



# RADIO TEST REPORT

**Test Report No. : 13568152S-K-R1**

**Applicant** : KONICA MINOLTA, INC.  
**Type of EUT** : Wireless LAN SDIO module  
**Model Number of EUT** : SX-SDMAN2  
\*: The EUT was installed in the typical host device for testing.  
**Test regulation** : FCC Part 15 Subpart C: 2021  
**Test item** : Antenna terminal conducted test  
**Test Result** : Complied (Refer to SECTION 3.2)

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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 limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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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. The all test items in this test report are conducted by UL Japan, Inc. Shonan EMC Lab.
8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
9. The information provided from the customer for this report is identified in SECTION 1.
10. This report is a revised version of 13568152S-K. 13568152S-K is replaced with this report.

**Date of test:** July 6 to 8, 2016 and January 13, 2021  
and February 18, 2022

**Representative test engineer:**

*Y. Murakami*

Yosuke Murakami  
Engineer

**Approved by:**

*T. Imamura*

Toyokazu Imamura  
Leader



CERTIFICATE 1266.03

- 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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## REVISION HISTORY

**Original Test Report No.: 13568152S-K**

| Revision     | Test report No. | Date                 | Page revised | Contents   |
|--------------|-----------------|----------------------|--------------|--|
| - (Original) | 13568152S-K     | March 1, 2021        | -            | -  |
| 1            | 13568152S-K-R1  | February 22,<br>2022 | 1            | Addition Date of test:<br>February 17, 2022  |
|              |                 |                      | 6            | Addition Receipt Date:<br>February 8, 2022   |
|              |                 |                      | 21,22        | Correction of Average output power data:<br>11g: 2437 MHz<br>11n-20 (MIMO): 2437 MHz |
|              |                 |                      | 29           | Addition of Test equipment.<br>Used for February 17, 2022 tested.                    |

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## Reference: Abbreviations (Including words undescribed in this report)

|                |   |         |   |
|----------------|---|---------|---|
| A2LA           | The American Association for Laboratory Accreditation           | MCS     | Modulation and Coding Scheme                        |
| AC             | Alternating Current   | MRA     | Mutual Recognition Arrangement                      |
| AFH            | Adaptive Frequency Hopping                                      | N/A     | Not Applicable                                      |
| AM             | Amplitude Modulation  | NIST    | National Institute of Standards and Technology      |
| Amp, AMP       | Amplifier   | NS      | No signal detect.                                   |
| ANSI           | American National Standards Institute                           | NSA     | Normalized Site Attenuation                         |
| Ant, ANT       | Antenna   | NVLAP   | National Voluntary Laboratory Accreditation Program |
| AP             | Access Point  | OBW     | Occupied Band Width                                 |
| ASK            | Amplitude Shift Keying  | OFDM    | Orthogonal Frequency Division Multiplexing          |
| Atten., ATT    | Attenuator  | P/M     | Power meter   |
| AV             | Average   | PCB     | Printed Circuit Board                               |
| BPSK           | Binary Phase-Shift Keying                                       | PER     | Packet Error Rate                                   |
| BR             | Bluetooth Basic Rate  | PHY     | Physical Layer                                      |
| BT             | Bluetooth   | PK      | Peak  |
| BT LE          | Bluetooth Low Energy  | PN      | Pseudo random Noise                                 |
| BW             | BandWidth   | PRBS    | Pseudo-Random Bit Sequence                          |
| Cal Int        | Calibration Interval  | PSD     | Power Spectral Density                              |
| CCK            | Complementary Code Keying                                       | QAM     | Quadrature Amplitude Modulation                     |
| Ch., CH        | Channel   | QP      | Quasi-Peak  |
| CISPR          | Comite International Special des Perturbations Radioelectriques | QPSK    | Quadri-Phase Shift Keying                           |
| CW             | Continuous Wave   | RBW     | Resolution Band Width                               |
| DBPSK          | Differential BPSK   | RDS     | Radio Data System                                   |
| DC             | Direct Current  | RE      | Radio Equipment                                     |
| D-factor       | Distance factor   | RF      | Radio Frequency                                     |
| DFS            | Dynamic Frequency Selection                                     | RMS     | Root Mean Square                                    |
| DQPSK          | Differential QPSK   | RSS     | Radio Standards Specifications                      |
| DSSS           | Direct Sequence Spread Spectrum                                 | Rx      | Receiving   |
| EDR            | Enhanced Data Rate  | SA, S/A | Spectrum Analyzer                                   |
| EIRP, e.i.r.p. | Equivalent Isotropically Radiated Power                         | SG      | Signal Generator                                    |
| EMC            | ElectroMagnetic Compatibility                                   | SVSWR   | Site-Voltage Standing Wave Ratio                    |
| EMI            | ElectroMagnetic Interference                                    | TR      | Test Receiver                                       |
| EN             | European Norm   | Tx      | Transmitting  |
| ERP, e.r.p.    | Effective Radiated Power  | VBW     | Video BandWidth                                     |
| EU             | European Union  | Vert.   | Vertical  |
| EUT            | Equipment Under Test  | WLAN    | Wireless LAN  |
| Fac.           | Factor  |         |   |
| FCC            | Federal Communications Commission                               |         |   |
| FHSS           | Frequency Hopping Spread Spectrum                               |         |   |
| FM             | Frequency Modulation  |         |   |
| Freq.          | Frequency   |         |   |
| FSK            | Frequency Shift Keying  |         |   |
| GFSK           | Gaussian Frequency-Shift Keying                                 |         |   |
| GNSS           | Global Navigation Satellite System                              |         |   |
| GPS            | Global Positioning System                                       |         |   |
| Hori.          | Horizontal  |         |   |
| ICES           | Interference-Causing Equipment Standard                         |         |   |
| IEC            | International Electrotechnical Commission                       |         |   |
| IEEE           | Institute of Electrical and Electronics Engineers               |         |   |
| IF             | Intermediate Frequency  |         |   |
| ILAC           | International Laboratory Accreditation Conference               |         |   |
| ISED           | Innovation, Science and Economic Development Canada             |         |   |
| ISO            | International Organization for Standardization                  |         |   |
| JAB            | Japan Accreditation Board                                       |         |   |
| LAN            | Local Area Network  |         |   |
| LIMS           | Laboratory Information Management System                        |         |   |

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| <b>CONTENTS</b>   | <b>PAGE</b> |
|---|-------------|
| <b>SECTION 1: Customer information.....</b>                         | <b>5</b>    |
| <b>SECTION 2: Equipment under test (EUT).....</b>                   | <b>5</b>    |
| <b>SECTION 3: Test specification, procedures &amp; results.....</b> | <b>6</b>    |
| <b>SECTION 4: Operation of EUT during testing.....</b>              | <b>9</b>    |
| <b>SECTION 5: Antenna Terminal Conducted Tests.....</b>             | <b>12</b>   |
| <b>APPENDIX 1: Test data .....</b>                                  | <b>13</b>   |
| 6 dB Bandwidth and 99 % Occupied Bandwidth.....                     | 13          |
| Maximum Peak Output Power .....                                     | 18          |
| Average Output Power .....  | 20          |
| Conducted Spurious Emission .....                                   | 23          |
| Power Density .....   | 24          |
| <b>APPENDIX 2: Test instruments .....</b>                           | <b>29</b>   |
| <b>APPENDIX 3: Photographs of test setup .....</b>                  | <b>30</b>   |
| Antenna Terminal Conducted Tests.....                               | 30          |

## **SECTION 1: Customer information**

Company Name : KONICA MINOLTA, INC.  
Address : 1, Sakura-machi, Hino-shi, Tokyo, Japan 191-8511  
Telephone Number : +81-42-589-8429  
Facsimile Number : +81-42-589-8053  
Contact Person : Yukihiro Niekawa

The information provided from the customer is as follows;

- Applicant, Type of EUT, Model Number of EUT on the cover and other relevant pages
  - Operating/Test Mode(s) (Mode(s)) on all the relevant pages
  - SECTION 1: Customer information
  - SECTION 2: Equipment under test (EUT) other than the Receipt Date
  - SECTION 4: Operation of EUT during testing
- \* The laboratory is exempted from liability of any test results affected from the above information in SECTION 2 and 4.

## **SECTION 2: Equipment under test (EUT)**

### **2.1 Identification of EUT**

Type : Wireless LAN SDIO module  
Model Number : SX-SDMAN2  
Serial Number : Refer to SECTION 4.2  
Rating : DC 3.3 V, DC 1.8 V  
Receipt Date : June 17, 2016, September 29, 2020 and February 8, 2022  
Country of Mass-production : Japan  
Condition : Production prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Modification : No Modification by the test lab.

### **2.2 Product Description**

Model: SX-SDMAN2 (referred to as the EUT in this report) is a Wireless LAN SDIO module.

Clock frequency(ies) in the system : 26 MHz

#### **Radio Specification**

| Type of radio          | IEEE802.11b   | IEEE802.11g                            | IEEE802.11a  | IEEE802.11n (20 M band)   | IEEE802.11n (40 M band)  |
|------------------------|---|--|--|---|--|
| Frequency of operation | 2412 MHz-2462 MHz   | 2412 MHz-2462 MHz                      | 5180 MHz-5240 MHz<br>5260 MHz-5320 MHz<br>5500 MHz-5700 MHz<br>5745 MHz-5825 MHz | 2412 MHz-2462 MHz<br>5180 MHz-5240 MHz<br>5260 MHz-5320 MHz<br>5500 MHz-5700 MHz<br>5745 MHz-5825 MHz | 5190 MHz-5230 MHz<br>5270 MHz-5310 MHz<br>5510 MHz-5670 MHz<br>5755 MHz-5795 MHz |
| Type of modulation     | DSSS<br>(CCK, DQPSK, DBPSK)   | OFDM-CCK<br>(64QAM, 16QAM, QPSK, BPSK) | OFDM<br>(64QAM, 16QAM, QPSK, BPSK)   |   |  |
| Channel spacing        | 5 MHz   |  | 20 MHz   | 2.4 GHz band: 5 MHz<br>5 GHz band: 20 MHz   | 40 MHz   |
| Antenna type           | [Main Antenna ( chain 0 )/Sub Antenna ( chain 1 )]<br>PIFA (Planar Inverted F Antenna)  |  |  |   |  |
| Antenna Gain           | Main Antenna ( chain 0 ) -1.95 dBi (2.4 GHz Band), -0.98 dBi (5 GHz Band)<br>Sub Antenna ( chain 1 ) -2.21 dBi (2.4 GHz Band), -1.54 dBi (5 GHz Band) |  |  |   |  |
| Antenna Connector type | [Main Antenna ( chain 0 )/Sub Antenna ( chain 1 )]<br>Connector; PCB side: U.FL, Antenna side: soldered   |  |  |   |  |

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

### **3.1 Test Specification**

Test Specification : FCC Part 15 Subpart C  
FCC Part 15 final revised on January 12, 2021 and effective February 11, 2021

Title : FCC 47 CFR Part 15 Radio Frequency Device Subpart C Intentional Radiators  
Section 15.207 Conducted limits  
Section 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz,  
and 5725-5850 MHz

\* The revisions do not affect the test result conducted before its effective date.

