

RADIO TEST REPORT

Test Report No. 15702455H-A-R1

Customer	NIDEC MOBILITY CORPORATION
Description of EUT	Body Control Module
Model Number of EUT	K84S0
FCC ID	OUCK84S0
Test Regulation	FCC Part 15 Subpart C
Test Result	Complied
Issue Date	April 22, 2025
Remarks	-

Representative test engineer



Yuichiro Yamazaki
Engineer

Approved by



Akihiko Maeda
Leader



CERTIFICATE 5107.02

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REVISION HISTORY

Original Test Report No. 15702455H-A

This report is a revised version of 15702455H-A. 15702455H-A is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	15702455H-A	March 25, 2025	-
1	15702455H-A-R1	April 22, 2025	Section 2.2 Radio Specification [Receiver part] -Added IF frequency. Section 2.2 -Added Antenna Information. "This EUT has ... (omit) installed in any combination." Section 4.1 - Modified explanatory note under the table. "The EUT has ... (omit) with System 1 as representative." → *The test was performed with representative antennas.

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	Comité International Special des Perturbations Radioélectriques	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	Quadrature 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	NIDEC MOBILITY CORPORATION
Address	6368, Nenjozaka, Okusa, Komaki, Aichi, 485-0802, Japan
Telephone Number	+81-568-78-6159
Contact Person	Takashi Betsui

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	Body Control Module
Model Number	K84S0
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	February 21, 2025
Test Date	February 25, 2025

2.2 Product Description

General Specification

Rating	DC 12 V
Operating temperature	Except Antennas: -40 deg. C to 85 deg. C Antennas: -40 deg. C to 90 deg. C

Radio Specification

[Transmitter part]

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

[Receiver part] *1)

Equipment Type	Receiver
Frequency of Operation	433.92 MHz
IF frequency	274 kHz (Upper heterodyne)

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

This EUT has 5 antenna ports (DR, AS, INF, INR, TG).

The antennas attached to these antenna ports are following;

[Antenna Type]

LF Antenna (Type B, YB)
LF antenna (Type 1, Y1, G, G-2, YG, YG-2, E, E-2)
LF antenna (Type 3, Y3)
LF antenna (Type 2-2, Y2-2)
LF antenna (Type H, YH)
LF antenna (Type 2, Y2, 2-3, Y2-3)

Each vehicle can be fitted with five antennas, but they can be installed in any combination.

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 8.2 RSS-Gen 8.9	1.6 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 8.3 RSS-Gen 8.9	0.3 dB 40.119 MHz, Vertical, 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)

This EUT provides stable voltage constantly to RF Parts regardless of input voltage. 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 vehicle. 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	RSS-Gen 6.7	-	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	5.0
		Vertical	5.0
	200 MHz to 1000 MHz	Horizontal	5.2
		Vertical	6.2
10 m	30 MHz to 200 MHz	Horizontal	5.5
		Vertical	5.4
	200 MHz to 1000 MHz	Horizontal	5.5
		Vertical	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

-20 dB Bandwidth and 99% Occupied 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.

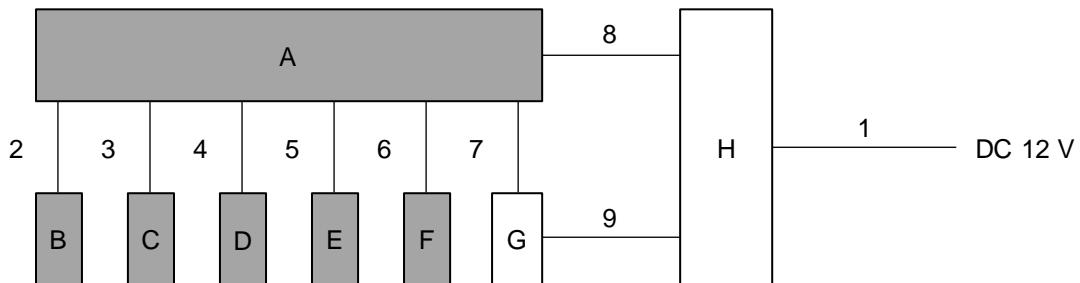
SECTION 4: Operation of EUT during testing

4.1. Operating Mode(s)

Test mode	Remarks
1) Continuous Transmitting mode (AND)	-
2) Continuous Transmitting mode (ANA)	-
3) Continuous Transmitting mode (ANI)	-
4) Continuous Transmitting mode (ANL)	-
5) Continuous Transmitting mode (ANB)	-

*Power of the EUT was set by the software as follows;
Software: F1090241
(Date: February 18, 2025, 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.
*The test was performed with representative antennas.

