RADIO TEST REPORT

Test Report No. 14841967H-A-R1

Customer	**Mitsubishi Electric Corporation Himeji works**
Description of EUT	**Smart Keyless System Smart Unit**
Model Number of EUT	**SKEA7A-04**
FCC ID	**WAZSKEA7A04**
Test Regulation	**FCC Part 15 Subpart C**
Test Result	**Complied**
Issue Date	**August 22, 2023**
Remarks	**-**

Representative test engineer	Approved by
	
Tetsuro Yoshida Engineer	Tsubasa Takayama Leader

CERTIFICATE 5107.02

☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan, Inc.
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- The information provided from the customer for this report is identified in SECTION 1.
- For test report(s) referred in this report, the latest version (including any revisions) is always referred.

REVISION HISTORY

Original Test Report No. 14841967H-A

This report is a revised version of 14841967H-A. 14841967H-A is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	14841967H-A	July 19, 2023	-
1	14841967H-A-R1	August 22, 2023	Change the Worst Margin for Spurious Emission due to Factor correction in Clause 3.2; From “29.6 dB, 0.37500 MHz, 0 deg., Peak with Duty factor” To “22.6 dB, 0.62500 MHz, 0 deg., QP”
1	14841967H-A-R1	August 22, 2023	Replacement of the data due to Loss Factor correction of 4th to 10th harmonics (page 13)
1	14841967H-A-R1	August 22, 2023	Correction of the Plot data due to Factor correction (page 14)

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 Corporation Himeji works
Address	840, Chiyoda-machi, Himeji, Hyogo 670-8677, Japan
Telephone Number	+81-79-298-9580
Contact Person	Yasuhiro Takahashi

The information provided from 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

* 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

Description	Smart Keyless System Smart Unit
Model Number	SKEA7A-04
Serial Number	Refer to SECTION 4.2
Condition	Production model
Modification	No Modification by the test lab
Receipt Date	July 3, 2023
Test Date	July 4, 2023

2.2 Product Description

General Specification

Rating	DC 12 V

Radio Specification

[LF part]

Equipment Type	Transmitter
Frequency of Operation	125 kHz
Type of Modulation	ASK

[RF part] *1)

Equipment Type	Receiver
Frequency of Operation	315 MHz
Local Oscillator Frequency	314.72 MHz
Intermediate Frequency	280 kHz
Voltage Controlled Oscillator	1888.32 MHz

*1) The test of this function 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 15.207 Conducted limits Section 15.209 Radiated emission limits; general requirements.
*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	<FCC> ANSI C63.10:2013 6 Standard test methods <ISED> RSS-Gen 8.8	<FCC> Section 15.207 <ISED> RSS-Gen 8.8	N/A	N/A	*1)
Electric Field Strength of Fundamental Emission	<FCC> ANSI C63.10:2013 6 Standard test methods <ISED> RSS-Gen 6.5, 6.12	<FCC> Section 15.209 <ISED> RSS-210 7.2 RSS-Gen 8.9	6.3 dB 125 kHz, 0 deg. Peak with Duty factor	Complied	Radiated
Electric Field Strength of Spurious Emission	<FCC> ANSI C63.10:2013 6 Standard test methods <ISED> RSS-Gen 6.5, 6.6, 6.13	<FCC> Section 15.209 <ISED> RSS-210 7.3 RSS-Gen 8.9	22.6 dB 0.62500 MHz, 0 deg., QP	Complied	Radiated
-20 dB Bandwidth	<FCC> ANSI C63.10:2013 6 Standard test methods <ISED> -	<FCC> Reference data <ISED> -	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 is not the device that is designed to be connected to the public utility (AC) power line.					

