



EMI TEST REPORT

Test Report No.: 13980529H-R2

Customer	mitsubishi electric corporation sanda works
Description of EUT	HEADUNIT A-HIGH
Model Number of EUT	NR-213
FCC ID	UJHNR213B
Test Regulation	FCC Part 15 Subpart B: 2021 Class B
Test Result	Complied (Refer to SECTION 3)
Issue Date	August 19, 2022
Remarks	-

Representative Test Engineer

Kiyoshiro Okazaki
Engineer

Approved By

Tsubasa Takayama
Leader



CERTIFICATE 5107.02

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

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

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- The information provided from the customer for this report is identified in SECTION 1.

REVISION HISTORY

Original Test Report No.: 13980529H

This report is a revised version of 13980529H. 13980529H is replaced with this report.

(1/2)

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	13980529H	March 11, 2022	-
1	13980529H-R1	July 26, 2022	<u>Cover page</u> Updated Issue No. for the Form-ULID-003532; Issue# 20.0 ↓ Issue# 21.0
1	13980529H-R1	July 26, 2022	<u>Clause 2.1</u> Corrected Receipt Date; August 23, 2021 (for Mode 4) September 21, 2021 (for other than Mode 4) ↓ August 23, 2021 (for Mode 7) September 21, 2021 (for other than Mode 7)
1	13980529H-R1	July 26, 2022	<u>Clause 2.2</u> Corrected Clock frequency (ies) in the system; 1.4 GHz, 40 MHz (Radio part) ↓ 1.4 GHz
1	13980529H-R1	July 26, 2022	<u>Clause 2.2</u> Corrected Frequency of operation for AM and FM; AM: 531 kHz to 1602 kHz, 5800 kHz to 6250 kHz FM: 87.5 MHz to 108.0 MHz ↓ AM: 535 kHz to 1710 kHz FM: 87.5 MHz to 107.9 MHz
1	13980529H-R1	July 26, 2022	<u>Clause 2.2</u> Added Local frequency
1	13980529H-R1	July 26, 2022	<u>Clause 4.1</u> Added reception frequency for Local to Mode 1 to 4
1	13980529H-R1	July 26, 2022	<u>Clause 6.2</u> Corrected Test configuration; EUT was placed on a <u>wooden table</u> of nominal size, 1.0 m by 1.5 m, raised 0.8 m from the ground. ↓ EUT was placed on a <u>urethane platform</u> of nominal size, 1.0 m by 1.5 m, raised 0.8 m from the ground.

(2/2)

Revision	Test Report No.	Date	Page Revised Contents
2	13980529H-R2	August 19, 2022	<u>Clause 4.1</u> Corrected Mode 1 to 4
2	13980529H-R2	August 19, 2022	<u>Clause 5.4</u> Corrected Test procedure; The test of Local oscillator spurious has (...omit...) the antenna terminal test. ↓ For the test of Local oscillator spurious, (...omit...) the local oscillator emission became maximum were reported. Emissions from other than the local oscillator (Other) were (...omit...) the local oscillator emission became maximum.

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	mitsubishi electric corporation sanda works
Address	2-3-33, Miwa, Sanda-city, Hyogo, 669-1513, Japan
Telephone Number	+81-79-559-3600
Contact Person	Kazuhito Funae

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	HEADUNIT A-HIGH
Model Number	NR-213
Serial Number	Refer to SECTION 4.2
Condition	Production model
Modification	No Modification by the test lab
Receipt Date	August 23, 2021 (for Mode 7) September 21, 2021 (for other than Mode 7)
Test Date	August 24, 2021 to February 22, 2022

2.2 Product Description**General Specification**

Rating	DC 12 V
Clock frequency(ies) in the system	1.4 GHz

Radio Specification

	IEEE802.11b	IEEE802.11g/n (20 M band)	IEEE802.11a/n (20 M band)	IEEE802.11n (40 M band)	Bluetooth Ver.3.0 with EDR function
Frequency of operation	2412-2462 MHz	2412-2462 MHz	5180-5240 MHz 5260-5320 MHz 5500-5700 MHz 5745-5825 MHz	5190-5230 MHz 5270-5310 MHz 5510-5670 MHz 5755-5795 MHz	2402-2480 MHz
Type of modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (64QAM, 16QAM, QPSK, BPSK)	OFDM (64QAM, 16QAM, QPSK, BPSK)		FHSS (GFSK, $\pi/4$ -DQPSK, 8-DPSK)
Channel spacing	5 MHz		20 MHz	40 MHz	1 MHz
Antenna type	Printed patch Antenna				Dipole Pattern Antenna
Antenna Gain	3.3 dBi		6.5 dBi		2.32 dBi
Antenna Connector type	FAKRA				PSE-LP2

	GPS
Frequency of operation	See table below.
Type of modulation	GPS: BPSK GLONASS: BPSK
Antenna type	Active antenna
Antenna Connector type	FAKRA
Antenna Gain	25dBi

Supported GNSS and GNSS signals

GNSS	RNSS Frequency Band / Frequency [MHz]		
	1559 to 1610	1215 to 1300	1164 to 1215
BDS	☐ B11 1561.098	-	-
Galileo	☐ E1 1575.42	☐ E6 1278.75	☐ E5a 1176.45 ☐ E5b 1207.14
GLONASS	☒ G1 1598.063 - 1605.375	☐ G2 1242.9375 - 1248.625	-
GPS	☒ L1 1575.42	☐ L2 1227.6	☐ L5 1176.45
SBAS	☐ L1 1575.42	-	☐ L5 1176.45

☒ Supported GNSS signal☐ Not supported GNSS signal**AM / FM**

	AM / FM
Frequency of operation	AM: 535 kHz to 1710 kHz FM: 87.5 MHz to 107.9 MHz
Local frequency	Receiving frequency $\pm$ 25 kHz
Channel spacing	AM: 9 kHz FM: 100 kHz
Antenna connector type	FAKRA

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	FCC Part 15 Subpart B FCC Part 15 final revised on May 3, 2021 and effective July 2, 2021
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	FCC: ANSI C63.4: 2014 + C63.4a: 2017 7. AC power - line conducted emission measurements (IEEE Std 187-2003.)	FCC: Part 15 Subpart B 15.107(a)	N/A	N/A	N/A	*1)
Radiated emission	FCC: ANSI C63.4: 2014 + C63.4a: 2017 8. Radiated emission measurements (IEEE Std 187-2003.)	FCC: Part 15 Subpart B 15.109(a)	N/A	0.15 dB 97.834 MHz, Horizontal, QP (Mode 4 (Local))	Complied# a)	-
Antenna Terminal	FCC: ANSI C63.4: 2014 + C63.4a: 2017 12. Measurement of unintentional radiators other than ITE (IEEE Std 187-2003.)	FCC: Part 15 Subpart B 15.111(a)	N/A	16.1 dB 70.335 MHz (Mode 9)	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)

Symbols:

Complied The data of this test item has enough margin, more than the measurement uncertainty.

Complied# The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.

3.3 Addition to standard

No addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

There is no applicable rule of uncertainty in this applied standard. Therefore, the results are derived depending on whether or not laboratory uncertainty is applied.

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	5.0 dB
		Vertical	5.0 dB
3 m	1 GHz to 6 GHz		5.1 dB
	6 GHz to 18 GHz		5.4 dB
1 m	10 GHz to 26.5 GHz		5.4 dB
	26.5 GHz to 40 GHz		5.4 dB
0.5 m	26.5 GHz to 40 GHz		5.4 dB
10 m	1 GHz to 18 GHz		5.4 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, Facsimile: +81 596 24 8124

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	-	-

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

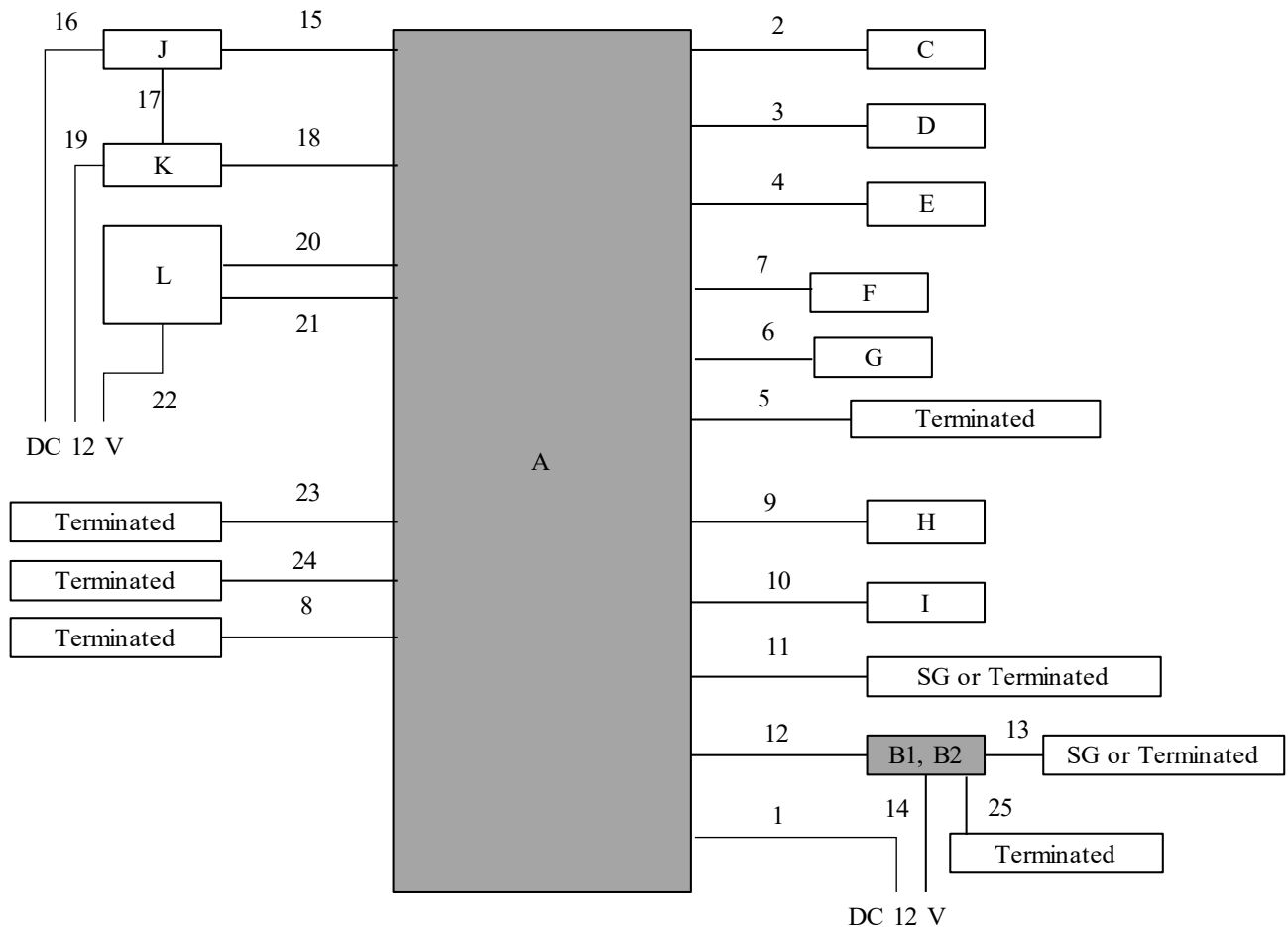
SECTION 4: Operation of EUT during testing