4.2 Configuration and Peripherals



- * Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.
- * The input voltage (DC 12 V) passes through Item No. H without affecting it and is supplied to the Body Control Module (Item No. A) without any drop in voltage.
- * The EUT does not transmit simultaneously from multiple antennas.
- * Antenna was evaluated with the worst duty respectively.
- * The EUT was set to transmit the data continuously from one antenna as a worst case, not to transmit it randomly from each antenna.

Description of EUT and Support Equipment

No.	Item	Model number	Serial Number	Manufacturer	Remark
A	Body Control Module	K84S0	BCM No.1	NIDEC MOBILITY CORPORATION	EUT
B	LF Antenna-1 (TYPE 1)	CGF-S002-D01	001	NIDEC MOBILITY CORPORATION	EUT, AND
C	LF Antenna-2 (TYPE 1)	CGF-S002-D01	002	NIDEC MOBILITY CORPORATION	EUT, ANA
D	LF Antenna-3 (TYPE 3)	CGF-S002-D03	003	NIDEC MOBILITY CORPORATION	EUT, ANI
E	LF Antenna-4 (TYPE 3)	CGF-S002-D03	004	NIDEC MOBILITY CORPORATION	EUT, ANL
F	LF Antenna-5 (TYPE 1)	CGF-S002-D01	005	NIDEC MOBILITY CORPORATION	EUT, ANB
G	PUSH START SWITCH	P55R0	2754H1	NIDEC MOBILITY CORPORATION	-
H	Jig Board	-	No.1	NIDEC MOBILITY CORPORATION	-

List of Cables Used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC Cable	1.9	Unshielded	Unshielded	-
2	Antenna Cable	2.1	Unshielded	Unshielded	AND Port
3	Antenna Cable	2.1	Unshielded	Unshielded	ANA Port
4	Antenna Cable	2.1	Unshielded	Unshielded	ANI Port
5	Antenna Cable	1.9	Unshielded	Unshielded	ANL Port
6	Antenna Cable	1.9	Unshielded	Unshielded	ANB Port
7	Antenna Cable	2.0	Unshielded	Unshielded	-
8	DC and Signal Cable	2.0	Unshielded	Unshielded	-
9	Signal Cable	2.0	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: $40 \times \log (3 \text{ m} / 300 \text{ m}) = -80 \text{ dB}$

*2) Distance Factor: $40 \times \log (3 \text{ m} / 30 \text{ m}) = -40 \text{ dB}$

Figure 1: Test Setup

Below 1 GHz

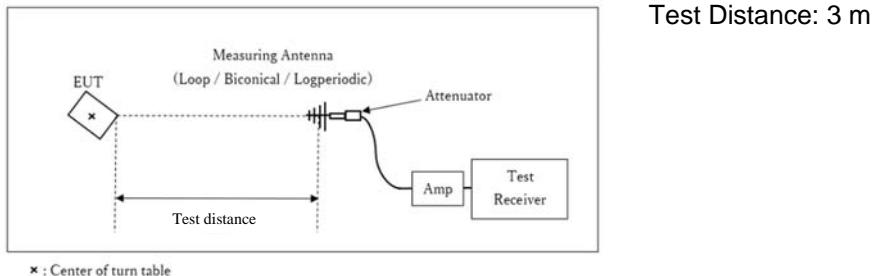
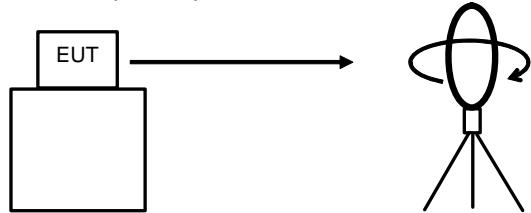
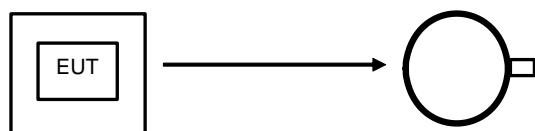


Figure 2: Direction of the Loop Antenna

Side View (Vertical)

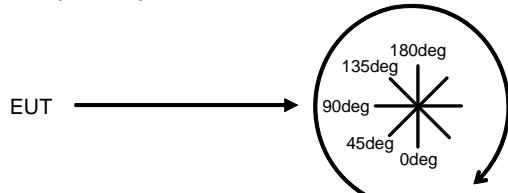


Top View (Horizontal)



