



EMI TEST REPORT

Test Report No. : 13703823H-C-R1

Applicant : DENSO TEN Limited
Type of EUT : Car Navigation
Model Number of EUT : FT0048A
FCC ID : BABFT0048A
Test regulation : FCC Part 15 Subpart B: 2021
Test Result : Complied (Refer to SECTION 3)

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7. The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
9. The information provided from the customer for this report is identified in SECTION 1.
10. This report is a revised version of 13703823H-C. 13703823H-C is replaced with this report.

Date of test: March 6 to May 12, 2021

Representative test engineer: T. Noguchi
Takafumi Noguchi
Engineer

Approved by: T. Takayama
Tsubasa Takayama
Leader



CERTIFICATE 5107.02

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

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REVISION HISTORY

Original Test Report No.: 13703823H-C

Revision	Test report No.	Date	Page revised	Contents
- (Original)	13703823H-C	April 22, 2021	-	-
1	13703823H-C-R1	May 13, 2021	P.11	Addition of description for Item S
1	13703823H-C-R1	May 13, 2021	P.12	Addition of test place (No.4 semi anechoic chamber)
1	13703823H-C-R1	May 13, 2021	P.13	Correction of distance factor on 1 GHz - 13 GHz from .029 dB to 0.29 dB
1	13703823H-C-R1	May 13, 2021	P.13	Addition of test date and engineer on May 12, 2021
1	13703823H-C-R1	May 13, 2021	P.14	-Addition of test place (No.4 Measurement room) -Addition of test date and engineer on May 12, 2021
1	13703823H-C-R1	May 13, 2021	P.29	Deletion of "+ ANT FACTOR" from Calculation formula.
1	13703823H-C-R1	May 13, 2021	P.19, 21, 23, 25, 27, 29, 31, 33	Addition of "(Main)" for Mode
1	13703823H-C-R1	May 13, 2021	P.20, 22, 24, 26, 28, 30, 32, 34	Addition of test data
1	13703823H-C-R1	May 13, 2021	P.36	Addition of test equipment (test date: May 12, 2021)
1	13703823H-C-R1	May 13, 2021	P.39	Addition of Antenna Terminal Conducted Emission test setup photo

Reference: Abbreviations (Including words undescribed in this report)

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

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SECTION 1: Customer information

Company Name : DENSO TEN Limited
Address : 2-28, Gosho-dori, 1-chome, Hyogo-ku, Kobe 652-8510 Japan
Telephone Number : +81-78-682-2159
Contact Person : Daisuke Fukii

The information provided from the customer is as follows;

- Applicant, Type 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
- 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

Type : Car Navigation
Model Number : FT0048A
Serial Number : Refer to SECTION 4.2
Rating : DC 12 V
Receipt Date : March 5, 2021
Country of Mass-production : Japan
Condition : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification : No Modification by the test lab

2.2 Product Description

Model: FT0048A (referred to as the EUT in this report) is a Car Navigation.

General Specification

Feature of EUT:

Clock frequency(ies) in the system : 1110 MHz

Radio Specification

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

Radio Type : Transceiver
Frequency of Operation : 2412 MHz - 2462 MHz
Type of Modulation : 11b: DSSS, 11g/n: OFDM
Antenna type : Inverted F type Antenna
Antenna Gain : 1.53 dBi (PEAK)

[Bluetooth (Ver.3.0 with EDR function)]

Radio Type : Transceiver
Frequency of Operation : 2402 MHz - 2480 MHz
Type of Modulation : FHSS
Antenna type : Inverted F type Antenna
Antenna Gain : 0.46 dBi (PEAK)

[GPS]

Radio Type : Receiver
Frequency of Operation : 1575.42 MHz
Type of Modulation : CDMA
Antenna type : Dome Antenna
Antenna Gain : -6.0 dBi

[Broadband]

Radio Type : Receiver
Frequency of Operation : AM / HD_AM: 530 kHz - 1710 kHz
FM / HD_FM: 87.75 MHz - 107.9 MHz
XM:2332.5 MHz - 2345.0 MHz
Local oscillation frequency : AM: 472.5 kHz - 1767.5 kHz
FM: 87.45 MHz - 108.2 MHz
Channel spacing : AM / HD_AM: 10 kHz
FM / HD_FM: 0.2 MHz
IF Frequency : AM: 57.5 kHz
FM: 300 kHz
Antenna Connector type : HFC III

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart B
FCC Part 15 final revised on January 12, 2021 and effective February 11, 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	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	1.26 dB (803.390 MHz, Horizontal, QP, USB Play mode)	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	19.85 dB 3161.721 MHz	Complied b)	-
<p>*Note: UL Japan, Inc's EMI Work Procedure 13-EM-W0420. *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.</p> <p>a) Refer to APPENDIX 1 (data of Radiated Emission) b) Refer to APPENDIX 1 (data of Antenna Terminal Conducted Emission)</p> <p>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.</p>						

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)	5.2 dB
		(Vertical)	6.3 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	4.9 dB	
	6 GHz to 18 GHz	5.2 dB	
1 m	10 GHz to 26.5 GHz	5.5 dB	
	26.5 GHz to 40 GHz	5.5 dB	
0.5 m	26.5 GHz to 40 GHz	5.5 dB	
10 m	1 GHz to 18 GHz	5.2 dB	

Antenna Terminal test

Test Item	Uncertainty (+/-)
Antenna terminal conducted emission / Power density / Burst power	2.6 dB

3.5 Test Location

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* A2LA Certificate Number: 5107.02/ FCC Test Firm Registration Number: 199967 / ISED Lab Company Number: 2973C

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.11 measurement room	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 m x 2.0 m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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SECTION 4: Operation of EUT during testing

4.1 Operating Mode(s)

Mode 1: USB Play mode

Mode 2: CD Play mode

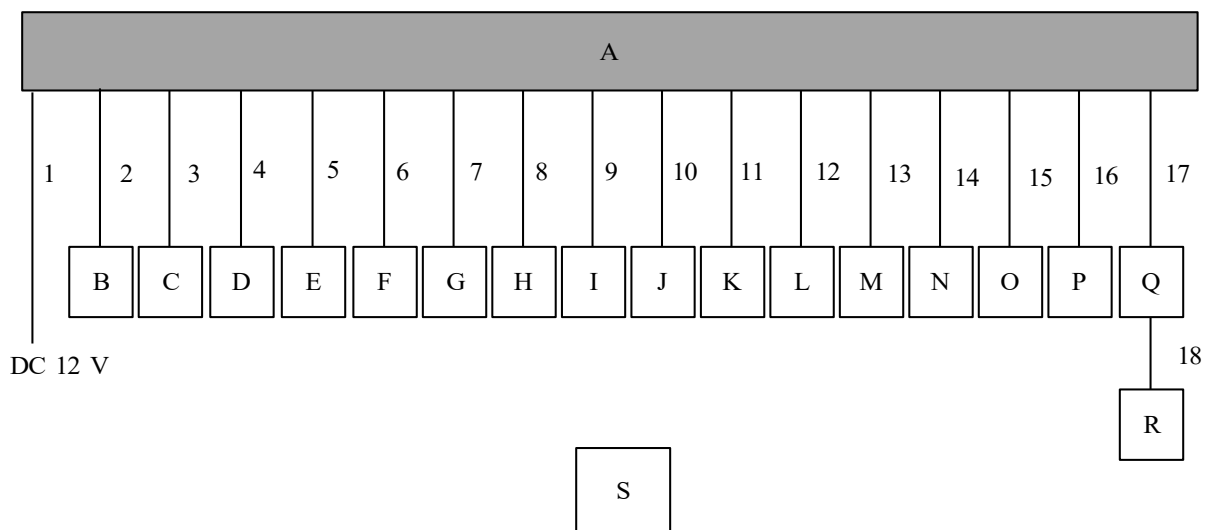
Mode 3 : FM Receiving (other)

Mode 4 : FM Receiving (Local)

* Radiated Emission test was performed on all mode,
Antenna Terminal test was only performed on Mode 4.

