EMI TEST REPORT

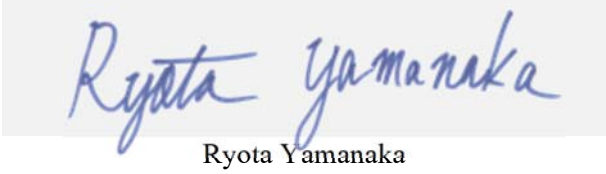
Test Report No.: 14617448H-F-R2

Customer	**DENSO TEN Limited**
Description of EUT	**Car Audio**
Model Number of EUT	**TN0036B**
FCC ID	**BABTN0036B**
Test Regulation	**FCC Part 15 Subpart B**
Test Result	**Complied (Refer to SECTION 3)**
Issue Date	**July 18, 2023**
Remarks	**-**

Representative test engineer

Yuta Moriya
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".

Report Cover Page - Form-ULID-003532 (DCS:13-EM-F0429) Issue# 21.0

ANNOUNCEMENT

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- The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
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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.: 14617448H-F

This report is a revised version of 14617448H-F-R1. 14617448H-F-R1 is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	14617448H-F	April 28, 2023	-
1	14617448H-F-R1	July 14, 2023	P.6 Correction of Frequency of Operation (WLAN) from 5755 MHz to 5775 MHz to 5765 MHz
1	14617448H-F-R1	July 14, 2023	P.12 SECTION 5.4 Correction of Test Frequency range above 1 GHz from “1 GHz - 18 GHz” and “Above 18 GHz” to “1 GHz - 10 GHz” and “Above 10 GHz”
1	14617448H-F-R1	July 14, 2023	P.13 Correction of Frequency range Correction of Test Frequency range above 1 GHz from “1 GHz to 13 GHz” and “13 GHz to 40 GHz” to “1 GHz to 10 GHz” and “10 GHz to 40 GHz”
1	14617448H-F-R1	July 14, 2023	P.13 Correction of distance factor for 1 GHz to 10 GHz: from 0.67 dB to 0.65 dB
1	14617448H-F-R1	July 14, 2023	P.29 Correction of Cal int for Local ID: MCC-265 from “-“ to “12”
2	14617448H-F-R2	July 18, 2023	P.10 Correction of Remarks for Mode 3: from “Antenna Terminal tes” to “Antenna Terminal test”
2	14617448H-F-R2	July 18, 2023	P.13 Correction of distance factor for 1 GHz to 10 GHz: from 0.65 dB to 0.70 dB

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_{LT}	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_{ST}	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, Gosho-dori 1-chome, Hyoto-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	TN0036B
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	December 20, 2022
Test Date	January 10 to April 26, 2023

2.2 Product Description

General Specification

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

Radio Specification

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

Equipment Type	Transceiver
Frequency of Operation	5765 MHz
Type of Modulation	OFDM
Antenna Gain	0.72 dBi

Bluetooth (BR / EDR)

Equipment Type	Transceiver
Frequency of Operation	2402 MHz to 2480 MHz
Type of Modulation	FHSS (GFSK, π/4 DQPSK, 8 DPSK)
Antenna Gain	0.14 dBi

AM / FM (incl. RDS) / DAB

Equipment Type	Receiver
Frequency of Operation	AM: 531 kHz to 1602 kHz FM: 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	Deviation	Worst margin	Result	Remarks
Conducted emission	ANSI C63.4: 2014 +C63.4a:2017 7. AC power - line conducted emission measurements IEEE 187:2003	Part 15 Subpart B 15.107(a)	N/A	-	N/A	*1)
Radiated emission	ANSI C63.4: 2014 +C63.4a:2017 8. Radiated emission measurements IEEE 187:2003	Part 15 Subpart B 15.109(a)	N/A	1.27 dB (370.880 MHz, Horizontal, QP, Mode 2)	Complied a)	-
Antenna Terminal	ANSI C63.4: 2014 +C63.4a:2017 12. Measurement of unintentional radiators other than ITE IEEE 187:2003	Part 15 Subpart B 15.111(a)	N/A	22.41 dB 5200.000 MHz, Mode 3	Complied b)	-

* 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.

a) Refer to APPENDIX 1 (data of Radiated Emission)
b) Refer to APPENDIX 1 (data of Antenna Terminal Conducted Emission)

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	2.7 dB

3.5 Test Location

UL Japan, Inc. Ise EMC Lab.
*A2LA Certificate Number: 5107.02 / FCC Test Firm Registration Number: 884919
ISED Lab Company Number: 2973C / CAB identifier: JP0002
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 Japan
Telephone: +81-596-24-8999

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.

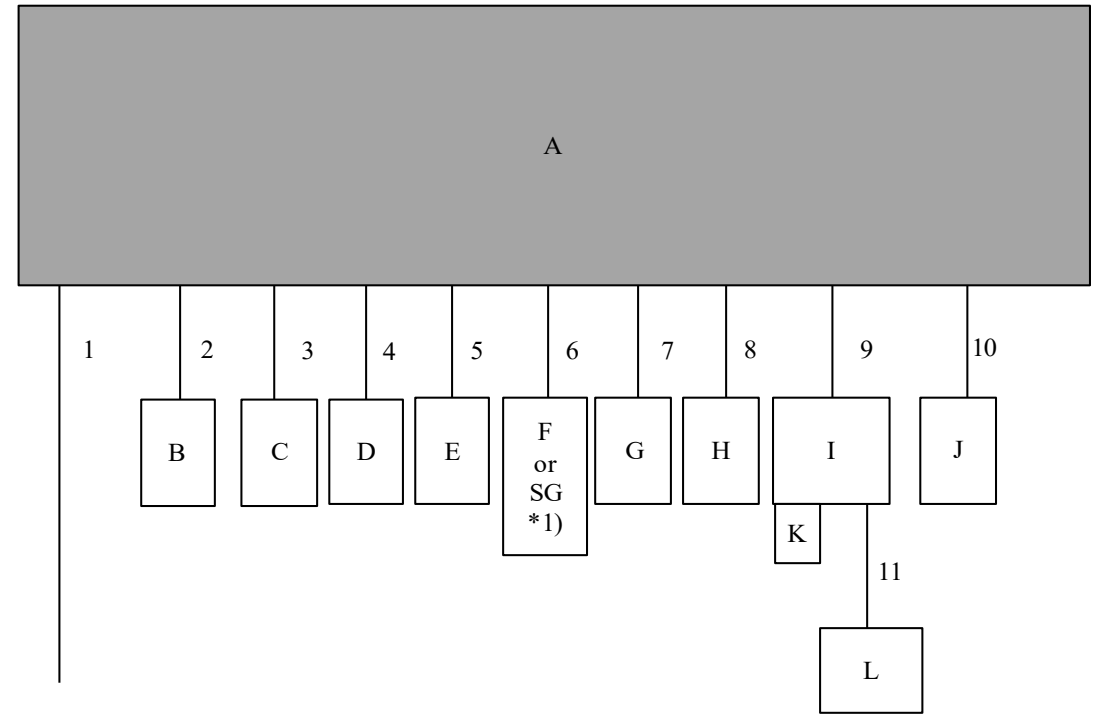
SECTION 4: Operation of EUT during testing