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 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

Test data : APPENDIX
Test result : Pass

SECTION 7: 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
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.1
Date	February 25, 2025
Temperature / Humidity	18 deg. C / 37 % RH
Engineer	20 deg. C / 40 % RH
Mode	Yuichiro Yamazaki
	Tetsuro Yoshida
	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	111.0	19.2	-74.0	32.3	-	23.9	45.6	21.7	Fundamental
0deg	0.25000	PK	45.3	19.5	-64.2	32.3	-	-31.7	39.6	71.3	
0deg	0.37500	PK	43.5	19.5	-64.3	32.3	-	-33.6	36.1	69.7	
0deg	0.50000	QP	25.7	19.5	-24.3	32.3	-	-11.4	33.6	45.0	
0deg	0.62500	QP	24.8	19.5	-24.2	32.3	-	-12.2	31.7	43.9	
0deg	0.75000	QP	23.1	19.5	-24.2	32.3	-	-13.9	30.1	44.0	Floor Noise
0deg	0.87500	QP	22.9	19.5	-24.2	32.3	-	-14.1	28.7	42.8	Floor Noise
0deg	1.00000	QP	22.6	19.5	-24.2	32.3	-	-14.4	27.6	42.0	Floor Noise
0deg	1.12500	QP	22.3	19.5	-24.2	32.3	-	-14.7	26.5	41.2	Floor Noise
0deg	1.25000	QP	22.3	19.6	-24.2	32.3	-	-14.6	25.6	40.2	Floor Noise
Hori.	35.946	QP	38.0	16.3	7.4	38.9	-	22.8	40.0	17.2	
Hori.	40.346	QP	39.3	14.6	7.5	38.9	-	22.5	40.0	17.5	
Hori.	95.718	QP	49.9	9.4	8.4	38.9	-	28.8	43.5	14.7	
Hori.	107.976	QP	47.3	11.2	8.5	39.0	-	28.0	43.5	15.5	
Hori.	156.965	QP	40.2	15.3	9.1	39.0	-	25.6	43.5	17.9	
Hori.	308.675	QP	50.0	13.8	10.6	38.7	-	35.7	46.0	10.3	
Vert.	35.980	QP	48.2	16.3	7.4	38.9	-	33.0	40.0	7.0	
Vert.	40.046	QP	49.4	14.7	7.5	38.9	-	32.7	40.0	7.3	
Vert.	95.718	QP	51.0	9.4	8.4	38.9	-	29.9	43.5	13.6	
Vert.	107.976	QP	48.5	11.2	8.5	39.0	-	29.2	43.5	14.3	
Vert.	156.757	QP	48.1	15.3	9.1	39.0	-	33.5	43.5	10.0	
Vert.	201.263	QP	45.2	11.8	9.6	39.0	-	27.6	43.5	15.9	

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

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	111.0	19.2	-74.0	32.3	0.0	23.9	25.6	1.7	Fundamental
0deg	0.25000	PK	45.3	19.5	-64.2	32.3	0.0	-31.7	19.6	51.3	
0deg	0.37500	PK	43.5	19.5	-64.3	32.3	0.0	-33.6	16.1	49.7	

Result = Reading + Ant Factor + Loss (Cable + Attenuator + Filter + D.Factor) - Gain(Amplifier) + 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	111.0	19.2	6.0	32.3	-	103.9	-	-	Fundamental

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

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).

Radiated Emission (Fundamental and Spurious Emission)

Test place Ise EMC Lab.
 Semi Anechoic Chamber No.1
 Date February 25, 2025
 Temperature / Humidity 18 deg. C / 37 % RH
 Engineer Yuichiro Yamazaki
 Mode Mode 2
 20 deg. C / 40 % RH
 Tetsuro Yoshida

