RADIO TEST REPORT

Test Report No. 15619443H-R1

Customer	**TOYOTA MOTOR CORPORATION**
Description of EUT	**Smart LF Oscillator**
Model Number of EUT	**TMLF19T-8**
FCC ID	**NI4TMLF19T-8**
Test Regulation	**FCC Part 15 Subpart C**
Test Result	**Complied**
Issue Date	**May 15, 2025**
Remarks	**-**

Representative test engineer	Approved by
	
Tetsuro Yoshida Engineer	Akihiko Maeda Leader

CERTIFICATE 5107.02

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

UL Japan, Inc. Ise EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 Japan / +81-596-24-8999

ANNOUNCEMENT

- This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
- The results in this report apply only to the sample tested. (Laboratory was not involved in sampling.)
- This sample tested is in compliance with the limits of the above regulation.
- The test results in this test report are traceable to the national or international standards.
- This test report must not be used by the customer to claim product certification, approval, or endorsement by the A2LA accreditation body.
- This test report covers Radio technical requirements.
  It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
- The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
- The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan, Inc. has been accredited.
- The information provided by the customer for this report is identified in SECTION 1.
- The laboratory is not responsible for information provided by the customer which can impact the validity of the results.
- For test report(s) referred in this report, the latest version (including any revisions) is always referred.

REVISION HISTORY

Original Test Report No. 15619443H

This report is a revised version of 15619443H. 15619443H is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	15619443H	April 1, 2025	-
1	15619443H-R1	May 15, 2025	Correction of erroneous description for SECTION 5 (page 14); from Figure 22 to Figure 2

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	TOYOTA MOTOR CORPORATION
Address	1, Toyota-Cho, Toyota, Aichi, 471-8572 Japan
Telephone Number	+81-80-5814-2629
Contact Person	Arinobu Kimura

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	Smart LF Oscillator
Model Number	TMLF19T-8
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 10, 2025
Test Date	February 13, 2025

2.2 Product Description

General Specification

Rating	DC 12.0 V (Max 1.71 A (ave.))

Radio Specification

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

Smart LF Oscillator (model: TMLF19T-8) consists of the following parts:
- Computer Assy, Smart Key (ECU)
- D Door Antenna (Door Antenna)
- P Door Antenna (Door Antenna)
- Back Door Antenna (Trunk Antenna)
- Fr Antenna (Room Antenna)
- Rr1 Antenna (Room Antenna)
- Rr2 Antenna (Room Antenna)
- Immobilizer Antenna

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	<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	15.1 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	1.3 dB 31.966 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)
The battery voltage (DC 12 V) is provided to the EUT. Input voltage to RF part does not go through the regulator. So the test was performed with the supply voltage varied between 85 % and 115 % of the nominal rated supply voltage (DC 12 V) and the variation of the input power does not affect the test result, therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
It is impossible for end users to replace the antenna, because the antenna is mounted inside of the 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	dB	5.0
		Vertical	dB	5.0
	200 MHz to 1000 MHz	Horizontal	dB	5.2
		Vertical	dB	6.2
10 m	30 MHz to 200 MHz	Horizontal	dB	5.5
		Vertical	dB	5.4
	200 MHz to 1000 MHz	Horizontal	dB	5.5
		Vertical	dB	5.5

-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)

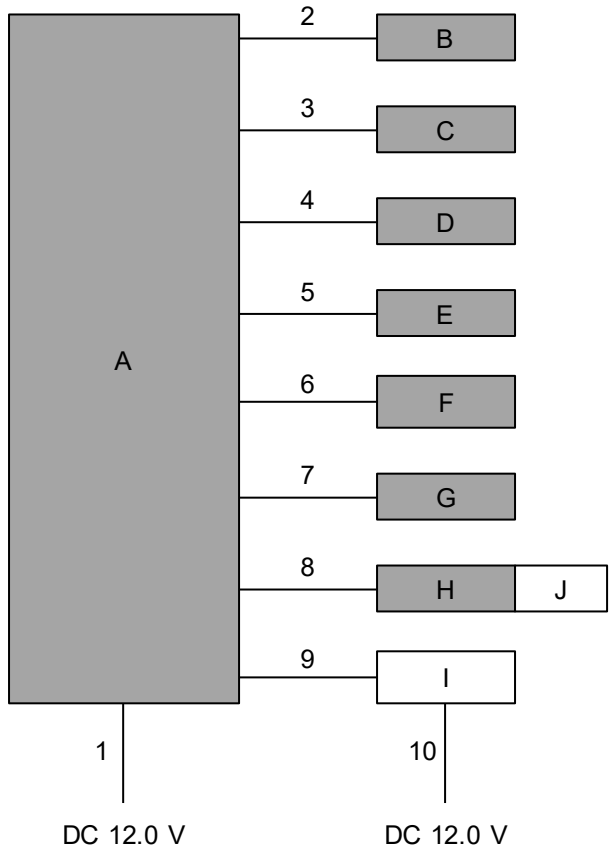
Test mode	Remarks
1) Transmitting mode (Tx) D Door Antenna (19DD1), Max Power	*1)
2) Transmitting mode (Tx) Fr Antenna (19WA0), Max Power	*2)
3) Transmitting mode (Tx) Back Door Antenna (12TA0), Max Power	-
4) Transmitting mode (Tx) Immobilizer Antenna (19PA0)	*3)
5) Transmitting mode (Tx) D Door Antenna (19DD1), Min Power	*1), *4)
6) Transmitting mode (Tx) Fr Antenna (19WA0), Min Power	*2), *4)
7) Transmitting mode (Tx) Back Door Antenna (12TA0), Min Power	*4)
*Power of the EUT was set by the software as follows; Software: S19T-2-01_max V1.00 (for maximum output power) S19T-2-01_min V1.00 (for minimum output power) (Date: December 9, 2020, 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.	

