

# RADIO TEST REPORT

## Test Report No. 15398179H-A-R3

Customer	MITSUBISHI ELECTRIC MOBILITY CORPORATION
Description of EUT	Remote Parking Keyless System Remocon Key
Model Number of EUT	SKE11D-02
FCC ID	UJHSKE11D02
Test Regulation	FCC Part 15 Subpart C
Test Result	Complied
Issue Date	February 25, 2025
Remarks	-

**Representative test engineer**Daiki Matsui  
Engineer**Approved by**Akihiko Maeda  
Leader

CERTIFICATE 5107.02

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

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- The information provided by the customer for this report is identified in SECTION 1.
- The laboratory is not responsible for information provided by the customer which can impact the validity of the results.
- For test report(s) referred in this report, the latest version (including any revisions) is always referred.

## **REVISION HISTORY**

### **Original Test Report No. 15398179H-A**

This report is a revised version of 15398179H-A-R2. 15398179H-A-R2 is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	15398179H-A	November 27, 2024	-
1	15398179H-A-R1	February 7, 2025	Addition of the note *1) in SECTION 1.
1	15398179H-A-R1	February 7, 2025	Addition of the following content; - SECTION 4.2: Configuration and Peripherals - SECTION 8: Average Output Power - APPENDIX 1: Test Data - APPENDIX 2: Test Instruments - APPENDIX 3: Photographs of Test Setup
2	15398179H-A-R2	February 21, 2025	Change of the following items due to the additional measurement of Radiated Emission test (above 3.2 GHz). - SECTION 2.1: Test Date - SECTION 5: Test Setup Calculation Formula and Measurement range - APPENDIX 1: Test Data (Radiated Emission) - APPENDIX 2: Test Instruments
2	15398179H-A-R2	February 21, 2025	Addition of the "Highest frequency used in the device" in SECTION 2.2.
2	15398179H-A-R2	February 21, 2025	Correction of the table size for 30 MHz to 1 GHz in SECTION 5: from 0.5 m by 0.5 m to 1.0 m by 1.5 m.
3	15398179H-A-R3	February 25, 2025	Correction of the Test Setup Calculation Formula in SECTION 5.
3	15398179H-A-R3	February 25, 2025	Addition of the Calculation for 6 GHz to 10 GHz under the Radiated Emission test data (page 15)

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

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

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## **SECTION 1: Customer Information**

Company Name	MITSUBISHI ELECTRIC MOBILITY CORPORATION
Address	840, Chiyoda-machi, Himeji, Hyogo, 670-8677, Japan <sup>*1)</sup>
Telephone Number	+81-79-298-8994 <sup>*1)</sup>
Contact Person	Masashi Nojima <sup>*1)</sup>

<sup>\*1)</sup> The Grantee address, Telephone Number and Contact Person in the FCC application are “2-3-33, Miwa, Sanda-city, Hyogo, 669-1513 Japan”, “+81-79-559-3505” and “Koichi Kuriyama”.

The information provided by the customer is as follows;

- Customer, Description 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 and Test Date
- SECTION 4: Operation of EUT during testing

## **SECTION 2: Equipment Under Test (EUT)**

### **2.1 Identification of EUT**

Description	Remote Parking Keyless System Remocon Key
Model Number	SKE11D-02
Serial Number	Refer to SECTION 4.2
Condition	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	No Modification by the test lab
Receipt Date	October 1, 2024
Test Date	October 24, 2024 to February 20, 2025

### **2.2 Product Description**

#### **General Specification**

Rating	DC 3.0 V
Highest frequency used in the device	1890 MHz (FSK modulator)

#### **Radio Specification**

[RF part]

Equipment Type	Transmitter
Frequency of Operation	315 MHz
Type of Modulation	FSK

[LF part] <sup>\*1)</sup>

Equipment Type	Receiver
Frequency of Operation	125 kHz

<sup>\*1)</sup> The test of receiver part was performed separately from this test report, and the conformability is confirmed.

## SECTION 3: Test Specification, Procedures & Results

### 3.1 Test Specification

Test Specification	FCC Part 15 Subpart C The latest version on the first day of the testing period
Title	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.231 Periodic operation in the band 40.66-40.70 MHz and above 70 MHz.

