



# EMI TEST REPORT

Test Report No. : 13280770H-B-R2

Applicant : OMRON HEALTHCARE Co., Ltd.  
Type of EUT : WheezeScan  
Model Number of EUT : RE-W100  
FCC ID : Q6ZHWZ1000T  
Test regulation : FCC Part 15 Subpart B: 2019  
Test Result : Complied (Refer to SECTION 3.2)

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
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.
5. This test report covers EMC technical requirements.

It does not cover administrative issues such as Manual or non-EMC test related Requirements. (if applicable)

6. The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
7. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.
8. The information provided from the customer for this report is identified in SECTION 1.
9. This report is a revised version of 13280770H.-B-R1 13280770H-B-R1 is replaced with this report.

Date of test: April 5, 2020

Representative test engineer:

Hiroyuki Furutaka  
Engineer  
Consumer Technology Division

Approved by:

Takayuki Shimada  
Leader  
Consumer Technology Division



This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.  
\*As for the range of Accreditation in NVLAP, you may refer to the WEB address,  
[http://japan.ul.com/resources/emc\\_accredited/](http://japan.ul.com/resources/emc_accredited/)

- ☐ This report contains data that are not covered by the NVLAP accreditation.  
☒ There is no testing item of "Non-accreditation".

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## **REVISION HISTORY**

### **Original Test Report No.: 13280770H-B**

| Revision        | Test report No. | Date           | Page revised | Contents                                                                                                                   |
|-----------------|-----------------|----------------|--------------|----------------------------------------------------------------------------------------------------------------------------|
| -<br>(Original) | 13280770H-B     | April 22, 2020 | -            | -                                                                                                                          |
| 1               | 13280770H-B-R1  | May 26, 2020   | P. 13        | Addition of the following sentence under the test data;<br>Refer to Test Report: 13280770H-A for measurement above 13 GHz. |
| 2               | 13280770H-B-R2  | June 5, 2020   | P.6          | Correction of the Result description of Radiated emission in Clause 3.2;<br>From “N/A” to “Complied”                       |