### **3.2 Procedures and results**

| Item                                    | Test Procedure   | Specification  | Worst margin | Results        | Remarks                            |
|---|--|--|--------------|----------------|------------------------------------|
| 6 dB Bandwidth                          | FCC: KDB 558074 D01 15.247<br>Meas Guidance v05r02<br>ISED: -            | FCC: Section 15.247(a)(2)<br>ISED: RSS-247 5.2(a)                          | See data.    | Complied<br>a) | Conducted                          |
| Maximum Peak Output Power               | FCC: KDB 558074 D01 15.247<br>Meas Guidance v05r02<br>ISED: RSS-Gen 6.12 | FCC: Section 15.247(b)(3)<br>ISED: RSS-247 5.4(d)                          |              | Complied<br>b) | Conducted                          |
| Power Density                           | FCC: KDB 558074 D01 15.247<br>Meas Guidance v05r02<br>ISED: -            | FCC: Section 15.247(e)<br>ISED: RSS-247 5.2(b)                             |              | Complied<br>c) | Conducted                          |
| Spurious Emission Restricted Band Edges | FCC: KDB 558074 D01 15.247<br>Meas Guidance v05r02<br>ISED: RSS-Gen 6.13 | FCC: Section 15.247(d)<br>ISED: RSS-247 5.5<br>RSS-Gen 8.9<br>RSS-Gen 8.10 |              | Complied<br>d) | Conducted<br>(below 30 MHz)<br>*1) |

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

\*1) Radiated test result is not included in this test report.

a) Refer to APPENDIX 1 (data of 6 dB Bandwidth and 99 % Occupied Bandwidth)

b) Refer to APPENDIX 1 (data of Maximum Peak Output Power)

c) Refer to APPENDIX 1 (data of Power Density)

d) Refer to APPENDIX 1 (data of Conducted Spurious Emission)

Symbols:

Complied The data of this test item has enough margin, more than the measurement uncertainty.

Complied# The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.

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

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

The RF Module has its own regulator.

The RF Module is constantly provided voltage through the regulator regardless of input voltage. Therefore, this EUT complies with the requirement.

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

The EUT has a unique coupling/antenna connector. Therefore the equipment complies with the requirement.

### **3.3 Addition to standard**

| Item  | Test Procedure    | Specification | Worst margin | Results | Remarks   |
|---|-------------------|---------------|--------------|---------|-----------|
| 99 % Occupied Bandwidth   | ISED: RSS-Gen 6.7 | ISED: -       | N/A          | -<br>a) | Conducted |
| a) Refer to APPENDIX 1 (data of 6 dB Bandwidth and 99 % Occupied Bandwidth) |                   |               |              |         |           |

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

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### 3.4 Uncertainty

There is no applicable rule of uncertainty in this applied standard. Therefore, the results are derived depending on whether or not laboratory uncertainty is applied.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor  $k=2$ .  
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| Antenna terminal test                                   | Uncertainty (+/-) |
|---|-------------------|
| Power Measurement above 1 GHz (Average Detector)_SPM-06 | 1.4 dB            |
| Power Measurement above 1 GHz (Peak Detector)_SPM-06    | 1.6 dB            |
| Power Measurement above 1 GHz (Average Detector)_SPM-07 | 0.89 dB           |
| Power Measurement above 1 GHz (Peak Detector)_SPM-07    | 1.2 dB            |
| Power Measurement above 1 GHz (Average Detector)_SPM-13 | 0.91 dB           |
| Power Measurement above 1 GHz (Peak Detector)_SPM-13    | 1.2 dB            |
| Spurious emission (Conducted) below 1GHz                | 0.87 dB           |
| Spurious emission (Conducted) 1 GHz-3 GHz               | 0.96 dB           |
| Spurious emission (Conducted) 3 GHz-18 GHz              | 3.0 dB            |
| Spurious emission (Conducted) 18 GHz-26.5 GHz           | 2.6 dB            |
| Spurious emission (Conducted) 26.5 GHz-40 GHz           | 2.2 dB            |
| Bandwidth Measurement                                   | 0.012 %           |
| Duty cycle and Time Measurement                         | 0.27 %            |
| Temperature_SCH-01                                      | 0.95 deg.C.       |
| Humidity_SCH-01   | 0.83 %            |
| Temperature_SCH-02                                      | 2.0 deg.C.        |
| Humidity_SCH-02   | 6.6 %             |
| Voltage   | 0.86 %            |

### 3.5 Test Location

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A2LA Certificate Number: 1266.03

(FCC test firm registration number: 626366, ISED lab company number: 2973D / CAB identifier: JP0001)

| Test site                  | IC Registration Number | Width x Depth x Height (m) | Size of reference ground plane (m) / horizontal conducting plane | Maximum measurement distance |
|----------------------------|------------------------|----------------------------|--|------------------------------|
| No.1 Semi-anechoic chamber | 2973D-1                | 20.6 x 11.3 x 7.65         | 20.6 x 11.3  | 10 m                         |
| No.2 Semi-anechoic chamber | 2973D-2                | 20.6 x 11.3 x 7.65         | 20.6 x 11.3  | 10 m                         |
| No.3 Semi-anechoic chamber | 2973D-3                | 12.7 x 7.7 x 5.35          | 12.7 x 7.7   | 5 m                          |
| No.4 Semi-anechoic chamber | -                      | 8.1 x 5.1 x 3.55           | 8.1 x 5.1  | -                            |
| No.1 Shielded room         | -                      | 6.8 x 4.1 x 2.7            | 6.8 x 4.1  | -                            |
| No.2 Shielded room         | -                      | 6.8 x 4.1 x 2.7            | 6.8 x 4.1  | -                            |
| No.3 Shielded room         | -                      | 6.3 x 4.7 x 2.7            | 6.3 x 4.7  | -                            |
| No.4 Shielded room         | -                      | 4.4 x 4.7 x 2.7            | 4.4 x 4.7  | -                            |
| No.5 Shielded room         | -                      | 7.8 x 6.4 x 2.7            | 7.8 x 6.4  | -                            |
| No.6 Shielded room         | -                      | 7.8 x 6.4 x 2.7            | 7.8 x 6.4  | -                            |
| No.8 Shielded room         | -                      | 3.45 x 5.5 x 2.4           | 3.45 x 5.5   | -                            |
| No.1 Measurement room      | -                      | 2.55 x 4.1 x 2.5           | -  | -                            |

### 3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.



## **SECTION 4: Operation of EUT during testing**

### **4.1 Operating Mode(s)**

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

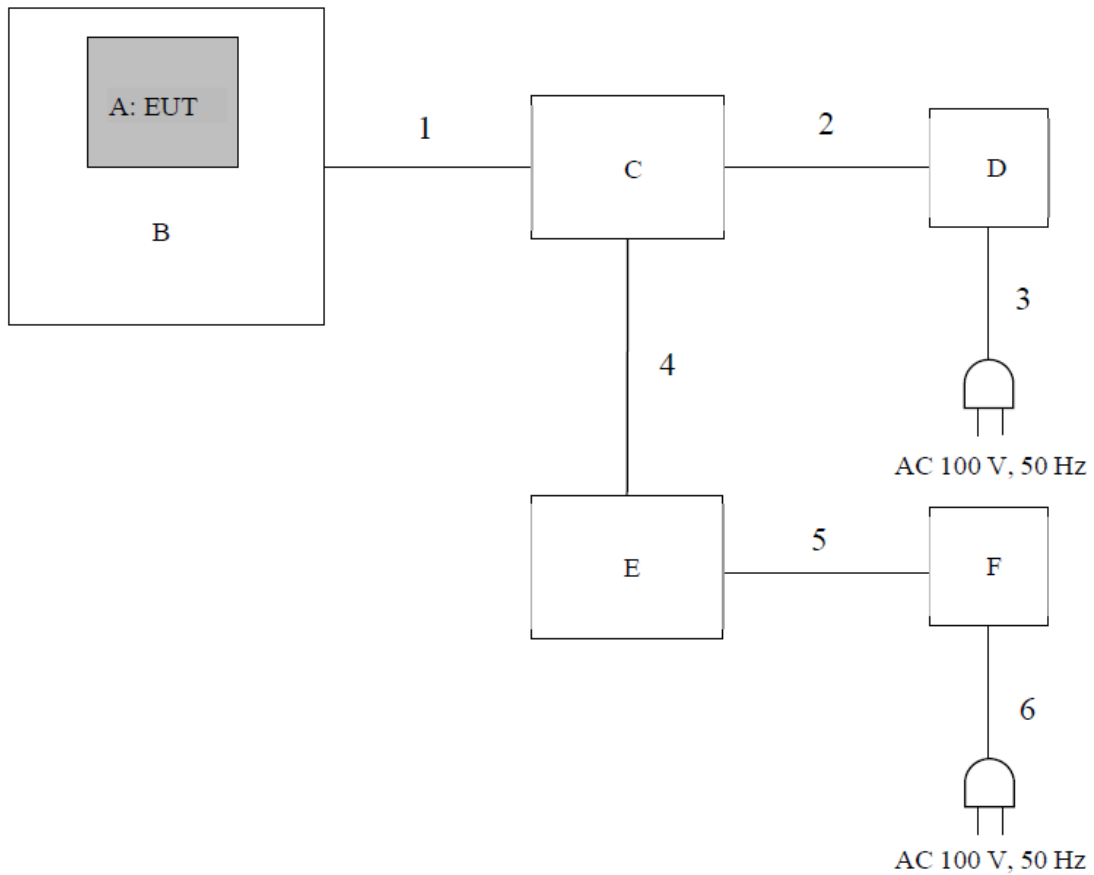
| <b>Mode</b>   | <b>Remarks*</b>      | <b>Power Setting (dBm)</b> |
|---|----------------------|----------------------------|
| IEEE 802.11b (11b)  | 11 Mbps, PN9         | 14                         |
| IEEE 802.11g (11g)  | 36 Mbps, PN9         | 8, 15, 11                  |
| IEEE 802.11n SISO 20 MHz BW (11n-20)  | MCS 4 (Long GI) PN9  | 6, 14, 7                   |
| IEEE 802.11n MIMO 20 MHz BW (11n-20)  | MCS 12 (Long GI) PN9 | 6, 14, 7                   |
| *The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)   |                      |                            |
| *Power of the EUT was set by the software as follows;<br>- Software: Wireless authentication test tool<br>Version 1.3.0.3 (Maximum Peak output power), Date: 2016.7.6,<br>Version 1.3.0 (other than Maximum Peak output power), Date: 2017.4.18, (Storage location: Driven by connected PC) |                      |                            |
| *This setting of software is the worst case.<br>Any conditions under the normal use do not exceed the condition of setting.<br>In addition, end users cannot change the settings of the output power of the product.  |                      |                            |

\*The details of Operating mode(s)

| <b>Test Item</b>   | <b>Operating Mode</b> | <b>Tested Antenna</b> | <b>Tested frequency</b>          |
|--|-----------------------|-----------------------|----------------------------------|
| Conducted Spurious Emission                                  | 11n-20 (MIMO) Tx      | Sub                   | 2437 MHz                         |
| 6 dB Bandwidth<br>Maximum Peak Output Power<br>Power Density | 11b Tx                | Sub                   | 2412 MHz                         |
|  | 11g Tx                |                       | 2437 MHz                         |
|  | 11sn-20 (SISO) Tx     |                       | 2462 MHz                         |
| 99 % Occupied Bandwidth                                      | 11n-20 (MIMO) Tx      | Main + Sub            | 2412 MHz<br>2437 MHz<br>2462 MHz |