4.1 Operating Mode(s)

Mode	Remarks
1. FM TUN1 Port Receiving mode (AMP1) (Local: Tuning mode / Other: 95.1 MHz reception)	Radiated Emission test
2. FM TUN1 Port Receiving mode (AMP2) (Local: Tuning mode / Other: 95.1 MHz reception)	Radiated Emission test
3. FM TUN2 Port Receiving mode (AMP1) (Local: Tuning mode / Other: 100.3 MHz reception)	Radiated Emission test
4. FM TUN2 Port Receiving mode (AMP2) (Local: Tuning mode / Other: 100.3 MHz reception)	Radiated Emission test
5. USB Memory Play mode (AMP1)	Radiated Emission test
6. USB Memory Play mode (AMP2)	Radiated Emission test
7. FM TUN1 Port Tuning mode	Antenna Terminal test
8. FM TUN2 Port Tuning mode (AMP1)	Antenna Terminal test
9. FM TUN2 Port Tuning mode (AMP2)	Antenna Terminal test

Software(s)	E480.0
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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	HEADUNIT A-HIGH	NR-213	MEG890M1191245	MITSUBISHI ELECTRIC CORPORATION SANDA WORKS	EUT
B1	TUN2 (AM/FM)_AMP1	RKE2123U1	152346	Continental	EUT *1)
B2	TUN2 (AM/FM)_AMP2	RKE2123U1	002188	KATHREIN Automotive GmbH	EUT *2)
C	GPS Antenna	LHC	001	WiSi	-
D	WLAN Antenna	A2139058402	00015	MercedesBenz	-
E	BT Antenna	AG98	A2218205475	WiSi	-
F	USB Memory	USM4GRB	-	SONY	-
G	USB Memory	RUF3-K8GA-BK/N	P90611	BUFFALO	-
H	USB Memory	USM4GRB	-	SONY	-
I	Speaker dummy	-	-	-	-
J	Display	A2C93853702	0200151770029	Continental	-
K	CCU	A2059008018	0000166842	Continental	-
L	CANTOOL	CT2E1001-5HNLT	16C1431B	i-TEC	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	2.5	Unshielded	Unshielded	-
2	GNSS Antenna Cable	5.0	Shielded	Shielded	-
3	Antenna Cable	1.5	Shielded	Shielded	-
4	Antenna Cable	1.2	Shielded	Shielded	-
5	Signal Cable	1.0	Shielded	Shielded	-
6	USB Cable	2.0	Shielded	Shielded	-
7	USB Cable	2.0	Shielded	Shielded	-
8	Signal Cable	2.0	Unshielded	Unshielded	-
9	USB Cable	4.0	Shielded	Shielded	-
10	Speaker Cable	2.2	Unshielded	Unshielded	-
11	Tuner1 Cable	1.0	Shielded	Shielded	-
12	Tuner2 Cable	1.0	Shielded	Shielded	*3)
13	RF Cable	0.1	Shielded	Shielded	*3)
14	DC Cable	2.5	Unshielded	Unshielded	*3)
15	Display Cable	1.0	Shielded	Shielded	-
16	DC Cable	2.5	Unshielded	Unshielded	-
17	CAN Cable	1.8	Unshielded	Unshielded	-
18	CAN Cable	2.8	Unshielded	Unshielded	-
19	DC Cable	2.5	Unshielded	Unshielded	-
20	CAN Cable	3.0	Unshielded	Unshielded	-
21	CAN Cable	3.0	Unshielded	Unshielded	-
22	DC Cable	2.5	Unshielded	Unshielded	-
23	Signal Cable	1.0	Unshielded	Unshielded	-
24	Signal Cable	1.0	Unshielded	Unshielded	-
25	Signal Cable	1.0	Unshielded	Unshielded	*2)

*1) Used on Mode 1, 3, 5, and 8 only

*2) Used on Mode 2, 4, 6, and 9 only

*3) Used on modes other than Mode 7

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 - 200 MHz (Biconical antenna) / 200 MHz - 1000 MHz (Logperiodic antenna)
 1000 MHz - 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.

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

For the test of Local oscillator spurious, pre-scanning has been carried out with all frequencies including the highest / middle / lowest reception frequencies based on the results of the antenna terminal test, and the measurement values at the frequency in which the local oscillator emission became maximum were reported.

Emissions from other than the local oscillator (Other) were tested by receiving frequencies in which the local oscillator emission became maximum.

For above 1 GHz, test antenna was aimed at the EUT for receiving the maximum signal and always kept within the illumination area of the 3 dB beamwidth of the antenna.

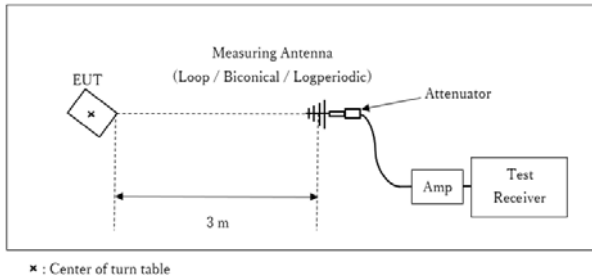
Frequency	Below 1 GHz	Above 1 GHz *1)
Instrument used	Test Receiver	Test Receiver
IF Bandwidth	QP: BW 120 kHz	PK: BW 1 MHz, CAV: BW 1 MHz

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

Distance Factor: See Figure 2.

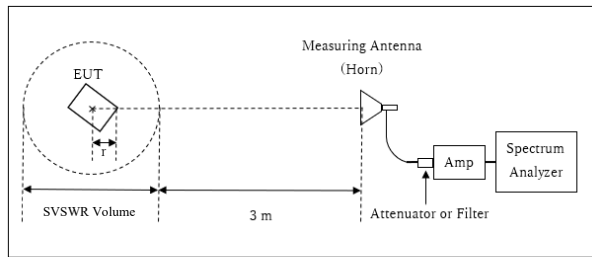
Figure 2: Test Setup

Below 1 GHz



Test Distance: 3 m

1 GHz - 10 GHz

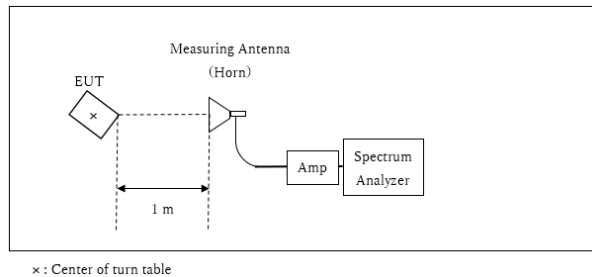


r : Radius of an outer periphery of EUT
× : Center of turn table

Distance Factor: $20 \times \log (3.10 \text{ m}^* / 3.0 \text{ m}) = 0.29 \text{ dB}$
* Test Distance: $(3 + \text{SVSWR Volume} / 2) - r = 3.10 \text{ m}$

SVSWR Volume: 2 m
(SVSWR Volume has been calibrated based on CISPR 16-1-4.)
 $r = 0.90 \text{ m}$

10 GHz - 40 GHz



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.

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: 100 kHz	PK: RBW: 1 MHz / VBW: 3 MHz

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

6.5 Test result

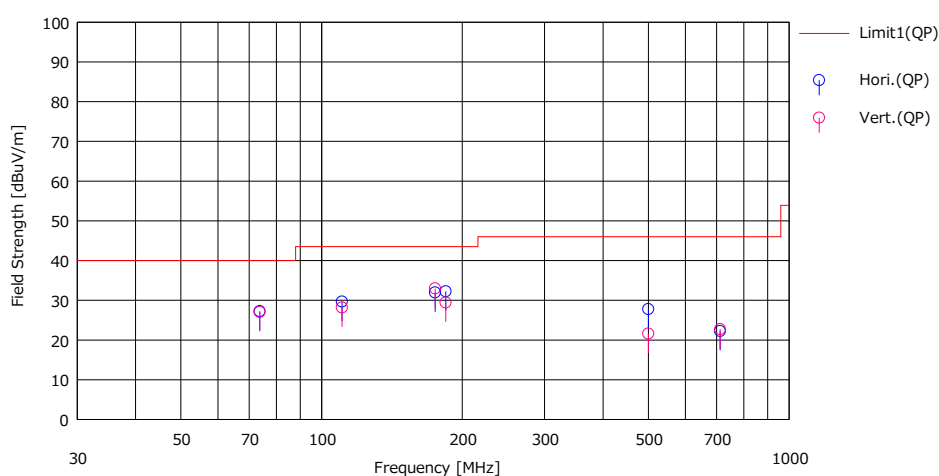
Summary of the test results: Pass

APPENDIX 1: Test data

Radiated Emission

Test place Ise EMC Lab.
Semi Anechoic Chamber No.4
Date January 20, 2022
Temperature / Humidity 24 deg. C / 34 % RH
Engineer Kiyoshiro Okazaki
(Below 1 GHz)
Mode Mode 1 (Local)

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]	Margn [QP] [dB]	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
1	73.735	45.30	6.38	7.58	32.02	27.24	40.00	12.76	Hori.	259	300	BA	
2	110.575	41.90	11.80	7.95	31.98	29.67	43.50	13.83	Hori.	165	81	BA	
3	174.991	39.40	16.02	8.49	31.94	31.97	43.50	11.53	Hori.	289	72	BA	
4	184.356	39.30	16.28	8.57	31.93	32.22	43.50	11.28	Hori.	175	357	BA	
5	500.047	31.10	17.95	10.72	31.99	27.78	46.00	18.22	Hori.	100	172	LA23	
6	712.435	22.60	20.16	11.57	32.10	22.23	46.00	23.77	Hori.	100	112	LA23	
7	73.735	45.10	6.38	7.58	32.02	27.04	40.00	12.96	Vert.	100	1	BA	
8	110.575	40.40	11.80	7.95	31.98	28.17	43.50	15.33	Vert.	100	332	BA	
9	174.991	40.40	16.02	8.49	31.94	32.97	43.50	10.53	Vert.	100	354	BA	
10	184.356	36.50	16.28	8.57	31.93	29.42	43.50	14.08	Vert.	100	187	BA	
11	500.047	24.90	17.95	10.72	31.99	21.58	46.00	24.42	Vert.	100	183	LA23	
12	712.435	23.10	20.16	11.57	32.10	22.73	46.00	23.27	Vert.	100	248	LA23	

