





# EMI TEST REPORT

## Test Report No. 14898707H-R3

Customer	DENSO TEN Limited
Description of EUT	Car Audio
Model Number of EUT	TN0036A
FCC ID	BABTN0036A
Test Regulation	FCC Part 15 Subpart B
Test Result	Complied
Issue Date	December 4, 2023
Remarks	-

<b>Representative test engineer</b>	<b>Approved by</b>
	
Takumi Nishida Engineer	Ryota Yamanaka Engineer
	 
	CERTIFICATE 5107.02
<input type="checkbox"/> The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan, Inc.	
<input checked="" type="checkbox"/> There is no testing item of "Non-accreditation".	

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- The information provided from the customer for this report is identified in SECTION 1.
- For test report(s) referred in this report, the latest version (including any revisions) is always referred.

## **REVISION HISTORY**

### **Original Test Report No. 14898707H**

This report is a revised version of 14898707H-R2. 14898707H-R2 is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	14898707H	September 4, 2023	-
1	14898707H-R1	November 7, 2023	P.6 SECTION 2.2 Correction of Antenna Gain: Bluetooth: from -0.86 dBi to -0.84 dBi WLAN: from 4.31 dBi to 2.90 dBi
2	14898707H-R2	November 27, 2023	P.6 SECTION 2.2 Correction of Frequency of Operation for WLAN From "5735 MHz to 5835 MHz" to "5765 MHz"
2	14898707H-R2	November 27, 2023	P.11 SECTION 4.2 Update of following item information No. D: Serial Number No. E: all No. 5: Cable Name
3	14898707H-R3	December 4, 2023	P.11 SECTION 4.2 Update of following item information No. 5: Shield (Cable, Connector)

**Reference: Abbreviations (Including words undescribed in this report)**

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

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## **SECTION 1: Customer information**

Company Name	DENSO TEN Limited
Address	2-28, Goshō-dori 1-Chome, Hyogo-ku, Kobe 652-8510 Japan
Telephone Number	+81-78-682-2159
Contact Person	Kaoru Abe

The information provided from the customer is as follows;

- Customer, Description of EUT, Model Number of EUT, FCC ID on the cover and other relevant pages
- Operating/Test Mode(s) (Mode(s)) on all the relevant pages
- SECTION 1: Customer Information
- SECTION 2: Equipment Under Test (EUT) other than the Receipt Date and Test Date
- SECTION 4: Operation of EUT during testing

\* The laboratory is exempted from liability of any test results affected from the above information in SECTION 2 and 4.

## **SECTION 2: Equipment under test (EUT)**

### **2.1 Identification of EUT**

Description	Car Audio
Model Number	TN0036A
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	August 1, 2023
Test Date	August 2 and 3, 2023

### **2.2 Product Description**

#### **General Specification**

Rating	DC 12 V
Clock frequency (ies) in the system	1.716 GHz (MAX)

## Radio Specification

### Bluetooth (BR/EDR)

Equipment Type	Transceiver	
Frequency of Operation	2402 MHz to 2480 MHz	
Type of Modulation	GFSK, $\pi/4$ DQPSK, 8 DPSK	
Antenna Gain	-0.84 dBi (Peak)	

### WLAN (IEEE802.11a/11n-20)

Equipment Type	Transceiver	
Frequency of Operation	20 MHz Band	5765 MHz
Type of Modulation	OFDM	
Antenna Gain	2.90 dBi (Peak)	

### GNSS

Equipment Type	Receiver
Frequency of Operation	See table below.

### Supported GNSS and GNSS signals

GNSS	RNSS Frequency Band / Frequency [MHz]		
	1559 to 1610	1215 to 1300	1164 to 1215
BDS	<input type="checkbox"/> B1I 1561.098	-	-
Galileo	<input checked="" type="checkbox"/> E1 1575.42 (1575.42 $\pm$ 2.046)	<input type="checkbox"/> E6 1278.75	<input type="checkbox"/> E5a 1176.45
			<input type="checkbox"/> E5b 1207.14
GLONASS	<input checked="" type="checkbox"/> G1 1595 - 1608	<input type="checkbox"/> G2 1242.9375 - 1248.625	-
GPS	<input checked="" type="checkbox"/> L1 1575.42 (1575.42 $\pm$ 1.023)	<input type="checkbox"/> L2 1227.6	<input type="checkbox"/> L5 1176.45
SBAS	<input type="checkbox"/> L1 1575.42	-	<input type="checkbox"/> L5 1176.45

- Supported GNSS signal  
 Not supported GNSS signal

### AM/FM (incl. RDS)/DAB

Equipment Type	Receiver
Frequency of Operation	AM: 531 kHz to 1602 kHz FM: Band II: 87.5 MHz to 108.0 MHz DAB (Band III): 174.928 MHz to 229.072 MHz
Type of Modulation	AM FM DAB: OFDM
Antenna Connector Type	HFC IV
Impedance	AM, FM: 75 ohm DAB: 50 ohm

## 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 7. AC power - line conducted emission measurements IEEE 187:2003	Part 15 Subpart B 15.107(a)	-	N/A	*1)
Radiated emission	ANSI C63.4: 2014 8. Radiated emission measurements IEEE 187:2003	Part 15 Subpart B 15.109(a)	6.34 dB 914.622 MHz, Horizontal, Mode 1	Complied	-
Antenna Terminal	ANSI C63.4: 2014 12. Measurement of unintentional radiators other than ITE IEEE 187:2003	Part 15 Subpart B 15.111(a)	19.60 dB 823.733 MHz, PK, Mode 3	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		Uncertainty (+/-)
3 m	30 MHz to 200 MHz	Horizontal	4.8 dB
		Vertical	5.0 dB
	200 MHz to 1000 MHz	Horizontal	5.1 dB
		Vertical	6.2 dB
10 m	30 MHz to 200 MHz	Horizontal	4.8 dB
		Vertical	4.8 dB
	200 MHz to 1000 MHz	Horizontal	4.9 dB
		Vertical	5.0 dB
3 m	1 GHz to 6 GHz	Test Receiver	5.0 dB
		Spectrum analyzer	4.9 dB
	6 GHz to 18 GHz	Test Receiver	5.3 dB
		Spectrum analyzer	5.2 dB
1 m	10 GHz to 26.5 GHz	Spectrum analyzer	5.5 dB
	26.5 GHz to 40 GHz	Spectrum analyzer	5.4 dB
0.5 m	26.5 GHz to 40 GHz	Spectrum analyzer	5.4 dB
10 m	1 GHz to 18 GHz	Test Receiver	5.3 dB

