | 43.8         | 36.1         | 64.8        | 54.8        | 21.0         | 18.7         |
| 3   | 0.191     | 25.5          | 12.0          | 16.1 | 41.6         | 28.1         | 64.0        | 54.0        | 22.4         | 25.9         |
| 4   | 0.270     | 16.9          | 4.9           | 15.7 | 32.6         | 20.6         | 61.1        | 51.1        | 28.5         | 30.5         |
| 5   | 0.308     | 16.9          | 5.2           | 15.9 | 32.8         | 21.1         | 60.0        | 50.0        | 27.2         | 28.9         |
| 6   | 2.452     | 6.2           | -0.6          | 15.9 | 22.1         | 15.3         | 56.0        | 46.0        | 33.9         | 30.7         |

--- L1 Phase ---

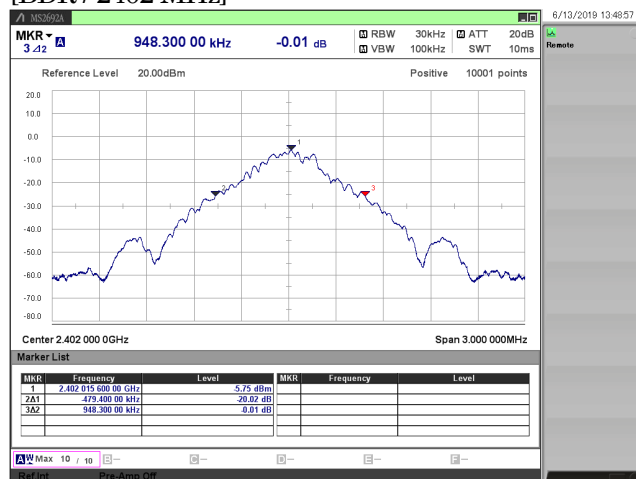
| No. | Frequency | Reading<br>QP | Reading<br>AV | c. f | Result<br>QP | Result<br>AV | Limit<br>QP | Limit<br>AV | Margin<br>QP | Margin<br>AV |
|-----|-----------|---------------|---------------|------|--------------|--------------|-------------|-------------|--------------|--------------|
|     | [MHz]     | [dB(μV)]      | [dB(μV)]      | [dB] | [dB(μV)]     | [dB(μV)]     | [dB(μV)]    | [dB(μV)]    | [dB]         | [dB]         |
| 1   | 0.153     | 30.5          | 11.5          | 16.0 | 46.5         | 27.5         | 65.9        | 55.9        | 19.4         | 28.4         |
| 2   | 0.170     | 28.6          | 12.9          | 16.3 | 44.9         | 29.2         | 65.0        | 55.0        | 20.1         | 25.8         |
| 3   | 0.173     | 27.2          | 14.9          | 16.3 | 43.5         | 31.2         | 64.8        | 54.8        | 21.3         | 23.6         |
| 4   | 0.215     | 22.7          | 9.6           | 15.8 | 38.5         | 25.4         | 63.0        | 53.0        | 24.5         | 27.6         |
| 5   | 0.225     | 27.3          | 7.9           | 15.8 | 43.1         | 23.7         | 62.6        | 52.6        | 19.5         | 28.9         |
| 6   | 0.957     | 12.1          | 6.1           | 16.0 | 28.1         | 22.1         | 56.0        | 46.0        | 27.9         | 23.9         |

### 3.2. 20dB Bandwidth

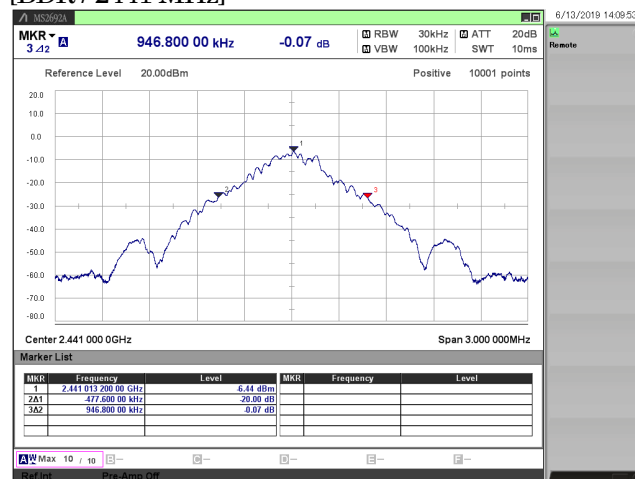
- 1) Ambient temperature : 21.3 deg.C
- 2) Relative humidity : 52.8 %
- 3) Date of measurement : June 13, 2019
- 4) Measured by : H.WAKI
- 5) Operating mode : Transmitting mode

| Mode |      | Channel [MHz] | Result [MHz] | Limit [MHz] |
|------|------|---------------|--------------|-------------|
| BDR  | DH5  | 2402          | 0.948        | -           |
|      |      | 2441          | 0.947        | -           |
|      |      | 2480          | 0.950        | -           |
| EDR  | 3DH5 | 2402          | 1.293        | -           |
|      |      | 2441          | 1.291        | -           |
|      |      | 2480          | 1.291        | -           |

[BDR / 2402 MHz]



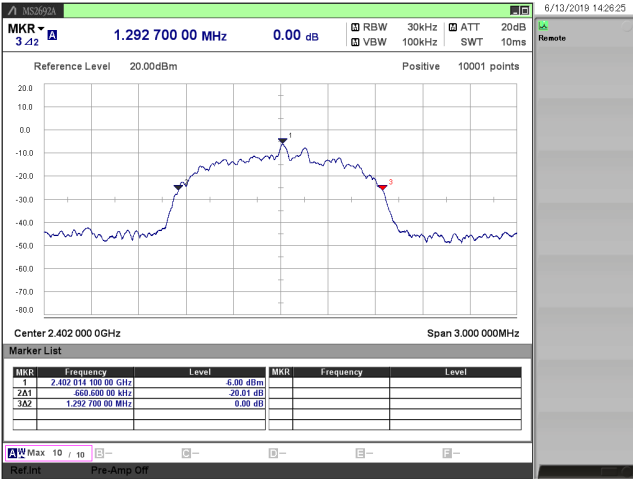
[BDR / 2441 MHz]



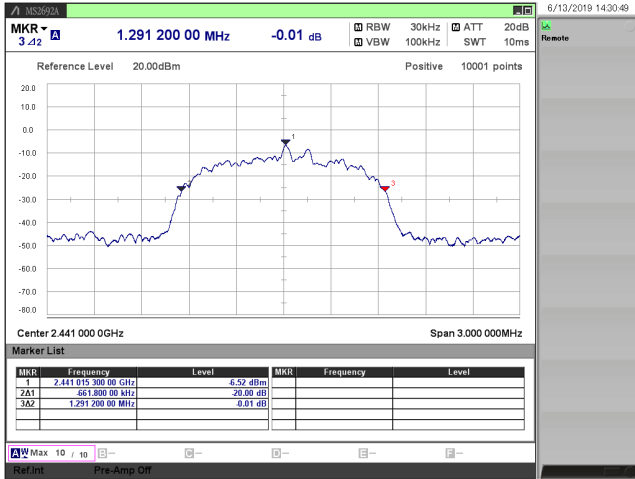
[BDR / 2480 MHz]



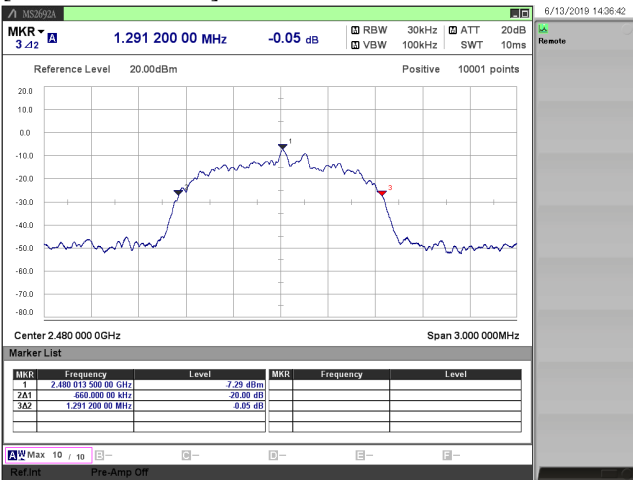
[EDR / 2402 MHz]



[EDR / 2441 MHz]



[EDR / 2480 MHz]

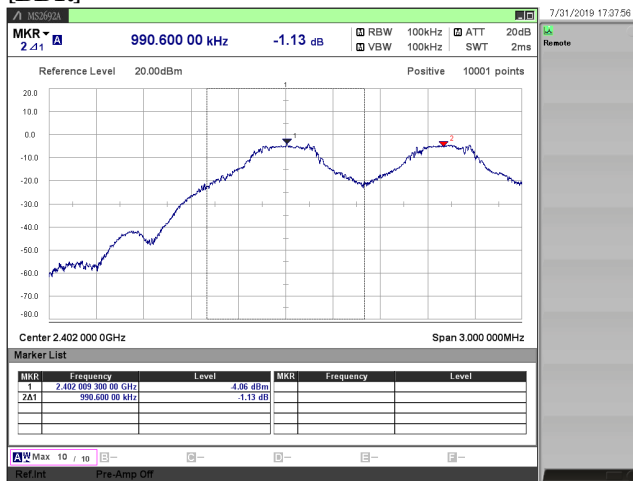


### 3.3. Carrier Frequency Separation

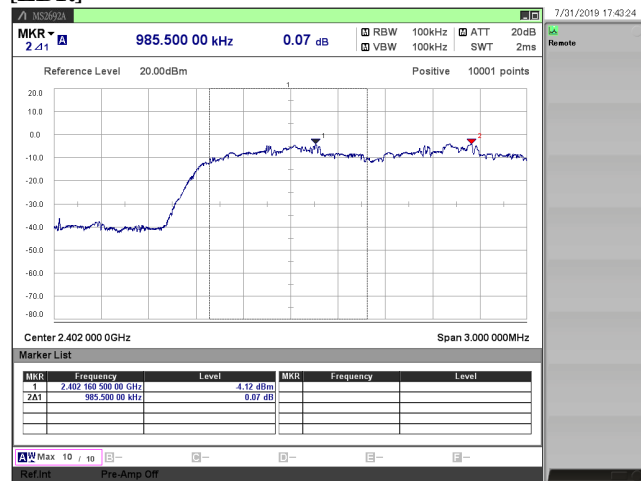
- 1) Ambient temperature : 20.4 deg.C
- 2) Relative humidity : 70.7 %
- 3) Date of measurement : July 31, 2019
- 4) Measured by : M.KOUGA
- 5) Operating mode : Transmitting mode

| Mode |      | Reading [kHz] | Limit [kHz]  |
|------|------|---------------|--------------|
| BDR  | DH5  | 990.6         | $\geq 633.2$ |
| EDR  | 3DH5 | 985.5         | $\geq 861.8$ |

[BDR]



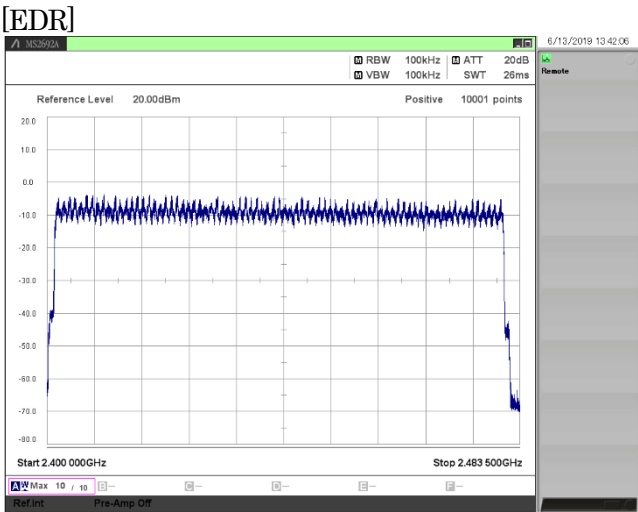
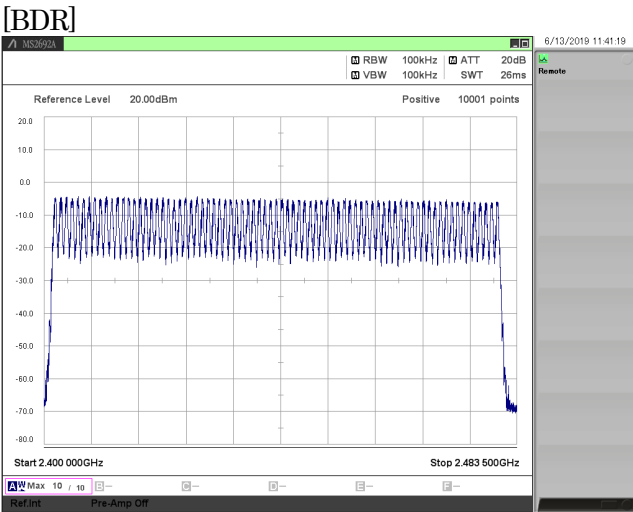
[EDR]



3.4. Number of Hopping Frequencies

- 1) Ambient temperature : 21.3 deg.C
- 2) Relative humidity : 52.8 %
- 3) Date of measurement : June 13, 2019
- 4) Measured by : H.WAKI
- 5) Operating mode : Transmitting mode

| Mode |      | Number<br>[channel] | Limit<br>[channel] |
|------|------|---------------------|--------------------|
| BDR  | DH5  | 79                  | ≥ 15               |
| EDR  | 3DH5 | 79                  | ≥ 15               |

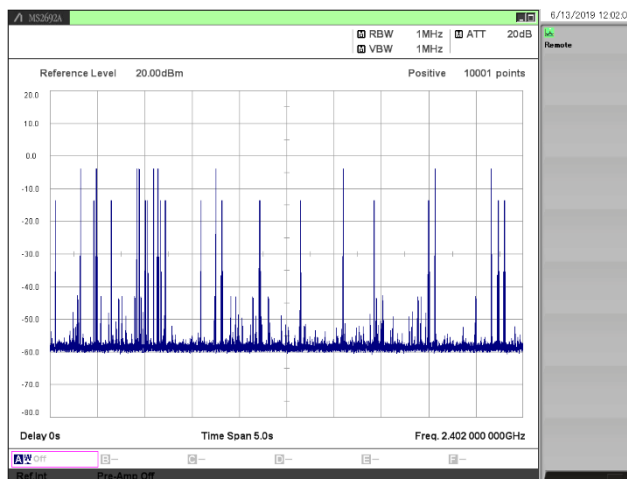
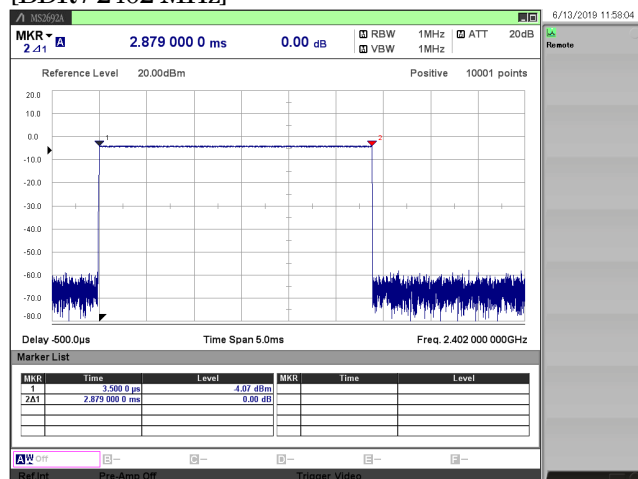


### 3.5. Time of Occupancy (Dwell Time)

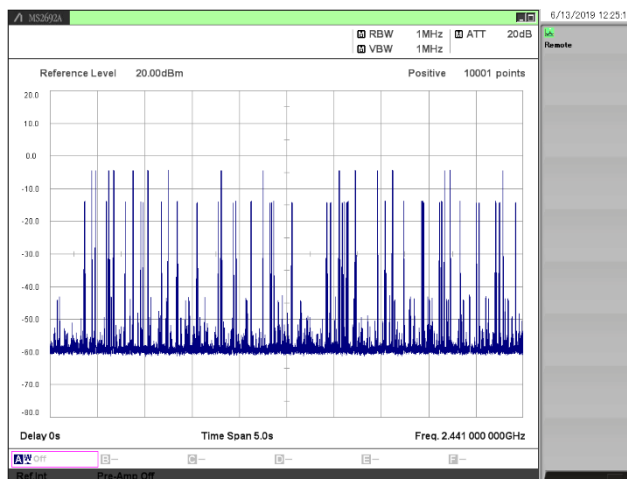
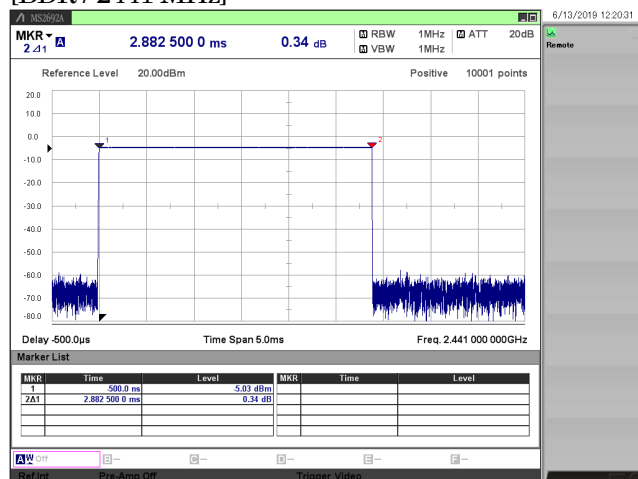
- 1) Ambient temperature : 21.3 deg.C
- 2) Relative humidity : 52.8 %
- 3) Date of measurement : June 13, 2019
- 4) Measured by : H.WAKI
- 5) Operating mode : Transmitting mode

| Mode |      | Channel [MHz] | Dwell Time [msec] | Cycle [time] | Result [msec] | Limit [msec] |
|------|------|---------------|-------------------|--------------|---------------|--------------|
| BDR  | DH5  | 2402          | 2.88              | 15.8         | 287.5         | $\leq 400.0$ |
|      |      | 2441          | 2.88              | 12.6         | 229.5         | $\leq 400.0$ |
|      |      | 2480          | 2.88              | 15.8         | 287.7         | $\leq 400.0$ |
| EDR  | 3DH5 | 2402          | 2.88              | 17.4         | 317.1         | $\leq 400.0$ |
|      |      | 2441          | 2.89              | 15.4         | 281.0         | $\leq 400.0$ |
|      |      | 2480          | 2.89              | 17.8         | 324.7         | $\leq 400.0$ |

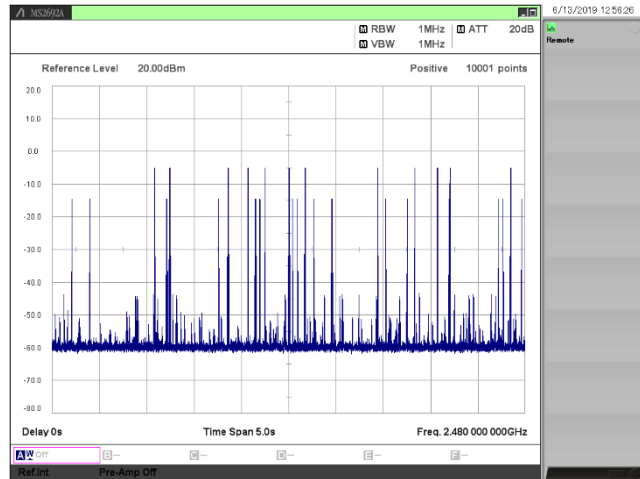
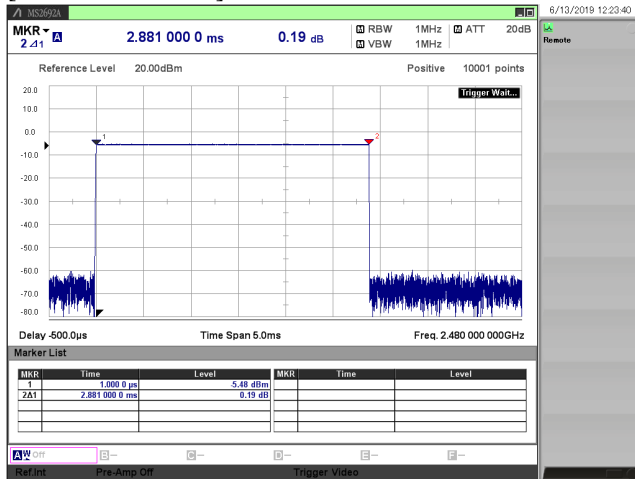
#### [BDR / 2402 MHz]



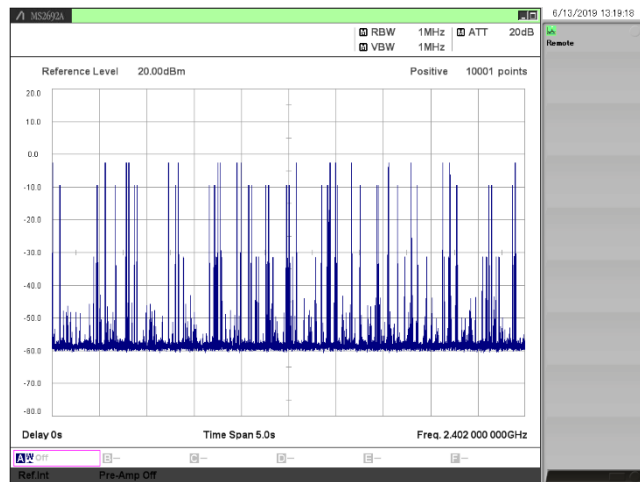
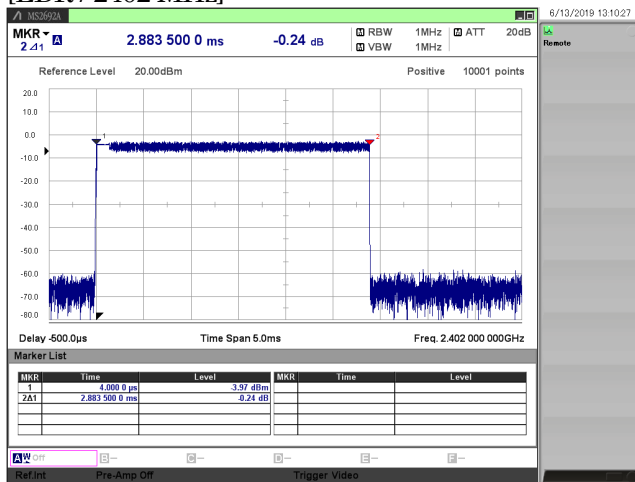
#### [BDR / 2441 MHz]