Software : Audio: 010172

4.2 Configuration and peripherals



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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Car Navigation	FT0048A	ASC00919	DENSO TEN Limited	EUT
B	Monitor	85110-801A6	K2LJ004	Pioneer	-
C	Monitor	RSE-R	1052	Panasonic Corporation	-
D	Monitor	RSE-L	1051	Panasonic Corporation	-
E	ECU	RSE-ECU	1059	Panasonic Corporation	-
F	ECU	A-10K0892X013	KK1008011	DENSO	-
G	Controller	-	-	Panasonic Corporation	-
H	Camera	GP-KD5352RC	1ZC01921	-	-
I	Antenna	195000-0180A700	0H59	DENSO TEN Limited	-
J	Antenna	A258124	-	MinebeaMitsumi inc.	-
K	Mic	-	No.2	-	-
L	Mic	-	No.2	-	-
M	FM Antenna	-	No.9	DENSO TEN Limited	-
N	Speaker	E505SSP	-	ECLIPSE	-
O	Speaker	E503SSP	-	ECLIPSE	-
P	Audio AMP	86280-53190	TPJA000077WL	Pioneer	-
Q	SUSB/MINI JACK BOX	86190-53051	501907	Panasonic Corporation	-
R	iPod touch	A1367	CCQ50WDDCPC	Apple	-
S	Remote Controller	86170-50390	600007	-	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	3.0	Unshielded	Unshielded	-
2	Signal Cable	3.0	Unshielded	Unshielded	-
3	Signal Cable	3.0	Unshielded	Unshielded	-
4	Signal Cable	3.0	Unshielded	Unshielded	-
5	Signal Cable	3.0	Unshielded	Unshielded	-
6	Signal Cable	3.0	Unshielded	Unshielded	-
7	Signal Cable	3.0	Unshielded	Unshielded	-
8	Signal Cable	3.0	Unshielded	Unshielded	-
9	Antenna Cable	3.0	Shielded	Shielded	-
10	Antenna Cable	3.0	Shielded	Shielded	-
11	Antenna Cable	3.0	Shielded	Shielded	-
12	MIC Cable	3.0	Unshielded	Unshielded	-
13	Antenna Cable	3.0	Shielded	Shielded	-
14	Speaker Cable	5.0	Unshielded	Unshielded	-
15	Speaker Cable	5.0	Unshielded	Unshielded	-
16	Signal Cable	3.0	Unshielded	Unshielded	-
17	Signal Cable	3.0	Unshielded	Unshielded	-
18	Signal Cable	1.5	Unshielded	Unshielded	-

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SECTION 5: Radiated Emission

5.1 Operating environment

Test place : No.3 semi anechoic chamber and No.4 semi anechoic chamber
Temperature : See data
Humidity : 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 center 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.

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

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.

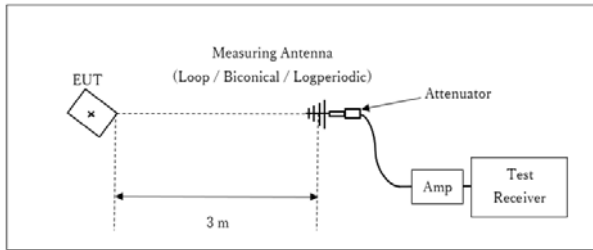
Frequency	Below 1GHz	Above 1GHz *1)
Instrument used	Test Receiver	Test Receiver
IF Bandwidth	QP: BW 120 kHz	PK: BW 1 MHz, CISPR AV: BW 1 MHz

*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

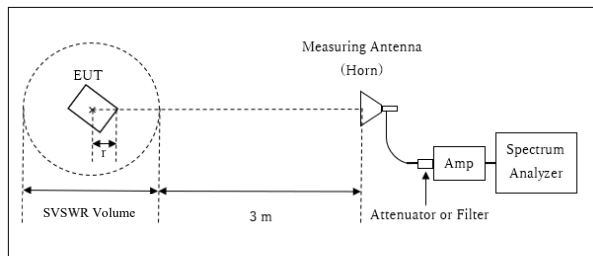
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz - 13 GHz

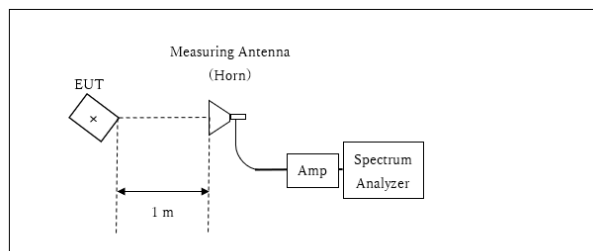


r : Radius of an outer periphery of EUT
× : Center of turn table

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 = 0.90m

13 GHz - 40 GHz



× : Center of turn table

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

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

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.

Date: March 6, 2021
March 7, 2021
May 12, 2021

Test engineer: Takafumi Noguchi
Hiroki Numata
Masaya Minami

SECTION 6: Antenna Terminal

6.1 Operating environment

Test place : No.3 Measurement room and No.4 Measurement room
Temperature : See data
Humidity : See data

6.2 Test configuration

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

6.3 Test conditions

Frequency range : 30 MHz - 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

Date: March 6, 2021
May 12, 2021

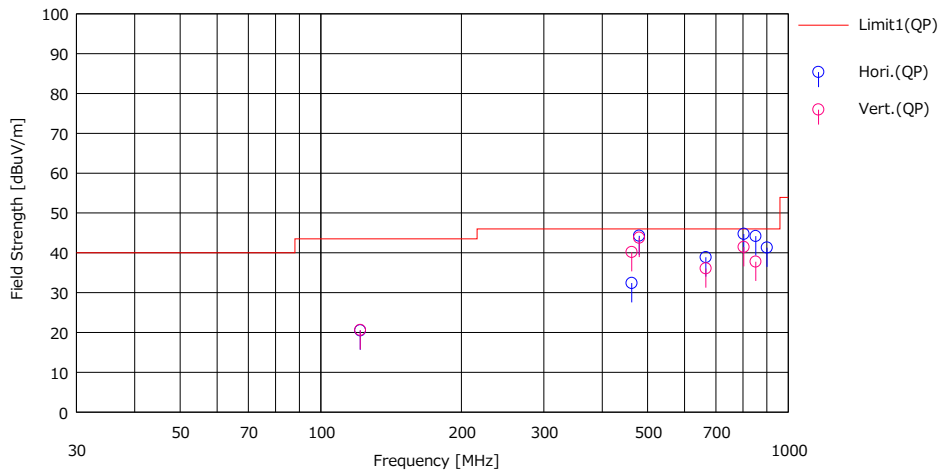
Test engineer: Takafumi Noguchi
Masaya Minami

APPENDIX 1: Test data

Radiated Emission

Report No. 13703823H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date March 6, 2021
Temperature / Humidity 22 deg. C / 57 % RH
Engineer Takafumi Noguchi
(Below 1 GHz)
Mode Mode 1

Limit : FCC_Part15 Subpart B(15.109)_Class B



No.	Freq. [MHz]	Reading	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit	Margin	Pda. [H/V]	Height [m]	Angle [deg]	Ant. Type	Comment
		[dBuV]				[dBuV/m]	[dBuV/m]	[dB]					
1	121.509	31.30	12.95	8.41	32.17	20.49	43.50	23.01	Hori.	140	93	BA	
2	462.534	36.40	16.82	11.18	32.01	32.39	46.00	13.61	Hori.	100	27	LA22	
3	480.000	47.80	17.19	11.29	32.01	44.27	46.00	1.73	Hori.	116	176	LA22	
4	666.500	39.20	19.35	12.38	32.06	38.87	46.00	7.13	Hori.	118	169	LA22	
5	803.390	42.40	20.72	13.10	31.48	44.74	46.00	1.26	Hori.	169	24	LA22	
6	852.029	40.60	21.42	13.34	31.20	44.16	46.00	1.84	Hori.	100	34	LA22	
7	900.613	36.70	21.95	13.57	30.93	41.29	46.00	4.71	Hori.	100	33	LA22	
8	121.509	31.40	12.95	8.41	32.17	20.59	43.50	22.91	Vert.	100	229	BA	
9	462.534	44.20	16.82	11.18	32.01	40.19	46.00	5.81	Vert.	102	330	LA22	
10	480.000	47.30	17.19	11.29	32.01	43.77	46.00	2.23	Vert.	100	96	LA22	
11	666.500	36.40	19.35	12.38	32.06	36.07	46.00	9.93	Vert.	109	181	LA22	
12	803.390	39.10	20.72	13.10	31.48	41.44	46.00	4.56	Vert.	114	182	LA22	
13	852.029	34.20	21.42	13.34	31.20	37.76	46.00	8.24	Vert.	115	144	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.