CHART: WITH FACTOR

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

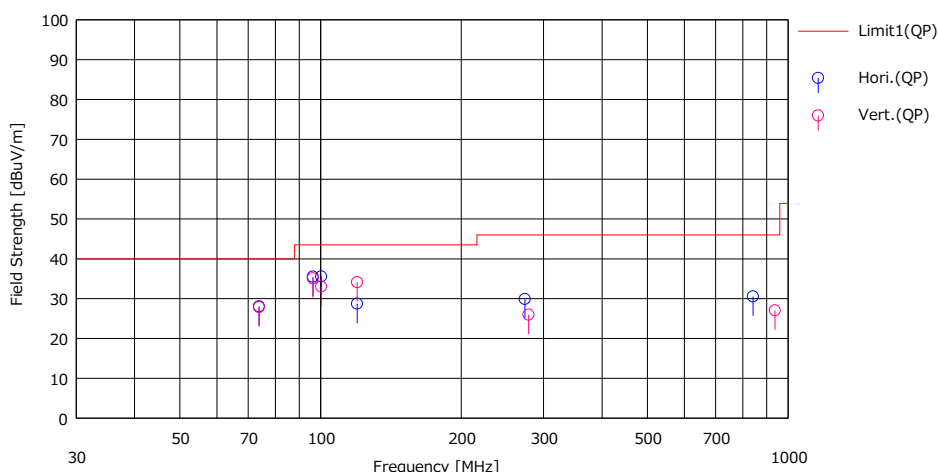
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + ATT) - GAIN(AMP)

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

Radiated Emission

Test place Ise EMC Lab.
Semi Anechoic Chamber No.4
Date January 20, 2022
Temperature / Humidity 24 deg. C / 34 % RH
Engineer Kiyoshiro Okazaki
(Below 1 GHz)
Mode Mode 1 (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]	Margn (QP) [dB]	Pols. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	[Type]	
1	73.860	46.10	6.38	7.59	32.02	28.05	40.00	11.95	Hori.	300	345	BA	
2	96.303	50.00	9.67	7.81	32.00	35.48	43.50	8.02	Hori.	205	84	BA	
3	100.367	49.30	10.37	7.85	31.99	35.53	43.50	7.97	Hori.	204	309	BA	
4	119.761	39.80	12.87	8.03	31.98	28.72	43.50	14.78	Hori.	100	239	BA	
5	273.600	39.20	13.33	9.23	31.87	29.89	46.00	16.11	Hori.	100	230	LA23	
6	841.650	28.50	21.44	12.05	31.46	30.53	46.00	15.47	Hori.	100	214	LA23	
7	73.860	45.90	6.38	7.59	32.02	27.85	40.00	12.15	Vert.	100	195	BA	
8	96.303	49.60	9.67	7.81	32.00	35.08	43.50	8.42	Vert.	126	319	BA	
9	100.367	46.80	10.37	7.85	31.99	33.03	43.50	10.47	Vert.	100	156	BA	
10	119.761	45.20	12.87	8.03	31.98	34.12	43.50	9.38	Vert.	100	145	BA	
11	278.600	35.00	13.55	9.26	31.86	25.95	46.00	20.05	Vert.	150	82	LA23	
12	937.632	23.40	22.15	12.48	30.99	27.04	46.00	18.96	Vert.	100	354	LA23	

CHART: WITH FACTOR

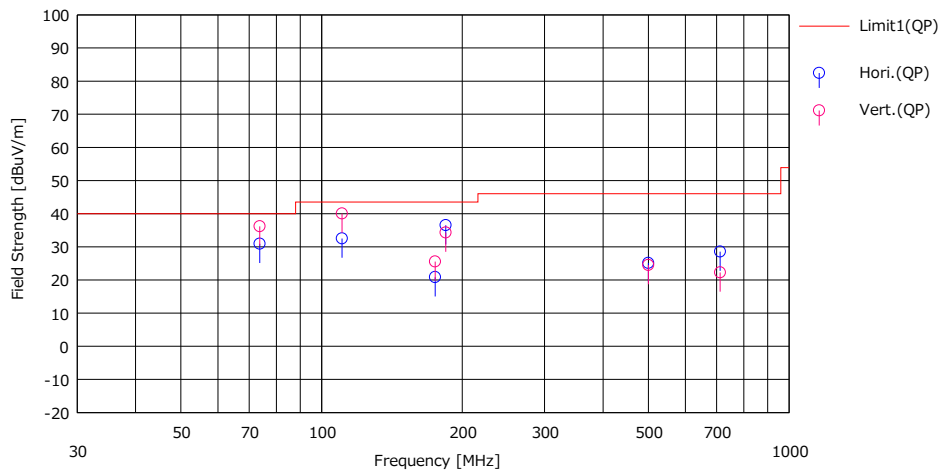
ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + ATT) - GAIN(AMP)

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

Radiated Emission

Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date February 22, 2022
Temperature / Humidity 23 deg. C / 33 % RH
Engineer Kiyoshiro Okazaki
(Below 1 GHz)
Mode Mode 2 (Local)

Limit : FCC_Part 15 Subpart B(15.109)_Class B



No.	Freq. [MHz]	Reading [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Pola [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
1	73.735	49.00	6.38	7.79	32.26	30.91	40.00	9.09	Hori.	273	190	BA	
2	110.575	44.70	11.80	8.25	32.23	32.52	43.50	10.98	Hori.	166	231	BA	
3	174.991	26.10	16.02	8.92	32.19	20.85	43.50	22.65	Hori.	190	115	BA	
4	184.356	43.40	16.28	9.01	32.18	36.51	43.50	6.99	Hori.	306	143	BA	
5	500.047	27.80	18.02	11.38	32.10	25.10	46.00	20.90	Hori.	202	173	LA22	
6	712.435	27.80	20.16	12.62	32.02	28.56	46.00	17.44	Hori.	100	234	LA22	
7	73.735	54.30	6.38	7.79	32.26	36.21	40.00	3.79	Vert.	100	50	BA	
8	110.575	52.20	11.80	8.25	32.23	40.02	43.50	3.48	Vert.	100	121	BA	
9	174.991	32.80	16.02	8.92	32.19	25.55	43.50	17.95	Vert.	100	341	BA	
10	184.356	41.20	16.28	9.01	32.18	34.31	43.50	9.19	Vert.	100	123	BA	
11	500.047	27.20	18.02	11.38	32.10	24.50	46.00	21.50	Vert.	100	210	LA22	
12	712.435	21.50	20.16	12.62	32.02	22.26	46.00	23.74	Vert.	124	12	LA22	

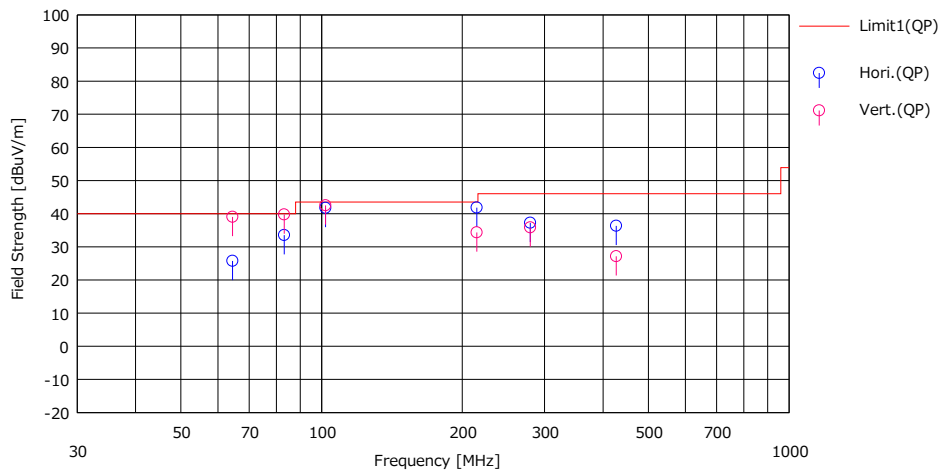
CHART: WITH FACTOR

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 February 22, 2022
Temperature / Humidity 23 deg. C / 33 % RH
Engineer Kiyoshiro Okazaki
(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	64.477	43.50	6.87	7.65	32.27	25.75	40.00	14.25	Hori.	100	68	BA	
2	83.176	50.50	7.38	7.92	32.26	33.54	40.00	6.46	Hori.	223	109	BA	
3	101.990	55.20	10.62	8.15	32.24	41.73	43.50	1.77	Hori.	156	89	BA	
4	214.775	53.00	11.69	9.30	32.16	41.83	43.50	1.67	Hori.	145	0	LA22	
5	279.608	45.70	13.81	9.85	32.11	37.25	46.00	8.75	Hori.	122	261	LA22	
6	426.824	41.20	16.34	10.90	32.10	36.34	46.00	9.66	Hori.	100	142	LA22	
7	64.477	56.80	6.87	7.65	32.27	39.05	40.00	0.95	Vert.	100	285	BA	
8	83.176	56.70	7.38	7.92	32.26	39.74	40.00	0.26	Vert.	100	290	BA	
9	101.990	56.00	10.62	8.15	32.24	42.53	43.50	0.97	Vert.	100	68	BA	
10	214.775	45.50	11.69	9.30	32.16	34.33	43.50	9.17	Vert.	100	33	LA22	
11	279.608	44.30	13.81	9.85	32.11	35.85	46.00	10.15	Vert.	100	310	LA22	
12	426.824	32.00	16.34	10.90	32.10	27.14	46.00	18.86	Vert.	100	17	LA22	

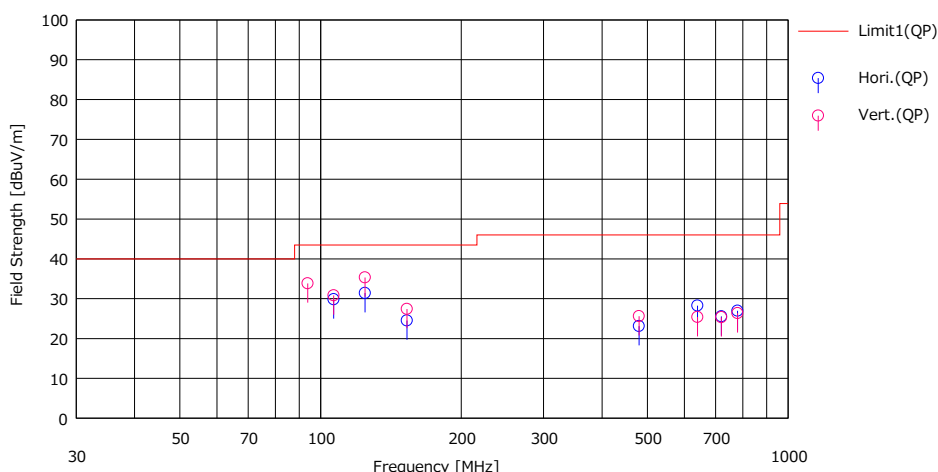
CHART: WITH FACTOR

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.4
Date January 20, 2022
Temperature / Humidity 24 deg. C / 34 % RH
Engineer Kiyoshiro Okazaki
(Below 1 GHz)
Mode Mode 3 (Local)