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	111.0	19.2	-74.0	32.3	-	23.9	45.6	21.7	Fundamental
0deg	0.25000	PK	47.7	19.5	-64.2	32.3	-	-29.3	39.6	68.9	
0deg	0.37500	PK	42.2	19.5	-64.3	32.3	-	-34.9	36.1	71.0	
0deg	0.50000	QP	25.7	19.5	-24.3	32.3	-	-11.4	33.6	45.0	
0deg	0.62500	QP	24.6	19.5	-24.2	32.3	-	-12.4	31.7	44.1	
0deg	0.75000	QP	23.1	19.5	-24.2	32.3	-	-13.9	30.1	44.0	Floor Noise
0deg	0.87500	QP	22.9	19.5	-24.2	32.3	-	-14.1	28.7	42.8	Floor Noise
0deg	1.00000	QP	22.7	19.5	-24.2	32.3	-	-14.3	27.6	41.9	Floor Noise
0deg	1.12500	QP	22.3	19.5	-24.2	32.3	-	-14.7	26.5	41.2	Floor Noise
0deg	1.25000	QP	22.2	19.6	-24.2	32.3	-	-14.7	25.6	40.3	Floor Noise
Hori.	35.973	QP	36.8	16.3	7.4	38.9	-	21.6	40.0	18.4	
Hori.	40.153	QP	46.3	14.7	7.5	38.9	-	29.6	40.0	10.4	
Hori.	95.718	QP	51.2	9.4	8.4	38.9	-	30.1	43.5	13.4	
Hori.	107.976	QP	47.3	11.2	8.5	39.0	-	28.0	43.5	15.5	
Hori.	156.955	QP	40.5	15.3	9.1	39.0	-	25.9	43.5	17.6	
Hori.	308.922	QP	50.7	13.8	10.6	38.7	-	36.4	46.0	9.6	
Vert.	35.980	QP	49.0	16.3	7.4	38.9	-	33.8	40.0	6.2	
Vert.	40.119	QP	56.4	14.7	7.5	38.9	-	39.7	40.0	0.3	
Vert.	95.718	QP	51.9	9.4	8.4	38.9	-	30.8	43.5	12.7	
Vert.	107.976	QP	48.5	11.2	8.5	39.0	-	29.2	43.5	14.3	
Vert.	156.717	QP	48.2	15.3	9.1	39.0	-	33.6	43.5	9.9	
Vert.	201.952	QP	45.1	11.7	9.6	39.0	-	27.4	43.5	16.1	

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

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	111.0	19.2	-74.0	32.3	0.0	23.9	25.6	1.7	Fundamental
0deg	0.25000	PK	47.7	19.5	-64.2	32.3	0.0	-29.3	19.6	48.9	
0deg	0.37500	PK	42.2	19.5	-64.3	32.3	0.0	-34.9	16.1	51.0	

Result = Reading + Ant Factor + Loss (Cable + Attenuator + Filter + D.Factor) - Gain(Amplifier) + 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	111.0	19.2	6.0	32.3	-	103.9	-	-	Fundamental

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

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).

Radiated Emission (Fundamental and Spurious Emission)

Test place Ise EMC Lab.
 Semi Anechoic Chamber No.1
 Date February 25, 2025
 Temperature / Humidity 18 deg. C / 37 % RH
 Engineer Yuichiro Yamazaki
 Mode Mode 3
 20 deg. C / 40 % RH
 Tetsuro Yoshida

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	111.0	19.2	-74.0	32.3	-	23.9	45.6	21.7	Fundamental
0deg	0.25000	PK	44.6	19.5	-64.2	32.3	-	-32.4	39.6	72.0	
0deg	0.37500	PK	45.4	19.5	-64.3	32.3	-	-31.7	36.1	67.8	
0deg	0.50000	QP	26.0	19.5	-24.3	32.3	-	-11.1	33.6	44.7	
0deg	0.62500	QP	24.8	19.5	-24.2	32.3	-	-12.2	31.7	43.9	
0deg	0.75000	QP	23.1	19.5	-24.2	32.3	-	-13.9	30.1	44.0	Floor Noise
0deg	0.87500	QP	22.9	19.5	-24.2	32.3	-	-14.1	28.7	42.8	Floor Noise
0deg	1.00000	QP	22.6	19.5	-24.2	32.3	-	-14.4	27.6	42.0	Floor Noise
0deg	1.12500	QP	22.3	19.5	-24.2	32.3	-	-14.7	26.5	41.2	Floor Noise
0deg	1.25000	QP	22.4	19.6	-24.2	32.3	-	-14.5	25.6	40.1	Floor Noise
Hori.	35.748	QP	37.6	16.3	7.4	38.9	-	22.4	40.0	17.6	
Hori.	40.242	QP	38.7	14.6	7.5	38.9	-	21.9	40.0	18.1	
Hori.	95.765	QP	49.3	9.4	8.4	38.9	-	28.2	43.5	15.3	
Hori.	107.976	QP	46.9	11.2	8.5	39.0	-	27.6	43.5	15.9	
Hori.	156.968	QP	41.3	15.3	9.1	39.0	-	26.7	43.5	16.8	
Hori.	308.927	QP	50.6	13.8	10.6	38.7	-	36.3	46.0	9.7	
Vert.	35.368	QP	54.3	16.5	7.4	38.9	-	39.3	40.0	0.7	
Vert.	40.200	QP	51.3	14.6	7.5	38.9	-	34.5	40.0	5.5	
Vert.	95.743	QP	49.9	9.4	8.4	38.9	-	28.8	43.5	14.7	
Vert.	107.976	QP	48.3	11.2	8.5	39.0	-	29.0	43.5	14.5	
Vert.	156.712	QP	48.6	15.3	9.1	39.0	-	34.0	43.5	9.5	
Vert.	201.952	QP	49.9	11.7	9.6	39.0	-	32.2	43.5	11.3	