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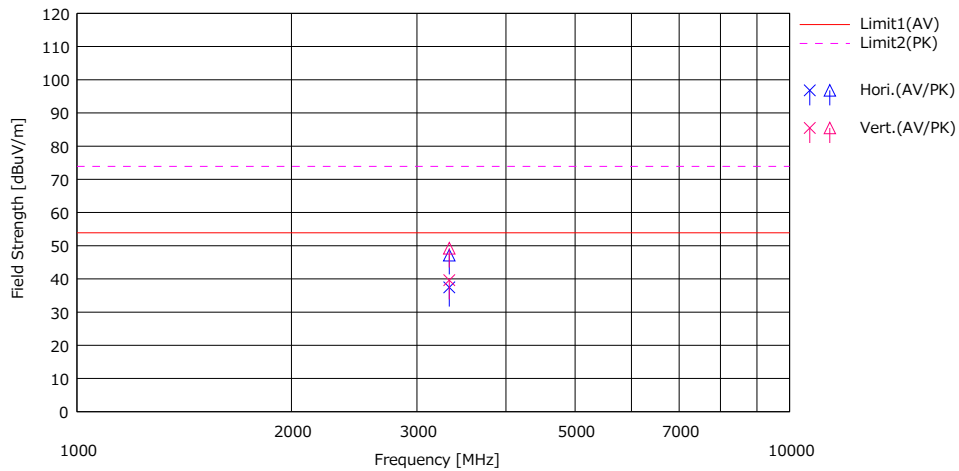
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Radiated Emission

Report No. 13703823H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date March 7, 2021
Temperature / Humidity 24 deg. C / 48 % RH
Engineer Hiroki Numata
(Above 1 GHz)
Mode Mode 1

Limit : FCC_Part15 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) [dB]	(PK) [dB]							
1	3330.620	38.00	47.70	28.31	3.29	32.16	37.44	47.14	53.90	73.90	16.46	26.76	Hori.	100	169	H2 1	
2	3330.620	40.20	49.80	28.31	3.29	32.16	39.64	49.24	53.90	73.90	14.26	24.66	Vert.	221	243	H2 1	

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.

UL Japan, Inc.

Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

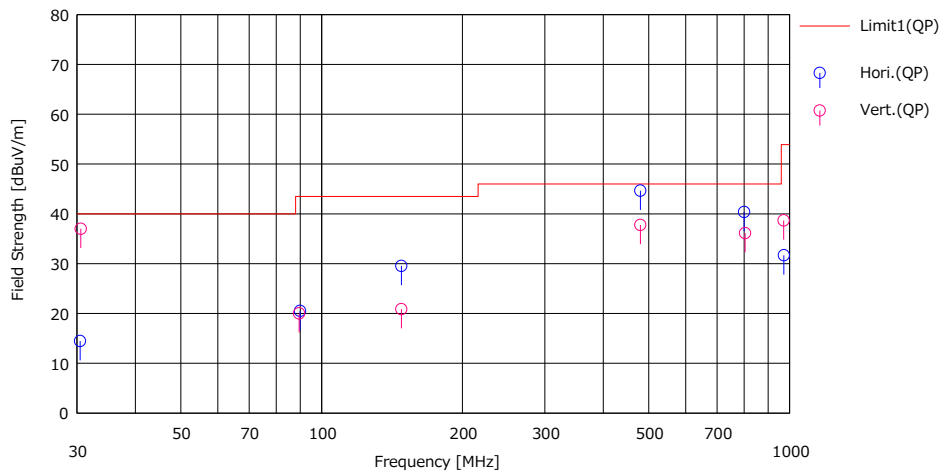
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Emission

Report No. 13703823H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date March 7, 2021
Temperature / Humidity 24 deg. C / 48 % RH
Engineer Hiroki Numata
(Below 1 GHz)
Mode Mode 2

Limit : FCC_Part15 Subpart B(15.109)_Class B



No.	Freq. [MHz]	Reading	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit	Margin	Polz. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		[dBuV]				[dBuV/m]	[dBuV/m]	[dBuV/m]					
1	30.457	21.30	18.27	7.12	32.22	14.47	40.00	25.53	Hori.	100	0	BA	
2	89.930	36.00	8.62	8.06	32.18	20.50	43.50	23.00	Hori.	234	272	BA	
3	148.027	37.90	15.09	8.71	32.14	29.56	43.50	13.94	Hori.	115	263	BA	
4	480.005	48.20	17.19	11.29	32.01	44.67	46.00	1.33	Hori.	102	40	LA22	
5	800.000	38.10	20.70	13.08	31.50	40.38	46.00	5.62	Hori.	107	289	LA22	
6	972.657	26.10	22.17	13.94	30.52	31.69	53.90	22.21	Hori.	121	150	LA22	
7	30.583	43.90	18.21	7.12	32.22	37.01	40.00	2.99	Vert.	232	148	BA	
8	89.514	35.60	8.55	8.05	32.18	20.02	43.50	23.48	Vert.	113	192	BA	
9	148.027	29.20	15.09	8.71	32.14	20.86	43.50	22.64	Vert.	100	169	BA	
10	480.000	41.30	17.19	11.29	32.01	37.77	46.00	8.23	Vert.	100	145	LA22	
11	803.800	33.80	20.72	13.10	31.48	36.14	46.00	9.86	Vert.	100	157	LA22	
12	971.996	33.10	22.17	13.94	30.52	38.69	53.90	15.21	Vert.	100	348	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.

UL Japan, Inc.

Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

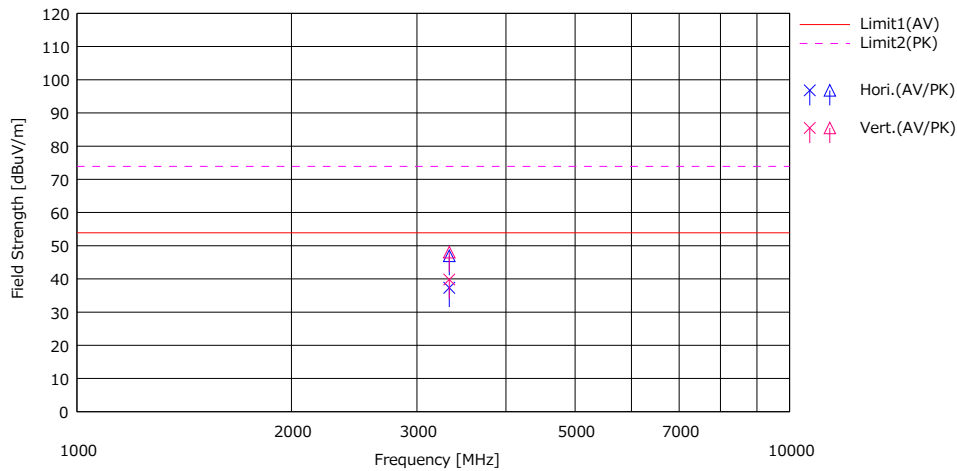
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Emission

Report No. 13703823H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date March 7, 2021
Temperature / Humidity 24 deg. C / 48 % RH
Engineer Hiroki Numata
(Above 1 GHz)
Mode Mode 2

Limit : FCC_Part15 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	3330.620	37.90	47.50	28.31	3.29	32.16	37.34	46.94	53.90	73.90	16.56	26.96	Hori.	100	169	H2 1	
2	3330.620	40.40	48.60	28.31	3.29	32.16	39.84	48.04	53.90	73.90	14.06	25.86	Vert.	159	227	H2 1	

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.

UL Japan, Inc.

Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

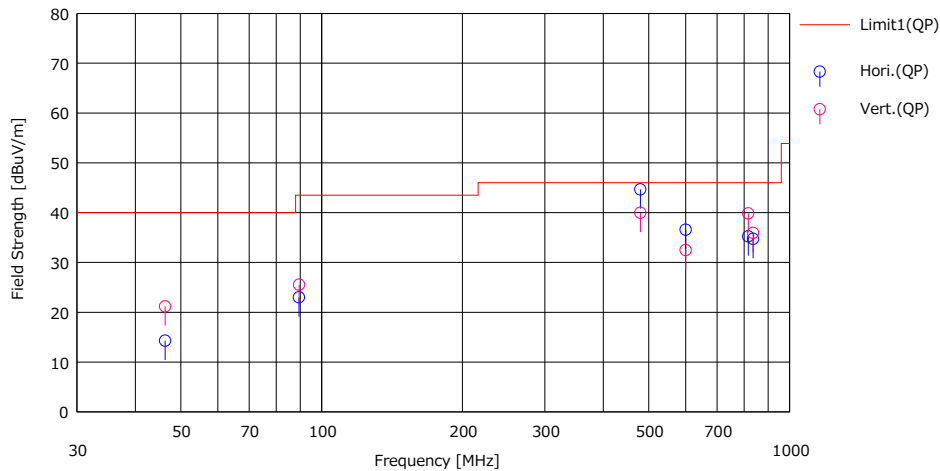
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Emission

Report No. 13703823H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date March 7, 2021
Temperature / Humidity 24 deg. C / 48 % RH
Engineer Hiroki Numata
(Below 1 GHz)
Mode Mode 3(Main)