Limit : FCC_Part 15 Subpart B(15.109)_Class B



No.	Freq.	Reading	Ant.Fac	Loss	Gain	Result	Limit	Margn	Pda.	Height	Angle	Ant. Type	Comment
		(QP)				(QP)	(QP)	(QP)					
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]		
1	106.631	42.60	11.31	7.91	31.99	29.83	43.50	13.67	Hori.	179	83	BA	
2	124.420	42.00	13.31	8.07	31.97	31.41	43.50	12.09	Hori.	332	19	BA	
3	153.018	33.00	15.14	8.32	31.95	24.51	43.50	18.99	Hori.	342	143	BA	
4	480.019	27.20	17.30	10.58	31.98	23.10	46.00	22.90	Hori.	121	181	LA23	
5	640.006	29.60	19.42	11.36	32.11	28.27	46.00	17.73	Hori.	112	183	LA23	
6	720.080	25.80	20.21	11.59	32.06	25.54	46.00	20.46	Hori.	100	0	LA23	
7	780.093	26.20	20.71	11.81	31.76	26.96	46.00	19.04	Hori.	100	0	LA23	
8	93.846	48.80	9.25	7.79	32.00	33.84	43.50	9.66	Vert.	100	19	BA	
9	106.631	43.60	11.31	7.91	31.99	30.83	43.50	12.67	Vert.	100	0	BA	
10	124.420	45.90	13.31	8.07	31.97	35.31	43.50	8.19	Vert.	100	119	BA	
11	153.018	35.90	15.14	8.32	31.95	27.41	43.50	16.09	Vert.	100	214	BA	
12	480.019	29.70	17.30	10.58	31.98	25.60	46.00	20.40	Vert.	121	181	LA23	
13	640.006	26.70	19.42	11.36	32.11	25.37	46.00	20.63	Vert.	100	20	LA23	
14	720.080	25.60	20.21	11.59	32.06	25.34	46.00	20.66	Vert.	100	0	LA23	
15	780.093	25.60	20.71	11.81	31.76	26.36	46.00	19.64	Vert.	100	0	LA23	

CHART: WITH FACTOR

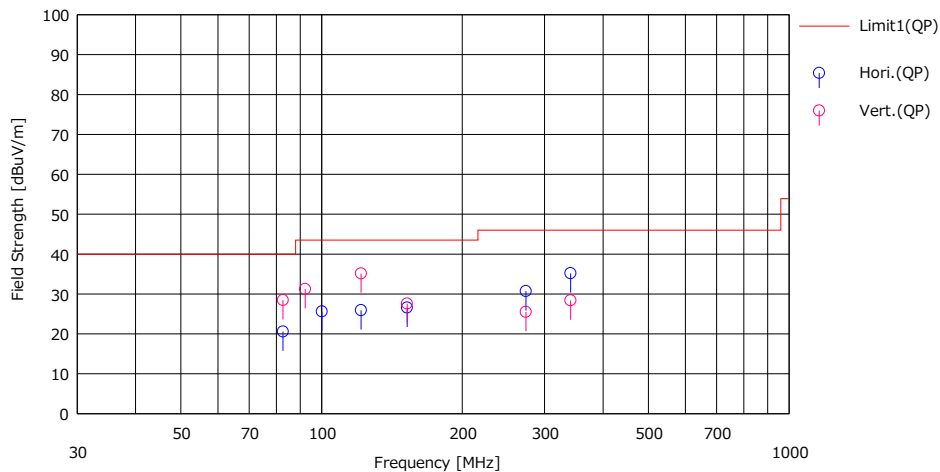
ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + ATT) - GAIN(AMP)

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

Radiated Emission

Test place Ise EMC Lab.
Semi Anechoic Chamber No.4
Date January 20, 2022
Temperature / Humidity 24 deg. C / 34 % RH
Engineer Kiyoshiro Okazaki
(Below 1 GHz)
Mode Mode 3 (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	Margn	Pola [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		[dBuV]				[dBuV/m]	[dBuV/m]	[dB]					
1	82.697	37.60	7.30	7.68	32.02	20.56	40.00	19.44	Hori.	300	76	BA	
2	100.180	39.40	10.33	7.85	31.99	25.59	43.50	17.91	Hori.	300	92	BA	
3	121.461	36.80	13.05	8.04	31.97	25.92	43.50	17.58	Hori.	300	50	BA	
4	152.401	35.10	15.10	8.32	31.95	26.57	43.50	16.93	Hori.	300	34	BA	
5	273.606	40.00	13.33	9.23	31.87	30.69	46.00	15.31	Hori.	100	34	LA23	
6	340.812	42.30	15.08	9.68	31.88	35.18	46.00	10.82	Hori.	100	267	LA23	
7	82.697	45.50	7.30	7.68	32.02	28.46	40.00	11.54	Vert.	100	10	BA	
8	92.235	46.50	8.95	7.77	32.00	31.22	43.50	12.28	Vert.	100	304	BA	
9	121.461	46.00	13.05	8.04	31.97	35.12	43.50	8.38	Vert.	100	124	BA	
10	152.401	36.10	15.10	8.32	31.95	27.57	43.50	15.93	Vert.	100	166	BA	
11	273.606	34.80	13.33	9.23	31.87	25.49	46.00	20.51	Vert.	100	209	LA23	
12	340.812	35.50	15.08	9.68	31.88	28.38	46.00	17.62	Vert.	150	181	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)

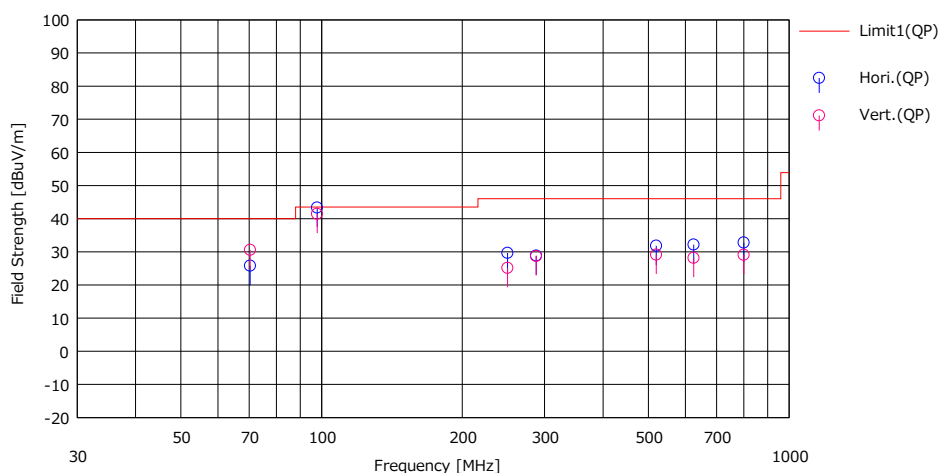
Except for the above table: adequate margin data below the limits.

Radiated Emission

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer
Mode

Ise EMC Lab.
No.3
February 22, 2022
23 deg. C / 33 % RH
Kiyoshiro Okazaki
(Below 1 GHz)
Mode 4 (Local)

Limit : FCC_Part 15 Subpart B(15.109)_Class B



No.	Freq. [MHz]	Reading (QP) [dBuV]	Ant.Fac (dB/m) [dB]	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	70.335	43.90	6.39	7.74	32.26	25.77	40.00	14.23	Hori.	400	225	BA	
2	97.834	57.60	9.89	8.10	32.24	43.35	43.50	0.15	Hori.	313	81	BA	
3	249.996	40.10	12.06	9.60	32.13	29.63	46.00	16.37	Hori.	132	307	LA22	
4	287.920	37.20	13.86	9.91	32.10	28.87	46.00	17.13	Hori.	115	44	LA22	
5	520.005	34.60	17.82	11.50	32.10	31.82	46.00	14.18	Hori.	100	149	LA22	
6	624.987	32.60	19.52	12.12	32.09	32.15	46.00	13.85	Hori.	132	331	LA22	
7	799.943	30.30	20.94	13.07	31.54	32.77	46.00	13.23	Hori.	131	115	LA22	
8	70.335	48.70	6.39	7.74	32.26	30.57	40.00	9.43	Vert.	100	83	BA	
9	97.834	55.70	9.89	8.10	32.24	41.45	43.50	2.05	Vert.	100	105	BA	
10	249.996	35.60	12.06	9.60	32.13	25.13	46.00	20.87	Vert.	100	35	LA22	
11	287.920	37.00	13.86	9.91	32.10	28.67	46.00	17.33	Vert.	100	319	LA22	
12	520.005	31.90	17.82	11.50	32.10	29.12	46.00	16.88	Vert.	100	210	LA22	
13	624.987	28.60	19.52	12.12	32.09	28.15	46.00	17.85	Vert.	100	15	LA22	
14	799.943	26.60	20.94	13.07	31.54	29.07	46.00	16.93	Vert.	100	213	LA22	

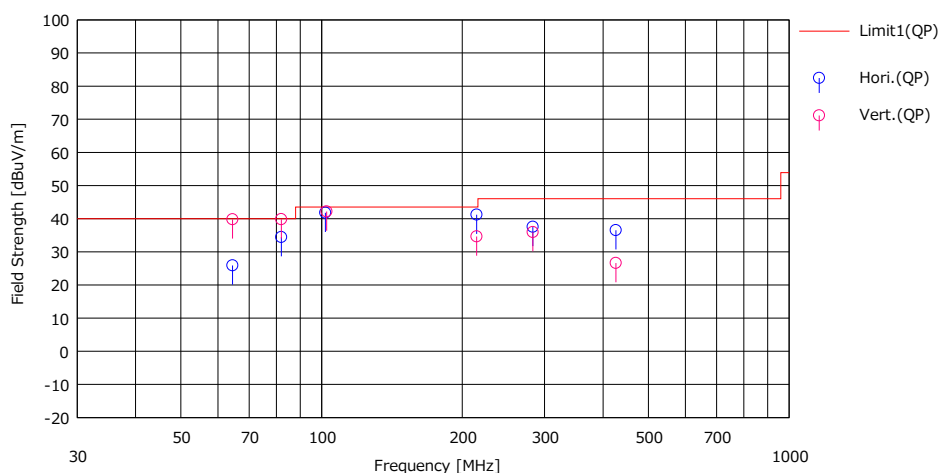
CHART: WITH FACTOR

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 February 22, 2022
Temperature / Humidity 23 deg. C / 33 % RH
Engineer Kiyoshiro Okazaki
 (Below 1 GHz)
Mode Mode 4 (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	64.495	43.60	6.93	7.65	32.27	25.91	40.00	14.09	Hori.	100	211	BA	
2	81.978	51.60	7.18	7.91	32.26	34.43	40.00	5.57	Hori.	220	316	BA	
3	101.895	55.30	10.59	8.15	32.24	41.80	43.50	1.70	Hori.	176	62	BA	
4	214.617	52.40	11.69	9.30	32.16	41.23	43.50	2.27	Hori.	152	55	LA22	
5	283.173	45.90	13.86	9.88	32.10	37.54	46.00	8.46	Hori.	122	43	LA22	
6	426.194	41.40	16.34	10.89	32.10	36.53	46.00	9.47	Hori.	100	138	LA22	
7	64.495	57.50	6.93	7.65	32.27	39.81	40.00	0.19	Vert.	100	266	BA	
8	81.978	57.00	7.18	7.91	32.26	39.83	40.00	0.17	Vert.	100	250	BA	
9	102.481	55.60	10.65	8.16	32.24	42.17	43.50	1.33	Vert.	100	276	BA	
10	214.617	45.80	11.69	9.30	32.16	34.63	43.50	8.87	Vert.	100	0	LA22	
11	283.173	44.30	13.86	9.88	32.10	35.94	46.00	10.06	Vert.	100	19	LA22	
12	426.194	31.50	16.34	10.89	32.10	26.63	46.00	19.37	Vert.	100	10	LA22	