4.1 Operating Mode(s)

Mode	Remarks
Mode 1: USB Memory Play mode	Radiated Emission test
Mode 2: FM Receiving mode (Local / Other)	Radiated Emission test
Mode 3: FM Seek mode	Antenna Terminal test

Software(s)	E-DA2H software V1.0.0

4.2 Configuration and peripherals



*1) SG(Signal Generator) used Mode 2.

* 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	TN0036B	1100229982-0014	DENSO TEN Limited	EUT
B	Microphone module	86730-78010	No.5	Panasonic	-
C	Back camera	867B0-78070	No.5	Panasonic	-
D	Steering switch	84250-58150-BO	No.4	TOKAI RIKA	-
E	Speaker Dummy Load	SP Dummy	-	DENSO TEN Limited	-
F	AM/FM Sharkfin AMP	86760-K0010	-	YOKOWO	-
G	DAB Antenna AMP	863C0-60050	No.2	DENSO TEN Limited	-
H	GNSS Antenna	86880-78010	UI034346	HARADA	-
I	USB I/F Box	86190-78020	501002	Panasonic	-
J	Jig Board	-	-	-	-
K	USB Memory	RUF3-K16GB	P10416	Buffalo Inc.	-
L	iPhone6 64GB	MG4H2J/A	F78P6KZCG5MT	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	4.0	Unshielded	Unshielded	-
4	Signal Cable	3.0	Unshielded	Unshielded	-
5	Speaker Cable	3.0	Unshielded	Unshielded	-
6	Antenna Cable	3.2	Shielded	Shielded	-
7	Antenna Cable	3.0	Shielded	Shielded	-
8	Antenna Cable	3.0	Shielded	Shielded	-
9	Signal Cable	2.8	Unshielded	Unshielded	-
10	Signal Cable	0.2	Unshielded	Unshielded	-
11	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

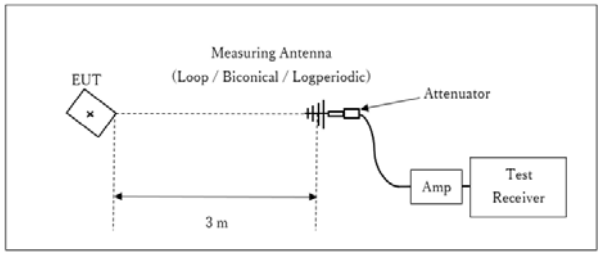
The height of the measuring antenna varied between 1 and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.
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 1GHz	1 GHz - 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

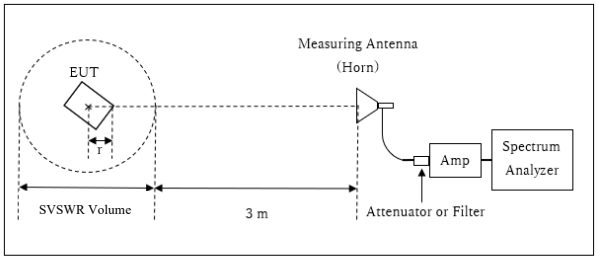
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz to 10 GHz

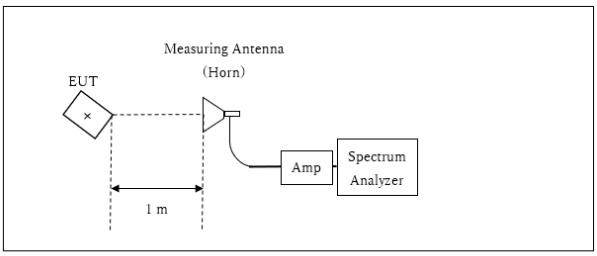


r : Radius of an outer periphery of EUT
× : Center of turn table

Distance Factor: 20 x log (3.25 m*/3.0 m) = 0.70 dB
* Test Distance: (3 + SVSWR Volume /2) - r = 3.25 m

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

10 GHz to 40 GHz



× : Center of turn table

Distance Factor: 20 x log (1.0 m* / 3.0 m) = -9.54 dB
*Test Distance: 1 m

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.

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 urethane platform 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 - 1000 MHz / 1000 MHz - 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: 300 kHz	PK: RBW: 1 MHz / VBW: 3 MHz

*1) The Spectrum Analyzer was used in 6 dB resolution bandwidth.

6.5 Test result

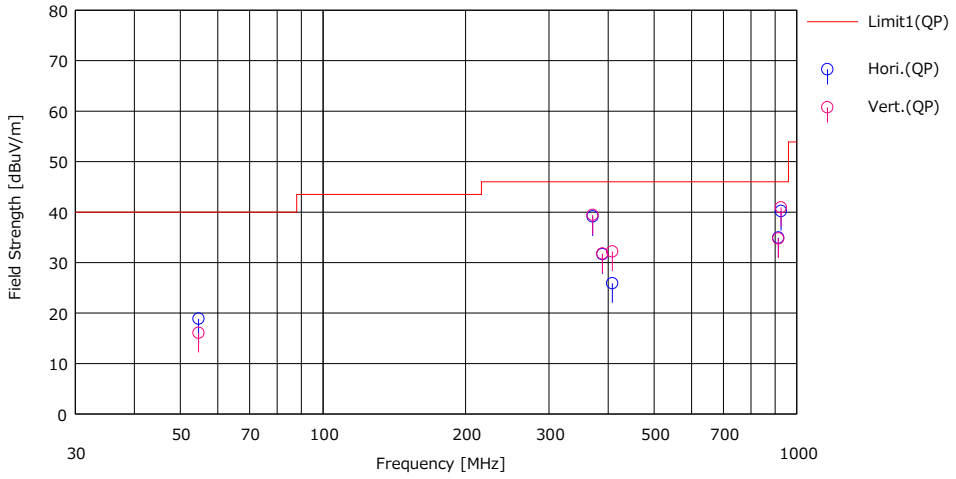
Summary of the test results: Pass

APPENDIX 1: Test data

Radiated Emission

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.1
Date	January 17, 2023
Temperature / Humidity	23 deg. C / 35 % RH
Engineer	Yuta Moriya
	(Below 1 GHz)
Mode	Mode 1

