

EMI TEST REPORT

Test Report No. 15474876H-D-R2

Customer	DENSO CORPORATION
Description of EUT	Cockpit Control Unit
Model Number of EUT	DNNS125
FCC ID	HYQDNNS125
Test Regulation	FCC Part 15 Subpart B
Test Result	Complied
Issue Date	November 29, 2024
Remarks	-

Representative test engineerHiroki Numata
Engineer**Approved by**Ryota Yamanaka
Engineer

CERTIFICATE 5107.02

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

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REVISION HISTORY

Original Test Report No. 15474876H-D

This report is a revised version of 15474876H-D-R1. 15474876H-D-R1 is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	15474876H-D	September 6, 2024	-
1	15474876H-D-R1	October 25, 2024	SECTION 2.2 Correction of Antenna gain for 2.4 GHz band: WLAN: from 1.10 dBi to 1.78 dBi Bluetooth: from 1.10 dBi to 1.83 dBi
1	15474876H-D-R1	October 25, 2024	SECTION 3.1 Deletion of unneeded test regulation
1	15474876H-D-R1	October 25, 2024	SECTION 5 Figure 1: Test Setup Correction of how to describe about Test Distance.
1	15474876H-D-R1	October 25, 2024	SECTION 6.3 Correction of Frequency range (above 1 GHz) from "1000 MHz to 40000 MHz" to "1000 MHz to 30000 MHz"
1	15474876H-D-R1	October 25, 2024	APPENDIX 1 Deletion of test data for Sub antenna
2	15474876H-D-R2	November 29, 2024	SECTION 6.4 Figure 1 Correction of Test Distance value (6 GHz to 10 GHz) from 5.2 to 5.16.

Reference: Abbreviations (Including words undescribed in this report)

A2LA	The American Association for Laboratory Accreditation	Hori.	Horizontal
AAN	Asymmetric Artificial Network	ICES	Interference-Causing Equipment Standard
AC	Alternating Current	I/O	Input/Output
AE	Auxiliary equipment	IEC	International Electrotechnical Commission
AM	Amplitude Modulation	IEEE	Institute of Electrical and Electronics Engineers
AMN	Artificial Mains Network	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	ISN	Impedance Stabilization Network
AP	Access Point	ISO	International Organization for Standardization
ASK	Amplitude Shift Keying	JAB	Japan Accreditation Board
Atten., ATT	Attenuator	LAN	Local Area Network
AV	Average	LCL	Longitudinal Conversion Loss
BPSK	Binary Phase-Shift Keying	LIMS	Laboratory Information Management System
BR	Bluetooth Basic Rate	LISN	Line Impedance Stabilization Network
BT	Bluetooth	MRA	Mutual Recognition Arrangement
BT LE	Bluetooth Low Energy	N/A	Not Applicable
BW	BandWidth	NIST	National Institute of Standards and Technology
C.F	Correction Factor	NS	No signal detect.
Cal Int	Calibration Interval	NSA	Normalized Site Attenuation
CAV	CISPR AV	OBW	Occupied BandWidth
CCK	Complementary Code Keying	OFDM	Orthogonal Frequency Division Multiplexing
CDN	Coupling Decoupling Network	PER	Packet Error Rate
Ch., CH	Channel	PK	Peak
CISPR	Comite International Special des Perturbations Radioelectriques	P _{LT}	long-term flicker severity
Corr.	Correction	POHC(A)	Partial Odd Harmonic Current
CPE	Customer premise equipment	Pol., Pola.	Polarization
CW	Continuous Wave	PR-ASK	Phase Reversal ASK
DBPSK	Differential BPSK	P _{ST}	short-term flicker severity
DC	Direct Current	QAM	Quadrature Amplitude Modulation
DET	Detector	QP	Quasi-Peak
D-factor, D.fac.	Distance factor	QPSK	Quadrature Phase Shift Keying
Dmax	maximum absolute voltage change during an observation period	r.m.s., RMS	Root Mean Square
DQPSK	Differential QPSK	RBW	Resolution BandWidth
DSSS	Direct Sequence Spread Spectrum	RE	Radio Equipment
DUT	Device Under Test	REV	Reverse
EDR	Enhanced Data Rate	RF	Radio Frequency
e.i.r.p., EIRP	Equivalent Isotropically Radiated Power	RFID	Radio Frequency Identifier
EM clamp	Electromagnetic clamp	RNSS	Radio Navigation Satellite Service
EMC	ElectroMagnetic Compatibility	RSS	Radio Standards Specifications
EMI	ElectroMagnetic Interference	Rx	Receiving
EMS	ElectroMagnetic Susceptibility	S.fac.	Site factor
EN	European Norm	SINAD	Ratio of (Signal + Noise + Distortion) to (Noise + Distortion)
e.r.p., ERP	Effective Radiated Power	S/N	Signal to Noise ratio
ETSI	European Telecommunications Standards Institute	SA, S/A	Spectrum Analyzer
EU	European Union	SABS	South African Bureau of Standards
EUT	Equipment Under Test	SANS	South African National Standards
Fac.	Factor	SG	Signal Generator
FCC	Federal Communications Commission	SVSWR	Site-Voltage Standing Wave Ratio
FHSS	Frequency Hopping Spread Spectrum	THC(A)	Total Harmonic Current
FM	Frequency Modulation	THD(%)	Total Harmonic Distortion
Freq.	Frequency	TR, T/R	Test Receiver
FSK	Frequency Shift Keying	Tx	Transmitting
Fund	Fundamental	UFA	Uniform field area
FWD	Forward	VBW	Video BandWidth
GFSK	Gaussian Frequency-Shift Keying	Vert.	Vertical
GNSS	Global Navigation Satellite System	WLAN	Wireless LAN
GPS	Global Positioning System	xDSL	Generic term for all types of DSL technology (DSL: Digital Subscriber Line)

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SECTION 1: Customer information

Company Name	DENSO CORPORATION
Address	1-1 Showa-cho, Kariya-shi, Aichi ken, 448-8661 Japan
Telephone Number	+81-70-2236-5904
Contact Person	Naoto Makino

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	Cockpit Control Unit
Model Number	DNNS125
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	June 10, 2024 (Test on June 16 to 18, 2024) June 20, 2024 (Test on June 24, 2024)
Test Date	June 16 to 24, 2024

2.2 Product Description

General Specification

Rating	DC 13.2 V
Operating temperature	-30 deg. C to 65 deg. C

Radio Specification

WLAN (IEEE802.11b/11g/11n-20)

Equipment Type	Transceiver	
Frequency of Operation	2412 MHz to 2462 MHz	
Type of Modulation	DSSS, OFDM	
Antenna Gain ^{a)}	Main Antenna: Chain 0	Sub Antenna: Chain 1
	1.78 dBi	1.78 dBi

Bluetooth (BR / EDR)

Equipment Type	Transceiver	
Frequency of Operation	2402 MHz to 2480 MHz	
Type of Modulation	FHSS (GFSK, $\pi/4$ DQPSK, 8 DPSK)	
Antenna Type	External Antenna	
Antenna Gain ^{a)}	1.83 dBi	

WLAN (IEEE802.11a/11n-20/11ac-20/11n-40/11ac-40/11ac-80)

Equipment Type	Transceiver	
Frequency of Operation	20 MHz Band	5180 MHz to 5240 MHz 5745 MHz to 5825 MHz
	40 MHz Band	5190 MHz to 5230 MHz 5755 MHz to 5795 MHz
	80 MHz Band	5210 MHz 5775 MHz
Type of Modulation	OFDM	
Antenna Gain ^{a)}	Main Antenna: Chain 0	Sub Antenna: Chain 1
	0.30 dBi (5180 MHz to 5240 MHz) 0.99 dBi (5745 MHz to 5825 MHz)	0.30 dBi (5180 MHz to 5240 MHz) 0.99 dBi (5745 MHz to 5825 MHz)

AM/FM (incl. RDS)

Equipment Type	Receiver	
Frequency of Operation	522 kHz to 1710 kHz 87 MHz to 108 MHz	

FM tuner specification Intermediate frequency: 220 kHz

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	FCC Part 15 Subpart B The latest version on the first day of the testing period
Title	FCC 47CFR Part15 Radio Frequency Device Subpart B Unintentional Radiators

3.2 Procedures and results

Item	Test Procedure	Limits	Worst margin	Result	Remarks
Conducted emission	ANSI C63.4: 2014 + C63.4a: 2017 7. AC power - line conducted emission measurements	Part 15 Subpart B 15.107(a)	-	N/A	*1)
Radiated emission	ANSI C63.4: 2014 + C63.4a: 2017 8. Radiated emission measurements	Part 15 Subpart B 15.109(a)	1.77 dB 47.074 MHz, QP, Vertical, Mode 1	Complied	-
Antenna Terminal	ANSI C63.4: 2014 + C63.4a: 2017 12. Measurement of unintentional radiators other than ITE	Part 15 Subpart B 15.111(a)	4.33 dB 3434.330 MHz, Main port	Complied	-

* Note: UL Japan, Inc.'s EMI Work Procedure: Work Instructions-ULID-003591.