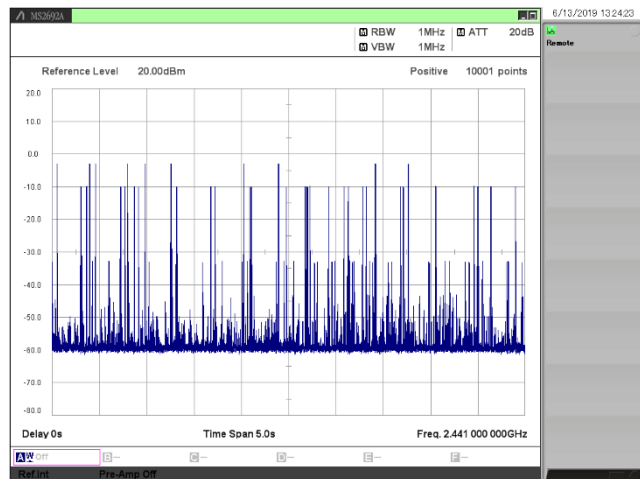
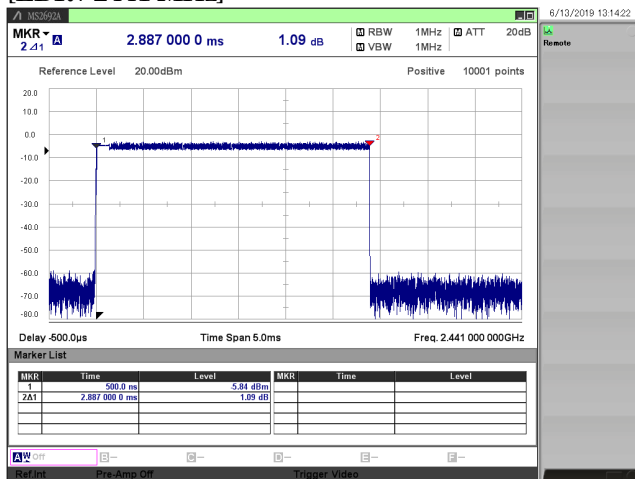
## [BDR / 2480 MHz]



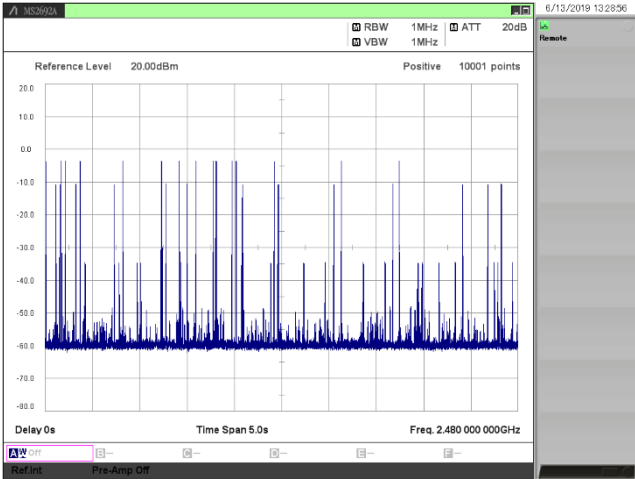
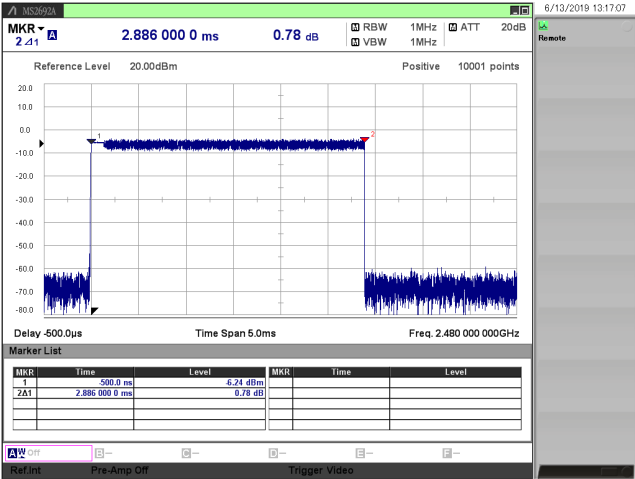
## [EDR / 2402 MHz]



## [EDR / 2441 MHz]



[EDR / 2480 MHz]



### 3.6. Maximum Peak Conducted Output Power

- 1) Ambient temperature : 23.3 deg.C
- 2) Relative humidity : 57.7 %
- 3) Date of measurement : May 22, 2019
- 4) Measured by : M.KOUGA
- 5) Operating mode : Transmitting mode

#### Maximum Peak Conducted Output Power

| Mode |      | Channel [MHz] | Reading(PK) [dBm] | C.F. [dB] | Result(PK) [dBm] | Result(PK) [W] | Limit [dBm] | Limit [W] | Margin [dB] |
|------|------|---------------|-------------------|-----------|------------------|----------------|-------------|-----------|-------------|
| BDR  | DH5  | 2402          | -3.13             | 10.41     | 7.28             | 0.00535        | 20.97       | 0.125     | 13.69       |
|      |      | 2441          | -3.77             | 10.41     | 6.64             | 0.00461        | 20.97       | 0.125     | 14.33       |
|      |      | 2480          | -4.56             | 10.41     | 5.85             | 0.00385        | 20.97       | 0.125     | 15.12       |
| EDR  | 2DH5 | 2402          | -1.67             | 10.41     | 8.74             | 0.00748        | 20.97       | 0.125     | 12.23       |
|      |      | 2441          | -2.18             | 10.41     | 8.23             | 0.00665        | 20.97       | 0.125     | 12.74       |
|      |      | 2480          | -2.88             | 10.41     | 7.53             | 0.00566        | 20.97       | 0.125     | 13.44       |
|      | 3DH5 | 2402          | -1.36             | 10.41     | 9.05             | 0.00804        | 20.97       | 0.125     | 11.92       |
|      |      | 2441          | -1.83             | 10.41     | 8.58             | 0.00721        | 20.97       | 0.125     | 12.39       |
|      |      | 2480          | -2.52             | 10.41     | 7.89             | 0.00615        | 20.97       | 0.125     | 13.08       |
|      |      |               |                   |           |                  |                |             |           |             |

#### Duty Cycle check

| Mode |      | Channel [MHz] | T(on+off) [msec] | T(on) [msec] | Duty Cycle [%] |
|------|------|---------------|------------------|--------------|----------------|
| BDR  | DH1  | 2441          | 1.250            | 0.377        | 30.19          |
|      | DH3  | 2441          | 2.500            | 1.633        | 65.31          |
|      | DH5  | 2441          | 3.751            | 2.881        | 76.81          |
| EDR  | 2DH1 | 2441          | 1.250            | 0.384        | 30.69          |
|      | 2DH3 | 2441          | 2.500            | 1.635        | 65.41          |
|      | 2DH5 | 2441          | 3.751            | 2.881        | 76.83          |
|      | 3DH1 | 2441          | 1.250            | 0.383        | 30.67          |
|      | 3DH3 | 2441          | 2.500            | 1.632        | 65.30          |
|      | 3DH5 | 2441          | 3.751            | 2.884        | 76.90          |

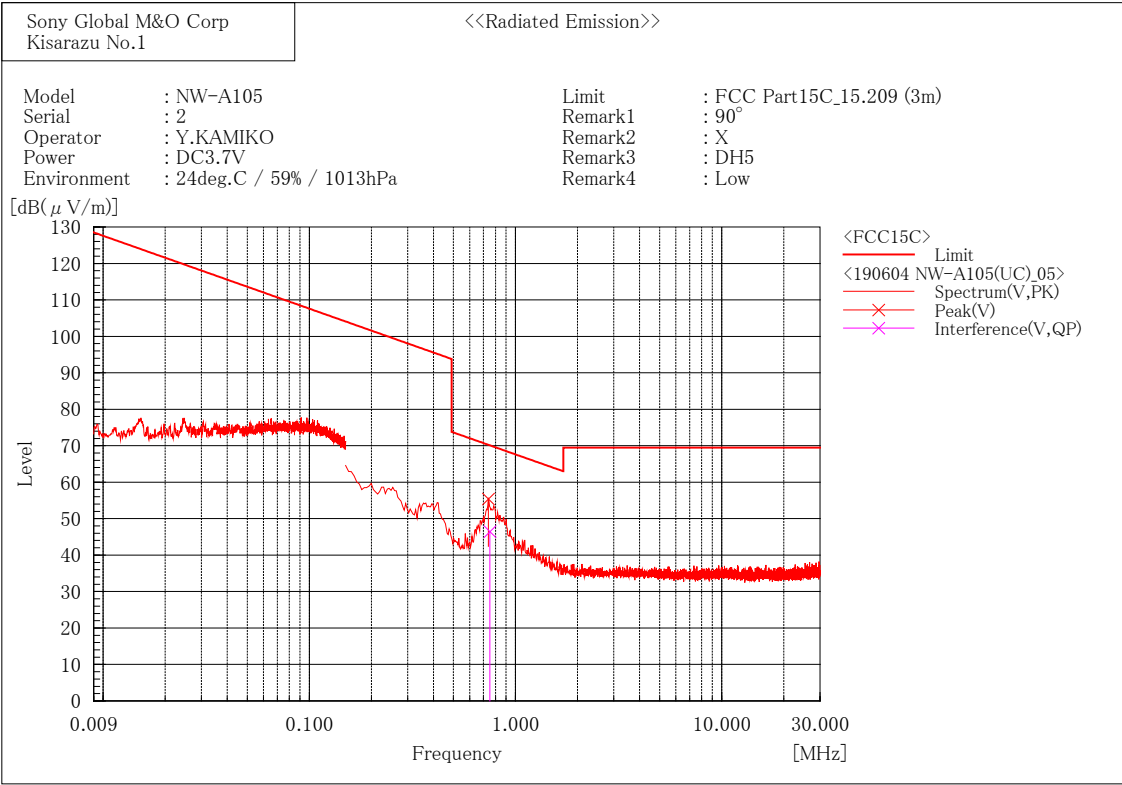
### 3.7. Radiated Spurious Emissions

#### 1) Date of measurement

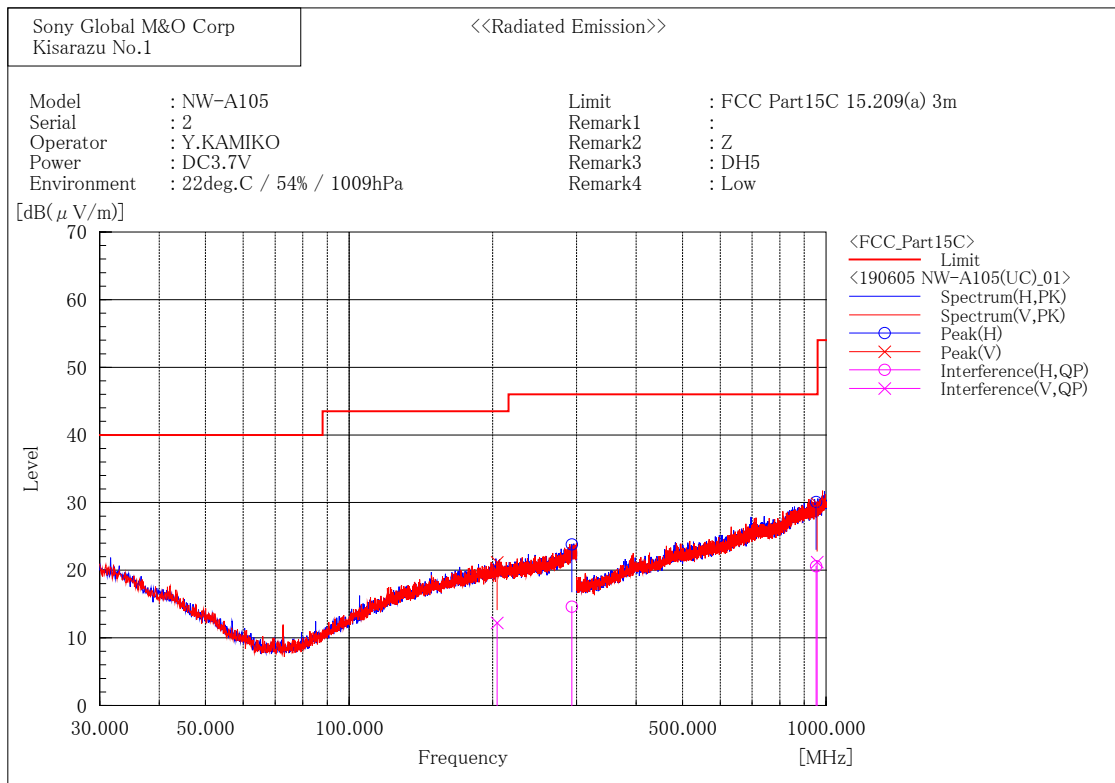
|                    |                |            |                                                    |
|--------------------|----------------|------------|----------------------------------------------------|
| 9 kHz to 30 MHz    | : June 4, 2019 | (all mode) |                                                    |
| 30 MHz to 1000 MHz | : June 5, 2019 | (all mode) |                                                    |
| 1 GHz to 6 GHz     | : May 30, 2019 | (all mode) | May 30, 2019 to May 31, 2019 (band edge plot data) |
| 6 GHz to 18 GHz    | : May 31, 2019 | (all mode) |                                                    |
| 18 GHz to 26.5 GHz | : June 3, 2019 | (all mode) |                                                    |

The test data is mentioned as follows.

9 kHz to 30 MHz  
[BDR (DH5) / 2402 MHz]



30 MHz to 1000 MHz  
[BDR (DH5) / 2402 MHz]



## Final Result

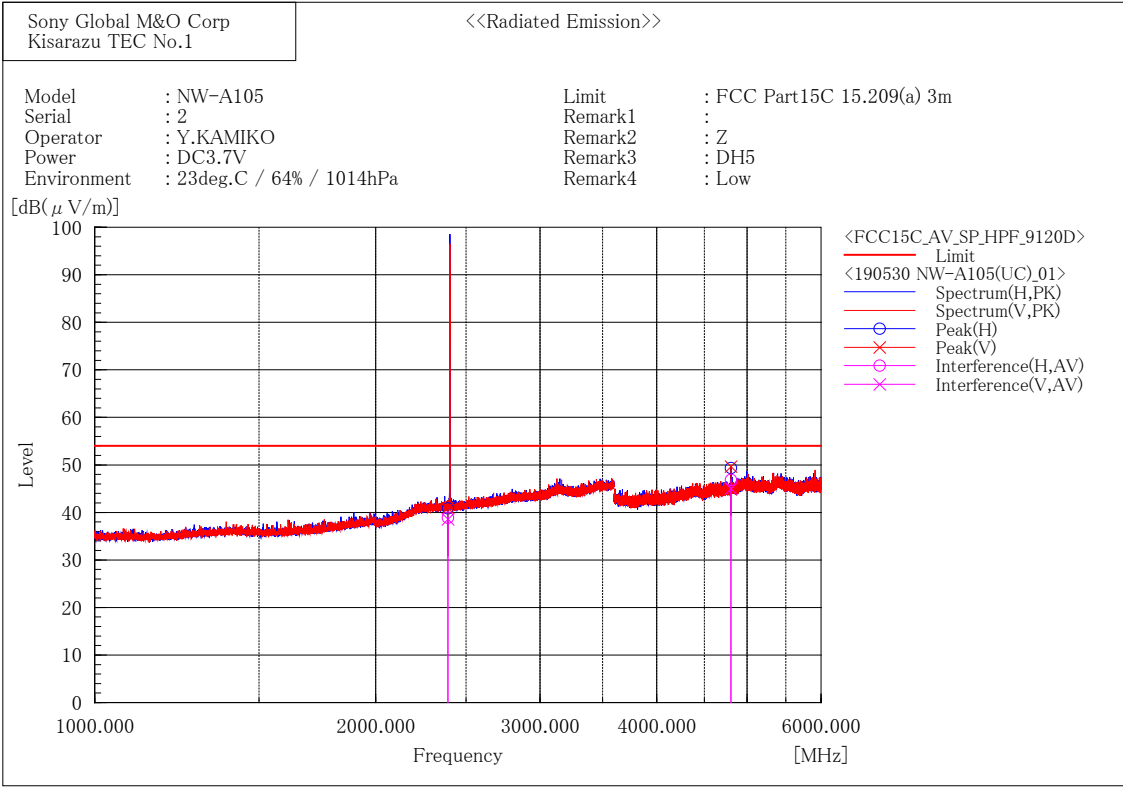
## --- Horizontal Polarization (QP)---

| No. | Frequency [MHz] | Reading [dB(μV)] | c.f [dB(1/m)] | Result [dB(μV/m)] | Limit [dB(μV/m)] | Margin [dB] | Height [cm] | Angle [°] |
|-----|-----------------|------------------|---------------|-------------------|------------------|-------------|-------------|-----------|
| 1   | 293.250         | 19.4             | -4.8          | 14.6              | 46.0             | 31.4        | 299.8       | 185.1     |
| 2   | 953.567         | 19.3             | 1.3           | 20.6              | 46.0             | 25.4        | 209.5       | 228.2     |

## --- Vertical Polarization (QP)---

| No. | Frequency [MHz] | Reading [dB(μV)] | c.f [dB(1/m)] | Result [dB(μV/m)] | Limit [dB(μV/m)] | Margin [dB] | Height [cm] | Angle [°] |
|-----|-----------------|------------------|---------------|-------------------|------------------|-------------|-------------|-----------|
| 1   | 204.240         | 19.6             | -7.4          | 12.2              | 43.5             | 31.3        | 280.8       | 96.4      |
| 2   | 957.533         | 19.8             | 1.4           | 21.2              | 46.0             | 24.8        | 368.9       | 356.4     |

1 GHz to 6 GHz  
[BDR (DH5) / 2402 MHz]



Final Result

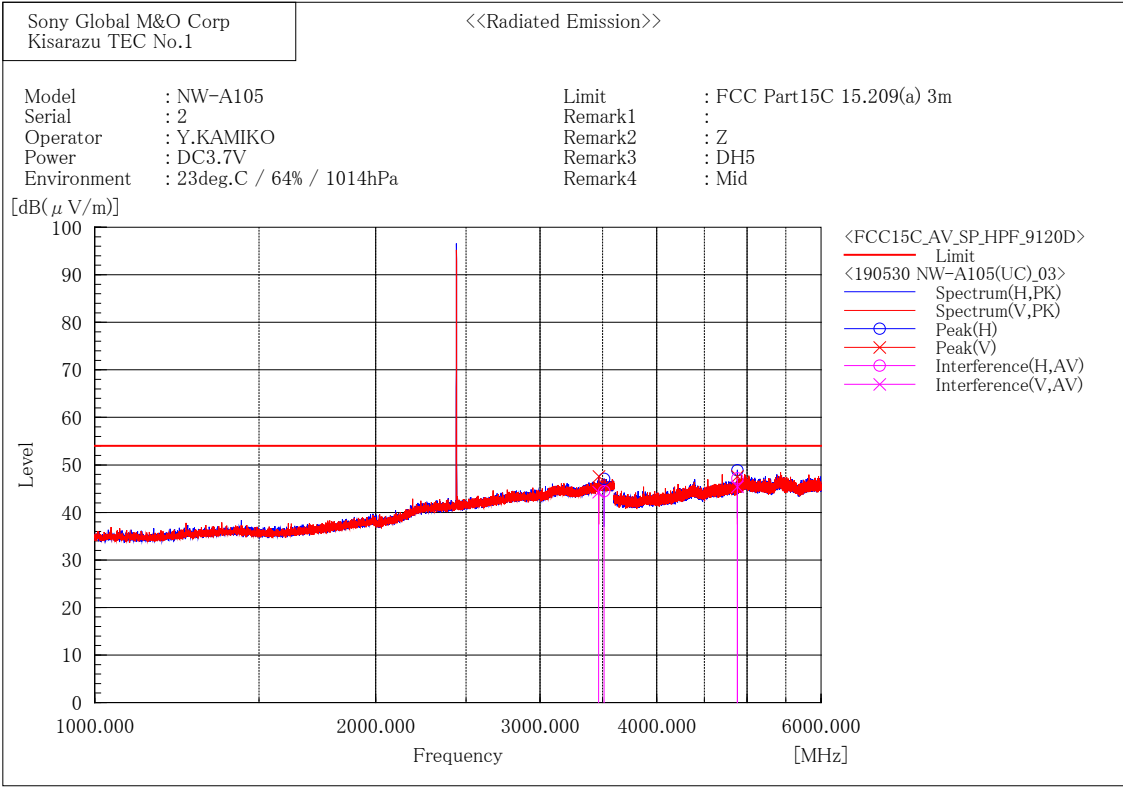
--- Horizontal Polarization (AV) ---

| No. | Frequency<br>[MHz] | Reading<br>[dB(μV)] | c. f<br>[dB(1/m)] | Result<br>[dB(μV/m)] | Limit<br>[dB(μV/m)] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] |
|-----|--------------------|---------------------|-------------------|----------------------|---------------------|----------------|----------------|--------------|
| 1   | 2390.000           | 36.2                | 2.7               | 38.9                 | 54.0                | 15.1           | 176.7          | 260.5        |
| 2   | 4803.985           | 36.0                | 10.9              | 46.9                 | 54.0                | 7.1            | 152.0          | 313.3        |