FCC Part 15.31 (e)
The battery voltage (DC 12 V) is provided to the EUT. Input voltage to RF part does not go through the regulator. So the test was performed with the supply voltage varied between 85 % and 115 % of the nominal rated supply voltage (DC 12 V) and the variation of the input power does not affect the test result, 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	Deviation	Worst margin	Results	Remarks
99 % emission bandwidth	RSS-Gen 6.7	-	N/A	N/A	-	Radiated

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	4.8
		Vertical	dB	5.0
	200 MHz to 1000 MHz	Horizontal	dB	5.1
		Vertical	dB	6.2
10 m	30 MHz to 200 MHz	Horizontal	dB	4.8
		Vertical	dB	4.8
	200 MHz to 1000 MHz	Horizontal	dB	4.9
		Vertical	dB	5.0

Antenna Terminal Conducted Tests

Item	Unit	Calculated Uncertainty (+/-)
Antenna Terminated Conducted Emission / Power Density / Burst Power	dB	3.28
Adjacent Channel Power (ACP)	dB	2.27
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
Power Measurement (Power meter)	dB	1.50
Frequency Readout (Frequency counter)	ppm	0.67
Frequency Readout (Spectrum analyzer frequency readout function)	ppm	1.61
Temperature (Constant temperature bath)	deg. C	0.78
Humidity (Constant temperature bath)	%RH	2.80
Modulation Characteristics	%	6.93
Frequency for Mobile	ppm	0.08

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

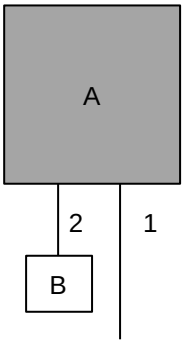
Refer to APPENDIX.

SECTION 4: Operation of EUT during testing

4.1. Operating Mode(s)

Test mode	Remarks
1) Transmitting mode (125 kHz)	-
*Power of the EUT was set by the software as follows; Software: Smcm_Dn2 (Date: 2021.04.16, 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



DC 12 V

* Cabling and setup(s) 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	Smart Keyless System Smart Unit	SKEA7A-04	20230613-E2 No.19	Mitsubishi Electric Corporation Himeji works	EUT
B	SW	-	-	-	-

List of Cables Used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	3.5	Unshielded	Unshielded	-
2	Signal Cable	0.7	Unshielded	Unshielded	-

SECTION 5: Radiated emission (Fundamental and Spurious Emission)

Test Procedure

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.

[Limit conversion]

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

[Frequency: From 9 kHz to 30 MHz]

The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for vertical polarization (antenna angle: 0 deg., 45 deg., 90 deg., and 135 deg.).
*Refer to Figure 2 about Direction of the Loop Antenna.

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

These tests were performed in semi anechoic chamber. Therefore, the measured level of emissions may be higher than if measurements were made without a ground plane. However, test results were confirmed to pass against standard limit.

[Frequency: From 30 MHz to 1 GHz]

The measuring antenna height 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.

[Test instruments and test settings]

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

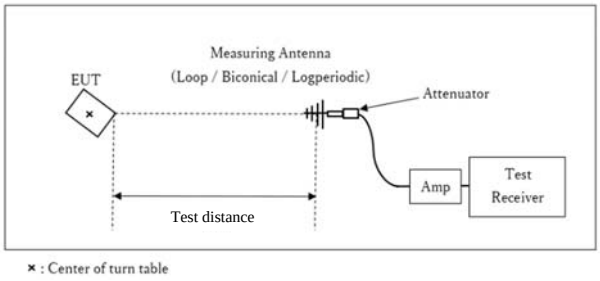
The test was made with the detector (RBW/VBW) in the following table.
When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

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
Instrument used	Test Receiver				
Detector	PK / AV	QP	PK / AV	QP	QP
IF Bandwidth	200 Hz	200 Hz	9 kHz	9 kHz	120 kHz
Test Distance	3 m *1)	3 m *1)	3 m *1)	3 m *2)	3 m

*1) Distance Factor: 40 x log (3 m / 300 m) = -80 dB
*2) Distance Factor: 40 x log (3 m / 30 m) = -40 dB

Figure 1: Test Setup

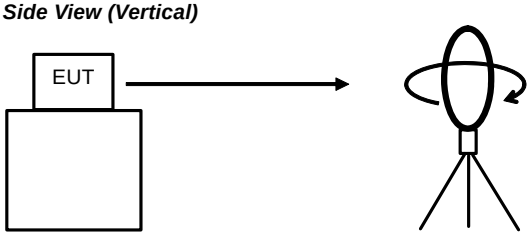
Below 1 GHz



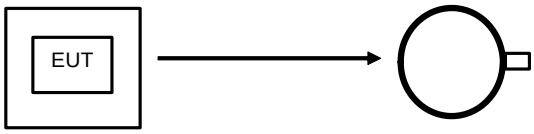
Test Distance: 3 m

Figure 2: Direction of the Loop Antenna

Side View (Vertical)