## 4.2 Configuration and peripherals

For Maximum Peak Output Power



### Description of EUT and Support equipment

| No. | Item                     | Model number              | Serial number | Manufacturer          | Remarks |
|-----|--------------------------|---------------------------|---------------|-----------------------|---------|
| A   | Wireless LAN SDIO module | SX-SDMAN2                 | A9YH-S002     | KONICA MINOLTA Inc.   | EUT     |
| B   | SKR 3000                 | P-75                      | A9YH-S002     | KONICA MINOLTA Inc.   | -       |
| C   | Battery Charging Unit    | AeroDR                    | A7R9-00077    | KONICA MINOLTA Inc.   | -       |
| D   | AC Adapter               | TR60M48                   | 60480-0000099 | ELECTRONICS CO., LTD. | -       |
| E   | Laptop Computer          | dynabook Satellite B453 M | ZE127581H     | TOSHIBA               | -       |
| F   | AC Adapter               | PA3917U-1ACA              | G71C000DP410  | TOSHIBA               | -       |

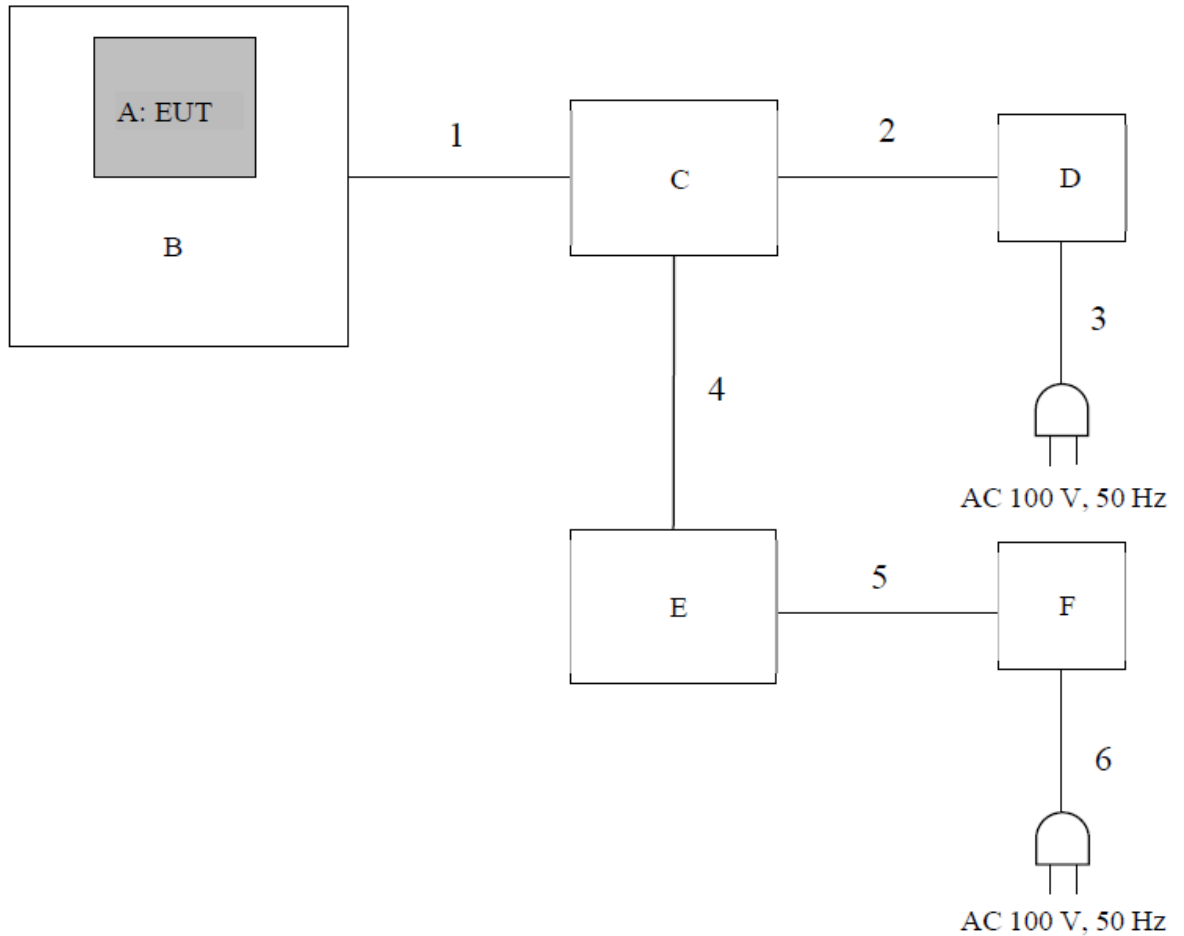
### List of cables used

| No. | Name      | Length (m) | Shield     |            | Remarks |
|-----|-----------|------------|------------|------------|---------|
|     |           |            | Cable      | Connector  |         |
| 1   | IO Cable  | 10.0       | Shielded   | Shielded   | -       |
| 2   | DC Cable  | 1.5        | Unshielded | Unshielded | -       |
| 3   | AC Cable  | 3.0        | Unshielded | Unshielded | -       |
| 4   | LAN Cable | 1.0        | Unshielded | Unshielded | Cat.6   |
| 5   | DC Cable  | 0.8        | Unshielded | Unshielded | -       |
| 6   | AC Cable  | 1.7        | Unshielded | Unshielded | -       |

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For Other Antenna Terminal Conducted tests



Description of EUT and Support equipment

| No. | Item                     | Model number | Serial number              | Manufacturer          | Remarks |
|-----|--------------------------|--------------|----------------------------|-----------------------|---------|
| A   | Wireless LAN SDIO module | SX-SDMAN2    | A8CE-S002                  | KONICA MINOLTA Inc.   | EUT     |
| B   | SKR 3000                 | P-61         | A8CE-S002                  | KONICA MINOLTA Inc.   | -       |
| C   | Battery Charging Unit    | AeroDR       | -                          | KONICA MINOLTA Inc.   | -       |
| D   | AC Adapter               | TR60M48      | -                          | ELECTRONICS CO., LTD. | -       |
| E   | Laptop Computer          | 7666-77J     | LV-B8PZ8 08/05             | Lenovo                | -       |
| F   | AC Adapter               | 92P1213      | 11S92P1213Z1ZD<br>DZ92C2WU | Lenovo                | -       |

List of cables used

| No. | Name      | Length (m) | Shield     |            | Remarks |
|-----|-----------|------------|------------|------------|---------|
|     |           |            | Cable      | Connector  |         |
| 1   | IO Cable  | 10.0       | Shielded   | Shielded   | -       |
| 2   | DC Cable  | 1.5        | Unshielded | Unshielded | -       |
| 3   | AC Cable  | 3.0        | Unshielded | Unshielded | -       |
| 4   | LAN Cable | 1.0        | Unshielded | Unshielded | Cat.6   |
| 5   | DC Cable  | 0.8        | Unshielded | Unshielded | -       |
| 6   | AC Cable  | 1.7        | Unshielded | Unshielded | -       |

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## **SECTION 5: 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                  |
|-------------------------------------|---|-----------------|--------------------|------------|------------------|----------|----------------------------------|
| 6 dB Bandwidth                      | 50 MHz                                  | 100 kHz         | 300 kHz            | Auto       | Peak             | Max Hold | Spectrum Analyzer                |
| 99 % Occupied Bandwidth *1)         | Enough width to display emission skirts | 1 to 5 % of OBW | Three times of RBW | Auto       | Sample           | Max Hold | Spectrum Analyzer                |
| Maximum Peak Output Power           | -                                       | -               | -                  | Auto       | Peak/Average *2) | -        | Power Meter (Sensor: 160 MHz BW) |
| Peak Power Density                  | 1.5 times the 6 dB Bandwidth            | 3 kHz           | 9.1 kHz            | Auto       | Peak             | Max Hold | Spectrum Analyzer *3)            |
| Conducted Spurious Emission *4) *5) | 9 kHz to 150 kHz                        | 200 Hz          | 620 Hz             | Auto       | Peak             | Max Hold | Spectrum Analyzer                |
|                                     | 150 kHz to 30 MHz                       | 10 kHz          | 30 kHz             |            |                  |          |                                  |

\*1) Peak hold was applied as Worst-case measurement.

\*2) Reference data

\*3) Section 11.10.2 Method PKPSD (peak PSD) of "ANSI C63.10-2013".

\*4) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.

Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.

(9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 10 kHz)

\*5) The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ohms. For example, the measurement at frequency 9 kHz resulted in a level of 45.5 dBuV/m, which is equivalent to  $45.5 - 51.5 = -6.0$  dBuA/m, which has the same margin, 3 dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

The test results and limit are rounded off to two decimals place, so some differences might be observed.  
The equipment and cables were not used for factor 0 dB of the data sheets.

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

**UL Japan, Inc.**

**Shonan EMC Lab.**

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**APPENDIX 1: Test data**

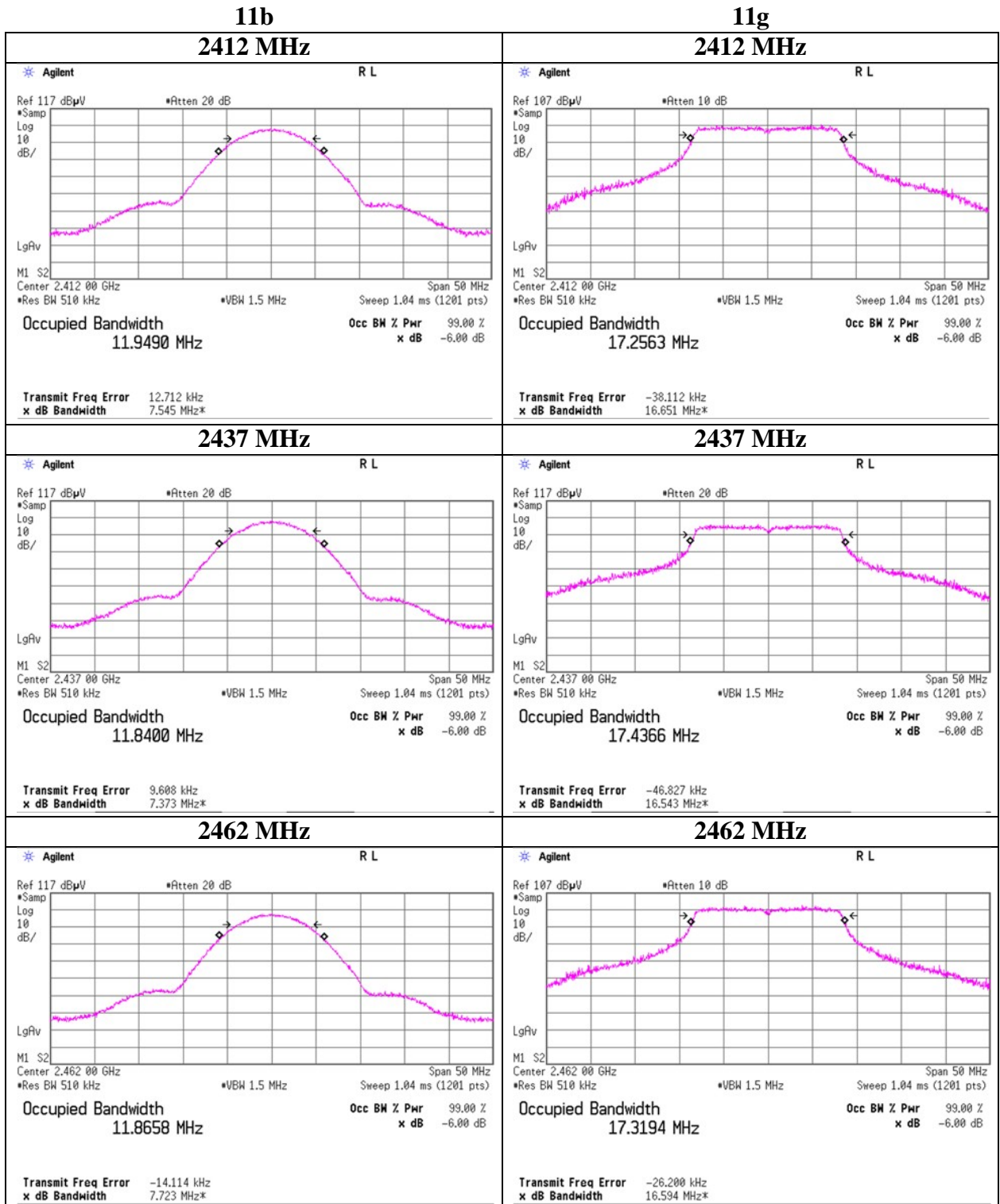
**6 dB Bandwidth and 99 % Occupied Bandwidth**