*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.

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

Antenna Terminal test

Item	Unit	Calculated Uncertainty (+/-)
Antenna terminal conducted emission	dB	3.1

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

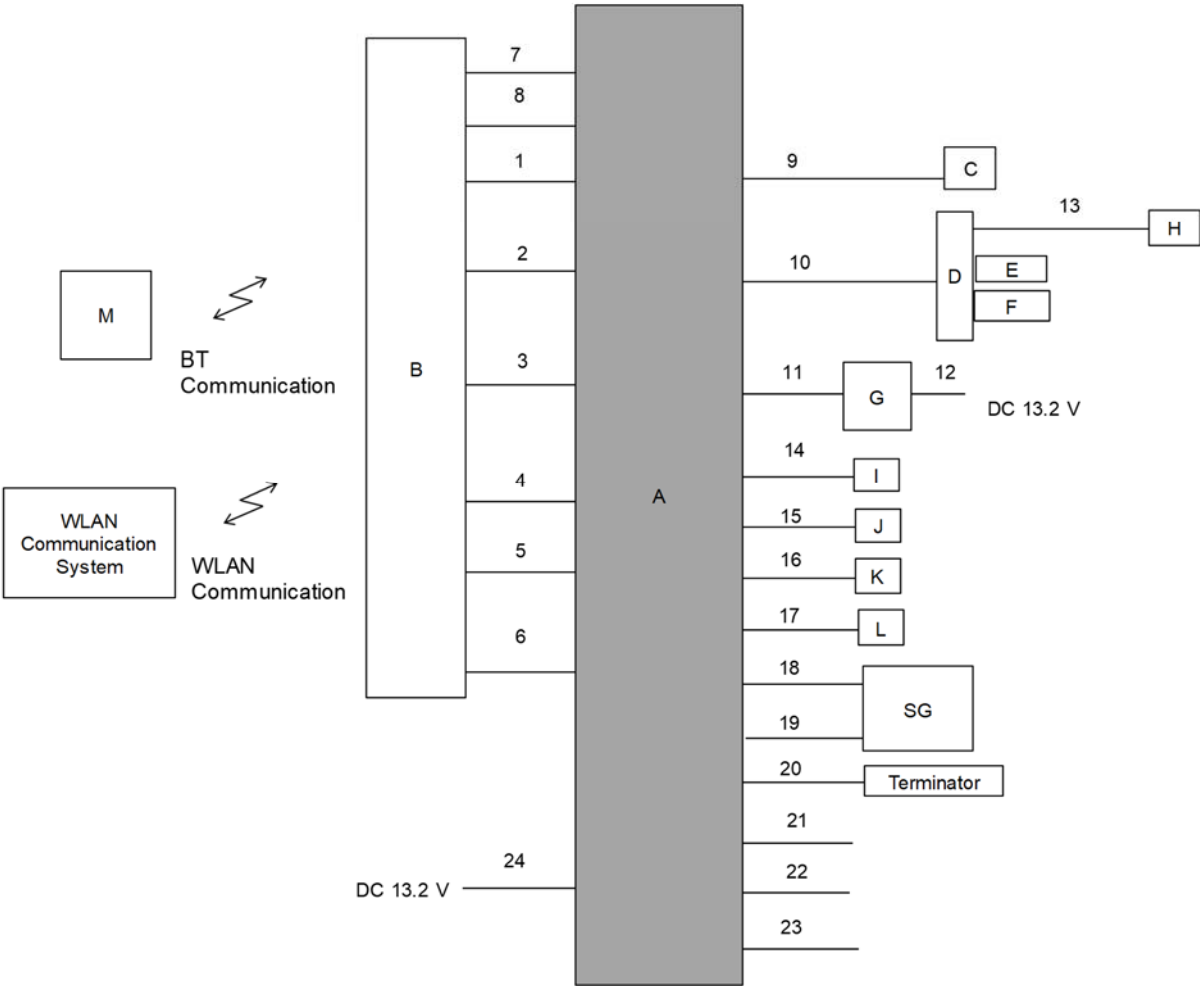
Refer to APPENDIX.

SECTION 4: Operation of EUT during testing

4.1 Operating Mode(s)

Mode	1. AM Receiving mode 2. FM Receiving mode (Local / Other) 3. WLAN + BT Communication mode 4. FM Seek mode	(for Radiated emission) (for Radiated emission) (for Radiated emission) (for Antenna Terminal)
Remarks	-	
Software(s)	MSoC Version: F67WHM010-708	

4.2 Configuration and peripherals



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

Description of EUT and Support Equipment

No.	Item	Model number	Serial Number	Manufacturer	Remarks
A	Cockpit Control Unit	DNNS125	468726400500243000031 *1) 046872640000021330200321 *2)	DENSO CORPORATION	EUT
B	Display (CID)	DNNS132-2	86412FN450	-	-
C	Mic	-	-	Panasonic	-
D	USB BOX	86257AN00A	No.7	SUBARU	-
E	USB	RUF3-K16GB	P10416	Buffalo Inc.	-
F	USB	USM4GR V	17116DGGNN	Sony Corporation	-
G	Meter	TN257550-6773	85002AN02A	-	-
H	iPod touch	A1367	CCQ50WDDCPC	Apple	-
I	Speaker	SPEAKER ASSY 4FD	-	FOSTER	-
J	Speaker	SPEAKER ASSY 4FD	-	FOSTER	-
K	Speaker	SPEAKER ASSY 4RD	-	FOSTER	-
L	Speaker	SPEAKER ASSY 4RD	-	FOSTER	-
M	iPad	MUUK2J/A	DMPZK05JLMPF	Apple	-

*1) for Mode 1 and 2

*2) for Mode 3

List of Cables Used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	0.2	Unshielded	Unshielded	-
2	Signal Cable	0.2	Unshielded	Unshielded	-
3	GND Cable	0.2	Unshielded	Unshielded	-
4	GND Cable	0.2	Unshielded	Unshielded	-
5	GND Cable	0.2	Unshielded	Unshielded	-
6	GND Cable	0.2	Unshielded	Unshielded	-
7	RF Cable	0.1	Shielded	Shielded	-
8	RF Cable	0.1	Shielded	Shielded	-
9	Mic Cable	1.0	Unshielded	Unshielded	-
10	Signal Cable	0.5	Unshielded	Unshielded	-
11	Signal Cable	1.0	Unshielded	Unshielded	-
12	DC Cable	2.5	Unshielded	Unshielded	-
13	Audio Cable	1.0	Shielded	Shielded	-
14	Speaker Cable	2.0	Unshielded	Unshielded	-
15	Speaker Cable	2.0	Unshielded	Unshielded	-
16	Speaker Cable	2.0	Unshielded	Unshielded	-
17	Speaker Cable	2.0	Unshielded	Unshielded	-
18	Antenna Cable	1.5	Shielded	Shielded	-
19	Antenna Cable	1.5	Shielded	Shielded	-
20	Antenna Cable	1.0	Shielded	Shielded	-
21	Signal Cable	1.0	Unshielded	Unshielded	-
22	Signal Cable	1.0	Unshielded	Unshielded	-
23	Signal Cable	1.0	Unshielded	Unshielded	-
24	DC Cable	2.5	Unshielded	Unshielded	-

SECTION 5: Radiated Emission

5.1 Operating environment

Date : See data
Test place : See data
Temperature : See data
Humidity : See data
Test engineer : See data

5.2 Test configuration

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 EUT was set on the edge of the tabletop.

Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

Photographs of the set up are shown in APPENDIX 3.

5.3 Test conditions

Frequency range : 30 MHz to 200 MHz (Biconical antenna)
200 MHz to 1000 MHz (Logperiodic antenna)
1000 MHz to 30000 MHz (Horn antenna)
Test distance : 3 m
EUT position : Table top
EUT operation mode : See Clause 4.1

5.4 Test procedure

The height of the measuring antenna 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 with the Test Receiver or the Spectrum Analyzer.

The radiated emission measurements were made with the following detector function of the Test Receiver and the Spectrum Analyzer.

The test of Local oscillator spurious has been measured up to appropriate frequency based on the result of the antenna terminal test.

Test antenna was aimed at the emission source for receiving the maximum signal and always kept. (Above 1 GHz)

Frequency	Below 1 GHz	1 GHz to 26 GHz *1)	26 GHz to 40 GHz *1)
Instrument used	Test Receiver	Test Receiver	Spectrum Analyzer
IF Bandwidth	QP: BW 120 kHz	PK: BW 1 MHz, CAV: BW 1 MHz	PK: RBW: 1 MHz / VBW: 3 MHz AV *2): RBW: 1 MHz / VBW: 10 Hz

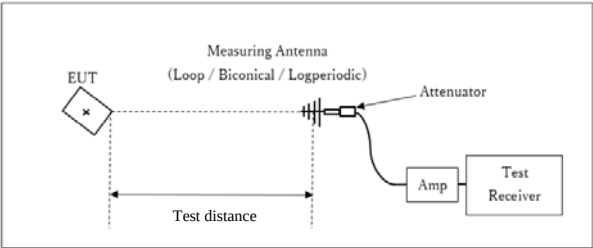
*1) The measurement data was adjusted to a 3 m distance using the following Distance Factor.