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

|                |                                                                 |             |                                                                                |
|----------------|-----------------------------------------------------------------|-------------|--------------------------------------------------------------------------------|
| AAN            | Asymmetric Artificial Network                                   | ILAC        | International Laboratory Accreditation Conference                              |
| AC             | Alternating Current                                             | ISED        | Innovation, Science and Economic Development Canada                            |
| AM             | Amplitude Modulation                                            | ISN         | Impedance Stabilization Network                                                |
| AMN            | Artificial Mains Network                                        | ISO         | International Organization for Standardization                                 |
| Amp, AMP       | Amplifier                                                       | JAB         | Japan Accreditation Board                                                      |
| ANSI           | American National Standards Institute                           | LAN         | Local Area Network                                                             |
| Ant, ANT       | Antenna                                                         | LCL         | Longitudinal Conversion Loss                                                   |
| AP             | Access Point                                                    | LIMS        | Laboratory Information Management System                                       |
| ASK            | Amplitude Shift Keying                                          | LISN        | Line Impedance Stabilization Network                                           |
| Atten., ATT    | Attenuator                                                      | MRA         | Mutual Recognition Arrangement                                                 |
| AV             | Average                                                         | N/A         | Not Applicable                                                                 |
| BPSK           | Binary Phase-Shift Keying                                       | NIST        | National Institute of Standards and Technology                                 |
| BR             | Bluetooth Basic Rate                                            | NS          | No signal detect.                                                              |
| BT             | Bluetooth                                                       | NSA         | Normalized Site Attenuation                                                    |
| BT LE          | Bluetooth Low Energy                                            | NVLAP       | National Voluntary Laboratory Accreditation Program                            |
| BW             | BandWidth                                                       | OBW         | Occupied Band Width                                                            |
| C.F            | Correction Factor                                               | OFDM        | Orthogonal Frequency Division Multiplexing                                     |
| Cal Int        | Calibration Interval                                            | PK          | Peak                                                                           |
| CAV            | CISPR AV                                                        | PLT         | long-term flicker severity                                                     |
| CCK            | Complementary Code Keying                                       | POHC(A)     | Partial Odd Harmonic Current                                                   |
| CDN            | Coupling Decoupling Network                                     | Pol., Pola. | Polarization                                                                   |
| Ch., CH        | Channel                                                         | PR-ASK      | Phase Reversal ASK                                                             |
| CISPR          | Comite International Special des Perturbations Radioelectriques | PST         | short-term flicker severity                                                    |
| Corr.          | Correction                                                      | QAM         | Quadrature Amplitude Modulation                                                |
| CPE            | Customer premise equipment                                      | QP          | Quasi-Peak                                                                     |
| CW             | Continuous Wave                                                 | QPSK        | Quadri-Phase Shift Keying                                                      |
| DBPSK          | Differential BPSK                                               | r.m.s., RMS | Root Mean Square                                                               |
| DC             | Direct Current                                                  | RBW         | Resolution Band Width                                                          |
| DET            | Detector                                                        | RE          | Radio Equipment                                                                |
| D-factor       | Distance factor                                                 | REV         | Reverse                                                                        |
| Dmax           | maximum absolute voltage change during an observation period    | RF          | Radio Frequency                                                                |
| DQPSK          | Differential QPSK                                               | RFID        | Radio Frequency Identifier                                                     |
| DSSS           | Direct Sequence Spread Spectrum                                 | RSS         | Radio Standards Specifications                                                 |
| EDR            | Enhanced Data Rate                                              | Rx          | Receiving                                                                      |
| e.i.r.p., EIRP | Equivalent Isotropically Radiated Power                         | SINAD       | Ratio of (Signal + Noise + Distortion) to (Noise + Distortion)                 |
| EM clamp       | Electromagnetic clamp                                           | S/N         | Signal to Noise ratio                                                          |
| EMC            | ElectroMagnetic Compatibility                                   | SA, S/A     | Spectrum Analyzer                                                              |
| EMI            | ElectroMagnetic Interference                                    | SG          | Signal Generator                                                               |
| EMS            | ElectroMagnetic Susceptibility                                  | SVSWR       | Site-Voltage Standing Wave Ratio                                               |
| EN             | European Norm                                                   | THC(A)      | Total Harmonic Current                                                         |
| e.r.p., ERP    | Effective Radiated Power                                        | THD(%)      | Total Harmonic Distortion                                                      |
| EU             | European Union                                                  | TR          | Test Receiver                                                                  |
| EUT            | Equipment Under Test                                            | Tx          | Transmitting                                                                   |
| Fac.           | Factor                                                          | VBW         | Video BandWidth                                                                |
| FCC            | Federal Communications Commission                               | Vert.       | Vertical                                                                       |
| FHSS           | Frequency Hopping Spread Spectrum                               | WLAN        | Wireless LAN                                                                   |
| FM             | Frequency Modulation                                            | xDSL        | Generic term for all types of DSL technology<br>(DSL: Digital Subscriber Line) |
| Freq.          | Frequency                                                       |             |                                                                                |
| FSK            | Frequency Shift Keying                                          |             |                                                                                |
| Fund           | Fundamental                                                     |             |                                                                                |
| FWD            | Forward                                                         |             |                                                                                |
| GFSK           | Gaussian Frequency-Shift Keying                                 |             |                                                                                |
| GNSS           | Global Navigation Satellite System                              |             |                                                                                |
| GPS            | Global Positioning System                                       |             |                                                                                |
| Hori.          | Horizontal                                                      |             |                                                                                |
| ICES           | Interference-Causing Equipment Standard                         |             |                                                                                |
| I/O            | Input/Output                                                    |             |                                                                                |
| IEC            | International Electrotechnical Commission                       |             |                                                                                |
| IEEE           | Institute of Electrical and Electronics Engineers               |             |                                                                                |
| IF             | Intermediate Frequency                                          |             |                                                                                |

