RADIO TEST REPORT

Test Report No. 15204675H-A

Customer	**Hosiden Corporation**
Description of EUT	**CRADLE ASSY, MOBILE WIRELESS CHARGER**
Model Number of EUT	**861C0-B2010-C0**
FCC ID	**VIYCBC4077**
Test Regulation	**FCC Part 15 Subpart C**
Test Result	**Complied**
Issue Date	**March 19, 2024**
Remarks	**Wireless power transmission (Qi) part**

Representative test engineer	Approved by
	
Tetsuro Yoshida Engineer	Tsubasa Takayama Leader

CERTIFICATE 5107.02

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☒ There is no testing item of "Non-accreditation".

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REVISION HISTORY

Original Test Report No. 15204675H-A

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	15204675H-A	March 19, 2024	-

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

CONTENTS PAGE

SECTION 1: Customer Information

Company Name	Hosiden Corporation
Address	4-33, Kitakyuhoji 1-Chome, Yao-City, Osaka, 581-0071 Japan
Telephone Number	+81-72-924-1293
Contact Person	Fumitaka Sekiguchi

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	CRADLE ASSY, MOBILE WIRELESS CHARGER
Model Number	861C0-B2010-C0
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	January 22, 2024
Test Date	January 29 to February 6, 2024

2.2 Product Description

General Specification

Rating	DC 14 V / 2 A
Operating frequency	-30 deg. C to +60 deg. C (Wireless power transmission (Qi)) -30 deg. C to +80 deg. C (NFC)

Radio Specification

Wireless power transmission (Qi)

Operating Frequency	127.70 kHz (Power transmit) / 125.73 kHz to 129.81 kHz (Communication)
Rated Output Power	15 W
Modulation	FSK
Coil system	Single Coil
Charging distance	Contact

NFC

Equipment Type	Transceiver
Frequency of Operation	13.56 MHz
Type of Modulation	ASK

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.

3.2 Procedures and results

Item	Test Procedure*	Specification	Worst margin	Results	Remarks
Conducted Emission	ANSI C63.10:2013 6 Standard test methods	Section 15.207	N/A	N/A	*1)
Electric Field Strength of Fundamental Emission	ANSI C63.10:2013 6 Standard test methods	Section 15.209	7.6 dB 127.70 kHz, 0 deg. Peak with Duty factor (Tx 15 W)	Complied	Radiated
Electric Field Strength of Spurious Emission	ANSI C63.10:2013 6 Standard test methods	Section 15.209	14.8 dB 0.63980 MHz, 0 deg., QP (FSK 127.96 kHz)	Complied	Radiated
-20 dB Bandwidth	ANSI C63.10:2013 6 Standard test methods	Reference data	N/A	Complied	Radiated

Note: UL Japan, Inc.'s EMI Work Procedures: Work Instructions-ULID-003591 and Work Instructions-ULID-003593.
* ANSI C 63.30-2021 is also referred.

*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 worst case stable voltage was provided to the EUT during the all tests.
And maximum and minimum voltage were provided to the EUT during the output power measurement test.
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

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	4.7
		Vertical	dB	4.7
	200 MHz to 1000 MHz	Horizontal	dB	4.8
		Vertical	dB	6.0
10 m	30 MHz to 200 MHz	Horizontal	dB	5.2
		Vertical	dB	5.1
	200 MHz to 1000 MHz	Horizontal	dB	5.2
		Vertical	dB	5.2
3 m	1 GHz to 6 GHz		dB	5.0
	6 GHz to 18 GHz		dB	5.2
1 m	10 GHz to 18 GHz		dB	5.3
	18 GHz to 26.5 GHz		dB	5.2
	26.5 GHz to 40 GHz		dB	4.7
0.5 m	26.5 GHz to 40 GHz		dB	4.8

-20 dB Bandwidth

Item	Unit	Calculated Uncertainty (+/-)
Bandwidth (OBW)	%	0.96

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.

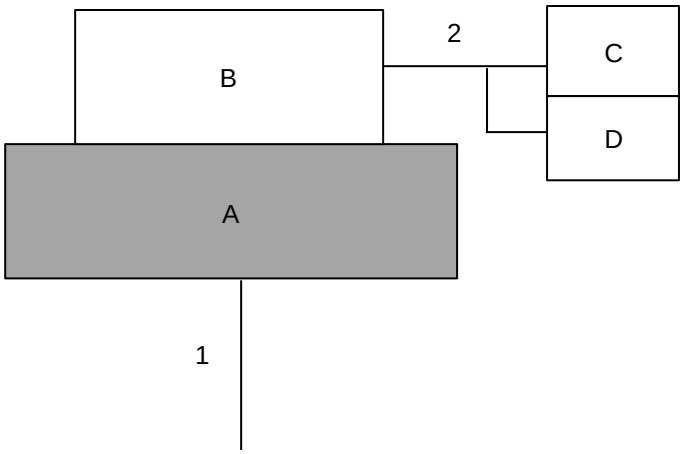
SECTION 4: Operation of EUT during testing

4.1. Operating Mode(s)

Test mode	Remarks
1) Tx 15 W (127.70 kHz)	-
2) Tx 5 W (127.70 kHz)	
3) Tx FSK (127.96 kHz / 128.21 kHz / 128.74 kHz / 129.81 kHz / 127.45 kHz / 127.19 kHz / 126.70 kHz / 125.73 kHz)	
*For Mode 3, a simulator was used to actualize typical FSK operating conditions. *After the comparison of load conditions of 10 % or less, 40 % to 60 %, and 100 % at pre-check, and the final tests were performed with the worst load conditions. *The load used was adjusted so that wireless power transmission was output at a certain level.	
*Power of the EUT was set by the software as follows; Software: Wireless power transmission V1.02 (Date: 2022.06.07, 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

Tx 15 W



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

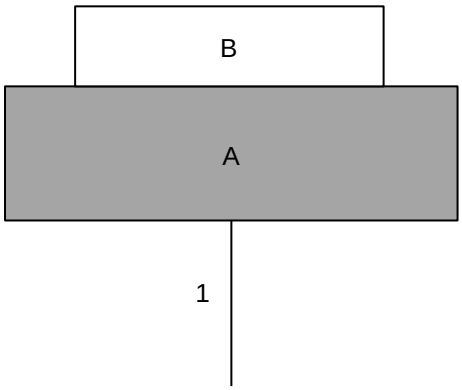
Description of EUT and Support Equipment

No.	Item	Model number	Serial Number	Manufacturer	Remark
A	CRADLE ASSY, MOBILE WIRELESS CHARGER	861C0-B2010-C0	102	Hosiden Corporation	EUT
B	Receiver coil	CBC-4091	ES-35	-	-
C	Resistance	HS50F	19.3	ARCOL	-
D	Resistance	HS50	20.03	ARCOL	-

List of Cables Used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC Cable	2.5	Unshielded	Unshielded	-
2	DC Cable	0.2	Unshielded	Unshielded	-

Tx 5 W



DC 14 V

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

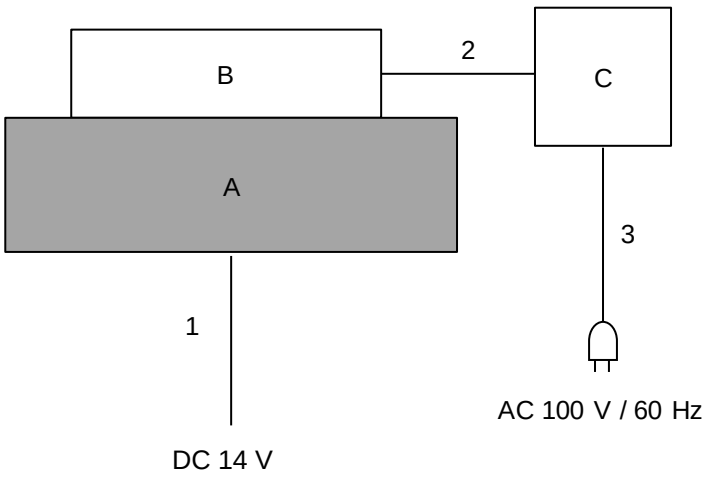
Description of EUT and Support Equipment

No.	Item	Model number	Serial Number	Manufacturer	Remark
A	CRADLE ASSY, MOBILE WIRELESS CHARGER	861C0-B2010-C0	101	Hosiden Corporation	EUT
B	Receiver	SM-G9810	86	Samsung Electronics	-

List of Cables Used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC Cable	2.5	Unshielded	Unshielded	-

FSK



* 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	Remark
A	CRADLE ASSY, MOBILE WIRELESS CHARGER	861C0-B2010-C0	102	Hosiden Corporation	EUT
B	Receiver coil	TPR#MP1B	EBST-01-03	nok9	-
C	Qi measurement instrument	CATS II BST	200134-1807	nok9	-