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

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	111.0	19.2	-74.0	32.3	0.0	23.9	25.6	1.7	Fundamental
0deg	0.25000	PK	44.6	19.5	-64.2	32.3	0.0	-32.4	19.6	52.0	
0deg	0.37500	PK	45.4	19.5	-64.3	32.3	0.0	-31.7	16.1	47.8	

Result = Reading + Ant Factor + Loss (Cable + Attenuator + Filter + D.Factor) - Gain(Amplifier) + 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	111.0	19.2	6.0	32.3	-	103.9	-	-	Fundamental

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

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).

Radiated Emission (Fundamental and Spurious Emission)

Test place Ise EMC Lab.
 Semi Anechoic Chamber No.1
 Date February 25, 2025
 Temperature / Humidity 18 deg. C / 37 % RH
 Engineer Yuichiro Yamazaki
 Mode Mode 4
 20 deg. C / 40 % RH
 Tetsuro Yoshida

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	111.0	19.2	-74.0	32.3	-	23.9	45.6	21.7	Fundamental
0deg	0.25000	PK	44.5	19.5	-64.2	32.3	-	-32.5	39.6	72.1	
0deg	0.37500	PK	45.3	19.5	-64.3	32.3	-	-31.8	36.1	67.9	
0deg	0.50000	QP	26.0	19.5	-24.3	32.3	-	-11.1	33.6	44.7	
0deg	0.62500	QP	24.7	19.5	-24.2	32.3	-	-12.3	31.7	44.0	
0deg	0.75000	QP	23.0	19.5	-24.2	32.3	-	-14.0	30.1	44.1	Floor Noise
0deg	0.87500	QP	22.9	19.5	-24.2	32.3	-	-14.1	28.7	42.8	Floor Noise
0deg	1.00000	QP	22.7	19.5	-24.2	32.3	-	-14.3	27.6	41.9	Floor Noise
0deg	1.12500	QP	22.3	19.5	-24.2	32.3	-	-14.7	26.5	41.2	Floor Noise
0deg	1.25000	QP	22.3	19.6	-24.2	32.3	-	-14.6	25.6	40.2	Floor Noise
Hori.	35.721	QP	34.3	16.3	7.4	38.9	-	19.1	40.0	20.9	
Hori.	40.242	QP	38.1	14.6	7.5	38.9	-	21.3	40.0	18.7	
Hori.	95.765	QP	49.0	9.4	8.4	38.9	-	27.9	43.5	15.6	
Hori.	107.976	QP	47.1	11.2	8.5	39.0	-	27.8	43.5	15.7	
Hori.	156.968	QP	41.0	15.3	9.1	39.0	-	26.4	43.5	17.1	
Hori.	308.927	QP	50.2	13.8	10.6	38.7	-	35.9	46.0	10.1	
Vert.	35.352	QP	47.5	16.5	7.4	38.9	-	32.5	40.0	7.5	
Vert.	40.232	QP	49.2	14.6	7.5	38.9	-	32.4	40.0	7.6	
Vert.	95.745	QP	49.4	9.4	8.4	38.9	-	28.3	43.5	15.2	
Vert.	107.976	QP	48.5	11.2	8.5	39.0	-	29.2	43.5	14.3	
Vert.	156.735	QP	48.7	15.3	9.1	39.0	-	34.1	43.5	9.4	
Vert.	201.963	QP	45.3	11.7	9.6	39.0	-	27.6	43.5	15.9	

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

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	111.0	19.2	-74.0	32.3	0.0	23.9	25.6	1.7	Fundamental
0deg	0.25000	PK	44.5	19.5	-64.2	32.3	0.0	-32.5	19.6	52.1	
0deg	0.37500	PK	45.3	19.5	-64.3	32.3	0.0	-31.8	16.1	47.9	

Result = Reading + Ant Factor + Loss (Cable + Attenuator + Filter + D.Factor) - Gain(Amplifier) + 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	111.0	19.2	6.0	32.3	-	103.9	-	-	Fundamental

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

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).