Distance Factor: See Figure 1.

*2) When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Figure 1: Test Setup

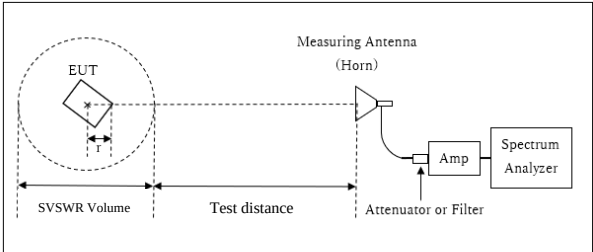
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz to 6 GHz



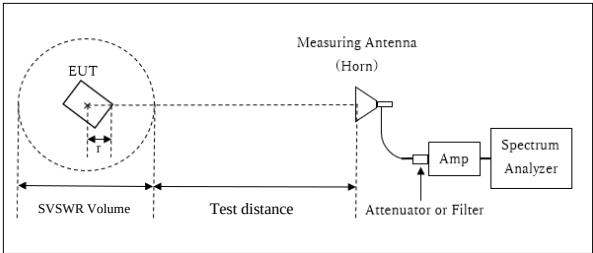
r : Radius of an outer periphery of EUT

× : Center of turn table

Distance Factor: $20 \times \log (3.0 \text{ m} / 3.0 \text{ m}) = 0 \text{ dB}$
*(Test Distance + SVSWR Volume / 2) - r = 3 m

Test Distance: 3 m
SVSWR Volume: 1.5m
(SVSWR Volume has been calibrated based on CISPR 16-1-4.)
r: 0.75 m

6 GHz to 10 GHz



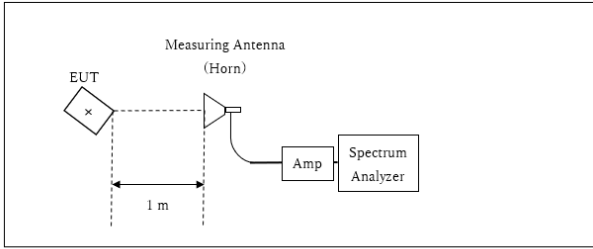
r : Radius of an outer periphery of EUT

× : Center of turn table

Distance Factor: $20 \times \log (5.2 \text{ m} / 3.0 \text{ m}) = 4.78 \text{ dB}$
*(Test Distance + SVSWR Volume / 2) - r = 5.2 m

Test Distance: 5.16 m
SVSWR Volume: 1.68 m
(SVSWR Volume has been calibrated based on CISPR 16-1-4.)
r: 0.8 m

10 GHz to 30 GHz



× : Center of turn table

Distance Factor: $20 \times \log (1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$
*Test Distance: 1 m

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

6.5 Test result

Summary of the test results: Pass

The limit is rounded down to one decimal place.

The test result is rounded off to one or two decimal places, so some differences might be observed.

SECTION 6: Antenna Terminal

6.1 Operating environment

Date : See data
Test place : See data
Temperature : See data
Humidity : See data
Test engineer : See data

6.2 Test configuration

EUT was placed on a wooden table of nominal size, 1.0 m by 1.5 m, raised 0.8 m from the ground. Photographs of the set up are shown in APPENDIX 3.

6.3 Test conditions

Frequency range : 30 MHz to 1000 MHz / 1000 MHz to 30000 MHz
Test distance : N/A
EUT position : Table top
EUT operation mode : See Clause 4.1

6.4 Test procedure

The Antenna Terminal was measured with a spectrum analyzer connected to the antenna port.

Frequency	Below 1 GHz	Above 1 GHz
Instrument used	Spectrum Analyzer	Spectrum Analyzer *1)
IF Bandwidth	PK: RBW: 100 kHz / VBW: 300 kHz	PK: RBW: 1 MHz / VBW: 3 MHz

*1) The Spectrum Analyzer was used in 3 dB resolution bandwidth.

6.5 Test result

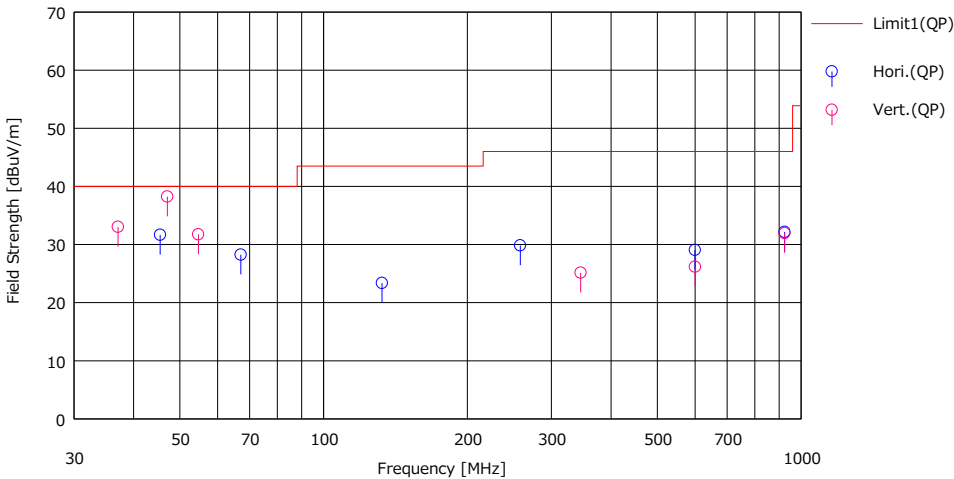
Summary of the test results: Pass

APPENDIX 1: Test data

Radiated Emission

Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date June 17, 2024
Temperature / Humidity 22 deg. C / 57 % RH
Engineer Hiroki Numata
 (Below 1 GHz)
Mode Mode 1

Limit : FCC_Part 15 Subpart B(15.109)_Class B



No.	Freq. [MHz]	Reading (QP)	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit	Margin	Pda. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		[dBuV]				(QP) [dBuV/m]	(QP) [dBuV/m]	(QP) [dB]					
1	45.477	43.90	12.79	7.16	32.19	31.66	40.00	8.34	Hori.	400	251	BA	
2	67.088	46.30	6.64	7.48	32.18	28.24	40.00	11.76	Hori.	400	231	BA	
3	132.583	33.50	13.77	8.22	32.12	23.37	43.50	20.13	Hori.	227	251	BA	
4	258.191	40.50	12.03	9.32	32.02	29.83	46.00	16.17	Hori.	117	247	LA22	
5	599.816	30.30	19.36	11.46	32.06	29.06	46.00	16.94	Hori.	100	359	LA22	
6	924.001	27.90	22.03	13.05	30.83	32.15	46.00	13.85	Hori.	100	44	LA22	
7	37.106	42.30	15.90	7.03	32.20	33.03	40.00	6.97	Vert.	100	353	BA	
8	47.074	51.00	12.23	7.19	32.19	38.23	40.00	1.77	Vert.	100	77	BA	
9	54.656	47.00	9.64	7.30	32.19	31.75	40.00	8.25	Vert.	100	282	BA	
10	345.621	32.20	14.97	9.97	32.00	25.14	46.00	20.86	Vert.	165	160	LA22	
11	599.886	27.40	19.36	11.46	32.06	26.16	46.00	19.84	Vert.	169	258	LA22	
12	924.001	27.70	22.03	13.05	30.83	31.95	46.00	14.05	Vert.	153	1	LA22	

CHART: WITH FACTOR
ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + ATT) - GAIN(AMP)
Except for the above table: adequate margin data below the limits.