\*Also the EUT complies with FCC Part 15 Subpart B.

### 3.2 Procedures and Results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted emission	<b>FCC:</b> ANSI C63.10:2013 6 Standard test methods  <b>ISED:</b> RSS-Gen 8.8	<b>FCC:</b> Section 15.207  <b>ISED:</b> RSS-Gen 8.8	N/A	N/A	*1)
Automatically Deactivate	<b>FCC:</b> ANSI C63.10:2013 6 Standard test methods  <b>ISED:</b> -	<b>FCC:</b> Section 15.231(a)(1)  <b>ISED:</b> RSS-210 A1.2	N/A	Complied	Radiated
Electric Field Strength of Fundamental Emission	<b>FCC:</b> ANSI C63.10:2013 6 Standard test methods  <b>ISED:</b> RSS-Gen 6.12	<b>FCC:</b> Section 15.231(b)  <b>ISED:</b> RSS-210 A1.3	4.0 dB 315.000 MHz, Horizontal, AV	Complied	Radiated
Electric Field Strength of Spurious Emission	<b>FCC:</b> ANSI C63.10:2013 6 Standard test methods  <b>ISED:</b> RSS-Gen 6.13	<b>FCC:</b> Section 15.205 Section 15.209 Section 15.231(b) <b>ISED:</b> RSS-210 A1.3 RSS-Gen 8.9	10.8 dB 630.000 MHz, Vertical, AV	Complied	Radiated
-20 dB Bandwidth	<b>FCC:</b> ANSI C63.10:2013 6 Standard test methods  <b>ISED:</b> -	<b>FCC:</b> Section 15.231(c)  <b>ISED:</b> Reference data	N/A	Complied	Radiated

Note: UL Japan, Inc.'s EMI Work Procedures: Work Instructions-ULID-003591 and Work Instructions-ULID-003593.

\*1) The test is not applicable since the EUT does not have AC Mains.

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

The test was performed with the New Battery during the tests.  
Therefore, this EUT complies with the requirement.

#### **FCC Part 15.203 Antenna requirement**

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT.  
Therefore, the equipment complies with the antenna requirement of Section 15.203.

### 3.3 Addition to Standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% emission bandwidth	ANSI C63.10:2013 6 Standard test methods	Reference data	N/A	-	Radiated

Note: UL Japan, Inc.'s EMI Work Procedures: Work Instructions-ULID-003591 and Work Instructions-ULID-003593.

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

### 3.4 Uncertainty

Measurement uncertainty is not taken into account when stating conformity with a specified requirement.  
Note: When margins obtained from test results are less than the measurement uncertainty, the test results may exceed the limit.

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		Unit	Calculated Uncertainty (+/-)
3 m	9 kHz to 30 MHz		dB	3.3
10 m			dB	3.1
3 m	30 MHz to 200 MHz	Horizontal	dB	5.0
		Vertical	dB	5.0
	200 MHz to 1000 MHz	Horizontal	dB	5.2
		Vertical	dB	6.2
10 m	30 MHz to 200 MHz	Horizontal	dB	5.5
		Vertical	dB	5.4
	200 MHz to 1000 MHz	Horizontal	dB	5.5
		Vertical	dB	5.5
3 m	1 GHz to 6 GHz		dB	5.1
	6 GHz to 18 GHz		dB	5.4
1 m	10 GHz to 18 GHz		dB	5.4
	18 GHz to 26.5 GHz		dB	5.3
	26.5 GHz to 40 GHz		dB	4.8
0.5 m	26.5 GHz to 40 GHz		dB	5.0

#### Automatically Deactivate, -20 dB Bandwidth and 99% Occupied Bandwidth

Item	Unit	Calculated Uncertainty (+/-)
Bandwidth (OBW)	%	0.96
Time readout (time span upto 100 msec)	%	0.11
Time readout (time span upto 1000 msec)	%	0.11
Time readout (time span upto 60 sec)	%	0.02