Limit : FCC_Part15 Subpart B(15.109)_Class B



No.	Freq. [MHz]	Reading	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit	Margin	Polz. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		<QP> [dBuV]				<QP> [dBuV/m]	<QP> [dB]						
1	46.306	26.50	12.58	7.41	32.21	14.28	40.00	25.72	Hori.	300	68	BA	
2	89.437	38.60	8.53	8.05	32.18	23.00	43.50	20.50	Hori.	235	263	BA	
3	480.023	48.20	17.19	11.29	32.01	44.67	46.00	1.33	Hori.	100	39	LA22	
4	600.105	37.40	19.18	12.03	32.04	36.57	46.00	9.43	Hori.	100	316	LA22	
5	816.183	32.70	20.79	13.16	31.41	35.24	46.00	10.76	Hori.	100	171	LA22	
6	836.066	31.70	21.04	13.26	31.29	34.71	46.00	11.29	Hori.	100	167	LA22	
7	46.306	33.40	12.58	7.41	32.21	21.18	40.00	18.82	Vert.	100	262	BA	
8	89.504	41.10	8.55	8.05	32.18	25.52	43.50	17.98	Vert.	100	211	BA	
9	480.000	43.50	17.19	11.29	32.01	39.97	46.00	6.03	Vert.	100	121	LA22	
10	600.105	33.30	19.18	12.03	32.04	32.47	46.00	13.53	Vert.	100	143	LA22	
11	816.183	37.30	20.79	13.16	31.41	39.84	46.00	6.16	Vert.	102	175	LA22	
12	836.066	32.90	21.04	13.26	31.29	35.91	46.00	10.09	Vert.	100	168	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.

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Ise EMC Lab.

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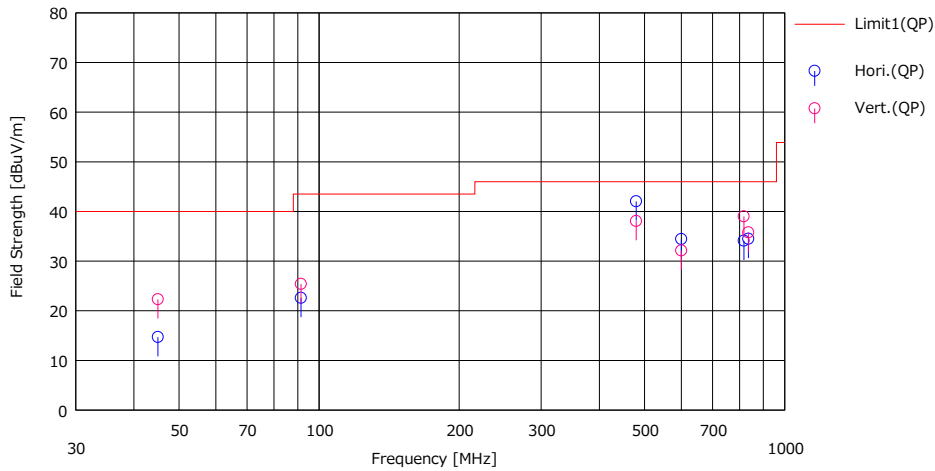
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Emission

Report No. 13703823H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.4
Date May 12, 2021
Temperature / Humidity 23 deg. C / 41 % RH
Engineer Masaya Minami
(Below 1 GHz)
Mode Mode 3(Sub)

Limit : FCC_Part 15 Subpart B(15.109)_Class B



No.	Fres. [MHz]	Reading	Ant.Fac	Loss	Gain	Result	Limit	Margn	P.d.a.	Height	Angle	Ant. Type	Comment
		(QP)	[dB/m]	[dB]	[dB]	(QP)	(QP)	(QP)					
1	45.074	25.90	12.94	7.35	31.49	14.70	40.00	25.30	Hori.	212	245	BA	
2	91.437	37.50	8.65	7.89	31.47	22.57	43.50	20.93	Hori.	224	255	BA	
3	480.000	45.60	17.17	10.62	31.35	42.04	46.00	3.96	Hori.	100	56	LA23	
4	600.000	35.60	19.13	11.20	31.50	34.43	46.00	11.57	Hori.	100	311	LA23	
5	817.300	32.40	20.72	12.02	31.05	34.09	46.00	11.91	Hori.	100	165	LA23	
6	836.000	32.30	21.02	12.09	30.95	34.46	46.00	11.54	Hori.	100	153	LA23	
7	45.074	33.50	12.94	7.35	31.49	22.30	40.00	17.70	Vert.	100	252	BA	
8	91.437	40.30	8.65	7.89	31.47	25.37	43.50	18.13	Vert.	100	235	BA	
9	480.000	41.60	17.17	10.62	31.35	38.04	46.00	7.96	Vert.	100	133	LA23	
10	600.000	33.30	19.13	11.20	31.50	32.13	46.00	13.87	Vert.	100	156	LA23	
11	817.300	37.30	20.72	12.02	31.05	38.99	46.00	7.01	Vert.	102	175	LA23	
12	836.000	33.60	21.02	12.09	30.95	35.76	46.00	10.24	Vert.	100	177	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.

UL Japan, Inc.

Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

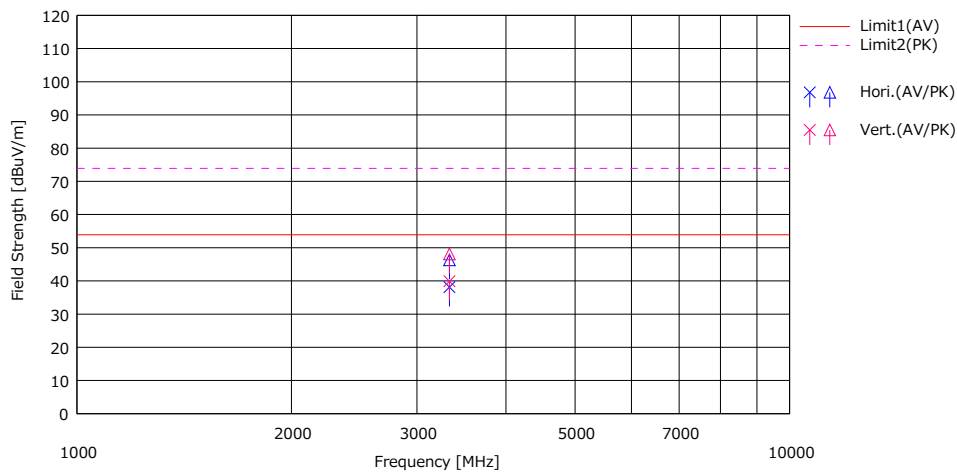
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Facsimile : +81 596 24 8124

Radiated Emission

Report No. 13703823H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date March 7, 2021
Temperature / Humidity 24 deg. C / 48 % RH
Engineer Hiroki Numata
(Above 1 GHz)
Mode Mode 3(Main)

Limit : FCC_Part15 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	3332.506	38.70	46.90	28.30	3.29	32.16	38.13	46.33	53.90	73.90	15.77	27.57	Hori.	176	197	H2 1	
2	3332.506	40.50	48.70	28.30	3.29	32.16	39.93	48.13	53.90	73.90	13.97	25.77	Vert.	160	225	H2 1	

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.

UL Japan, Inc.

Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

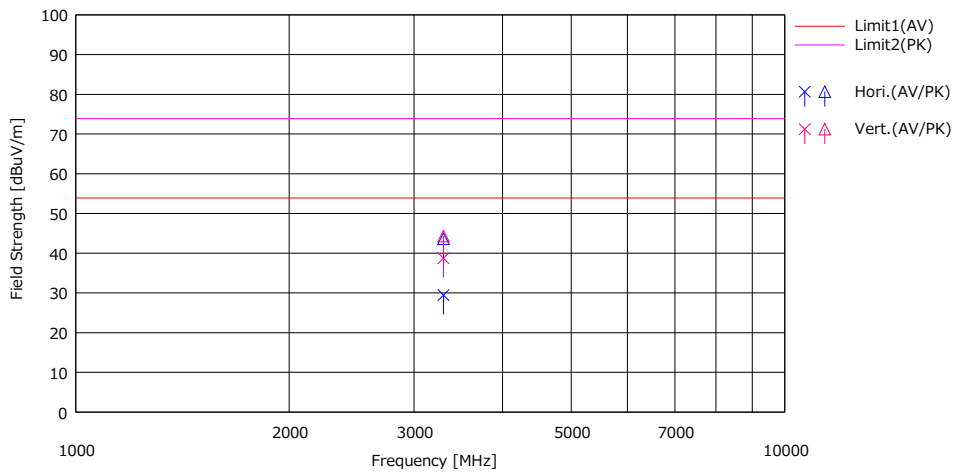
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Emission

Report No. 13703823H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.4
Date May 12, 2021
Temperature / Humidity 23 deg. C / 41 % RH
Engineer Masaya Minami
(Above 1 GHz)
Mode Mode 3(Sub)

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	3302.460	30.10	44.31	28.07	2.80	31.53	29.44	43.65	53.90	73.90	24.46	30.25	Hori.	100	5	HA5	
2	3302.460	39.40	44.97	28.07	2.80	31.53	38.74	44.31	53.90	73.90	15.16	29.59	Vert.	184	221	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.