Radiated Emission (Fundamental and Spurious Emission)

Test place Ise EMC Lab.
 Semi Anechoic Chamber No.1
 Date February 25, 2025
 Temperature / Humidity 18 deg. C / 37 % RH
 Engineer Yuichiro Yamazaki
 Mode Mode 5
 20 deg. C / 40 % RH
 Tetsuro Yoshida

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	111.1	19.2	-74.0	32.3	-	24.0	45.6	21.6	Fundamental
0deg	0.25000	PK	45.2	19.5	-64.2	32.3	-	-31.8	39.6	71.4	
0deg	0.37500	PK	45.3	19.5	-64.3	32.3	-	-31.8	36.1	67.9	
0deg	0.50000	QP	26.0	19.5	-24.3	32.3	-	-11.1	33.6	44.7	
0deg	0.62500	QP	24.7	19.5	-24.2	32.3	-	-12.3	31.7	44.0	
0deg	0.75000	QP	23.1	19.5	-24.2	32.3	-	-13.9	30.1	44.0	Floor Noise
0deg	0.87500	QP	23.0	19.5	-24.2	32.3	-	-14.0	28.7	42.7	Floor Noise
0deg	1.00000	QP	22.6	19.5	-24.2	32.3	-	-14.4	27.6	42.0	Floor Noise
0deg	1.12500	QP	22.4	19.5	-24.2	32.3	-	-14.6	26.5	41.1	Floor Noise
0deg	1.25000	QP	22.3	19.6	-24.2	32.3	-	-14.6	25.6	40.2	Floor Noise
Hori.	35.946	QP	36.1	16.3	7.4	38.9	-	20.9	40.0	19.1	
Hori.	44.263	QP	41.3	13.2	7.5	38.9	-	23.1	40.0	16.9	
Hori.	95.718	QP	51.1	9.4	8.4	38.9	-	30.0	43.5	13.5	
Hori.	107.976	QP	47.6	11.2	8.5	39.0	-	28.3	43.5	15.2	
Hori.	156.965	QP	40.2	15.3	9.1	39.0	-	25.6	43.5	17.9	
Hori.	308.984	QP	50.5	13.8	10.6	38.7	-	36.2	46.0	9.8	
Vert.	35.980	QP	48.5	16.3	7.4	38.9	-	33.3	40.0	6.7	
Vert.	44.003	QP	52.4	13.3	7.5	38.9	-	34.3	40.0	5.7	
Vert.	95.718	QP	51.2	9.4	8.4	38.9	-	30.1	43.5	13.4	
Vert.	107.976	QP	48.3	11.2	8.5	39.0	-	29.0	43.5	14.5	
Vert.	156.757	QP	48.2	15.3	9.1	39.0	-	33.6	43.5	9.9	
Vert.	248.329	QP	43.6	11.8	10.0	38.9	-	26.5	46.0	19.5	

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

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	111.1	19.2	-74.0	32.3	0.0	24.0	25.6	1.6	Fundamental
0deg	0.25000	PK	45.2	19.5	-64.2	32.3	0.0	-31.8	19.6	51.4	
0deg	0.37500	PK	45.3	19.5	-64.3	32.3	0.0	-31.8	16.1	47.9	

Result = Reading + Ant Factor + Loss (Cable + Attenuator + Filter + D.Factor) - Gain(Amplifier) + 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	111.1	19.2	6.0	32.3	-	104.0	-	-	Fundamental

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

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.