*1) The test was performed with Item B as representative, because it was confirmed that there was no difference among Item B and Item C at the pre-check.
*2) The test was performed with Item E as representative, because it was confirmed that there was no difference among Item E to Item G at the pre-check.
*3) This EUT has two modes which transponder key is attached or not. The worst case was confirmed with and without transponder key attached. The result is below;
- Below 30 MHz: without transponder key attached
- Above 30 MHz: with transponder key attached

Therefore for Electric Field Strength of Fundamental Emission and Electric Field Strength of Spurious Emission tests were performed only above mode.
*4) This mode was only tested with the fundamental and worst spurious point.

4.2 Configuration and Peripherals

Mode 4



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

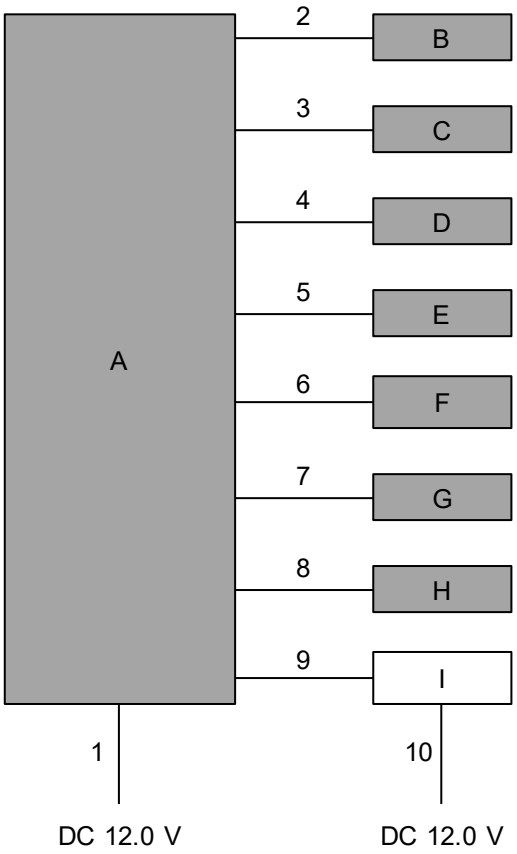
Description of EUT and Support Equipment

No.	Item	Model number	Serial Number	Manufacturer	Remark
A	Computer Assy, Smart Key (ECU)	TMLF19T-8	19ECU2503	-	EUT
B	D Door Antenna	19DD1	19DRP2504	-	EUT
C	P Door Antenna	19DD1	19DRD2504	-	EUT
D	Back Door Antenna	12TA0	19BK2504	-	EUT
E	Fr Door Antenna	19WA0	19LF2352	-	EUT
F	Rr1 Door Antenna	19WA0	19LF2351	-	EUT
G	Rr2 Door Antenna	19WA0	19LF2353	-	EUT
H	Immobilizer Antenna	19PA0	19ENG2316	-	EUT
I	Switch Jig	19SWB2310	-	-	-
J	Key	19CY	KT-TRT2	-	-

List of Cables Used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC Cable	2.0	Unshielded	Unshielded	-
2	D Door Antenna Cable	2.0	Unshielded	Unshielded	-
3	P Door Antenna Cable	2.0	Unshielded	Unshielded	-
4	Back Door Antenna Cable	2.0	Unshielded	Unshielded	-
5	Fr Door Antenna Cable	2.0	Unshielded	Unshielded	-
6	Rr1 Door Antenna Cable	2.0	Unshielded	Unshielded	-
7	Rr2 Door Antenna Cable	2.0	Unshielded	Unshielded	-
8	Immobilizer Antenna Cable	2.0	Unshielded	Unshielded	-
9	Signal Cable	2.0	Unshielded	Unshielded	-
10	DC Cable	2.0	Unshielded	Unshielded	-

Other mode except for Mode 4



* 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	Computer Assy, Smart Key (ECU)	TMLF19T-8	19ECU2410 *1) 19ECU2504 *2)	-	EUT
B	D Door Antenna	19DD1	19DRP2502	-	EUT
C	P Door Antenna	19DD1	19DRD2502	-	EUT
D	Back Door Antenna	12TA0	19BK2503	-	EUT
E	Fr Door Antenna	19WA0	19LF2401	-	EUT
F	Rr1 Door Antenna	19WA0	19LF2402	-	EUT
G	Rr2 Door Antenna	19WA0	19LF2403	-	EUT
H	Immobilizer Antenna	19PA0	19ENG2401	-	EUT
I	Switch Jig	HNS2401	-	-	-