CHART: WITH FACTOR

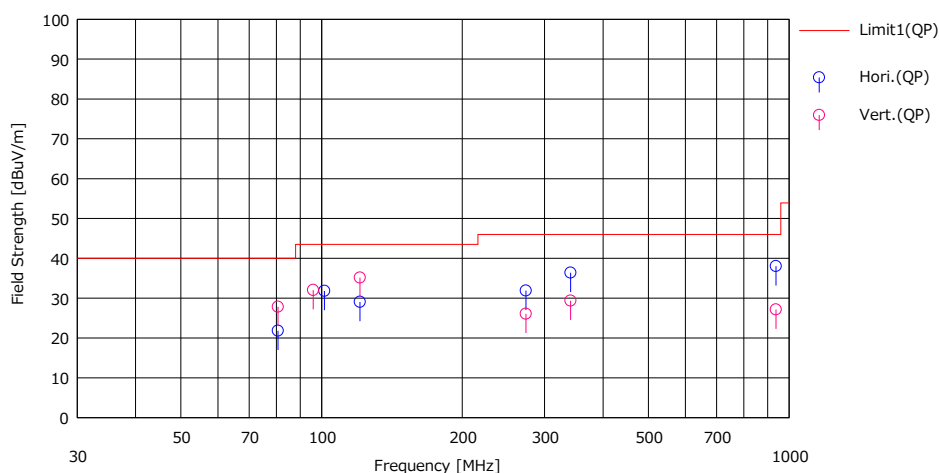
ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + ATT) - GAIN(AMP)
Except for the above table: adequate margin data below the limits.

Radiated Emission

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer
Mode

Ise EMC Lab.
No.4
January 20, 2022
24 deg. C / 34 % RH
Kiyoshiro Okazaki
(Below 1 GHz)
Mode 5

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]	Margn (QP) [dB]	Pola [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]		
1	80.662	39.20	6.97	7.67	32.02	21.82	40.00	18.18	Hori.	300	173	BA	
2	101.400	45.40	10.54	7.86	31.99	31.81	43.50	11.69	Hori.	300	286	BA	
3	120.779	40.00	12.99	8.04	31.98	29.05	43.50	14.45	Hori.	300	71	BA	
4	273.604	41.20	13.33	9.23	31.87	31.89	46.00	14.11	Hori.	100	359	LA23	
5	340.805	43.50	15.08	9.68	31.88	36.38	46.00	9.62	Hori.	100	187	LA23	
6	937.540	34.40	22.15	12.48	30.99	38.04	46.00	7.96	Hori.	100	274	LA23	
7	80.662	45.20	6.97	7.67	32.02	27.82	40.00	12.18	Vert.	100	129	BA	
8	95.962	46.60	9.61	7.81	32.00	32.02	43.50	11.48	Vert.	200	278	BA	
9	120.779	46.10	12.99	8.04	31.98	35.15	43.50	8.35	Vert.	100	124	BA	
10	273.604	35.40	13.33	9.23	31.87	26.09	46.00	19.91	Vert.	150	15	LA23	
11	340.805	36.50	15.08	9.68	31.88	29.38	46.00	16.62	Vert.	150	161	LA23	
12	937.540	23.50	22.15	12.48	30.99	27.14	46.00	18.86	Vert.	100	14	LA23	

CHART: WITH FACTOR

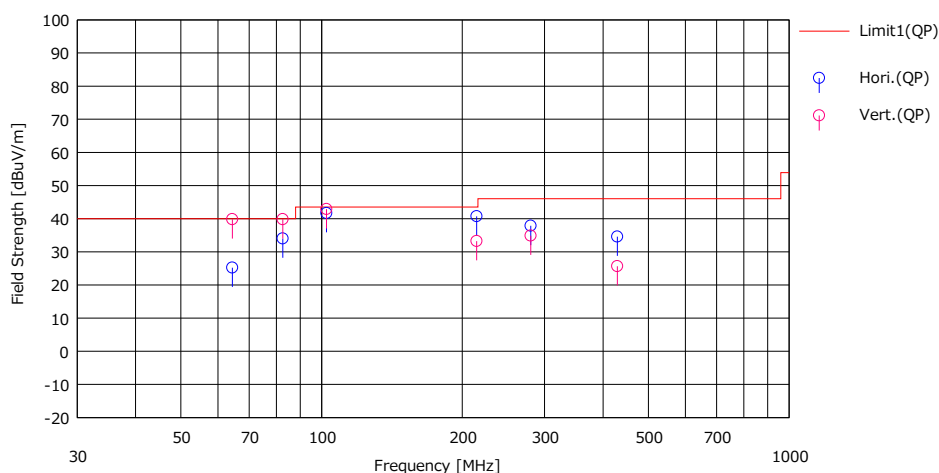
ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
 CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + ATT) - GAIN(AMP)
 Except for the above table: adequate margin data below the limits.

Radiated Emission

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer
Mode

Ise EMC Lab.
No.3
February 22, 2022
23 deg. C / 33 % RH
Kiyoshiro Okazaki
(Below 1 GHz)
Mode 6

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	64.411	42.90	6.95	7.65	32.27	25.23	40.00	14.77	Hori.	100	211	BA	
2	82.568	51.10	7.28	7.91	32.26	34.03	40.00	5.97	Hori.	220	316	BA	
3	102.477	55.10	10.65	8.16	32.24	41.67	43.50	1.83	Hori.	176	62	BA	
4	214.689	51.90	11.69	9.30	32.16	40.73	43.50	2.77	Hori.	152	55	LA22	
5	280.073	46.30	13.82	9.85	32.11	37.86	46.00	8.14	Hori.	122	43	LA22	
6	429.173	39.40	16.36	10.91	32.10	34.57	46.00	11.43	Hori.	100	138	LA22	
7	64.411	57.50	6.95	7.65	32.27	39.83	40.00	0.17	Vert.	100	266	BA	
8	82.568	56.90	7.28	7.91	32.26	39.83	40.00	0.17	Vert.	100	250	BA	
9	102.477	56.30	10.65	8.16	32.24	42.87	43.50	0.63	Vert.	100	276	BA	
10	214.689	44.40	11.69	9.30	32.16	33.23	43.50	10.27	Vert.	100	20	LA22	
11	280.073	43.30	13.82	9.85	32.11	34.86	46.00	11.14	Vert.	100	19	LA22	
12	429.173	30.50	16.36	10.91	32.10	25.67	46.00	20.33	Vert.	100	50	LA22	

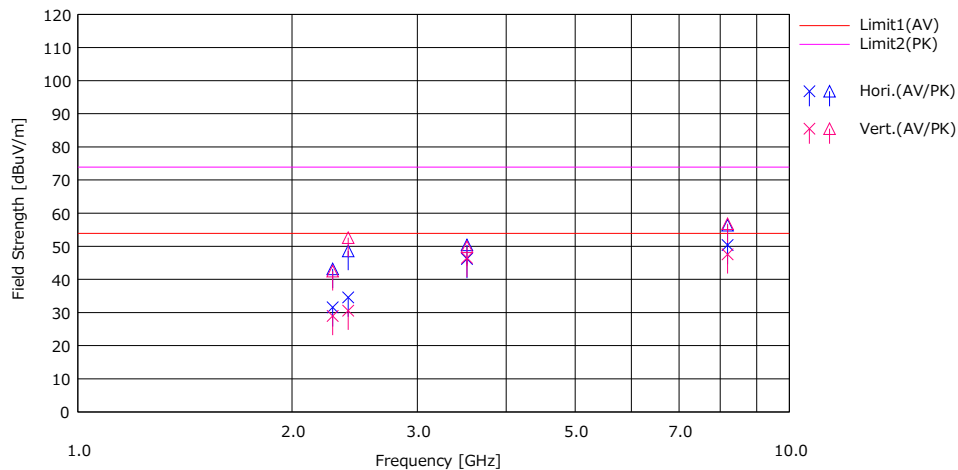
CHART: WITH FACTOR

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.1
Date January 24, 2022
Temperature / Humidity 18 deg. C / 32 % RH
Engineer Hiroyuki Furutaka
 (Above 1 GHz)
Mode Mode 1 (Local & Other)

Limit : FCC_Part 15 Subpart B(15.109)_Class B



No.	Freq. [MHz]	Reading		Ant.Fac. [dBm]	Loss [dB]	Gain [dB]	Result		Limit		Margin		Pola.	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	2281.762	36.60	48.20	28.12	2.74	35.89	31.57	43.17	53.90	73.90	22.3	30.7	Hori.	100	318	HA5	
2	2399.990	40.00	54.00	27.64	2.81	35.89	34.56	48.56	53.90	73.90	19.3	25.3	Hori.	100	318	HA5	
3	3523.809	49.80	54.00	28.70	3.36	35.66	46.20	50.40	53.90	73.90	7.7	23.5	Hori.	100	44	HA5	
4	8190.600	44.30	50.30	36.48	5.08	35.49	50.37	56.37	53.90	73.90	3.5	17.5	Hori.	100	170	HA5	
5	2281.762	34.00	47.50	28.12	2.74	35.89	28.97	42.47	53.90	73.90	24.9	31.4	Vert.	100	198	HA5	
6	2399.990	36.00	58.00	27.64	2.81	35.89	30.56	52.56	53.90	73.90	23.3	21.3	Vert.	217	159	HA5	
7	3523.809	50.10	53.40	28.70	3.36	35.66	46.50	49.80	53.90	73.90	7.4	24.1	Vert.	174	123	HA5	
8	8190.600	41.50	50.70	36.48	5.08	35.49	47.57	56.77	53.90	73.90	6.3	17.1	Vert.	100	278	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.