Radiated Emission

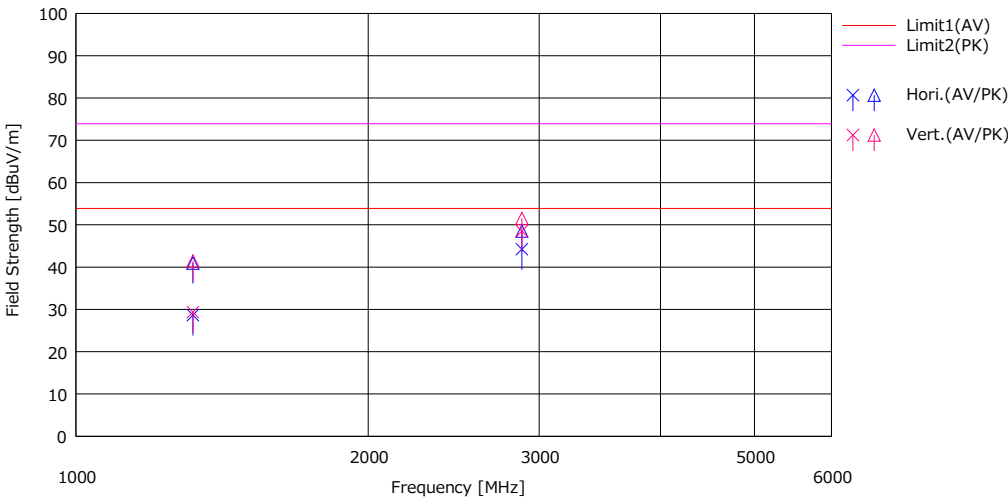
Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer

Mode

Ise EMC Lab.
No.2
June 24, 2024
22 deg. C / 65 % RH
Takeshi Hiyaji
(1 GHz - 6 GHz)
Mode 1

No.1
June 24, 2024
21 deg. C / 57 % RH
Takeshi Hiyaji
(Above 6 GHz)

Limit : FCC_Part 15 Subpart B(15.109)_Class B



No.	Freq. [MHz]	Reading		Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result		Limit		Margin		Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		(AV) [dBuV]	(PK) [dBuV]				(AV) [dBuV/m]	(PK) [dBuV/m]	(AV) [dBuV/m]	(PK) [dBuV/m]	(AV) [dB]	(PK) [dB]					
		[dBuV]	[dBuV]				[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]					
1	1320.000	35.80	48.10	26.16	1.94	35.25	28.65	40.95	53.90	73.90	25.25	32.95	Hori.	100	162	HA6	
2	2880.214	47.00	51.30	28.57	2.90	34.25	44.22	48.52	53.90	73.90	9.68	25.38	Hori.	115	144	HA6	
3	1320.000	36.50	48.60	26.16	1.94	35.25	29.35	41.45	53.90	73.90	24.55	32.45	Vert.	100	191	HA6	
4	2880.214	51.30	54.30	28.57	2.90	34.25	48.52	51.52	53.90	73.90	5.38	22.38	Vert.	100	172	HA6	

CHART: WITH FACTOR
ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + D-factor) - GAIN(AMP)
Except for the above table: adequate margin data below the limits.

* No signal was detected above 6 GHz.

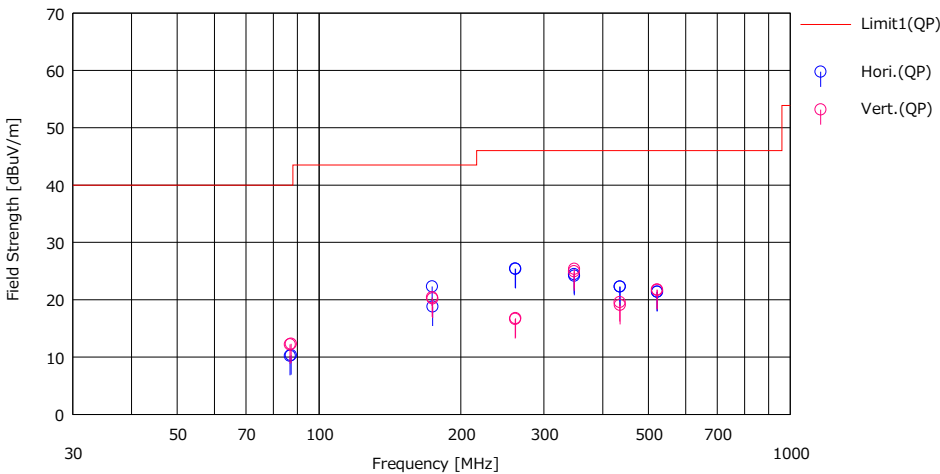
Radiated Emission

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer

Mode

Ise EMC Lab.
No.3
June 17, 2024
22 deg. C / 57 % RH
Hiroki Numata
(Below 1 GHz)
Mode 2 (Local) 87.0 MHz

Limit : FCC_Part 15 Subpart B(15.109)_Class B



No.	Freq. [MHz]	Reading	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit	Margn	Pda. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		[dBuV]				[dBuV/m]	[dBuV/m]	[dB]					
1	86.780	26.80	7.79	7.77	32.16	10.20	40.00	29.80	Hori.	273	314	BA	
2	87.220	26.80	7.89	7.78	32.16	10.31	40.00	29.69	Hori.	273	314	BA	
3	173.780	29.70	16.03	8.65	32.08	22.30	43.50	21.20	Hori.	198	231	BA	
4	174.220	26.20	16.02	8.66	32.08	18.80	43.50	24.70	Hori.	198	231	BA	
5	260.780	35.80	12.27	9.37	32.01	25.43	46.00	20.57	Hori.	100	329	LA22	
6	261.220	35.70	12.30	9.38	32.01	25.37	46.00	20.63	Hori.	100	329	LA22	
7	347.780	31.40	15.03	10.02	32.00	24.45	46.00	21.55	Hori.	100	305	LA22	
8	348.220	31.10	15.03	10.03	32.00	24.16	46.00	21.84	Hori.	100	305	LA22	
9	434.780	27.50	16.21	10.59	32.02	22.28	46.00	23.72	Hori.	100	340	LA22	
10	435.220	27.50	16.21	10.60	32.02	22.29	46.00	23.71	Hori.	100	340	LA22	
11	521.780	24.70	17.64	11.08	32.04	21.38	46.00	24.62	Hori.	100	132	LA22	
12	522.220	24.70	17.64	11.08	32.04	21.38	46.00	24.62	Hori.	100	132	LA22	
13	86.780	28.80	7.79	7.77	32.16	12.20	40.00	27.80	Vert.	100	355	BA	
14	87.220	28.80	7.89	7.78	32.16	12.31	40.00	27.69	Vert.	100	355	BA	
15	173.780	27.80	16.03	8.65	32.08	20.40	43.50	23.10	Vert.	284	187	BA	
16	174.220	27.60	16.02	8.66	32.08	20.20	43.50	23.30	Vert.	284	187	BA	
17	260.780	27.00	12.27	9.37	32.01	16.63	46.00	29.37	Vert.	165	34	LA22	
18	261.220	27.10	12.30	9.38	32.01	16.77	46.00	29.23	Vert.	165	34	LA22	
19	347.780	31.90	15.03	10.02	32.00	24.95	46.00	21.05	Vert.	100	334	LA22	
20	348.220	32.30	15.03	10.03	32.00	25.36	46.00	20.64	Vert.	100	334	LA22	
21	434.780	24.80	16.21	10.59	32.02	19.58	46.00	26.42	Vert.	100	195	LA22	
22	435.220	24.30	16.21	10.60	32.02	19.09	46.00	26.91	Vert.	100	195	LA22	
23	521.780	25.10	17.64	11.08	32.04	21.78	46.00	24.22	Vert.	100	191	LA22	
24	522.220	25.00	17.64	11.08	32.04	21.68	46.00	24.32	Vert.	100	191	LA22	

CHART: WITH FACTOR
ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + ATT) - GAIN(AMP)
Except for the above table: adequate margin data below the limits.

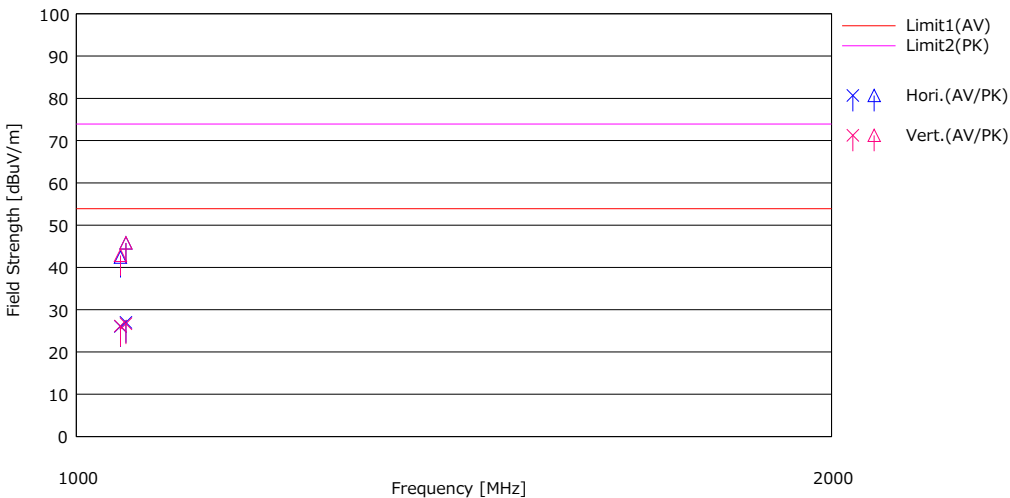
Radiated Emission

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer

Mode

Ise EMC Lab.
No.2
June 24, 2024
22 deg. C / 65 % RH
Takeshi Hiyaji
(Above 1 GHz)
Mode 2 (Local) 87.0 MHz

Limit : FCC_Part 15 Subpart B(15.109)_Class B



No.	Freq. [MHz]	Reading		Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result		Limit		Margin		Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		<AV> [dBuV]	<PK> [dBuV]				<AV> [dBuV/m]	<PK> [dBuV/m]	<AV> [dBuV/m]	<PK> [dBuV/m]	<AV> [dB]	<PK> [dB]					
1	1041.360	34.90	51.30	24.96	1.71	35.53	26.04	42.44	53.90	73.90	27.86	31.46	Hori.	100	0	HA6	
2	1046.640	35.80	54.60	24.98	1.72	35.52	26.98	45.78	53.90	73.90	26.92	28.12	Hori.	100	0	HA6	
3	1041.360	35.00	51.70	24.96	1.71	35.53	26.14	42.84	53.90	73.90	27.76	31.06	Vert.	100	0	HA6	
4	1046.640	35.50	54.60	24.98	1.72	35.52	26.68	45.78	53.90	73.90	27.22	28.12	Vert.	100	0	HA6	

CHART: WITH FACTOR
ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + D-factor) - GAIN(AMP)
Except for the above table: adequate margin data below the limits.