List of Cables Used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC Cable	2.5	Unshielded	Unshielded	-
2	DC Cable	0.5	Unshielded	Unshielded	-
3	AC Cable	1.5	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., 180 deg.) and horizontal polarization.
*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

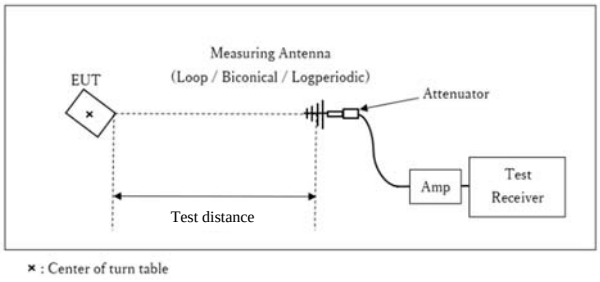
The test was made with the detector (RBW/VBW) in the following table.
When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

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

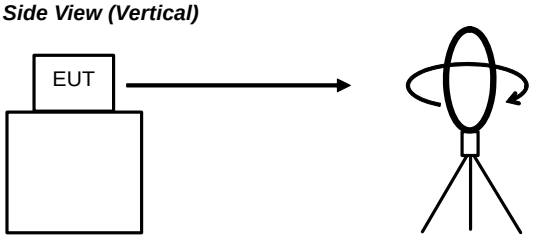
Below 1 GHz



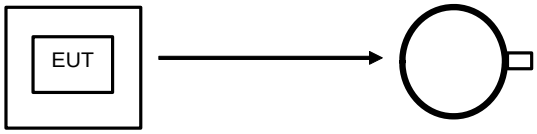
Test Distance: 3 m

Figure 2: Direction of the Loop Antenna

Side View (Vertical)

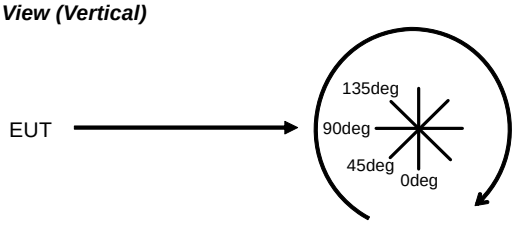


Top View (Horizontal)



Antenna was not rotated.

Top View (Vertical)



Front side: 0 deg.
Forward direction: clockwise

The test was made on EUT at the normal use position.

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 using a test fixture.

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

*For mode 1 and mode 2, a settings are not followed by ANSI requirement, because signal is almost sine wave, the smaller RBW setting is, the narrower result is. So actual settings are 10 kHz for RBW.

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

Radiated Emission (Fundamental and Spurious Emission)

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	Large Chamber	Large Chamber
Date	January 29, 2024	January 31, 2024
Temperature / Humidity	24 deg. C / 40 % RH	25 deg. C / 30 % RH
Engineer	Tetsuro Yoshida (Below 30 MHz)	Tetsuro Yoshida (Below 30 MHz)
Mode	Tx 15 W 127.70 kHz	

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	0.12770	PK	105.7	19.1	-74.0	33.0	-	17.8	45.4	27.6	Fundamental (DC 14.0 V)
0deg	0.12770	PK	105.7	19.1	-74.0	33.0	-	17.8	45.4	27.6	Fundamental (DC 11.9 V)
0deg	0.12770	PK	105.7	19.1	-74.0	33.0	-	17.8	45.4	27.6	Fundamental (DC 16.1 V)
0deg	0.25540	PK	56.1	19.2	-64.3	33.0	-	-22.0	39.4	61.4	
0deg	0.38310	PK	65.9	19.3	-64.3	33.0	-	-12.1	35.9	48.0	
0deg	0.51080	QP	27.8	19.3	-24.3	33.0	-	-10.2	33.4	43.6	
0deg	0.63850	QP	49.0	19.3	-24.3	33.0	-	11.0	31.5	20.5	
0deg	0.76620	QP	25.4	19.3	-24.3	33.0	-	-12.6	29.9	42.5	
0deg	0.89390	QP	44.8	19.3	-24.3	33.0	-	6.8	28.5	21.7	
0deg	1.02160	QP	24.5	19.3	-24.3	33.0	-	-13.5	27.4	40.9	
0deg	1.14930	QP	41.0	19.3	-24.3	33.0	-	3.0	26.4	23.4	
0deg	1.27700	QP	24.1	19.3	-24.3	33.0	-	-13.9	25.4	39.3	
Hori.	48.024	QP	31.3	10.3	7.4	33.0	-	16.0	40.0	24.0	
Hori.	52.157	QP	23.5	9.9	7.5	33.0	-	7.9	40.0	32.1	
Hori.	162.929	QP	32.1	12.7	8.7	33.0	-	20.5	43.5	23.0	
Hori.	197.660	QP	24.1	14.2	9.0	33.0	-	14.3	43.5	29.2	
Hori.	215.845	QP	27.4	10.6	9.2	33.0	-	14.2	43.5	29.3	
Hori.	288.017	QP	28.4	12.6	9.7	33.0	-	17.7	46.0	28.3	
Vert.	39.182	QP	38.5	11.6	7.3	33.0	-	24.4	40.0	15.6	
Vert.	42.259	QP	35.6	11.1	7.3	33.0	-	21.0	40.0	19.0	
Vert.	46.475	QP	38.2	10.5	7.4	33.0	-	23.1	40.0	16.9	
Vert.	52.435	QP	34.2	9.9	7.5	33.0	-	18.6	40.0	21.4	
Vert.	56.559	QP	37.7	9.7	7.5	33.0	-	21.9	40.0	18.1	
Vert.	83.510	QP	34.8	9.1	7.9	33.0	-	18.8	40.0	21.2	

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	0.12770	PK	105.7	19.1	-74.0	33.0	0.0	17.8	25.4	***7.6***	Fundamental (DC 14.0 V)
0deg	0.12770	PK	105.7	19.1	-74.0	33.0	0.0	17.8	25.4	***7.6***	Fundamental (DC 11.9 V)
0deg	0.12770	PK	105.7	19.1	-74.0	33.0	0.0	17.8	25.4	***7.6***	Fundamental (DC 16.1 V)
0deg	0.25540	PK	56.1	19.2	-64.3	33.0	0.0	-22.0	19.4	41.4	
0deg	0.38310	PK	65.9	19.3	-64.3	33.0	0.0	-12.1	15.9	28.0	

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	0.12770	PK	105.7	19.1	6.0	33.0	-	97.8	-	-	Fundamental

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 emission due to the input voltage.

Radiated Emission (Fundamental and Spurious Emission)

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	Large Chamber	Large Chamber
Date	January 29, 2024	January 31, 2024
Temperature / Humidity	24 deg. C / 40 % RH	25 deg. C / 30 % RH
Engineer	Tetsuro Yoshida (Below 30 MHz)	Tetsuro Yoshida (Below 30 MHz)
Mode	Tx 5 W 127.70 kHz	

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	0.12770	PK	96.9	19.1	-74.0	33.0	-	9.0	45.4	36.4	Fundamental (DC 14.0 V)
0deg	0.12770	PK	96.9	19.1	-74.0	33.0	-	9.0	45.4	36.4	Fundamental (DC 11.9 V)
0deg	0.12770	PK	96.9	19.1	-74.0	33.0	-	9.0	45.4	36.4	Fundamental (DC 16.1 V)
0deg	0.25540	PK	41.7	19.2	-64.3	33.0	-	-36.4	39.4	75.8	
0deg	0.38310	PK	60.3	19.3	-64.3	33.0	-	-17.7	35.9	53.6	
0deg	0.51080	QP	27.0	19.3	-24.3	33.0	-	-11.0	33.4	44.4	
0deg	0.63850	QP	42.5	19.3	-24.3	33.0	-	4.5	31.5	27.0	
0deg	0.76620	QP	23.8	19.3	-24.3	33.0	-	-14.2	29.9	44.1	
0deg	0.89390	QP	37.3	19.3	-24.3	33.0	-	-0.7	28.5	29.2	
0deg	1.02160	QP	23.3	19.3	-24.3	33.0	-	-14.7	27.4	42.1	
0deg	1.14930	QP	32.8	19.3	-24.3	33.0	-	-5.2	26.4	31.6	
0deg	1.27700	QP	23.1	19.3	-24.3	33.0	-	-14.9	25.4	40.3	
Hori.	39.715	QP	23.5	11.5	7.3	33.0	-	9.3	40.0	30.7	
Hori.	42.132	QP	24.3	11.1	7.3	33.0	-	9.7	40.0	30.3	
Hori.	46.219	QP	25.6	10.5	7.4	33.0	-	10.5	40.0	29.5	
Hori.	48.031	QP	31.5	10.3	7.4	33.0	-	16.2	40.0	23.8	
Hori.	177.024	QP	29.3	13.4	8.8	33.0	-	18.5	43.5	25.0	
Hori.	741.753	QP	30.3	21.2	12.1	32.7	-	30.9	46.0	15.1	
Vert.	39.705	QP	27.4	11.5	7.3	33.0	-	13.2	40.0	26.8	
Vert.	42.132	QP	31.2	11.1	7.3	33.0	-	16.6	40.0	23.4	
Vert.	46.219	QP	32.9	10.5	7.4	33.0	-	17.8	40.0	22.2	
Vert.	48.031	QP	33.7	10.3	7.4	33.0	-	18.4	40.0	21.6	
Vert.	57.014	QP	29.7	9.6	7.6	33.0	-	13.9	40.0	26.1	
Vert.	741.753	QP	32.3	21.2	12.1	32.7	-	32.9	46.0	***13.1***	