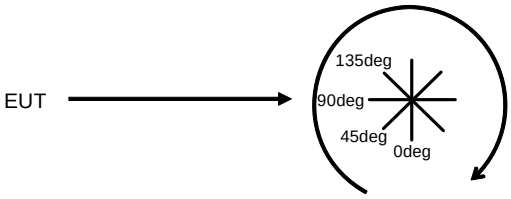


Top View (Horizontal)



Antenna was not rotated.

Top View (Vertical)



Front side: 0 deg.
Forward direction: clockwise

- 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 1 GHz
Test data : APPENDIX
Test result : Pass

SECTION 6: -20 dB Bandwidth

Test Procedure

The test was measured with a spectrum analyzer.

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
-20 dB Bandwidth	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer

Test data : APPENDIX
Test result : Pass

SECTION 7: 99 % emission bandwidth

Test Procedure

The test was measured with a spectrum analyzer.

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

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

Radiated Emission (Fundamental and Spurious Emission)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	July 4, 2023
Temperature / Humidity	24 deg. C / 50 % RH
Engineer	Tetsuro Yoshida
Mode	Mode 1

PK or QP

Ant Deg [deg] or Polarity [Hori/Vert]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
0deg	0.12500	PK	105.9	19.6	-74.0	32.2	-	19.3	45.6	26.3	Fundamental (DC 10.2 V)
0deg	0.12500	PK	105.9	19.6	-74.0	32.2	-	19.3	45.6	26.3	Fundamental (DC 12.0 V)
0deg	0.12500	PK	105.9	19.6	-74.0	32.2	-	19.3	45.6	26.3	Fundamental (DC 13.8 V)
0deg	0.25000	PK	43.0	19.6	-64.3	32.2	-	-33.9	39.6	73.5	
0deg	0.37500	PK	63.4	19.6	-64.3	32.2	-	-13.5	36.1	49.6	
0deg	0.50000	QP	24.0	19.6	-24.3	32.2	-	-12.9	33.6	46.5	
0deg	0.62500	QP	46.0	19.6	-24.3	32.2	-	9.1	31.7	22.6	
0deg	0.75000	QP	22.0	19.6	-24.3	32.2	-	-14.9	30.1	45.0	
0deg	0.87500	QP	40.1	19.7	-24.3	32.2	-	3.3	28.7	25.4	
0deg	1.00000	QP	21.3	19.6	-24.3	32.2	-	-15.6	27.6	43.2	
0deg	1.12500	QP	35.8	19.7	-24.2	32.2	-	-0.9	26.5	27.4	
0deg	1.25000	QP	21.1	19.7	-24.2	32.2	-	-15.6	25.6	41.2	
Hori.	45.284	QP	23.1	13.1	6.8	32.2	-	10.8	40.0	29.2	Floor Noise
Hori.	100.085	QP	22.7	10.3	7.4	32.1	-	8.3	43.5	35.2	Floor Noise
Hori.	184.667	QP	22.4	16.3	8.0	32.1	-	14.6	43.5	28.9	Floor Noise
Hori.	277.409	QP	22.1	13.9	8.6	32.0	-	12.6	46.0	33.4	Floor Noise
Hori.	503.293	QP	22.2	18.1	9.8	32.0	-	18.1	46.0	27.9	Floor Noise
Hori.	615.265	QP	22.3	19.5	10.2	31.9	-	20.1	46.0	25.9	Floor Noise
Vert.	45.284	QP	23.1	13.1	6.8	32.2	-	10.8	40.0	29.2	Floor Noise
Vert.	100.085	QP	22.7	10.3	7.4	32.1	-	8.3	43.5	35.2	Floor Noise
Vert.	184.667	QP	22.4	16.3	8.0	32.1	-	14.6	43.5	28.9	Floor Noise
Vert.	277.409	QP	22.1	13.9	8.6	32.0	-	12.6	46.0	33.4	Floor Noise
Vert.	503.293	QP	22.2	18.1	9.8	32.0	-	18.1	46.0	27.9	Floor Noise
Vert.	615.265	QP	22.3	19.5	10.2	31.9	-	20.1	46.0	25.9	Floor Noise