#### Antenna Terminal test

Test Item	Uncertainty (+/-)
Antenna terminal conducted emission	3.3 dB



### 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.

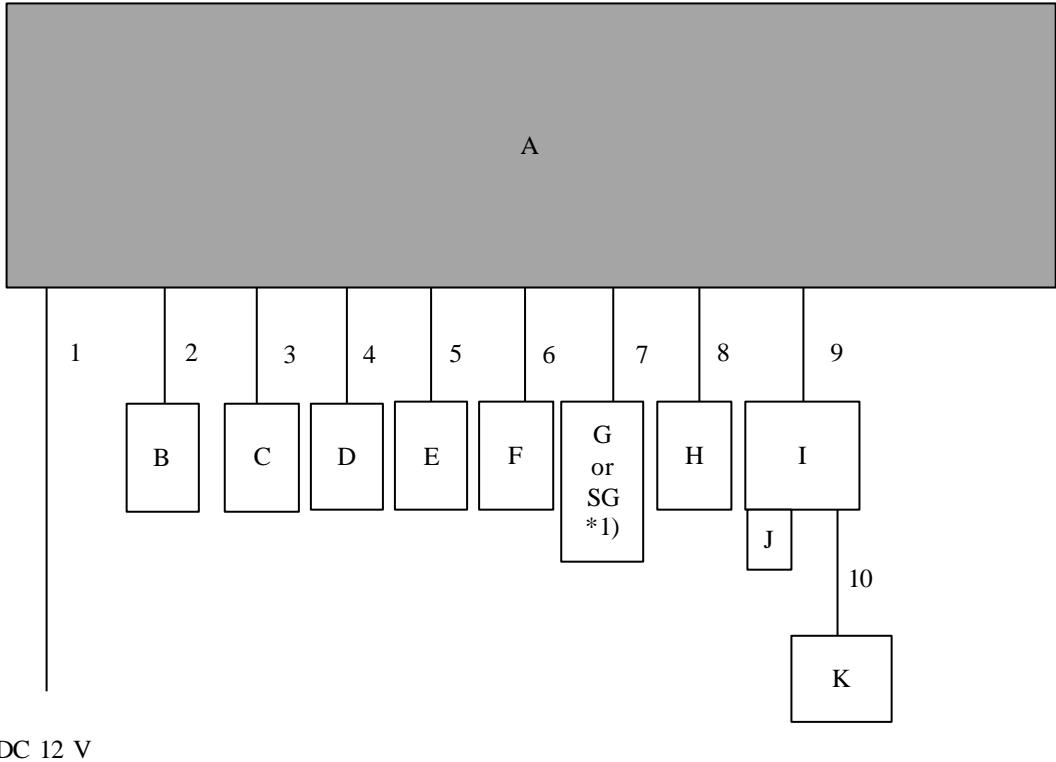
**SECTION 4: Operation of EUT during testing**

**4.1 Operating Mode(s)**

Mode	1. USB Play mode (Radiated Emission test) 2. FM Receiving mode (Local / Other) (Radiated Emission test) 3. FM Seek mode (Antenna Terminal Conducted test)
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Software(s)	E-DA2H software V1.0.0
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**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	Car Audio	TN0036A	114000-83790000	DENSO TEN Limited	EUT
B	Microphone module	86730-78010	No.10	Panasonic	-
C	Back camera	867B0-78070	No.2	Panasonic	-
D	Steering switch	84250-58150-BO	No.1	DENSO TEN Limited	-
E	GNSS Antenna	86880-78010	UI034347	HARADA	-
F	Speaker Dummy Load	SP Dummy	-	DENSO TEN Limited	-
G	AM/FM Antenna	210906001	-	DENSO TEN Limited	-
H	DAB Antenna	863C0-60050	PS603296	DENSO TEN Limited	-
I	USB I/F Box	86190-78020	500854	Panasonic	-
J	USB Memory	RUF3-K16GB	P10416	Buffalo Inc.	-
K	iPhone8 64GB	MQ7A2J/A	F4GVJEW2JC6J	Apple	-

**List of Cables Used**

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	4.0	Unshielded	Unshielded	-
2	Audio Cable	3.0	Shielded	Shielded	-
3	Signal Cable	4.6	Unshielded	Unshielded	-
4	Signal Cable	3.2	Unshielded	Unshielded	-
5	Antenna Cable	2.0	Shielded	Shielded	-
6	Speaker Cable	3.6	Unshielded	Unshielded	-
7	Antenna Cable	3.2	Shielded	Shielded	-
8	Antenna Cable	2.2	Shielded	Shielded	-
9	Signal Cable	2.2	Unshielded	Unshielded	-
10	USB Cable	1.0	Shielded	Shielded	-

## **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 40000 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 10 GHz *1)	Above 10 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

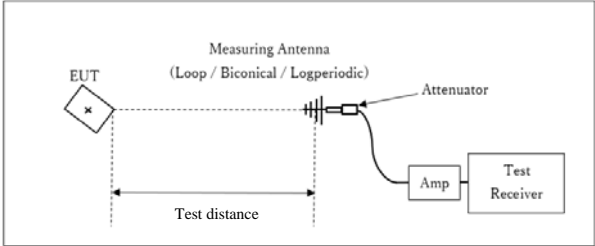
\*1) The measurement data was adjusted to a 3 m distance using the following Distance Factor.