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	0.12770	PK	96.9	19.1	-74.0	33.0	0.0	9.0	25.4	16.4	Fundamental (DC 14.0 V)
0deg	0.12770	PK	96.9	19.1	-74.0	33.0	0.0	9.0	25.4	16.4	Fundamental (DC 11.9 V)
0deg	0.12770	PK	96.9	19.1	-74.0	33.0	0.0	9.0	25.4	16.4	Fundamental (DC 16.1 V)
0deg	0.25540	PK	41.7	19.2	-64.3	33.0	0.0	-36.4	19.4	55.8	
0deg	0.38310	PK	60.3	19.3	-64.3	33.0	0.0	-17.7	15.9	33.6	

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	0.12770	PK	96.9	19.1	6.0	33.0	-	89.0	-	-	Fundamental

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 emission due to the input voltage.

Radiated Emission (Fundamental and Spurious Emission)

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	Large Chamber	Large Chamber
Date	January 30, 2024	January 31, 2024
Temperature / Humidity	24 deg. C / 40 % RH	25 deg. C / 30 % RH
Engineer	Tetsuro Yoshida (Below 30 MHz)	Tetsuro Yoshida (Below 30 MHz)
Mode	Tx FSK 127.96 kHz	

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	0.12796	PK	102.7	19.1	-74.0	33.0	-	14.8	45.4	30.6	Fundamental (DC 14.0 V)
0deg	0.12796	PK	102.7	19.1	-74.0	33.0	-	14.8	45.4	30.6	Fundamental (DC 11.9 V)
0deg	0.12796	PK	102.7	19.1	-74.0	33.0	-	14.8	45.4	30.6	Fundamental (DC 16.1 V)
0deg	0.25592	PK	52.8	19.2	-64.3	33.0	-	-25.3	39.4	64.7	
0deg	0.38388	PK	64.5	19.3	-64.3	33.0	-	-13.5	35.9	49.4	
0deg	0.51184	QP	26.6	19.3	-24.3	33.0	-	-11.4	33.4	44.8	
0deg	0.63980	QP	54.7	19.3	-24.3	33.0	-	16.7	31.5	14.8	
0deg	0.76776	QP	25.0	19.3	-24.3	33.0	-	-13.0	29.9	42.9	
0deg	0.89572	QP	48.9	19.3	-24.3	33.0	-	10.9	28.5	17.6	
0deg	1.02368	QP	25.0	19.3	-24.3	33.0	-	-13.0	27.4	40.4	
0deg	1.15164	QP	44.3	19.3	-24.3	33.0	-	6.3	26.3	20.0	
0deg	1.27960	QP	26.1	19.3	-24.3	33.0	-	-11.9	25.4	37.3	
Hori.	97.875	QP	28.6	9.8	8.1	33.0	-	13.5	43.5	30.0	
Hori.	154.128	QP	30.6	12.2	8.6	33.0	-	18.4	43.5	25.1	
Hori.	219.741	QP	30.2	10.5	9.2	33.0	-	16.9	46.0	29.1	
Hori.	306.408	QP	27.8	13.0	9.8	33.0	-	17.6	46.0	28.4	
Hori.	384.821	QP	31.1	14.9	10.3	33.0	-	23.3	46.0	22.7	
Hori.	569.820	QP	23.0	18.6	11.3	33.2	-	19.7	46.0	26.3	
Vert.	97.875	QP	32.9	9.8	8.1	33.0	-	17.8	43.5	25.7	
Vert.	154.128	QP	28.5	12.2	8.6	33.0	-	16.3	43.5	27.2	
Vert.	219.741	QP	28.3	10.5	9.2	33.0	-	15.0	46.0	31.0	
Vert.	306.408	QP	24.0	13.0	9.8	33.0	-	13.8	46.0	32.2	
Vert.	384.821	QP	29.1	14.9	10.3	33.0	-	21.3	46.0	24.7	
Vert.	569.820	QP	24.4	18.6	11.3	33.2	-	21.1	46.0	24.9	

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	0.12796	PK	102.7	19.1	-74.0	33.0	0.0	14.8	25.4	***10.6***	Fundamental (DC 14.0 V)
0deg	0.12796	PK	102.7	19.1	-74.0	33.0	0.0	14.8	25.4	***10.6***	Fundamental (DC 11.9 V)
0deg	0.12796	PK	102.7	19.1	-74.0	33.0	0.0	14.8	25.4	***10.6***	Fundamental (DC 16.1 V)
0deg	0.25592	PK	52.8	19.2	-64.3	33.0	0.0	-25.3	19.4	44.7	
0deg	0.38388	PK	64.5	19.3	-64.3	33.0	0.0	-13.5	15.9	29.4	

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	0.12796	PK	102.7	19.1	6.0	33.0	-	94.8	-	-	Fundamental

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 emission due to the input voltage.

Radiated Emission (Fundamental and Spurious Emission)

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	Large Chamber	Large Chamber
Date	January 30, 2024	January 31, 2024
Temperature / Humidity	24 deg. C / 40 % RH	25 deg. C / 30 % RH
Engineer	Tetsuro Yoshida (Below 30 MHz)	Tetsuro Yoshida (Below 30 MHz)
Mode	Tx FSK 128.21 kHz	

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	0.12821	PK	102.4	19.1	-74.0	33.0	-	14.5	45.4	30.9	Fundamental (DC 14.0 V)
0deg	0.12821	PK	102.4	19.1	-74.0	33.0	-	14.5	45.4	30.9	Fundamental (DC 11.9 V)
0deg	0.12821	PK	102.4	19.1	-74.0	33.0	-	14.5	45.4	30.9	Fundamental (DC 16.1 V)
0deg	0.25642	PK	50.1	19.2	-64.3	33.0	-	-28.0	39.4	67.4	
0deg	0.38463	PK	63.1	19.3	-64.3	33.0	-	-14.9	35.9	50.8	
0deg	0.51284	QP	26.4	19.3	-24.3	33.0	-	-11.6	33.4	45.0	
0deg	0.64105	QP	52.0	19.3	-24.3	33.0	-	14.0	31.5	17.5	
0deg	0.76926	QP	25.1	19.3	-24.3	33.0	-	-12.9	29.9	42.8	
0deg	0.89747	QP	48.8	19.3	-24.3	33.0	-	10.8	28.5	17.7	
0deg	1.02568	QP	25.2	19.3	-24.3	33.0	-	-12.8	27.3	40.1	
0deg	1.15389	QP	44.4	19.3	-24.3	33.0	-	6.4	26.3	19.9	
0deg	1.28210	QP	26.2	19.3	-24.3	33.0	-	-11.8	25.4	37.2	
Hori.	97.875	QP	28.6	9.8	8.1	33.0	-	13.5	43.5	30.0	
Hori.	154.128	QP	30.4	12.2	8.6	33.0	-	18.2	43.5	25.3	
Hori.	219.741	QP	30.2	10.5	9.2	33.0	-	16.9	46.0	29.1	
Hori.	306.408	QP	27.8	13.0	9.8	33.0	-	17.6	46.0	28.4	
Hori.	384.821	QP	31.0	14.9	10.3	33.0	-	23.2	46.0	22.8	
Hori.	569.820	QP	23.0	18.6	11.3	33.2	-	19.7	46.0	26.3	
Vert.	97.875	QP	32.6	9.8	8.1	33.0	-	17.5	43.5	26.0	
Vert.	154.128	QP	28.5	12.2	8.6	33.0	-	16.3	43.5	27.2	
Vert.	219.741	QP	28.3	10.5	9.2	33.0	-	15.0	46.0	31.0	
Vert.	306.408	QP	24.1	13.0	9.8	33.0	-	13.9	46.0	32.1	
Vert.	384.821	QP	29.1	14.9	10.3	33.0	-	21.3	46.0	24.7	
Vert.	569.820	QP	24.3	18.6	11.3	33.2	-	21.0	46.0	25.0	

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	0.12821	PK	102.4	19.1	-74.0	33.0	0.0	14.5	25.4	***10.9***	Fundamental (DC 14.0 V)
0deg	0.12821	PK	102.4	19.1	-74.0	33.0	0.0	14.5	25.4	***10.9***	Fundamental (DC 11.9 V)
0deg	0.12821	PK	102.4	19.1	-74.0	33.0	0.0	14.5	25.4	***10.9***	Fundamental (DC 16.1 V)
0deg	0.25642	PK	50.1	19.2	-64.3	33.0	0.0	-28.0	19.4	47.4	
0deg	0.38463	PK	63.1	19.3	-64.3	33.0	0.0	-14.9	15.9	30.8	

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	0.12821	PK	102.4	19.1	6.0	33.0	-	94.5	-	-	Fundamental

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 emission due to the input voltage.