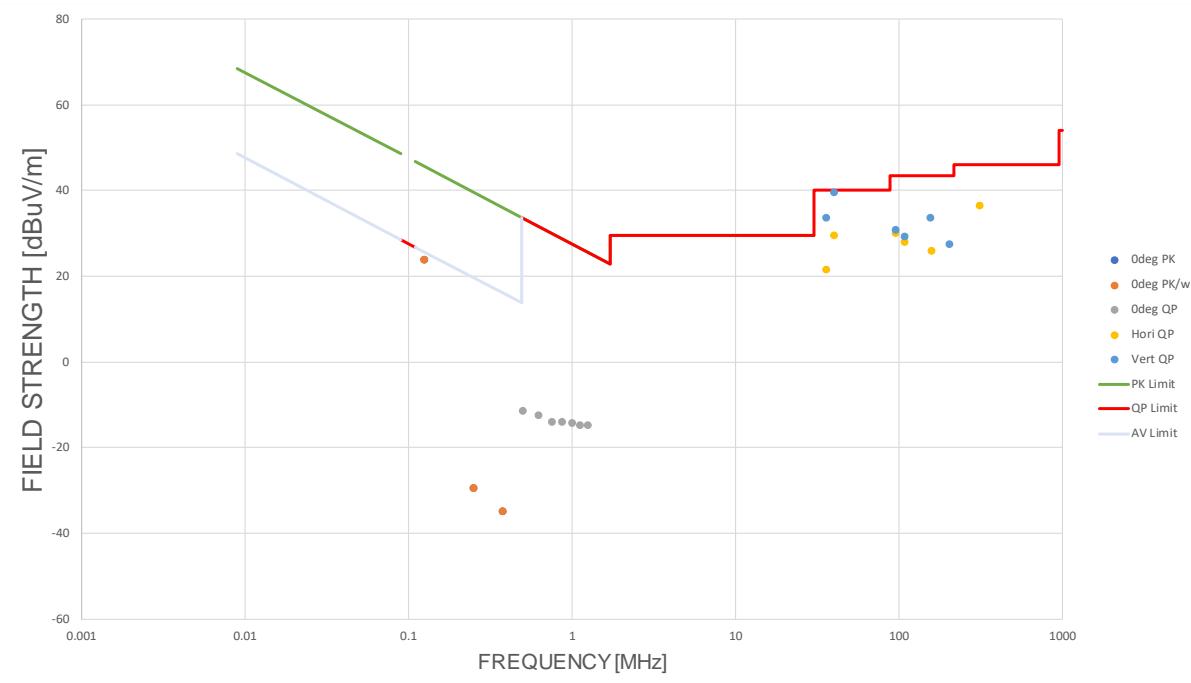
Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