*1) Used for Mode 1 to 3
*2) Used for Mode 5 to 7

List of Cables Used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC Cable	2.0	Unshielded	Unshielded	-
2	D Door Antenna Cable	2.0	Unshielded	Unshielded	-
3	P Door Antenna Cable	2.0	Unshielded	Unshielded	-
4	Back Door Antenna Cable	2.0	Unshielded	Unshielded	-
5	Fr Door Antenna Cable	2.0	Unshielded	Unshielded	-
6	Rr1 Door Antenna Cable	2.0	Unshielded	Unshielded	-
7	Rr2 Door Antenna Cable	2.0	Unshielded	Unshielded	-
8	Immobilizer Antenna Cable	2.0	Unshielded	Unshielded	-
9	Signal Cable	2.0	Unshielded	Unshielded	-
10	DC 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

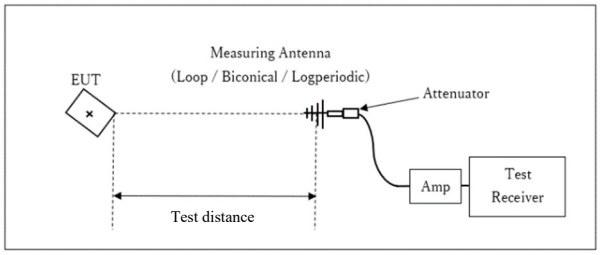
The test was made with the detector (RBW/VBW) in the following table.
When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

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

Figure 1: Test Setup

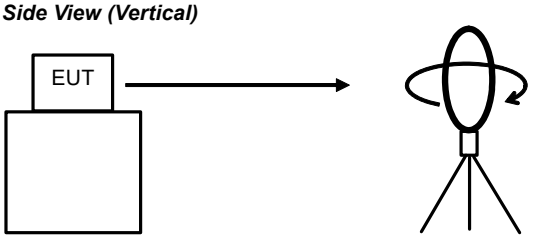
Below 1 GHz



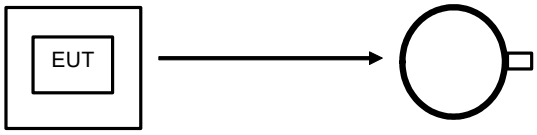
Test Distance: 3 m

Figure 2: Direction of the Loop Antenna

Side View (Vertical)

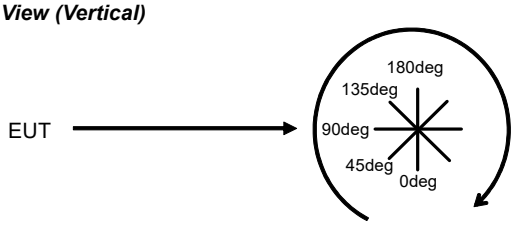


Top View (Horizontal)



Antenna was not rotated.

Top View (Vertical)



Front side: 0 deg.
Forward direction: clockwise

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

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

Measurement range : 9 kHz to 1 GHz
Test data : APPENDIX
Test result : Pass

SECTION 6: -20 dB Bandwidth

Test Procedure

The test was measured with a spectrum analyzer.

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
-20 dB Bandwidth	Between two times and five times the BW	1 to 5 % of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer

Test data : APPENDIX
Test result : Pass

SECTION 7: 99 % emission bandwidth

Test Procedure

The test was measured with a spectrum analyzer.

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

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

Radiated Emission (Fundamental and Spurious Emission)

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	February 13, 2025	February 13, 2025
Temperature / Humidity	20 deg. C / 40 % RH	22 deg. C / 40 % RH
Engineer	Tetsuro Yoshida	Yuichiro Yamazaki
Mode	Mode 1 and 5	