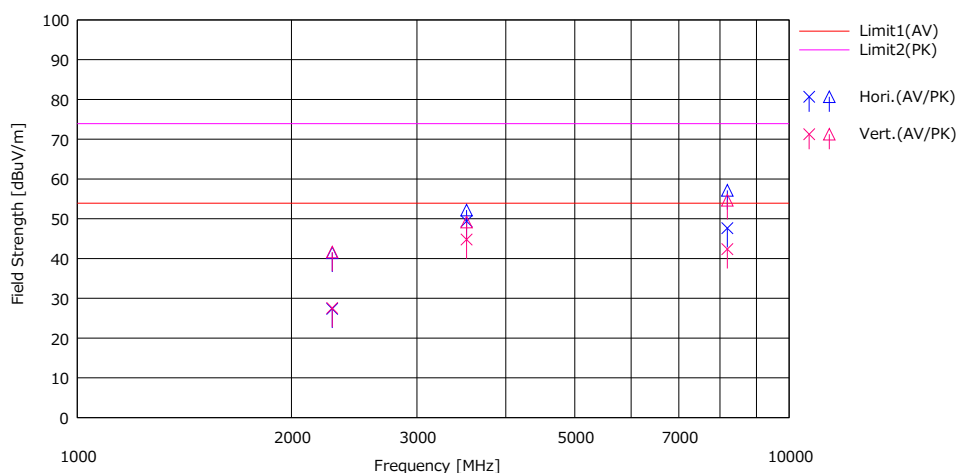
* No signal was detected above 10 GHz.

Radiated Emission

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer
Mode

Ise EMC Lab.
No.3
February 22, 2022
23 deg. C / 33 % RH
Kiyoshiro Okazaki
(Above 1 GHz)
Mode 2 (Local & 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	2281.762	29.40	43.50	28.10	2.45	32.62	27.33	41.43	53.90	73.90	26.57	32.47	Hori.	100	0	H20	
2	3523.952	49.50	52.30	28.86	3.09	32.09	49.36	52.16	53.90	73.90	4.54	21.74	Hori.	100	135	H20	
3	8189.600	39.10	48.60	36.42	4.95	32.83	47.64	57.14	53.90	73.90	6.26	16.76	Hori.	100	215	H20	
4	2281.762	29.60	43.70	28.10	2.45	32.62	27.53	41.63	53.90	73.90	26.37	32.27	Vert.	100	0	H20	
5	3523.952	44.90	49.30	28.86	3.09	32.09	44.76	49.16	53.90	73.90	9.14	24.74	Vert.	100	333	H20	
6	8189.600	33.80	46.10	36.42	4.95	32.83	42.34	54.64	53.90	73.90	11.56	19.26	Vert.	100	26	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.

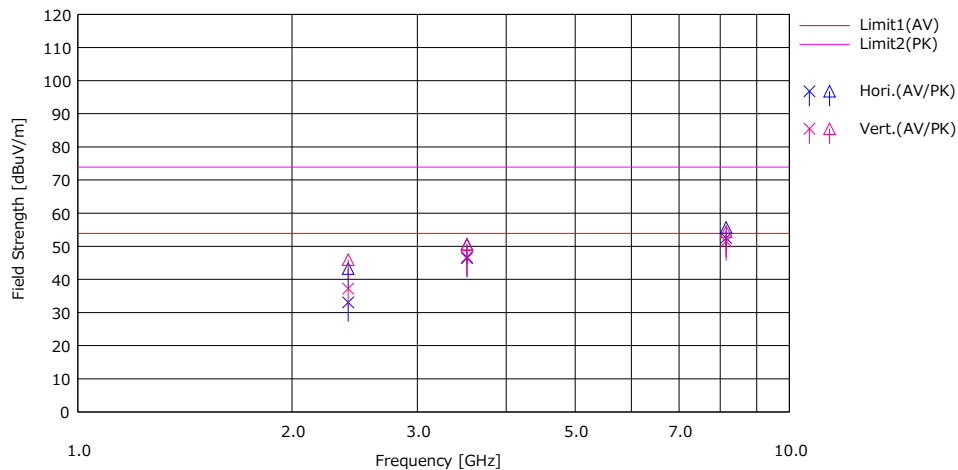
* No signal was detected above 10 GHz.

Radiated Emission

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer
Mode

Ise EMC Lab.
No.1
January 24, 2022
18 deg. C / 32 % RH
Hiroyuki Furutaka
(Above 1 GHz)
Mode 3 (Local & Other)

Limit : FCC_Part 15 Subpart B(15.109)_Class B



No.	Freq. [MHz]	Reading		Ant.Fac. [dBuV]	Loss [dB]	Gain [dB]	Result		Limit		Margin		Pola. [H/V]	Height [m]	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	2399.990	38.50	48.70	27.64	2.81	35.89	33.06	43.26	53.90	73.90	20.8	30.6	Hori.	100	318	HA5	
2	3523.809	50.00	54.20	28.70	3.36	35.66	46.40	50.60	53.90	73.90	7.5	23.3	Hori.	100	40	HA5	
3	8152.206	46.30	49.50	36.60	5.07	35.49	52.48	55.68	53.90	73.90	1.4	18.2	Hori.	100	170	HA5	
4	2399.990	42.70	51.40	27.64	2.81	35.89	37.26	45.96	53.90	73.90	16.6	27.9	Vert.	217	159	HA5	
5	3523.809	50.40	54.00	28.70	3.36	35.66	46.80	50.40	53.90	73.90	7.1	23.5	Vert.	174	113	HA5	
6	8152.206	45.30	48.30	36.60	5.07	35.49	51.48	54.48	53.90	73.90	2.4	19.4	Vert.	100	236	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.

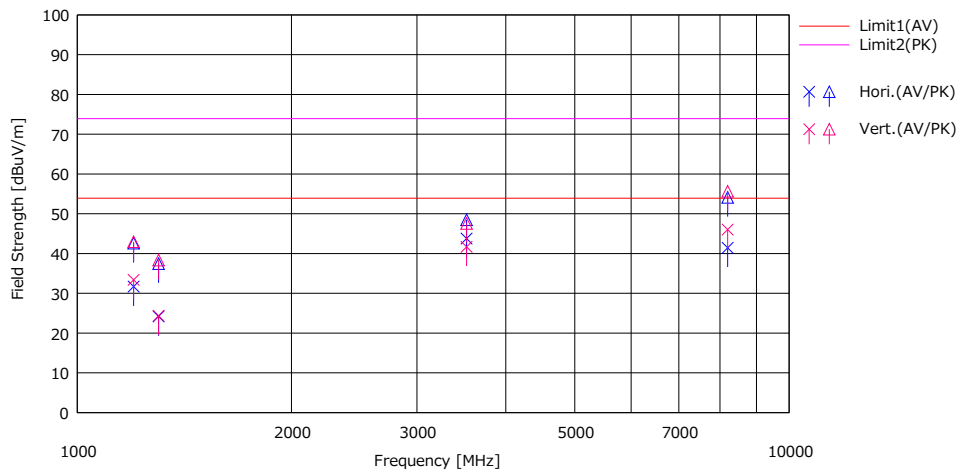
* No signal was detected above 10 GHz.

Radiated Emission

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer
Mode

Ise EMC Lab.
No.3
February 22, 2022
23 deg. C / 33 % RH
Kiyoshiro Okazaki
(Above 1 GHz)
Mode 4 (Local & 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	1200.011	39.40	50.30	25.20	1.75	34.68	31.67	42.57	53.90	73.90	22.23	31.33	Hori.	100	89	H20	
2	1301.257	31.10	44.40	25.67	1.81	34.43	24.15	37.45	53.90	73.90	29.75	36.45	Hori.	100	0	H20	
3	3523.944	43.90	48.60	28.86	3.09	32.09	43.76	48.46	53.90	73.90	10.14	25.44	Hori.	126	186	H20	
4	8200.173	32.90	45.60	36.39	4.96	32.83	41.42	54.12	53.90	73.90	12.48	19.78	Hori.	166	351	H20	
5	1200.011	41.10	50.70	25.20	1.75	34.68	33.37	42.97	53.90	73.90	20.53	30.93	Vert.	100	210	H20	
6	1301.257	31.30	45.30	25.67	1.81	34.43	24.35	38.35	53.90	73.90	29.55	35.55	Vert.	100	81	H20	
7	3523.944	41.80	47.70	28.86	3.09	32.09	41.66	47.56	53.90	73.90	12.24	26.34	Vert.	100	114	H20	
8	8200.173	37.50	47.10	36.39	4.96	32.83	46.02	55.62	53.90	73.90	7.88	18.28	Vert.	100	176	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.

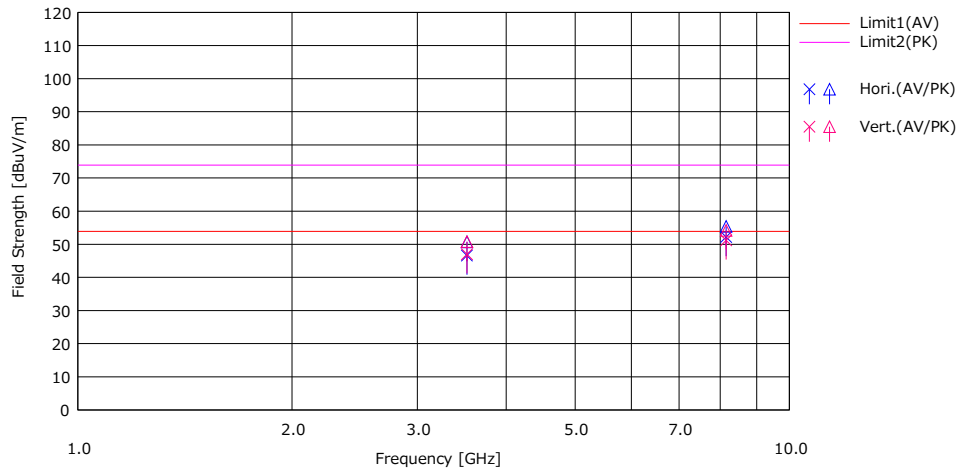
* No signal was detected above 10 GHz.

Radiated Emission

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer
Mode

Ise EMC Lab.
No.1
January 24, 2022
18 deg. C / 32 % RH
Hiroyuki Furutaka
(Above 1 GHz)
Mode 5

Limit : FCC_Part 15 Subpart B(15.109)_Class B



No.	Freq. [MHz]	Reading		Ant.Fac. [dBuV]	Loss [dB]	Gain [dB]	Result		Limit		Margin		Pola. [H/V]	Height [m]	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	3523.058	50.20	54.30	28.70	3.35	35.66	46.59	50.69	53.90	73.90	7.3	23.2	Hori.	100	38	HA5	
2	81 52.206	46.00	49.20	36.60	5.07	35.49	52.18	55.38	53.90	73.90	1.7	18.5	Hori.	100	167	HA5	
3	3523.978	50.60	54.40	28.70	3.36	35.66	47.00	50.80	53.90	73.90	6.9	23.1	Vert.	174	111	HA5	
4	81 52.206	45.00	48.00	36.60	5.07	35.49	51.18	54.18	53.90	73.90	2.7	19.7	Vert.	100	231	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)

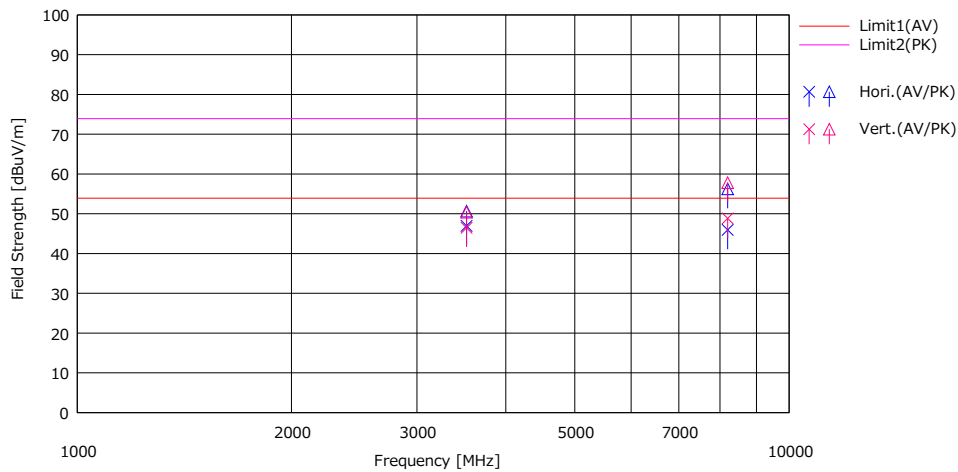
Except for the above table: adequate margin data below the limits.