Limit : FCC_Part 15 Subpart B(15.109)_Class B



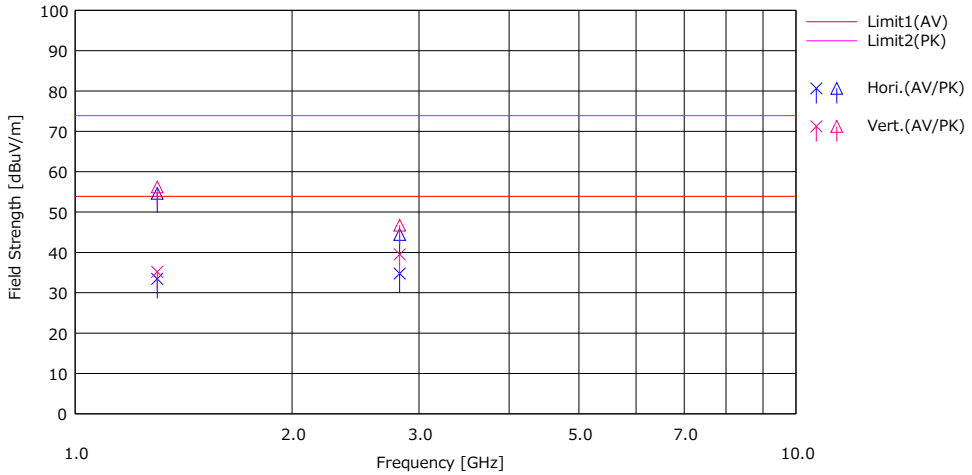
No.	Freq. [MHz]	Reading (QP) [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result (QP) [dBuV/m]	Limit (QP) [dBuV/m]	Margin (QP) [dB]	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
1	54.650	40.80	9.39	7.70	39.02	18.87	40.00	21.13	Hori.	375	269	BA	
2	370.880	51.50	15.42	10.95	38.74	39.13	46.00	6.87	Hori.	130	320	LA20	
3	388.801	43.30	15.98	11.09	38.70	31.67	46.00	14.33	Hori.	135	304	LA20	
4	407.954	36.60	16.74	11.23	38.67	25.90	46.00	20.10	Hori.	128	320	LA20	
5	914.415	36.70	22.28	14.24	38.26	34.96	46.00	11.04	Hori.	100	116	LA20	
6	926.252	41.80	22.30	14.32	38.20	40.22	46.00	5.78	Hori.	107	139	LA20	
7	54.650	38.00	9.39	7.70	39.02	16.07	40.00	23.93	Vert.	320	0	BA	
8	370.880	51.80	15.42	10.95	38.74	39.43	46.00	6.57	Vert.	170	9	LA20	
9	388.801	43.40	15.98	11.09	38.70	31.77	46.00	14.23	Vert.	168	11	LA20	
10	407.954	42.90	16.74	11.23	38.67	32.20	46.00	13.80	Vert.	137	71	LA20	
11	914.415	36.50	22.28	14.24	38.26	34.76	46.00	11.24	Vert.	100	174	LA20	
12	926.257	42.50	22.30	14.32	38.20	40.92	46.00	5.08	Vert.	100	163	LA20	

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.1
Date	January 17, 2023
Temperature / Humidity	23 deg. C / 35 % RH
Engineer	Yuta Moriya
	(Above 1 GHz)
Mode	Mode 1

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
		〈AV〉	〈PK〉				〈AV〉	〈PK〉	〈AV〉	〈PK〉	〈AV〉	〈PK〉					
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	[H/V]	[cm]	[deg]		
1	1300.007	41.62	62.80	26.00	2.54	36.73	33.43	54.61	53.90	73.90	20.47	19.29	Hori.	139	4	HA5	
2	2820.393	39.20	48.90	28.39	3.49	36.35	34.73	44.43	53.90	73.90	19.17	29.47	Hori.	103	225	HA5	
3	1300.007	43.40	64.40	26.00	2.54	36.73	35.21	56.21	53.90	73.90	18.69	17.69	Vert.	118	208	HA5	
4	2820.393	44.00	51.20	28.39	3.49	36.35	39.53	46.73	53.90	73.90	14.37	27.17	Vert.	180	321	HA5	

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.4
Date	April 26, 2023
Temperature / Humidity	21 deg. C / 46 % RH
Engineer	Hiroki Numata
	(Below 1 GHz)
Mode	Mode 2(Local) 87.5 MHz