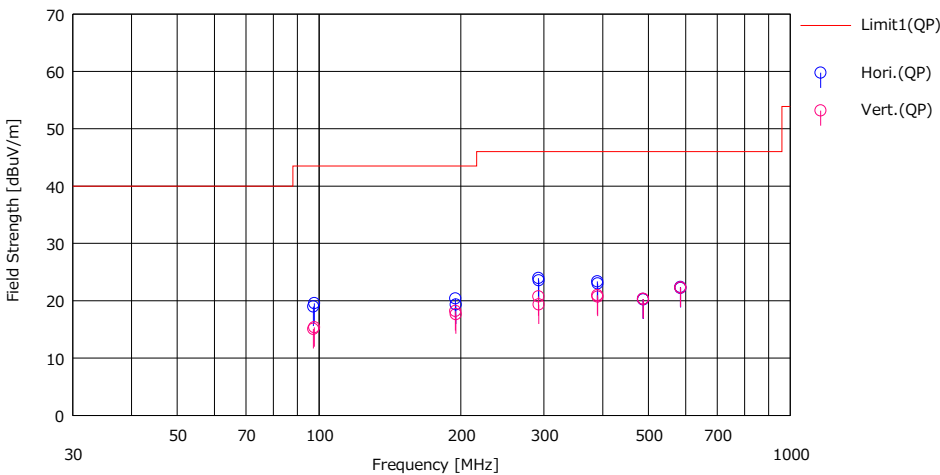
Radiated Emission

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer

Mode

Ise EMC Lab.
No.3
June 17, 2024
22 deg. C / 57 % RH
Hiroki Numata
(Below 1 GHz)
Mode 2 (Local) 97.5 MHz

Limit : FCC_Part 15 Subpart B(15.109)_Class B



No.	Freq. [MHz]	Reading (QP)	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit	Margn	Pda [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		[dBuV]				[dBuV/m]	[dBuV/m]	[dB]					
1	97.280	33.40	9.84	7.89	32.15	18.98	43.50	24.52	Hori.	295	100	BA	
2	97.720	33.90	9.92	7.89	32.15	19.56	43.50	23.94	Hori.	295	100	BA	
3	194.780	27.10	16.51	8.84	32.06	20.39	43.50	23.11	Hori.	100	285	BA	
4	195.220	26.00	16.53	8.85	32.05	19.33	43.50	24.17	Hori.	100	285	BA	
5	292.280	32.70	13.61	9.62	31.99	23.94	46.00	22.06	Hori.	100	349	LA22	
6	292.720	32.30	13.61	9.62	31.99	23.54	46.00	22.46	Hori.	100	349	LA22	
7	389.780	29.70	15.36	10.32	32.01	23.37	46.00	22.63	Hori.	100	354	LA22	
8	390.220	29.30	15.38	10.32	32.01	22.99	46.00	23.01	Hori.	100	354	LA22	
9	487.280	24.00	17.44	10.89	32.04	20.29	46.00	25.71	Hori.	100	0	LA22	
10	487.720	23.90	17.46	10.89	32.04	20.21	46.00	25.79	Hori.	100	0	LA22	
11	584.780	24.10	18.92	11.43	32.06	22.39	46.00	23.61	Hori.	169	19	LA22	
12	585.220	23.90	18.93	11.43	32.06	22.20	46.00	23.80	Hori.	169	19	LA22	
13	97.280	29.50	9.84	7.89	32.15	15.08	43.50	28.42	Vert.	100	265	BA	
14	97.720	29.70	9.92	7.89	32.15	15.36	43.50	28.14	Vert.	100	265	BA	
15	194.780	24.90	16.51	8.84	32.06	18.19	43.50	25.31	Vert.	100	0	BA	
16	195.220	24.30	16.53	8.85	32.05	17.63	43.50	25.87	Vert.	100	0	BA	
17	292.280	29.50	13.61	9.62	31.99	20.74	46.00	25.26	Vert.	100	303	LA22	
18	292.720	28.10	13.61	9.62	31.99	19.34	46.00	26.66	Vert.	100	303	LA22	
19	389.780	27.30	15.36	10.32	32.01	20.97	46.00	25.03	Vert.	100	350	LA22	
20	390.220	27.00	15.38	10.32	32.01	20.69	46.00	25.31	Vert.	100	350	LA22	
21	487.280	24.00	17.44	10.89	32.04	20.29	46.00	25.71	Vert.	100	243	LA22	
22	487.720	24.00	17.46	10.89	32.04	20.31	46.00	25.69	Vert.	100	243	LA22	
23	584.780	24.00	18.92	11.43	32.06	22.29	46.00	23.71	Vert.	100	239	LA22	
24	585.220	24.00	18.93	11.43	32.06	22.30	46.00	23.70	Vert.	100	239	LA22	

CHART: WITH FACTOR
ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + ATT) - GAIN(AMP)
Except for the above table: adequate margin data below the limits.

Radiated Emission

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer

Mode

Ise EMC Lab.
No.2
June 24, 2024
22 deg. C / 65 % RH
Takeshi Hiyaji
(Above 1 GHz)
Mode 2 (Local) 97.5 MHz

Limit : FCC_Part 15 Subpart B(15.109)_Class B



No.	Freq. [MHz]	Reading		Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result		Limit		Margin		Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		<AV> [dBuV]	<PK> [dBuV]				<AV> [dBuV/m]	<PK> [dBuV/m]	<AV> [dBuV/m]	<PK> [dBuV/m]	<AV> [dB]	<PK> [dB]					
1	1070.080	33.00	46.40	25.05	1.74	35.50	24.29	37.69	53.90	73.90	29.61	36.21	Hori.	100	188	HA6	
2	1074.920	34.70	48.00	25.05	1.74	35.49	26.01	39.31	53.90	73.90	27.89	34.59	Hori.	100	111	HA6	
3	1070.080	33.60	47.10	25.05	1.74	35.50	24.89	38.39	53.90	73.90	29.01	35.51	Vert.	100	120	HA6	
4	1074.920	34.70	47.80	25.05	1.74	35.49	26.01	39.11	53.90	73.90	27.89	34.79	Vert.	100	353	HA6	

CHART: WITH FACTOR
ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + D-factor) - GAIN(AMP)
Except for the above table: adequate margin data below the limits.

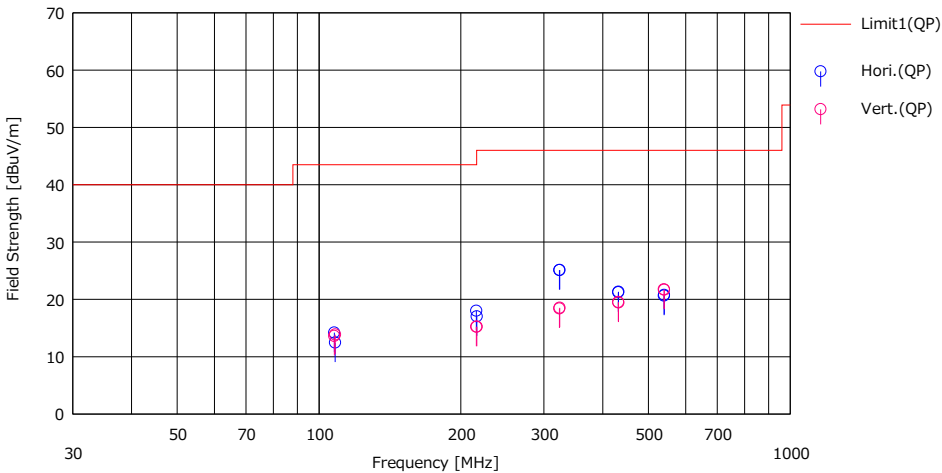
Radiated Emission

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer

Mode

Ise EMC Lab.
No.3
June 17, 2024
22 deg. C / 57 % RH
Hiroki Numata
(Below 1 GHz)
Mode 2 (Local) 108.0 MHz