Test place                      Shonan EMC Lab. No.5 Shielded Room  
Date                                July 8, 2016  
Temperature / Humidity        25 deg. C / 56 % RH  
Engineer                         Hiroyuki Morikawa  
Mode                                Tx

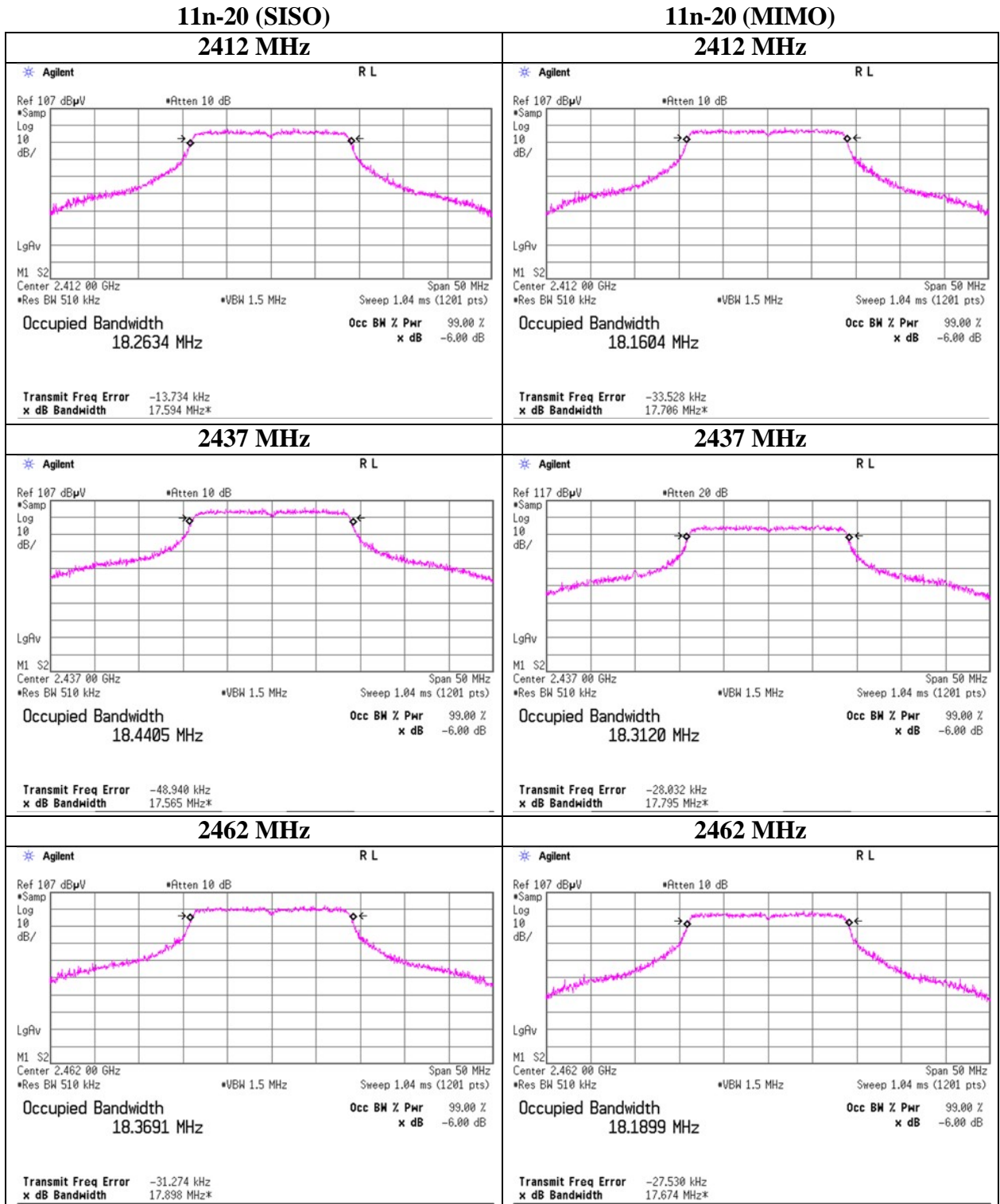
| Mode             | Frequency<br>[MHz] | 99 % Occupied<br>Bandwidth<br>[kHz] | 6 dB Bandwidth<br>[MHz] | Limit for<br>6dB Bandwidth<br>[MHz] |
|------------------|--------------------|-------------------------------------|-------------------------|-------------------------------------|
| 11b              | 2412               | 11949.0                             | 6.955                   | > 0.5000                            |
|                  | 2437               | 11840.0                             | 7.436                   | > 0.5000                            |
|                  | 2462               | 11865.8                             | 7.456                   | > 0.5000                            |
| 11g              | 2412               | 17256.3                             | 16.494                  | > 0.5000                            |
|                  | 2437               | 17436.6                             | 16.479                  | > 0.5000                            |
|                  | 2462               | 17319.4                             | 16.480                  | > 0.5000                            |
| 11n-20<br>(SISO) | 2412               | 18263.4                             | 17.661                  | > 0.5000                            |
|                  | 2437               | 18440.5                             | 17.715                  | > 0.5000                            |
|                  | 2462               | 18369.1                             | 17.686                  | > 0.5000                            |
| 11n-20<br>(MIMO) | 2412               | 18160.4                             | 17.678                  | > 0.5000                            |
|                  | 2437               | 18312.0                             | 17.674                  | > 0.5000                            |
|                  | 2462               | 18189.9                             | 17.663                  | > 0.5000                            |

\* The test was carried out by worst antenna port.