### 3.5 Test Location

UL Japan, Inc. Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 Japan

Telephone: +81-596-24-8999

\*A2LA Certificate Number: 5107.02 / FCC Test Firm Registration Number: 884919

ISED Lab Company Number: 2973C / CAB identifier: JP0002

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.10 shielded room	3.8 x 2.8 x 2.8	3.8 x 2.8	-	-
No.11 measurement room	4.0 x 3.4 x 2.5	N/A	-	-
No.12 measurement room	2.6 x 3.4 x 2.5	N/A	-	-
Large Chamber	16.9 x 22.1 x 10.17	16.9 x 22.1	-	10 m
Small Chamber	5.3 x 6.69 x 3.59	5.3 x 6.69	-	-

### 3.6 Test Data, Test Instruments, and Test Set Up

Refer to APPENDIX.

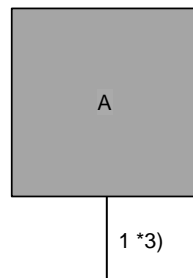


## SECTION 4: Operation of EUT during testing

### 4.1 Operating Mode(s)

Test mode	Remarks
1) Normal use mode	-
2) Transmitting mode (Tx 315 MHz)	-
* The system was configured in typical fashion (as a user would normally use it) for testing.	
*Power of the EUT was set by the software as follows; Software: IC1: DZ111712 / IC2: DZ111812 (Date: IC1: 2024.04.18, IC1: 2024.04.18, Storage location: EUT memory)	
*This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.	
Justification: The system was configured in typical fashion (as a user would normally use it) for testing.	

### 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	Remark
A	Remote Parking Keyless System Remocon Key	SKE11D-02	20240718-R1 (No.1) *1) 20240718-R2 (No.2) *2) 20240718-R3 (No.3) *3)	MITSUBISHI ELECTRIC MOBILITY CORPORATION	EUT

#### List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	Antenna Cable	0.04	Shielded	Shielded	*3)

\*1) Used for other tests

\*2) Used for Automatically Deactivate test

\*3) Used for Average Output Power test

## **SECTION 5: Radiated Spurious Emission**

### **Test Procedure**

[For below 30 MHz]

The noise level was checked by moving a search-coil (Loop Antenna) close to the EUT.

[For 30 MHz to 1 GHz]

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 Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane.

The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

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

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.

The measurements were performed for both vertical and horizontal antenna polarization.

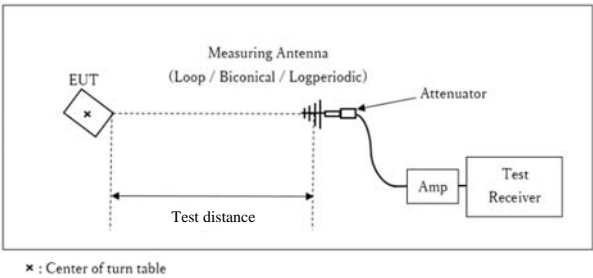
The radiated emission measurements were made with the following detector function of the test receiver / spectrum analyzer.

### **Test Antennas are used as below;**

Frequency	Below 30 MHz	30 MHz to 200 MHz	200 MHz to 1 GHz	Above 1 GHz
Antenna Type	Loop	Biconical	Logperiodic	Horn

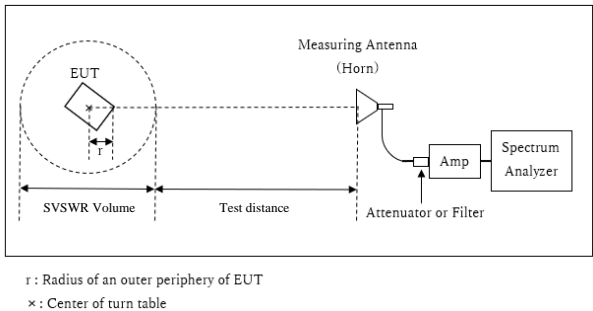
Frequency	From 9 kHz to 90 kHz and From 110 kHz to 150 kHz	From 90 kHz to 110 kHz	From 150 kHz to 490 kHz	From 490 kHz to 30 MHz	From 30 MHz to 1 GHz	Above 1 GHz
Detector Type	Peak	Peak	Peak	Peak	Peak and Peak with Duty factor	Peak and Peak with Duty factor
IF Bandwidth	200 Hz	200 Hz	9.1 kHz	9.1 kHz	120 kHz	PK: S/A: RBW: 1 MHz, VBW: 3 MHz