UL Japan, Inc.

Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

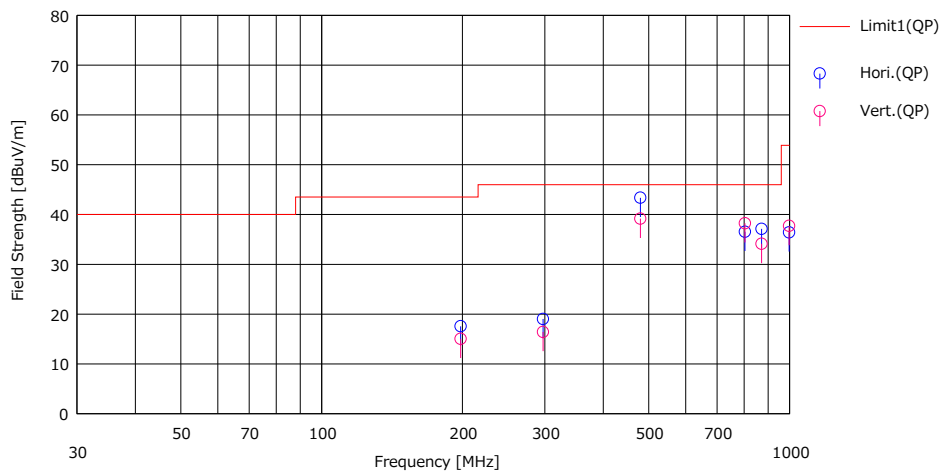
Telephone : +81 596 24 8999

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Radiated Emission

Report No. 13703823H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date March 7, 2021
Temperature / Humidity 24 deg. C / 48 % RH
Engineer Hiroki Numata
(Below 1 GHz)
Mode Mode 4(Main)

Limit : FCC_Part15 Subpart B(15.109)_Class B



No.	Freq. [MHz]	Reading	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit	Margin	Polz. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		<QP> [dBuV]				<QP> [dBuV/m]	<QP> [dB]						
1	198.200	23.60	16.85	9.19	32.09	17.55	43.50	25.95	Hori.	192	282	BA	
2	297.300	27.50	13.49	10.03	32.01	19.01	46.00	26.99	Hori.	100	246	LA22	
3	480.000	46.90	17.19	11.29	32.01	43.37	46.00	2.63	Hori.	100	302	LA22	
4	803.326	34.20	20.72	13.10	31.48	36.54	46.00	9.46	Hori.	100	160	LA22	
5	871.643	33.00	21.78	13.43	31.09	37.12	46.00	8.88	Hori.	100	161	LA22	
6	998.075	30.30	22.42	14.07	30.37	36.42	53.90	17.48	Hori.	100	359	LA22	
7	198.200	21.10	16.85	9.19	32.09	15.05	43.50	28.45	Vert.	100	172	BA	
8	297.300	24.90	13.49	10.03	32.01	16.41	46.00	29.59	Vert.	187	236	LA22	
9	480.000	42.70	17.19	11.29	32.01	39.17	46.00	6.83	Vert.	100	156	LA22	
10	803.326	35.90	20.72	13.10	31.48	38.24	46.00	7.76	Vert.	127	154	LA22	
11	871.643	30.00	21.78	13.43	31.09	34.12	46.00	11.88	Vert.	100	324	LA22	
12	998.075	31.60	22.42	14.07	30.37	37.72	53.90	16.18	Vert.	100	134	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.

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Ise EMC Lab.

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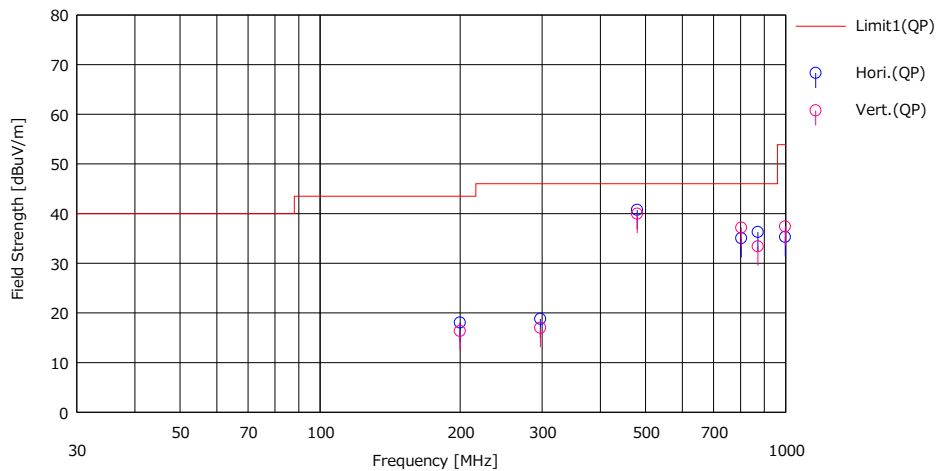
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Radiated Emission

Report No. 13703823H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.4
Date May 12, 2021
Temperature / Humidity 23 deg. C / 41 % RH
Engineer Masaya Minami
(Below 1 GHz)
Mode Mode 4(Sub)

Limit : FCC_Part 15 Subpart B(15.109)_Class B



No.	Fres. [MHz]	Reading	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit	Margn	P.d.a. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		(QP) [dBuV]				(QP) [dBuV/m]	(QP) [dB]	(QP) [dB]					
1	199.800	24.10	16.45	8.83	31.34	18.04	43.50	25.46	Hori.	188	265	BA	
2	297.300	26.90	13.57	9.55	31.25	18.77	46.00	27.23	Hori.	100	231	LA23	
3	480.000	44.30	17.17	10.62	31.35	40.74	46.00	5.26	Hori.	100	312	LA23	
4	803.326	33.50	20.68	11.97	31.12	35.03	46.00	10.97	Hori.	100	154	LA23	
5	871.966	33.00	21.80	12.24	30.78	36.26	46.00	9.74	Hori.	100	161	LA23	
6	998.000	30.20	22.45	12.78	30.15	35.28	53.90	18.62	Hori.	100	0	LA23	
7	199.800	22.40	16.45	8.83	31.34	16.34	43.50	27.16	Vert.	100	165	BA	
8	297.300	25.10	13.57	9.55	31.25	16.97	46.00	29.03	Vert.	187	241	LA23	
9	480.000	43.50	17.17	10.62	31.35	39.94	46.00	6.06	Vert.	100	153	LA23	
10	803.326	35.60	20.68	11.97	31.12	37.13	46.00	8.87	Vert.	133	154	LA23	
11	871.966	30.10	21.80	12.24	30.78	33.36	46.00	12.64	Vert.	100	312	LA23	
12	998.000	32.30	22.45	12.78	30.15	37.38	53.90	16.52	Vert.	100	132	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.

UL Japan, Inc.

Ise EMC Lab.

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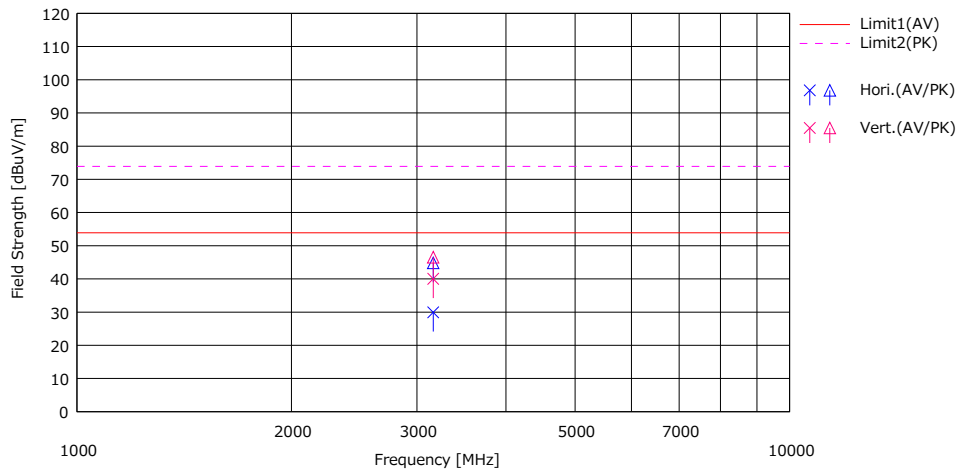
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Radiated Emission

Report No. 13703823H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date March 7, 2021
Temperature / Humidity 24 deg. C / 48 % RH
Engineer Hiroki Numata
(Above 1 GHz)
Mode Mode 4(Main)

Limit : FCC_Part15 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	3161.721	30.10	45.00	28.85	3.21	32.23	29.93	44.83	53.90	73.90	23.97	29.07	Hori.	100	10	H21	
2	3161.721	40.20	46.70	28.85	3.21	32.23	40.03	46.53	53.90	73.90	13.87	27.37	Vert.	186	215	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.