Radiated Emission (Fundamental and Spurious Emission)

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	Large Chamber	Large Chamber
Date	January 30, 2024	January 31, 2024
Temperature / Humidity	24 deg. C / 40 % RH	25 deg. C / 30 % RH
Engineer	Tetsuro Yoshida (Below 30 MHz)	Tetsuro Yoshida (Below 30 MHz)
Mode	Tx FSK 128.74 kHz	

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	0.12874	PK	102.3	19.1	-74.0	33.0	-	14.4	45.3	30.9	Fundamental (DC 14.0 V)
0deg	0.12874	PK	102.3	19.1	-74.0	33.0	-	14.4	45.3	30.9	Fundamental (DC 11.9 V)
0deg	0.12874	PK	102.3	19.1	-74.0	33.0	-	14.4	45.3	30.9	Fundamental (DC 16.1 V)
0deg	0.25748	PK	43.1	19.2	-64.3	33.0	-	-35.0	39.4	74.4	
0deg	0.38622	PK	63.7	19.3	-64.3	33.0	-	-14.3	35.9	50.2	
0deg	0.51496	QP	26.3	19.3	-24.3	33.0	-	-11.7	33.4	45.1	
0deg	0.64370	QP	54.4	19.3	-24.3	33.0	-	16.4	31.4	15.0	
0deg	0.77244	QP	25.2	19.3	-24.3	33.0	-	-12.8	29.8	42.6	
0deg	0.90118	QP	48.7	19.3	-24.3	33.0	-	10.7	28.5	17.8	
0deg	1.02992	QP	25.3	19.3	-24.3	33.0	-	-12.7	27.3	40.0	
0deg	1.15866	QP	44.3	19.3	-24.3	33.0	-	6.3	26.3	20.0	
0deg	1.28740	QP	26.1	19.3	-24.3	33.0	-	-11.9	25.4	37.3	
Hori.	97.875	QP	28.7	9.8	8.1	33.0	-	13.6	43.5	29.9	
Hori.	154.128	QP	30.5	12.2	8.6	33.0	-	18.3	43.5	25.2	
Hori.	219.741	QP	30.1	10.5	9.2	33.0	-	16.8	46.0	29.2	
Hori.	306.408	QP	27.8	13.0	9.8	33.0	-	17.6	46.0	28.4	
Hori.	384.821	QP	31.0	14.9	10.3	33.0	-	23.2	46.0	22.8	
Hori.	569.820	QP	23.0	18.6	11.3	33.2	-	19.7	46.0	26.3	
Vert.	97.875	QP	32.9	9.8	8.1	33.0	-	17.8	43.5	25.7	
Vert.	154.128	QP	28.5	12.2	8.6	33.0	-	16.3	43.5	27.2	
Vert.	219.741	QP	28.3	10.5	9.2	33.0	-	15.0	46.0	31.0	
Vert.	306.408	QP	24.0	13.0	9.8	33.0	-	13.8	46.0	32.2	
Vert.	384.821	QP	29.0	14.9	10.3	33.0	-	21.2	46.0	24.8	
Vert.	569.820	QP	24.5	18.6	11.3	33.2	-	21.2	46.0	24.8	

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	0.12874	PK	102.3	19.1	-74.0	33.0	0.0	14.4	25.3	***10.9***	Fundamental (DC 14.0 V)
0deg	0.12874	PK	102.3	19.1	-74.0	33.0	0.0	14.4	25.3	***10.9***	Fundamental (DC 11.9 V)
0deg	0.12874	PK	102.3	19.1	-74.0	33.0	0.0	14.4	25.3	***10.9***	Fundamental (DC 16.1 V)
0deg	0.25748	PK	43.1	19.2	-64.3	33.0	0.0	-35.0	19.4	54.4	
0deg	0.38622	PK	63.7	19.3	-64.3	33.0	0.0	-14.3	15.9	30.2	

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	0.12874	PK	102.3	19.1	6.0	33.0	-	94.4	-	-	Fundamental

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 emission due to the input voltage.

Radiated Emission (Fundamental and Spurious Emission)

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	Large Chamber	Large Chamber
Date	January 30, 2024	January 31, 2024
Temperature / Humidity	24 deg. C / 40 % RH	25 deg. C / 30 % RH
Engineer	Tetsuro Yoshida (Below 30 MHz)	Tetsuro Yoshida (Below 30 MHz)
Mode	Tx FSK 129.81 kHz	

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	0.12981	PK	102.2	19.1	-74.0	33.0	-	14.3	45.3	31.0	Fundamental (DC 14.0 V)
0deg	0.12981	PK	102.2	19.1	-74.0	33.0	-	14.3	45.3	31.0	Fundamental (DC 11.9 V)
0deg	0.12981	PK	102.2	19.1	-74.0	33.0	-	14.3	45.3	31.0	Fundamental (DC 16.1 V)
0deg	0.25962	PK	41.1	19.2	-64.3	33.0	-	-37.0	39.3	76.3	
0deg	0.38943	PK	63.6	19.3	-64.3	33.0	-	-14.4	35.8	50.2	
0deg	0.51924	QP	26.5	19.3	-24.3	33.0	-	-11.5	33.3	44.8	
0deg	0.64905	QP	54.4	19.3	-24.3	33.0	-	16.4	31.3	14.9	
0deg	0.77886	QP	25.4	19.3	-24.3	33.0	-	-12.6	29.8	42.4	
0deg	0.90867	QP	48.6	19.3	-24.3	33.0	-	10.6	28.4	17.8	
0deg	1.03848	QP	25.2	19.3	-24.3	33.0	-	-12.8	27.2	40.0	
0deg	1.16829	QP	44.2	19.3	-24.3	33.0	-	6.2	26.2	20.0	
0deg	1.29810	QP	26.3	19.3	-24.3	33.0	-	-11.7	25.3	37.0	
Hori.	97.875	QP	28.6	9.8	8.1	33.0	-	13.5	43.5	30.0	
Hori.	154.128	QP	30.5	12.2	8.6	33.0	-	18.3	43.5	25.2	
Hori.	219.741	QP	30.1	10.5	9.2	33.0	-	16.8	46.0	29.2	
Hori.	306.408	QP	27.9	13.0	9.8	33.0	-	17.7	46.0	28.3	
Hori.	384.821	QP	31.0	14.9	10.3	33.0	-	23.2	46.0	22.8	
Hori.	569.820	QP	23.1	18.6	11.3	33.2	-	19.8	46.0	26.2	
Vert.	97.875	QP	32.9	9.8	8.1	33.0	-	17.8	43.5	25.7	
Vert.	154.128	QP	28.5	12.2	8.6	33.0	-	16.3	43.5	27.2	
Vert.	219.741	QP	28.3	10.5	9.2	33.0	-	15.0	46.0	31.0	
Vert.	306.408	QP	24.0	13.0	9.8	33.0	-	13.8	46.0	32.2	
Vert.	384.821	QP	29.0	14.9	10.3	33.0	-	21.2	46.0	24.8	
Vert.	569.820	QP	24.6	18.6	11.3	33.2	-	21.3	46.0	24.7	

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	0.12981	PK	102.2	19.1	-74.0	33.0	0.0	14.3	25.3	***11.0***	Fundamental (DC 14.0 V)
0deg	0.12981	PK	102.2	19.1	-74.0	33.0	0.0	14.3	25.3	***11.0***	Fundamental (DC 11.9 V)
0deg	0.12981	PK	102.2	19.1	-74.0	33.0	0.0	14.3	25.3	***11.0***	Fundamental (DC 16.1 V)
0deg	0.25962	PK	41.1	19.2	-64.3	33.0	0.0	-37.0	19.3	56.3	
0deg	0.38943	PK	63.6	19.3	-64.3	33.0	0.0	-14.4	15.8	30.2	

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	0.12981	PK	102.2	19.1	6.0	33.0	-	94.3	-	-	Fundamental

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 emission due to the input voltage.

