



EMI TEST REPORT

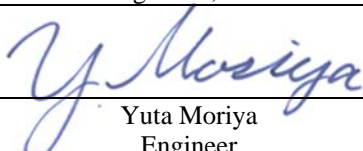
Test Report No. : 13438454H-B-R1

Applicant : DAIHATSU MOTOR CO., LTD.
Type of EUT : Immobilizer system (Immobilizer and RKE)
Model Number of EUT : DH19R-2
FCC ID : 2AVSADH19R-2
Test regulation : FCC Part 15 Subpart B: 2020
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 must not be used by the customer to claim product certification, approval, or endorsement by the A2LA accreditation body.
6. This test report covers EMC technical requirements. It does not cover administrative issues such as Manual or non-EMC test related Requirements. (if applicable)
7. The all test items in this test report are conducted by UL Japan, Inc. Ise 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 13438454H-B. 13438454H-B is replaced with this report.

Date of test: August 19, 2020

Representative test engineer:


Yuta Moriya
Engineer
Consumer Technology Division

Approved by:


Motoya Imura
Leader
Consumer Technology Division



CERTIFICATE 5107.02

- 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.: 13438454H-B

| Revision | Test report No. | Date | Page revised | Contents |
|-----------------|-----------------|--------------------|--------------|--|
| - (Original) | 13438454H-B | September 11, 2020 | - | - |
| 1 | 13438454H-B-R1 | October 19, 2020 | P.10 | Correction of Cable list in Clause 4.2 Cable No.1) From DC Cable 2.0 m to Signal Cable 0.6 m Cable No.2) From Signal Cable 0.6 m to DC Cable 2.0 m |

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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 (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 : DAIHATSU MOTOR CO., LTD.*
Address : 2-1-1, Momozono, Ikeda-shi, Osaka, 563-8651, Japan
Telephone Number : +81-72-754-4526
Facsimile Number : +81-72-754-3857
Contact Person : Hideshige Nakano

***Remarks:**

DAIHATSU MOTOR CO., LTD. designates DENSO CORPORATION and TOKAI RIKA CO., LTD. as manufacturer of the product (Immobilizer system (Immobilizer and RKE)).

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 : Immobilizer system (Immobilizer and RKE)
Model Number : DH19R-2
Serial Number : Refer to SECTION 4.2
Rating : DC 12.0 V
Receipt Date : June 16, 2020
Country of Mass-production : Malaysia and Republic of Indonesia
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: DH19R-2 (referred to as the EUT in this report) is a Immobilizer system (Immobilizer and RKE).

Radio Specification

[Transmitter part]

Radio Type : LF Transmitter
Frequency of Operation : 125 kHz
Oscillator Frequency : 4 MHz
Type of Modulation : ASK
Antenna : Immobilizer Antenna
Clock frequency (maximum) : MPU: 8 MHz

[Receiver part]

Frequency of Operation : 433.92 MHz
Oscillator Frequency : 33.600 MHz (Crystal)
Operating Channel Width (OCW) : 433.92 MHz \pm 60 kHz
Local Oscillator Frequency : 433.395 MHz
Intermediate Frequency : 525 kHz
Type of Modulation : FSK
Type of receiving system : Super-heterodyne
Antenna Type : Internal antenna (Inverted F antenna)
Receiver Bandwidth : 120 kHz

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart B
FCC Part 15 final revised on June 26, 2020 and effective July 27, 2020
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 7. AC power - line conducted emission measurements | FCC:Part 15 Subpart B 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 8. Radiated emission measurements | FCC: Part 15 Subpart B 15.109(a) | N/A | 22.84 dB 433.395 MHz, Vertical, QP | Complied a) | - |
| | ISED: RSS-Gen 7.1 | ISED: RSS-Gen 7.3 | | | | |
| Antenna Terminal | FCC: ANSI C63.4: 2014 12. Measurement of unintentional radiators other than ITE | FCC: Part 15 Subpart B 15.111(a) | N/A | N/A | N/A | *2) |
| | ISED: - RSS-Gen 7.1 | ISED: RSS-Gen 7.4 | | | | |
| <p>*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. *2) The receiving antenna (of this EUT) is installed inside the EUT and cannot be removed (permanently attached). Therefore, Radiated emission test was performed.</p> <p>a) Refer to APPENDIX 1 (data of Radiated Emission)</p> | | | | | | |
| <p>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.</p> | | | | | | |

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 |
| 0.5 m | 26.5 GHz to 40 GHz | | 5.5 dB |
| 10 m | 1 GHz to 18 GHz | | 5.2 dB |

3.5 Test Location

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A2LA Certificate Number: 5107.02

| 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 m × 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.