--- Vertical Polarization (AV) ---

| No. | Frequency<br>[MHz] | Reading<br>[dB(μV)] | c. f<br>[dB(1/m)] | Result<br>[dB(μV/m)] | Limit<br>[dB(μV/m)] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] |
|-----|--------------------|---------------------|-------------------|----------------------|---------------------|----------------|----------------|--------------|
| 1   | 2390.000           | 35.9                | 2.7               | 38.6                 | 54.0                | 15.4           | 300.0          | 45.9         |
| 2   | 4804.284           | 34.1                | 10.9              | 45.0                 | 54.0                | 9.0            | 239.5          | 7.4          |

[BDR (DH5) / 2441 MHz]



Final Result

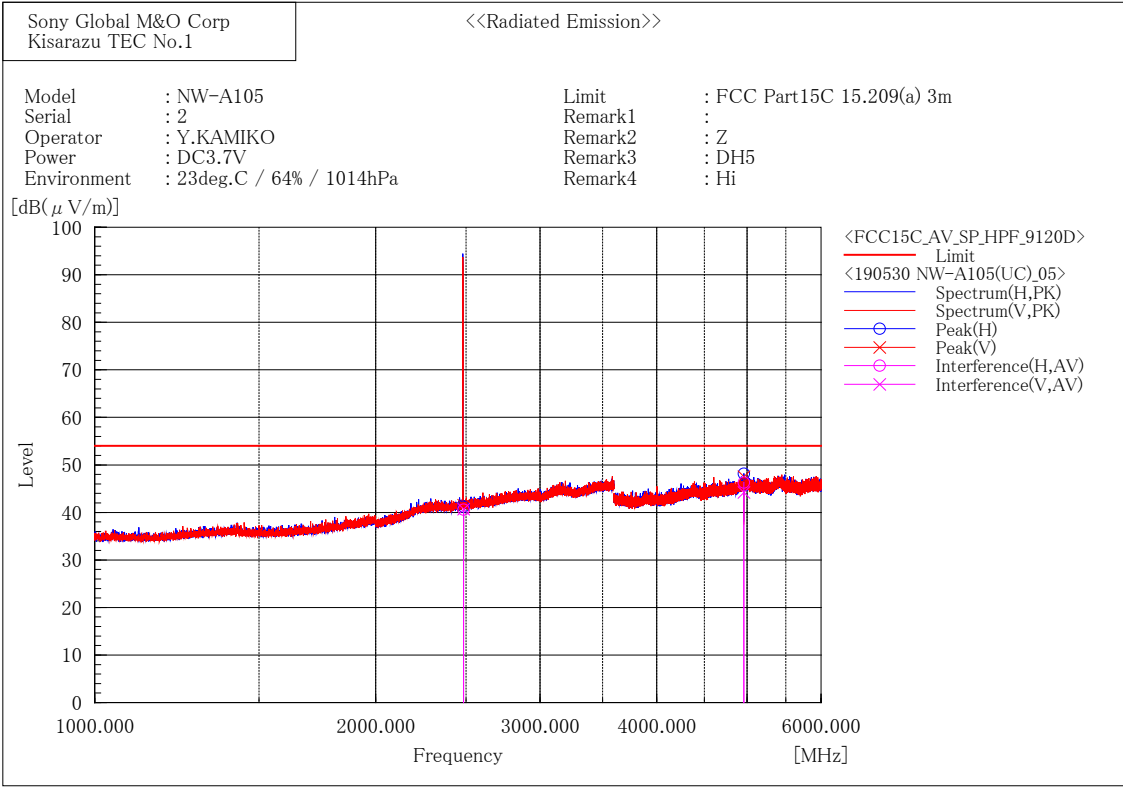
--- Horizontal Polarization (AV) ---

| No. | Frequency [MHz] | Reading [dB(μ V)] | c. f [dB(1/m)] | Result [dB(μ V/m)] | Limit [dB(μ V/m)] | Margin [dB] | Height [cm] | Angle [°] |
|-----|-----------------|-------------------|----------------|--------------------|-------------------|-------------|-------------|-----------|
| 1   | 3513.488        | 37.5              | 7.0            | 44.5               | 54.0              | 9.5         | 115.6       | 281.9     |
| 2   | 4881.683        | 36.2              | 11.0           | 47.2               | 54.0              | 6.8         | 149.0       | 329.4     |

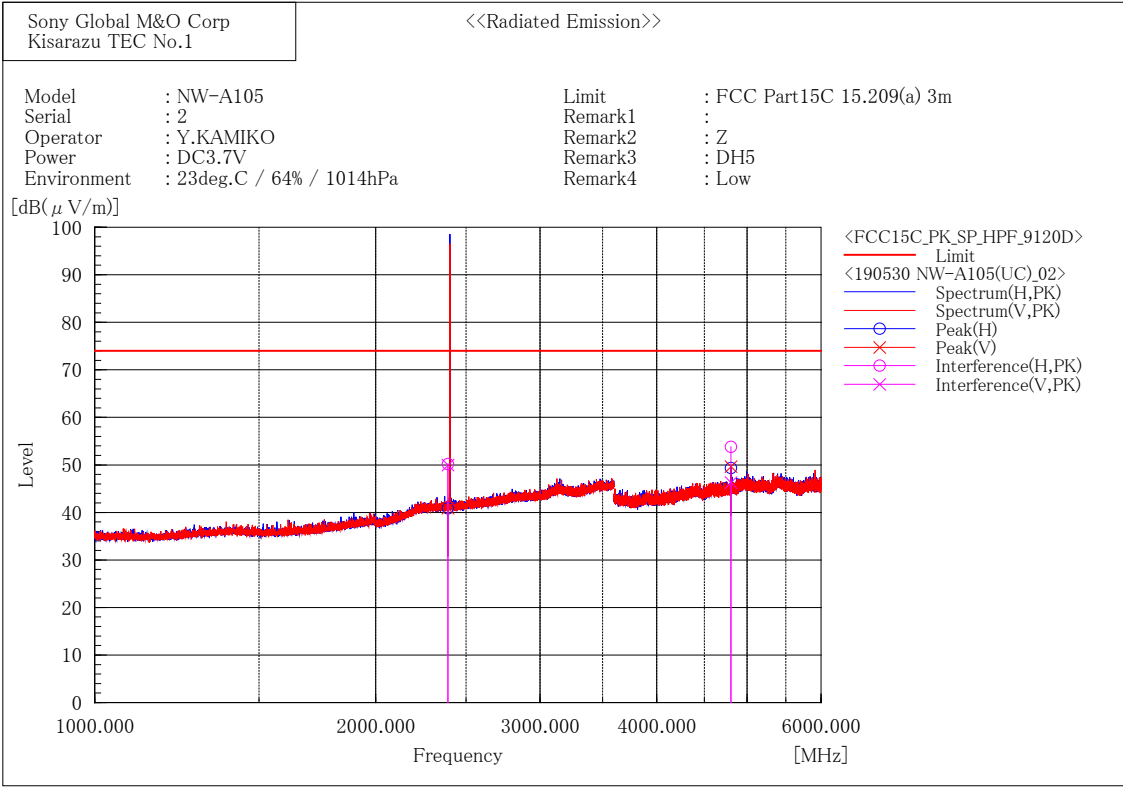
--- Vertical Polarization (AV) ---

| No. | Frequency [MHz] | Reading [dB(μ V)] | c. f [dB(1/m)] | Result [dB(μ V/m)] | Limit [dB(μ V/m)] | Margin [dB] | Height [cm] | Angle [°] |
|-----|-----------------|-------------------|----------------|--------------------|-------------------|-------------|-------------|-----------|
| 1   | 3466.886        | 37.7              | 6.6            | 44.3               | 54.0              | 9.7         | 432.0       | 187.2     |
| 2   | 4882.001        | 34.4              | 11.0           | 45.4               | 54.0              | 8.6         | 267.0       | 352.9     |

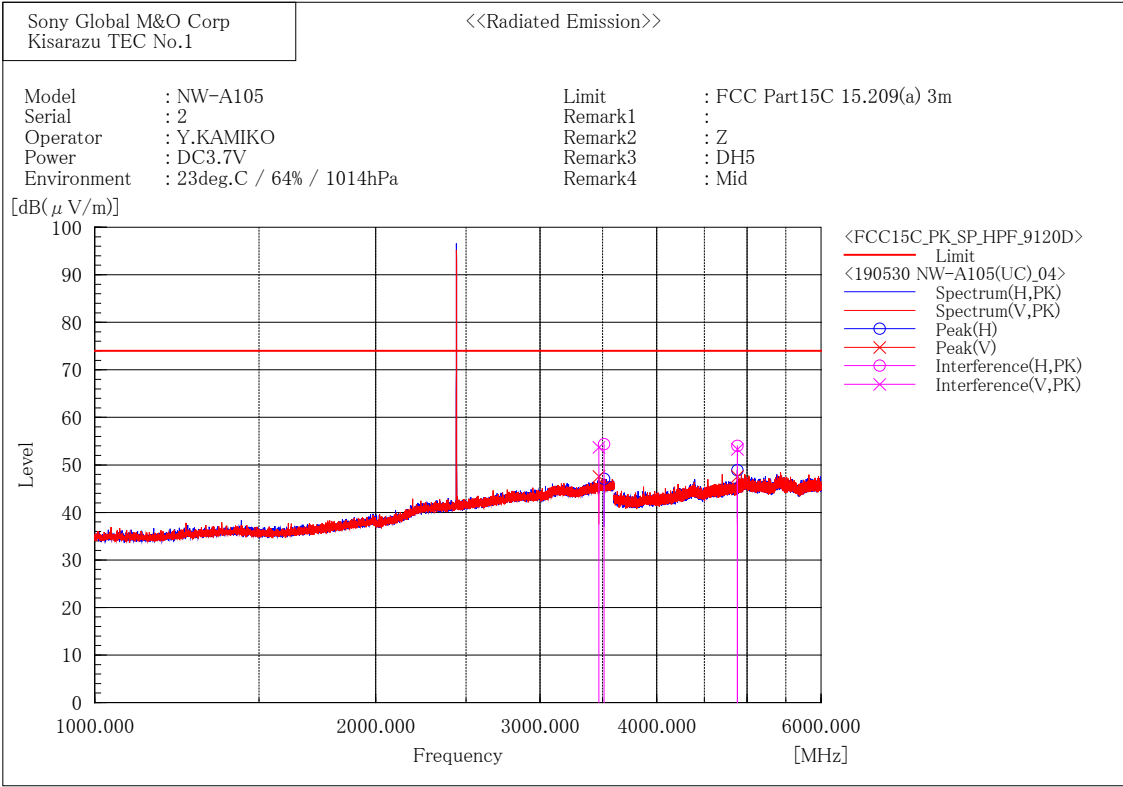
[BDR (DH5) / 2480 MHz]



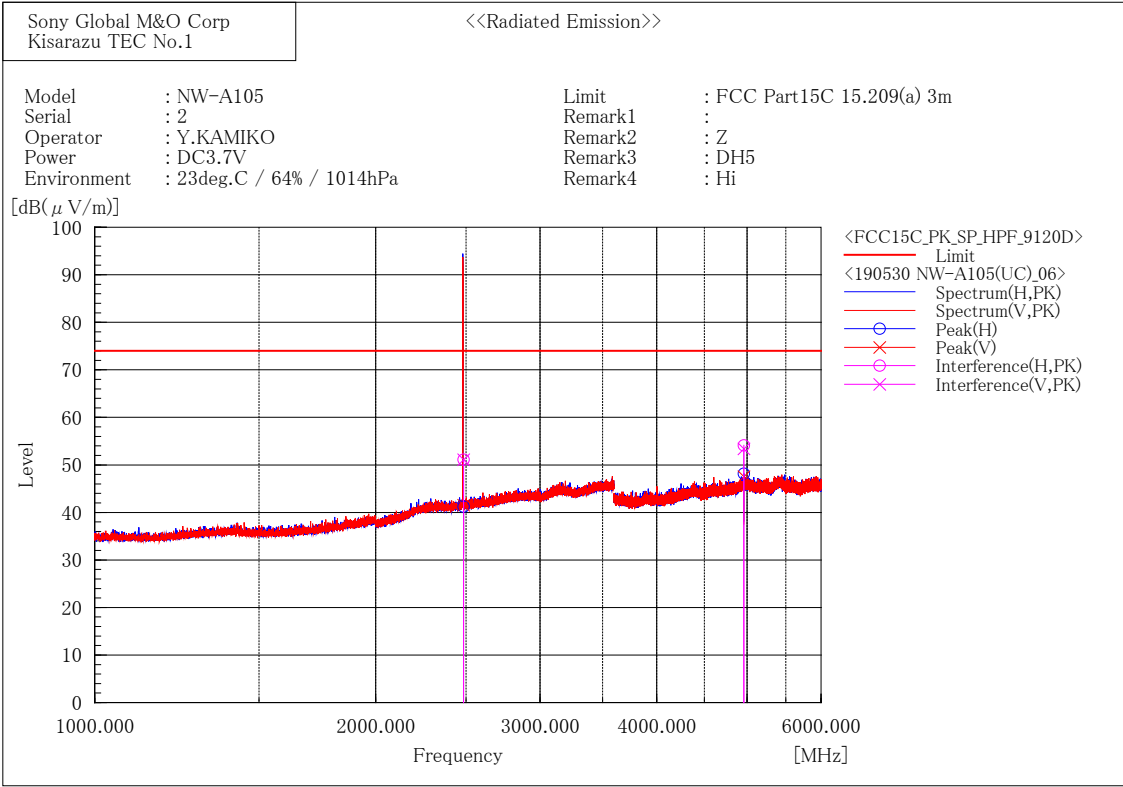
[BDR (DH5) / 2402 MHz]



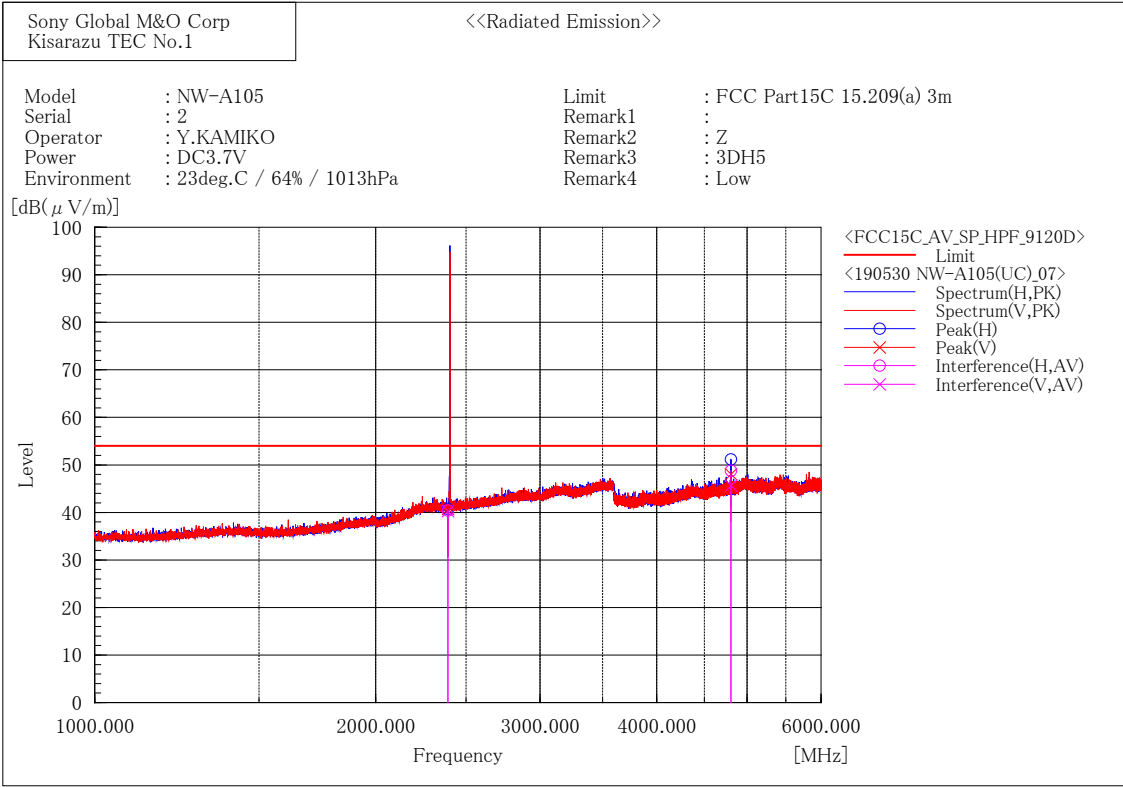
[BDR (DH5) / 2441 MHz]



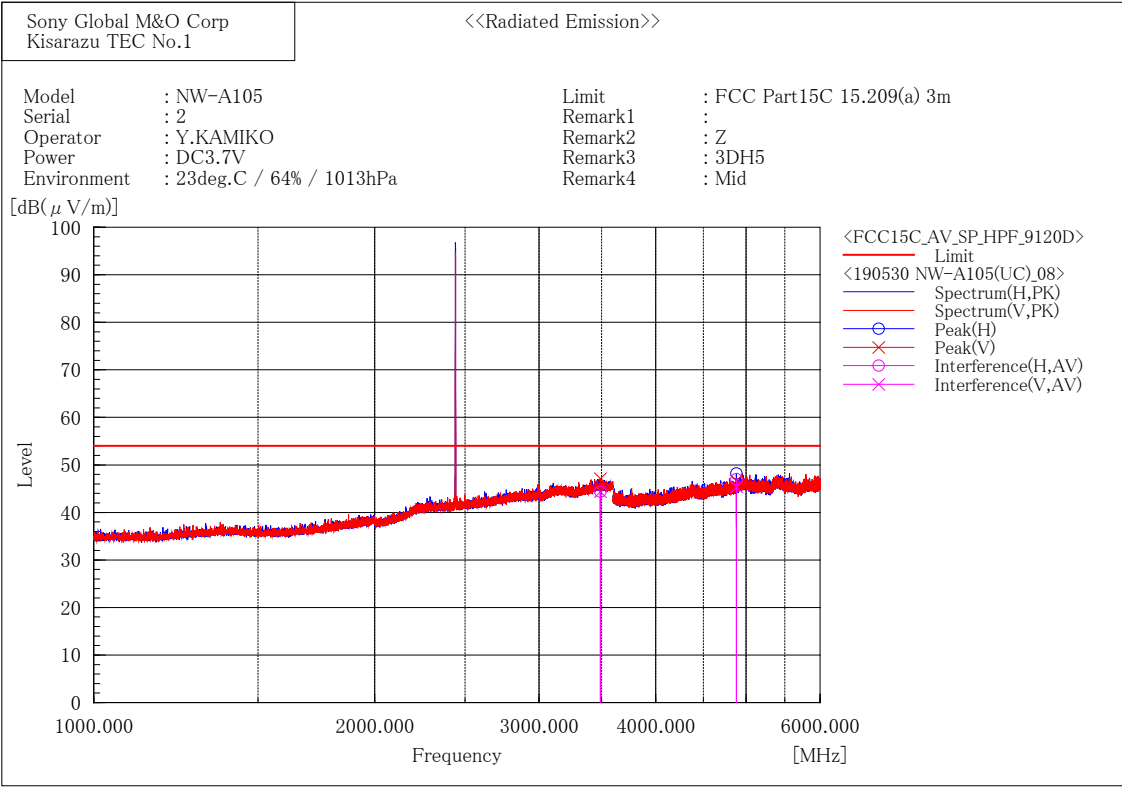
[BDR (DH5) / 2480 MHz]



[EDR (3DH5) / 2402 MHz]



[EDR (3DH5) / 2441 MHz]



Final Result

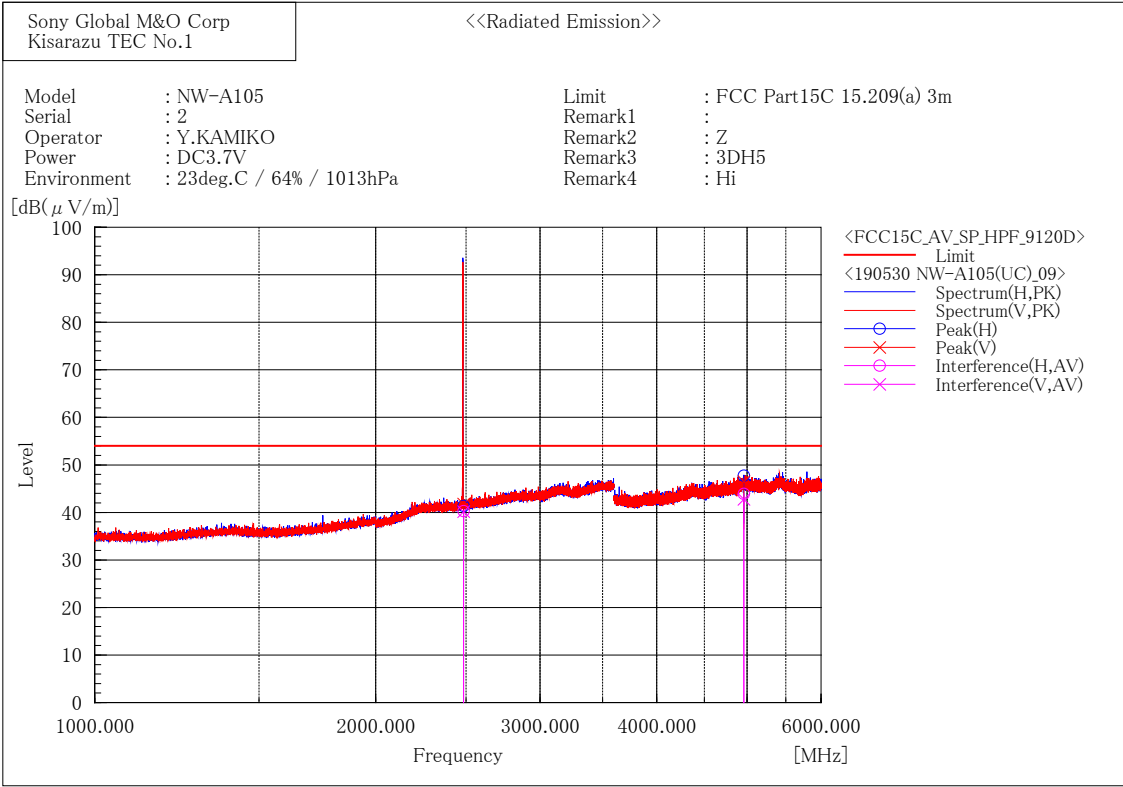
--- Horizontal Polarization (AV) ---

| No. | Frequency<br>[MHz] | Reading<br>[dB(μ V)] | c. f<br>[dB(1/m)] | Result<br>[dB(μ V/m)] | Limit<br>[dB(μ V/m)] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] |
|-----|--------------------|----------------------|-------------------|-----------------------|----------------------|----------------|----------------|--------------|
| 1   | 3489.331           | 37.6                 | 6.8               | 44.4                  | 54.0                 | 9.6            | 251.5          | 168.5        |
| 2   | 4881.542           | 36.0                 | 11.0              | 47.0                  | 54.0                 | 7.0            | 171.6          | 315.8        |