Radiated Emission (Fundamental and Spurious Emission)

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	Large Chamber	Large Chamber
Date	January 30, 2024	January 31, 2024
Temperature / Humidity	24 deg. C / 40 % RH	25 deg. C / 30 % RH
Engineer	Tetsuro Yoshida (Below 30 MHz)	Tetsuro Yoshida (Below 30 MHz)
Mode	Tx FSK 127.45 kHz	

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	0.12745	PK	102.2	19.1	-74.0	33.0	-	14.3	45.4	31.1	Fundamental (DC 14.0 V)
0deg	0.12745	PK	102.2	19.1	-74.0	33.0	-	14.3	45.4	31.1	Fundamental (DC 11.9 V)
0deg	0.12745	PK	102.2	19.1	-74.0	33.0	-	14.3	45.4	31.1	Fundamental (DC 16.1 V)
0deg	0.25490	PK	53.7	19.2	-64.3	33.0	-	-24.4	39.4	63.8	
0deg	0.38235	PK	63.3	19.3	-64.3	33.0	-	-14.7	35.9	50.6	
0deg	0.50980	QP	26.4	19.3	-24.3	33.0	-	-11.6	33.5	45.1	
0deg	0.63725	QP	54.1	19.3	-24.3	33.0	-	16.1	31.5	15.4	
0deg	0.76470	QP	25.1	19.3	-24.3	33.0	-	-12.9	29.9	42.8	
0deg	0.89215	QP	48.6	19.3	-24.3	33.0	-	10.6	28.6	18.0	
0deg	1.01960	QP	25.2	19.3	-24.3	33.0	-	-12.8	27.4	40.2	
0deg	1.14705	QP	44.2	19.3	-24.3	33.0	-	6.2	26.4	20.2	
0deg	1.27450	QP	26.2	19.3	-24.3	33.0	-	-11.8	25.4	37.2	
Hori.	97.875	QP	28.6	9.8	8.1	33.0	-	13.5	43.5	30.0	
Hori.	154.128	QP	30.5	12.2	8.6	33.0	-	18.3	43.5	25.2	
Hori.	219.741	QP	30.1	10.5	9.2	33.0	-	16.8	46.0	29.2	
Hori.	306.408	QP	27.9	13.0	9.8	33.0	-	17.7	46.0	28.3	
Hori.	384.821	QP	31.0	14.9	10.3	33.0	-	23.2	46.0	22.8	
Hori.	569.820	QP	23.0	18.6	11.3	33.2	-	19.7	46.0	26.3	
Vert.	97.875	QP	32.9	9.8	8.1	33.0	-	17.8	43.5	25.7	
Vert.	154.128	QP	28.6	12.2	8.6	33.0	-	16.4	43.5	27.1	
Vert.	219.741	QP	28.1	10.5	9.2	33.0	-	14.8	46.0	31.2	
Vert.	306.408	QP	24.0	13.0	9.8	33.0	-	13.8	46.0	32.2	
Vert.	384.821	QP	29.0	14.9	10.3	33.0	-	21.2	46.0	24.8	
Vert.	569.820	QP	24.5	18.6	11.3	33.2	-	21.2	46.0	24.8	

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	0.12745	PK	102.2	19.1	-74.0	33.0	0.0	14.3	25.4	***11.1***	Fundamental (DC 14.0 V)
0deg	0.12745	PK	102.2	19.1	-74.0	33.0	0.0	14.3	25.4	***11.1***	Fundamental (DC 11.9 V)
0deg	0.12745	PK	102.2	19.1	-74.0	33.0	0.0	14.3	25.4	***11.1***	Fundamental (DC 16.1 V)
0deg	0.25490	PK	53.7	19.2	-64.3	33.0	0.0	-24.4	19.4	43.8	
0deg	0.38235	PK	63.3	19.3	-64.3	33.0	0.0	-14.7	15.9	30.6	

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	0.12745	PK	102.2	19.1	6.0	33.0	-	94.3	-	-	Fundamental

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 emission due to the input voltage.

Radiated Emission (Fundamental and Spurious Emission)

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	Large Chamber	Large Chamber
Date	January 30, 2024	January 31, 2024
Temperature / Humidity	24 deg. C / 40 % RH	25 deg. C / 30 % RH
Engineer	Tetsuro Yoshida (Below 30 MHz)	Tetsuro Yoshida (Below 30 MHz)
Mode	Tx FSK 127.19 kHz	

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	0.12719	PK	102.3	19.1	-74.0	33.0	-	14.4	45.5	31.1	Fundamental (DC 14.0 V)
0deg	0.12719	PK	102.3	19.1	-74.0	33.0	-	14.4	45.5	31.1	Fundamental (DC 11.9 V)
0deg	0.12719	PK	102.3	19.1	-74.0	33.0	-	14.4	45.5	31.1	Fundamental (DC 16.1 V)
0deg	0.25438	PK	53.6	19.2	-64.3	33.0	-	-24.5	39.5	64.0	
0deg	0.38157	PK	63.2	19.3	-64.3	33.0	-	-14.8	36.0	50.8	
0deg	0.50876	QP	26.5	19.3	-24.3	33.0	-	-11.5	33.5	45.0	
0deg	0.63595	QP	54.0	19.3	-24.3	33.0	-	16.0	31.5	15.5	
0deg	0.76314	QP	25.0	19.3	-24.3	33.0	-	-13.0	29.9	42.9	
0deg	0.89033	QP	48.7	19.3	-24.3	33.0	-	10.7	28.6	17.9	
0deg	1.01752	QP	25.4	19.3	-24.3	33.0	-	-12.6	27.4	40.0	
0deg	1.14471	QP	44.1	19.3	-24.3	33.0	-	6.1	26.4	20.3	
0deg	1.27190	QP	26.2	19.3	-24.3	33.0	-	-11.8	25.5	37.3	
Hori.	97.875	QP	28.4	9.8	8.1	33.0	-	13.3	43.5	30.2	
Hori.	154.128	QP	30.5	12.2	8.6	33.0	-	18.3	43.5	25.2	
Hori.	219.741	QP	30.2	10.5	9.2	33.0	-	16.9	46.0	29.1	
Hori.	306.408	QP	27.7	13.0	9.8	33.0	-	17.5	46.0	28.5	
Hori.	384.821	QP	31.1	14.9	10.3	33.0	-	23.3	46.0	22.7	
Hori.	569.820	QP	23.0	18.6	11.3	33.2	-	19.7	46.0	26.3	
Vert.	97.875	QP	33.0	9.8	8.1	33.0	-	17.9	43.5	25.6	
Vert.	154.128	QP	28.3	12.2	8.6	33.0	-	16.1	43.5	27.4	
Vert.	219.741	QP	28.3	10.5	9.2	33.0	-	15.0	46.0	31.0	
Vert.	306.408	QP	24.1	13.0	9.8	33.0	-	13.9	46.0	32.1	
Vert.	384.821	QP	29.1	14.9	10.3	33.0	-	21.3	46.0	24.7	
Vert.	569.820	QP	24.4	18.6	11.3	33.2	-	21.1	46.0	24.9	

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	0.12719	PK	102.3	19.1	-74.0	33.0	0.0	14.4	25.5	***11.1***	Fundamental (DC 14.0 V)
0deg	0.12719	PK	102.3	19.1	-74.0	33.0	0.0	14.4	25.5	***11.1***	Fundamental (DC 11.9 V)
0deg	0.12719	PK	102.3	19.1	-74.0	33.0	0.0	14.4	25.5	***11.1***	Fundamental (DC 16.1 V)
0deg	0.25438	PK	53.6	19.2	-64.3	33.0	0.0	-24.5	19.5	44.0	
0deg	0.38157	PK	63.2	19.3	-64.3	33.0	0.0	-14.8	16.0	30.8	

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	0.12719	PK	102.3	19.1	6.0	33.0	-	94.4	-	-	Fundamental

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 emission due to the input voltage.