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	93.8	19.2	-74.0	32.3	-	6.7	45.6	38.9	Fundamental(DC 10.2 V)
0deg	0.12500	PK	93.8	19.2	-74.0	32.3	-	6.7	45.6	38.9	Fundamental(DC 12.0 V)
0deg	0.12500	PK	93.8	19.2	-74.0	32.3	-	6.7	45.6	38.9	Fundamental(DC 13.8 V)
0deg	0.12500	PK	75.1	19.2	-74.0	32.3	-	-12.0	45.6	57.6	Fundamental(Mode 5)
0deg	0.25000	PK	49.1	19.5	-64.3	32.3	-	-28.0	39.6	67.6	
0deg	0.37500	PK	67.2	19.5	-64.3	32.3	-	-9.9	36.1	46.0	
0deg	0.50000	QP	36.0	19.5	-24.3	32.3	-	-1.1	33.6	34.7	
0deg	0.62500	QP	63.5	19.5	-24.3	32.3	-	26.4	31.7	5.3	
0deg	0.62500	QP	57.2	19.5	-24.3	32.3	-	20.1	31.7	11.6	Mode 5
0deg	0.75000	QP	29.8	19.5	-24.3	32.3	-	-7.3	30.1	37.4	
0deg	0.87500	QP	41.6	19.5	-24.3	32.3	-	4.5	28.7	24.2	
0deg	1.00000	QP	27.3	19.5	-24.2	32.3	-	-9.7	27.6	37.3	
0deg	1.12500	QP	52.5	19.5	-24.2	32.3	-	15.5	26.5	11.0	
0deg	1.25000	QP	25.7	19.6	-24.2	32.3	-	-11.2	25.6	36.8	
Hori.	31.966	QP	25.0	18.0	6.9	28.6	-	21.3	40.0	18.7	
Hori.	58.000	QP	44.9	8.3	7.2	28.5	-	31.9	40.0	8.1	
Hori.	58.001	QP	36.5	8.3	7.2	28.5	-	23.5	40.0	16.5	Mode 5
Hori.	64.000	QP	39.3	6.8	7.2	28.5	-	24.8	40.0	15.2	
Hori.	72.003	QP	37.0	6.3	7.3	28.5	-	22.1	40.0	17.9	
Hori.	192.492	QP	33.2	16.5	8.2	28.0	-	29.9	43.5	13.6	
Hori.	204.482	QP	33.0	11.6	8.3	28.0	-	24.9	43.5	18.6	
Vert.	31.966	QP	42.4	18.0	6.9	28.6	-	38.7	40.0	***1.3***	
Vert.	31.966	QP	33.4	18.0	6.9	28.6	-	29.7	40.0	10.3	Mode 5
Vert.	42.468	QP	38.4	14.1	7.0	28.5	-	31.0	40.0	9.0	
Vert.	58.475	QP	42.2	8.2	7.2	28.5	-	29.1	40.0	10.9	
Vert.	74.480	QP	41.0	6.4	7.3	28.5	-	26.2	40.0	13.8	
Vert.	197.022	QP	36.3	16.6	8.3	28.0	-	33.2	43.5	10.3	
Vert.	204.482	QP	41.5	11.6	8.3	28.0	-	33.4	43.5	10.1	

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	0.12500	PK	93.8	19.2	-74.0	32.3	0.0	6.7	25.6	18.9	Fundamental(DC 10.2 V)
0deg	0.12500	PK	93.8	19.2	-74.0	32.3	0.0	6.7	25.6	18.9	Fundamental(DC 12.0 V)
0deg	0.12500	PK	93.8	19.2	-74.0	32.3	0.0	6.7	25.6	18.9	Fundamental(DC 13.2 V)
0deg	0.12500	PK	75.1	19.2	-74.0	32.3	0.0	-12.0	25.6	37.6	Fundamental(Mode 5)
0deg	0.25000	PK	49.1	19.5	-64.3	32.3	0.0	-28.0	19.6	47.6	
0deg	0.37500	PK	67.2	19.5	-64.3	32.3	0.0	-9.9	16.1	26.0	

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	0.12500	PK	93.8	19.2	6.0	32.3	-	86.7	-	-	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).

Radiated Emission (Fundamental and Spurious Emission)

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	February 13, 2025	February 13, 2025
Temperature / Humidity	20 deg. C / 40 % RH	22 deg. C / 40 % RH
Engineer	Tetsuro Yoshida	Yuichiro Yamazaki
Mode	Mode 2 and 6	

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	95.5	19.2	-74.0	32.3	-	8.4	45.6	37.2	Fundamental(DC 10.2 V)
0deg	0.12500	PK	95.5	19.2	-74.0	32.3	-	8.4	45.6	37.2	Fundamental(DC 12.0 V)
0deg	0.12500	PK	95.5	19.2	-74.0	32.3	-	8.4	45.6	37.2	Fundamental(DC 13.8 V)
0deg	0.12500	PK	70.9	19.2	-74.0	32.3	-	-16.2	45.6	61.8	Fundamental(Mode 6)
0deg	0.25000	PK	45.8	19.5	-64.3	32.3	-	-31.3	39.6	70.9	
0deg	0.37500	PK	59.8	19.5	-64.3	32.3	-	-17.3	36.1	53.4	
0deg	0.50000	QP	31.0	19.5	-24.3	32.3	-	-6.1	33.6	39.7	
0deg	0.62500	QP	53.4	19.5	-24.3	32.3	-	16.3	31.7	15.4	
0deg	0.62500	QP	41.0	19.5	-24.3	32.3	-	3.9	31.7	27.8	Mode 6
0deg	0.75000	QP	21.9	19.5	-24.3	32.3	-	-15.2	30.1	45.3	
0deg	0.87500	QP	37.2	19.5	-24.3	32.3	-	0.1	28.7	28.6	
0deg	1.00000	QP	25.4	19.5	-24.2	32.3	-	-11.6	27.6	39.2	
0deg	1.12500	QP	36.8	19.5	-24.2	32.3	-	-0.2	26.5	26.7	
0deg	1.25000	QP	21.0	19.6	-24.2	32.3	-	-15.9	25.6	41.5	
Hori.	30.613	QP	26.0	18.5	6.8	28.6	-	22.7	40.0	17.3	
Hori.	46.489	QP	27.3	12.6	7.0	28.5	-	18.4	40.0	21.6	
Hori.	58.000	QP	44.5	8.3	7.2	28.5	-	31.5	40.0	8.5	
Hori.	58.000	QP	37.1	8.3	7.2	28.5	-	24.1	40.0	15.9	Mode 6
Hori.	60.995	QP	38.5	7.4	7.2	28.5	-	24.6	40.0	15.4	
Hori.	73.991	QP	32.3	6.4	7.3	28.5	-	17.5	40.0	22.5	
Hori.	194.520	QP	27.1	16.6	8.2	28.0	-	23.9	43.5	19.6	
Vert.	30.547	QP	40.3	18.5	6.8	28.6	-	37.0	40.0	***3.0***	
Vert.	30.547	QP	32.7	18.5	6.8	28.6	-	29.4	40.0	10.6	Mode 6
Vert.	46.509	QP	35.6	12.6	7.0	28.5	-	26.7	40.0	13.3	
Vert.	58.004	QP	42.5	8.3	7.2	28.5	-	29.5	40.0	10.5	
Vert.	73.978	QP	41.0	6.4	7.3	28.5	-	26.2	40.0	13.8	
Vert.	178.500	QP	35.8	16.0	8.1	28.1	-	31.8	43.5	11.7	
Vert.	195.521	QP	34.6	16.6	8.2	28.0	-	31.4	43.5	12.1	