--- Vertical Polarization (AV) ---

| No. | Frequency<br>[MHz] | Reading<br>[dB(μ V)] | c. f<br>[dB(1/m)] | Result<br>[dB(μ V/m)] | Limit<br>[dB(μ V/m)] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] |
|-----|--------------------|----------------------|-------------------|-----------------------|----------------------|----------------|----------------|--------------|
| 1   | 3489.265           | 37.6                 | 6.8               | 44.4                  | 54.0                 | 9.6            | 218.3          | 263.3        |
| 2   | 4882.041           | 34.4                 | 11.0              | 45.4                  | 54.0                 | 8.6            | 334.6          | 346.0        |

[EDR (3DH5) / 2480 MHz]



Final Result

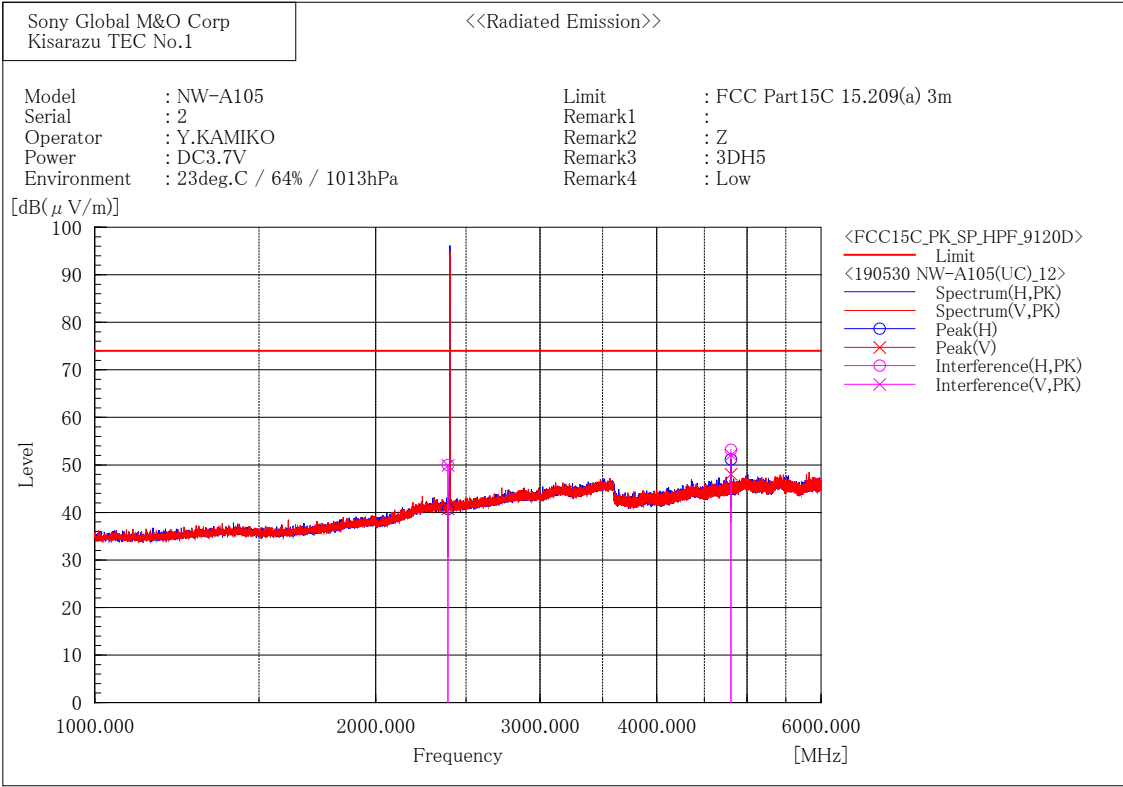
--- Horizontal Polarization (AV) ---

| No. | Frequency [MHz] | Reading [dB(μ V)] | c. f [dB(1/m)] | Result [dB(μ V/m)] | Limit [dB(μ V/m)] | Margin [dB] | Height [cm] | Angle [°] |
|-----|-----------------|-------------------|----------------|--------------------|-------------------|-------------|-------------|-----------|
| 1   | 2483.500        | 37.2              | 3.1            | 40.3               | 54.0              | 13.7        | 400.5       | 124.5     |
| 2   | 4959.881        | 32.6              | 11.3           | 43.9               | 54.0              | 10.1        | 132.7       | 343.0     |

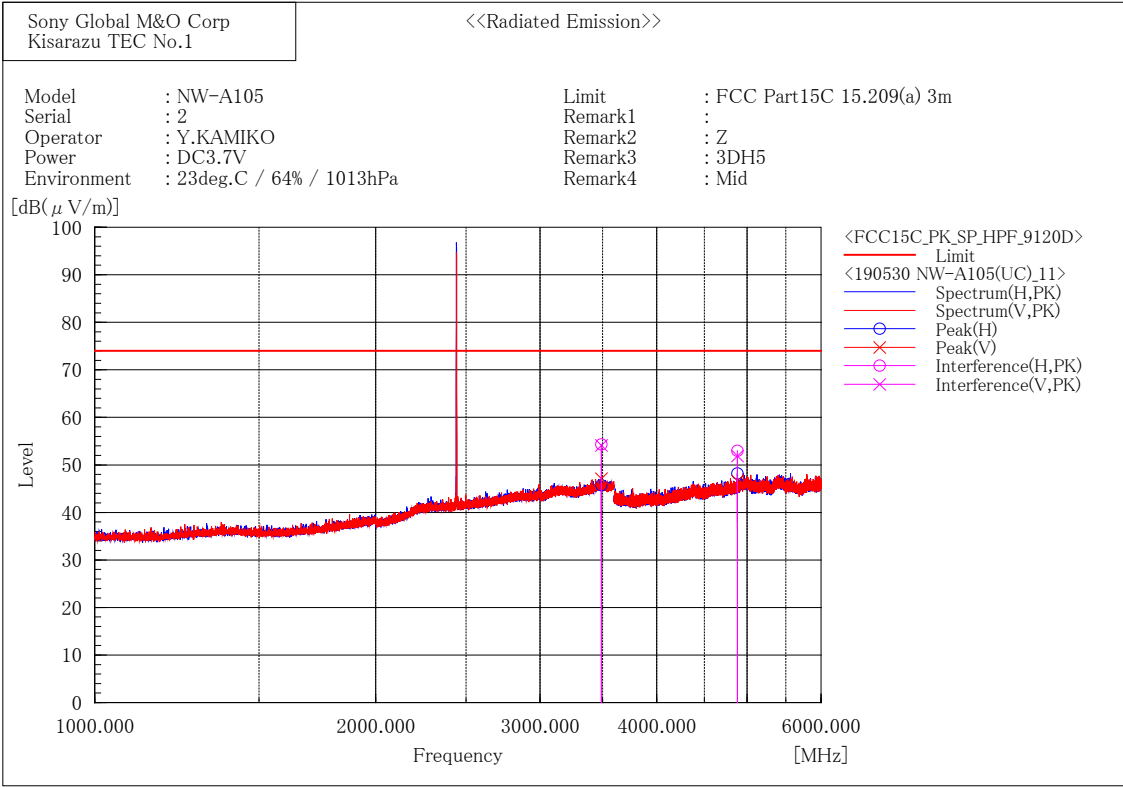
--- Vertical Polarization (AV) ---

| No. | Frequency [MHz] | Reading [dB(μ V)] | c. f [dB(1/m)] | Result [dB(μ V/m)] | Limit [dB(μ V/m)] | Margin [dB] | Height [cm] | Angle [°] |
|-----|-----------------|-------------------|----------------|--------------------|-------------------|-------------|-------------|-----------|
| 1   | 2483.500        | 37.1              | 3.1            | 40.2               | 54.0              | 13.8        | 100.0       | 272.3     |
| 2   | 4960.081        | 31.5              | 11.3           | 42.8               | 54.0              | 11.2        | 184.2       | 3.4       |

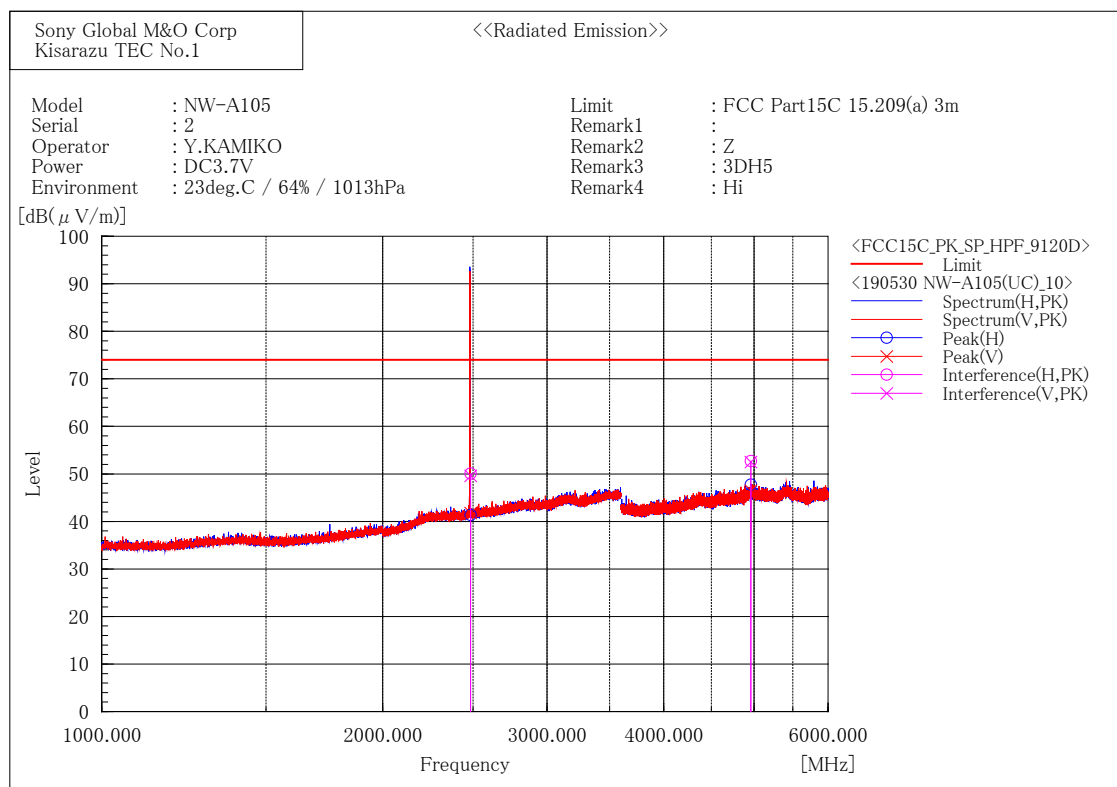
[EDR (3DH5) / 2402 MHz]



[EDR (3DH5) / 2441 MHz]



[EDR (3DH5) / 2480 MHz]



## Final Result

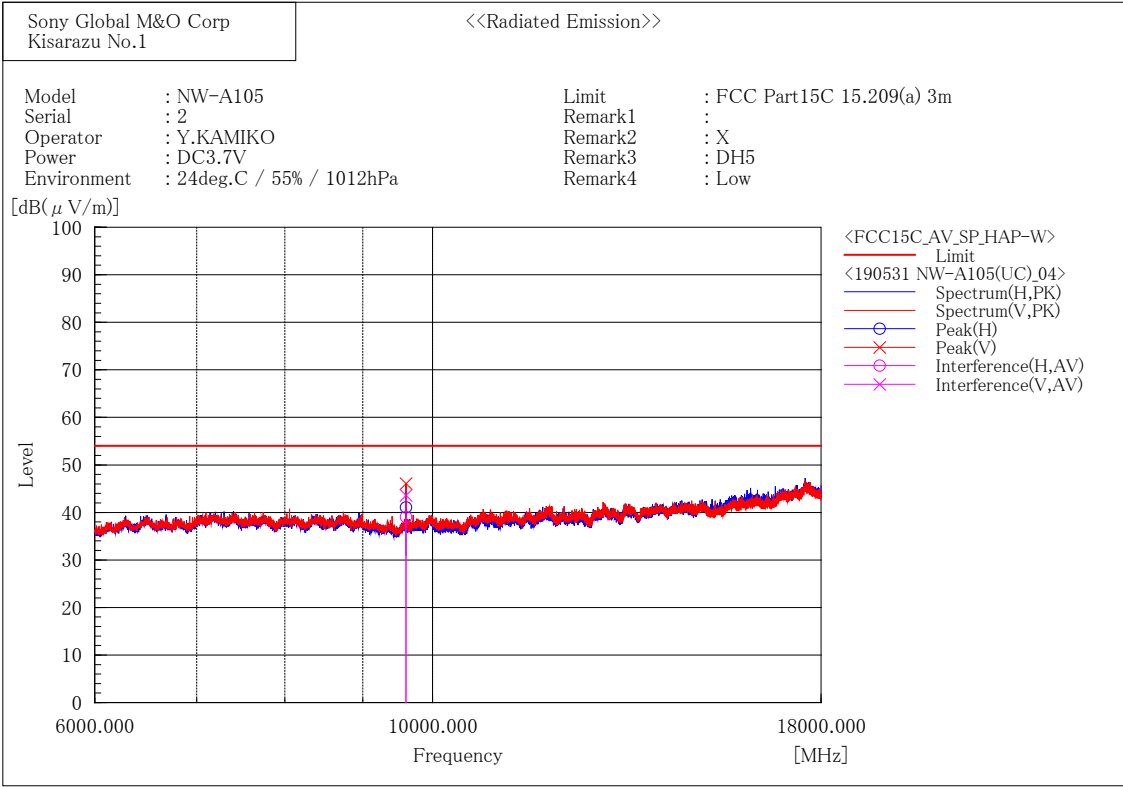
## --- Horizontal Polarization (PK) ---

| No. | Frequency [MHz] | Reading [dB( $\mu$ V)] | c. f [dB(1/m)] | Result [dB( $\mu$ V/m)] | Limit [dB( $\mu$ V/m)] | Margin [dB] | Height [cm] | Angle [°] |
|-----|-----------------|------------------------|----------------|-------------------------|------------------------|-------------|-------------|-----------|
| 1   | 2483.500        | 47.0                   | 3.1            | 50.1                    | 74.0                   | 23.9        | 400.5       | 122.7     |
| 2   | 4960.516        | 41.4                   | 11.3           | 52.7                    | 74.0                   | 21.3        | 132.7       | 343.0     |

## --- Vertical Polarization (PK) ---

| No. | Frequency [MHz] | Reading [dB( $\mu$ V)] | c. f [dB(1/m)] | Result [dB( $\mu$ V/m)] | Limit [dB( $\mu$ V/m)] | Margin [dB] | Height [cm] | Angle [°] |
|-----|-----------------|------------------------|----------------|-------------------------|------------------------|-------------|-------------|-----------|
| 1   | 2483.500        | 46.5                   | 3.1            | 49.6                    | 74.0                   | 24.4        | 100.0       | 270.4     |
| 2   | 4959.988        | 41.2                   | 11.3           | 52.5                    | 74.0                   | 21.5        | 184.2       | 1.4       |

6 GHz to 18 GHz  
[BDR (DH5) / 2402 MHz]



Final Result

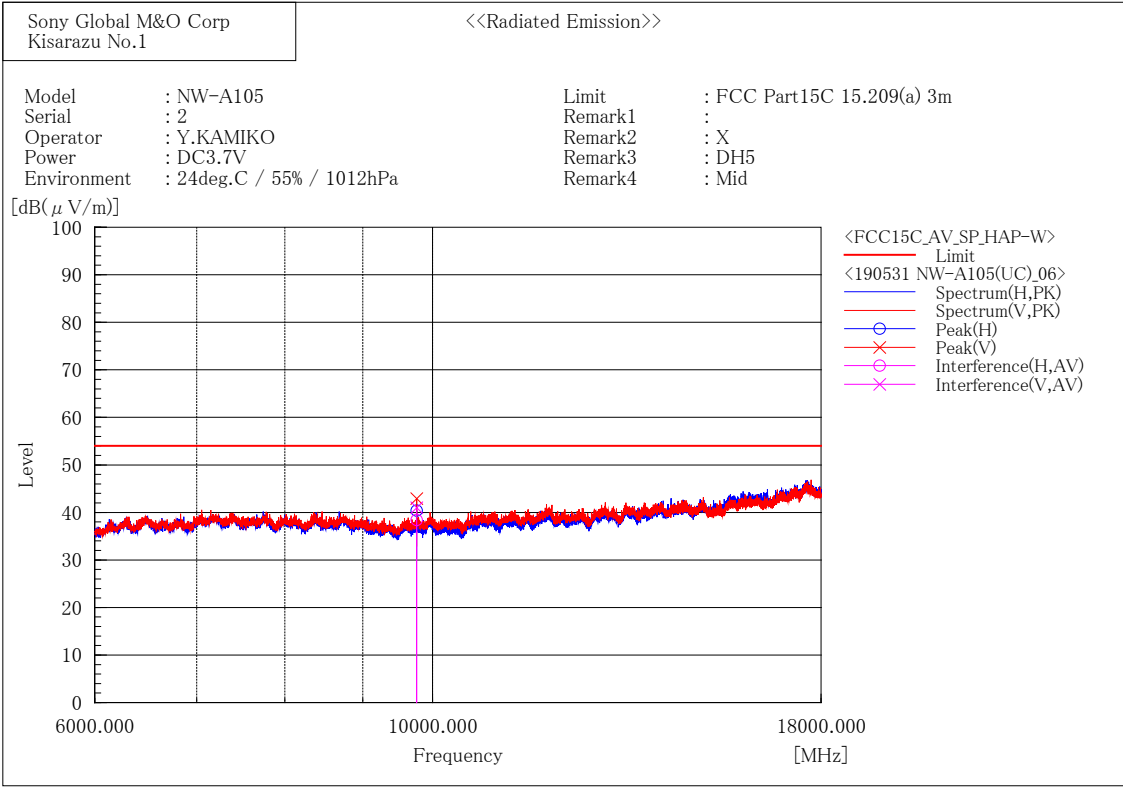
--- Horizontal Polarization (AV) ---

| No. | Frequency<br>[MHz] | Reading<br>[dB(μ V)] | c. f<br>[dB(1/m)] | Result<br>[dB(μ V/m)] | Limit<br>[dB(μ V/m)] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] |
|-----|--------------------|----------------------|-------------------|-----------------------|----------------------|----------------|----------------|--------------|
| 1   | 9607.609           | 45.0                 | -6.0              | 39.0                  | 54.0                 | 15.0           | 100.0          | 61.2         |

--- Vertical Polarization (AV) ---

| No. | Frequency<br>[MHz] | Reading<br>[dB(μ V)] | c. f<br>[dB(1/m)] | Result<br>[dB(μ V/m)] | Limit<br>[dB(μ V/m)] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] |
|-----|--------------------|----------------------|-------------------|-----------------------|----------------------|----------------|----------------|--------------|
| 1   | 9607.671           | 49.6                 | -6.0              | 43.6                  | 54.0                 | 10.4           | 121.5          | 32.3         |

[BDR (DH5) / 2441 MHz]



Final Result

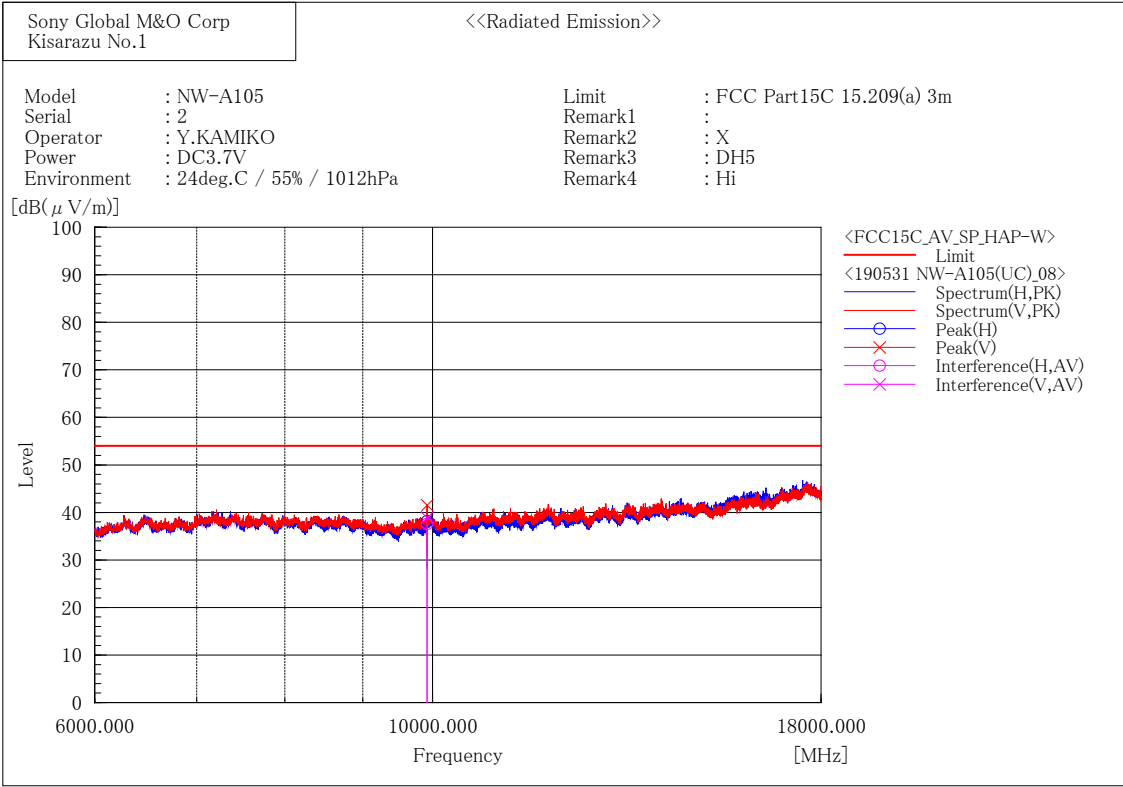
--- Horizontal Polarization (AV) ---

| No. | Frequency<br>[MHz] | Reading<br>[dB(μ V)] | c. f<br>[dB(1/m)] | Result<br>[dB(μ V/m)] | Limit<br>[dB(μ V/m)] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] |
|-----|--------------------|----------------------|-------------------|-----------------------|----------------------|----------------|----------------|--------------|
| 1   | 9763.395           | 43.8                 | -5.4              | 38.4                  | 54.0                 | 15.6           | 100.0          | 63.2         |