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**

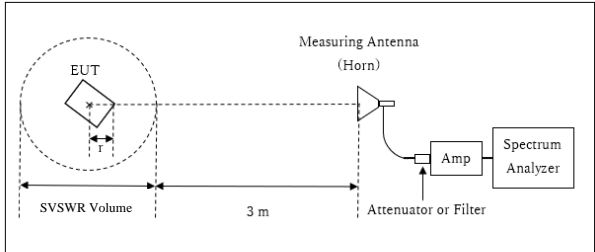
Below 1 GHz



Test Distance: 3 m

× : Center of turn table

1 GHz to 10 GHz

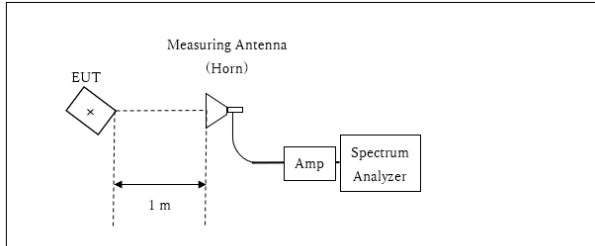


Distance Factor:  $20 \times \log(3.25 \text{ m} / 3.0 \text{ m}) = 0.70 \text{ dB}$   
 \* Test Distance:  $(3 + \text{SVSWR Volume} / 2) - r = 3.25 \text{ m}$

SVSWR Volume: 2 m  
 (SVSWR Volume has been calibrated based on CISPR 16-1-4.)  
 $r = 0.75 \text{ m}$

r : Radius of an outer periphery of EUT  
 × : Center of turn table

10 GHz to 40 GHz



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

× : Center of turn table

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

**5.5 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.

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## **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, 0.6 m by 1.4 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 40000 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: 100 kHz	PK: RBW: 1 MHz / VBW: 3 MHz

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

### **6.5 Test result**

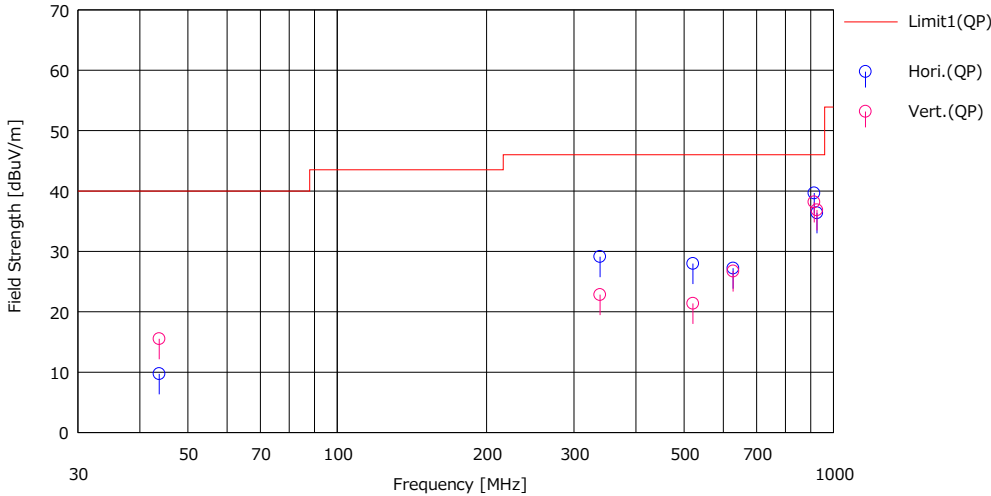
Summary of the test results: Pass

**APPENDIX 1: Test data**

**Radiated Emission**

Test place Ise EMC Lab.  
Semi Anechoic Chamber No.3  
Date August 3, 2023  
Temperature / Humidity 24 deg. C / 46 % RH  
Engineer Takumi Nishida  
(Below 1 GHz)  
Mode Mode 1

Limit : FCC\_Part 15 Subpart B(15.109)\_Class B



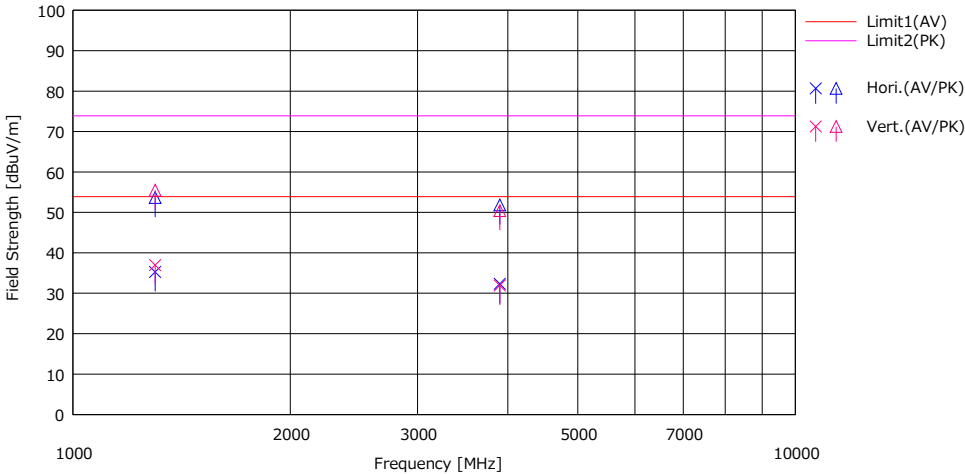
No.	Freq. [MHz]	Reading	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit	Margin	Pola [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		(QP) [dBuV]				(QP) [dBuV/m]	(QP) [dB]						
1	43.767	21.10	13.50	7.28	32.16	9.72	40.00	30.28	Hori.	329	10	BA	
2	338.502	35.80	15.01	10.29	31.97	29.13	46.00	16.87	Hori.	109	205	LA22	
3	520.906	30.70	17.71	11.53	31.96	27.98	46.00	18.02	Hori.	105	21	LA22	
4	627.808	27.40	19.58	12.18	31.94	27.22	46.00	18.78	Hori.	110	135	LA22	
5	914.622	34.40	22.30	13.73	30.77	39.66	46.00	6.34	Hori.	147	235	LA22	
6	926.250	31.00	22.28	13.80	30.71	36.37	46.00	9.63	Hori.	139	239	LA22	
7	43.767	26.90	13.50	7.28	32.16	15.52	40.00	24.48	Vert.	110	86	BA	
8	338.502	29.50	15.01	10.29	31.97	22.83	46.00	23.17	Vert.	141	113	LA22	
9	520.906	24.10	17.71	11.53	31.96	21.38	46.00	24.62	Vert.	124	149	LA22	
10	627.808	26.90	19.58	12.18	31.94	26.72	46.00	19.28	Vert.	111	180	LA22	
11	914.622	32.90	22.30	13.73	30.77	38.16	46.00	7.84	Vert.	108	201	LA22	
12	926.250	31.50	22.28	13.80	30.71	36.87	46.00	9.13	Vert.	101	201	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 Ise EMC Lab.  
Semi Anechoic Chamber No.3  
Date August 3, 2023  
Temperature / Humidity 23 deg. C / 47 % RH  
Engineer Kiyoshiro Okazaki  
(Above 1 GHz)  
Mode Mode 1