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	0.12500	PK	95.5	19.2	-74.0	32.3	0.0	8.4	25.6	17.2	Fundamental(DC 10.2 V)
0deg	0.12500	PK	95.5	19.2	-74.0	32.3	0.0	8.4	25.6	17.2	Fundamental(DC 12.0 V)
0deg	0.12500	PK	95.5	19.2	-74.0	32.3	0.0	8.4	25.6	17.2	Fundamental(DC 13.2 V)
0deg	0.12500	PK	70.9	19.2	-74.0	32.3	0.0	-16.2	25.6	41.8	Fundamental(Mode 6)
0deg	0.25000	PK	45.8	19.5	-64.3	32.3	0.0	-31.3	19.6	50.9	
0deg	0.37500	PK	59.8	19.5	-64.3	32.3	0.0	-17.3	16.1	33.4	

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	0.12500	PK	95.5	19.2	6.0	32.3	-	88.4	-	-	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).

Radiated Emission (Fundamental and Spurious Emission)

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	February 13, 2025	February 13, 2025
Temperature / Humidity	20 deg. C / 40 % RH	22 deg. C / 40 % RH
Engineer	Tetsuro Yoshida	Yuichiro Yamazaki
Mode	Mode 3 and 7	

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	94.8	19.2	-74.0	32.3	-	7.7	45.6	37.9	Fundamental(DC 10.2 V)
0deg	0.12500	PK	94.8	19.2	-74.0	32.3	-	7.7	45.6	37.9	Fundamental(DC 12.0 V)
0deg	0.12500	PK	94.8	19.2	-74.0	32.3	-	7.7	45.6	37.9	Fundamental(DC 13.8 V)
0deg	0.12500	PK	74.3	19.2	-74.0	32.3	-	-12.8	45.6	58.4	Fundamental(Mode 7)
0deg	0.25000	PK	71.6	19.5	-64.3	32.3	-	-5.5	39.6	45.1	
0deg	0.37500	PK	56.0	19.5	-64.3	32.3	-	-21.1	36.1	57.2	
0deg	0.50000	QP	51.5	19.5	-24.3	32.3	-	14.4	33.6	19.2	
0deg	0.62500	QP	52.0	19.5	-24.3	32.3	-	14.9	31.7	16.8	
0deg	0.62500	QP	43.7	19.5	-24.3	32.3	-	6.6	31.7	25.1	Mode 7
0deg	0.75000	QP	45.7	19.5	-24.3	32.3	-	8.6	30.1	21.5	
0deg	0.87500	QP	35.1	19.5	-24.3	32.3	-	-2.0	28.7	30.7	
0deg	1.00000	QP	42.7	19.5	-24.2	32.3	-	5.7	27.6	21.9	
0deg	1.12500	QP	40.5	19.5	-24.2	32.3	-	3.5	26.5	23.0	
0deg	1.25000	QP	31.5	19.6	-24.2	32.3	-	-5.4	25.6	31.0	
Hori.	30.000	QP	26.5	18.7	6.8	28.6	-	23.4	40.0	16.6	
Hori.	59.518	QP	44.9	7.8	7.2	28.5	-	31.4	40.0	8.6	
Hori.	61.448	QP	37.8	7.3	7.2	28.5	-	23.8	40.0	16.2	Mode 7
Hori.	73.846	QP	32.0	6.4	7.3	28.5	-	17.2	40.0	22.8	
Hori.	173.974	QP	23.5	15.8	8.1	28.1	-	19.3	43.5	24.2	
Hori.	190.003	QP	25.2	16.5	8.2	28.0	-	21.9	43.5	21.6	
Hori.	214.560	QP	33.9	11.3	8.4	27.9	-	25.7	43.5	17.8	
Vert.	30.002	QP	41.6	18.7	6.8	28.6	-	38.5	40.0	***1.5***	
Vert.	30.002	QP	32.4	18.7	6.8	28.6	-	29.3	40.0	10.7	Mode 7
Vert.	45.958	QP	36.4	12.8	7.0	28.5	-	27.7	40.0	12.3	
Vert.	59.958	QP	42.4	7.7	7.2	28.5	-	28.8	40.0	11.2	
Vert.	73.546	QP	38.7	6.3	7.3	28.5	-	23.8	40.0	16.2	
Vert.	173.494	QP	33.6	15.8	8.1	28.1	-	29.4	43.5	14.1	
Vert.	214.500	QP	40.3	11.3	8.4	27.9	-	32.1	43.5	11.4	