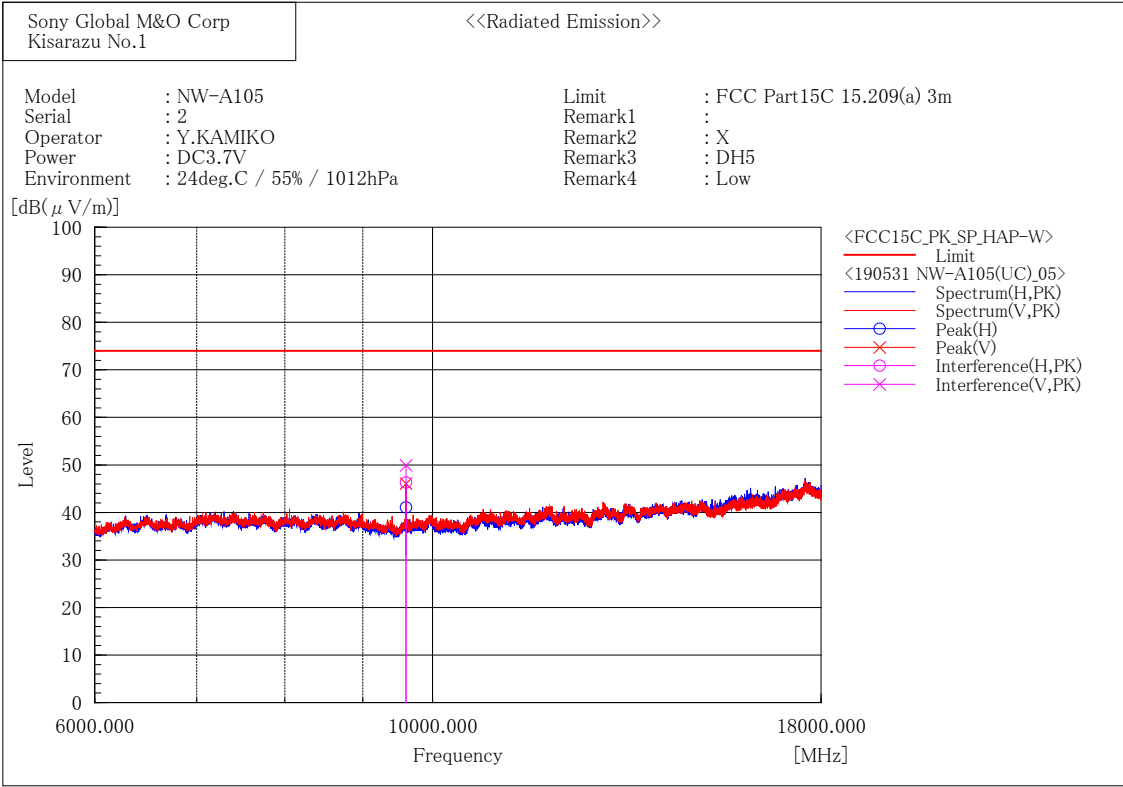
--- Vertical Polarization (AV) ---

| No. | Frequency<br>[MHz] | Reading<br>[dB(μ V)] | c. f<br>[dB(1/m)] | Result<br>[dB(μ V/m)] | Limit<br>[dB(μ V/m)] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] |
|-----|--------------------|----------------------|-------------------|-----------------------|----------------------|----------------|----------------|--------------|
| 1   | 9763.735           | 46.4                 | -5.4              | 41.0                  | 54.0                 | 13.0           | 103.0          | 25.0         |

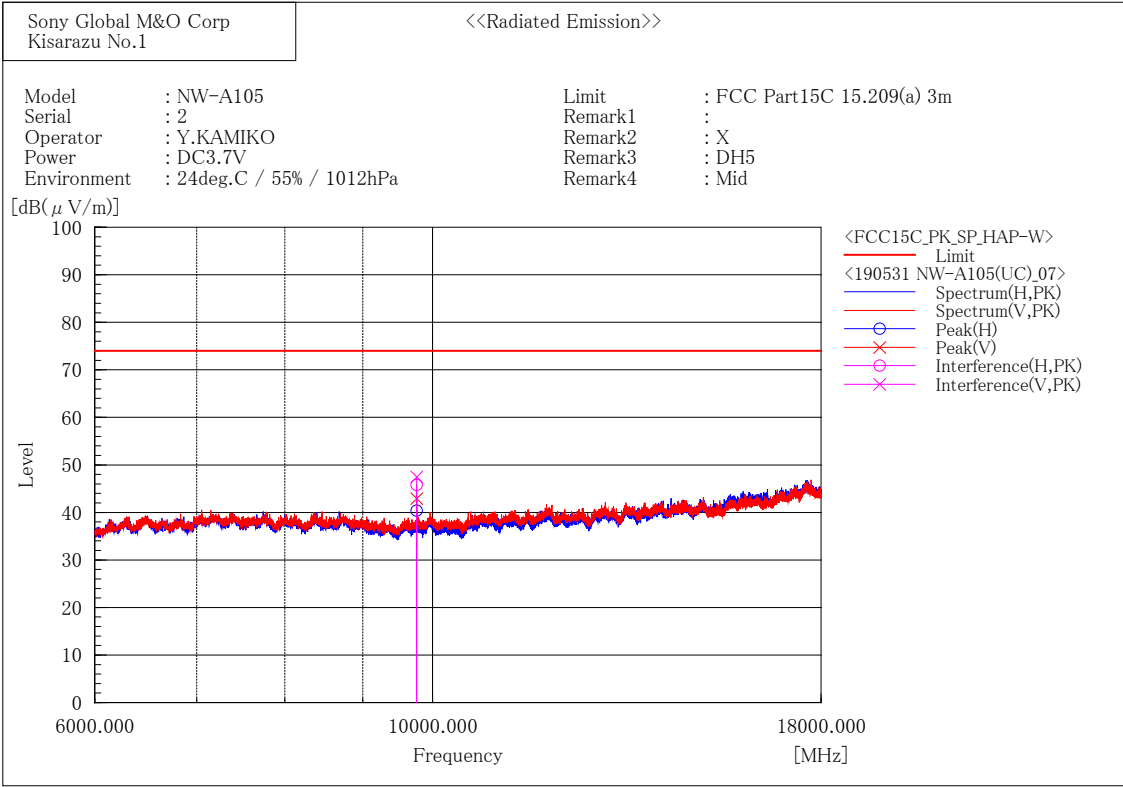
[BDR (DH5) / 2480 MHz]



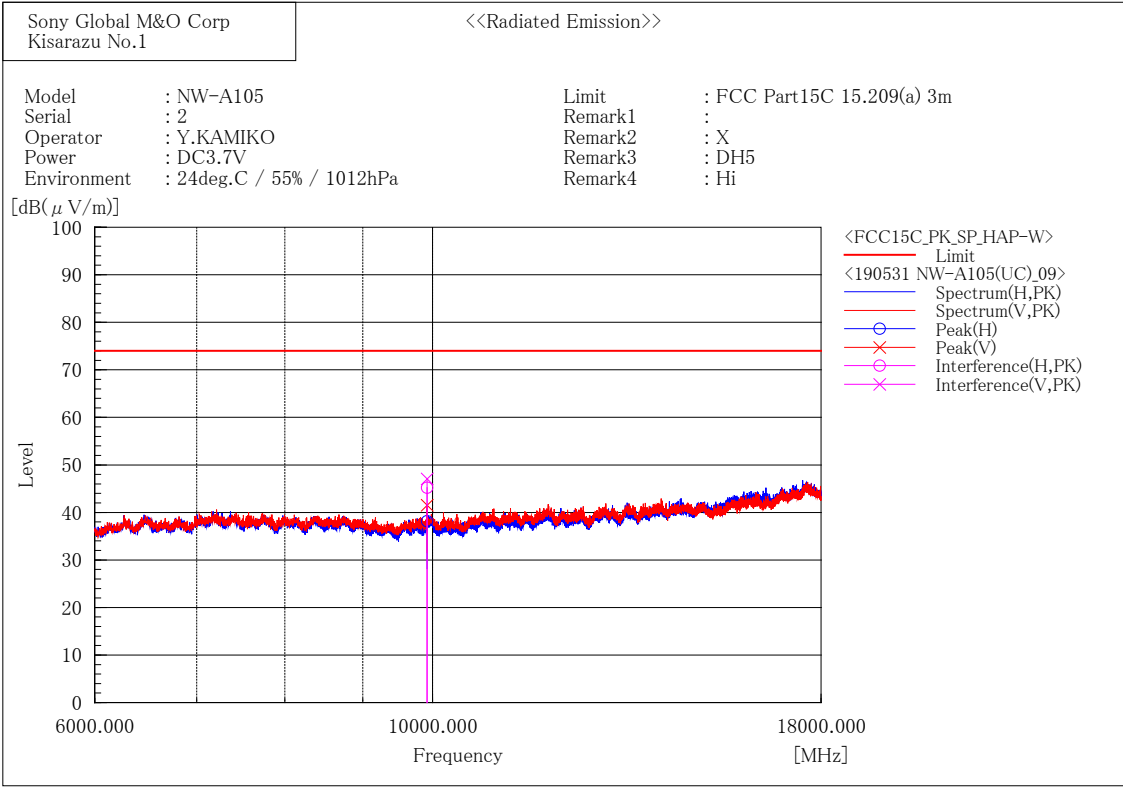
[BDR (DH5) / 2402 MHz]



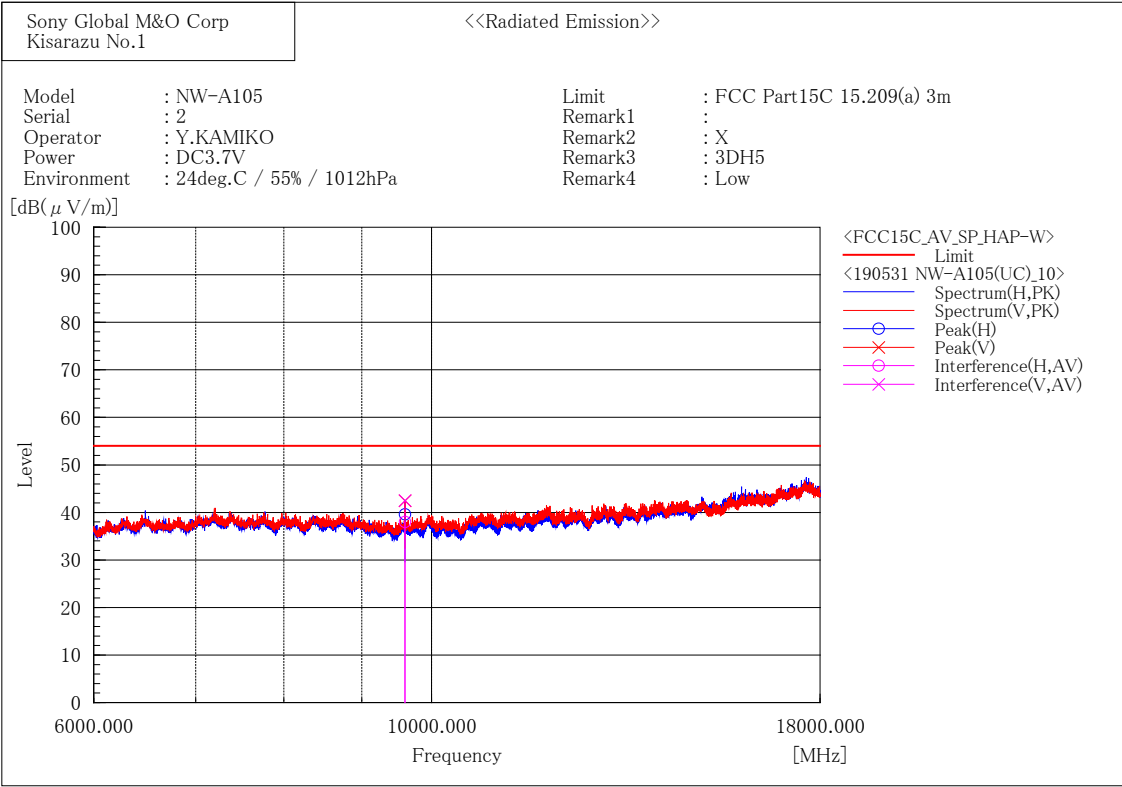
[BDR (DH5) / 2441 MHz]



[BDR (DH5) / 2480 MHz]



[EDR (3DH5) / 2402 MHz]



Final Result

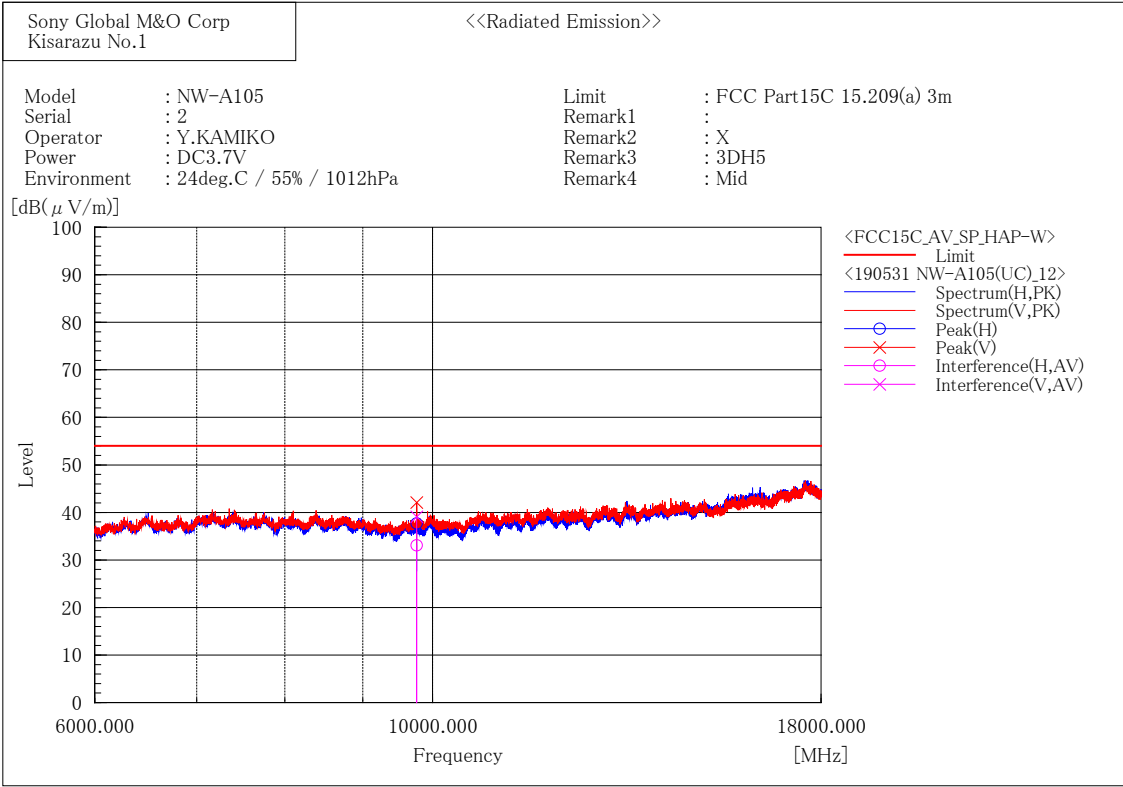
--- Horizontal Polarization (AV) ---

| No. | Frequency [MHz] | Reading [dB(μ V)] | c. f [dB(1/m)] | Result [dB(μ V/m)] | Limit [dB(μ V/m)] | Margin [dB] | Height [cm] | Angle [°] |
|-----|-----------------|-------------------|----------------|--------------------|-------------------|-------------|-------------|-----------|
| 1   | 9608.422        | 44.0              | -6.0           | 38.0               | 54.0              | 16.0        | 100.0       | 59.2      |

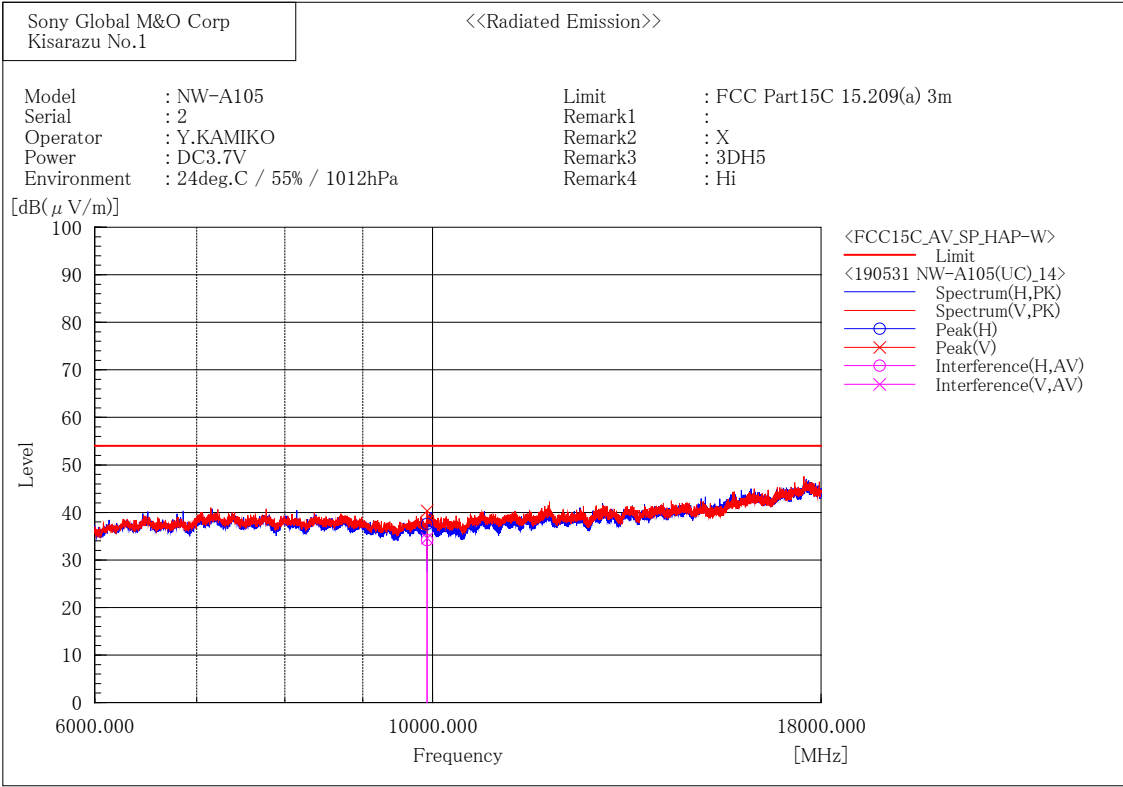
--- Vertical Polarization (AV) ---

| No. | Frequency [MHz] | Reading [dB(μ V)] | c. f [dB(1/m)] | Result [dB(μ V/m)] | Limit [dB(μ V/m)] | Margin [dB] | Height [cm] | Angle [°] |
|-----|-----------------|-------------------|----------------|--------------------|-------------------|-------------|-------------|-----------|
| 1   | 9608.186        | 48.5              | -6.0           | 42.5               | 54.0              | 11.5        | 123.7       | 35.3      |