Limit : FCC_Part 15 Subpart B(15.109)_Class B



No.	Freq. [MHz]	Reading (QP)	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result (QP)	Limit (QP)	Margn (QP)	Pda. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		[dBuV]				[dBuV/m]	[dBuV/m]	[dB]					
1	107.780	26.80	11.54	8.00	32.14	14.20	43.50	29.30	Hori.	172	14	BA	
2	108.220	25.00	11.59	8.00	32.14	12.45	43.50	31.05	Hori.	172	14	BA	
3	215.780	29.80	11.23	9.02	32.04	18.01	43.50	25.49	Hori.	152	201	LA22	
4	216.220	28.80	11.23	9.03	32.04	17.02	46.00	28.98	Hori.	152	201	LA22	
5	323.780	33.00	14.25	9.85	32.00	25.10	46.00	20.90	Hori.	100	287	LA22	
6	324.220	33.00	14.27	9.85	32.00	25.12	46.00	20.88	Hori.	100	287	LA22	
7	431.780	26.50	16.16	10.58	32.02	21.22	46.00	24.78	Hori.	100	334	LA22	
8	432.220	26.60	16.16	10.58	32.02	21.32	46.00	24.68	Hori.	100	334	LA22	
9	539.780	23.70	17.82	11.18	32.05	20.65	46.00	25.35	Hori.	100	9	LA22	
10	540.220	23.80	17.82	11.19	32.05	20.76	46.00	25.24	Hori.	100	9	LA22	
11	107.780	26.20	11.54	8.00	32.14	13.60	43.50	29.90	Vert.	100	276	BA	
12	108.220	26.40	11.59	8.00	32.14	13.85	43.50	29.65	Vert.	100	276	BA	
13	215.780	27.00	11.23	9.02	32.04	15.21	43.50	28.29	Vert.	100	344	LA22	
14	216.220	27.00	11.23	9.03	32.04	15.22	46.00	30.78	Vert.	100	344	LA22	
15	323.780	26.30	14.25	9.85	32.00	18.40	46.00	27.60	Vert.	100	336	LA22	
16	324.220	26.40	14.27	9.85	32.00	18.52	46.00	27.48	Vert.	100	336	LA22	
17	431.780	24.80	16.16	10.58	32.02	19.52	46.00	26.48	Vert.	100	13	LA22	
18	432.220	24.70	16.16	10.58	32.02	19.42	46.00	26.58	Vert.	100	13	LA22	
19	539.780	24.80	17.82	11.18	32.05	21.75	46.00	24.25	Vert.	100	354	LA22	
20	540.220	24.70	17.82	11.19	32.05	21.66	46.00	24.34	Vert.	100	354	LA22	

CHART: WITH FACTOR
ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + ATT) - GAIN(AMP)
Except for the above table: adequate margin data below the limits.

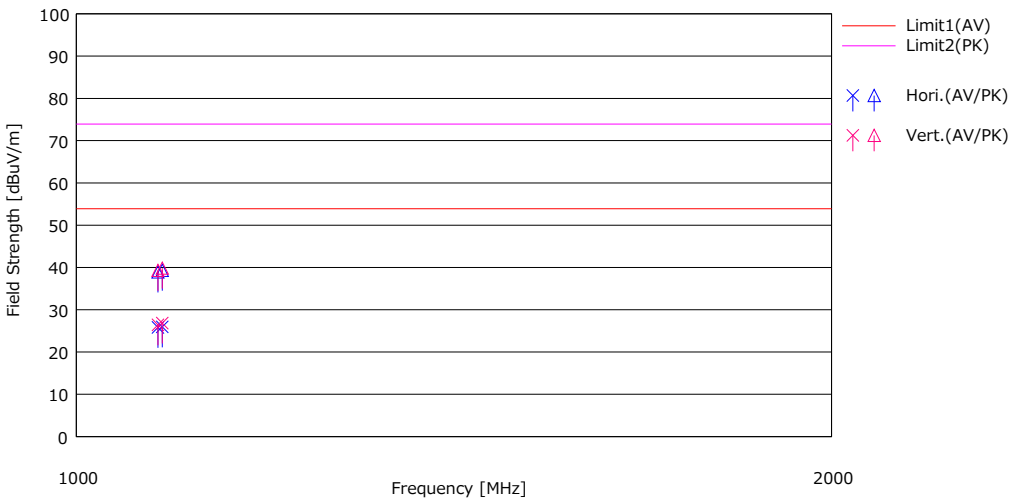
Radiated Emission

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer

Mode

Ise EMC Lab.
No.2
June 24, 2024
22 deg. C / 65 % RH
Takeshi Hiyaji
(Above 1 GHz)
Mode 2 (Local) 108.0 MHz

Limit : FCC_Part 15 Subpart B(15.109)_Class B



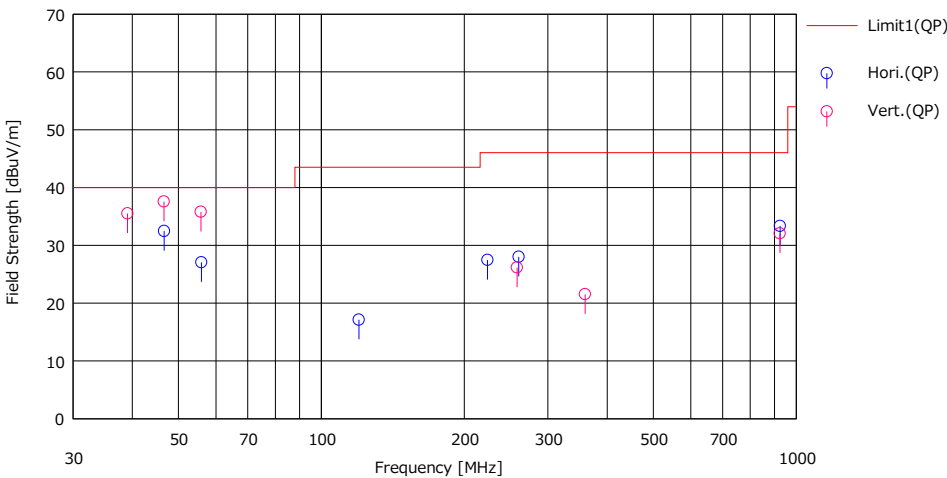
No.	Freq. [MHz]	Reading		Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result		Limit		Margin		Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		<AV> [dBuV]	<PK> [dBuV]				<AV> [dBuV/m]	<PK> [dBuV/m]	<AV> [dBuV/m]	<PK> [dBuV/m]	<AV> [dB]	<PK> [dB]					
1	1077.800	34.50	47.60	25.07	1.74	35.49	25.82	38.92	53.90	73.90	28.08	34.98	Hori.	100	144	HA6	
2	1082.200	34.60	48.00	25.08	1.75	35.49	25.94	39.34	53.90	73.90	27.96	34.56	Hori.	100	186	HA6	
3	1077.800	35.10	48.00	25.07	1.74	35.49	26.42	39.32	53.90	73.90	27.48	34.58	Vert.	100	120	HA6	
4	1082.200	35.50	48.50	25.08	1.75	35.49	26.84	39.84	53.90	73.90	27.06	34.06	Vert.	100	145	HA6	

CHART: WITH FACTOR
ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + D-factor) - GAIN(AMP)
Except for the above table: adequate margin data below the limits.

Radiated Emission

Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date June 18, 2024
Temperature / Humidity 23 deg. C / 53 % RH
Engineer Hiroki Numata
Mode (Below 1 GHz)
Mode 2 (Other)

Limit : FCC15.209 3 m, below 1 GHz:QP, above 1 GHz:AV/PK



No.	Freq. [MHz]	Reading (QP)	Ant.Fac [dB/m]	Loss (dB)	Gain (dB)	Result (QP)	Limit (QP)	Margn (QP)	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		[dBuV]				[dBuV/m]	[dBuV/m]	[dB]					
1	46.678	45.10	12.37	7.18	32.19	32.46	40.00	7.54	Hori.	398	59	BA	
2	55.913	42.70	9.23	7.32	32.19	27.06	40.00	12.94	Hori.	311	293	BA	
3	120.005	28.30	12.87	8.09	32.13	17.13	43.52	26.39	Hori.	241	238	BA	
4	223.860	39.20	11.26	9.05	32.04	27.47	46.02	18.55	Hori.	150	56	LA22	
5	260.450	38.50	12.18	9.34	32.01	28.01	46.02	18.01	Hori.	100	281	LA22	
6	924.792	29.10	22.02	13.05	30.83	33.34	46.02	12.68	Hori.	102	323	LA22	
7	39.085	45.50	15.14	7.06	32.20	35.50	40.00	4.50	Vert.	100	20	BA	
8	46.621	50.20	12.39	7.18	32.19	37.58	40.00	2.42	Vert.	173	179	BA	
9	55.795	51.40	9.27	7.32	32.19	35.80	40.00	4.20	Vert.	100	265	BA	
10	258.387	36.80	12.05	9.32	32.01	25.16	46.02	19.86	Vert.	100	174	LA22	
11	359.379	28.40	15.08	10.06	32.00	21.54	46.02	24.48	Vert.	172	148	LA22	
12	924.001	27.80	22.03	13.05	30.83	32.05	46.02	13.97	Vert.	100	11	LA22	

CHART: WITH FACTOR
ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + ATT) - GAIN(AMP)
Except for the above table: adequate margin data below the limits.