Limit : FCC_Part 15 Subpart B(15.109)_Class B

<< QP DATA >>

No.	Freq.	Reading (QP)	Ant.Fac	Loss	Gain	Result (QP)	Limit (QP)	Margin (QP)	Pola.	Height	Angle	Ant. Type	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]		
1	87.796	21.60	8.20	7.77	32.06	5.51	40.00	34.49	Hori.	100	0	BA	
2	175.592	20.50	16.01	8.56	32.02	13.05	43.50	30.45	Hori.	100	0	BA	
3	263.387	23.70	12.49	9.34	32.01	13.52	46.00	32.48	Hori.	100	0	LA23	
4	351.183	21.00	15.18	9.92	32.06	14.04	46.00	31.96	Hori.	100	0	LA23	
5	438.979	20.50	16.39	10.41	32.14	15.16	46.00	30.84	Hori.	100	0	LA23	
6	526.775	20.20	17.79	10.95	32.20	16.74	46.00	29.26	Hori.	100	0	LA23	
7	614.570	20.20	19.50	11.37	32.25	18.82	46.00	27.18	Hori.	100	0	LA23	
8	702.366	20.20	19.94	11.66	32.28	19.52	46.00	26.48	Hori.	100	0	LA23	
9	790.162	20.40	20.71	11.97	31.76	21.32	46.00	24.68	Hori.	100	0	LA23	
10	877.958	19.70	22.03	12.29	31.25	22.77	46.00	23.23	Hori.	100	0	LA23	
11	965.753	19.20	22.16	12.67	30.73	23.30	53.90	30.60	Hori.	100	0	LA23	
12	87.796	28.70	8.20	7.77	32.06	12.61	40.00	27.39	Vert.	100	0	BA	
13	175.592	20.30	16.01	8.56	32.02	12.85	43.50	30.65	Vert.	100	0	BA	
14	263.387	21.50	12.49	9.34	32.01	11.32	46.00	34.68	Vert.	100	0	LA23	
15	351.183	20.60	15.18	9.92	32.06	13.64	46.00	32.36	Vert.	100	0	LA23	
16	438.979	20.50	16.39	10.41	32.14	15.16	46.00	30.84	Vert.	100	0	LA23	
17	526.775	20.10	17.79	10.95	32.20	16.64	46.00	29.36	Vert.	100	0	LA23	
18	614.570	20.20	19.50	11.37	32.25	18.82	46.00	27.18	Vert.	100	0	LA23	
19	702.366	20.30	19.94	11.66	32.28	19.62	46.00	26.38	Vert.	100	0	LA23	
20	790.162	20.30	20.71	11.97	31.76	21.22	46.00	24.78	Vert.	100	0	LA23	
21	877.958	19.80	22.03	12.29	31.25	22.87	46.00	23.13	Vert.	100	0	LA23	
22	965.753	20.50	22.16	12.67	30.73	24.60	53.90	29.30	Vert.	100	0	LA23	

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.4
Date	April 26, 2023
Temperature / Humidity	21 deg. C / 46 % RH
Engineer	Hiroki Numata
	(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.	Reading		Ant.Fac	Loss	Gain	Result		Limit		Margin		Pola.	Height	Angle	Ant. Type	Comment
		〈AV〉	〈PK〉				〈AV〉	〈PK〉	〈AV〉	〈PK〉	〈AV〉	〈PK〉					
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	[H/V]	[cm]	[deg]		
1	1053.549	31.40	44.70	24.31	2.22	34.73	23.20	36.50	53.90	73.90	30.70	37.40	Hori.	100	0	H21	
2	1141.345	30.80	44.30	24.71	2.28	34.50	23.29	36.79	53.90	73.90	30.61	37.11	Hori.	100	0	H21	
3	1229.141	31.20	44.80	25.16	2.34	34.27	24.43	38.03	53.90	73.90	29.47	35.87	Hori.	100	0	H21	
4	1316.936	31.80	50.10	25.48	2.40	34.03	25.65	43.95	53.90	73.90	28.25	29.95	Hori.	100	0	H21	
5	1053.549	31.30	44.80	24.31	2.22	34.73	23.10	36.60	53.90	73.90	30.80	37.30	Vert.	100	0	H21	
6	1141.345	30.90	44.50	24.71	2.28	34.50	23.39	36.99	53.90	73.90	30.51	36.91	Vert.	100	0	H21	
7	1229.141	31.30	46.50	25.16	2.34	34.27	24.53	39.73	53.90	73.90	29.37	34.17	Vert.	100	0	H21	
8	1316.936	32.60	51.90	25.48	2.40	34.03	26.45	45.75	53.90	73.90	27.45	28.15	Vert.	100	0	H21	

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.4
Date	April 26, 2023
Temperature / Humidity	21 deg. C / 46 % RH
Engineer	Hiroki Numata
	(Below 1 GHz)
Mode	Mode 2(Local) 98 MHz

Limit : FCC_Part 15 Subpart B(15.109)_Class B

<< QP DATA >>

No.	Freq.	Reading (QP)	Ant.Fac	Loss	Gain	Result (QP)	Limit (QP)	Margin (QP)	Pola.	Height	Angle	Ant. Type	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg.]		
1	98.301	21.70	9.99	7.87	32.04	7.52	43.50	35.98	Hori.	100	0	BA	
2	196.602	20.60	16.45	8.74	32.01	13.78	43.50	29.72	Hori.	100	0	BA	
3	294.903	22.60	13.75	9.63	32.01	13.97	46.00	32.03	Hori.	100	0	LA23	
4	393.204	21.10	15.70	10.13	32.09	14.84	46.00	31.16	Hori.	100	0	LA23	
5	491.504	21.50	17.70	10.74	32.18	17.76	46.00	28.24	Hori.	100	0	LA23	
6	589.805	20.20	18.96	11.26	32.23	18.19	46.00	27.81	Hori.	100	0	LA23	
7	688.106	20.30	19.68	11.61	32.28	19.31	46.00	26.69	Hori.	100	0	LA23	
8	786.407	20.50	20.66	11.95	31.78	21.33	46.00	24.67	Hori.	100	0	LA23	
9	884.708	19.80	22.06	12.33	31.21	22.98	46.00	23.02	Hori.	100	0	LA23	
10	983.009	18.60	22.24	12.76	30.63	22.97	53.90	30.93	Hori.	100	0	LA23	
11	98.301	22.00	9.99	7.87	32.04	7.82	43.50	35.68	Vert.	100	0	BA	
12	196.602	20.50	16.45	8.74	32.01	13.68	43.50	29.82	Vert.	100	0	BA	
13	294.903	21.70	13.75	9.63	32.01	13.07	46.00	32.93	Vert.	100	0	LA23	
14	393.204	20.40	15.70	10.13	32.09	14.14	46.00	31.86	Vert.	100	0	LA23	
15	491.504	21.10	17.70	10.74	32.18	17.36	46.00	28.64	Vert.	100	0	LA23	
16	589.805	20.10	18.96	11.26	32.23	18.09	46.00	27.91	Vert.	100	0	LA23	
17	688.106	20.30	19.68	11.61	32.28	19.31	46.00	26.69	Vert.	100	0	LA23	
18	786.407	20.20	20.66	11.95	31.78	21.03	46.00	24.97	Vert.	100	0	LA23	
19	884.708	19.20	22.06	12.33	31.21	22.38	46.00	23.62	Vert.	100	0	LA23	
20	983.009	19.80	22.24	12.76	30.63	24.17	53.90	29.73	Vert.	100	0	LA23	