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## **SECTION 1: Customer information**

|                  |   |                                                        |
|------------------|---|--------------------------------------------------------|
| Company Name     | : | OMRON HEALTHCARE Co., Ltd.                             |
| Address          | : | 53, Kunotsubo, Terado-cho, Muko, KYOTO, 617-0002 Japan |
| Telephone Number | : | +81-75-925-2045                                        |
| Facsimile Number | : | +81-75-925-2046                                        |
| Contact Person   | : | Yoshinori Tsurumi                                      |

The information provided from the customer is as follows;

- Applicant, Type of EUT, Model Number of EUT, FCC ID 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                       | : | WheezeScan                                                                                |
| Model Number               | : | RE-W100                                                                                   |
| Serial Number              | : | Refer to SECTION 4.2                                                                      |
| Rating                     | : | DC 3.0 V                                                                                  |
| Receipt Date               | : | March 23, 2020                                                                            |
| Country of Mass-production | : | China                                                                                     |
| Condition                  | : | Production prototype<br>(Not for Sale: This sample is equivalent to mass-produced items.) |
| Modification of EUT        | : | No Modification by the test lab                                                           |

### **2.2 Product Description**

Model: RE-W100 (referred to as the EUT in this report) is a WheezeScan.

### **Radio Specification**

|                           |   |                     |
|---------------------------|---|---------------------|
| Radio Type                | : | Transceiver         |
| Frequency of Operation    | : | 2402 MHz - 2480 MHz |
| Modulation                | : | GFSK                |
| Antenna type              | : | Chip Antenna        |
| Antenna Gain              | : | 5.05 dBi            |
| Clock frequency (Maximum) | : | 26 MHz              |

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

#### **3.1 Test Specification**

Test Specification : FCC Part 15 Subpart B  
FCC Part 15 final revised on July 19, 2019 and effective August 19, 2019 except 15.258

Title : FCC 47CFR Part15 Radio Frequency Device  
Subpart B Unintentional Radiators

#### **3.2 Procedures and results**

| Item                                                                                                                                   | Test Procedure                                                                    | Limits                                                                                                      | Deviation | Worst margin                               | Result         | Remarks |
|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-----------|--------------------------------------------|----------------|---------|
| Conducted emission                                                                                                                     | FCC: ANSI C63.4: 2014<br>7. AC power - line<br>conducted emission<br>measurements | FCC:Part 15 Subpart B<br>15.107(a)                                                                          | N/A       | N/A                                        | N/A            | *1)     |
|                                                                                                                                        | ISED: RSS-Gen 7.1                                                                 | ISED: RSS-Gen 7.2                                                                                           |           |                                            |                |         |
| Radiated emission                                                                                                                      | FCC: ANSI C63.4: 2014<br>8. Radiated<br>emission measurements                     | FCC: Part 15 Subpart B<br>15.109(a)                                                                         | N/A       | 15.14 dB<br>818.848 MHz,<br>Horizontal, QP | Complied<br>a) | -       |
|                                                                                                                                        | ISED: RSS-Gen 7.1                                                                 | ISED: RSS-Gen 7.3                                                                                           |           |                                            |                |         |
| *Note: UL Japan, Inc’s EMI Work Procedure 13-EM-W0420.                                                                                 |                                                                                   |                                                                                                             |           |                                            |                |         |
| *1) The test is not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line. |                                                                                   |                                                                                                             |           |                                            |                |         |
| a) Refer to APPENDIX 1 (data of Radiated 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. |           |                                            |                |         |

#### **3.3 Addition to standard**

No addition, exclusion nor deviation has been made from the standard.

### 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  $k = 2$ .

#### Radiated emission

| Measurement distance | Frequency range                  | Uncertainty (+/-) |
|----------------------|----------------------------------|-------------------|
| 3 m                  | 30 MHz to 200 MHz (Horizontal)   | 4.8 dB            |
|                      | (Vertical)                       | 5.0 dB            |
|                      | 200 MHz to 1000 MHz (Horizontal) | 5.2 dB            |
|                      | (Vertical)                       | 6.3 dB            |
| 10 m                 | 30 MHz to 200 MHz (Horizontal)   | 4.8 dB            |
|                      | (Vertical)                       | 4.8 dB            |
|                      | 200 MHz to 1000 MHz (Horizontal) | 5.0 dB            |
|                      | (Vertical)                       | 5.0 dB            |
|                      |                                  |                   |
| 3 m                  | 1 GHz to 6 GHz                   | 4.9 dB            |
|                      | 6 GHz to 18 GHz                  | 5.2 dB            |
| 1 m                  | 10 GHz to 26.5 GHz               | 5.5 dB            |
|                      | 26.5 GHz to 40 GHz               | 5.5 dB            |
| 10 m                 | 1 GHz to 18 GHz                  | 5.2 dB            |