Radiated Emission (Fundamental and Spurious Emission)

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	Large Chamber	Large Chamber
Date	January 30, 2024	January 31, 2024
Temperature / Humidity	24 deg. C / 40 % RH	25 deg. C / 30 % RH
Engineer	Tetsuro Yoshida (Below 30 MHz)	Tetsuro Yoshida (Below 30 MHz)
Mode	Tx FSK 126.70 kHz	

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	0.12670	PK	102.1	19.1	-74.0	33.0	-	14.2	45.5	31.3	Fundamental (DC 14.0 V)
0deg	0.12670	PK	102.1	19.1	-74.0	33.0	-	14.2	45.5	31.3	Fundamental (DC 11.9 V)
0deg	0.12670	PK	102.1	19.1	-74.0	33.0	-	14.2	45.5	31.3	Fundamental (DC 16.1 V)
0deg	0.25340	PK	53.6	19.2	-64.3	33.0	-	-24.5	39.5	64.0	
0deg	0.38010	PK	63.4	19.3	-64.3	33.0	-	-14.6	36.0	50.6	
0deg	0.50680	QP	26.2	19.3	-24.3	33.0	-	-11.8	33.5	45.3	
0deg	0.63350	QP	53.9	19.3	-24.3	33.0	-	15.9	31.6	15.7	
0deg	0.76020	QP	25.0	19.3	-24.3	33.0	-	-13.0	30.0	43.0	
0deg	0.88690	QP	48.8	19.3	-24.3	33.0	-	10.8	28.6	17.8	
0deg	1.01360	QP	25.1	19.3	-24.3	33.0	-	-12.9	27.5	40.4	
0deg	1.14030	QP	44.5	19.3	-24.3	33.0	-	6.5	26.4	19.9	
0deg	1.26700	QP	26.1	19.3	-24.3	33.0	-	-11.9	25.5	37.4	
Hori.	97.875	QP	28.8	9.8	8.1	33.0	-	13.7	43.5	29.8	
Hori.	154.128	QP	30.6	12.2	8.6	33.0	-	18.4	43.5	25.1	
Hori.	219.741	QP	30.2	10.5	9.2	33.0	-	16.9	46.0	29.1	
Hori.	306.408	QP	27.9	13.0	9.8	33.0	-	17.7	46.0	28.3	
Hori.	384.821	QP	31.0	14.9	10.3	33.0	-	23.2	46.0	22.8	
Hori.	569.820	QP	23.2	18.6	11.3	33.2	-	19.9	46.0	26.1	
Vert.	97.875	QP	32.9	9.8	8.1	33.0	-	17.8	43.5	25.7	
Vert.	154.128	QP	28.4	12.2	8.6	33.0	-	16.2	43.5	27.3	
Vert.	219.741	QP	28.3	10.5	9.2	33.0	-	15.0	46.0	31.0	
Vert.	306.408	QP	24.1	13.0	9.8	33.0	-	13.9	46.0	32.1	
Vert.	384.821	QP	29.0	14.9	10.3	33.0	-	21.2	46.0	24.8	
Vert.	569.820	QP	24.4	18.6	11.3	33.2	-	21.1	46.0	24.9	

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	0.12670	PK	102.1	19.1	-74.0	33.0	0.0	14.2	25.5	***11.3***	Fundamental (DC 14.0 V)
0deg	0.12670	PK	102.1	19.1	-74.0	33.0	0.0	14.2	25.5	***11.3***	Fundamental (DC 11.9 V)
0deg	0.12670	PK	102.1	19.1	-74.0	33.0	0.0	14.2	25.5	***11.3***	Fundamental (DC 16.1 V)
0deg	0.25340	PK	53.6	19.2	-64.3	33.0	0.0	-24.5	19.5	44.0	
0deg	0.38010	PK	63.4	19.3	-64.3	33.0	0.0	-14.6	16.0	30.6	

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	0.12670	PK	102.1	19.1	6.0	33.0	-	94.2	-	-	Fundamental

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 emission due to the input voltage.

Radiated Emission (Fundamental and Spurious Emission)

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	Large Chamber	Large Chamber
Date	January 30, 2024	January 31, 2024
Temperature / Humidity	24 deg. C / 40 % RH	25 deg. C / 30 % RH
Engineer	Tetsuro Yoshida (Below 30 MHz)	Tetsuro Yoshida (Below 30 MHz)
Mode	Tx FSK 125.73 kHz	

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	0.12573	PK	102.1	19.1	-74.0	33.0	-	14.2	45.6	31.4	Fundamental (DC 14.0 V)
0deg	0.12573	PK	102.1	19.1	-74.0	33.0	-	14.2	45.6	31.4	Fundamental (DC 11.9 V)
0deg	0.12573	PK	102.1	19.1	-74.0	33.0	-	14.2	45.6	31.4	Fundamental (DC 16.1 V)
0deg	0.25146	PK	53.5	19.2	-64.3	33.0	-	-24.6	39.6	64.2	
0deg	0.37719	PK	63.3	19.3	-64.3	33.0	-	-14.7	36.1	50.8	
0deg	0.50292	QP	26.2	19.3	-24.3	33.0	-	-11.8	33.6	45.4	
0deg	0.62865	QP	54.0	19.3	-24.3	33.0	-	16.0	31.6	15.6	
0deg	0.75438	QP	25.2	19.3	-24.3	33.0	-	-12.8	30.0	42.8	
0deg	0.88011	QP	48.7	19.3	-24.3	33.0	-	10.7	28.7	18.0	
0deg	1.00584	QP	25.1	19.3	-24.3	33.0	-	-12.9	27.5	40.4	
0deg	1.13157	QP	44.6	19.3	-24.3	33.0	-	6.6	26.5	19.9	
0deg	1.25730	QP	26.2	19.3	-24.3	33.0	-	-11.8	25.6	37.4	
Hori.	97.875	QP	28.6	9.8	8.1	33.0	-	13.5	43.5	30.0	
Hori.	154.128	QP	30.5	12.2	8.6	33.0	-	18.3	43.5	25.2	
Hori.	219.741	QP	30.2	10.5	9.2	33.0	-	16.9	46.0	29.1	
Hori.	306.408	QP	27.9	13.0	9.8	33.0	-	17.7	46.0	28.3	
Hori.	384.821	QP	31.1	14.9	10.3	33.0	-	23.3	46.0	22.7	
Hori.	569.820	QP	23.0	18.6	11.3	33.2	-	19.7	46.0	26.3	
Vert.	97.875	QP	32.9	9.8	8.1	33.0	-	17.8	43.5	25.7	
Vert.	154.128	QP	28.6	12.2	8.6	33.0	-	16.4	43.5	27.1	
Vert.	219.741	QP	28.3	10.5	9.2	33.0	-	15.0	46.0	31.0	
Vert.	306.408	QP	24.1	13.0	9.8	33.0	-	13.9	46.0	32.1	
Vert.	384.821	QP	28.9	14.9	10.3	33.0	-	21.1	46.0	24.9	
Vert.	569.820	QP	24.2	18.6	11.3	33.2	-	20.9	46.0	25.1	

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	0.12573	PK	102.1	19.1	-74.0	33.0	0.0	14.2	25.6	***11.4***	Fundamental (DC 14.0 V)
0deg	0.12573	PK	102.1	19.1	-74.0	33.0	0.0	14.2	25.6	***11.4***	Fundamental (DC 11.9 V)
0deg	0.12573	PK	102.1	19.1	-74.0	33.0	0.0	14.2	25.6	***11.4***	Fundamental (DC 16.1 V)
0deg	0.25146	PK	53.5	19.2	-64.3	33.0	0.0	-24.6	19.6	44.2	
0deg	0.37719	PK	63.3	19.3	-64.3	33.0	0.0	-14.7	16.1	30.8	

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	0.12573	PK	102.1	19.1	6.0	33.0	-	94.2	-	-	Fundamental

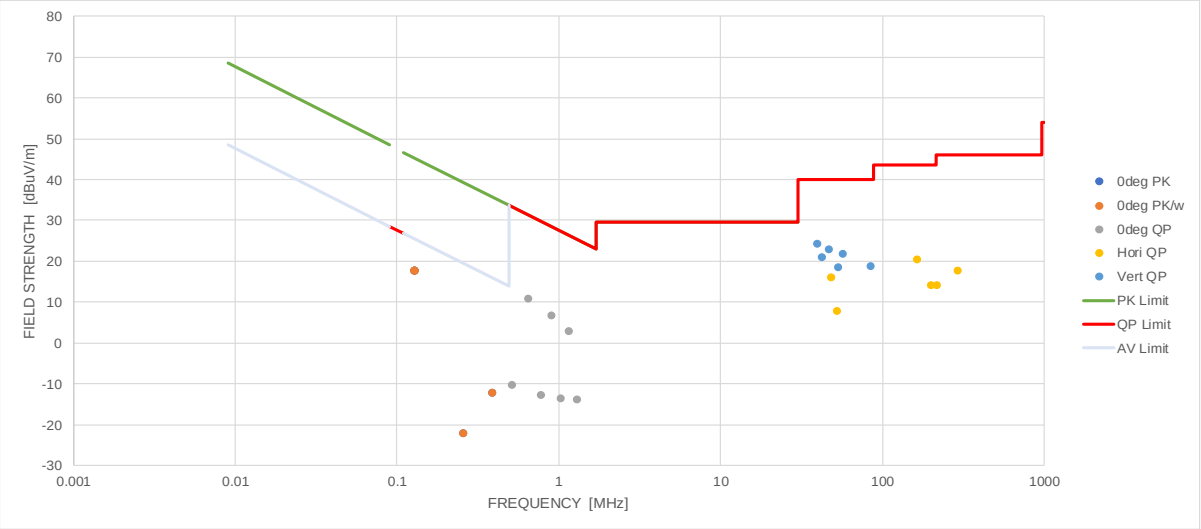
Result = Reading + Ant Factor + Loss (Cable+Attenuator) - Gain(Amprifier)

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 emission due to the input voltage.