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.4
Date	April 26, 2023
Temperature / Humidity	21 deg. C / 46 % RH
Engineer	Hiroki Numata
	(Above 1 GHz)
Mode	Mode 2 (Local) 98 MHz

Limit : FCC_Part 15 Subpart B(15.109)_Class B

<< AV/PK DATA >>

No.	Freq.	Reading		Ant.Fac	Loss	Gain	Result		Limit		Margin		Pola.	Height	Angle	Ant. Type	Comment
		(AV)	(PK)				(AV)	(PK)	(AV)	(PK)	(AV)	(PK)					
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	[H/V]	[cm]	[deg]		
1	1081.310	31.00	44.50	24.42	2.24	34.66	23.00	36.50	53.90	73.90	30.90	37.40	Hori.	100	0	H21	
2	1179.610	31.40	45.80	24.86	2.31	34.40	24.17	38.57	53.90	73.90	29.73	35.33	Hori.	100	0	H21	
3	1277.911	30.40	45.10	25.43	2.37	34.14	24.06	38.76	53.90	73.90	29.84	35.14	Hori.	100	0	H21	
4	1376.212	30.70	45.20	25.54	2.43	33.88	24.79	39.29	53.90	73.90	29.11	34.61	Hori.	100	0	H21	
5	1474.513	30.20	43.60	25.19	2.50	33.62	24.27	37.67	53.90	73.90	29.63	36.23	Hori.	100	0	H21	
6	1081.310	31.10	44.50	24.42	2.24	34.66	23.10	36.50	53.90	73.90	30.80	37.40	Vert.	100	0	H21	
7	1179.610	31.50	45.40	24.86	2.31	34.40	24.27	38.17	53.90	73.90	29.63	35.73	Vert.	100	0	H21	
8	1277.911	30.40	45.90	25.43	2.37	34.14	24.06	39.56	53.90	73.90	29.84	34.34	Vert.	100	0	H21	
9	1376.212	30.60	43.80	25.54	2.43	33.88	24.69	37.89	53.90	73.90	29.21	36.01	Vert.	100	0	H21	
10	1474.513	30.20	43.70	25.19	2.50	33.62	24.27	37.77	53.90	73.90	29.63	36.13	Vert.	100	0	H21	

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.4
Date	April 26, 2023
Temperature / Humidity	21 deg. C / 46 % RH
Engineer	Hiroki Numata
	(Below 1 GHz)
Mode	Mode 2(Local) 108 MHz

Limit : FCC_Part 15 Subpart B(15.109)_Class B

<< QP DATA >>

No.	Freq.	Reading (QP)	Ant.Fac	Loss	Gain	Result (QP)	Limit (QP)	Margin (QP)	Pola.	Height	Angle	Ant. Type	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg.]		
1	107.703	21.50	11.40	7.96	32.04	8.82	43.50	34.68	Hori.	100	0	BA	
2	215.405	21.40	11.08	8.92	32.01	9.39	43.50	34.11	Hori.	100	0	LA23	
3	323.108	21.20	14.37	9.79	32.03	13.33	46.00	32.67	Hori.	100	0	LA23	
4	430.811	20.80	16.24	10.36	32.13	15.27	46.00	30.73	Hori.	100	0	LA23	
5	538.513	20.20	17.75	11.01	32.21	16.75	46.00	29.25	Hori.	100	0	LA23	
6	646.216	20.30	19.33	11.47	32.26	18.84	46.00	27.16	Hori.	100	0	LA23	
7	753.918	20.10	20.27	11.81	31.97	20.21	46.00	25.79	Hori.	100	0	LA23	
8	861.621	19.90	21.77	12.20	31.34	22.53	46.00	23.47	Hori.	100	0	LA23	
9	969.324	20.20	22.19	12.69	30.71	24.37	53.90	29.53	Hori.	100	0	LA23	
10	107.703	21.90	11.40	7.96	32.04	9.22	43.50	34.28	Vert.	100	0	BA	
11	215.405	21.00	11.08	8.92	32.01	8.99	43.50	34.51	Vert.	100	0	LA23	
12	323.108	20.70	14.37	9.79	32.03	12.83	46.00	33.17	Vert.	100	0	LA23	
13	430.811	20.50	16.24	10.36	32.13	14.97	46.00	31.03	Vert.	100	0	LA23	
14	538.513	20.20	17.75	11.01	32.21	16.75	46.00	29.25	Vert.	100	0	LA23	
15	646.216	20.60	19.33	11.47	32.26	19.14	46.00	26.86	Vert.	100	0	LA23	
16	753.918	20.20	20.27	11.81	31.97	20.31	46.00	25.69	Vert.	100	0	LA23	
17	861.621	19.80	21.77	12.20	31.34	22.43	46.00	23.57	Vert.	100	0	LA23	
18	969.324	20.20	22.19	12.69	30.71	24.37	53.90	29.53	Vert.	100	0	LA23	

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.4
Date	April 26, 2023
Temperature / Humidity	21 deg. C / 46 % RH
Engineer	Hiroki Numata
	(Above 1 GHz)
Mode	Mode 2 (Local) 108 MHz

Limit : FCC_Part 15 Subpart B(15.109)_Class B

<< AV/PK DATA >>

No.	Freq.	Reading		Ant.Fac	Loss	Gain	Result		Limit		Margin		Polar.	Height	Angle	Ant. Type	Comment
		<AV>	<PK>				<AV>	<PK>	<AV>	<PK>	<AV>	<PK>					
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	[H/V]	[cm]	[deg]		
1	1077.026	31.90	45.40	24.40	2.24	34.67	23.87	37.37	53.90	73.90	30.03	36.53	Hori.	100	0	H21	
2	1184.729	31.20	45.00	24.88	2.31	34.38	24.01	37.81	53.90	73.90	29.89	36.09	Hori.	100	0	H21	
3	1292.432	37.10	60.50	25.49	2.38	34.10	30.87	54.27	53.90	73.90	23.03	19.63	Hori.	100	0	H21	
4	1400.134	29.80	43.40	25.51	2.45	33.81	23.95	37.55	53.90	73.90	29.95	36.35	Hori.	100	0	H21	
5	1507.837	29.60	43.20	25.12	2.52	33.53	23.71	37.31	53.90	73.90	30.19	36.59	Hori.	100	0	H21	
6	1615.539	29.80	43.60	24.89	2.59	33.24	24.04	37.84	53.90	73.90	29.86	36.06	Hori.	100	0	H21	
7	1077.026	32.00	45.60	24.40	2.24	34.67	23.97	37.57	53.90	73.90	29.93	36.33	Vert.	100	0	H21	
8	1184.729	31.30	44.90	24.88	2.31	34.38	24.11	37.71	53.90	73.90	29.79	36.19	Vert.	100	0	H21	
9	1292.432	34.80	59.80	25.49	2.38	34.10	28.57	53.57	53.90	73.90	25.33	20.33	Vert.	100	0	H21	
10	1400.134	29.70	43.70	25.51	2.45	33.81	23.85	37.85	53.90	73.90	30.05	36.05	Vert.	100	0	H21	
11	1507.837	29.60	43.60	25.12	2.52	33.53	23.71	37.71	53.90	73.90	30.19	36.19	Vert.	100	0	H21	
12	1615.539	29.90	43.50	24.89	2.59	33.24	24.14	37.74	53.90	73.90	29.76	36.16	Vert.	100	0	H21	