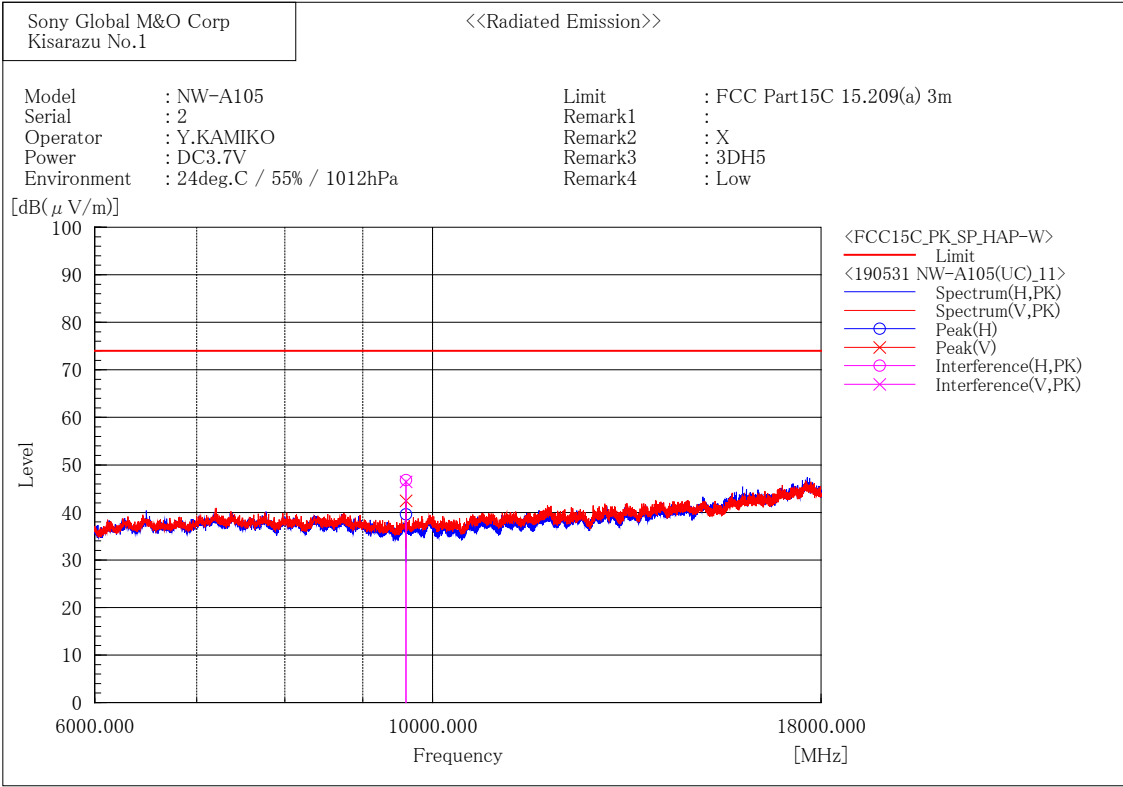
[EDR (3DH5) / 2441 MHz]



[EDR (3DH5) / 2480 MHz]



[EDR (3DH5) / 2402 MHz]



Final Result

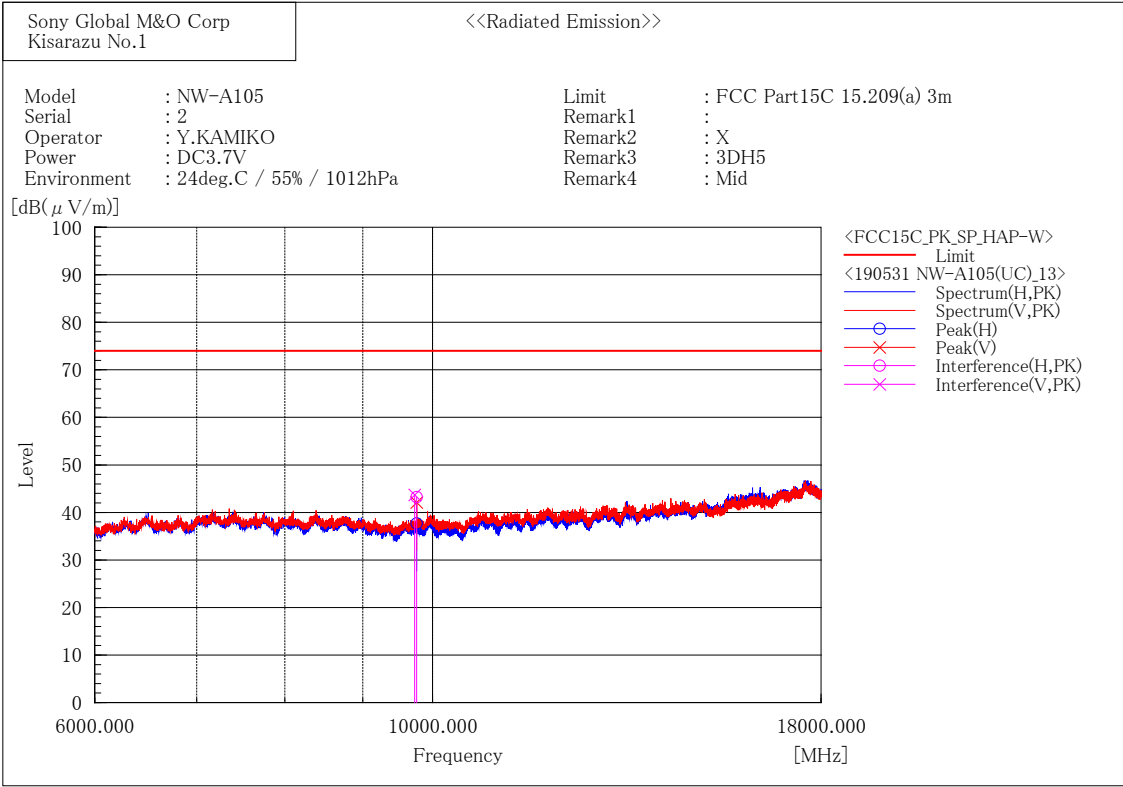
--- Horizontal Polarization (PK)---

| No. | Frequency [MHz] | Reading [dB(μ V)] | c. f [dB(1/m)] | Result [dB(μ V/m)] | Limit [dB(μ V/m)] | Margin [dB] | Height [cm] | Angle [°] |
|-----|-----------------|-------------------|----------------|--------------------|-------------------|-------------|-------------|-----------|
| 1   | 9607.993        | 52.8              | -6.0           | 46.8               | 74.0              | 27.2        | 100.0       | 59.2      |

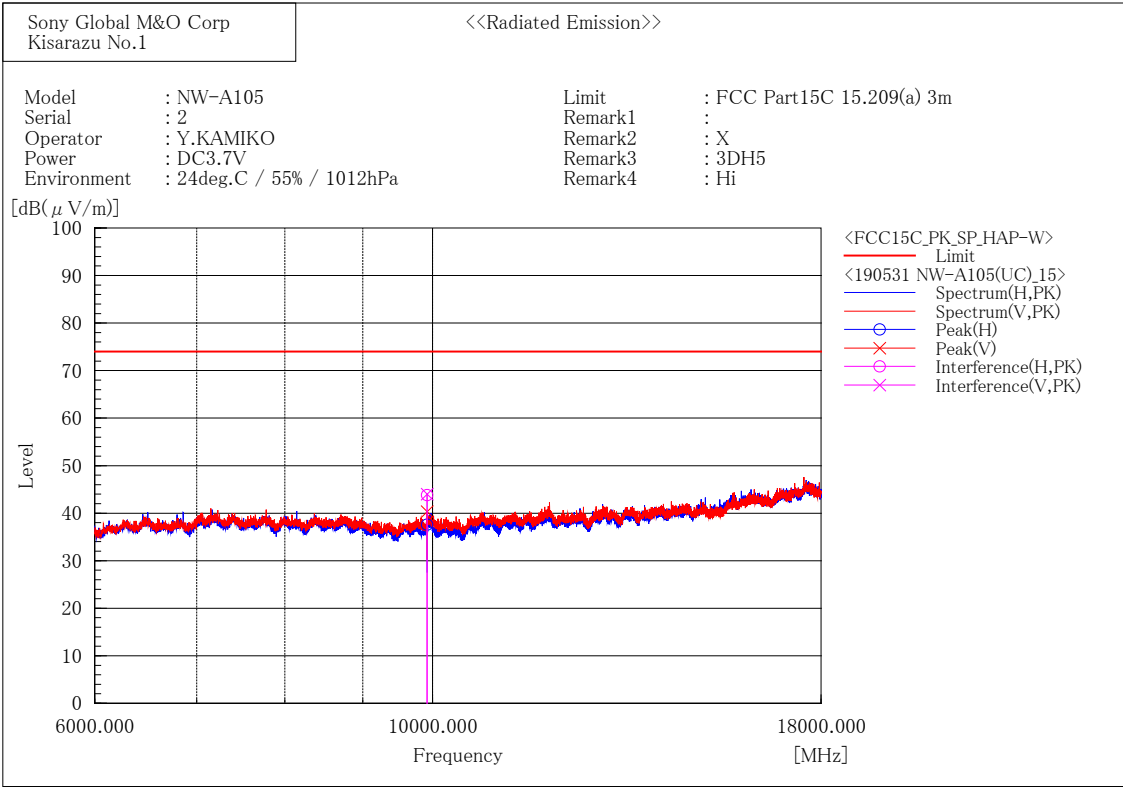
--- Vertical Polarization (PK)---

| No. | Frequency [MHz] | Reading [dB(μ V)] | c. f [dB(1/m)] | Result [dB(μ V/m)] | Limit [dB(μ V/m)] | Margin [dB] | Height [cm] | Angle [°] |
|-----|-----------------|-------------------|----------------|--------------------|-------------------|-------------|-------------|-----------|
| 1   | 9607.243        | 52.4              | -6.0           | 46.4               | 74.0              | 27.6        | 123.7       | 37.2      |

[EDR (3DH5) / 2441 MHz]



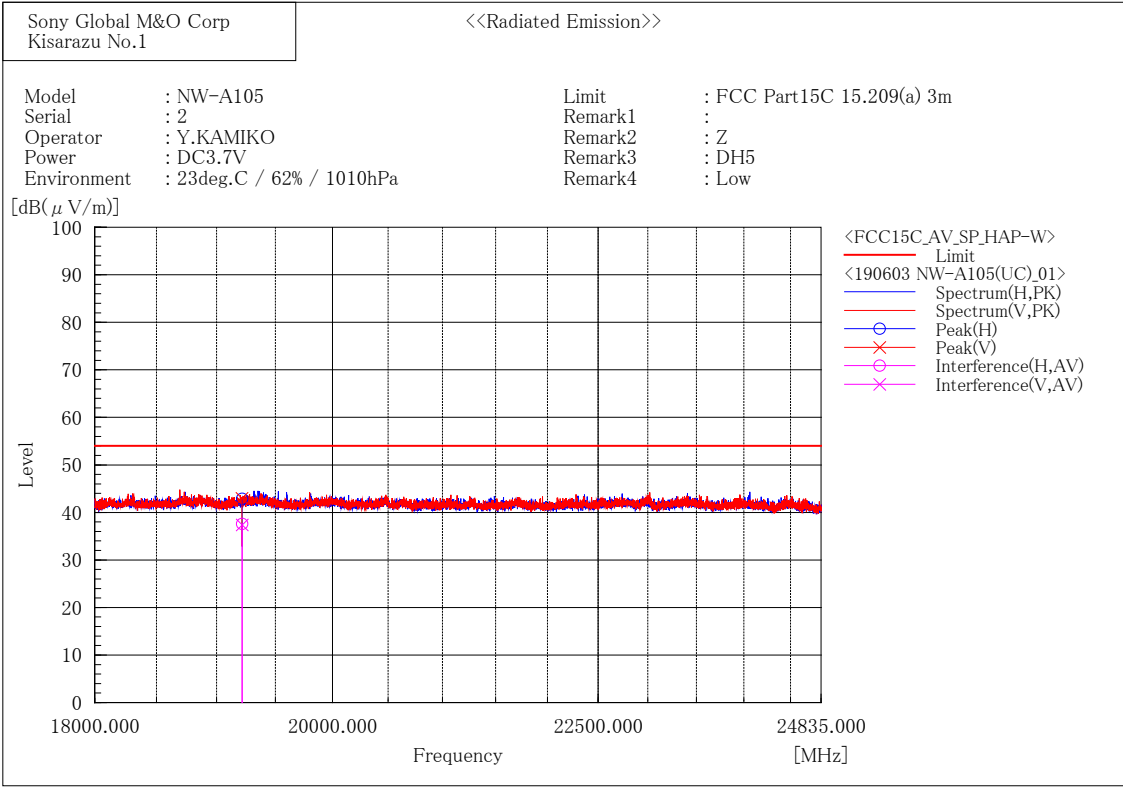
[EDR (3DH5) / 2480 MHz]



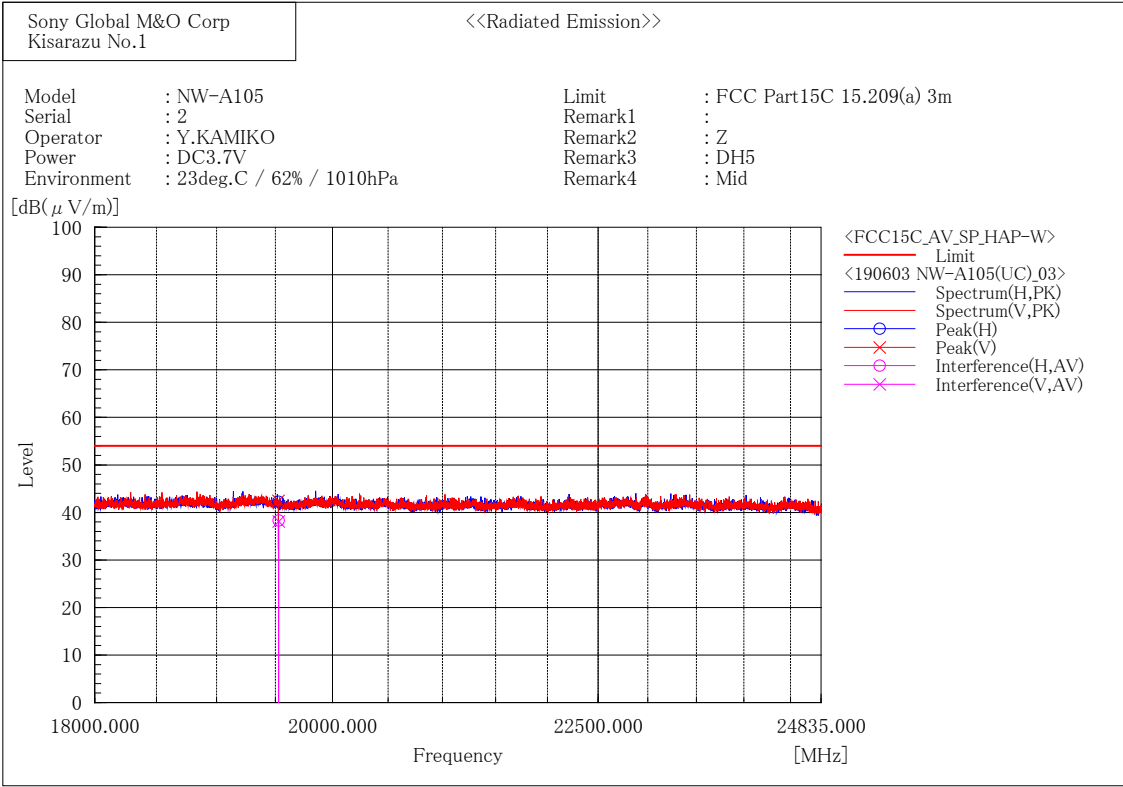
Final Result

|                                     |                 |                  |               |                   |                  |             |             |           |
|-------------------------------------|-----------------|------------------|---------------|-------------------|------------------|-------------|-------------|-----------|
| --- Horizontal Polarization (PK)--- |                 |                  |               |                   |                  |             |             |           |
| No.                                 | Frequency [MHz] | Reading [dB(μV)] | c.f [dB(1/m)] | Result [dB(μV/m)] | Limit [dB(μV/m)] | Margin [dB] | Height [cm] | Angle [°] |
| 1                                   | 9919.967        | 48.6             | -4.8          | 43.8              | 74.0             | 30.2        | 100.0       | 76.9      |
| --- Vertical Polarization (PK)---   |                 |                  |               |                   |                  |             |             |           |
| No.                                 | Frequency [MHz] | Reading [dB(μV)] | c.f [dB(1/m)] | Result [dB(μV/m)] | Limit [dB(μV/m)] | Margin [dB] | Height [cm] | Angle [°] |
| 1                                   | 9920.185        | 48.8             | -4.8          | 44.0              | 74.0             | 30.0        | 178.2       | 108.0     |

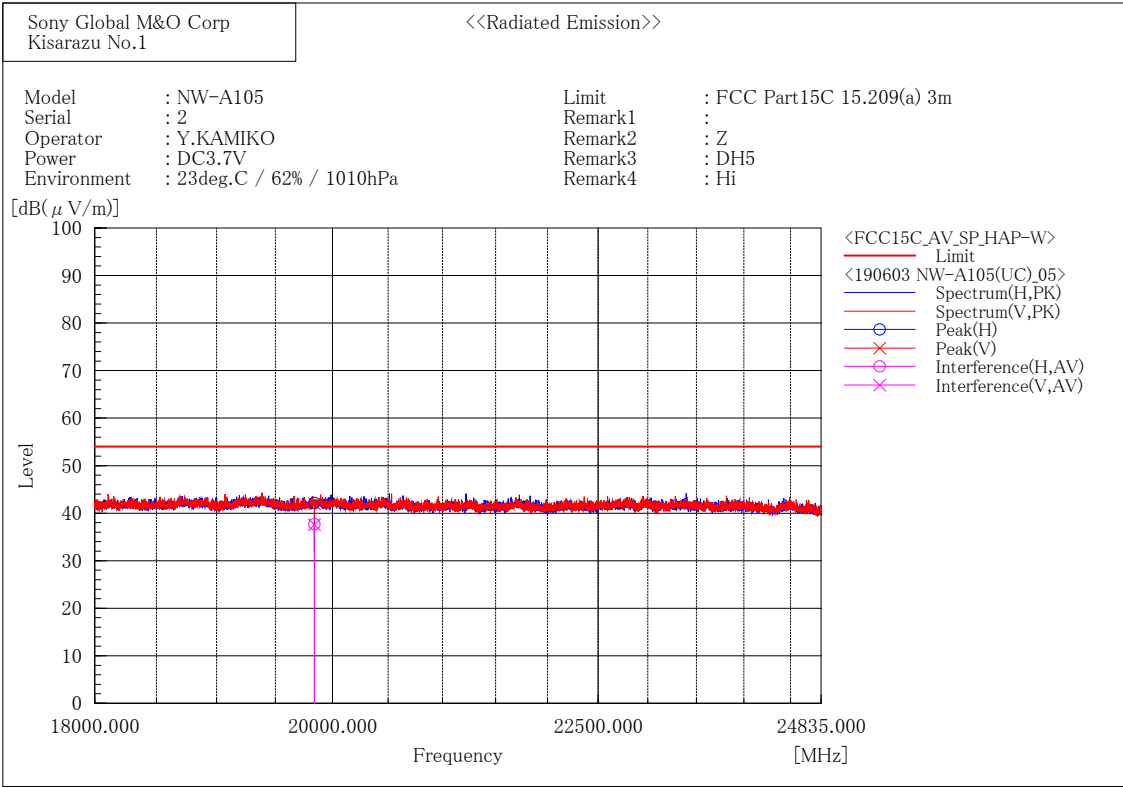
18 GHz to 26.5 GHz  
[BDR (DH5) / 2402 MHz]



[BDR (DH5) / 2441 MHz]



[BDR (DH5) / 2480 MHz]



Final Result

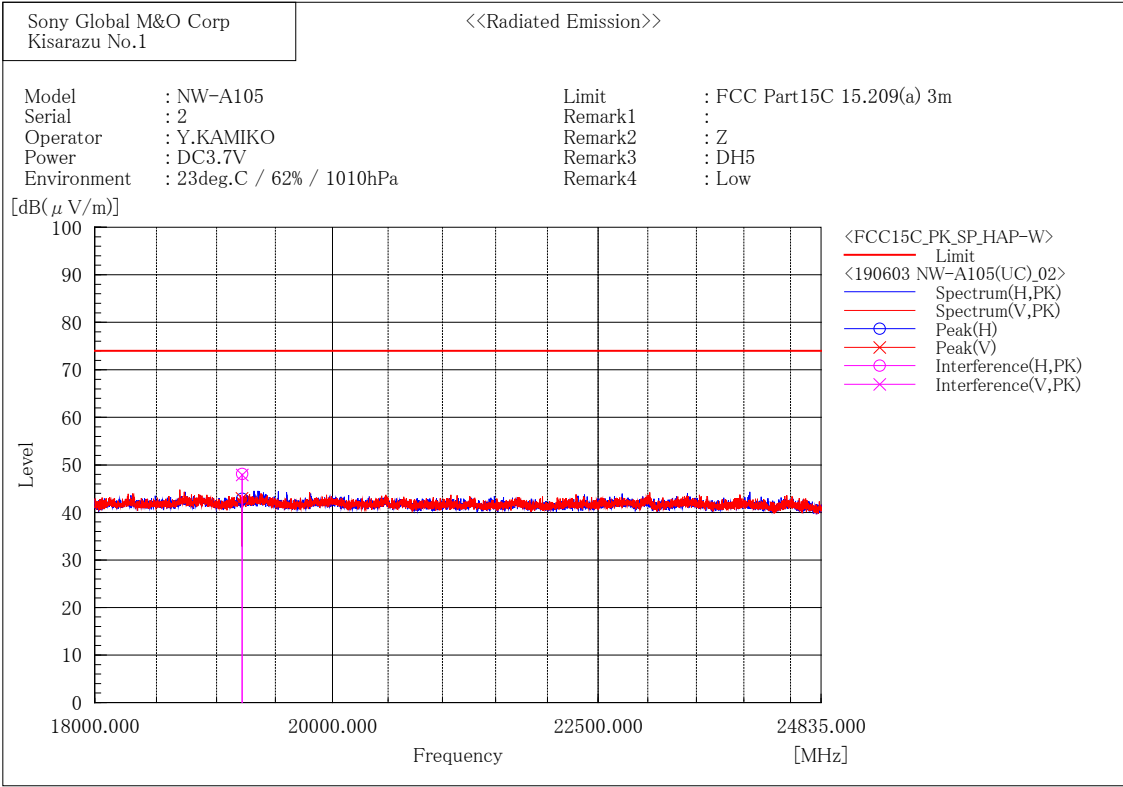
--- Horizontal Polarization (AV)---

| No. | Frequency<br>[MHz] | Reading<br>[dB(μV)] | c.f<br>[dB(1/m)] | Result<br>[dB(μV/m)] | Limit<br>[dB(μV/m)] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] |
|-----|--------------------|---------------------|------------------|----------------------|---------------------|----------------|----------------|--------------|
| 1   | 19840.710          | 38.6                | -0.9             | 37.7                 | 54.0                | 16.3           | 295.6          | 55.3         |