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

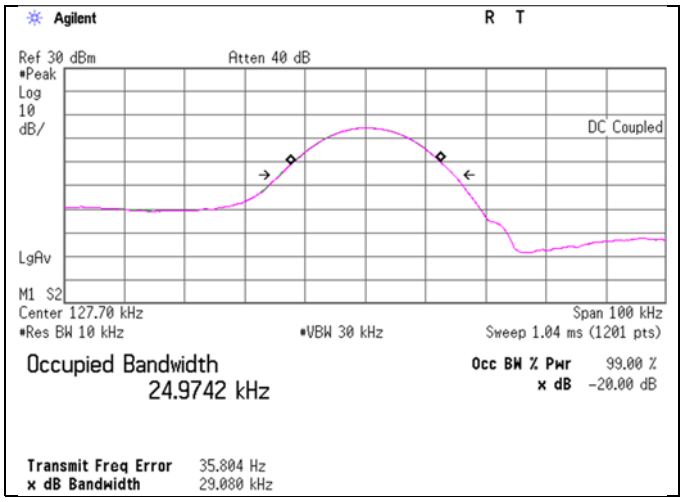
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	Large Chamber	Large Chamber
Date	January 29, 2024	January 31, 2024
Temperature / Humidity	24 deg. C / 40 % RH	25 deg. C / 30 % RH
Engineer	Tetsuro Yoshida (Below 30 MHz)	Tetsuro Yoshida (Below 30 MHz)
Mode	Tx 15 W 127.70 kHz	



-20 dB Bandwidth

Test place	Ise EMC Lab.
Measurement room	No.11
Date	February 6, 2024
Temperature / Humidity	20 deg. C / 46 % RH
Engineer	Takeshi Hiyaji
Mode	Tx 15 W 127.70 kHz

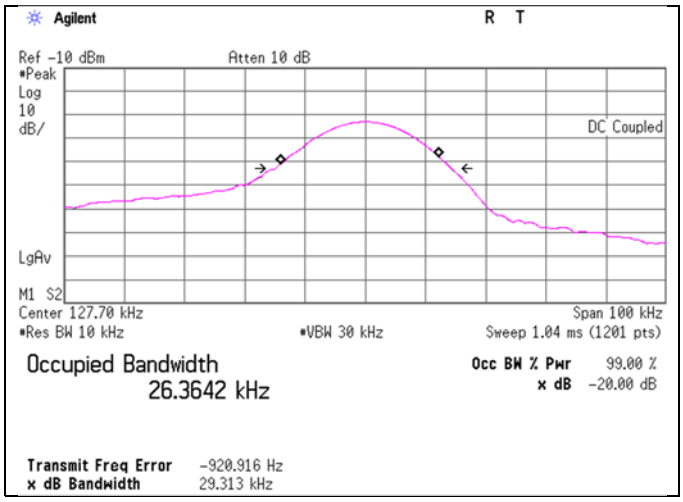
-20 dB Bandwidth [kHz]
29.080



-20 dB Bandwidth

Test place	Ise EMC Lab.
Measurement room	No.11
Date	February 6, 2024
Temperature / Humidity	20 deg. C / 46 % RH
Engineer	Takeshi Hiyaji
Mode	Tx 5 W 127.70 kHz

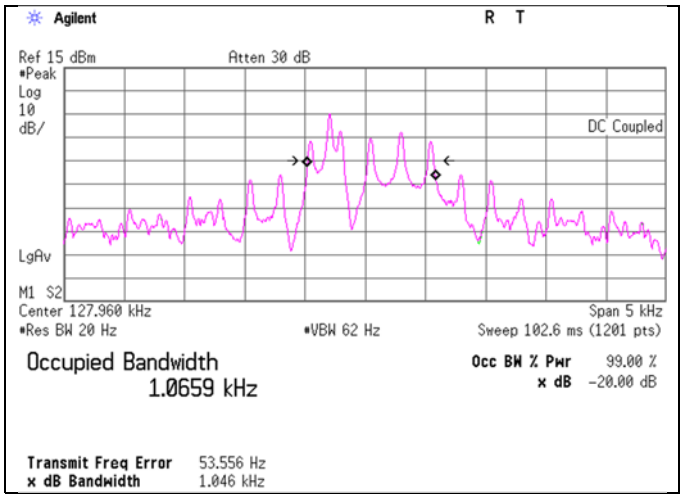
-20 dB Bandwidth [kHz]
29.313



-20 dB Bandwidth

Test place	Ise EMC Lab.
Measurement room	No.11
Date	February 6, 2024
Temperature / Humidity	20 deg. C / 46 % RH
Engineer	Takeshi Hiyaji
Mode	Tx FSK 127.96 kHz

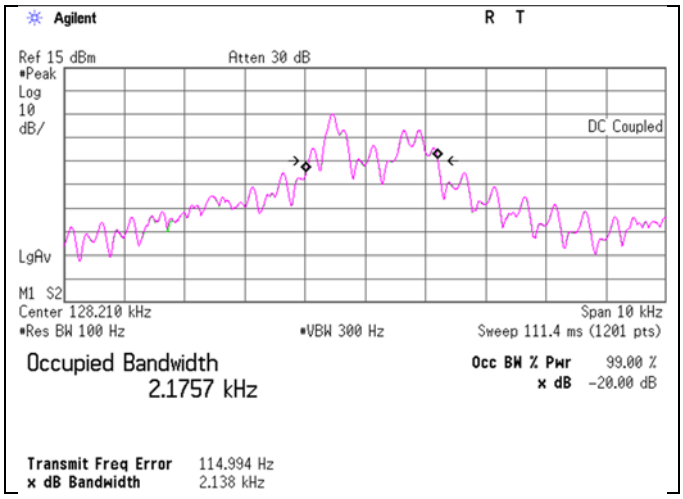
-20 dB Bandwidth [kHz]
1.046



-20 dB Bandwidth

Test place	Ise EMC Lab.
Measurement room	No.11
Date	February 6, 2024
Temperature / Humidity	20 deg. C / 46 % RH
Engineer	Takeshi Hiyaji
Mode	Tx FSK 128.21 kHz

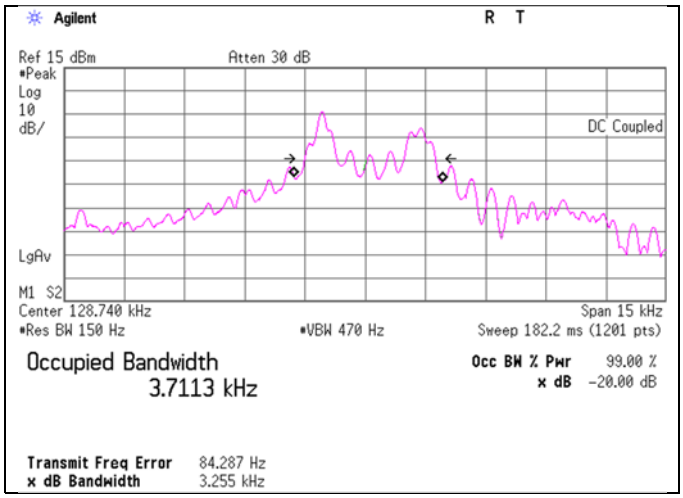
-20 dB Bandwidth [kHz]
2.138



-20 dB Bandwidth

Test place	Ise EMC Lab.
Measurement room	No.11
Date	February 6, 2024
Temperature / Humidity	20 deg. C / 46 % RH
Engineer	Takeshi Hiyaji
Mode	Tx FSK 128.74 kHz