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	1300.001	41.40	59.80	25.77	2.39	34.29	35.27	53.67	53.90	73.90	18.63	20.23	Hori.	100	136	H20	
2	3900.123	30.60	50.10	29.73	3.75	31.75	32.33	51.83	53.90	73.90	21.57	22.07	Hori.	100	156	H20	
3	1300.001	43.10	61.60	25.77	2.39	34.29	36.97	55.47	53.90	73.90	16.93	18.43	Vert.	100	204	H20	
4	3900.123	30.20	48.70	29.73	3.75	31.75	31.93	50.43	53.90	73.90	21.97	23.47	Vert.	100	221	H20	

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 10 GHz.



### Radiated Emission

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	August 3, 2023
Temperature / Humidity	24 deg. C / 46 % RH
Engineer	Takumi Nishida
	(Below 1 GHz)
Mode	Mode 2 (Local) 87.5 MHz

Limit : FCC\_Part 15 Subpart B(15.109)\_Class B

<< QP DATA >>

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
		(QP) [dBuV]				(QP) [dBuV/m]	(QP) [dB]						
1	87.796	21.20	8.20	7.95	32.13	5.22	40.00	34.78	Hori.	100	0	BA	
2	175.592	21.70	16.01	8.92	32.06	14.57	43.50	28.93	Hori.	100	0	BA	
3	263.387	29.00	12.63	9.71	32.00	19.34	46.00	26.66	Hori.	100	0	LA22	
4	351.183	30.90	15.21	10.39	31.97	24.53	46.00	21.47	Hori.	100	0	LA22	
5	438.979	21.50	16.42	11.00	31.97	16.95	46.00	29.05	Hori.	100	0	LA22	
6	526.775	24.50	17.72	11.57	31.96	21.83	46.00	24.17	Hori.	100	0	LA22	
7	614.570	24.00	19.56	12.11	31.94	23.73	46.00	22.27	Hori.	100	0	LA22	
8	702.366	20.70	19.92	12.63	31.91	21.34	46.00	24.66	Hori.	100	0	LA22	
9	790.162	20.40	20.76	13.11	31.44	22.83	46.00	23.17	Hori.	100	0	LA22	
10	877.958	20.10	22.10	13.54	30.96	24.78	46.00	21.22	Hori.	100	0	LA22	
11	965.753	19.00	22.20	14.02	30.49	24.73	53.90	29.17	Hori.	100	0	LA22	
12	87.796	22.80	8.20	7.95	32.13	6.82	40.00	33.18	Vert.	100	0	BA	
13	175.592	20.40	16.01	8.92	32.06	13.27	43.50	30.23	Vert.	100	0	BA	
14	263.387	21.20	12.63	9.71	32.00	11.54	46.00	34.46	Vert.	100	0	LA22	
15	351.183	24.70	15.21	10.39	31.97	18.33	46.00	27.67	Vert.	100	0	LA22	
16	438.979	20.60	16.42	11.00	31.97	16.05	46.00	29.95	Vert.	100	0	LA22	
17	526.775	23.00	17.72	11.57	31.96	20.33	46.00	25.67	Vert.	100	0	LA22	
18	614.570	23.20	19.56	12.11	31.94	22.93	46.00	23.07	Vert.	100	0	LA22	
19	702.366	21.30	19.92	12.63	31.91	21.94	46.00	24.06	Vert.	100	0	LA22	
20	790.162	19.90	20.76	13.11	31.44	22.33	46.00	23.67	Vert.	100	0	LA22	
21	877.958	20.90	22.10	13.54	30.96	25.58	46.00	20.42	Vert.	100	0	LA22	
22	965.753	20.90	22.20	14.02	30.49	26.63	53.90	27.27	Vert.	100	0	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	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	August 3, 2023
Temperature / Humidity	23 deg. C / 47 % RH
Engineer	Kiyoshiro Okazaki
	(Above 1 GHz)
Mode	Mode 2 (Local) 87.5 MHz

Limit : FCC\_Part 15 Subpart B(15.109)\_Class B

<< AV/PK DATA >>

No.	Freq. [MHz]	Reading		Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result		Limit		Margin		Pda. [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	1053.549	36.40	48.90	24.65	2.22	34.89	28.38	40.88	53.90	73.90	25.52	33.02	Hori.	100	0	H20	
2	1141.345	31.80	45.80	25.01	2.28	34.68	24.41	38.41	53.90	73.90	29.49	35.49	Hori.	100	0	H20	
3	1229.141	33.50	46.70	25.46	2.34	34.47	26.83	40.03	53.90	73.90	27.07	33.87	Hori.	100	0	H20	
4	1316.936	33.30	48.20	25.82	2.40	34.25	27.27	42.17	53.90	73.90	26.63	31.73	Hori.	100	0	H20	
5	1053.549	38.60	52.20	24.65	2.22	34.89	30.58	44.18	53.90	73.90	23.32	29.72	Vert.	100	0	H20	
6	1141.345	32.20	45.70	25.01	2.28	34.68	24.81	38.31	53.90	73.90	29.09	35.59	Vert.	100	0	H20	
7	1229.141	34.50	47.30	25.46	2.34	34.47	27.83	40.63	53.90	73.90	26.07	33.27	Vert.	100	0	H20	
8	1316.936	33.30	48.00	25.82	2.40	34.25	27.27	41.97	53.90	73.90	26.63	31.93	Vert.	100	0	H20	

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 10 GHz.