### 3.5 Test Location

UL Japan, Inc. Ise EMC Lab.

\*NVLAP Lab. code: 200572-0 / FCC Test Firm Registration Number: 199967 / ISED Lab Company Number: 2973C

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| Test site                  | Width x Depth x Height (m) | Size of reference ground plane (m) / horizontal conducting plane | Other rooms            | Maximum measurement distance |
|----------------------------|----------------------------|------------------------------------------------------------------|------------------------|------------------------------|
| No.1 semi-anechoic chamber | 19.2 x 11.2 x 7.7          | 7.0 x 6.0                                                        | No.1 Power source room | 10 m                         |
| No.2 semi-anechoic chamber | 7.5 x 5.8 x 5.2            | 4.0 x 4.0                                                        | -                      | 3 m                          |
| No.3 semi-anechoic chamber | 12.0 x 8.5 x 5.9           | 6.8 x 5.75                                                       | No.3 Preparation room  | 3 m                          |
| No.3 shielded room         | 4.0 x 6.0 x 2.7            | N/A                                                              | -                      | -                            |
| No.4 semi-anechoic chamber | 12.0 x 8.5 x 5.9           | 6.8 x 5.75                                                       | No.4 Preparation room  | 3 m                          |
| No.4 shielded room         | 4.0 x 6.0 x 2.7            | N/A                                                              | -                      | -                            |
| No.5 semi-anechoic chamber | 6.0 x 6.0 x 3.9            | 6.0 x 6.0                                                        | -                      | -                            |
| No.5 measurement room      | 6.4 x 6.4 x 3.0            | 6.4 x 6.4                                                        | -                      | -                            |
| No.6 shielded room         | 4.0 x 4.5 x 2.7            | 4.0 x 4.5                                                        | -                      | -                            |
| No.6 measurement room      | 4.75 x 5.4 x 3.0           | 4.75 x 4.15                                                      | -                      | -                            |
| No.7 shielded room         | 4.7 x 7.5 x 2.7            | 4.7 x 7.5                                                        | -                      | -                            |
| No.8 measurement room      | 3.1 x 5.0 x 2.7            | 3.1 x 5.0                                                        | -                      | -                            |
| No.9 measurement room      | 8.8 x 4.6 x 2.8            | 2.4 x 2.4                                                        | -                      | -                            |
| No.11 measurement room     | 6.2 x 4.7 x 3.0            | 4.8 x 4.6                                                        | -                      | -                            |

\* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0 m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

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

Refer to APPENDIX.



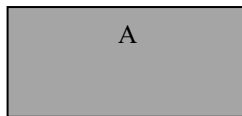
## **SECTION 4: Operation of EUT during testing**

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

| Mode                     | Remarks |
|--------------------------|---------|
| 1) Normal Operation mode | -       |

Software : Wheeze  
Ver. 01.00.04

### **4.2 Configuration and peripherals**



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

#### **Description of EUT**

| No. | Item       | Model number | Serial number | Manufacturer               | Remarks |
|-----|------------|--------------|---------------|----------------------------|---------|
| A   | WheezeScan | RE-W100      | 201910000016U | OMRON HEALTHCARE Co., Ltd. | EUT     |

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## **SECTION 5: Radiated Emission**

### **5.1 Operating environment**

Test place : No.4 semi anechoic chamber (Below 1GHz)  
: No.2 semi anechoic chamber (Above 1GHz)  
Temperature : See data  
Humidity : See data

### **5.2 Test configuration**

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane.