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

PK with Duty factor

Ant Deg [deg] or Polarity [Hori/Vert]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
0deg	0.12500	PK	94.8	19.2	-74.0	32.3	0.0	7.7	25.6	17.9	Fundamental(DC 10.2 V)
0deg	0.12500	PK	94.8	19.2	-74.0	32.3	0.0	7.7	25.6	17.9	Fundamental(DC 12.0 V)
0deg	0.12500	PK	94.8	19.2	-74.0	32.3	0.0	7.7	25.6	17.9	Fundamental(DC 13.2 V)
0deg	0.12500	PK	74.3	19.2	-74.0	32.3	0.0	-12.8	25.6	38.4	Fundamental(Mode 7)
0deg	0.25000	PK	71.6	19.5	-64.3	32.3	0.0	-5.5	19.6	25.1	
0deg	0.37500	PK	56.0	19.5	-64.3	32.3	0.0	-21.1	16.1	37.2	

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	0.12500	PK	94.8	19.2	6.0	32.3	-	87.7	-	-	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).

Radiated Emission (Fundamental and Spurious Emission)

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	February 13, 2025	February 13, 2025
Temperature / Humidity	20 deg. C / 40 % RH	22 deg. C / 40 % RH
Engineer	Tetsuro Yoshida	Yuichiro Yamazaki
Mode	Mode 4	

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	97.6	19.2	-74.0	32.3	-	10.5	45.6	35.1	Fundamental(DC 10.2 V)
0deg	0.12500	PK	97.6	19.2	-74.0	32.3	-	10.5	45.6	35.1	Fundamental(DC 12.0 V)
0deg	0.12500	PK	97.6	19.2	-74.0	32.3	-	10.5	45.6	35.1	Fundamental(DC 13.2 V)
0deg	0.25000	PK	47.4	19.5	-64.3	32.3	-	-29.7	39.6	69.3	
0deg	0.37500	PK	56.0	19.5	-64.3	32.3	-	-21.1	36.1	57.2	
0deg	0.50000	QP	25.6	19.5	-24.3	32.3	-	-11.5	33.6	45.1	
0deg	0.62500	QP	27.0	19.5	-24.3	32.3	-	-10.1	31.7	41.8	
0deg	0.75000	QP	21.4	19.5	-24.3	32.3	-	-15.7	30.1	45.8	
0deg	0.87500	QP	32.8	19.5	-24.3	32.3	-	-4.3	28.7	33.0	
0deg	1.00000	QP	22.2	19.5	-24.2	32.3	-	-14.8	27.6	42.4	
0deg	1.12500	QP	23.0	19.5	-24.2	32.3	-	-14.0	26.5	40.5	
0deg	1.25000	QP	20.5	19.6	-24.2	32.3	-	-16.4	25.6	42.0	
Hori.	30.454	QP	25.4	18.5	6.8	28.6	-	22.1	40.0	17.9	
Hori.	50.994	QP	31.7	10.9	7.1	28.5	-	21.2	40.0	18.8	
Hori.	64.506	QP	46.3	6.7	7.2	28.5	-	31.7	40.0	8.3	
Hori.	72.487	QP	35.2	6.3	7.3	28.5	-	20.3	40.0	19.7	
Hori.	185.000	QP	32.0	16.3	8.2	28.1	-	28.4	43.5	15.1	
Hori.	200.484	QP	35.3	11.6	8.3	28.0	-	27.2	43.5	16.3	
Vert.	30.015	QP	40.1	18.7	6.8	28.6	-	37.0	40.0	***3.0***	
Vert.	30.500	QP	37.7	18.5	6.8	28.6	-	34.4	40.0	5.6	
Vert.	47.002	QP	40.7	12.4	7.0	28.5	-	31.6	40.0	8.4	
Vert.	64.510	QP	44.6	6.7	7.2	28.5	-	30.0	40.0	10.0	
Vert.	186.066	QP	37.9	16.3	8.2	28.1	-	34.3	43.5	9.2	
Vert.	193.486	QP	39.3	16.5	8.2	28.0	-	36.0	43.5	7.5	
Vert.	200.484	QP	39.7	11.6	8.3	28.0	-	31.6	43.5	11.9	
Vert.	226.522	QP	38.6	11.4	8.4	27.9	-	30.5	46.0	15.5	