[Test Setup]  
Below 1 GHz



Test Distance: 3 m

1 GHz to 10 GHz



[1 GHz to 6 GHz]  
Distance Factor:  $20 \times \log (4.00 \text{ m} / 3.00 \text{ m}) = 2.50 \text{ dB}$   
\*(Test Distance + SVSWR Volume / 2) - r = 4.00 m

Test Distance: 3 m  
SVSWR Volume : 2.00 m  
(SVSWR Volume has been calibrated based on CISPR 16-1-4.)  
r = 0.0 m

[6 GHz to 10 GHz]  
Distance Factor:  $20 \times \log (5.00 \text{ m} / 3.00 \text{ m}) = 4.44 \text{ dB}$   
\*(Test Distance + SVSWR Volume / 2) - r = 5.00 m

Test Distance: 4.30 m  
SVSWR Volume : 1.40 m  
(SVSWR Volume has been calibrated based on CISPR 16-1-4.)  
r = 0.0 m

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

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

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

Measurement range : 9 kHz to 10 GHz  
Test data : APPENDIX  
Test result : Pass

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## **SECTION 6: Automatically deactivate**

### **Test Procedure**

The measurement was performed with Electric field strength using a spectrum analyzer.

Test data : APPENDIX  
Test result : Pass

## **SECTION 7: -20 dB Bandwidth and 99% emission bandwidth**

### **Test Procedure**

The test was measured with a spectrum analyzer using a test fixture.

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
-20 dB Bandwidth / 99% emission bandwidth	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak *1)	Max Hold *1)	Spectrum Analyzer
*1) Peak hold was applied as Worst-case measurement.							

Test data : APPENDIX  
Test result : Pass

## **SECTION 8: Average Output Power**

### **Test Procedure**

Average Output Power was measured with a Power Meter to measure Burst Average.  
The test data is reference data for RF Exposure.

Test data : APPENDIX

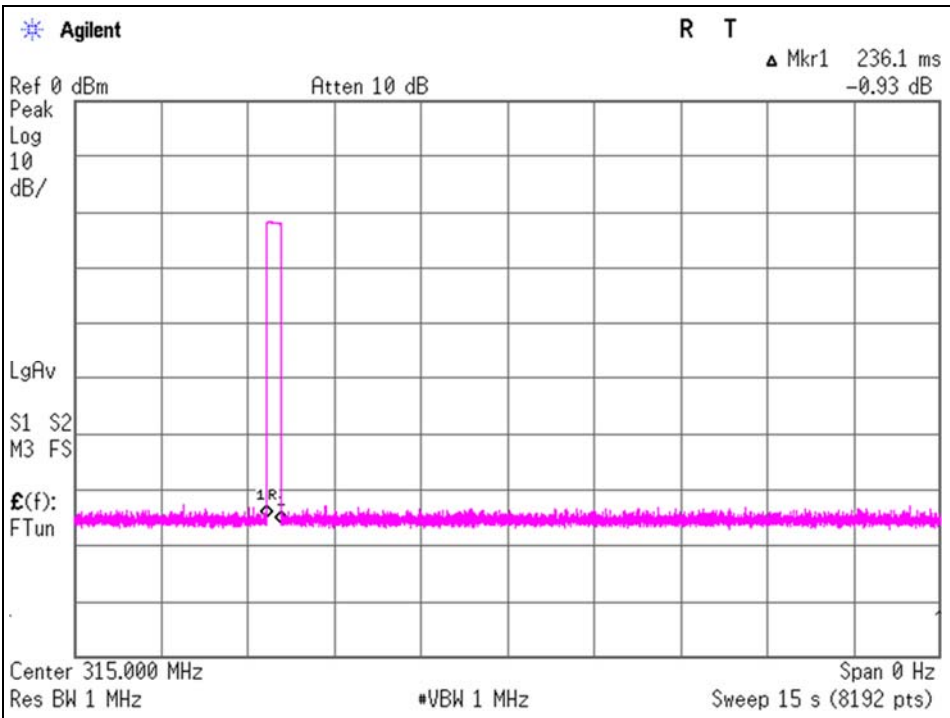
APPENDIX 1: Test Data

Automatically deactivate

Test place  
Semi Anechoic Chamber  
Date  
Temperature / Humidity  
Engineer  
Mode