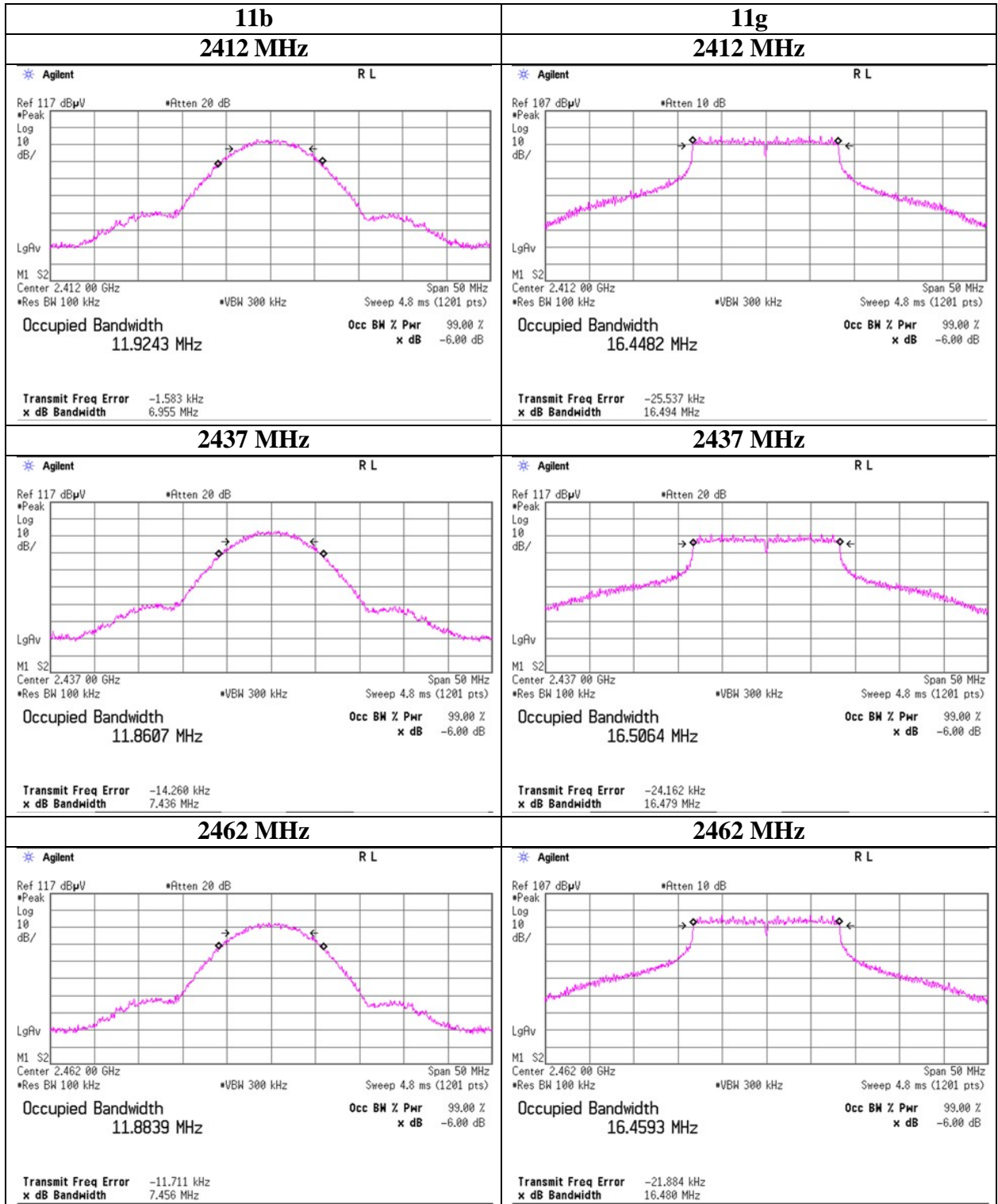
**99% Occupied Bandwidth**



**99% Occupied Bandwidth**

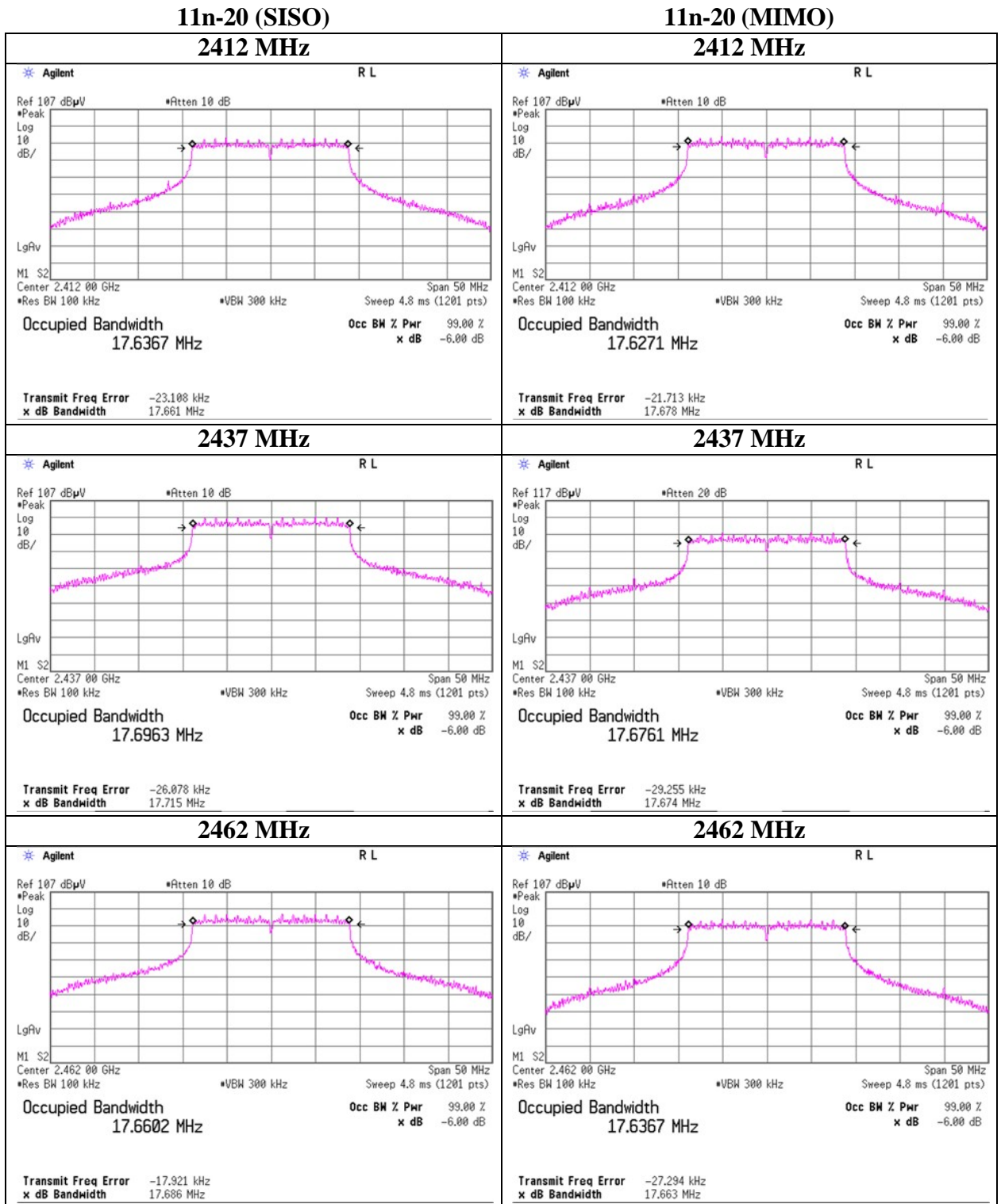


### 6dB Bandwidth





## 6dB Bandwidth



## Maximum Peak Output Power

Test place : Shonan EMC Lab. No.5 Shielded Room  
Date : January 13, 2021  
Temperature / Humidity : 22 deg. C / 36 % RH  
Engineer : Yosuke Murakami  
Mode : Tx

### 11b

| Sub Antenna    |                  |                       |                        | Conducted Power |       |       |      |                | e.i.r.p. for RSS-247     |        |       |       |      |                |
|----------------|------------------|-----------------------|------------------------|-----------------|-------|-------|------|----------------|--------------------------|--------|-------|-------|------|----------------|
| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result          |       | Limit |      | Margin<br>[dB] | Antenna<br>Gain<br>[dBi] | Result |       | Limit |      | Margin<br>[dB] |
|                |                  |                       |                        | [dBm]           | [mW]  | [dBm] | [mW] |                |                          | [dBm]  | [mW]  | [dBm] | [mW] |                |
| 2412           | 5.73             | 2.21                  | 9.88                   | 17.82           | 60.53 | 30.00 | 1000 | 12.18          | -2.21                    | 15.61  | 36.39 | 36.02 | 4000 | 20.41          |
| 2437           | 5.68             | 2.21                  | 9.88                   | 17.77           | 59.84 | 30.00 | 1000 | 12.23          | -2.21                    | 15.56  | 35.97 | 36.02 | 4000 | 20.46          |
| 2462           | 5.19             | 2.21                  | 9.88                   | 17.28           | 53.46 | 30.00 | 1000 | 12.72          | -2.21                    | 15.07  | 32.14 | 36.02 | 4000 | 20.95          |

Sample Calculation:

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

e.i.r.p. Result = Conducted Power Result + Antenna Gain

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

### 11g

| Sub Antenna    |                  |                       |                        | Conducted Power |        |       |      |                | e.i.r.p. for RSS-247     |        |        |       |      |                |
|----------------|------------------|-----------------------|------------------------|-----------------|--------|-------|------|----------------|--------------------------|--------|--------|-------|------|----------------|
| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result          |        | Limit |      | Margin<br>[dB] | Antenna<br>Gain<br>[dBi] | Result |        | Limit |      | Margin<br>[dB] |
|                |                  |                       |                        | [dBm]           | [mW]   | [dBm] | [mW] |                |                          | [dBm]  | [mW]   | [dBm] | [mW] |                |
| 2412           | 6.88             | 2.21                  | 9.88                   | 18.97           | 78.89  | 30.00 | 1000 | 11.03          | -2.21                    | 16.76  | 47.42  | 36.02 | 4000 | 19.26          |
| 2437           | 10.36            | 2.21                  | 9.88                   | 22.45           | 175.79 | 30.00 | 1000 | 7.55           | -2.21                    | 20.24  | 105.68 | 36.02 | 4000 | 15.78          |
| 2462           | 8.76             | 2.21                  | 9.88                   | 20.85           | 121.62 | 30.00 | 1000 | 9.15           | -2.21                    | 18.64  | 73.11  | 36.02 | 4000 | 17.38          |

Sample Calculation:

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

e.i.r.p. Result = Conducted Power Result + Antenna Gain

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

### 11n-20 (SISO)

| Sub Antenna    |                  |                       |                        | Conducted Power |        |       |      |                | e.i.r.p. for RSS-247     |        |       |       |      |                |
|----------------|------------------|-----------------------|------------------------|-----------------|--------|-------|------|----------------|--------------------------|--------|-------|-------|------|----------------|
| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result          |        | Limit |      | Margin<br>[dB] | Antenna<br>Gain<br>[dBi] | Result |       | Limit |      | Margin<br>[dB] |
|                |                  |                       |                        | [dBm]           | [mW]   | [dBm] | [mW] |                |                          | [dBm]  | [mW]  | [dBm] | [mW] |                |
| 2412           | 5.38             | 2.21                  | 9.88                   | 17.47           | 55.85  | 30.00 | 1000 | 12.53          | -2.21                    | 15.26  | 33.57 | 36.02 | 4000 | 20.76          |
| 2437           | 10.11            | 2.21                  | 9.88                   | 22.20           | 165.96 | 30.00 | 1000 | 7.80           | -2.21                    | 19.99  | 99.77 | 36.02 | 4000 | 16.03          |
| 2462           | 5.56             | 2.21                  | 9.88                   | 17.65           | 58.21  | 30.00 | 1000 | 12.35          | -2.21                    | 15.44  | 34.99 | 36.02 | 4000 | 20.58          |

Sample Calculation:

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

e.i.r.p. Result = Conducted Power Result + Antenna Gain

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

## Maximum Peak Output Power

Test place : Shonan EMC Lab. No.5 Shielded Room  
Date : January 13, 2021  
Temperature / Humidity : 22 deg. C / 36 % RH  
Engineer : Yosuke Murakami  
Mode : Tx 11n-20 MIMO

| Main Antenna + Sub Antenna |                                |                               | Conducted Power |        |       |      |                | e. i. r. p.              |        |        |       |         |                |
|----------------------------|--------------------------------|-------------------------------|-----------------|--------|-------|------|----------------|--------------------------|--------|--------|-------|---------|----------------|
| Freq.<br>[MHz]             | Main Antenna<br>Result<br>[mW] | Sub Antenna<br>Result<br>[mW] | Result          |        | Limit |      | Margin<br>[dB] | Antenna<br>Gain<br>[dBi] | Result |        | Limit |         | Margin<br>[dB] |
|                            |                                |                               | [dBm]           | [mW]   | [dBm] | [mW] |                |                          | [dBm]  | [mW]   |       |         |                |
| 2412                       | 52.24                          | 53.95                         | 20.26           | 106.19 | 30.00 | 1000 | 9.74           | -2.21                    | 18.05  | 63.83  | 36.02 | 4000.00 | 17.97          |
| 2437                       | 163.68                         | 167.49                        | 25.20           | 331.18 | 30.00 | 1000 | 4.80           | -2.21                    | 22.99  | 199.07 | 36.02 | 4000.00 | 13.03          |
| 2462                       | 56.10                          | 59.16                         | 20.62           | 115.26 | 30.00 | 1000 | 9.38           | -2.21                    | 18.41  | 69.34  | 36.02 | 4000.00 | 17.61          |

Sample Calculation:

Result = Antenna 1 + Antenna 2

e. i. r. p. Result = Conducted Power Result + Antenna Gain

### Main Antenna

| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result |        |
|----------------|------------------|-----------------------|------------------------|--------|--------|
|                |                  |                       |                        | [dBm]  | [mW]   |
| 2412           | 4.78             | 2.22                  | 10.18                  | 17.18  | 52.24  |
| 2437           | 9.73             | 2.23                  | 10.18                  | 22.14  | 163.68 |
| 2462           | 5.08             | 2.23                  | 10.18                  | 17.49  | 56.10  |

### Sub Antenna

| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result |        |
|----------------|------------------|-----------------------|------------------------|--------|--------|
|                |                  |                       |                        | [dBm]  | [mW]   |
| 2412           | 5.23             | 2.21                  | 9.88                   | 17.32  | 53.95  |
| 2437           | 10.15            | 2.21                  | 9.88                   | 22.24  | 167.49 |
| 2462           | 5.63             | 2.21                  | 9.88                   | 17.72  | 59.16  |