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

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer
Mode

Ise EMC Lab.
No.1
February 25, 2025
18 deg. C / 37 % RH
Yuichiro Yamazaki
Mode 2

No.1
February 25, 2025
20 deg. C / 40 % RH
Tetsuro Yoshida



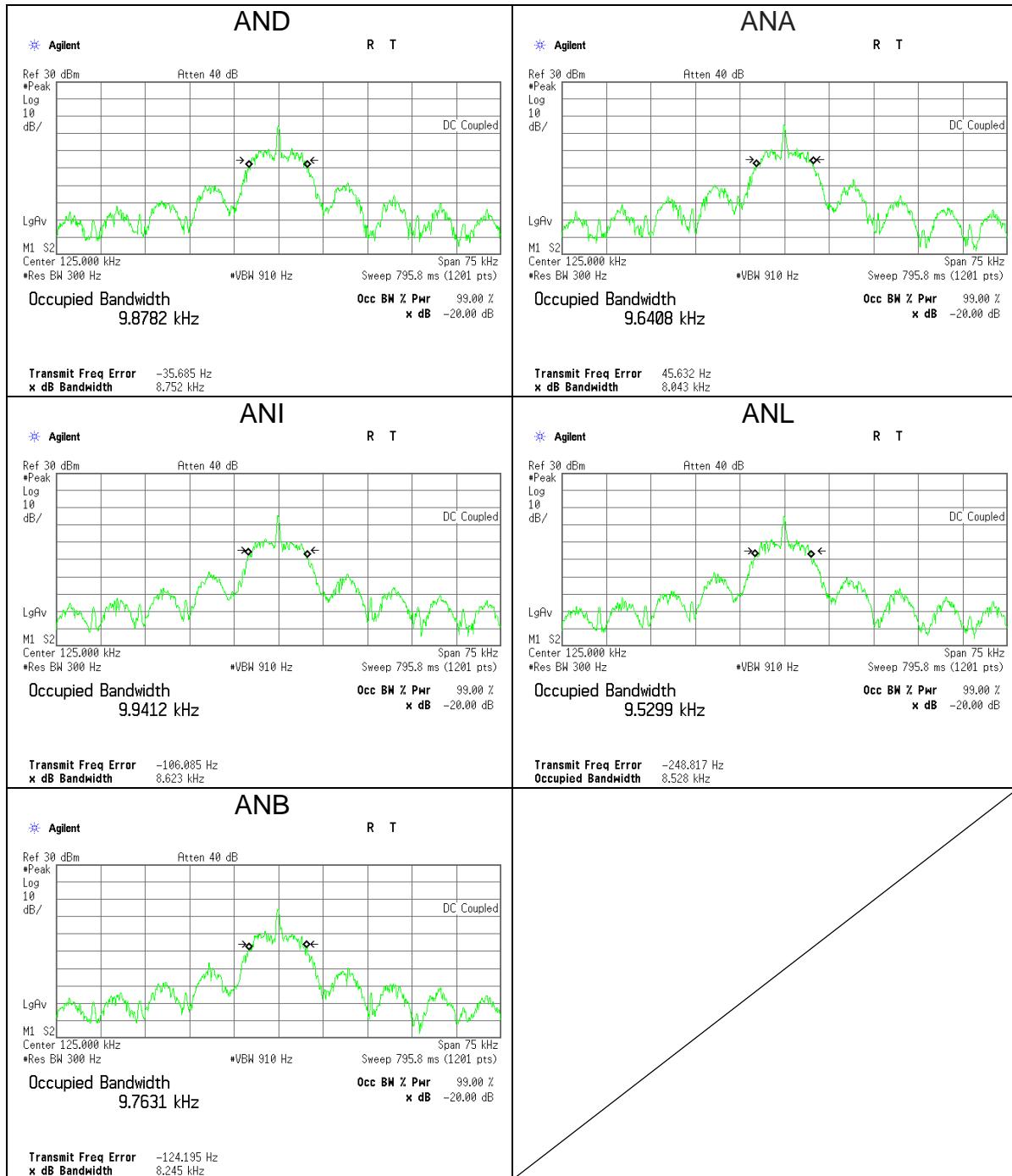
-20 dB Bandwidth / 99 % emission bandwidth

Test place Ise EMC Lab.
Semi Anechoic Chamber No.1
Date February 25, 2025
Temperature / Humidity 18 deg. C / 37 % RH
Engineer Yuichiro Yamazaki
Mode Mode 1 to Mode 5

Mode	Antenna	-20 dB Bandwidth [kHz]	99 % emission bandwidth [kHz]
1	AND	8.752	9.8782
2	ANA	8.043	9.6408
3	ANI	8.623	9.9412
4	ANL	8.528	9.5299
5	ANB	8.245	9.7631

-20 dB Bandwidth / 99 % emission bandwidth

Test place Ise EMC Lab.
Semi Anechoic Chamber No.1
Date February 25, 2025
Temperature / Humidity 18 deg. C / 37 % RH
Engineer Yuichiro Yamazaki
Mode Mode 1 to Mode 5



APPENDIX 2: Test instruments

Test Equipment

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	141198	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103+BBA9106	2513	07/10/2024	12
RE	141213	Attenuator(6dB)	Weinschel Corp	2	BK7971	11/11/2024	12
RE	141215	Coaxial Cable	Fujikura/Suhner/TSJ	5D-2W/3D-2W/RG400u/RFM-E421(SW)	-/01068 (Switcher)	06/24/2024	12
RE	141295	High Pass Filter 0.15-30MHz	Rohde & Schwarz	EZ-25/3	100041	02/14/2025	12
RE	141350	Coaxial Cable	Suhner/storm/Agilent/TSJ	-	-	03/05/2024	12
RE	141530	Digital Tester	Fluke Corporation	FLUKE 26-3	78030621	02/01/2024	12
RE	141568	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	2901	01/19/2025	12
RE	141582	Pre Amplifier	SONOMA INSTRUMENT	310	260834	02/14/2025	12
RE	141585	Pre Amplifier	L3 Narda-MITEQ	MLA-10K01-B01-35	1237616	02/17/2024	12
RE	141901	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY48250080	02/04/2025	12
RE	141950	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	11/28/2024	12
RE	141998	AC1_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	12/06/2023	24
RE	142226	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
RE	146613	Loop Antenna	Rohde & Schwarz	HFH2-Z2	842906/011	09/02/2024	12
RE	159670	Coaxial Cable	UL-ISE	-	-	11/11/2024	12
RE	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	242170	Logperiodic Antenna	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	00728	12/17/2024	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