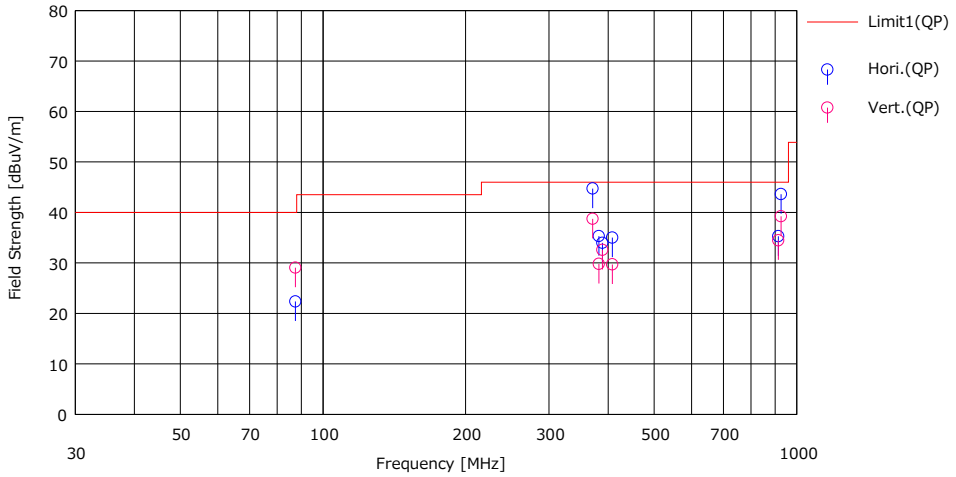
CHART: WITH FACTOR
ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + D-factor) - GAIN(AMP)
Except for the above table: adequate margin data below the limits.

* No signal was detected above 10 GHz.

Radiated Emission

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.1
Date	January 17, 2023
Temperature / Humidity	23 deg. C / 35 % RH
Engineer	Yuta Moriya
	(Below 1 GHz)
Mode	Mode 2(Other)

Limit : FCC_Part 15 Subpart B(15.109)_Class B



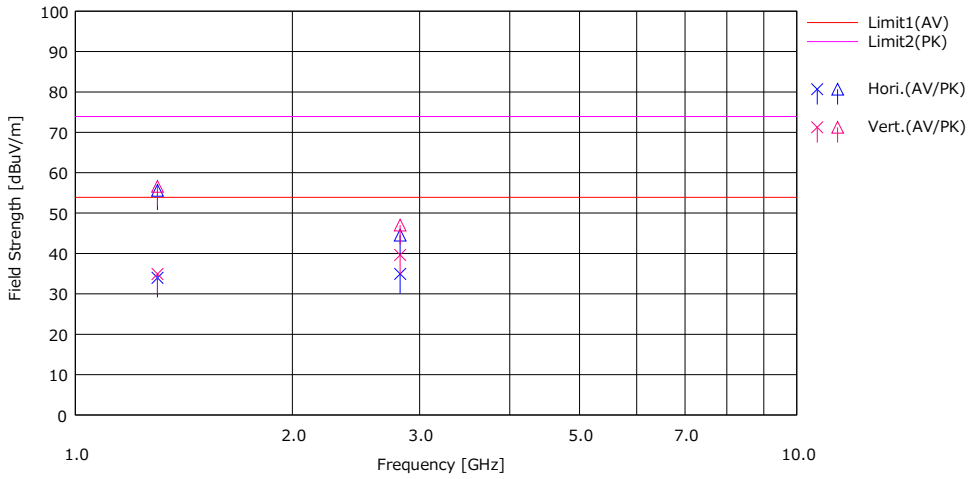
No.	Freq. [MHz]	Reading (QP) [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result (QP) [dBuV/m]	Limit (QP) [dBuV/m]	Margin (QP) [dB]	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
1	87.474	45.10	8.10	8.22	39.07	22.35	40.00	17.65	Hori.	256	344	BA	
2	370.880	57.10	15.42	10.95	38.74	44.73	46.00	1.27	Hori.	100	303	LA20	
3	382.371	47.30	15.66	11.04	38.71	35.29	46.00	10.71	Hori.	100	303	LA20	
4	388.801	45.60	15.98	11.09	38.70	33.97	46.00	12.03	Hori.	100	310	LA20	
5	408.010	45.70	16.74	11.23	38.67	35.00	46.00	11.00	Hori.	100	320	LA20	
6	914.438	37.00	22.28	14.25	38.26	35.27	46.00	10.73	Hori.	100	118	LA20	
7	926.257	45.20	22.30	14.32	38.20	43.62	46.00	2.38	Hori.	100	137	LA20	
8	87.474	51.80	8.10	8.22	39.07	29.05	40.00	10.95	Vert.	100	50	BA	
9	370.880	51.10	15.42	10.95	38.74	38.73	46.00	7.27	Vert.	169	9	LA20	
10	382.371	41.80	15.66	11.04	38.71	29.79	46.00	16.21	Vert.	169	9	LA20	
11	388.801	44.20	15.98	11.09	38.70	32.57	46.00	13.43	Vert.	158	11	LA20	
12	408.010	40.40	16.74	11.23	38.67	29.70	46.00	16.30	Vert.	150	10	LA20	
13	914.438	36.20	22.28	14.25	38.26	34.47	46.00	11.53	Vert.	117	199	LA20	
14	926.257	40.80	22.30	14.32	38.20	39.22	46.00	6.78	Vert.	100	29	LA20	