The EUT was set on the center of the tabletop.

Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

Photographs of the set up are shown in Appendix 3.

### **5.3 Test conditions**

Frequency range : 30 MHz - 200 MHz (Biconical antenna) / 200 MHz - 1000 MHz (Logperiodic antenna)  
1000 MHz - 13000 MHz (Horn antenna)  
Test distance : 3 m  
EUT position : Table top  
EUT operation mode : See Clause 4.1

### **5.4 Test procedure**

The height of the measuring antenna varied between 1 and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver.

The radiated emission measurements were made with the following detector function of the Test Receiver.

For above 1 GHz, test antenna was aimed at the EUT for receiving the maximum signal and always kept within the illumination area of the 3 dB beamwidth of the antenna.

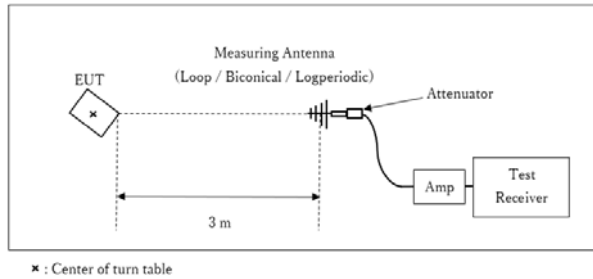
|                 |                |                                  |
|-----------------|----------------|----------------------------------|
| Frequency       | Below 1GHz     | Above 1GHz *1)                   |
| Instrument used | Test Receiver  | Test Receiver                    |
| IF Bandwidth    | QP: BW 120 kHz | PK: BW 1 MHz, CISPR AV: BW 1 MHz |

\*1) The measurement data was adjusted to a 3 m distance using the following Distance Factor.

Distance Factor: See Figure 2

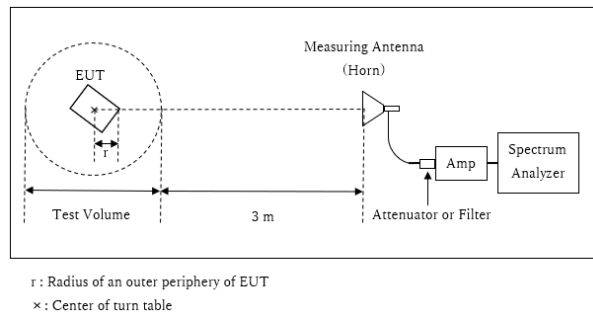
**Figure 2: Test Setup**

Below 1 GHz



Test Distance: 3 m

1 GHz - 10 GHz



Distance Factor:  $20 \times \log(3.75 \text{ m}^* / 3.0 \text{ m}) = 1.94 \text{ dB}$

\* Test Distance:  $(3 + \text{Test Volume} / 2) - r = 3.75 \text{ m}$

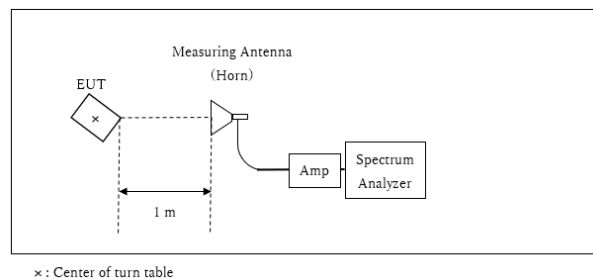
Test Volume: 1.5m

(Test Volume has been calibrated based on CISPR 16-1-4.)

$r = 0.0 \text{ m}$

\* The test was performed with  $r = 0.0 \text{ m}$  since EUT is small and it was the rather conservative condition.

10 GHz - 13 GHz



Distance Factor:  $20 \times \log(1.0 \text{ m}^* / 3.0 \text{ m}) = -9.54 \text{ dB}$

\*Test Distance: 1 m

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

## 5.5 Test result

Summary of the test results: Pass

The limit is rounded down to one decimal place.

The test result is rounded off to one or two decimal places, so some differences might be observed.