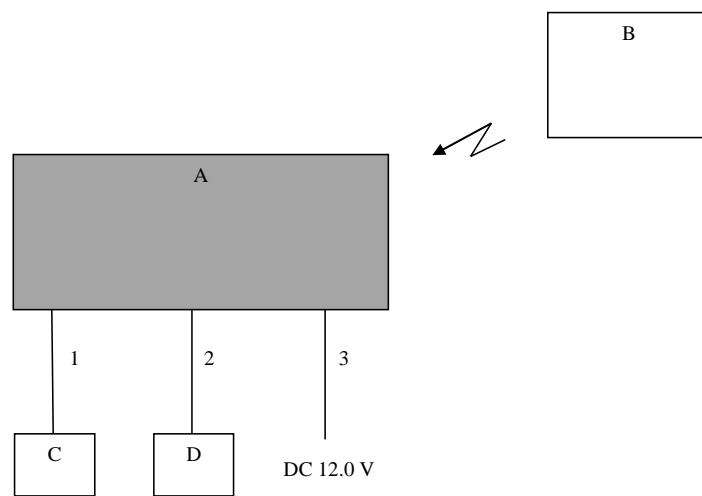
SECTION 4: Operation of EUT during testing

4.1 Operating Mode(s)

| Mode | Remarks |
|--|---------|
| 1) RKE Receiving mode | - |
| *EUT was set by the software as follows; Software: DN-2390005400-01.S | |

- * The test signal level was confirmed to be sufficient to stabilize the local oscillator of the EUT.
- * It was confirmed by using checker that the EUT receives the signal from the transmitter (pair of EUT).

4.2 Configuration and peripherals



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

Description of EUT and Support equipment

| No. | Item | Model number | Serial number | Manufacturer | Remarks |
|-----|----------|--------------|---------------|-------------------|---------|
| A | Body ECU | DH19R-2 | 273 | DENSO CORPORATION | EUT |
| B | Key | - | - | TOKAIRIKA CO.,LTD | - |
| C | LED | - | - | - | - |
| D | LED | - | - | - | - |

List of cables used

| No. | Name | Length (m) | Shield | | Remark |
|-----|--------------|------------|------------|------------|--------|
| | | | Cable | Connector | |
| 1 | Signal cable | 0.6 | Unshielded | Unshielded | - |
| 2 | Signal cable | 0.6 | Unshielded | Unshielded | - |
| 3 | DC Cable | 2.0 | Unshielded | Unshielded | - |

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SECTION 5: Radiated Emission

5.1 Operating environment

Test place : No.3 semi anechoic chamber
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 edge 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 - 10000 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.

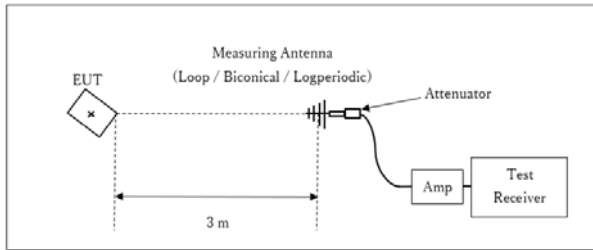
For above 1 GHz, test antenna was aimed at the EUT for receiving the maximum signal and always kept within the illumination area of the 3 dB beamwidth of the antenna.

| | | |
|-----------------|----------------|----------------------------------|
| 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

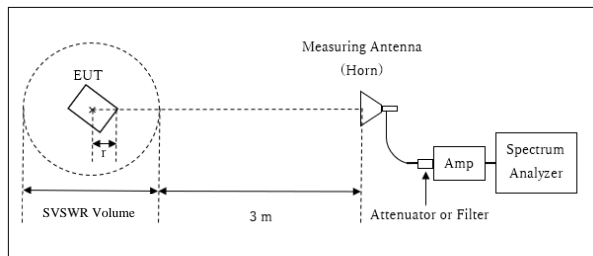
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz - 13 GHz



r : Radius of an outer periphery of EUT

× : Center of turn table

Distance Factor: $20 \times \log(4.0 \text{ m}^*/3.0 \text{ m}) = 2.50 \text{ dB}$
* Test Distance: $(3 + \text{SVSWR Volume} / 2) - r = 4.00 \text{ m}$

SVSWR Volume: 2 m
(SVSWR Volume has been calibrated based on CISPR 16-1-4.)
 $r = 0.00 \text{ m}$

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

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 representative X-axis since no difference was found among each position.