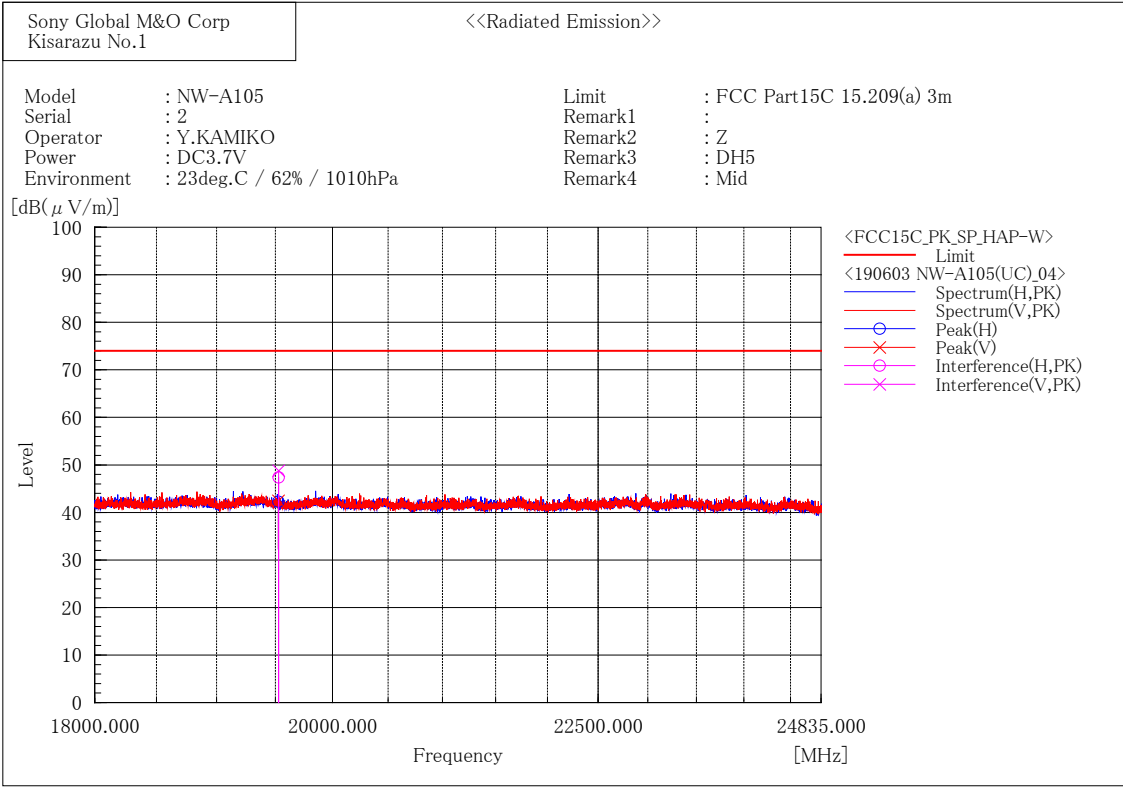
--- Vertical Polarization (AV)---

| No. | Frequency<br>[MHz] | Reading<br>[dB(μV)] | c.f<br>[dB(1/m)] | Result<br>[dB(μV/m)] | Limit<br>[dB(μV/m)] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] |
|-----|--------------------|---------------------|------------------|----------------------|---------------------|----------------|----------------|--------------|
| 1   | 19840.980          | 38.5                | -0.9             | 37.6                 | 54.0                | 16.4           | 212.0          | 217.9        |

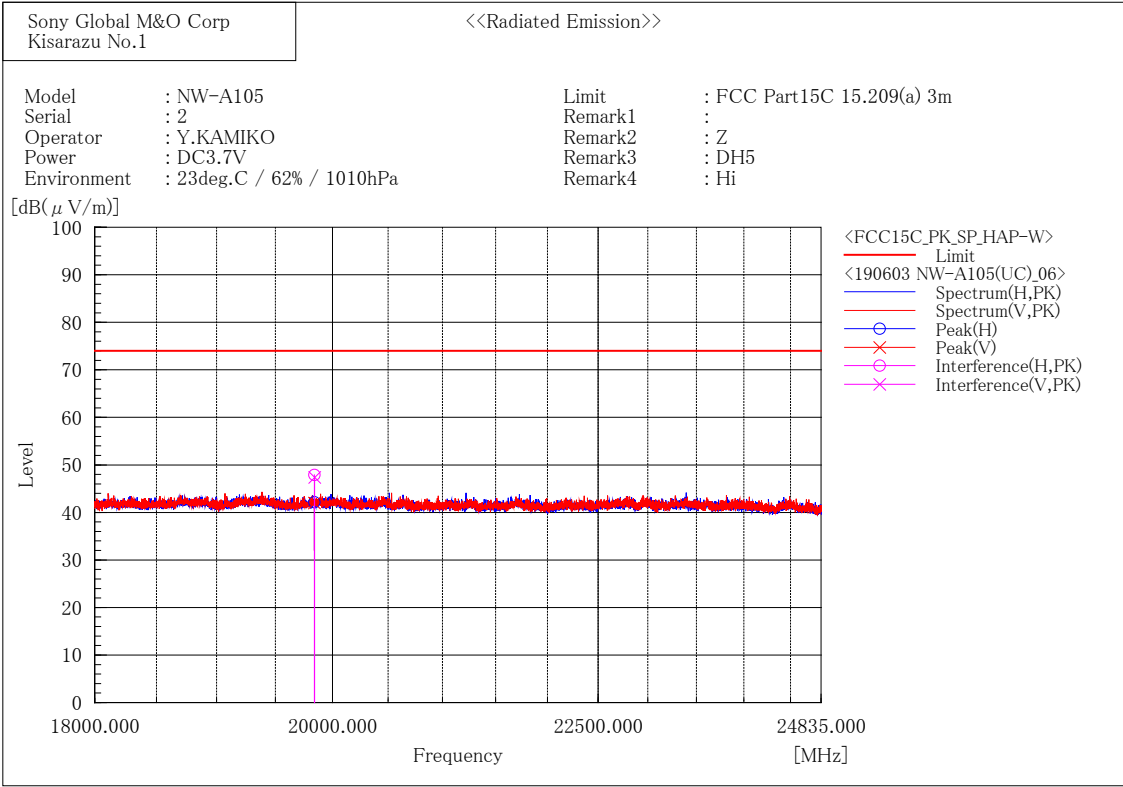
[BDR (DH5) / 2402 MHz]



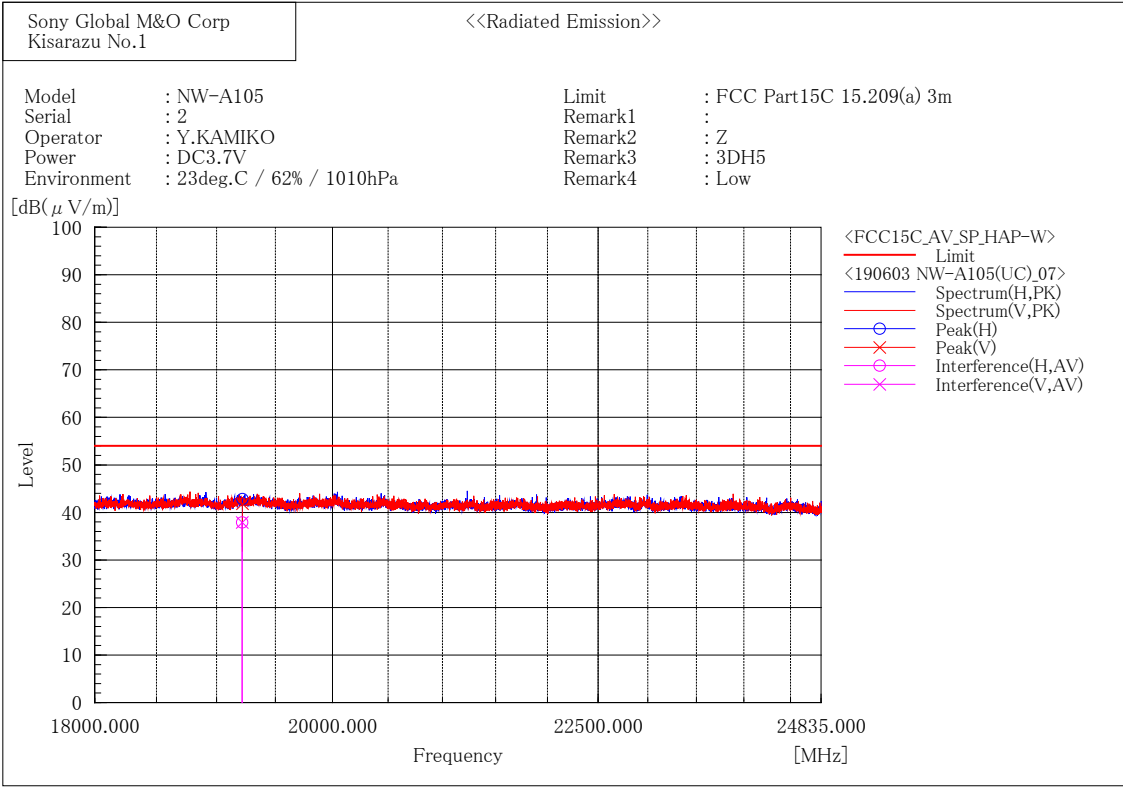
[BDR (DH5) / 2441 MHz]



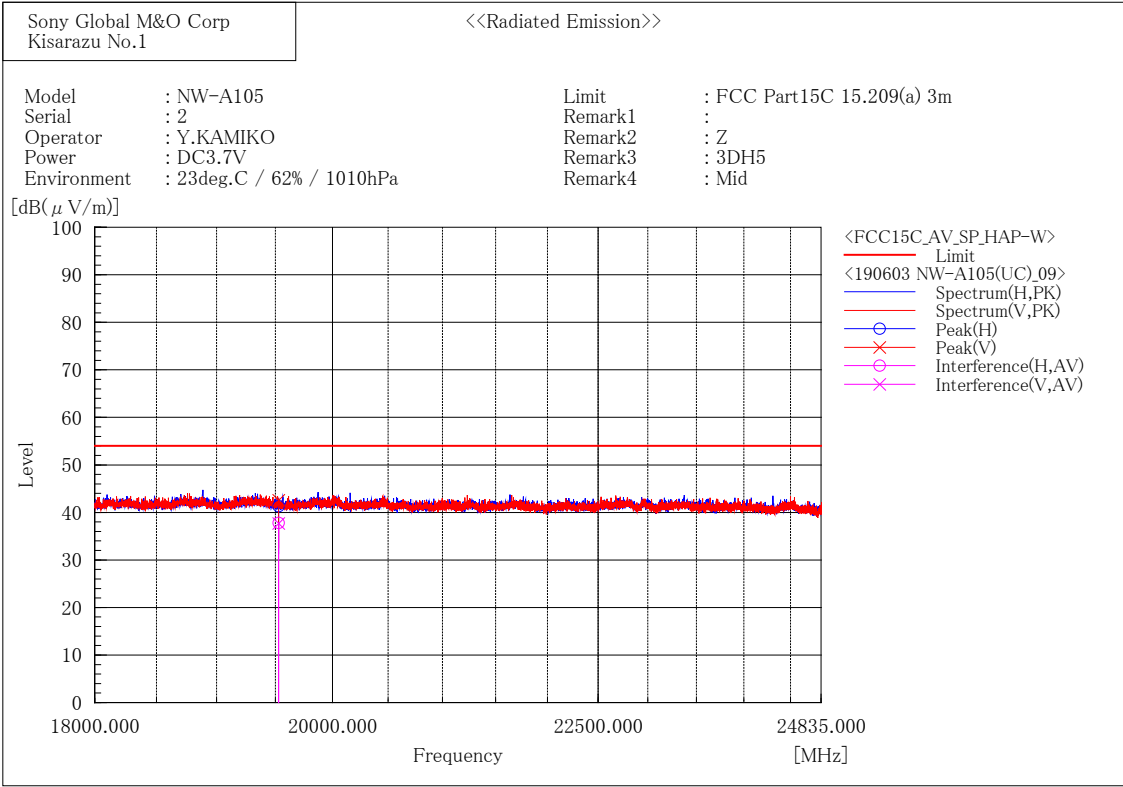
[BDR (DH5) / 2480 MHz]



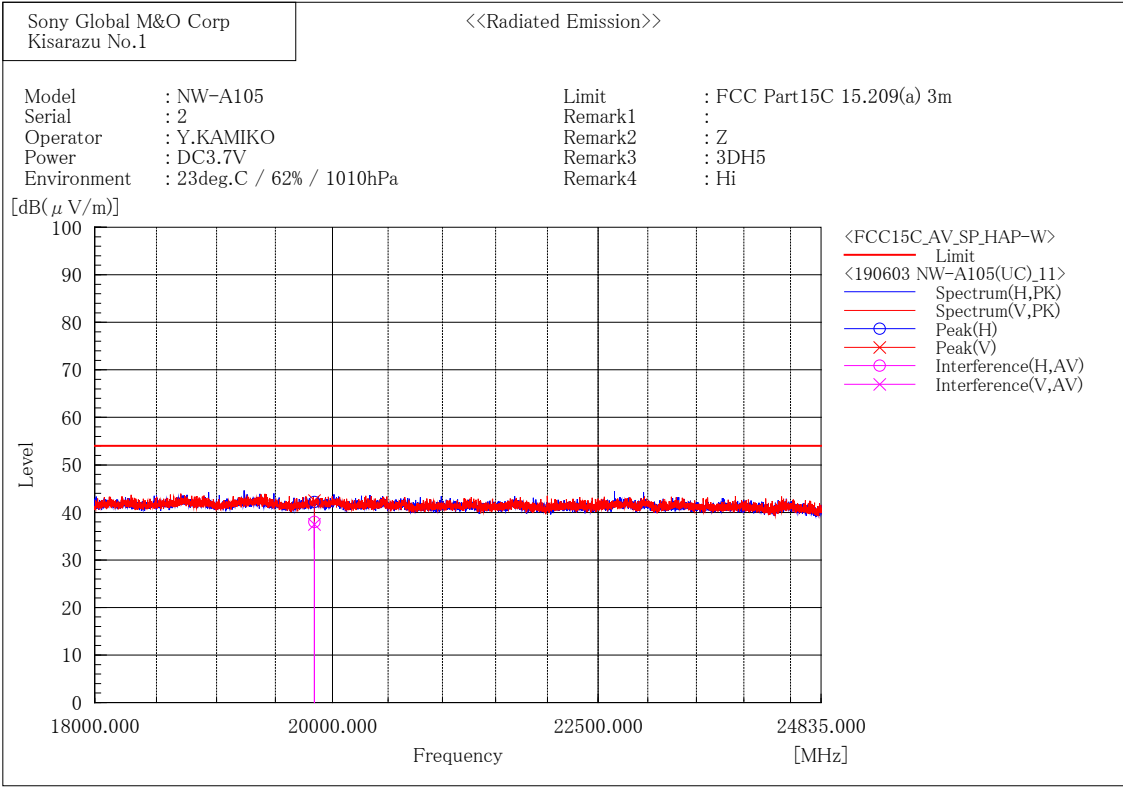
[EDR (3DH5) / 2402 MHz]



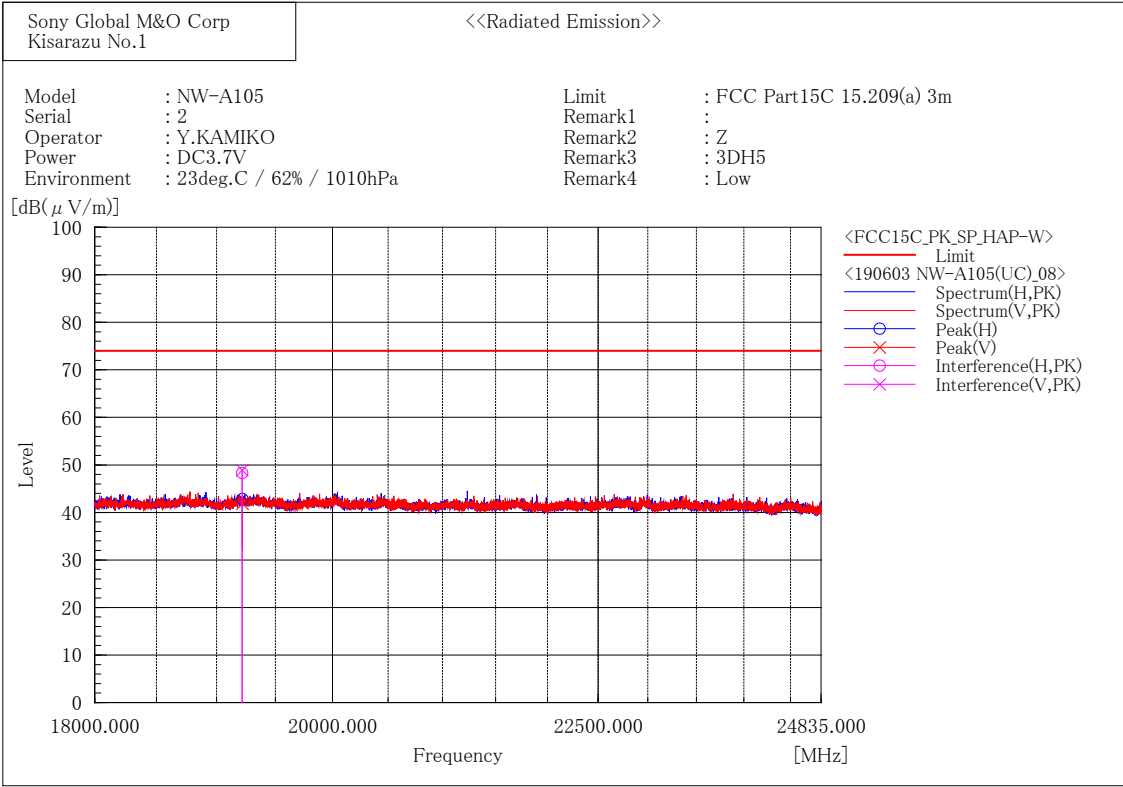
[EDR (3DH5) / 2441 MHz]



[EDR (3DH5) / 2480 MHz]



[EDR (3DH5) / 2402 MHz]



Final Result

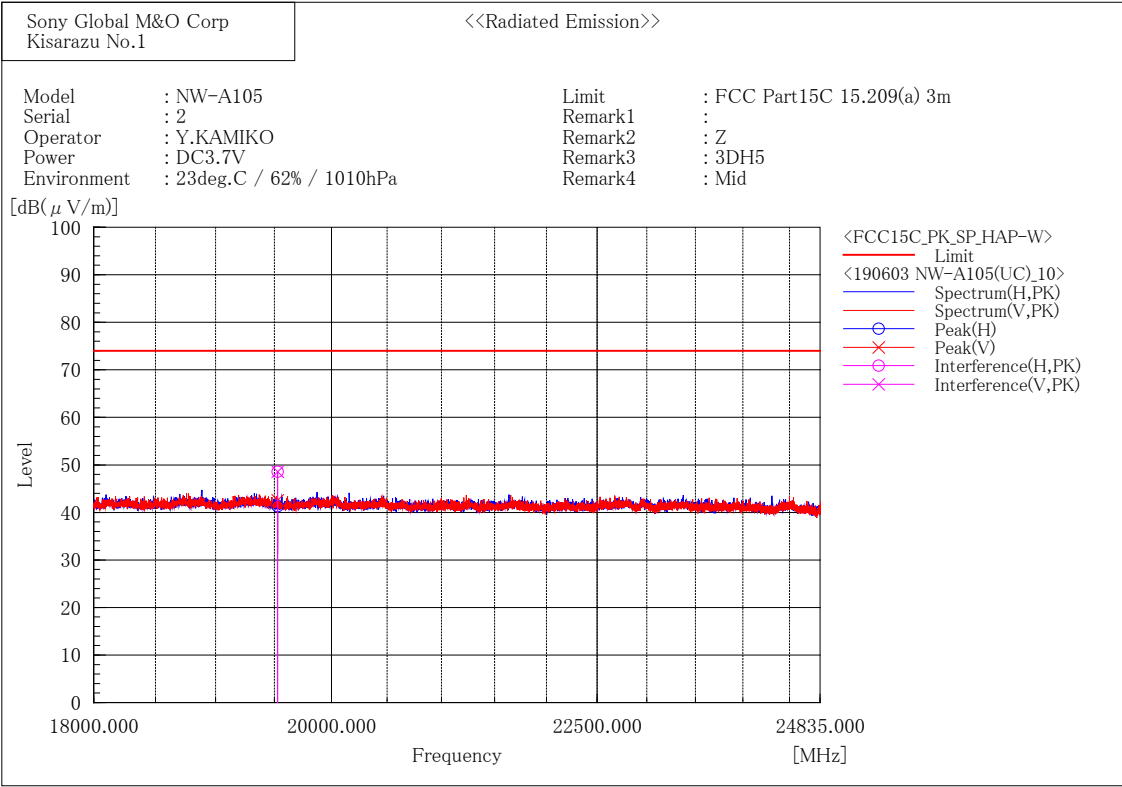
--- Horizontal Polarization (PK)---

| No. | Frequency<br>[MHz] | Reading<br>[dB(μ V)] | c.f<br>[dB(1/m)] | Result<br>[dB(μ V/m)] | Limit<br>[dB(μ V/m)] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] |
|-----|--------------------|----------------------|------------------|-----------------------|----------------------|----------------|----------------|--------------|
| 1   | 19216.000          | 49.1                 | -0.8             | 48.3                  | 74.0                 | 25.7           | 298.3          | 257.0        |