* No signal was detected above 10 GHz.

Radiated Emission

Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date February 22, 2022
Temperature / Humidity 23 deg. C / 33 % RH
Engineer Kiyoshiro Okazaki
 (Above 1 GHz)
Mode Mode 6

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.	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	3523.973	47.10	50.80	28.86	3.09	32.09	46.96	50.66	53.90	73.90	6.94	23.24	Hori.	100	151	H20	
2	8199.194	37.40	47.70	36.39	4.96	32.83	45.92	56.22	53.90	73.90	7.98	17.68	Hori.	100	181	H20	
3	3523.973	46.60	50.50	28.86	3.09	32.09	46.46	50.36	53.90	73.90	7.44	23.54	Vert.	100	210	H20	
4	8199.194	40.30	49.30	36.39	4.96	32.83	48.82	57.82	53.90	73.90	5.08	16.08	Vert.	100	174	H20	

CHART: WITH FACTOR

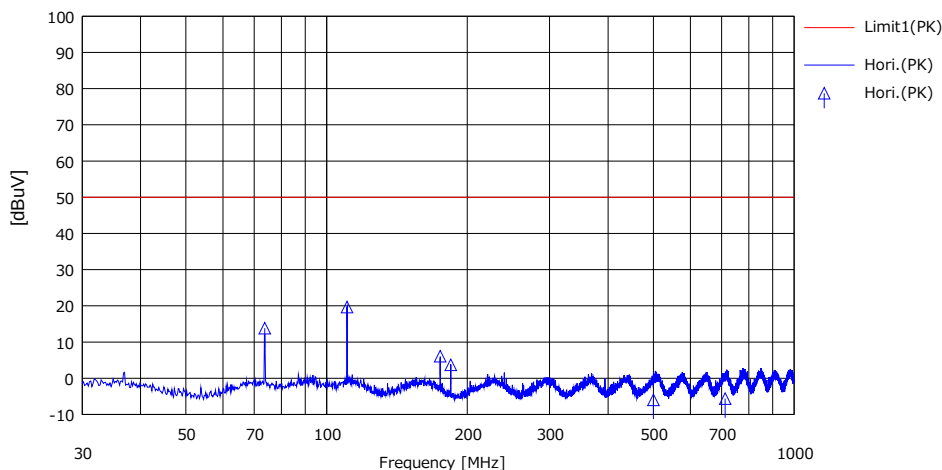
ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + D-factor) - GAIN(AMP)
Except for the above table: adequate margin data below the limits.

* No signal was detected above 10 GHz.

Antenna Terminal Conducted Emission

Test place Ise EMC Lab.
Semi Anechoic Chamber No.4
Date August 24, 2021
Temperature / Humidity 25 deg. C / 60 % RH
Engineer Junya Okuno
Mode Mode 7

Limit : FCC15.111 Antenna terminal measurement



No.	Freq. [MHz]	Reading (PK) [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result (PK) [dBuV]	Limit* (PK) [dBuV]	Margin (PK) [dB]	Pda. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
1	73.735	43.98	0.00	1.87	32.02	13.83	50.00	36.17				---	
2	110.575	49.75	0.00	1.89	31.98	19.66	50.00	30.34				---	
3	174.991	36.09	0.00	1.94	31.94	6.09	50.00	43.91				---	
4	184.356	33.71	0.00	1.94	31.93	3.72	50.00	46.28				---	
5	500.047	24.12	0.00	1.90	31.99	-5.97	50.00	55.97				---	
6	712.435	24.55	0.00	1.92	32.10	-5.63	50.00	55.63				---	

* 2 nW = -57 dBm = 50 dBuV

CHART: WITH FACTOR

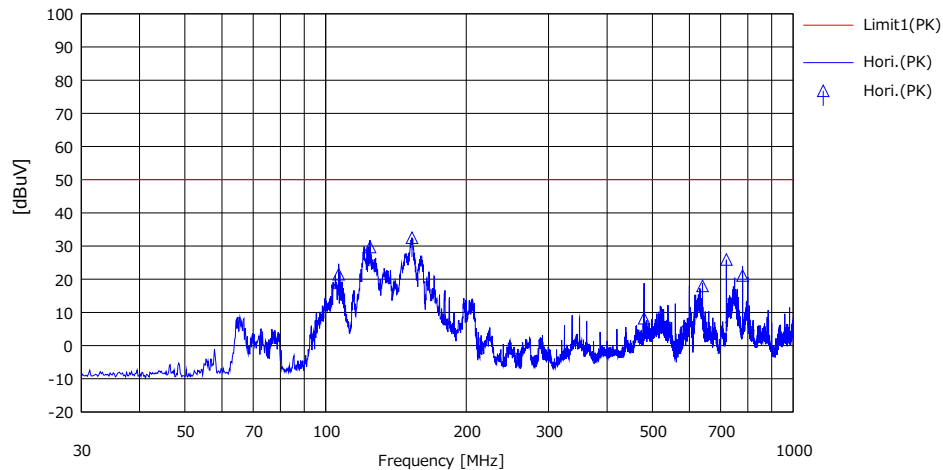
CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE + DC Block) - GAIN

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

Antenna Terminal Conducted Emission

Test place Ise EMC Lab.
Semi Anechoic Chamber No.4
Date January 19, 2022
Temperature / Humidity 21 deg. C / 34 % RH
Engineer Kiyoshiro Okazaki
Mode Mode 8

Limit : FCC15.111 Antenna terminal measurement



No.	Freq. [MHz]	Reading [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV]	Limit* [dBuV]	Margin [dB]	Pola [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
1	106.631	52.26	0.00	1.25	31.99	21.52	50.00	28.48				---	
2	124.420	60.44	0.00	1.27	31.97	29.74	50.00	20.26				---	
3	153.018	63.14	0.00	1.30	31.95	32.49	50.00	17.51				---	
4	480.019	38.47	0.00	1.75	31.98	8.24	50.00	41.76				---	
5	640.006	48.31	0.00	1.76	32.11	17.96	50.00	32.04				---	
6	720.080	56.20	0.00	1.81	32.06	25.95	50.00	24.05				---	
7	780.093	51.04	0.00	1.84	31.76	21.12	50.00	28.88				---	

* 2 nW = -57 dBm = 50 dBuV

CHART: WITH FACTOR

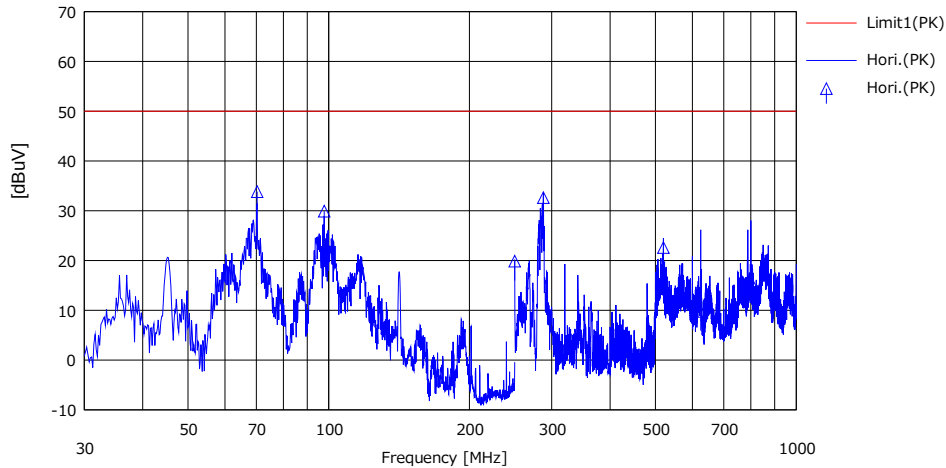
CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE + DC Block) - GAIN

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

Antenna Terminal Conducted Emission

Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 28, 2022
Temperature / Humidity 21 deg. C / 33 % RH
Engineer Kiyoshiro Okazaki
Mode Mode 9

Limit : FCC15.111 Antenna terminal measurement



No.	Freq. [MHz]	Reading (PK) [dBuV]	Ant.Fac (dB/m)	Loss (dB)	Gain (dB)	Result (PK) [dBuV]	Limit * (PK) [dBuV]	Margn (PK) [dB]	Pola (H/V)	Height (cm)	Angle (deg)	Ant. Type	Comment
		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV]	[dBuV]	[dB]	[H/V]	[cm]	[deg]		
1	70.335	64.65	0.00	1.20	32.02	33.83	50.00	16.17				---	
2	97.834	60.65	0.00	1.24	31.99	29.90	50.00	20.10				---	
3	249.996	50.32	0.00	1.42	31.89	19.85	50.00	30.15				---	
4	287.920	63.00	0.00	1.47	31.86	32.61	50.00	17.39				---	
5	520.005	52.84	0.00	1.76	32.01	22.59	50.00	27.41				---	
6	624.987	40.12	0.00	1.75	32.10	9.77	50.00	40.23				---	
7	799.943	45.60	0.00	1.85	31.67	15.78	50.00	34.22				---	

* 2 nW = -57 dBm = 50 dBuV

CHART: WITH FACTOR

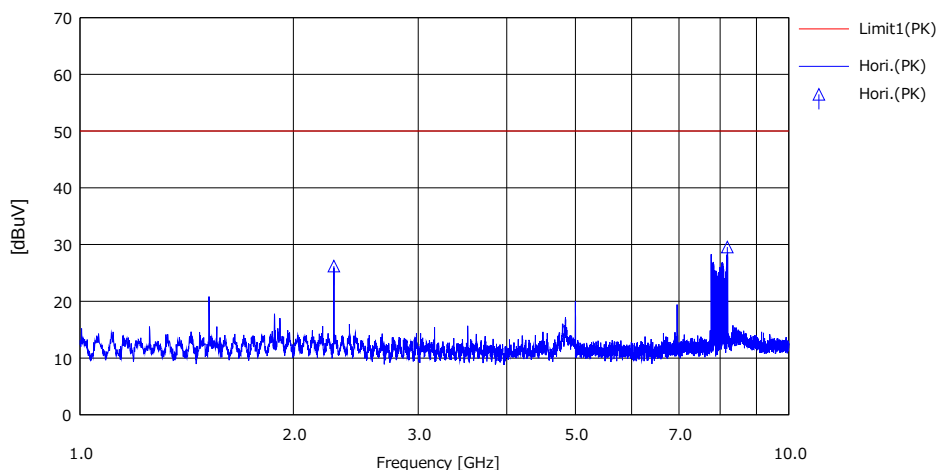
CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE + DC Block) - GAIN