### Radiated Emission

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	August 3, 2023
Temperature / Humidity	24 deg. C / 46 % RH
Engineer	Takumi Nishida
	(Below 1 GHz)
Mode	Mode 2 (Local) 98 MHz

Limit : FCC\_Part 15 Subpart B(15.109)\_Class B

<< QP DATA >>

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
		<QP> [dBuV]				<QP> [dBuV/m]	<QP> [dB]						
1	98.301	21.70	9.99	8.08	32.12	7.65	43.50	35.85	Hori.	100	0	BA	
2	196.602	22.40	16.45	9.13	32.04	15.94	43.50	27.56	Hori.	100	0	BA	
3	294.903	22.80	13.68	9.97	31.97	14.48	46.00	31.52	Hori.	100	0	LA22	
4	393.204	24.90	15.67	10.70	31.97	19.30	46.00	26.70	Hori.	100	0	LA22	
5	491.504	23.10	17.70	11.35	31.97	20.18	46.00	25.82	Hori.	100	0	LA22	
6	589.805	20.80	19.13	11.97	31.95	19.95	46.00	26.05	Hori.	100	0	LA22	
7	688.106	20.30	19.74	12.55	31.92	20.67	46.00	25.33	Hori.	100	0	LA22	
8	786.407	20.90	20.71	13.09	31.46	23.24	46.00	22.76	Hori.	100	0	LA22	
9	884.708	20.70	22.14	13.58	30.93	25.49	46.00	20.51	Hori.	100	0	LA22	
10	983.009	19.70	22.30	14.11	30.40	25.71	53.90	28.19	Hori.	100	0	LA22	
11	98.301	24.00	9.99	8.08	32.12	9.95	43.50	33.55	Vert.	100	0	BA	
12	196.602	20.90	16.45	9.13	32.04	14.44	43.50	29.06	Vert.	100	0	BA	
13	294.903	20.60	13.68	9.97	31.97	12.28	46.00	33.72	Vert.	100	0	LA22	
14	393.204	21.20	15.67	10.70	31.97	15.60	46.00	30.40	Vert.	100	0	LA22	
15	491.504	21.80	17.70	11.35	31.97	18.88	46.00	27.12	Vert.	100	0	LA22	
16	589.805	19.90	19.13	11.97	31.95	19.05	46.00	26.95	Vert.	100	0	LA22	
17	688.106	20.30	19.74	12.55	31.92	20.67	46.00	25.33	Vert.	100	0	LA22	
18	786.407	21.20	20.71	13.09	31.46	23.54	46.00	22.46	Vert.	100	0	LA22	
19	884.708	22.10	22.14	13.58	30.93	26.89	46.00	19.11	Vert.	100	0	LA22	
20	983.009	22.10	22.30	14.11	30.40	28.11	53.90	25.79	Vert.	100	0	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	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	August 3, 2023
Temperature / Humidity	23 deg. C / 47 % RH
Engineer	Kiyoshiro Okazaki
	(Above 1 GHz)
Mode	Mode 2 (Local) 98 MHz

Limit : FCC\_Part 15 Subpart B(15.109)\_Class B

<< AV/PK DATA >>

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)	(PK)	(AV)	(PK)	(AV)	(PK)					
		[dBuV]	[dBuV]				[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]					
1	1081.310	34.00	47.00	24.79	2.24	34.82	26.21	39.21	53.90	73.90	27.69	34.69	Hori.	100	0	H20	
2	1179.610	33.30	46.10	25.22	2.31	34.59	26.24	39.04	53.90	73.90	27.66	34.86	Hori.	100	0	H20	
3	1277.911	32.40	45.80	25.66	2.37	34.35	26.08	39.48	53.90	73.90	27.82	34.42	Hori.	100	0	H20	
4	1376.212	33.20	46.00	25.88	2.43	34.11	27.40	40.20	53.90	73.90	26.50	33.70	Hori.	100	0	H20	
5	1474.513	32.50	45.70	25.62	2.50	33.87	26.75	39.95	53.90	73.90	27.15	33.95	Hori.	100	0	H20	
6	1081.310	37.10	50.30	24.79	2.24	34.82	29.31	42.51	53.90	73.90	24.59	31.39	Vert.	100	0	H20	
7	1179.610	33.50	46.40	25.22	2.31	34.59	26.44	39.34	53.90	73.90	27.46	34.56	Vert.	100	0	H20	
8	1277.911	32.00	46.40	25.66	2.37	34.35	25.68	40.08	53.90	73.90	28.22	33.82	Vert.	100	0	H20	
9	1376.212	32.40	45.40	25.88	2.43	34.11	26.60	39.60	53.90	73.90	27.30	34.30	Vert.	100	0	H20	
10	1474.513	31.90	44.50	25.62	2.50	33.87	26.15	38.75	53.90	73.90	27.75	35.15	Vert.	100	0	H20	

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 10 GHz.