Sample Calculation:

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

**Average Output Power**  
**(Reference data)**

Test place Shonan EMC Lab. No.5 Shielded Room  
Date January 13, 2021 February 17, 2022  
Temperature / Humidity 22 deg. C / 36 % RH 23 deg. C / 34 % RH  
Engineer Yosuke Murakami  
Mode Tx

11b **11 Mbps** Sub Antenna

| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result<br>(Time average) |       | Duty<br>factor<br>[dB] | Result<br>(Burst power average) |       |
|----------------|------------------|-----------------------|------------------------|--------------------------|-------|------------------------|---------------------------------|-------|
|                |                  |                       |                        | [dBm]                    | [mW]  |                        | [dBm]                           | [mW]  |
| 2412           | 2.57             | 2.21                  | 9.88                   | 14.66                    | 29.24 | 0.16                   | 14.82                           | 30.34 |
| 2437           | 2.29             | 2.21                  | 9.88                   | 14.38                    | 27.42 | 0.16                   | 14.54                           | 28.44 |
| 2462           | 1.99             | 2.21                  | 9.88                   | 14.08                    | 25.59 | 0.16                   | 14.24                           | 26.55 |

11g **36 Mbps** Sub Antenna

| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result<br>(Time average) |       | Duty<br>factor<br>[dB] | Result<br>(Burst power average) |       |
|----------------|------------------|-----------------------|------------------------|--------------------------|-------|------------------------|---------------------------------|-------|
|                |                  |                       |                        | [dBm]                    | [mW]  |                        | [dBm]                           | [mW]  |
| 2412           | -3.64            | 2.21                  | 9.88                   | 8.45                     | 7.00  | 0.62                   | 9.07                            | 8.07  |
| 2437           | 1.89             | 2.66                  | 9.82                   | 14.37                    | 27.35 | 0.62                   | 14.99                           | 31.55 |
| 2462           | -1.55            | 2.21                  | 9.88                   | 10.54                    | 11.32 | 0.62                   | 11.16                           | 13.06 |

11n-20(SISO) **MCS 4** Sub Antenna

| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result<br>(Time average) |       | Duty<br>factor<br>[dB] | Result<br>(Burst power average) |       |
|----------------|------------------|-----------------------|------------------------|--------------------------|-------|------------------------|---------------------------------|-------|
|                |                  |                       |                        | [dBm]                    | [mW]  |                        | [dBm]                           | [mW]  |
| 2412           | -5.58            | 2.21                  | 9.88                   | 6.51                     | 4.48  | 0.64                   | 7.15                            | 5.19  |
| 2437           | 1.64             | 2.21                  | 9.88                   | 13.73                    | 23.60 | 0.64                   | 14.37                           | 27.35 |
| 2462           | -5.35            | 2.21                  | 9.88                   | 6.74                     | 4.72  | 0.64                   | 7.38                            | 5.47  |

Sample Calculation:

Result (Time average) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator  
Loss Result (Burst power average) = Time average + Duty factor

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

**Average Output Power**  
**(Reference data)**

|                        |                                    |                     |
|------------------------|------------------------------------|---------------------|
| Test place             | Shonan EMC Lab. No.5 Shielded Room |                     |
| Date                   | January 13, 2021                   | February 17, 2022   |
| Temperature / Humidity | 22 deg. C / 36 % RH                | 23 deg. C / 34 % RH |
| Engineer               | Yosuke Murakami                    |                     |
| Mode                   | Tx 11n-20 (MIMO)                   |                     |

**Main Antenna + Sub Antenna**

| Freq.<br>[MHz] | Main Ant<br>Result<br>[mW] | Sub Ant<br>Result<br>[mW] | Result |       | Limit |      | Margin<br>[dB] |
|----------------|----------------------------|---------------------------|--------|-------|-------|------|----------------|
|                |                            |                           | [dBm]  | [mW]  | [dBm] | [mW] |                |
| 2412.0         | 5.74                       | 5.82                      | 10.63  | 11.56 | 30.00 | 1000 | 19.37          |
| 2437.0         | 26.67                      | 30.62                     | 17.58  | 57.29 | 30.00 | 1000 | 12.42          |
| 2462.0         | 5.92                       | 6.01                      | 10.77  | 11.93 | 30.00 | 1000 | 19.23          |

**Main Antenna**

| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result<br>(Time average) |       | Duty<br>factor<br>[dB] | Result<br>(Burst power average) |       |
|----------------|------------------|-----------------------|------------------------|--------------------------|-------|------------------------|---------------------------------|-------|
|                |                  |                       |                        | [dBm]                    | [mW]  |                        | [dBm]                           | [mW]  |
| 2412.0         | -5.89            | 2.22                  | 10.18                  | 6.51                     | 4.48  | 1.08                   | 7.59                            | 5.74  |
| 2437.0         | 0.70             | 2.66                  | 9.82                   | 13.18                    | 20.80 | 1.08                   | 14.26                           | 26.67 |
| 2462.0         | -5.77            | 2.23                  | 10.18                  | 6.64                     | 4.61  | 1.08                   | 7.72                            | 5.92  |

**Sub Antenna**

| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result<br>(Time average) |       | Duty<br>factor<br>[dB] | Result<br>(Burst power average) |       |
|----------------|------------------|-----------------------|------------------------|--------------------------|-------|------------------------|---------------------------------|-------|
|                |                  |                       |                        | [dBm]                    | [mW]  |                        | [dBm]                           | [mW]  |
| 2412.0         | -5.52            | 2.21                  | 9.88                   | 6.57                     | 4.54  | 1.08                   | 7.65                            | 5.82  |
| 2437.0         | 1.30             | 2.66                  | 9.82                   | 13.78                    | 23.88 | 1.08                   | 14.86                           | 30.62 |
| 2462.0         | -5.38            | 2.21                  | 9.88                   | 6.71                     | 4.69  | 1.08                   | 7.79                            | 6.01  |

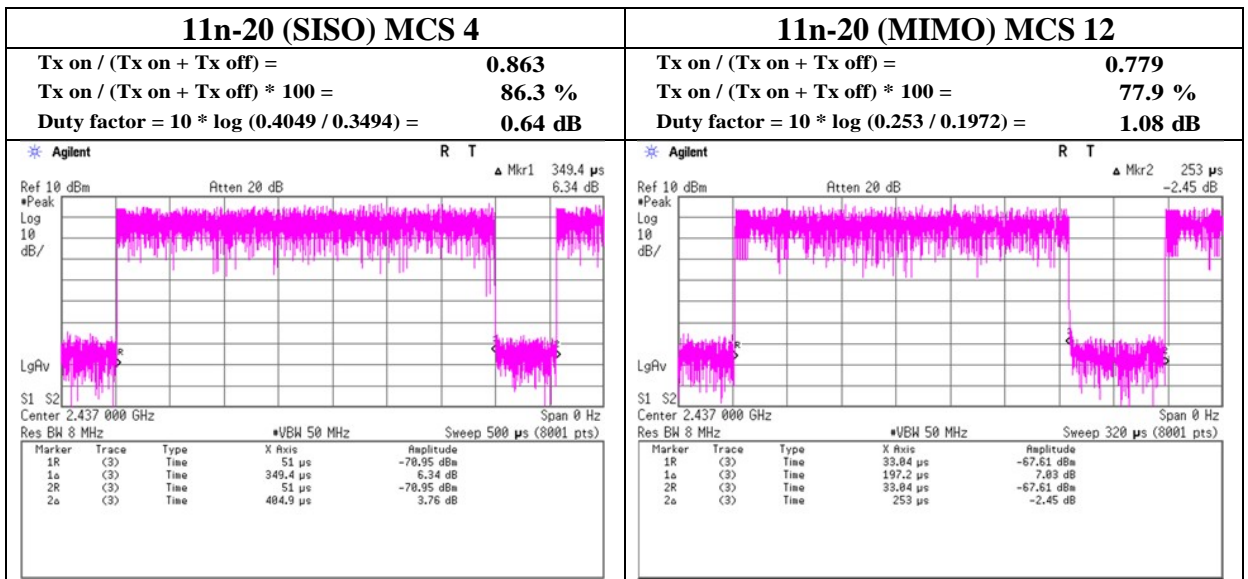
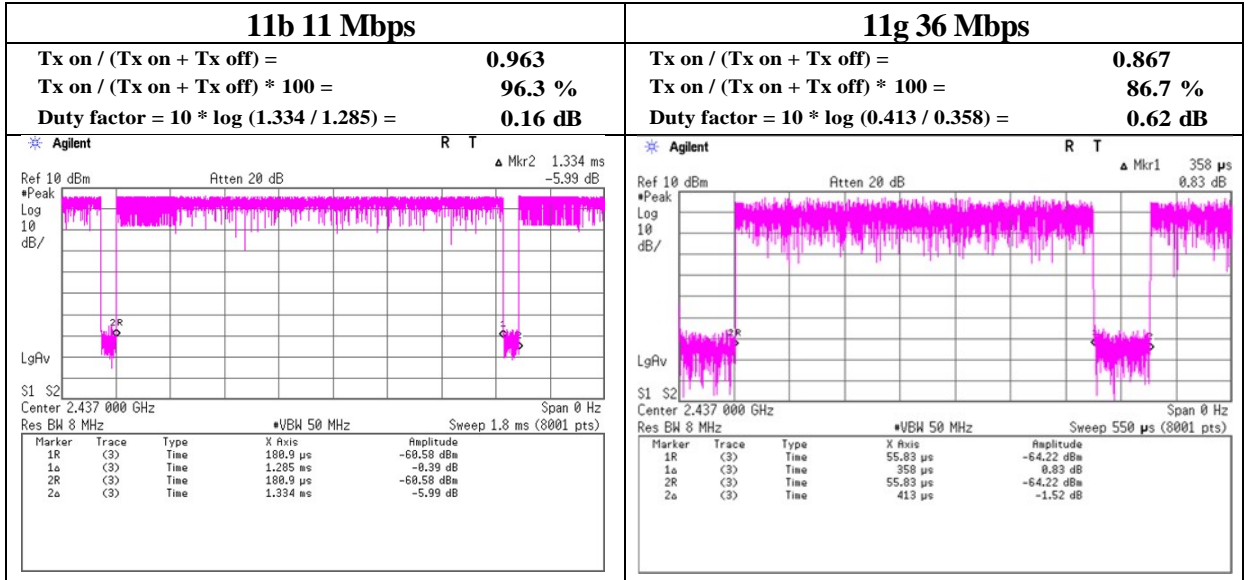
Sample Calculation:

Result (Time average) = Reading + Cable Loss (including the cable(s) customer supplied) +  
Attenuator Loss  
Result (Burst power average) = Time average + Duty factor