Result = Reading + Ant Factor + Loss (Cable + Attenuator + Filter + D.Factor) - Gain(Amprifier)

PK with Duty factor

Ant Deg [deg] or Polarity [Hori/Vert]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
0deg	0.12500	PK	105.9	19.6	-74.0	32.2	0.0	19.3	25.6	***6.3***	Fundamental (DC 10.2 V)
0deg	0.12500	PK	105.9	19.6	-74.0	32.2	0.0	19.3	25.6	***6.3***	Fundamental (DC 12.0 V)
0deg	0.12500	PK	105.9	19.6	-74.0	32.2	0.0	19.3	25.6	***6.3***	Fundamental (DC 13.8 V)
0deg	0.25000	PK	43.0	19.6	-64.3	32.2	0.0	-33.9	19.6	53.5	
0deg	0.37500	PK	63.4	19.6	-64.3	32.2	0.0	-13.5	16.1	29.6	

Result = Reading + Ant Factor + Loss (Cable + Attenuator + Filter + D.Factor) - Gain(Amprifier) + Duty factor *
* Since the peak emission result satisfied the average limit, duty factor was omitted.

Result of the fundamental emission at 3 m without Distance factor

Ant Deg [deg]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
0deg	0.12500	PK	105.9	19.6	6.0	32.2	-	99.3	-	-	Fundamental (DC 12.0 V)

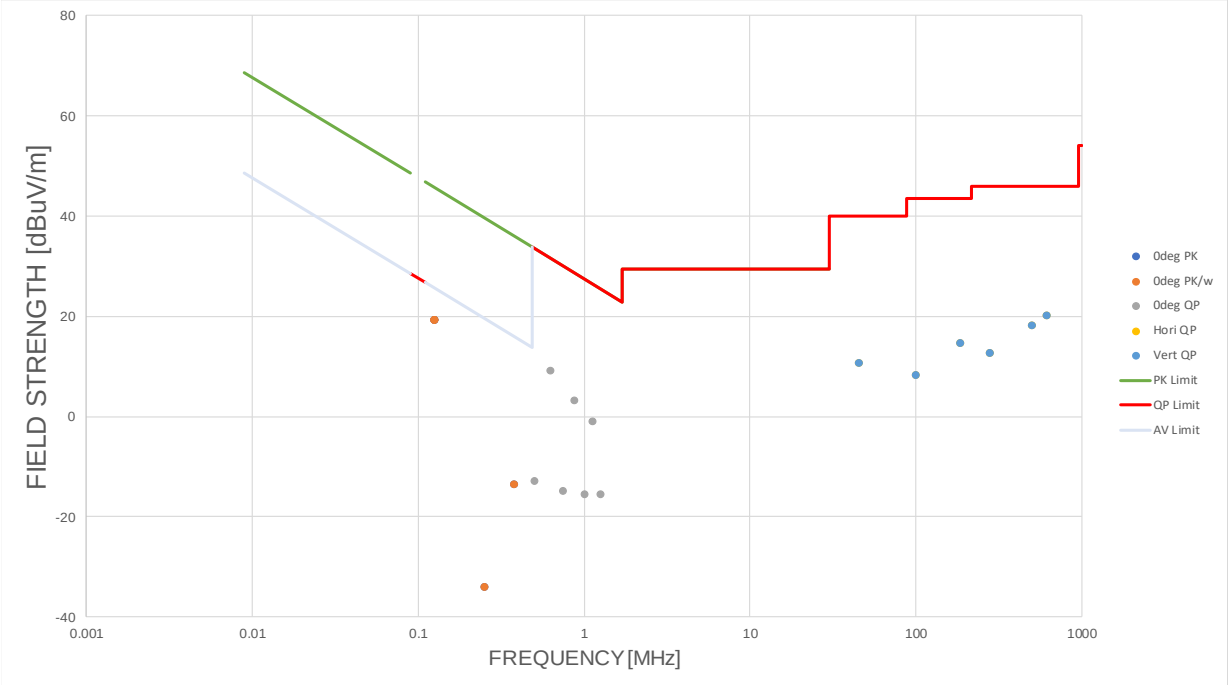
Result = Reading + Ant Factor + Loss (Cable+Attenuator) - Gain(Amprifier)