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

PK with Duty factor

Ant Deg [deg] or Polarity [Hori/Vert]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
0deg	0.12500	PK	97.6	19.2	-74.0	32.3	0.0	10.5	25.6	15.1	Fundamental(DC 10.2 V)
0deg	0.12500	PK	97.6	19.2	-74.0	32.3	0.0	10.5	25.6	15.1	Fundamental(DC 12.0 V)
0deg	0.12500	PK	97.6	19.2	-74.0	32.3	0.0	10.5	25.6	15.1	Fundamental(DC 13.2 V)
0deg	0.25000	PK	47.4	19.5	-64.3	32.3	0.0	-29.7	19.6	49.3	
0deg	0.37500	PK	56.0	19.5	-64.3	32.3	0.0	-21.1	16.1	37.2	

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

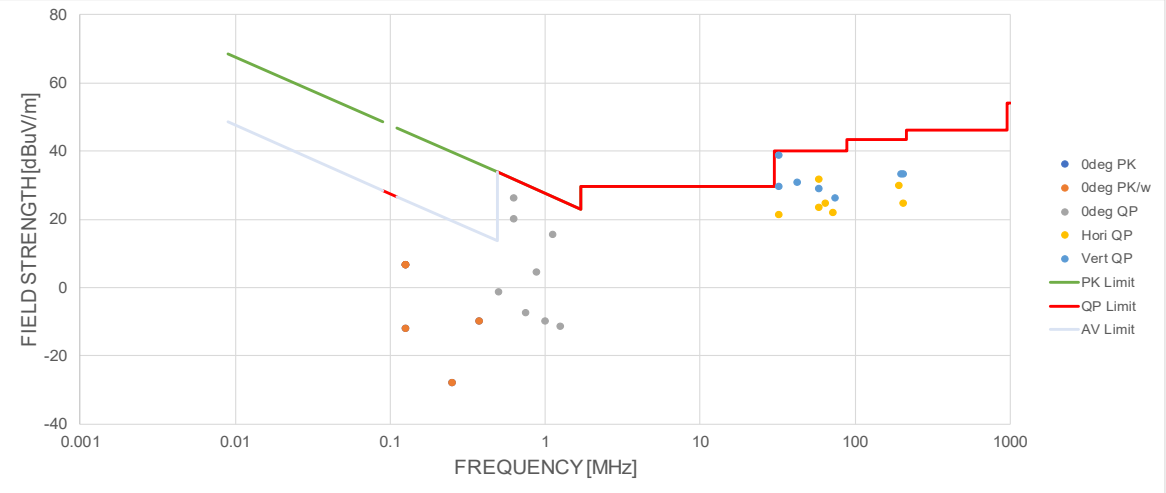
Ant Deg [deg]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
0deg	0.12500	PK	97.6	19.2	6.0	32.3	-	90.5	-	-	Fundamental

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).

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

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	February 13, 2025	February 13, 2025
Temperature / Humidity	20 deg. C / 40 % RH	22 deg. C / 40 % RH
Engineer	Tetsuro Yoshida	Yuichiro Yamazaki
Mode	Mode 1	

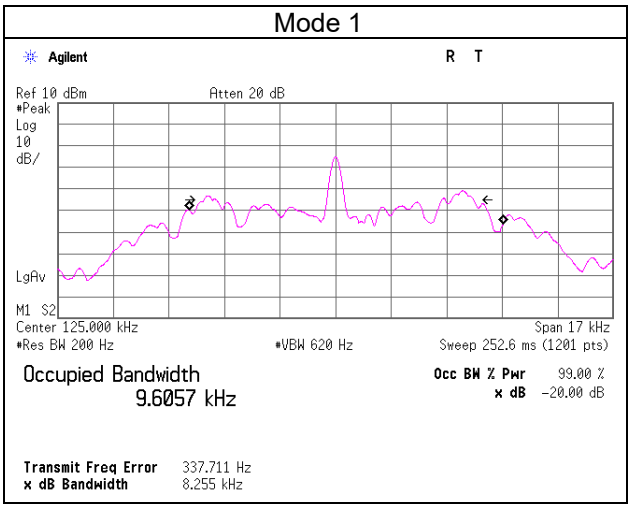


-20 dB Bandwidth / 99 % emission bandwidth

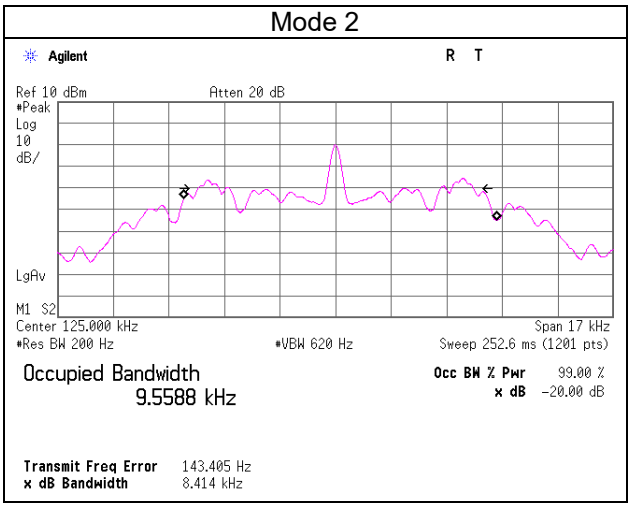
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	February 13, 2025
Temperature / Humidity	20 deg. C / 40 % RH
Engineer	Tetsuro Yoshida
Mode	Mode 1 to 4