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: August 19, 2020

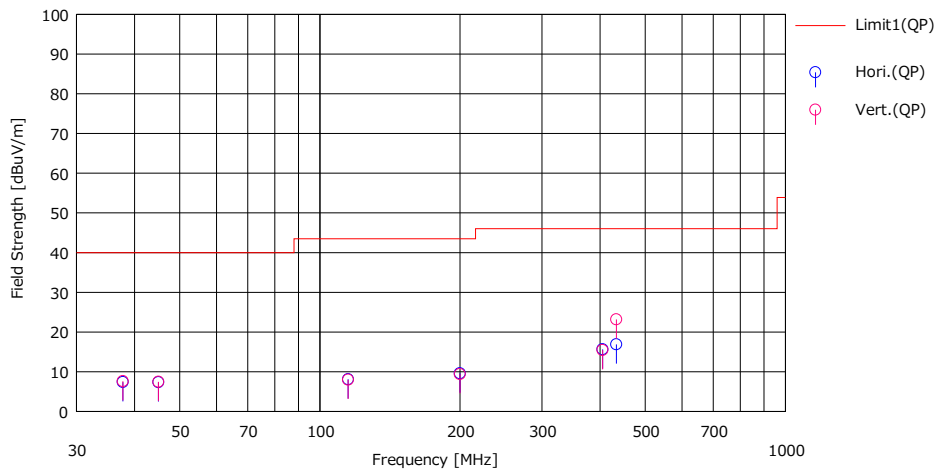
Test engineer: Yuta Moriya

APPENDIX 1: Test data

Radiated Emission

Report No. 13377198H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date August 19, 2020
Temperature / Humidity 25 deg. C / 58 % RH
Engineer Yuta Moriya
(Below 1 GHz)
Mode Mode 1

Limit : FCC_Part 15 Subpart B(15.109)_Class B



| No. | Freq. [MHz] | Reading (QP) [dBuV] | Ant.Fac [dB/m] | Loss [dB] | Gain [dB] | Result (QP) [dBuV/m] | Limit (QP) [dBuV/m] | Margin (QP) [dB] | Pol.a [H/V] | Height [cm] | Angle [deg] | Ant. Type | Comment |
|-----|-------------|---------------------|----------------|-----------|-----------|----------------------|---------------------|------------------|-------------|-------------|-------------|-----------|---------|
| 1 | 37.750 | 20.80 | 11.53 | 7.26 | 32.19 | 7.40 | 40.00 | 32.60 | Hori. | 100 | 0 | BA | |
| 2 | 45.000 | 21.70 | 10.42 | 7.39 | 32.17 | 7.34 | 40.00 | 32.66 | Hori. | 100 | 0 | BA | |
| 3 | 115.000 | 21.30 | 10.56 | 8.34 | 32.12 | 8.08 | 43.50 | 35.42 | Hori. | 100 | 0 | BA | |
| 4 | 200.001 | 21.00 | 11.37 | 9.22 | 32.01 | 9.58 | 43.50 | 33.92 | Hori. | 100 | 0 | LA | |
| 5 | 405.000 | 20.90 | 15.93 | 10.80 | 31.99 | 15.64 | 46.00 | 30.36 | Hori. | 100 | 0 | LA | |
| 6 | 433.395 | 21.60 | 16.26 | 10.99 | 31.99 | 16.86 | 46.00 | 29.14 | Hori. | 100 | 0 | LA | |
| 7 | 37.750 | 21.00 | 11.53 | 7.26 | 32.19 | 7.60 | 40.00 | 32.40 | Vert. | 100 | 0 | BA | |
| 8 | 45.000 | 21.80 | 10.42 | 7.39 | 32.17 | 7.44 | 40.00 | 32.56 | Vert. | 100 | 0 | BA | |
| 9 | 115.000 | 21.20 | 10.56 | 8.34 | 32.12 | 7.98 | 43.50 | 35.52 | Vert. | 100 | 0 | BA | |
| 10 | 200.001 | 20.80 | 11.37 | 9.22 | 32.01 | 9.38 | 43.50 | 34.12 | Vert. | 100 | 0 | LA | |
| 11 | 405.000 | 20.70 | 15.93 | 10.80 | 31.99 | 15.44 | 46.00 | 30.56 | Vert. | 100 | 0 | LA | |
| 12 | 433.395 | 27.90 | 16.26 | 10.99 | 31.99 | 23.16 | 46.00 | 22.84 | Vert. | 100 | 0 | LA | |