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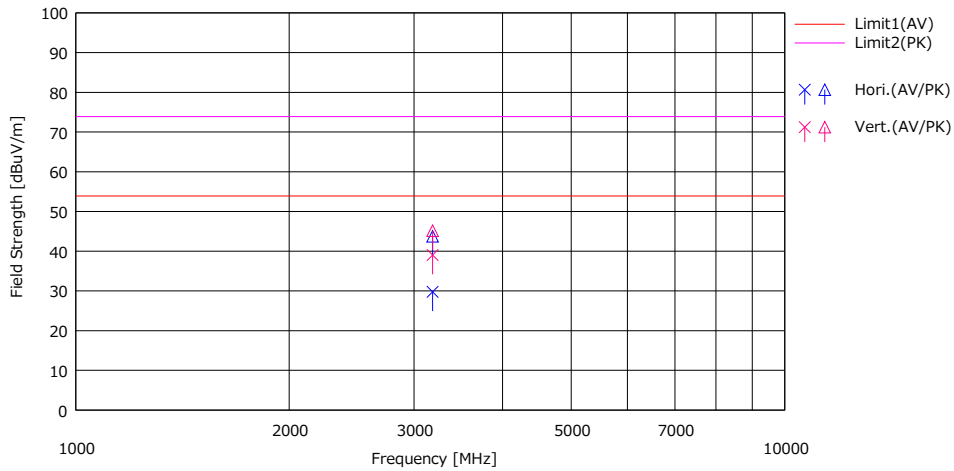
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Radiated Emission

Report No. 13703823H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.4
Date May 12, 2021
Temperature / Humidity 23 deg. C / 41 % RH
Engineer Masaya Minami
(Above 1 GHz)
Mode Mode 4(Sub)

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	3187.370	30.50	44.50	28.70	5.34	34.79	29.75	43.75	53.90	73.90	24.15	30.15	Hori.	100	2	HA5	
2	3187.370	39.80	45.90	28.70	5.34	34.79	39.05	45.15	53.90	73.90	14.85	28.75	Vert.	195	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.

UL Japan, Inc.

Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

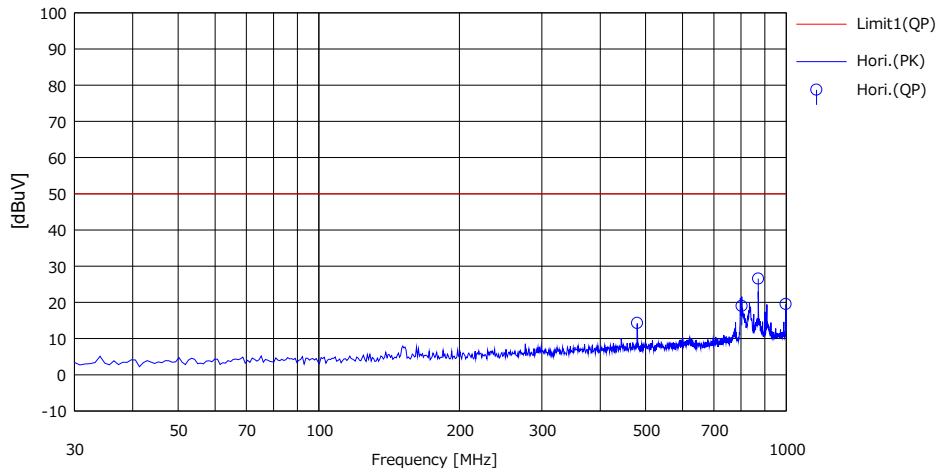
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Antenna Terminal Conducted Emission

Report No. 13703823H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date March 6, 2021
Temperature / Humidity 22 deg. C / 57 % RH
Engineer Takafumi Noguchi
Mode Mode 4(Main)

Limit : FCC15.111 Antenna terminal measurement



No.	Freq. [MHz]	Reading	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit (+1)	Margin [dB]	Pola [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		[dBuV]				[dBuV]							
1	480.000	34.59	0.00	11.69	32.01	14.27	50.00	35.73					---
2	803.326	37.00	0.00	13.46	31.48	18.98	50.00	31.02					---
3	871.643	43.84	0.00	13.78	31.09	26.53	50.00	23.47					---
4	998.075	35.49	0.00	14.40	30.37	19.52	50.00	30.48					---

*1) 2 nW = -57 dBm = 50 dBuV

CHART: WITH FACTOR

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

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

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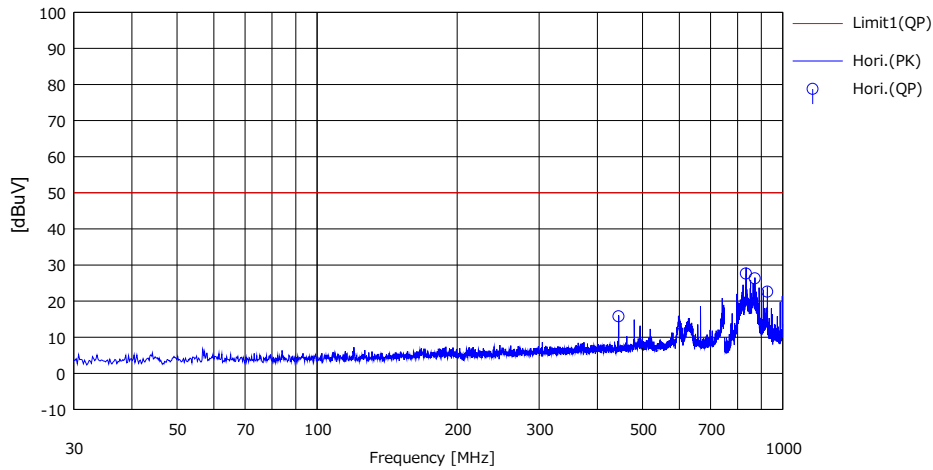
Telephone : +81 596 24 8999

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Antenna Terminal Conducted Emission

Report No. 13703823H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.4
Date May 12, 2021
Temperature / Humidity 23 deg. C / 41 % RH
Engineer Masaya Minami
Mode Mode 4(Sub)

Limit : FCC15.111 Antenna terminal measurement



No.	Freq. [MHz]	Reading	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit *1)	Margin	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		(QP) [dBuV]				(QP) [dBuV]	(QP) [dB]						
1	444.328	36.50	0.00	10.58	31.33	15.75	50.00	34.25				---	
2	834.448	46.30	0.00	12.27	30.96	27.61	50.00	22.39				---	
3	871.910	44.60	0.00	12.44	30.78	26.26	50.00	23.74				---	
4	927.307	40.40	0.00	12.67	30.50	22.57	50.00	27.43				---	

*1) 2 nW = -57 dBm = 50 dBuV

CHART: WITH FACTOR

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

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

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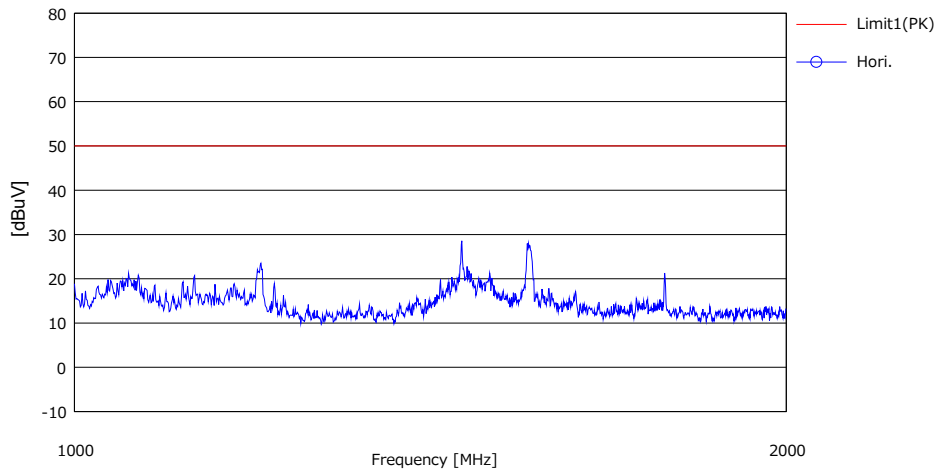
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Antenna Terminal Conducted Emission

Report No. 13703823H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date March 6, 2021
Temperature / Humidity 22 deg. C / 57 % RH
Engineer Takafumi Noguchi
Mode Mode 4(Main)