If Gain 0.0dB shown in the above table, pre-amplifier was not used to avoid the influence of carrier power. The pre-amplifier used for carrier frequency measurement was not saturated.
Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

*It was confirmed that there were no differences in the spurious due to the input voltage.

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

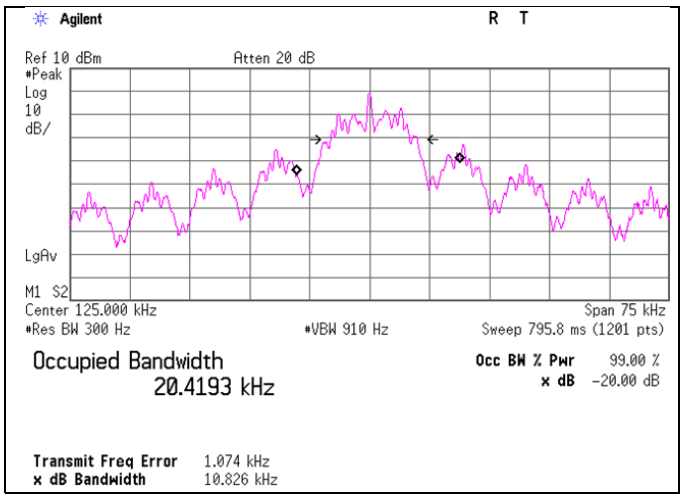
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	July 4, 2023
Temperature / Humidity	24 deg. C / 50 % RH
Engineer	Tetsuro Yoshida
Mode	Mode 1



-20 dB Bandwidth / 99 % emission bandwidth

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	July 4, 2023
Temperature / Humidity	24 deg. C / 50 % RH
Engineer	Tetsuro Yoshida
Mode	Mode 1

-20 dB Bandwidth [kHz]	99 % emission bandwidth [kHz]
10.826	20.4193



*It was confirmed that there were no differences in the bandwidth due to the input voltage.

APPENDIX 2: Test instruments

Test Equipment

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	MAEC-02	142004	AC2_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	05/30/2022	24
RE	MAT-112	220646	Attenuator	Huber+Suhner	6806_N-50-1	-	03/17/2023	12
RE	MBA-08	141427	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103B+ BBA9106	08031	07/30/2022	12
RE	MCC-12	141317	Coaxial Cable	UL Japan	-	-	09/27/2022	12
RE	MCC-13	141222	Coaxial Cable	Fujikura,HP,Mini-Circits,Fujikura	3D-2W(12m)/ 5D-2W(5m)/ 5D-2W(0.8m)/ 5D-2W(1m)	-	02/01/2023	12
RE	MCC-219	159670	Coaxial Cable	UL Japan	-	-	11/18/2022	12
RE	MHF-24	141295	High Pass Filter 0.15-30MHz	Rohde & Schwarz	EZ-25/3	100041	02/01/2023	12
RE	MJM-27	142228	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
RE	MLA-21	141265	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-190	07/30/2022	12
RE	MLPA-02	142152	Loop Antenna	Rohde & Schwarz	HFH2-Z2	836553/009	10/11/2022	12
RE	MMM-01	141542	Digital Tester	Fluke Corporation	FLUKE 26-3	78030611	08/12/2022	12
RE	MOS-41	192300	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	0013	12/17/2022	12
RE	MPA-13	141582	Pre Amplifier	SONOMA INSTRUMENT	310	260834	02/07/2023	12
RE	MSA-22	141978	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY46180899	03/06/2023	12
RE	MTR-08	141949	Test Receiver	Rohde & Schwarz	ESCI	100767	05/17/2023	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