Ise EMC Lab.  
No.4  
October 24, 2024  
22 deg. C / 60 % RH  
Daiki Matsui  
Mode 1

Time of Transmitting [s]	Limit [s]	Result
0.2361	5.00	Pass



**Average Output Power**  
**(Reference data for RF Exposure)**

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	October 25, 2024
Temperature / Humidity	22 deg. C / 60 % RH
Engineer	Daiki Matsui
Mode	Mode 2

Freq.	Reading (P/M)	Cable Loss	Atten. Loss	Conducted Power	
				Result	
				(Burst)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
315.00	-9.56	0.53	9.88	0.85	1.22

Sample Calculation:  
Conducted Power Result = Reading + Cable Loss + Atten. Loss

\*Since Burst Power is higher than Time Average Power, the test was performed at Burst Power to be more conservative.

## Radiated Emission (Fundamental and Spurious Emission)

Test place	Ise EMC Lab.	No.4	No.4
Semi Anechoic Chamber	No.4	October 25, 2024	February 20, 2025
Date	October 24, 2024	October 25, 2024	February 20, 2025
Temperature / Humidity	22 deg. C / 60 % RH	22 deg. C / 58 % RH	20 deg. C / 36 % RH
Engineer	Daiki Matsui	Daiki Matsui	Daiki Matsui
	(Below 1 GHz)	(1 GHz to 3.2 GHz)	(Above 3.2 GHz)
Mode	Mode 2		

Polarity [Hori/Vert]	Frequency [MHz]	Reading (PK) [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (PK) [dBuV/m]	Result (PK with Duty Factor) [dBuV/m]	Limit (PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (PK) [dB]	Margin (AV) [dB]	Inside or Outside of Restricted Bands	Remarks
Hori.	315.000	79.8	14.1	9.7	32.0	0.0	71.6	71.6	95.6	75.6	24.0	4.0	Carrier	
Hori.	630.000	45.0	19.6	11.4	32.3	0.0	43.7	43.7	75.6	55.6	31.9	11.9	Outside	
Hori.	945.000	28.8	22.1	12.5	30.9	-	32.5	32.5	75.6	55.6	43.1	23.1	Outside	Floor noise
Hori.	1260.000	42.9	25.9	4.7	34.0	-	39.5	39.5	75.6	55.6	36.1	16.1	Outside	Floor noise
Hori.	1575.000	42.4	25.3	5.0	33.1	-	39.6	39.6	73.9	53.9	34.3	14.3	Inside	Floor noise
Hori.	1890.000	44.5	25.7	5.0	32.3	0.0	42.9	42.9	75.6	55.6	32.7	12.7	Outside	
Hori.	2205.000	41.9	28.4	5.1	31.9	-	43.5	43.5	73.9	53.9	30.4	10.4	Inside	Floor noise
Hori.	2520.000	41.2	27.5	5.3	31.7	-	42.3	42.3	75.6	55.6	33.3	13.3	Outside	Floor noise
Hori.	2835.000	40.9	28.5	5.5	31.5	-	43.4	43.4	73.9	53.9	30.5	10.5	Inside	Floor noise
Hori.	3150.000	40.5	28.8	5.6	31.4	-	43.5	43.5	75.6	55.6	32.1	12.1	Outside	Floor noise
Vert.	315.000	76.7	14.1	9.7	32.0	0.0	68.5	68.5	95.6	75.6	27.1	7.1	Carrier	
Vert.	630.000	46.1	19.6	11.4	32.3	0.0	44.8	44.8	75.6	55.6	30.8	10.8	Outside	
Vert.	945.000	29.0	22.1	12.5	30.9	-	32.7	32.7	75.6	55.6	42.9	22.9	Outside	Floor noise
Vert.	1260.000	42.8	25.9	4.7	34.0	-	39.4	39.4	75.6	55.6	36.2	16.2	Outside	Floor noise
Vert.	1575.000	42.6	25.3	5.0	33.1	-	39.8	39.8	73.9	53.9	34.1	14.1	Inside	Floor noise
Vert.	1890.000	44.9	25.7	5.0	32.3	0.0	43.3	43.3	75.6	55.6	32.3	12.3	Outside	
Vert.	2205.000	41.8	28.4	5.1	31.9	-	43.4	43.4	73.9	53.9	30.5	10.5	Inside	Floor noise
Vert.	2520.000	41.6	27.5	5.3	31.7	-	42.7	42.7	75.6	55.6	32.9	12.9	Outside	Floor noise
Vert.	2835.000	40.7	28.5	5.5	31.5	-	43.2	43.2	73.9	53.9	30.7	10.7	Inside	Floor noise
Vert.	3150.000	40.3	28.8	5.6	31.4	-	43.3	43.3	75.6	55.6	32.3	12.3	Outside	Floor noise