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

Antenna Terminal Conducted Emission

Test place Ise EMC Lab.
Semi Anechoic Chamber No.4
Date August 24, 2021
Temperature / Humidity 25 deg. C / 60 % RH
Engineer Junya Okuno
Mode Mode 7

Limit : FCC15.111 Antenna terminal measurement



No.	Freq.	Reading	Ant.Fac.	Loss	Gain	Result	Limit	Margn	Pola.	Height	Angle	Ant.	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV]	[dBuV]	[dB]	[H/V]	[cm]	[deg]	Type	
1	2281.762	55.69	0.00	2.41	31.88	26.22	50.00	23.78				---	
2	8189.600	59.13	0.00	3.09	32.66	29.56	50.00	20.44				---	

* 2 nW = -57 dBm = 50 dBuV

CHART: WITH FACTOR

CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE + DC Block) - GAIN

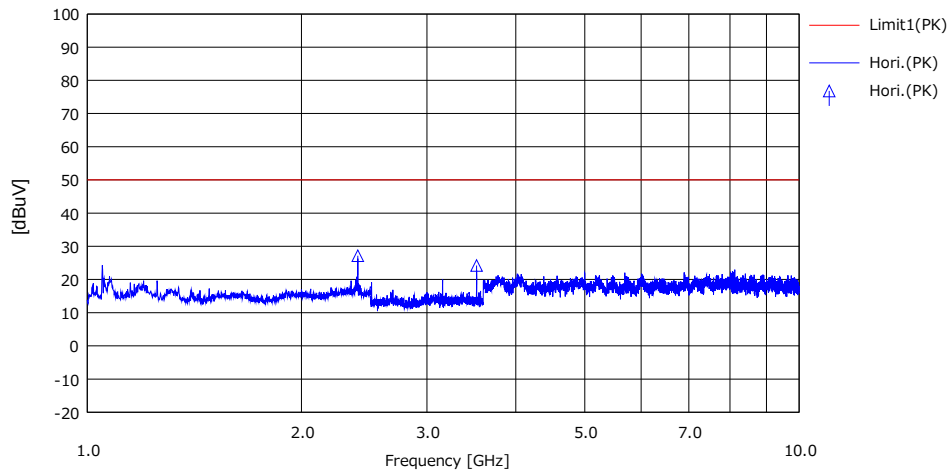
Except for the above table: adequate margin data below the limits.

* No signal was detected above 10 GHz.

Antenna Terminal Conducted Emission

Test place Ise EMC Lab.
Semi Anechoic Chamber No.4
Date January 19, 2022
Temperature / Humidity 21 deg. C / 34 % RH
Engineer Kiyoshiro Okazaki
Mode Mode 8

Limit : FCC15.111 Antenna terminal measurement



No.	Freq.	Reading	Ant.Fac	Loss	Gain	Result	Limit*	Margn	Pola	Height	Angle	Ant. Type	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV]	[dBuV]	[dB]	[H/V]	[cm]	[deg]		
1	2399.990	48.85	0.00	4.49	26.20	27.14	50.00	22.86				---	
2	3523.809	45.72	0.00	4.25	25.77	24.20	50.00	25.80				---	

* 2 nW = -57 dBm = 50 dBuV

CHART: WITH FACTOR

CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE + DC Block) - GAIN

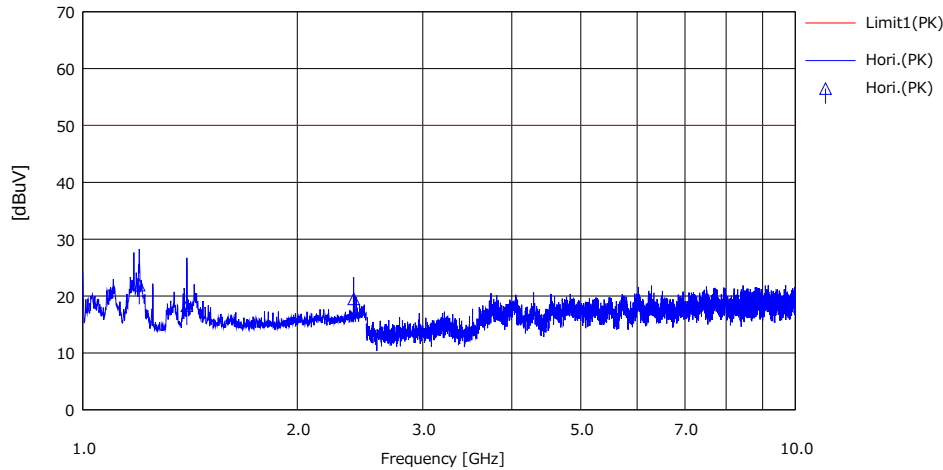
Except for the above table: adequate margin data below the limits.

* No signal was detected above 10 GHz.

Antenna Terminal Conducted Emission

Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 28, 2022
Temperature / Humidity 21 deg. C / 33 % RH
Engineer Kiyoshiro Okazaki
Mode Mode 9

Limit : FCC15.111 Antenna terminal measurement



No.	Freq. [MHz]	Reading [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV]	Limit* [dBuV]	Margn [dB]	Pol. [H/V]	Ant. Type	Comment
1	1199.962	45.59	0.00	3.42	27.08	21.93	50.00	28.0		---	
2	1400.020	41.58	0.00	3.61	26.90	18.29	50.00	31.7		---	
3	2400.045	41.20	0.00	4.49	26.20	19.49	50.00	30.5		---	

* 2 nW = -57 dBm = 50 dBuV

CHART: WITH FACTOR

CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE + DC Block) - GAIN

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

* No signal was detected above 10 GHz.

APPENDIX 2: Test instruments

Test equipment (1/2)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	MTR-03	141942	Test Receiver	Rohde & Schwarz	ESCI	100300	08/05/2021	12
RE	MCC-50	141397	Coaxial Cable	UL Japan	-	-	11/03/2021	12
RE	MAT-34	141331	Attenuator(6dB)	TME	UFA-01	-	02/02/2021	12
RE	MBA-05	141425	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103+BBA9106	VHA 91031302	08/28/2021	12
RE	MLA-23	141267	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-192	08/28/2021	12
RE	MPA-14	141583	Pre Amplifier	SONOMA INSTRUMENT	310	260833	02/08/2022	12
RE	MAEC-04	142011	AC4_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	05/25/2020	24
RE	MOS-15	141562	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	0010	01/10/2022	12
RE	MMM-10	141545	DIGITAL HiTESTER	HIOKI E.E. CORPORATION	3805	51201148	01/16/2022	12
RE	MJM-29	142230	Measure	KOMELON	KMC-36	-	-	-
RE	COTS- MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	MAEC-01	141998	AC1_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	06/08/2020	24
RE	MOS-27	141566	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	A08Q26	01/10/2022	12
RE	MMM-03	141530	Digital Tester	Fluke Corporation	FLUKE 26-3	78030621	08/10/2021	12
RE	MJM-25	142226	Measure	KOMELON	KMC-36	-	-	-
RE	COTS- MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	MAEC-01- SVSWR	141994	AC1_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 10m	DA-06881	04/05/2021	24
RE	MSA-21	212971	Signal Analyzer	Keysight Technologies Inc	N9030B	MY61330380	12/22/2021	12
RE	MHA-05	141511	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	253	09/24/2021	12
RE	MCC-217	141393	Microwave Cable	Junkosha	MWX221	1604S254(1 m) / 1608S088(5 m)	08/04/2021	12
RE	MPA-01	141576	Pre Amplifier	Keysight Technologies Inc	8449B	3008A01671	02/18/2021	12
RE	MHA-03	141504	Horn Antenna 26.5-40GHz	EMCO	3160-10	1150	09/03/2021	12
RE	MHA-02	141503	Horn Antenna 18-26.5GHz	EMCO	3160-09	1265	06/28/2021	12
RE	MCC-54	141325	Microwave Cable	Suhner	SUCOFLEX101	2873(1m) / 2876(5m)	03/02/2021	12
RE	MPA-03	141577	Microwave System Power Amplifier	Keysight Technologies Inc	83050A	MY39500610	10/28/2021	12
RE	MAEC-03	142008	AC3_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	05/22/2020	24
RE	MOS-13	141554	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	1301	01/10/2022	12
RE	MMM-08	141532	DIGITAL HiTESTER	HIOKI E.E. CORPORATION	3805	51201197	01/16/2022	12
RE	MTR-10	141951	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	03/09/2021	12
RE	MCC-51	141323	Coaxial cable	UL Japan	-	-	07/19/2021	12
RE	MAT-95	142314	Attenuator	Pasternack Enterprises	PE7390-6	D/C 1504	06/09/2021	12
RE	MBA-05	141425	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103+BBA9106	VHA 91031302	08/28/2021	12
RE	MLA-22	141266	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-191	08/21/2021	12

Test equipment (2/2)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	MAEC-04	142011	AC4_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	05/25/2020	24
AT	MOS-15	141562	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	0010	01/10/2022	12
AT	MMM-10	141545	DIGITAL HiTESTER	HIOKI E.E. CORPORATION	3805	51201148	01/16/2022	12
AT	MDCB-04	156190	DC Block	EMC Instruments Corporation	N9398C	MY46457635	07/08/2021	12
AT	MPA-14	141583	Pre Amplifier	SONOMA INSTRUMENT	310	260833	02/08/2022	12
AT	MCC-38	141395	Coaxial Cable	UL Japan	-	-	11/19/2021	12
AT	MCC-178	141227	Microwave Cable	Junkosha	MMX221-00500DMSDMS	1502S305	03/01/2021	12
AT	MRENT-130	141855	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46187750	11/28/2021	12
AT	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
AT	MSA-20	212970	Signal Analyzer	Keysight Technologies Inc	N9030B	MY61330357	12/22/2021	12
AT	MDCB-02	141485	DC Block Filter	Keysight Technologies Inc	N9398C	51053	11/19/2021	12
AT	MCC-224	160324	Coaxial Cable	Huber+Suhner	SUCOFLEX 102A	MY009/2A	11/19/2021	12
AT	MPA-03	141577	Microwave System Power Amplifier	Keysight Technologies Inc	83050A	MY39500610	10/28/2021	12
AT	MCC-64	141327	Coaxial Cable	UL Japan	-	-	02/03/2021	12
AT	MJM-29	142230	Measure	KOMELON	KMC-36	-	-	-

***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