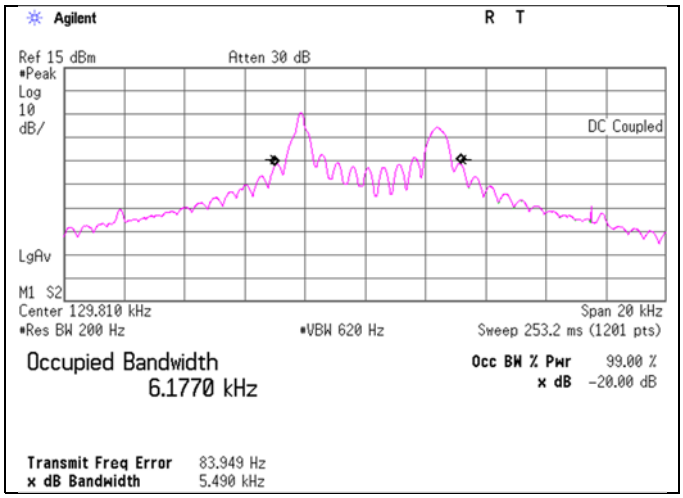
-20 dB Bandwidth [kHz]
3.255



-20 dB Bandwidth

Test place	Ise EMC Lab.
Measurement room	No.11
Date	February 6, 2024
Temperature / Humidity	20 deg. C / 46 % RH
Engineer	Takeshi Hiyaji
Mode	Tx FSK 129.81 kHz

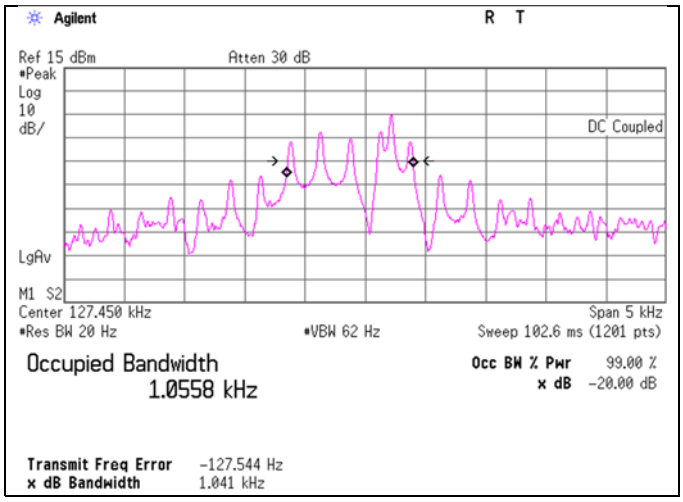
-20 dB Bandwidth [kHz]
5.490



-20 dB Bandwidth

Test place	Ise EMC Lab.
Measurement room	No.11
Date	February 6, 2024
Temperature / Humidity	20 deg. C / 46 % RH
Engineer	Takeshi Hiyaji
Mode	Tx FSK 127.45 kHz

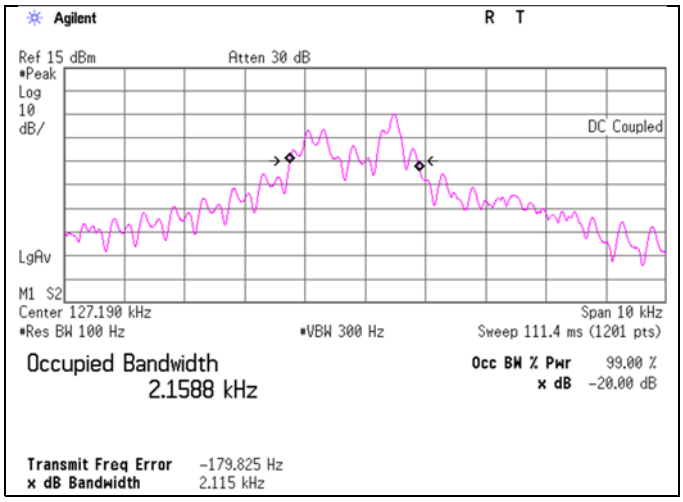
-20 dB Bandwidth [kHz]
1.041



-20 dB Bandwidth

Test place	Ise EMC Lab.
Measurement room	No.11
Date	February 6, 2024
Temperature / Humidity	20 deg. C / 46 % RH
Engineer	Takeshi Hiyaji
Mode	Tx FSK 127.19 kHz

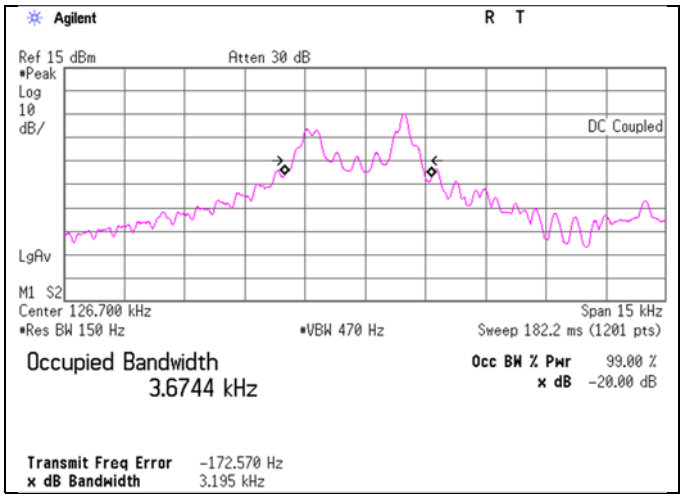
-20 dB Bandwidth [kHz]
2.115



-20 dB Bandwidth

Test place	Ise EMC Lab.
Measurement room	No.11
Date	February 6, 2024
Temperature / Humidity	20 deg. C / 46 % RH
Engineer	Takeshi Hiyaji
Mode	Tx FSK 126.70 kHz

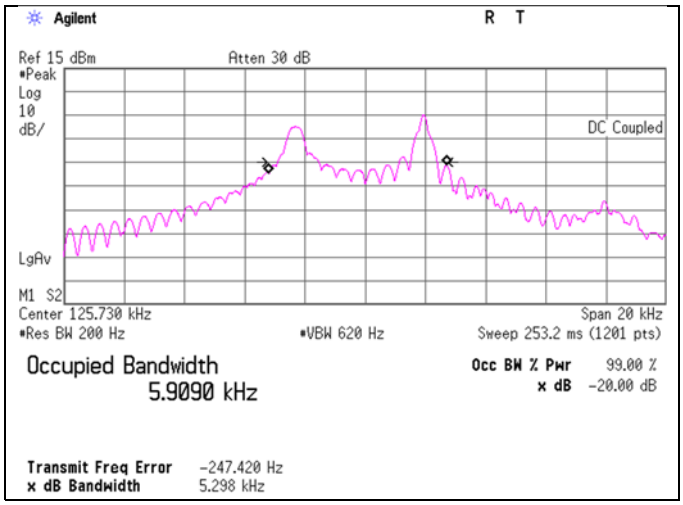
-20 dB Bandwidth [kHz]
3.195



-20 dB Bandwidth

Test place	Ise EMC Lab.
Measurement room	No.11
Date	February 6, 2024
Temperature / Humidity	20 deg. C / 46 % RH
Engineer	Takeshi Hiyaji
Mode	Tx FSK 125.73 kHz

-20 dB Bandwidth [kHz]
5.298



APPENDIX 2: Test instruments

Test equipment

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	199242	Semi-Anechoic Chamber	Riken Environmental System	Large Chamber	1	2023/02/09	24
RE	221241	Thermo-Hygrometer	Mother tool	MHB-382SD	55534	2023/07/26	12
RE	199240	EMI Test Receiver	Rohde & Schwarz	ESW44	101914	2023/02/15	12
RE	146966	Loop Antenna	Rohde & Schwarz	HFH2-Z2	829425/014	2023/06/19	12
RE	199050	Attenuator(6dB)	Anritsu Corporation	BW-N6W5+	1926	2023/11/15	12
RE	199211	Microwave Cable	Huber+Suhner	S04272B/RFM-E721/ RG223/Sucofeed/SF106	-	2023/11/20	12
RE	198470	Broadband Amplifier	SONOMA	310N	400557	2023/01/12	12
RE	141295	High Pass Filter 0.15-30MHz	Rohde & Schwarz	EZ-25/3	100041	2023/02/01	12
RE	144194	Test Receiver	Rohde & Schwarz	ESCI	100601	2023/09/11	12
RE	199476	Biconical antenna	Schwarzbeck Mess-Elektronik OHG	VHBB9124+BBA9106	01410	2023/05/16	12
RE	199477	Logperiodic antenna	Schwarzbeck Mess-Elektronik OHG	VULP9118A	00831	2023/05/16	12
AT	141902	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46187105	2023/05/23	12
AT	202511	Loop Antenna	UL Japan	-	-	-	-

***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