Date: April 5, 2020

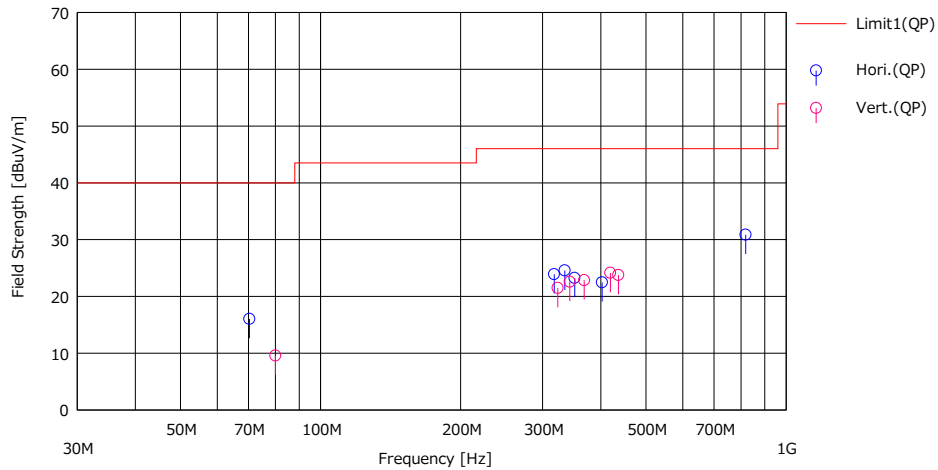
Test engineer: Hiroyuki Furutaka

## APPENDIX 1: Test data

### Radiated Emission

Report No. 13280770H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.4  
Date April 5, 2020  
Temperature / Humidity 23 deg. C / 41 % RH  
Engineer Hiroyuki Furutaka  
(Below 1 GHz)  
Mode Mode 1

Limit : FCC\_Part 15 Subpart B(15.109)\_Class B



| No. | Freq.<br>[MHz] | Reading<br>[QP]<br>[dBuV] | Ant.Fac<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Result<br>[QP]<br>[dBuV/m] | Limit<br>[QP]<br>[dBuV/m] | Margn<br>[QP]<br>[dB] | Pola.<br>[H/V] | Height<br>[cm] | Angle<br>[deg] | Ant.<br>Type | Comment |
|-----|----------------|---------------------------|-------------------|--------------|--------------|----------------------------|---------------------------|-----------------------|----------------|----------------|----------------|--------------|---------|
| 1   | 70.375         | 33.90                     | 6.33              | 7.75         | 31.96        | 16.02                      | 40.00                     | 23.98                 | Hori.          | 300            | 0              | BA           |         |
| 2   | 317.623        | 31.80                     | 14.02             | 9.84         | 31.76        | 23.90                      | 46.00                     | 22.10                 | Hori.          | 100            | 264            | LA23         |         |
| 3   | 334.669        | 31.70                     | 14.68             | 9.95         | 31.77        | 24.56                      | 46.00                     | 21.44                 | Hori.          | 100            | 1              | LA23         |         |
| 4   | 351.501        | 29.90                     | 15.05             | 10.06        | 31.78        | 23.23                      | 46.00                     | 22.77                 | Hori.          | 100            | 346            | LA23         |         |
| 5   | 402.456        | 28.10                     | 15.81             | 10.36        | 31.81        | 22.46                      | 46.00                     | 23.54                 | Hori.          | 100            | 353            | LA23         |         |
| 6   | 818.848        | 28.90                     | 20.97             | 12.48        | 31.49        | 30.86                      | 46.00                     | 15.14                 | Hori.          | 100            | 359            | LA23         |         |
| 7   | 80.004         | 26.80                     | 6.86              | 7.87         | 31.95        | 9.58                       | 40.00                     | 30.42                 | Vert.          | 100            | 0              | BA           |         |
| 8   | 323.300        | 29.10                     | 14.26             | 9.87         | 31.76        | 21.47                      | 46.00                     | 24.53                 | Vert.          | 145            | 113            | LA23         |         |
| 9   | 343.049        | 29.40                     | 14.95             | 10.00        | 31.78        | 22.57                      | 46.00                     | 23.43                 | Vert.          | 159            | 161            | LA23         |         |
| 10  | 368.491        | 29.40                     | 15.07             | 10.16        | 31.79        | 22.84                      | 46.00                     | 23.16                 | Vert.          | 147            | 181            | LA23         |         |
| 11  | 419.357        | 29.40                     | 16.09             | 10.47        | 31.82        | 24.14                      | 46.00                     | 21.86                 | Vert.          | 131            | 43             | LA23         |         |
| 12  | 436.258        | 28.60                     | 16.42             | 10.57        | 31.83        | 23.76                      | 46.00                     | 22.24                 | Vert.          | 126            | 227            | LA23         |         |