Limit : FCC15.111 Antenna terminal measurement



No.	Freq. [MHz]	Reading [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit	Margin	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
							<PK> [dBuV/m]	<PK> [dB]					

*1) 2 nW = -57 dBm = 50 dBuV

CHART: WITH FACTOR

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

* Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

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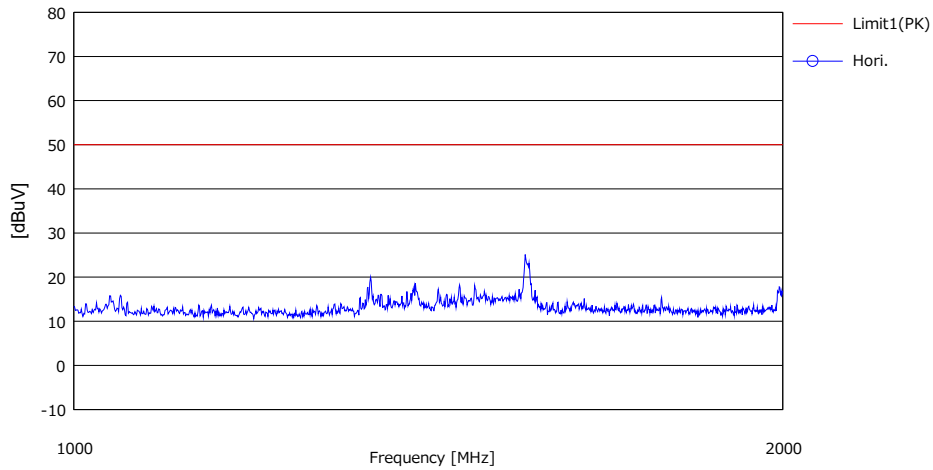
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Antenna Terminal Conducted Emission

Report No. 13703823H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.4
Date May 12, 2021
Temperature / Humidity 23 deg. C / 41 % RH
Engineer Masaya Minami
Mode Mode 4(Sub)

Limit : FCC15.111 Antenna terminal measurement



No.	Freq. [MHz]	Reading [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit #1)	Margin	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
							<PK> [dBuV/m]	<PK> [dB]					

*1) 2 nW = -57 dBm = 50 dBuV

CHART: WITH FACTOR

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

* Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

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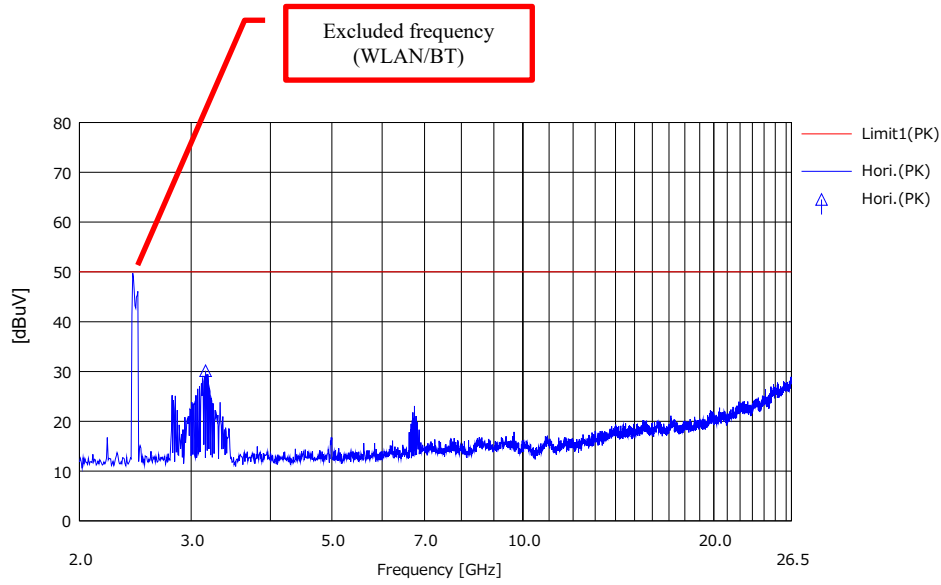
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Antenna Terminal Conducted Emission

Report No. 13703823H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date March 6, 2021
Temperature / Humidity 22 deg. C / 57 % RH
Engineer Takafumi Noguchi
Mode Mode 4(Main)

Limit : FCC15.111 Antenna terminal measurement



No.	Freq. [MHz]	Reading	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit *1)	Margin	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		[dBuV]				[dBuV]	[dB]						
1	3161.721	59.46	0.00	2.92	32.23	30.15	50.00	19.85					

*1) 2 nW = -57 dBm = 50 dBuV

CHART: WITH FACTOR

CALCULATION: RESULT = READING + LOSS (CABLE) - GAIN

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

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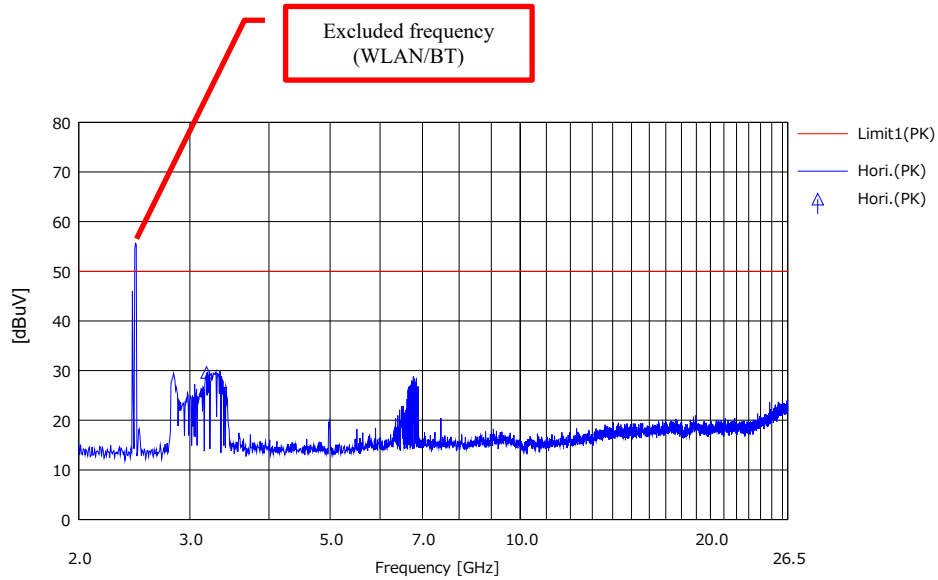
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Antenna Terminal Conducted Emission

Report No. 13703823H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.4
Date May 12, 2021
Temperature / Humidity 23 deg. C / 41 % RH
Engineer Masaya Minami
Mode Mode 4(Sub)

Limit : FCC15.111 Antenna terminal measurement



No.	Freq. [MHz]	Reading	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit*1)	Margin	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		[dBuV]				[dBuV]	[dB]						
1	3187.370	56.64	0.00	4.54	31.56	29.62	50.00	20.38					

*1) 2 nW = -57 dBm = 50 dBuV

CHART: WITH FACTOR

CALCULATION: RESULT = READING + LOSS (CABLE) - GAIN

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

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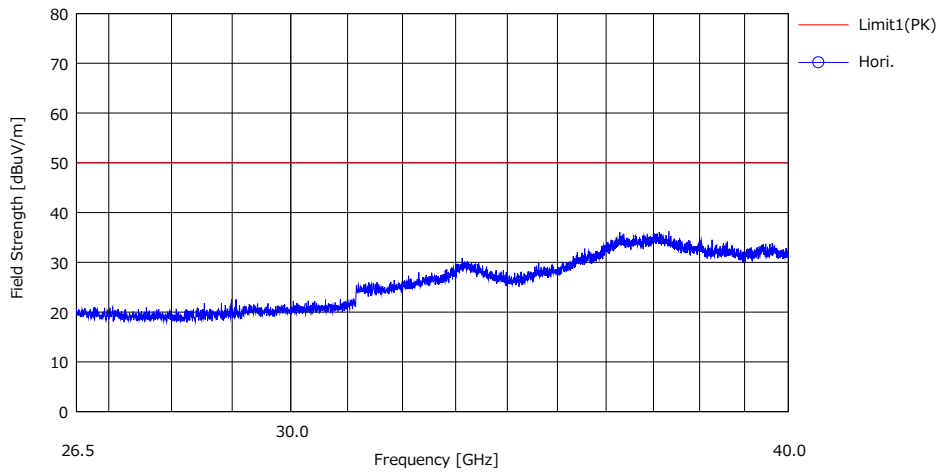
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Antenna Terminal Conducted Emission

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Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date March 6, 2021
Temperature / Humidity 22 deg. C / 57 % RH
Engineer Takafumi Noguchi
Mode Mode 4(Main)

Limit : FCC15.111 Antenna terminal measurement



No.	Freq. [MHz]	Reading [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV]	Limit *1)	Margin	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
							<PK> [dBuV]	<PK> [dB]					

*1) 2 nW = -57 dBm = 50 dBuV

CHART: WITH FACTOR

CALCULATION: RESULT = READING + LOSS (CABLE) - GAIN

* No signal was detected.