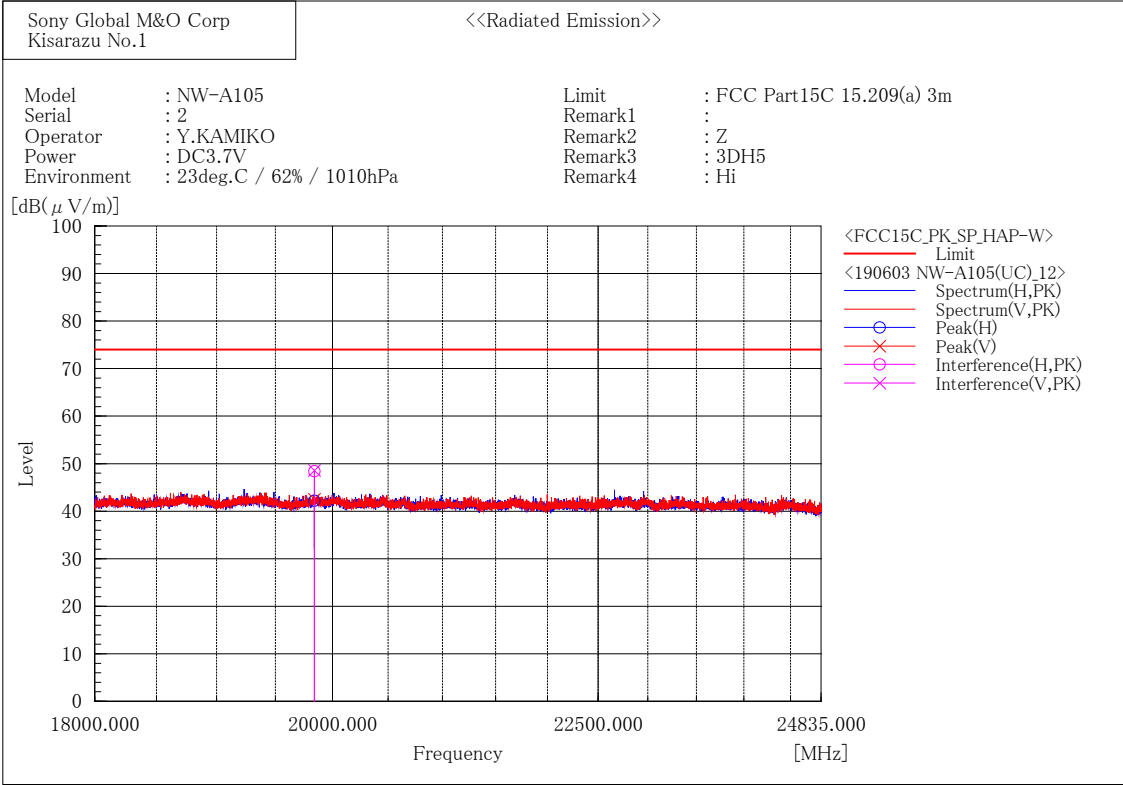
--- Vertical Polarization (PK)---

| No. | Frequency<br>[MHz] | Reading<br>[dB(μ V)] | c.f<br>[dB(1/m)] | Result<br>[dB(μ V/m)] | Limit<br>[dB(μ V/m)] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] |
|-----|--------------------|----------------------|------------------|-----------------------|----------------------|----------------|----------------|--------------|
| 1   | 19216.000          | 49.7                 | -0.8             | 48.9                  | 74.0                 | 25.1           | 158.3          | 128.0        |

[EDR (3DH5) / 2441 MHz]



[EDR (3DH5) / 2480 MHz]



Final Result

--- Horizontal Polarization (PK)---

| No. | Frequency<br>[MHz] | Reading<br>[dB(μV)] | c.f<br>[dB(1/m)] | Result<br>[dB(μV/m)] | Limit<br>[dB(μV/m)] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] |
|-----|--------------------|---------------------|------------------|----------------------|---------------------|----------------|----------------|--------------|
| 1   | 19840.000          | 49.3                | -0.9             | 48.4                 | 74.0                | 25.6           | 432.0          | 39.9         |

--- Vertical Polarization (PK)---

| No. | Frequency<br>[MHz] | Reading<br>[dB(μV)] | c.f<br>[dB(1/m)] | Result<br>[dB(μV/m)] | Limit<br>[dB(μV/m)] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] |
|-----|--------------------|---------------------|------------------|----------------------|---------------------|----------------|----------------|--------------|
| 1   | 19840.000          | 49.5                | -0.9             | 48.6                 | 74.0                | 25.4           | 177.4          | 28.8         |

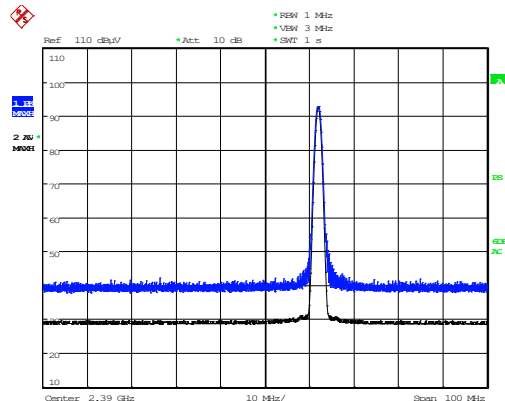
### 2.4 GHz Restricted-Band Edge (Plot data)

These plot data show peak (trace blue) and average (trace black) spectrum for worst case emissions in the restricted-band edges. (Restricted band edges: below 2390 MHz and above 2483.5 MHz)

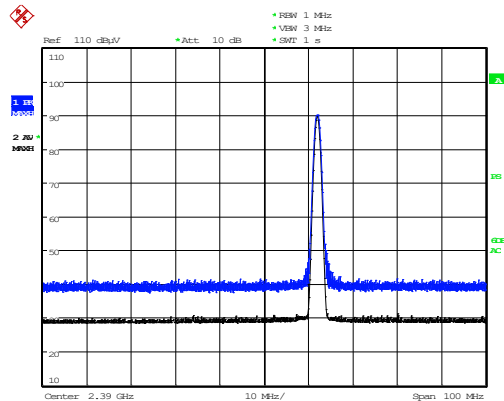
The result of the final radiated spurious emissions measurement refers in previous pages.

[BDR / 2402 MHz]

Horizontal

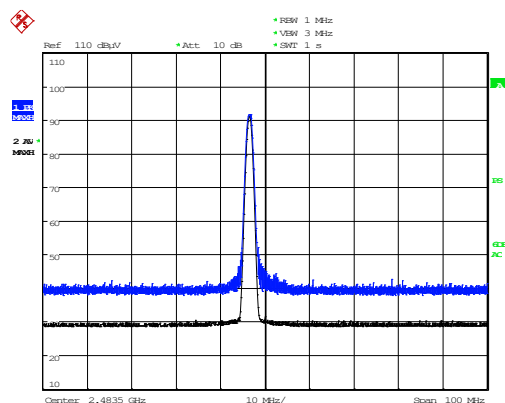


Vertical

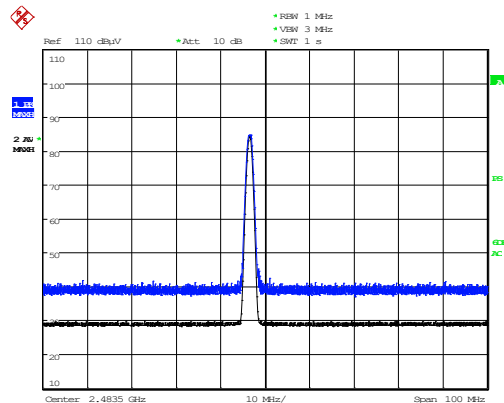


[BDR / 2480 MHz]

Horizontal

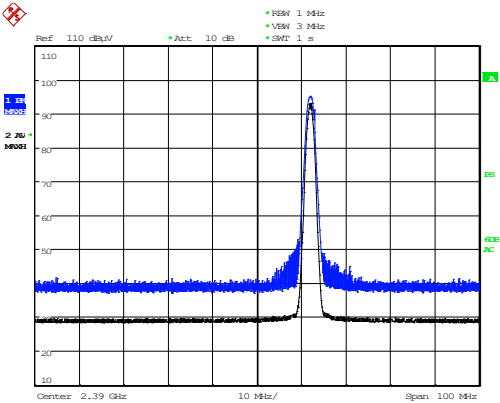


Vertical



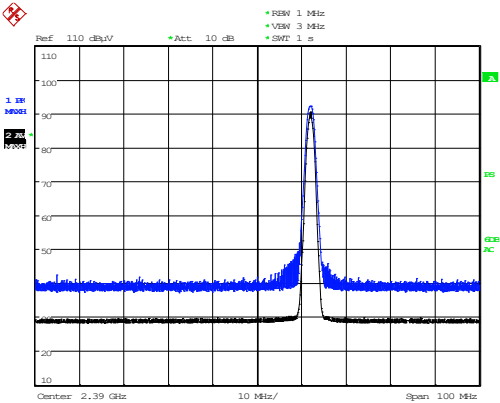
[EDR / 2402 MHz]

Horizontal



Date: 31.MAY.2019 01:01:24

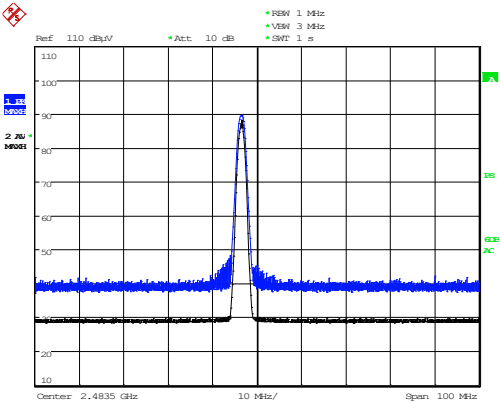
Vertical



Date: 31.MAY.2019 01:00:25

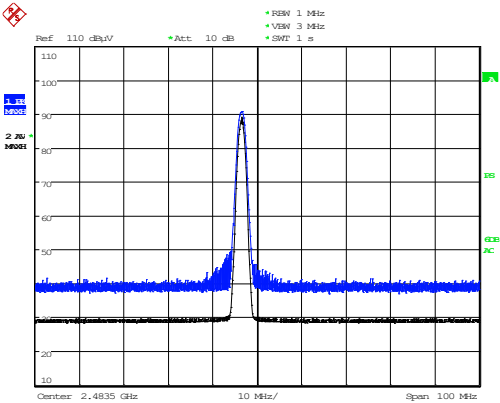
[EDR / 2480 MHz]

Horizontal



Date: 31.MAY.2019 00:19:43

Vertical



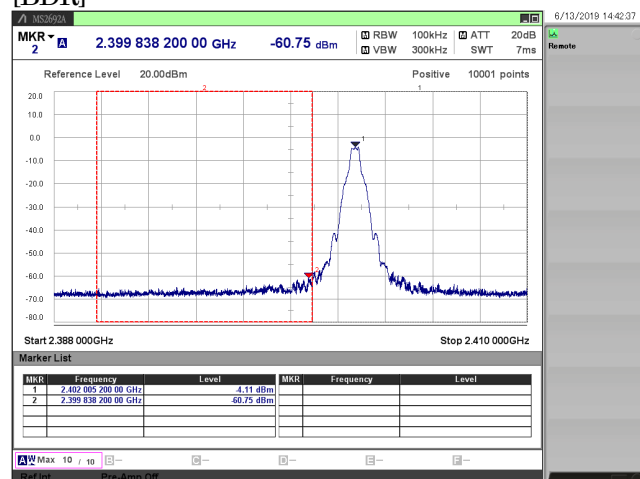
Date: 31.MAY.2019 00:17:18

### 3.8. Conducted Spurious Emissions for Band Edge

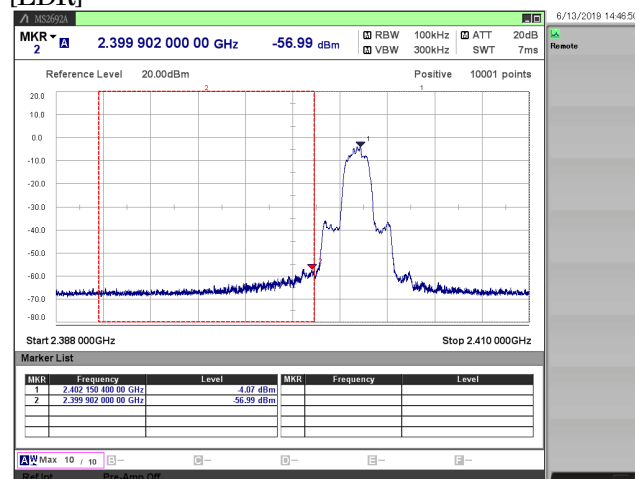
- 1) Ambient temperature : 21.3 deg.C
- 2) Relative humidity : 52.8 %
- 3) Date of measurement : June 13, 2019
- 4) Measured by : H.WAKI
- 5) Operating mode : Transmitting mode

| Mode |      | Channel [MHz] | Frequency [MHz] | Reading(PK) [dBm] | C.F. [dB] | Result(PK) [dBm] | Limit [dBm] | Margin [dB] |
|------|------|---------------|-----------------|-------------------|-----------|------------------|-------------|-------------|
| BDR  | DH5  | 2402          | 2402.01         | -4.11             | 10.86     | 6.75             | -           | -           |
|      |      |               | 2399.84         | -60.75            | 10.86     | -49.89           | -13.3       | 36.64       |
| EDR  | 3DH5 | 2402          | 2402.15         | -4.07             | 10.86     | 6.79             | -           | -           |
|      |      |               | 2399.90         | -56.99            | 10.86     | -46.13           | -13.2       | 32.92       |

[BDR]



[EDR]



## 4. Method of Calculation

### 4.1. AC Power-line Conducted Emissions

Method of calculation : Software  
Software Name : EP5/ CE  
Software Version : Ver5.0.0

Test Result [ dBuV ] = Meter Reading [ dBuV ] + C.F. [ dB ]

Note (a) Meter Reading : Reading of the EMI test receiver.  
(b) C.F. : System Loss + Correction Factor of LISN

### 4.2. Time of Occupancy (Dwell Time)

Method of calculation : Software  
Software Name : SW-0308  
Software Version : Ver.4

Test Result [ msec ] = Dwell Time [ msec ] \* Cycle [ time ] \* 31.6 [ sec ] / Sweep Time [ sec ]

Note (a) Dwell Time : Transmission duration of 1 hopping.  
(b) Cycle : Number of hopping appearances on the spectrum analyzer.  
(The average of 5 measurements if it is random hopping equipment)  
(c) 31.6 :  $0.4 \text{ [ sec ]} * \text{Number of Hopping Frequencies ( 79 )}$   
(d) Sweep Time : Sweep time settings on the spectrum analyzer.

### 4.3. Maximum Peak Conducted Output Power

Method of calculation : Software  
Software Name : SW-0308  
Software Version : Ver.4

Test Result (PK) [ dBm ] = Meter Reading [ dBm ] + C.F. [ dB ]

Note (a) Meter Reading : Reading of the power meter  
(b) C.F. : System Cable Loss + EUT Cable Loss

#### 4.4. Radiated Spurious Emissions

Method of calculation : Software  
Software Name : V-Scan  
Software Version : Ver.4.0.30

Test Result [ dBuV/ m ] = Meter Reading [ dBuV ] + C.F. [ dB/ m ]

Note (a) Meter Reading : Reading of the EMI test receiver or the spectrum analyzer.  
(b) C.F. : ☒ Antenna Factor (including Balun Loss) + System GainLoss  
: ☐ Antenna Factor (including Balun Loss) + System GainLoss + 20 log (3 m/ 10 m)

#### 4.5. Conducted Spurious Emissions for Band Edge

Method of calculation : Software  
Software Name : SW-0308  
Software Version : Ver.4

Test Result [ dBm ] = Meter Reading [ dBm ] + C.F. [ dB ]

Note (a) Meter Reading : Reading of the spectrum analyzer.  
(b) C.F. : System Cable Loss + EUT Cable Loss

## 5. List of Test Equipment

All test results are traceable to the national and/or international standards.

### 5.1. AC Power-line Conducted Emissions

|   | Ctrl.# | Equipment                  | Model No. | Serial No.   | Manufacturer     | Cal.Interval | Last Cal. |
|---|--------|----------------------------|-----------|--------------|------------------|--------------|-----------|
| x | CS0015 | EMC-CE Cable System 1      | -         | -            | -                | 12 months    | 18.11.04  |
| x | M0663  | 6dB Attenuator             | 6806.01A  | -            | HUBER+SUHNER     | 12 months    | 18.11.04  |
| x | M0569  | HIGH FREQUENCY FUSE        | MP612A    | -            | Anritsu          | 12 months    | 18.11.04  |
| x | M0130  | RF Selector                | NS4902SR  | 109001       | Toyo Corporation | 12 months    | 18.11.04  |
| x | M0605  | LISN/AMN                   | ENV216    | 101305       | Rohde & Schwarz  | 12 months    | 18.10.01  |
| x | M5062  | Scientific Ambient Monitor | 0560 6220 | 39515563/802 | testo            | 12 months    | 18.07.17  |
| x | M0515  | EMI Receiver               | ESCI      | 100606       | Rohde & Schwarz  | 12 months    | 18.10.01  |
| x | M5080  | Temperature Meter          | 608-H2    | 41476135     | testo            | 12 months    | 18.10.18  |

### 5.2. Antenna-port Conducted Measurements

|   | Ctrl.# | Equipment         | Model No.    | Serial No. | Manufacturer          | Cal.Interval | Last Cal. |
|---|--------|-------------------|--------------|------------|-----------------------|--------------|-----------|
| - | W0140  | Spectrum Analyzer | FSU26        | 200717     | Rohde & Schwarz       | 12 months    | 18.09.01  |
| x | W0101  | Signal Analyzer   | MS2692A      | 6201338955 | Anritsu               | 12 months    | 19.05.09  |
| x | W0110  | 10dB Attenuator   | 6610-SK-50-1 | 0002       | Huber + Suhner        | 12 months    | 18.09.01  |
| x | W0100  | Spectrum Analyzer | MS2692A      | 6201338954 | Anritsu               | 12 months    | 19.05.09  |
| x | W0006  | Power Meter       | N1911A       | MY50000295 | Keysight Technologies | 12 months    | 18.10.06  |
| x | W0007  | Power Sensor      | N1922A       | MY50180022 | Keysight Technologies | 12 months    | 18.10.06  |
| x | W0029  | 10dB Attenuator   | 8493C        | 76549      | Keysight Technologies | 12 months    | 18.09.01  |
| - | WC0002 | RF Cable          | SUCOFLEX 102 | 34124/2    | HUBER + SUHNER        | 12 months    | 18.09.01  |
| - | WC0003 | RF Cable          | SUCOFLEX 102 | 34127/2    | HUBER + SUHNER        | 12 months    | 18.09.01  |
| x | WC0004 | RF Cable          | SUCOFLEX 102 | 34288/2    | HUBER + SUHNER        | 12 months    | 18.09.01  |
| - | WC0005 | RF Cable          | SUCOFLEX 102 | 34287/2    | HUBER + SUHNER        | 12 months    | 18.09.01  |
| - | WC0006 | RF Cable          | SUCOFLEX 102 | 34289/2    | HUBER + SUHNER        | 12 months    | 18.09.01  |
| - | WC0007 | RF Cable          | SUCOFLEX 102 | 34286/2    | HUBER + SUHNER        | 12 months    | 18.09.01  |
| x | M0720  | Thermometer       | TH-321       | 140036     | AS ONE                | 12 months    | 18.07.20  |

### 5.3. Radiated Spurious Emissions

|   | Ctrl.#      | Equipment                  | Model No.   | Serial No.   | Manufacturer         | Cal.Interval | Last Cal. |
|---|-------------|----------------------------|-------------|--------------|----------------------|--------------|-----------|
| x | M0686       | EMI Receiver               | N9038A      | MY52260113   | Agilent Technologies | 12 months    | 18.11.13  |
| x | M0486       | EMI Receiver               | ESU40       | 100050       | Rohde & Schwarz      | 12 months    | 18.10.01  |
| x | A0073       | Loop Antenna               | HFH2-Z2     | 100171       | Rohde & Schwarz      | 12 months    | 18.12.10  |
| x | A0089       | Biconical Antenna          | BBA9106     | VHA91032835  | Schwarzbeck          | 12 months    | 18.12.03  |
| x | A0088       | Log periodic Antenna       | UHALP9108A1 | 0649         | Schwarzbeck          | 12 months    | 18.12.03  |
| x | A0064       | Horn Antenna               | BBHA9120D   | 746          | Schwarzbeck          | 12 months    | 18.11.04  |
| x | A0078       | Horn Antenna               | HAP06-18W   | 00000070     | Toyo Corporation     | 12 months    | 18.11.04  |
| x | A0058       | Horn Antenna               | HAP18-26W   | 00000016     | Toyo Corporation     | 12 months    | 18.12.01  |
| x | CS0017      | N-RE Cable System 1        | -           | -            | -                    | 12 months    | 18.11.04  |
| x | CS0018      | N-RE Cable System 2        | -           | -            | -                    | 12 months    | 18.11.04  |
| x | CS0045      | N-3m EMF Cable System      | -           | -            | -                    | 12 months    | 18.11.04  |
| x | CS0074/0075 | N-RE Cable SYSTEM 4        | -           | -            | -                    | 12 months    | 18.11.04  |
| x | M0126       | Step Attenuator            | 8494H       | 3837M01144   | Agilent Technologies | 12 months    | 18.11.04  |
| x | M0752       | Pre Amplifier              | 310N        | 320621       | SONOMA INSTRUMENT    | 12 months    | 18.11.04  |
| x | M0128       | 3dB Attenuator             | 8491A       | 53541        | Agilent Technologies | 12 months    | 18.11.04  |
| x | M0609       | 3dB Attenuator             | 8491B       | MY39265960   | Agilent Technologies | 12 months    | 18.11.04  |
| x | M0737       | GHz Filter Box             | FB-G1       | 001          | Sony EMCS            | 12 months    | 18.11.04  |
| x | M5079       | Temperature Meter          | 608-H2      | 41475953     | testo                | 12 months    | 18.10.18  |
| x | M5062       | Scientific Ambient Monitor | 0560 6220   | 39515563/802 | testo                | 12 months    | 18.07.17  |

About calibration interval

Valid until the end of the month listed in "Cal. Int." column.