CHART: WITH FACTOR

ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN  
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + ATT) - GAIN(AMP)

Except for the above table: adequate margin data below the limits.

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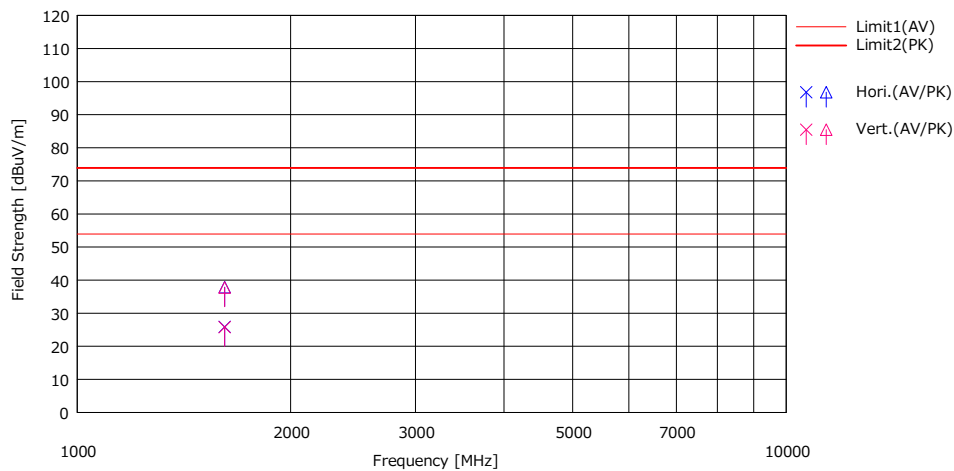
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## Radiated Emission

Report No. 13280770H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.2  
Date April 5, 2020  
Temperature / Humidity 23 deg. C / 41 % RH  
Engineer Hiroyuki Furutaka  
(Above 1 GHz)  
Mode Mode 1

Limit : FCC\_Part 15 Subpart B(15.109)\_Class B



| No. | Freq.<br>[MHz] | Reading        |                | Ant Fac.<br>[dB/m] | Loss<br>[dB] | Gain<br>[dB] | Result           |                  | Limit            |                  | Margin       |              | Pola.<br>[H/V] | Height<br>[cm] | Angle<br>[deg] | Ant.<br>Type | Comment |
|-----|----------------|----------------|----------------|--------------------|--------------|--------------|------------------|------------------|------------------|------------------|--------------|--------------|----------------|----------------|----------------|--------------|---------|
|     |                | (AV)<br>[dBuV] | (PK)<br>[dBuV] |                    |              |              | (AV)<br>[dBuV/m] | (PK)<br>[dBuV/m] | (AV)<br>[dBuV/m] | (PK)<br>[dBuV/m] | (AV)<br>[dB] | (PK)<br>[dB] |                |                |                |              |         |
| 1   | 1615.000       | 32.50          | 44.53          | 25.21              | 3.87         | 35.72        | 25.86            | 37.89            | 53.90            | 73.90            | 28.04        | 36.01        | Hori.          | 100            | 0              | HA6          |         |
| 2   | 1615.000       | 32.40          | 44.40          | 25.21              | 3.87         | 35.72        | 25.76            | 37.76            | 53.90            | 73.90            | 28.14        | 36.14        | Vert.          | 100            | 0              | HA6          |         |

CHART: WITH FACTOR

ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN  
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + D-factor) - GAIN(AMP)

Except for the above table: adequate margin data below the limits.