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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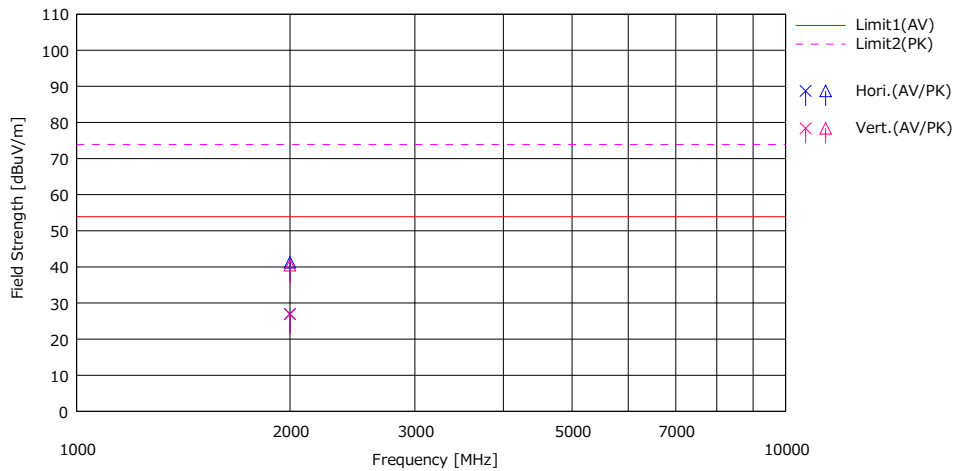
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Radiated Emission

Report No. 13377198H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date August 19, 2020
Temperature / Humidity 25 deg. C / 58 % RH
Engineer Yuta Moriya
(Above 1 GHz)
Mode Mode 1

Limit : FCC_Part 15 Subpart B(15.109)_Class B



| No. | Freq. [MHz] | Reading | | Ant.Fac [dB/m] | Loss [dB] | Gain [dB] | Result | | Limit | | Margin | | Pda. [H/V] | Height [cm] | Angle [deg] | Ant. Type | Comment |
|-----|----------------|----------------|----------------|-------------------|--------------|--------------|------------------|------------------|------------------|------------------|--------------|--------------|---------------|----------------|----------------|--------------|---------|
| | | (AV) [dBuV] | (PK) [dBuV] | | | | (AV) [dBuV/m] | (PK) [dBuV/m] | (AV) [dBuV/m] | (PK) [dBuV/m] | (AV) [dB] | (PK) [dB] | | | | | |
| 1 | 2000.000 | 28.60 | 43.10 | 26.29 | 4.77 | 32.88 | 26.98 | 41.28 | 53.90 | 73.90 | 26.92 | 32.62 | Hori. | 100 | 0 | H20 | |
| 2 | 2000.000 | 28.70 | 42.30 | 26.29 | 4.77 | 32.88 | 26.88 | 40.48 | 53.90 | 73.90 | 27.02 | 33.42 | Vert. | 100 | 0 | H20 | |

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 + Filter + D-factor) - GAIN(AMP)

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

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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 | MTR-10 | 141951 | EMI Test Receiver | Rohde & Schwarz | ESR26 | 101408 | 03/10/2020 | 12 |
| RE | MAT-95 | 142314 | Attenuator | Pasternack | PE7390-6 | D/C 1504 | 06/17/2020 | 12 |
| RE | MCC-51 | 141323 | Coaxial cable | UL Japan | - | - | 07/06/2020 | 12 |
| RE | MCC-231 | 177964 | Microwave Cable | Junkosha INC. | MMX221 | 1901S329(1m)/ 1902S579(5m) | 03/02/2020 | 12 |
| RE | MPA-13 | 141582 | Pre Amplifier | SONOMA INSTRUMENT | 310 | 260834 | 02/10/2020 | 12 |
| RE | MPA-11 | 141580 | MicroWave System Amplifier | Keysight Technologies Inc | 83017A | MY39500779 | 03/24/2020 | 12 |
| RE | MAEC-03 | 142008 | AC3_Semi Anechoic Chamber(NSA) | TDK | Semi Anechoic Chamber 3m | DA-10005 | 05/22/2020 | 24 |
| RE | MAEC-03- SVSWR | 142013 | AC3_Semi Anechoic Chamber(SVSWR) | TDK | Semi Anechoic Chamber 3m | DA-10005 | 04/08/2019 | 24 |
| RE | MOS-13 | 141554 | Thermo-Hygrometer | CUSTOM. Inc | CTH-201 | 1301 | 01/07/2020 | 12 |
| RE | COTS-ME MI-02 | 178648 | EMI measurement program | TSJ (Techno Science Japan) | TEPTO-DV | - | - | - |
| RE | MJM-16 | 142183 | Measure | KOMELON | KMC-36 | - | - | - |
| RE | MMM-08 | 141532 | DIGITAL HiTESTER | Hioki | 3805 | 51201197 | 01/06/2020 | 12 |
| RE | YBA-03 | 197990 | Biconical Antenna | Schwarzbeck Mess - Elektronik | VHBB 9124 + BBA 9106 | 01365 | 05/17/2020 | 12 |
| RE | LA-17 | 160924 | Logperiodic Antenna | Schwarzbeck Mess - Elektronik | VUSLP9111B | 225 | 11/29/2019 | 12 |
| RE | MHA-20 | 141507 | Horn Antenna 1-18GHz | Schwarzbeck Mess - Elektronik | BBHA9120D | 258 | 09/26/2019 | 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.

Ise EMC Lab.

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