No signal was detected above 3.2 GHz.

Sample calculation:

Result of PK = Reading + Ant Factor + Loss {Cable + Attenuator + Filter (above 1 GHz) + Distance factor (above 1 GHz)} - Gain (Amplifier)

Result of PK with Duty factor (PK / W) = Reading + Ant Factor + Loss {Cable + Attenuator + Filter (above 1 GHz) + Distance factor (above 1 GHz)} - Gain (Amplifier) + Duty factor

For 1 GHz to 6 GHz: Distance Factor:  $20 \times \log(4.00 \text{ m} / 3.00 \text{ m}) = 2.50 \text{ dB}$

For 6 GHz to 10 GHz: Distance Factor:  $20 \times \log(5.00 \text{ m} / 3.00 \text{ m}) = 4.44 \text{ dB}$

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

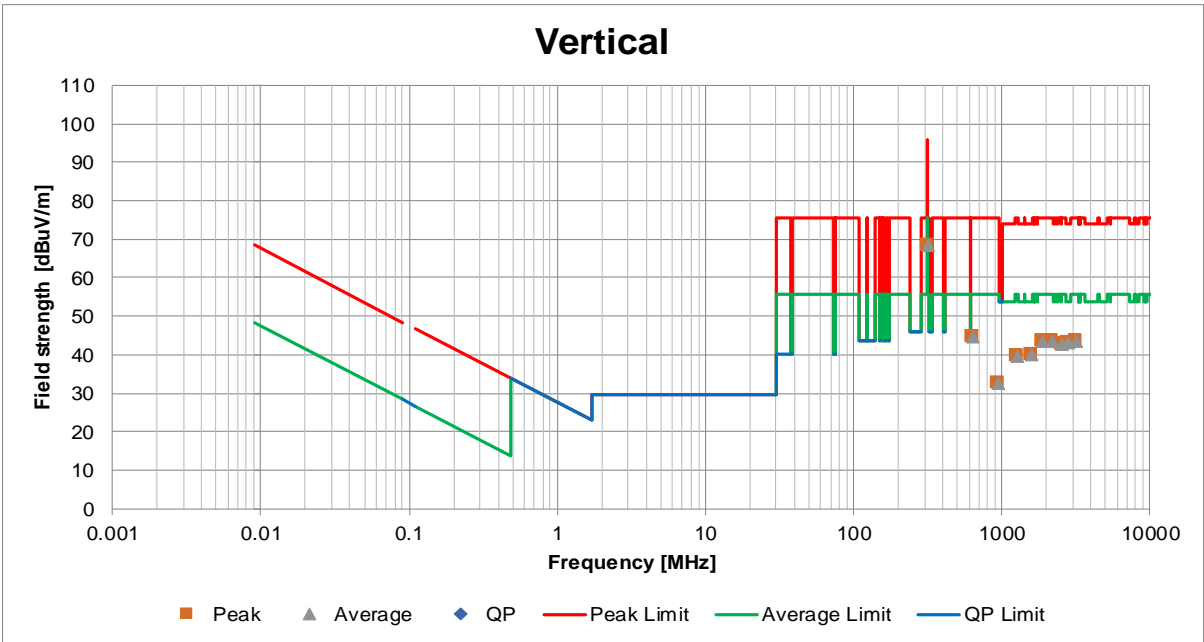
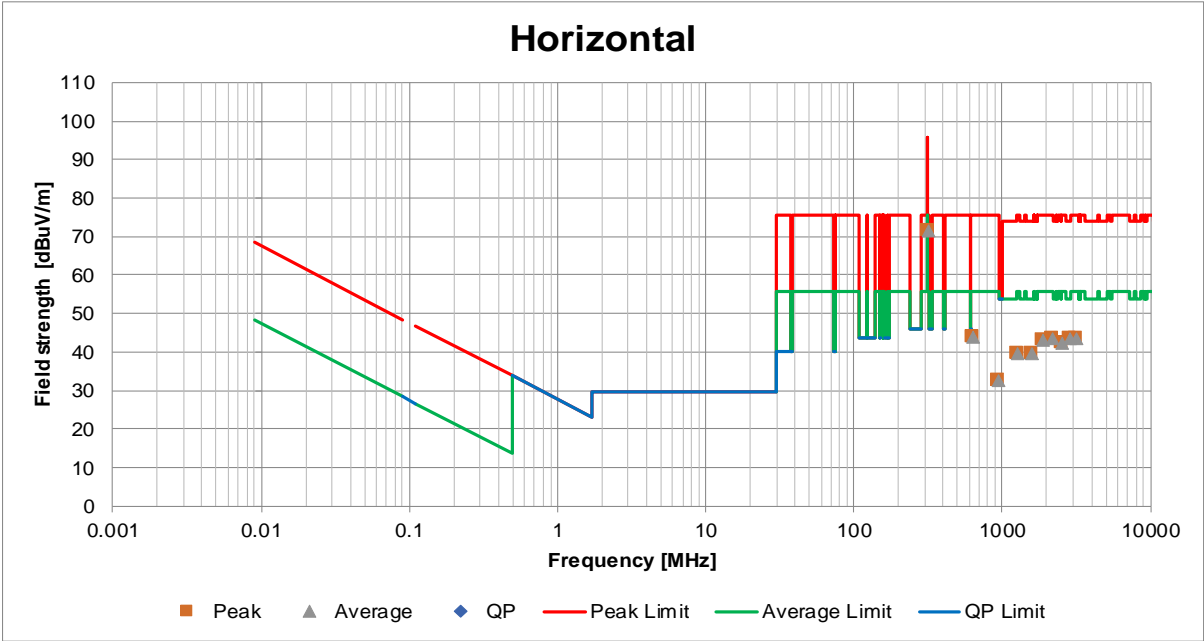
Harmonic test (Above 1 GHz) was applied to worst 100% (Duty factor = 0) although Duty Factor was applied in harmonic test which peak to peak frequency bandwidth of FSK modulation is equal to or more than measurement bandwidth (1 MHz).

Since the peak emission result satisfied the average limit, duty factor was omitted.

Although Duty of this product was 100% or less, the result (Below 1 GHz) of AV (PK with Duty factor) was calculated by applying Duty 100 % as worst.

**Radiated Spurious Emission**  
**(Plot data, Worst case for Fundamental Emission)**

Test place	Ise EMC Lab.	No.4	No.4
Semi Anechoic Chamber	No.4	No.4	No.4
Date	October 24, 2024	October 25, 2024	February 20, 2025
Temperature / Humidity	22 deg. C / 60 % RH	22 deg. C / 58 % RH	20 deg. C / 36 % RH
Engineer	Daiki Matsui	Daiki Matsui	Daiki Matsui
Mode	(Below 1 GHz)	(1 GHz to 3.2 GHz)	(Above 3.2 GHz)