\* No signal was detected above 10 GHz.

\*Refer to Test Report: 13280770H-A for measurement above 13 GHz.

**UL Japan, Inc.**

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## APPENDIX 2: Test instruments

### Test equipment

| Test Item | Local ID      | LIMS ID | Description                      | Manufacturer                  | Model                    | Serial                           | Last Calibration Date | Cal Int |
|-----------|---------------|---------|----------------------------------|-------------------------------|--------------------------|----------------------------------|-----------------------|---------|
| RE        | MAEC-02       | 142004  | AC2_Semi Anechoic Chamber(NSA)   | TDK                           | Semi Anechoic Chamber 3m | DA-06902                         | 06/29/2018            | 24      |
| RE        | MOS-41        | 192300  | Thermo-Hygrometer                | CUSTOM                        | CTH-201                  | 0013                             | 12/19/2019            | 12      |
| RE        | MMM-01        | 141542  | Digital Tester                   | Fluke Corporation             | FLUKE 26-3               | 78030611                         | 08/20/2019            | 12      |
| RE        | MJM-27        | 142228  | Measure                          | KOMELON                       | KMC-36                   | -                                | -                     | -       |
| RE        | COTS-ME MI-02 | 178648  | EMI measurement program          | TSJ                           | TEPTO-DV                 | -                                | -                     | -       |
| RE        | MAEC-02-SVSWR | 142006  | AC2_Semi Anechoic Chamber(SVSWR) | TDK                           | Semi Anechoic Chamber 3m | DA-06902                         | 04/01/2019            | 24      |
| RE        | MHA-06        | 141512  | Horn Antenna 1-18GHz             | Schwarzbeck Mess - Elektronik | BBHA9120D                | 254                              | 09/03/2019            | 12      |
| RE        | MCC-216       | 141392  | Microwave Cable                  | Junkosha                      | MWX221                   | 1604S253(1 m) / 537073/126E(5 m) | 02/18/2020            | 12      |
| RE        | MPA-10        | 141579  | Pre Amplifier                    | Keysight Technologies Inc     | 8449B                    | 3008A02142                       | 01/07/2020            | 12      |
| RE        | MAEC-04       | 142011  | AC4_Semi Anechoic Chamber(NSA)   | TDK                           | Semi Anechoic Chamber 3m | DA-10005                         | 06/28/2018            | 24      |
| RE        | MOS-15        | 141562  | Thermo-Hygrometer                | CUSTOM                        | CTH-201                  | 0010                             | 01/07/2020            | 12      |
| RE        | MMM-10        | 141545  | DIGITAL HiTESTER                 | Hioki                         | 3805                     | 51201148                         | 01/06/2020            | 12      |
| RE        | MJM-26        | 142227  | Measure                          | KOMELON                       | KMC-36                   | -                                | -                     | -       |
| RE        | MAT-34        | 141331  | Attenuator(6dB)                  | TME                           | UFA-01                   | -                                | 02/05/2020            | 12      |
| RE        | MBA-05        | 141425  | Biconical Antenna                | Schwarzbeck Mess - Elektronik | VHA9103+ BBA9106         | 1302                             | 08/24/2019            | 12      |
| RE        | MCC-50        | 141397  | Coaxial Cable                    | UL Japan                      | -                        | -                                | 03/24/2020            | 12      |
| RE        | MLA-23        | 141267  | Logperiodic Antenna(200-1000MHz) | Schwarzbeck Mess - Elektronik | VUSLP9111B               | 9111B-192                        | 08/24/2019            | 12      |
| RE        | MPA-14        | 141583  | Pre Amplifier                    | SONOMA INSTRUMENT             | 310                      | 260833                           | 02/18/2020            | 12      |
| RE        | MTR-10        | 141951  | EMI Test Receiver                | Rohde & Schwarz               | ESR26                    | 101408                           | 03/10/2020            | 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:

RE: Radiated emission

UL Japan, Inc.

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