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.1
Date	January 17, 2023
Temperature / Humidity	23 deg. C / 35 % RH
Engineer	Yuta Moriya
	(Above 1 GHz)
Mode	Mode 2 (Other)

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
		〈AV〉	〈PK〉				〈AV〉	〈PK〉	〈AV〉	〈PK〉	〈AV〉	〈PK〉					
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	[H/V]	[cm]	[deg]		
1	1300.007	42.15	63.80	26.00	2.54	36.73	33.96	55.61	53.90	73.90	19.94	18.29	Hori.	121	4	HA5	
2	2820.393	39.40	49.00	28.39	3.49	36.35	34.93	44.53	53.90	73.90	18.97	29.37	Hori.	100	228	HA5	
3	1300.007	43.10	64.80	26.00	2.54	36.73	34.91	56.61	53.90	73.90	18.99	17.29	Vert.	115	215	HA5	
4	2820.393	44.10	51.50	28.39	3.49	36.35	39.63	47.03	53.90	73.90	14.27	26.87	Vert.	178	322	HA5	

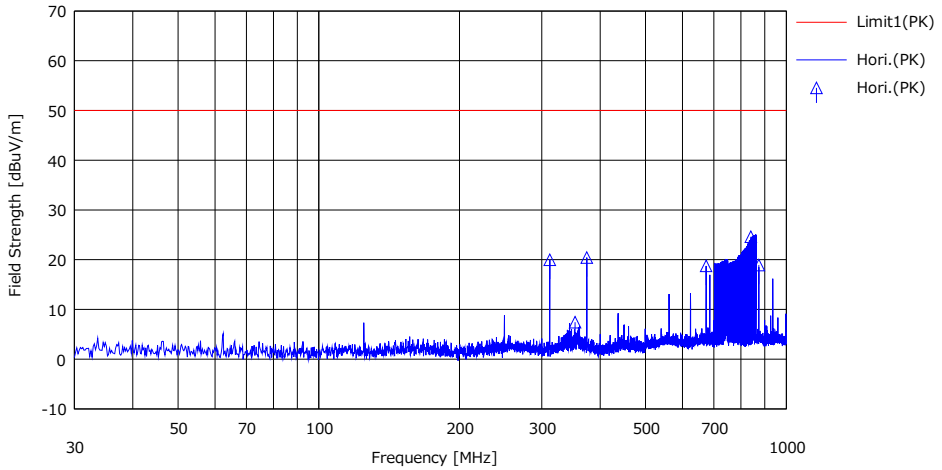
CHART: WITH FACTOR
ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + D-factor) - GAIN(AMP)
Except for the above table: adequate margin data below the limits.

* No signal was detected above 10 GHz.

Antenna Terminal Conducted Emission

Test place	Ise EMC Lab.
Shielded Room	No.6
Date	January 10, 2023
Temperature / Humidity	24 deg. C / 47 % RH
Engineer	Hiroyuki Furutaka
Mode	Mode 3

Limit : FCC15.111 Antenna terminal measurement



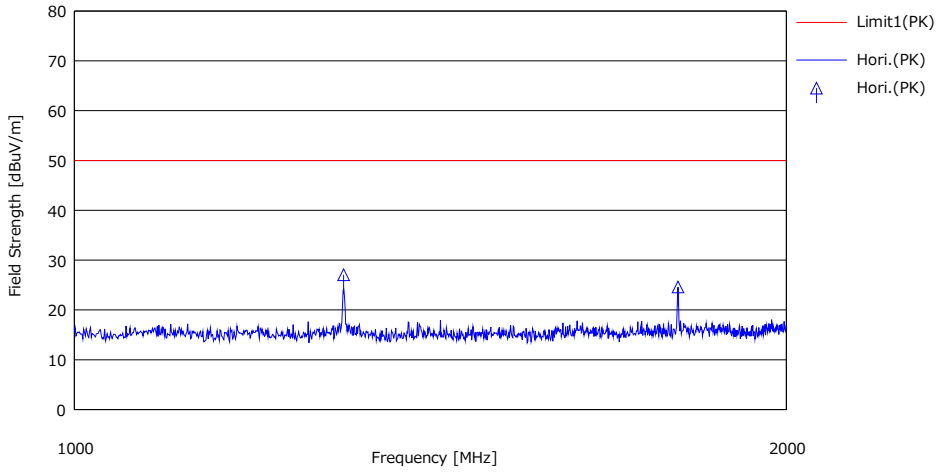
No.	Freq. [MHz]	Reading (PK) [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result (PK) [dBuV]	Limit *1) (PK) [dBuV]	Margin (PK) [dB]	Pola. [H/V]	Ant. Type	Comment
1	311.997	45.70	0.00	6.31	32.04	19.97	50.00	30.03	Hori.	---	Other
2	353.249	33.20	0.00	6.34	32.09	7.45	50.00	42.55	Hori.	---	Local 100.60MHz
3	374.391	46.20	0.00	6.34	32.11	20.43	50.00	29.57	Hori.	---	Other
4	673.911	44.70	0.00	6.47	32.42	18.75	50.00	31.25	Hori.	---	Other
5	840.025	49.70	0.00	6.51	31.60	24.61	50.00	25.39	Hori.	---	Local 104.70MHz
6	873.586	43.80	0.00	6.52	31.41	18.91	50.00	31.09	Hori.	---	Other

* 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.
Shielded Room	No.6
Date	January 10, 2023
Temperature / Humidity	24 deg. C / 47 % RH
Engineer	Hiroyuki Furutaka
Mode	Mode 3