### Radiated Emission

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	August 3, 2023
Temperature / Humidity	23 deg. C / 47 % RH
Engineer	Kiyoshiro Okazaki
	(Above 1 GHz)
Mode	Mode 2 (Local) 108 MHz

Limit : FCC\_Part 15 Subpart B(15.109)\_Class B

<< AV/PK DATA >>

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	1077.026	34.10	47.20	24.78	2.24	34.83	26.29	39.39	53.90	73.90	27.61	34.51	Hori.	100	0	H20	
2	1184.729	32.60	45.10	25.24	2.31	34.57	25.58	38.08	53.90	73.90	28.32	35.82	Hori.	100	0	H20	
3	1292.432	32.20	48.80	25.73	2.38	34.31	26.00	42.60	53.90	73.90	27.90	31.30	Hori.	100	0	H20	
4	1400.134	35.90	48.60	25.85	2.45	34.05	30.15	42.85	53.90	73.90	23.75	31.05	Hori.	100	0	H20	
5	1507.837	34.60	47.30	25.49	2.52	33.79	28.82	41.52	53.90	73.90	25.08	32.38	Hori.	100	0	H20	
6	1615.539	31.80	45.40	25.06	2.59	33.53	25.94	39.54	53.90	73.90	27.96	34.36	Hori.	100	0	H20	
7	1077.026	36.90	49.70	24.78	2.24	34.83	29.09	41.89	53.90	73.90	24.81	32.01	Vert.	100	0	H20	
8	1184.729	33.10	46.60	25.24	2.31	34.57	26.08	39.58	53.90	73.90	27.82	34.32	Vert.	100	0	H20	
9	1292.432	33.10	48.80	25.73	2.38	34.31	26.90	42.60	53.90	73.90	27.00	31.30	Vert.	100	0	H20	
10	1400.134	36.80	47.90	25.85	2.45	34.05	31.05	42.15	53.90	73.90	22.85	31.75	Vert.	100	0	H20	
11	1507.837	34.20	48.00	25.49	2.52	33.79	28.42	42.22	53.90	73.90	25.48	31.68	Vert.	100	0	H20	
12	1615.539	33.60	46.40	25.06	2.59	33.53	27.74	40.54	53.90	73.90	26.16	33.36	Vert.	100	0	H20	

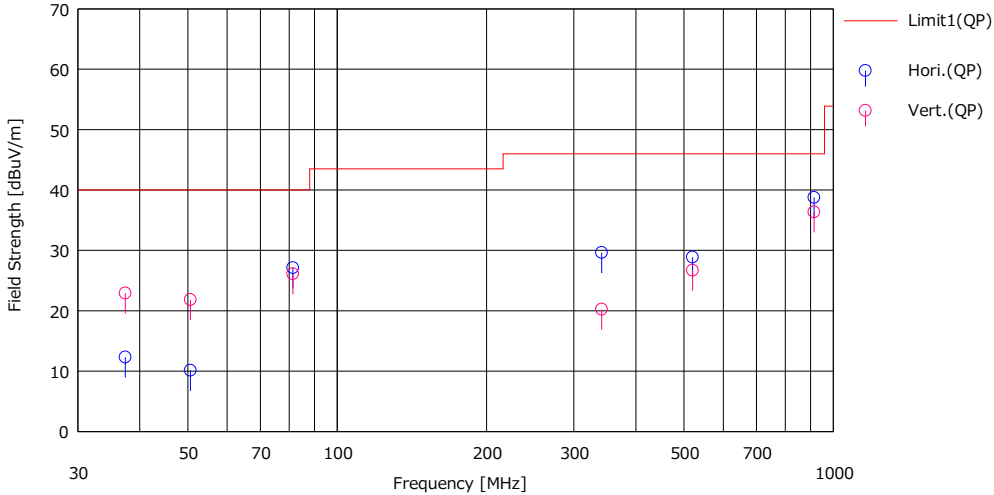
CHART: WITH FACTOR  
 ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN  
 CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + D-factor) - GAIN(AMP)  
 Except for the above table: adequate margin data below the limits.

\* No signal was detected above 10 GHz.

**Radiated Emission**

Test place Ise EMC Lab.  
Semi Anechoic Chamber No.3  
Date August 3, 2023  
Temperature / Humidity 24 deg. C / 46 % RH  
Engineer Takumi Nishida  
(Below 1 GHz)  
Mode Mode 2 (Other)

Limit : FCC\_Part 15 Subpart B(15.109)\_Class B



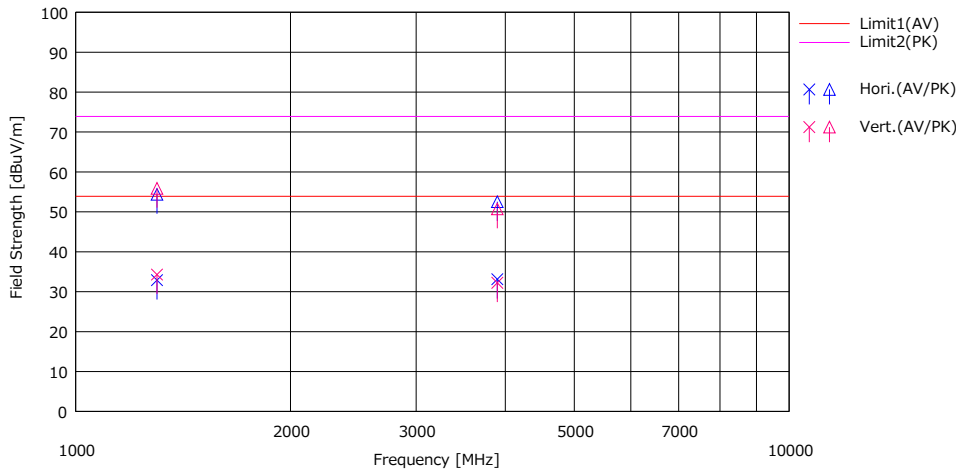
No.	Freq. [MHz]	Reading	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result	Limit	Margin	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		(QP) [dBuV]				(QP) [dBuV/m]	(QP) [dB]						
1	37.399	21.50	15.82	7.16	32.17	12.31	40.00	27.69	Hori.	320	218	BA	
2	50.601	23.90	10.99	7.40	32.16	10.13	40.00	29.87	Hori.	302	320	BA	
3	81.401	44.30	7.09	7.86	32.14	27.11	40.00	12.89	Hori.	235	270	BA	
4	341.418	36.20	15.09	10.31	31.97	29.63	46.00	16.37	Hori.	100	204	LA22	
5	520.366	31.60	17.71	11.53	31.96	28.88	46.00	17.12	Hori.	107	11	LA22	
6	914.618	33.50	22.30	13.73	30.77	38.76	46.00	7.24	Hori.	144	230	LA22	
7	37.399	32.10	15.82	7.16	32.17	22.91	40.00	17.09	Vert.	104	2	BA	
8	50.601	35.60	10.99	7.40	32.16	21.83	40.00	18.17	Vert.	100	312	BA	
9	81.401	43.30	7.09	7.86	32.14	26.11	40.00	13.89	Vert.	103	286	BA	
10	341.418	26.80	15.09	10.31	31.97	20.23	46.00	25.77	Vert.	100	249	LA22	
11	520.366	29.40	17.71	11.53	31.96	26.68	46.00	19.32	Vert.	141	93	LA22	
12	914.618	31.10	22.30	13.73	30.77	36.36	46.00	9.64	Vert.	101	192	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 Ise EMC Lab.  
Semi Anechoic Chamber No.3  
Date August 3, 2023  
Temperature / Humidity 23 deg. C / 47 % RH  
Engineer Kiyoshiro Okazaki  
(Above 1 GHz)  
Mode Mode 2 (Other)