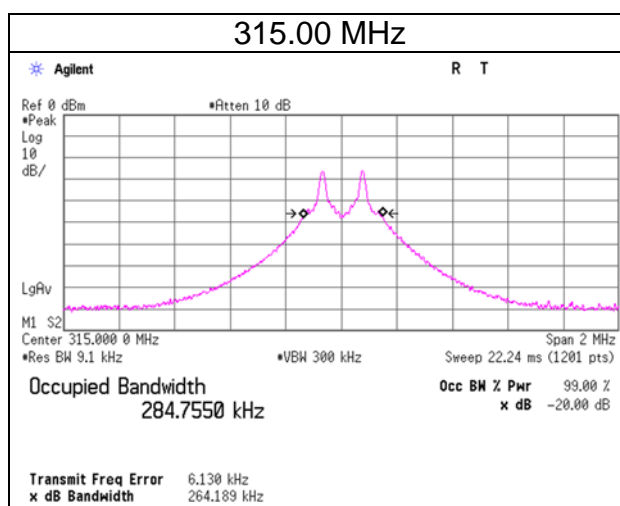
**-20 dB Bandwidth / 99% emission bandwidth**

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	October 24, 2024
Temperature / Humidity	22 deg. C / 60 % RH
Engineer	Daiki Matsui
Mode	Mode 2

Bandwidth Limit : Fundamental Frequency      315.00 MHz x 0.25 % = 787.500 kHz

-20 dB Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
264.189	787.500	Pass

99% emission bandwidth [kHz]	Bandwidth Limit [kHz]	Result
284.7550	787.500	Pass



## APPENDIX 2: Test Instruments

### Test Equipment (Tested on October 1, 2024)

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	141267	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-192	09/18/2024	12
RE	141331	Attenuator(6dB)	TME	UFA-01	-	02/17/2024	12
RE	141397	Coaxial Cable	UL Japan	-	-	11/22/2023	12
RE	141425	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103+BBA9106	VHA 91031302	08/23/2024	12
RE	141512	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	254	10/17/2023	12
RE	141545	DIGITAL HiTESTER	HIOKI E.E. CORPORATION	3805	51201148	02/01/2024	12
RE	141581	MicroWave System Amplifier	Keysight Technologies Inc	83017A	00650	10/30/2024	12
RE	141583	Pre Amplifier	SONOMA INSTRUMENT	310	260833	04/04/2024	12
RE	141903	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46186390	01/26/2024	12
RE	141950	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	11/20/2023	12
RE	142011	AC4_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	12/13/2023	24
RE	142017	AC4_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-10005	04/14/2023	24
RE	142230	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
RE	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	234602	Microwave Cable	Huber+Suhner	SF126E/11PC35/11PC35/1000M,5000M	537063/126E / 537074/126E	03/08/2024	12
RE	242978	High Pass Filter 1-13 GHz	Pasternak	PE87FL1018	D.C. 2215	02/02/2024	12
RE	244710	Thermo-Hygrometer	HIOKI E.E. CORPORATION	LR5001	231202104	01/25/2024	12
RE	142645	Loop Antenna	UL Japan	-	-	-	-
AT	141156	Attenuator(10dB)	Weinschel Corp	2	BL1173	11/17/2023	12
AT	141327	Coaxial Cable	UL-ISE	-	-	02/09/2024	12
AT	141545	DIGITAL HiTESTER	HIOKI E.E. CORPORATION	3805	51201148	02/01/2024	12
AT	141809	Power Meter	Anritsu Corporation	ML2495A	825002	05/22/2024	12
AT	141830	Power sensor	Anritsu Corporation	MA2411B	738285	05/22/2024	12
AT	244710	Thermo-Hygrometer	HIOKI E.E. CORPORATION	LR5001	231202104	01/25/2024	12

#### Test Equipment (Tested on February 20, 2025)

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	141508	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	557	05/17/2024	12
RE	141581	MicroWave System Amplifier	Keysight Technologies Inc	83017A	00650	10/30/2024	12
RE	141903	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46186390	01/30/2025	12
RE	142017	AC4_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-10005	04/14/2023	24
RE	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	234602	Microwave Cable	Huber+Suhner	SF126E/11PC35/11PC35/1000M,5000M	537063/126E / 537074/126E	03/08/2024	12
RE	238713	Double Ridge Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA 9120 C	688	09/02/2024	12
RE	242978	High Pass Filter 1-13 GHz	Pasternak	PE87FL1018	D.C. 2215	02/14/2025	12
RE	244710	Thermo-Hygrometer	HIOKI E. E. CORPORATION	LR5001	231202104	01/19/2025	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

AT: Antenna Terminal Conducted