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

### Burst rate confirmation

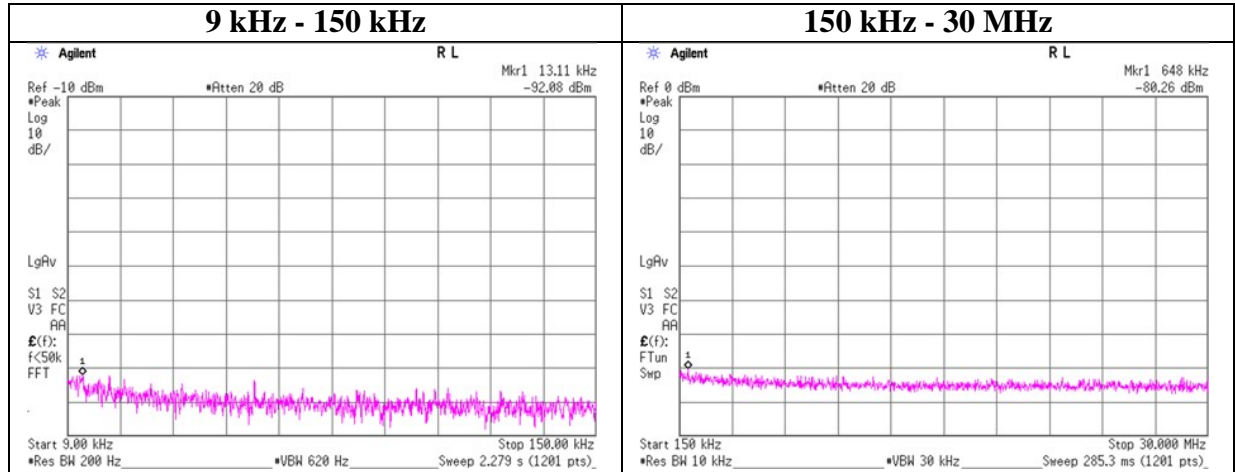
Test place : Shonan EMC Lab. No.5 Shielded Room  
Date : January 13, 2021  
Temperature / Humidity : 22 deg. C / 36 % RH  
Engineer : Yosuke Murakami  
Mode : Tx



Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

## Conducted Spurious Emission

Test place : Shonan EMC Lab. No.5 Shielded Room  
Date : July 8, 2016  
Temperature / Humidity : 25 deg. C / 56 % RH  
Engineer : Hiroyuki Morikawa  
Mode : Tx 11n-20 (MIMO) 2437 MHz



| Frequency [kHz] | Reading [dBm] | Cable Loss [dB] | Attenuator Loss [dB] | Antenna Gain [dBi] | N (Number of Output) | EIRP [dBm] | Distance [m] | Ground bounce [dB] | E (field strength) [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Remark |
|-----------------|---------------|-----------------|----------------------|--------------------|----------------------|------------|--------------|--------------------|-----------------------------|----------------|-------------|--------|
| 13.11           | -92.1         | 0.01            | 9.8                  | 2.0                | 2                    | -77.2      | 300          | 6.0                | -16.0                       | 45.2           | 61.2        | -      |
| 648.00          | -80.3         | 0.02            | 9.8                  | 2.0                | 2                    | -65.4      | 30           | 6.0                | 15.9                        | 31.3           | 15.4        | -      |

$E = \text{EIRP} - 20 \log(D) + \text{Ground bounce} + 104.8 \text{ [dBuV/m]}$

$\text{EIRP} = \text{Reading} + \text{Cable Loss} + \text{Attenuator Loss} + \text{Antenna Gain} + 10 * \log(N)$

\*2.0 dBi was applied to the test result based on ANSI C63.10 since antenna gain was less than 2.0 dBi.

## Power Density

Test place Shonan EMC Lab. No.5 Shielded Room  
Date July 8, 2016  
Temperature / Humidity 25 deg. C / 56 % RH  
Engineer Hiroyuki Morikawa  
Mode Tx

### 11b Sub antenna

| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] |
|----------------|------------------|-----------------------|------------------------|-----------------|----------------|----------------|
| 2412.00        | -21.35           | 3.42                  | 9.92                   | -8.01           | 8.00           | 16.01          |
| 2437.00        | -21.52           | 3.42                  | 9.92                   | -8.18           | 8.00           | 16.18          |
| 2462.00        | -21.85           | 3.43                  | 9.92                   | -8.50           | 8.00           | 16.50          |

### 11g Sub antenna

| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] |
|----------------|------------------|-----------------------|------------------------|-----------------|----------------|----------------|
| 2412.00        | -29.26           | 3.42                  | 9.92                   | -15.92          | 8.00           | 23.92          |
| 2437.00        | -23.12           | 3.42                  | 9.92                   | -9.78           | 8.00           | 17.78          |
| 2462.00        | -26.13           | 3.43                  | 9.92                   | -12.78          | 8.00           | 20.78          |

### 11n-20 (SISO) Sub antenna

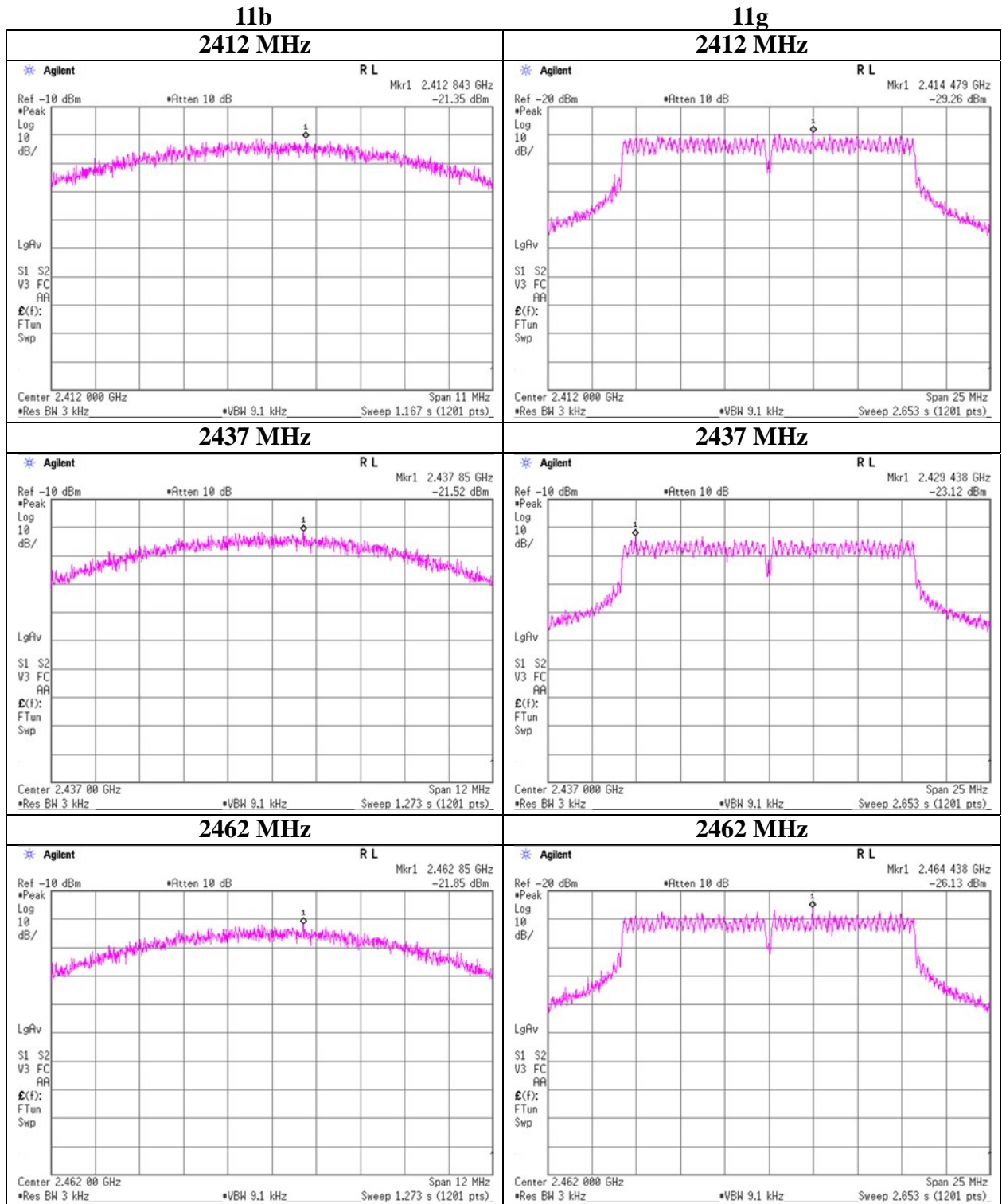
| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] |
|----------------|------------------|-----------------------|------------------------|-----------------|----------------|----------------|
| 2412.00        | -32.12           | 3.42                  | 9.92                   | -18.78          | 8.00           | 26.78          |
| 2437.00        | -22.14           | 3.42                  | 9.92                   | -8.80           | 8.00           | 16.80          |
| 2462.00        | -26.97           | 3.43                  | 9.92                   | -13.62          | 8.00           | 21.62          |

Sample Calculation:

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

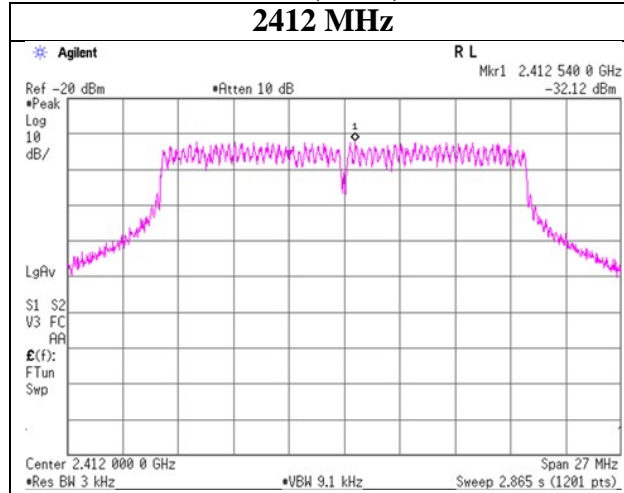


**Power Density**

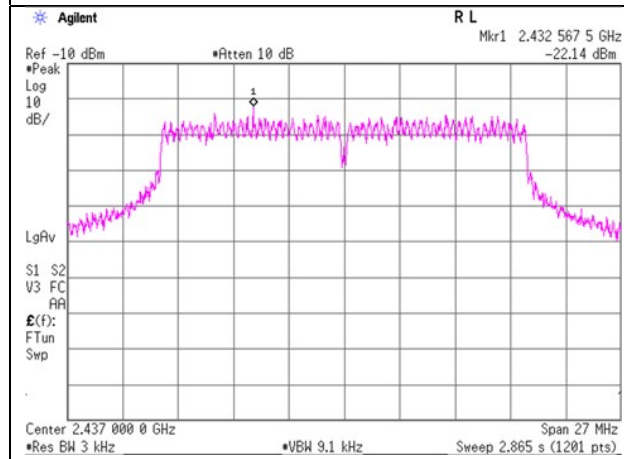


## Power Density

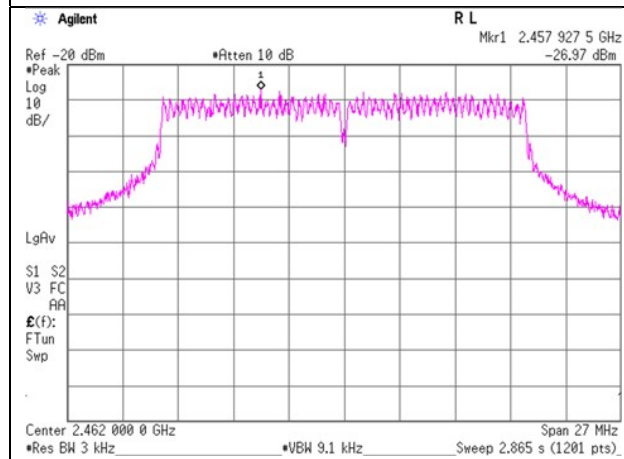
### 11n-20 (SISO) 2412 MHz



### 2437 MHz



### 2462 MHz



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Facsimile : +81 463 50 6401

## Power Density

Test place                      Shonan EMC Lab. No.5 Shielded Room  
Date                                July 8, 2016  
Temperature / Humidity        25 deg. C / 56 % RH  
Engineer                         Hiroyuki Morikawa  
Mode                                Tx