Mode	-20 dB Bandwidth [kHz]	99 % emission bandwidth [kHz]
1	8.255	9.6057
2	8.414	9.5588
3	8.334	9.7557
4 (with key)	15.125	17.8458
4 (without key)	9.725	16.6337

Mode 1



Mode 2

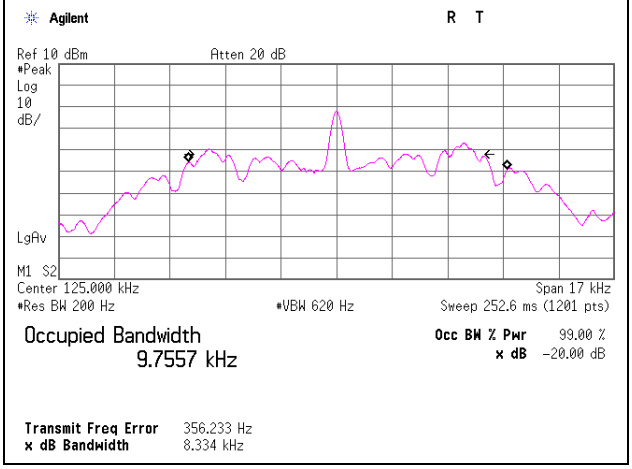


*It was confirmed that there were no differences in the bandwidth due to the input voltage.

-20 dB Bandwidth / 99 % emission bandwidth

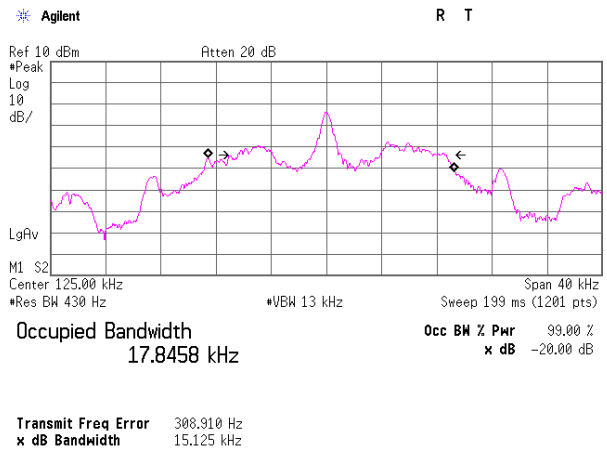
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	February 13, 2025
Temperature / Humidity	20 deg. C / 40 % RH
Engineer	Tetsuro Yoshida
Mode	Mode 3 to 4

Mode 3

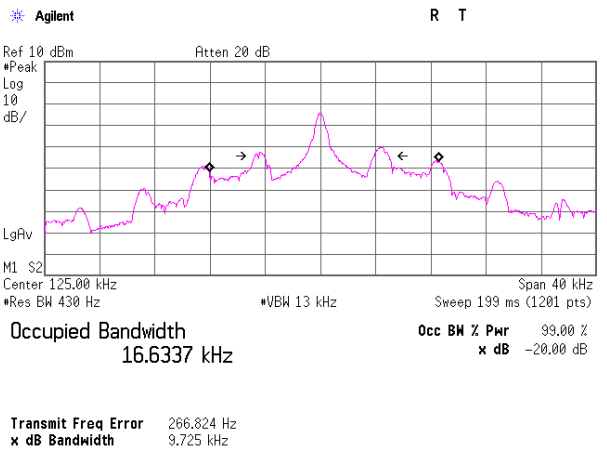


Mode 4

(with key)



(without key)



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

APPENDIX 2: Test instruments

Test Equipment

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	141217	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W/SFM141/ 421-010/ sucoform141-PE/ RFM-E121(SW)	-/04178	06/14/2024	12
RE	141265	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-190	07/10/2024	12
RE	141295	High Pass Filter 0.15-30MHz	Rohde & Schwarz	EZ-25/3	100041	02/14/2025	12
RE	141317	Coaxial Cable	UL-ISE	-	-	09/11/2024	12
RE	141331	Attenuator(6dB)	TME	UFA-01	-	02/19/2025	12
RE	141427	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103B+BBA9106	08031	07/30/2024	12
RE	141542	Digital Tester	Fluke Corporation	FLUKE 26-3	78030611	08/06/2024	12
RE	141582	Pre Amplifier	SONOMA INSTRUMENT	310	260834	02/14/2025	12
RE	141594	Pre Amplifier	Keysight Technologies Inc	8447D	2944A10150	02/19/2025	12
RE	141949	Test Receiver	Rohde & Schwarz	ESCI	100767	06/05/2024	12
RE	141978	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY46180899	05/09/2024	12
RE	142004	AC2_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	12/12/2023	24
RE	142228	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	220646	Attenuator	Huber+Suhner	6806_N-50-1	-	03/12/2024	12
RE	244707	Thermo-Hygrometer	HIOKI E. E. CORPORATION	LR5001	231202102	01/19/2025	12

***Hyphens for Last Calibration Date and Cal Int (month) are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.**

The expiration date of the calibration is the end of the expired month.
As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

Test item:

RE: Radiated Emission