Radiated Emission

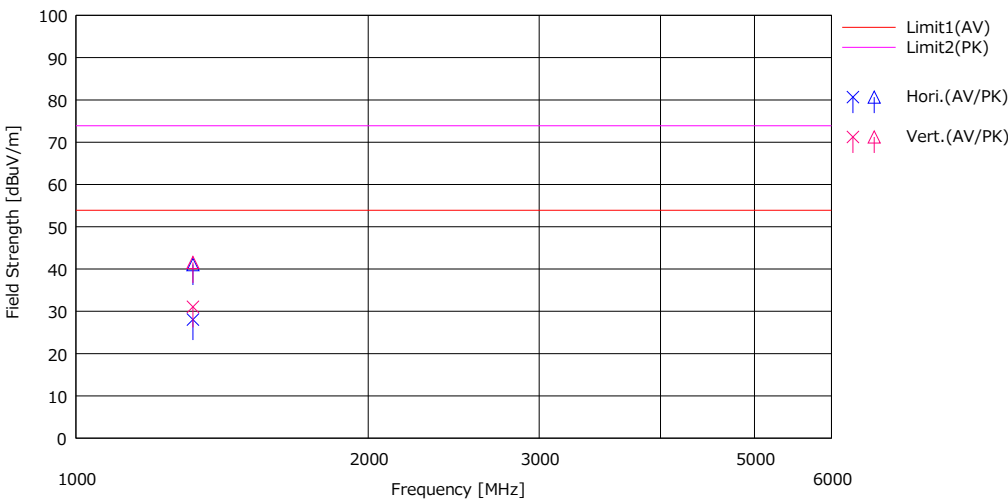
Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer

Mode

Ise EMC Lab.
No.2
June 24, 2024
22 deg. C / 65 % RH
Takeshi Hiyaji
(1 GHz - 6 GHz)
Mode 2 (Other)

No.1
June 24, 2024
21 deg. C / 57 % RH
Takeshi Hiyaji
(Above 6 GHz)

Limit : FCC_Part 15 Subpart B(15.109)_Class B



No.	Freq. [MHz]	Reading		Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result		Limit		Margin		Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		(AV) [dBuV]	(PK) [dBuV]				(AV) [dBuV/m]	(PK) [dBuV/m]	(AV) [dBuV/m]	(PK) [dBuV/m]	(AV) [dB]	(PK) [dB]					
1	1320.000	35.20	48.20	26.16	1.94	35.25	28.05	41.05	53.90	73.90	25.85	32.85	Hori.	100	137	HA6	
2	1320.000	38.20	48.70	26.16	1.94	35.25	31.05	41.55	53.90	73.90	22.85	32.35	Vert.	100	187	HA6	

CHART: WITH FACTOR
ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + D-factor) - GAIN(AMP)
Except for the above table: adequate margin data below the limits.

* No signal was detected above 6 GHz.

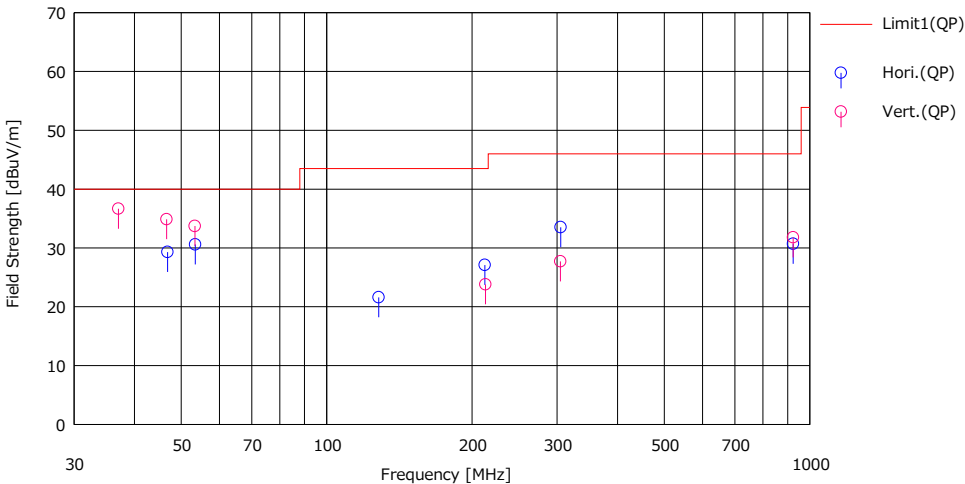
Radiated Emission

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer

Mode

Ise EMC Lab.
No.2
June 24, 2024
22 deg. C / 65 % RH
Nachi Konegawa
(Below 1 GHz)
Mode 3

Limit : FCC_Part 15 Subpart B(15.109)_Class B



No.	Freq.	Reading	Ant.Fac	Loss	Gain	Result	Limit	Margin	Pola.	Height	Angle	Ant. Type	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]					
1	46.855	38.70	12.26	6.85	28.52	29.29	40.00	10.71	Hori.	333	298	BA	
2	53.461	42.30	9.86	6.93	28.51	30.58	40.00	9.42	Hori.	374	272	BA	
3	128.180	28.70	13.61	7.59	28.31	21.59	43.50	21.91	Hori.	166	96	BA	
4	212.490	35.30	11.54	8.18	27.92	27.10	43.50	16.40	Hori.	100	235	LA21	
5	305.100	38.70	13.83	8.74	27.76	33.51	46.00	12.49	Hori.	100	212	LA21	
6	923.998	26.10	22.03	11.32	28.77	30.68	46.00	15.32	Hori.	152	37	LA21	
7	37.077	42.60	15.88	6.72	28.54	36.66	40.00	3.34	Vert.	100	101	BA	
8	46.660	44.20	12.34	6.85	28.53	34.86	40.00	5.14	Vert.	100	9	BA	
9	53.370	45.40	9.90	6.93	28.51	33.72	40.00	6.28	Vert.	100	271	BA	
10	213.240	32.00	11.54	8.18	27.92	23.80	43.50	19.70	Vert.	100	331	LA21	
11	304.780	32.90	13.82	8.74	27.76	27.70	46.00	18.30	Vert.	100	34	LA21	
12	923.998	27.20	22.03	11.32	28.77	31.78	46.00	14.22	Vert.	100	15	LA21	

CHART: WITH FACTOR
ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + ATT) - GAIN(AMP)
Except for the above table: adequate margin data below the limits.

Radiated Emission

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.1
Date	June 24, 2024	June 24, 2024
Temperature / Humidity	22 deg. C / 65 % RH	21 deg. C / 57 % RH
Engineer	Takeshi Hiyaji (1 GHz - 6 GHz)	Takeshi Hiyaji (Above 6 GHz)
Mode	Mode 3	

Limit : FCC Part 15 Subpart B(15.109) Class B

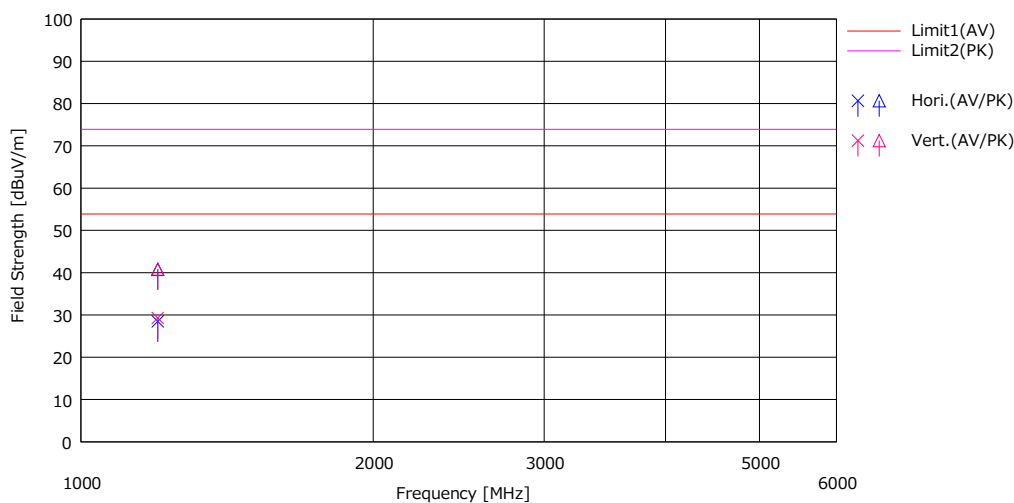
[illegible]

CHART: WITH FACTOR

ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN

CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + D-factor) - GAIN(AMP)

Except for the above table: adequate margin data below the limits.