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	1300.001	39.00	60.50	25.77	2.39	34.29	32.87	54.37	53.90	73.90	21.03	19.53	Hori.	100	139	H20	
2	3900.123	31.40	50.80	29.73	3.75	31.75	33.13	52.53	53.90	73.90	20.77	21.37	Hori.	100	173	H20	
3	1300.001	40.40	62.00	25.77	2.39	34.29	34.27	55.87	53.90	73.90	19.63	18.03	Vert.	100	203	H20	
4	3900.123	30.50	49.00	29.73	3.75	31.75	32.23	50.73	53.90	73.90	21.67	23.17	Vert.	100	223	H20	

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.

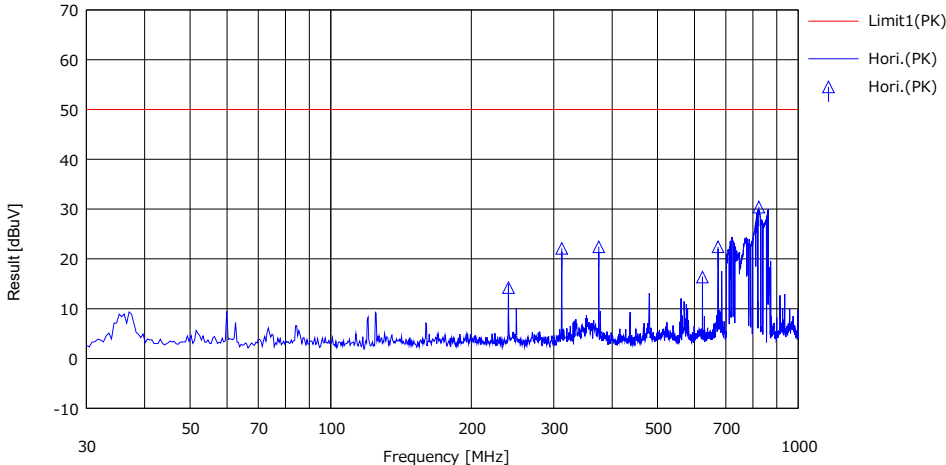
\* No signal was detected above 10 GHz.



### Antenna Terminal Conducted Emission

Test place Ise EMC Lab. No.6 Measurement Room  
 Date August 2, 2023  
 Temperature / Humidity 24 deg. C / 58 % RH  
 Engineer Takumi Nishida  
 Mode Mode 3

Limit : FCC15.111 Antenna terminal measurement



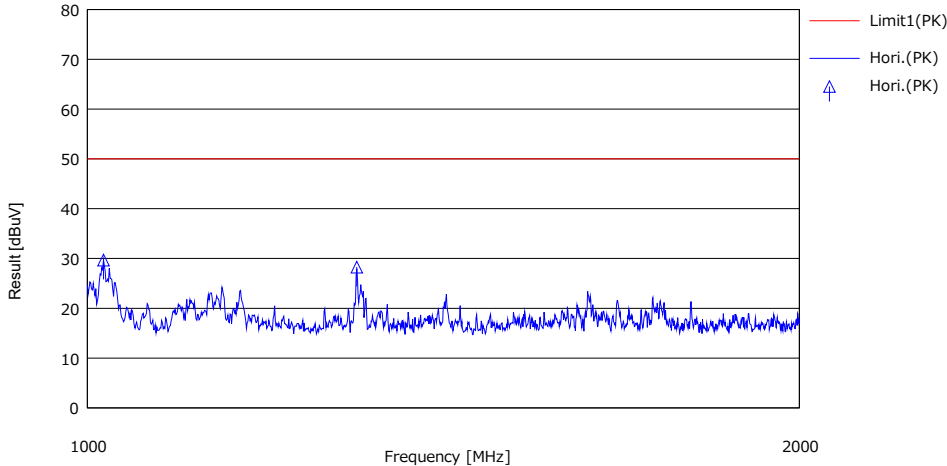
No.	Freq. [MHz]	Reading	AntFac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit*1)	Margn	Pola [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		(PK) [dBuV]				(PK) [dBuV]	(PK) [dB]						
1	240.000	39.92	0.00	6.30	32.01	14.21	50.00	35.79	Hori.				
2	312.000	47.60	0.00	6.33	32.02	22.11	50.00	27.89	Hori.				
3	374.400	48.14	0.00	6.36	32.08	22.42	50.00	27.58	Hori.				
4	624.000	42.13	0.00	6.47	32.25	16.35	50.00	33.65	Hori.				
5	673.912	48.19	0.00	6.51	32.28	22.42	50.00	27.58	Hori.				
6	823.733	55.40	0.00	6.56	31.56	30.40	50.00	19.60					local 10265

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

**Antenna Terminal Conducted Emission**

Test place                    Ise EMC Lab. No.6 Measurement Room  
Date                            August 2, 2023  
Temperature / Humidity    24 deg. C / 58 % RH  
Engineer                     Takumi Nishida  
Mode                            Mode 3