Limit : FCC15.111 Antenna terminal measurement



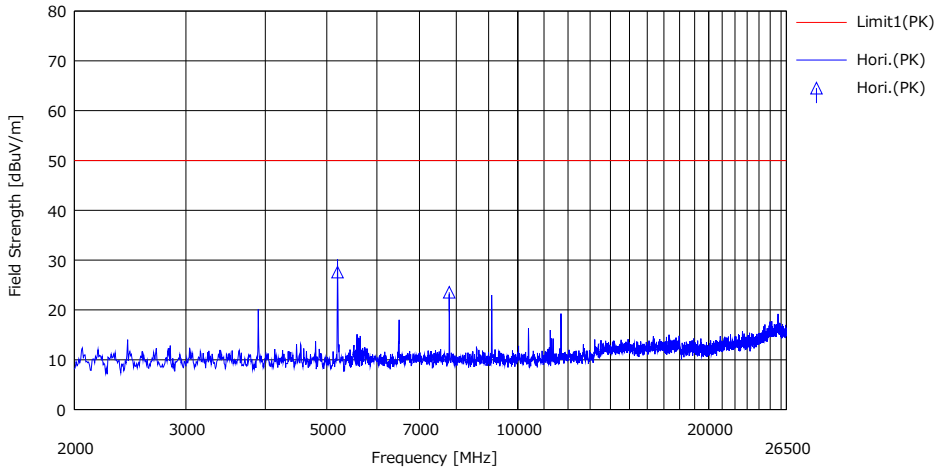
No.	Freq. [MHz]	Reading ⟨PK⟩ [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result ⟨PK⟩ [dBuV]	Limit *1) ⟨PK⟩ [dBuV]	Margin ⟨PK⟩ [dB]	Pola. [H/V]	Ant. Type	Comment
1	1299.792	54.50	0.00	6.64	34.08	27.06	50.00	22.94	Hori.	---	
2	1799.925	50.60	0.00	6.76	32.76	24.60	50.00	25.40	Hori.	---	

* 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.
Shielded Room	No.6
Date	January 10, 2023
Temperature / Humidity	24 deg. C / 47 % RH
Engineer	Hiroyuki Furutaka
Mode	Mode 3

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]	Margin (PK) [dB]	Pola. [H/V]	Ant. Type	Comment
1	5200.000	57.70	0.00	1.05	31.16	27.59	50.00	22.41	Hori.	---	Other
2	7800.133	54.80	0.00	1.36	32.63	23.53	50.00	26.47	Hori.	---	Other

* 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 was detected above 26.5 GHz.

APPENDIX 2: Test instruments

Test equipment-1/2 (Test on January 10 and 17, 2023)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	KBA-05	141198	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103+BBA9106	2513	05/14/2022	12
RE	MAEC-01	141998	AC1_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	06/28/2022	24
RE	MAEC-01-SVSWR	141994	AC1_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 10m	DA-06881	04/05/2021	24
RE	MAT-34	141331	Attenuator(6dB)	TME	UFA-01	-	02/25/2022	12
RE	MCC-02	141350	Coaxial Cable	Suhner/storm/Agilent/ TSJ	-	-	03/08/2022	12
RE	MCC-176	141279	Microwave Cable	Junkosha	MMX221-00500DMSDMS	1502S303	03/15/2022	12
RE	MCC-217	141393	Microwave Cable	Junkosha	MWX221	1604S254(1 m) / 1608S088(5 m)	08/02/2022	12
RE	MCC-241	196413	Microwave Cable	Huber+Suhner	SF101EA/11PC24/ 11PC24/2500MM	SN 800094/1EA	01/23/2023	12
RE	MHA-05	141511	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	253	09/20/2022	12
RE	MHA-17	141506	Horn Antenna 15-40GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9170	BBHA9170307	07/22/2022	12
RE	MHF-16	141406	High Pass Filter 7-20GHz	TOKIMEC	TF37NCCA	7001	09/07/2022	12
RE	MJM-25	142226	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
RE	MLA-20	141264	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	189	05/14/2022	12
RE	MMM-09	141533	DIGITAL HiTESTER	HIOKI E.E. CORPORATION	3805	51201195	01/18/2023	12
RE	MOS-27	141566	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	A08Q26	01/13/2023	12
RE	MPA-01	141576	Pre Amplifier	Keysight Technologies Inc	8449B	3008A01671	02/22/2022	12
RE	MPA-19	141585	Pre Amplifier	MITEQ	MLA-10K01-B01-35	1237616	02/28/2022	12
RE	MPA-33	220253	Broadband Amplifier	SAGE Millimeter, Inc.	SBB-0115033218-2F2F-E3	0001	05/13/2022	12
RE	MSA-03	141884	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY44020357	03/31/2022	12
RE	MTR-09	141950	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	10/11/2022	12
AT	MAT-10	141156	Attenuator(10dB)	Weinschel Corp	2	BL1173	11/10/2022	12
AT	MAT-57	141333	Attenuator(10dB)	Suhner	6810.19.A	-	12/21/2022	12
AT	MCC-38	141395	Coaxial Cable	UL Japan	-	-	11/18/2022	12
AT	MCC-98	141377	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	30819/2	06/15/2022	12
AT	MMM-17	141557	DIGIITAL HiTESTER	HIOKI E.E. CORPORATION	3805	70900530	01/18/2023	12
AT	MOS-28	141567	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	0008	01/13/2023	12
AT	MPM-12	141809	Power Meter	Anritsu Corporation	ML2495A	825002	05/18/2022	12
AT	MPSE-17	141830	Power sensor	Anritsu Corporation	MA2411B	738285	05/18/2022	12
AT	MSA-14	141901	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY48250080	01/16/2023	12

Test equipment-2/2 (Test on April 26, 2023)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	MAEC-04	142011	AC4_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	05/22/2022	24
RE	MAEC-04-SVSWR	142017	AC4_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-10005	04/12/2021	24
RE	MAT-34	141331	Attenuator(6dB)	TME	UFA-01	-	02/01/2023	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	12
RE	MCC-50	141397	Coaxial Cable	UL Japan	-	-	11/18/2022	12
RE	MHA-17	141506	Horn Antenna 15-40GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9170	BBHA9170307	07/22/2022	12
RE	MHA-21	141508	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	557	05/20/2022	12
RE	MHA-29	141517	Horn Antenna 26.5-40GHz	ETS-Lindgren	3160-10	152399	11/14/2022	12
RE	MJM-29	142230	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
RE	MLA-23	141267	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-192	09/21/2022	12
RE	MMM-10	141545	DIGITAL HiTESTER	HIOKI E.E. CORPORATION	3805	51201148	01/18/2023	12
RE	MOS-15	141562	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	0010	01/13/2023	12
RE	MPA-12	141581	MicroWave System Amplifier	Keysight Technologies Inc	83017A	00650	10/05/2022	12
RE	MPA-14	141583	Pre Amplifier	SONOMA INSTRUMENT	310	260833	04/05/2023	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	MTR-10	141951	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	07/25/2022	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