### Main antenna + Sub antenna

| Freq.<br>[MHz] | Main<br>Result<br>[mW] | Sub<br>Result<br>[mW] | Result |      | Limit<br>[dBm] | Margin<br>[dB] |
|----------------|------------------------|-----------------------|--------|------|----------------|----------------|
|                |                        |                       | [dBm]  | [mW] |                |                |
| 2412.00        | 0.01                   | 0.02                  | -15.08 | 0.03 | 8.00           | 23.08          |
| 2437.00        | 0.07                   | 0.08                  | -8.36  | 0.15 | 8.00           | 16.36          |
| 2462.00        | 0.01                   | 0.02                  | -14.45 | 0.04 | 8.00           | 22.45          |

Sample Calculation:

Result = Main antenna + Sub antenna

### Main antenna

| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result |      | Limit<br>[dBm] | Margin<br>[dB] |
|----------------|------------------|-----------------------|------------------------|--------|------|----------------|----------------|
|                |                  |                       |                        | [dBm]  | [mW] |                |                |
| 2412.00        | -31.61           | 3.42                  | 9.92                   | -18.27 | 0.01 | 8.00           | 26.27          |
| 2437.00        | -25.08           | 3.42                  | 9.92                   | -11.74 | 0.07 | 8.00           | 19.74          |
| 2462.00        | -31.62           | 3.43                  | 9.92                   | -18.27 | 0.01 | 8.00           | 26.27          |

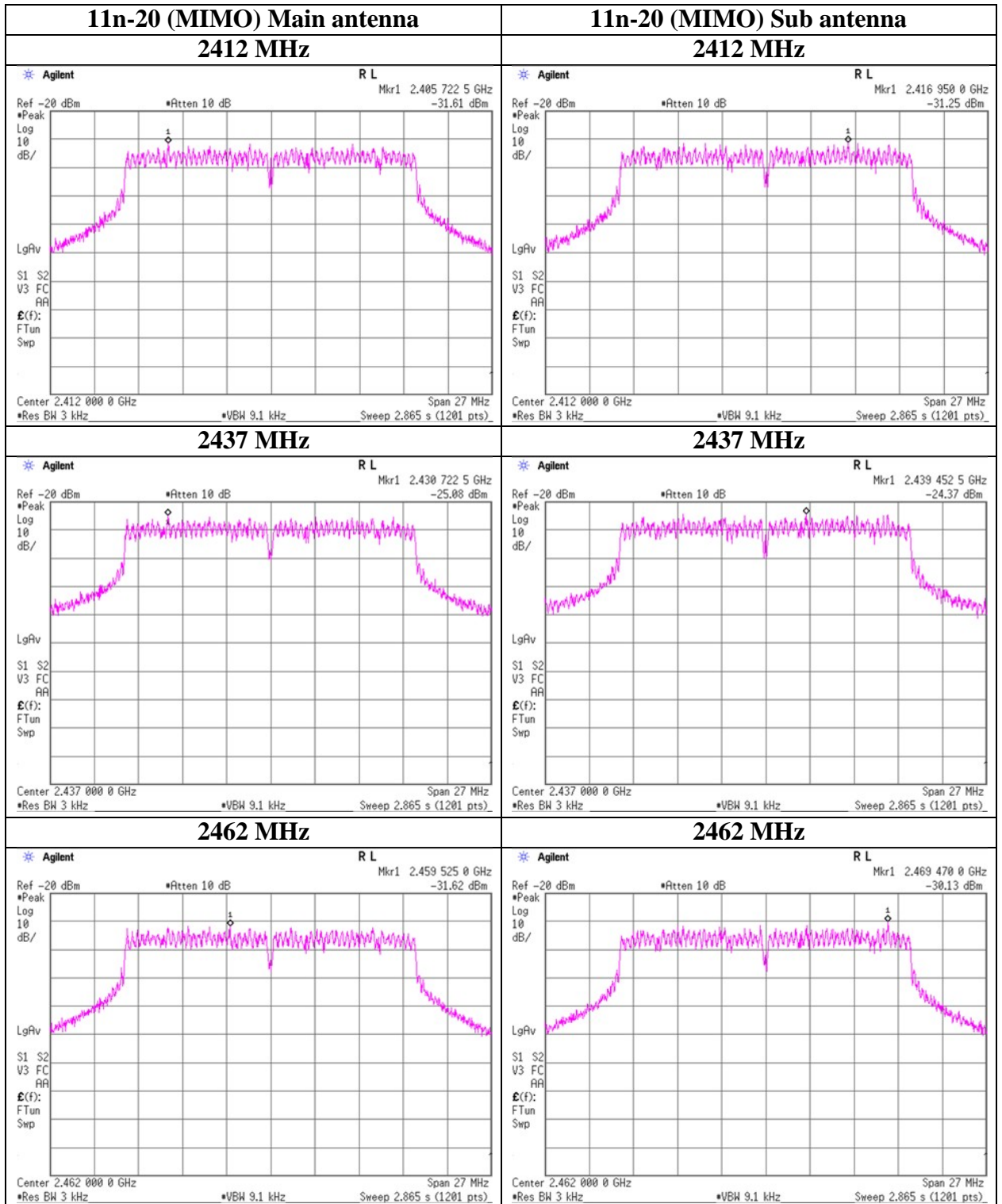
### Sub antenna

| Freq.<br>[MHz] | Reading<br>[dBm] | Cable<br>Loss<br>[dB] | Atten.<br>Loss<br>[dB] | Result |      | Limit<br>[dBm] | Margin<br>[dB] |
|----------------|------------------|-----------------------|------------------------|--------|------|----------------|----------------|
|                |                  |                       |                        | [dBm]  | [mW] |                |                |
| 2412.00        | -31.25           | 3.42                  | 9.92                   | -17.91 | 0.02 | 8.00           | 25.91          |
| 2437.00        | -24.37           | 3.42                  | 9.92                   | -11.03 | 0.08 | 8.00           | 19.03          |
| 2462.00        | -30.13           | 3.43                  | 9.92                   | -16.78 | 0.02 | 8.00           | 24.78          |

Sample Calculation:

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

**Power Density**



## **APPENDIX 2: Test instruments**

### **Test equipment**

#### **For Maximum Peak Output Power measurement**

| Test Item | Local ID | LIMS ID | Description        | Manufacturer              | Model        | Serial     | Last Calibration Date | Cal Int |
|-----------|----------|---------|--------------------|---------------------------|--------------|------------|-----------------------|---------|
| AT        | KTS-07   | 145111  | Digital Tester     | SANWA                     | PC500        | 7019232    | 2021/09/14            | 12      |
| AT        | SAT10-15 | 160493  | Attenuator         | Weinschel Corp.           | 54A-10       | 83406      | 2020/12/21            | 12      |
| AT        | SAT10-16 | 160494  | Attenuator         | Weinschel Corp.           | 54A-10       | 83420      | 2020/12/21            | 12      |
| AT        | SCC-G11  | 145174  | Coaxial Cable      | Suhner                    | SUCOFLEX 102 | 31595/2    | 2020/03/02            | 12      |
| AT        | SCC-G60  | 196941  | Coaxial Cable      | HUBER+SUNER               | SUCOFLEX 102 | 803093/2   | 2020/03/10            | 12      |
| AT        | SCC-G67  | 196949  | Coaxial Cable      | HUBER+SUNER               | SUCOFLEX 102 | 803480/2   | 2020/03/10            | 12      |
| AT        | SOS-27   | 191845  | Humidity Indicator | CUSTOM. Inc               | CTH-201      | -          | 2021/08/02            | 12      |
| AT        | SPM-07   | 146247  | Power Meter        | Keysight Technologies Inc | 8990B        | MY5100272  | 2020/05/27            | 12      |
| AT        | SPSS-04  | 146310  | Power sensor       | Keysight Technologies Inc | N1923A       | MY5326009  | 2020/05/27            | 12      |
| AT        | SPSS-05  | 146311  | Power sensor       | Keysight Technologies Inc | N1923A       | MY5349008  | 2020/05/27            | 12      |
| AT        | SRENT-22 | 202830  | Spectrum Analyzer  | Keysight Technologies Inc | E4440A       | MY48250036 | 2020/11/24            | 12      |
| AT        | SPM-13   | 169910  | Power Meter        | Keysight Technologies Inc | 8990B        | MY51000448 | 2022/01/25            | 12      |
| AT        | SPSS-06  | 169911  | Power sensor       | Keysight Technologies Inc | N1923A       | MY57270004 | 2022/01/25            | 12      |
| AT        | SAT10-14 | 154591  | Attenuator         | Weinschel Corp.           | 54A-10       | 81595      | 2021/04/08            | 12      |
| AT        | SCC-G12  | 145040  | Coaxial Cable      | Suhner                    | SUCOFLEX 102 | 30790/2    | 2021/03/04            | 12      |

#### **For Other Antenna Terminal Conducted tests**

| Test Item | Local ID | LIMS ID | Description        | Manufacturer    | Model        | Serial     | Last Calibration Date | Cal Int |
|-----------|----------|---------|--------------------|-----------------|--------------|------------|-----------------------|---------|
| AT        | SSA-02   | -       | Spectrum Analyzer  | Agilent         | E4448A       | MY48250106 | 2016/03/23            | 12      |
| AT        | SPM-07   | -       | Power Meter        | Agilent         | 8990B        | MY5100272  | 2016/04/04            | 12      |
| AT        | SPSS-04  | -       | Power sensor       | Agilent         | N1923A       | MY5326009  | 2016/04/04            | 12      |
| AT        | SOS-09   | -       | Humidity Indicator | A&D             | AD-5681      | 4061484    | 2015/12/07            | 12      |
| AT        | SCC-G13  | -       | Coaxial Cable      | Suhner          | SUCOFLEX 102 | 31599/2    | 2016/03/23            | 12      |
| AT        | SAT10-10 | -       | Attenuator         | Weinschel Corp. | 54A-10       | 37584      | 2016/04/18            | 12      |
| AT        | STM-G4   | -       | Terminator         | Weinschel       | M1459A       | U6592      | 2015/07/14            | 12      |
| AT        | KSA-08   | -       | Spectrum Analyzer  | Agilent         | E4446A       | MY46180525 | 2016/03/28            | 12      |

\*Hyphens for Last Calibration Date and Cal Int (month) are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.

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

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

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

Test item: AT: Antenna Terminal Conducted test