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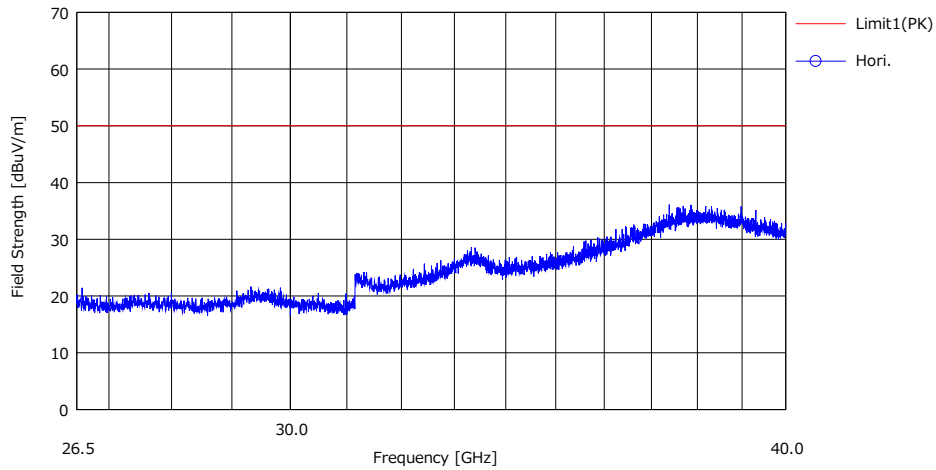
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Antenna Terminal Conducted Emission

Report No. 13703823H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.4
Date May 12, 2021
Temperature / Humidity 23 deg. C / 41 % RH
Engineer Masaya Minami
Mode Mode 4(Sub)

Limit : FCC15.111 Antenna terminal measurement



No.	Freq. [MHz]	Reading [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV]	Limit #1	Margin	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
							<PK> [dBuV]	<PK> [dB]					

*1) 2 nW = -57 dBm = 50 dBuV

CHART: WITH FACTOR

CALCULATION: RESULT = READING + LOSS (CABLE) - GAIN

* No signal was detected.

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APPENDIX 2: Test instruments

Test equipment (Test date: March 6 and 7, 2021)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	MSA-03	141884	Spectrum Analyzer	AGILENT	E4448A	MY44020357	03/04/2020	12
AT	MPA-13	141582	Pre Amplifier	SONOMA INSTRUMENT	11/5/1900	260834	02/03/2021	12
AT	MPA-11	141580	MicroWave System Amplifier	AGILENT	83017A	MY39500779	03/24/2020	12
AT	MPA-03	141577	Microwave System Power Amplifier	AGILENT	83050A	MY39500610	10/19/2020	12
AT	MCC-51	141323	Coaxial cable	UL Japan	-	-	07/06/2020	12
AT	MCC-231	177964	Microwave Cable	Junkosha INC.	MMX221	1901S329(1m)/1902S579(5m)	03/02/2020	12
AT	MCC-224	160324	Coaxial Cable	Huber+Suhner	SUCOFLEX 102A	MY009/2A	11/17/2020	12
RE	MAT-95	142314	Attenuator	Pasternack	PE7390-6	D/C 1504	06/17/2020	12
AT	MMP-01	141550	Matching Pad Anritsu	ANRITSU	MB-009	40063	07/02/2020	12
AT	MAEC-03	142008	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	05/22/2020	24
AT	MOS-13	141554	Thermo-Hygrometer	CUSTOM	CTH-180	1301	01/15/2021	12
AT	MMM-08	141532	DIGITAL HiTESTER	HIOKI	3805	51201197	01/07/2021	12
AT	MJM-16	142183	Measure	KOMELON	KMC-36	-	-	-
AT	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	MBA-03	141424	Biconical Antenna	Schwarzbeck	BBA9106	1915	08/13/2020	12
RE	MLA-22	141266	Logperiodic Antenna (200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-191	08/13/2020	12
RE	MAEC-03	142008	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	05/22/2020	24
RE	MOS-13	141554	Thermo-Hygrometer	CUSTOM	CTH-180	1301	01/15/2021	12
RE	MMM-08	141532	DIGITAL HiTESTER	HIOKI	3805	51201197	01/07/2021	12
RE	MJM-16	142183	Measure	KOMELON	KMC-36	-	-	-
RE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	MAEC-03-SVSWR	142013	Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-10005	04/08/2020	12
RE	MCC-51	141323	Coaxial cable	UL Japan	-	-	07/06/2020	12
RE	MCC-231	177964	Microwave Cable	Junkosha INC.	MMX221	1901S329(1m)/1902S579(5m)	03/02/2020	12
RE	MHA-16	141513	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	05/21/2020	12
RE	MHA-29	141517	Horn Antenna 26.5-40GHz	ETS LINDGREN	22190	152399	08/03/2020	12
RE	MCC-224	160324	Coaxial Cable	Huber+Suhner	SUCOFLEX 102A	MY009/2A	11/17/2020	12
RE	MPA-22	141588	Pre Amplifier	MITEQ, Inc	AMF-6F-2600400-33-8P / AMF-4F-2600400-33-8P	1871355 /1871328	09/07/2020	12
RE	MSG-20	158264	Signal Generator	Keysight Technologies Inc	N5182A	MY50142539	09/04/2020	12
RE	MMP-01	141550	Matching Pad Anritsu	ANRITSU	MB-009	40063	07/02/2020	12
RE	MSA-03	141884	Spectrum Analyzer	AGILENT	E4448A	MY44020357	03/04/2020	12
RE	MPA-13	141582	Pre Amplifier	SONOMA INSTRUMENT	11/5/1900	260834	02/03/2021	12
RE	MAEC-03	142008	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	05/22/2020	24
RE	MOS-13	141554	Thermo-Hygrometer	CUSTOM	CTH-180	1301	01/15/2021	12
RE	MMM-08	141532	DIGITAL HiTESTER	HIOKI	3805	51201197	01/07/2021	12
RE	MJM-16	142183	Measure	KOMELON	KMC-36	-	-	-
RE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	MTR-03	141942	Test Receiver	Rohde & Schwarz	ESCI	100300	08/18/2020	12

UL Japan, Inc.

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Telephone : +81 596 24 8999

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Test equipment (Test date: May 12, 2021)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT / RE	MAEC-04	142011	AC4_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	05/25/2020	24
AT / RE	MOS-15	141562	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	0010	01/15/2021	12
AT / RE	MMM-10	141545	DIGITAL HiTESTER	HIOKI E.E. CORPORATION	3805	51201148	01/07/2021	12
AT / RE	MJM-26	142227	Measure	KOMELON	KMC-36	-	-	-
AT / RE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
AT / RE	MAEC-04-SVSWR	142017	AC4_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-10005	04/12/2021	24
AT / RE	MTR-10	141951	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	03/09/2021	12
AT / RE	MSA-03	141884	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY44020357	03/10/2021	12
AT / RE	MPA-14	141583	Pre Amplifier	SONOMA INSTRUMENT	310	260833	02/18/2021	12
AT / RE	MPA-12	141581	MicroWave System Amplifier	Keysight Technologies Inc	83017A	00650	10/19/2020	12
AT / RE	MPA-03	141577	Microwave System Power Amplifier	Keysight Technologies Inc	83050A	MY39500610	10/19/2020	12
AT / RE	MCC-50	141397	Coaxial Cable	UL Japan	-	-	11/06/2020	12
AT / RE	MCC-246	199563	Microwave Cable	Huber+Suhner	SF126E/11PC35/11P C35/1000M,5000M	537061/126E / 537072/126E	06/11/2020	12
AT / RE	MCC-54	141325	Microwave Cable	Suhner	SUCOFLEX101	2873(1m) / 2876(5m)	03/02/2021	12
RE	MAT-34	141331	Attenuator(6dB)	TME	UFA-01	-	02/02/2021	12
AT / RE	MMP-01	141550	Matching Pad Anritsu	Anritsu Corporation	MB-009	40063	07/02/2020	12
RE	MHA-05	141511	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	253	09/01/2020	12
RE	MBA-05	141425	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103+BBA9106	VHA 91031302	08/31/2020	12
RE	MLA-23	141267	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-192	09/02/2020	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 test

UL Japan, Inc.

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