Limit : FCC15.111 Antenna terminal measurement



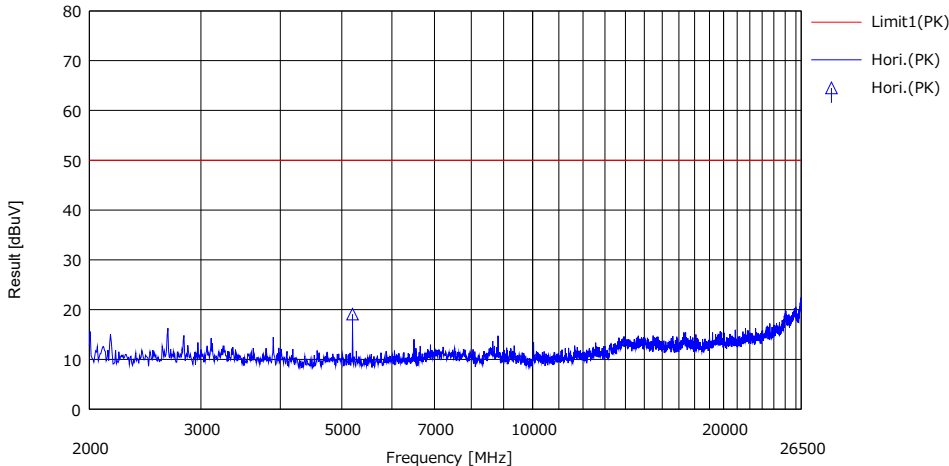
No.	Freq. [MHz]	Reading	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result	Limit *1)	Margin	Pda	Height	Angle	Ant. Type	Comment
		[dBuV]				[dBuV]	[dB]						
1	1015.901	58.00	0.00	6.64	34.98	29.64	50.00	20.34					
2	1299.964	55.85	0.00	6.69	34.29	28.25	50.00	21.75					

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

**Antenna Terminal Conducted Emission**

Test place Ise EMC Lab. No.6 Measurement Room  
 Date August 2, 2023  
 Temperature / Humidity 24 deg. C / 58 % RH  
 Engineer Takumi Nishida  
 Mode Mode 3

Limit : FCC15.111 Antenna terminal measurement



No.	Freq. [MHz]	Reading	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result	Limit *1)	Margn	Pda	Height [cm]	Angle [deg]	Ant. Type	Comment
		[dBuV]				[dBuV]	[dB]						
1	5200.443	49.44	0.00	1.04	31.40	19.08	50.00	30.92					

\* 2 nW = -57 dBm = 50 dBuV

CHART: WITH FACTOR

CALCULATION: RESULT = READING + LOSS (CABLE + Matching Pad + DC Block ) – GAIN (AMP)

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

\* No signal detected above 26.5 GHz

## APPENDIX 2: Test instruments

### Test equipment

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
AT	MCC-176	141279	Microwave Cable	Junkosha	MMX221-00500DMSDMS	1502S303	03/08/2023	12
AT	MCC-177	141226	Microwave Cable	Junkosha	MMX221-00500DMSDMS	1502S304	03/03/2023	12
AT	MDCB-02	141485	DC Block Filter	Keysight Technologies Inc	N9398C	51053	10/19/2022	12
AT	MMM-18	141558	Digital Tester (TRUE RMS MULTIMETER)	Fluke Corporation	115	17930030	05/29/2023	12
AT	MMP-01	141550	Matching Pad Anritsu	Anritsu Corporation	MB-009	40063	07/26/2023	12
AT	MOS-14	141561	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	1401	01/13/2023	12
AT	MPA-11	141580	MicroWave System Amplifier	Keysight Technologies Inc	83017A	MY39500779	03/08/2023	12
AT	MPA-14	141583	Pre Amplifier	SONOMA INSTRUMENT	310	260833	04/05/2023	12
AT	MPA-37	237927	Broadband Amplifier	ERAVANT	SBB-0115033218-2F2F-E3	27554-01	07/10/2023	12
AT	MSA-22	141978	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY46180899	03/06/2023	12
RE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	MAEC-03	142008	AC3_Semi Anechoic Chamber (NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	05/23/2022	24
RE	MAEC-03-SVSWR	142013	AC3_Semi Anechoic Chamber (SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-10005	04/12/2023	24
RE	MAT-95	142314	Attenuator	Pasternack Enterprises	PE7390-6	D/C 1504	06/23/2023	12
RE	MBA-05	141425	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103+BBA9106	VHA 91031302	08/26/2022	12
RE	MCC-224	160324	Coaxial Cable	Huber+Suhner	SUCOFLEX 102A	MY009/2A	10/19/2022	12
RE	MCC-265	234602	Microwave Cable	Huber+Suhner	SF126E/11PC35/11PC35/1000M,5000M	537063/126E / 537074/126E	03/16/2023	-
RE	MCC-51	141323	Coaxial cable	UL Japan	-	-	09/27/2022	12
RE	MHA-16	141513	Horn Antenna 15-40GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9170	BBHA9170306	07/19/2023	12
RE	MHA-20	141507	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	258	11/14/2022	12
RE	MHA-29	141517	Horn Antenna 26.5-40GHz	ETS-Lindgren	3160-10	152399	11/14/2022	12
RE	MJM-16	142183	Measure	KOMELON	KMC-36	-	10/03/2022	12
RE	MLA-22	141266	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-191	08/26/2022	12
RE	MMM-08	141532	DIGITAL HITESTER	HIOKI E.E. CORPORATION	3805	51201197	01/17/2023	12
RE	MOS-13	141554	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	1301	01/13/2023	12
RE	MPA-11	141580	MicroWave System Amplifier	Keysight Technologies Inc	83017A	MY39500779	03/08/2023	12
RE	MPA-13	141582	Pre Amplifier	SONOMA INSTRUMENT	310	260834	02/07/2023	12
RE	MPA-22	141588	Pre Amplifier	L3 Narda-MITEQ	AMF-6F-2600400-33-8P / AMF-4F-2600400-33-8P	1871355 /1871328	01/24/2023	12
RE	MSA-22	141978	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY46180899	03/06/2023	12
RE	MTR-10	141951	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	04/10/2023	12

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

The expiration date of the calibration is the end of the expired month.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

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

Test item:

RE: Radiated emission

AT: Antenna Terminal Conducted