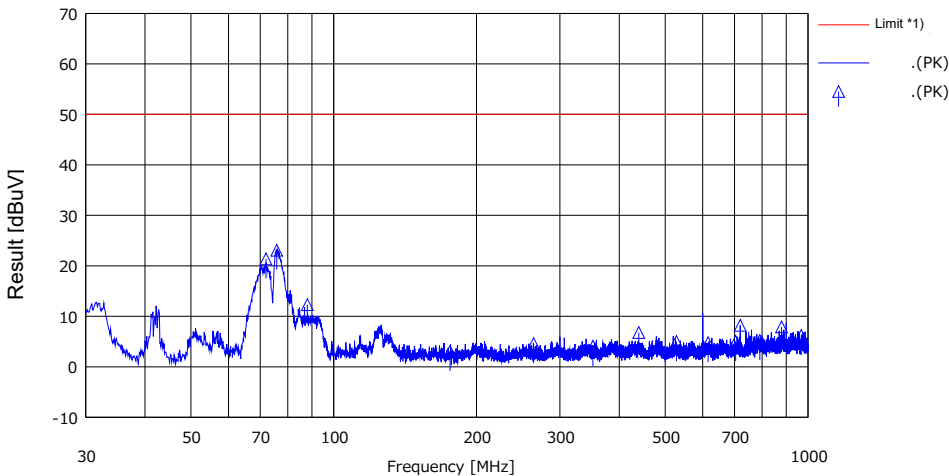
* No signal was detected above 6 GHz.

Antenna Terminal Conducted Emission

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer
Mode

Ise EMC Lab.
No.3
June 16, 2024
20 deg. C / 55 % RH
Hiroki Numata
Mode 4

Limit : FCC15.111 Antenna terminal measurement



No.	Freq. [MHz]	Reading (PK) [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result (PK) [dBuV]	Limit *1 (PK) [dBuV]	Margn (PK) [dB]	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		[dBuV]				[dBuV]	[dBuV]	[dB]					
1	71.957	47.31	0.00	6.24	32.18	21.37	50.00	28.63				---	
2	75.832	49.02	0.00	6.25	32.17	23.10	50.00	26.90				---	
3	87.970	38.19	0.00	6.28	32.16	12.31	50.00	37.69				---	
4	175.940	28.73	0.00	6.39	32.07	3.05	50.00	46.95				---	
5	263.910	30.12	0.00	6.49	32.01	4.60	50.00	45.40				---	
6	351.880	29.44	0.00	6.61	32.00	4.05	50.00	45.95				---	
7	439.850	31.93	0.00	6.87	32.02	6.78	50.00	43.22				---	
8	527.820	30.14	0.00	6.92	32.05	5.01	50.00	44.99				---	
9	615.790	29.97	0.00	6.89	32.06	4.80	50.00	45.20				---	
10	703.760	30.19	0.00	6.91	32.06	5.04	50.00	44.96				---	
11	720.000	33.26	0.00	6.92	31.97	8.21	50.00	41.79				---	
12	791.730	29.79	0.00	6.98	31.57	5.20	50.00	44.80				---	
13	879.700	31.91	0.00	7.05	31.08	7.88	50.00	42.12				---	
14	967.670	29.69	0.00	7.11	30.59	6.21	50.00	43.79				---	Local 87.75 MHz

* 2 nW = -57 dBm = 50 dBuV
CHART: WITH FACTOR
CALCULATION: RESULT = READING + LOSS (CABLE + Matching Pad) – GAIN (AMP)
Except for the above table: adequate margin data below the limits.

APPENDIX 2: Test instruments

Test equipment-1/2

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	141265	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-190	07/11/2023	12
RE	141266	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-191	08/10/2023	12
RE	141317	Coaxial Cable	UL Japan	-	-	09/12/2023	12
RE	141323	Coaxial cable	UL Japan	-	-	09/10/2023	12
RE	141393	Microwave Cable	Junkosha	MWX221	1604S254(1 m) /1608S088(5 m)	07/06/2024	12
RE	141424	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103 +BBA9106	1915	03/15/2024	12
RE	141427	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103B +BBA9106	08031	07/11/2023	12
RE	141511	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	253	09/25/2023	12
RE	141512	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	254	10/17/2023	12
RE	141513	Horn Antenna 15-40GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9170	BBHA9170306	07/19/2023	12
RE	141517	Horn Antenna 26.5-40GHz	ETS-Lindgren	3160-10	152399	11/20/2023	12
RE	141530	Digital Tester	Fluke Corporation	FLUKE 26-3	78030621	02/01/2024	12
RE	141532	DIGITAL HiTESTER	HIOKI E.E. CORPORATION	3805	051201197	01/31/2024	12
RE	141542	Digital Tester	Fluke Corporation	FLUKE 26-3	78030611	08/01/2023	12
RE	141550	Matching Pad Anritsu	Anritsu Corporation	MB-009	40063	07/04/2024	12
RE	141568	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	2901	01/10/2024	12
RE	141576	Pre Amplifier	Keysight Technologies Inc	8449B	3008A01671	02/17/2024	12
RE	141579	Pre Amplifier	Keysight Technologies Inc	8449B	3008A02142	02/17/2024	12
RE	141582	Pre Amplifier	SONOMA INSTRUMENT	310	260834	02/17/2024	12
RE	141588	Pre Amplifier	L3 Narda-MITEQ	AMF-6F-2600400-33-8P / AMF-4F-2600400-33-8P	1871355 / 1871328	01/22/2024	12
RE	141594	Pre Amplifier	Keysight Technologies Inc	8447D	2944A10150	02/17/2024	12
RE	141884	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY44020357	05/09/2024	12
RE	141894	Signal Generator	Rohde & Schwarz	SMC100A	103408	10/05/2023	12
RE	141950	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	11/20/2023	12
RE	141994	AC1_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 10m	DA-06881	04/20/2023	24
RE	141998	AC1_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	12/06/2023	24
RE	142004	AC2_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	12/12/2023	24
RE	142006	AC2_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-06902	04/17/2023	24
RE	142008	AC3_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	12/11/2023	24
RE	142183	Measure	KOMELON	KMC-36	-	10/20/2023	12
RE	142226	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
RE	142228	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
RE	142314	Attenuator	Pasternack Enterprises	PE7390-6	D/C 1504	06/06/2024	12
RE	144196	Test Receiver	Rohde & Schwarz	ESCI	100608	10/18/2023	12
RE	156190	DC Block	EMC Instruments Corporation	N9398C	MY46457635	07/04/2024	12
RE	160324	Coaxial Cable	Huber+Suhner	SUCOFLEX 102A	MY009/2A	10/05/2023	12
RE	176125	Wireless Connectivity Test Set	Anritsu Corporation	MT8862A	6261711752	-	-
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	238712	Double Ridge Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA 9120 C	687	08/10/2023	12
RE	244707	Thermo-Hygrometer	HIOKI E.E. CORPORATION	LR5001	231202102	01/25/2024	12
RE	244709	Thermo-Hygrometer	HIOKI E.E. CORPORATION	LR5001	231202103	01/25/2024	12

Test equipment-2/2

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	141327	Coaxial Cable	UL Japan	-	-	02/09/2024	12
AT	141532	DIGITAL HiTESTER	HIOKI E.E. CORPORATION	3805	051201197	01/31/2024	12
AT	141550	Matching Pad Anritsu	Anritsu Corporation	MB-009	40063	07/04/2024	12
AT	141580	MicroWave System Amplifier	Keysight Technologies Inc	83017A	MY39500779	03/08/2024	12
AT	141582	Pre Amplifier	SONOMA INSTRUMENT	310	260834	02/17/2024	12
AT	141588	Pre Amplifier	L3 Narda-MITEQ	AMF-6F-2600400-33-8P / AMF-4F-2600400-33-8P	1871355 /1871328	01/22/2024	12
AT	141885	Spectrum Analyzer	Keysight Technologies Inc	E4448A	US44300523	11/29/2023	12
AT	160324	Coaxial Cable	Huber+Suhner	SUCOFLEX 102A	MY009/2A	10/05/2023	12
AT	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
AT	244709	Thermo-Hygrometer	HIOKI E.E. CORPORATION	LR5001	231202103	01/25/2024	12
AT	246001	Microwave Cable	Huber+Suhner	SF103/11PC35/11P C35/1000mm / SF126E/5000mm	800673(1m) / 610204(5m)	03/06/2024	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

AT: Antenna Terminal Conducted