



EMI TEST REPORT

Test Report No. : 13941501Y-B-R4

Applicant: GIKEN TRASTEM CO.,LTD.
Type of EUT: Number of people count sensor
Model Number of EUT: AIO360G
FCC ID 2A22CAIO-360
Test regulation: FCC Part 15 Subpart B:2021 Class A
Test result: Complied (Refer to SECTION 3)

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by any agency of the Federal Government.
6. This test report covers EMC technical requirements.
It does not cover administrative issues such as Manual or non-EMC test related Requirements. (if applicable)
7. The all test items in this test report are conducted by UL Japan, Inc. Yokowa EMC Lab.
8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan, Inc. 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 13941501Y-B-R3. 13941501Y-B-R3 is replaced with this report.

Date of test:

September 7 to December 1, 2021

**Representative
test engineer:**

Tatsuhisa Nakai
Engineer

Approved by:

Daigo Hamaguchi
Leader



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

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Yokowa EMC Lab.

108 Yokowa-cho, Ise-shi, Mie-ken, 516-1106 JAPAN
Telephone: +81 596 24 8750
Facsimile: +81 596 39 0232

REVISION HISTORY

Original Test Report No.: 13941501Y

Revision	Test report No.	Date	Page revised	Contents
- (Original)	13941501Y-B	September 28, 2021	-	-
1	13941501Y-B-R1	October 13, 2021	Correspondence page	Added FCC ID 2A22CAIO-360
2	13941501Y-A-R2	October 22, 2021	P.1, P.5, P.9	Changed model number Original : AIO-360 Corrected : AIO360G
3	13941501Y-A-R3	December 13, 2021	P.5	Added sample receipt date
3	13941501Y-A-R3	December 13, 2021	P.6	Added Conducted emission test result and Radiated emission test result.
3	13941501Y-A-R3	December 13, 2021	P.9	Correction of errors for Configuration and peripherals Original : 100 V / 60 Hz Corrected : 120 V / 60 Hz, 240 V / 60 Hz
3	13941501Y-A-R3	December 13, 2021	P.9	Added details of operation
3	13941501Y-A-R3	December 13, 2021	P.14	Added Conducted emission test setup photographs
3	13941501Y-A-R3	December 13, 2021	P.15	Added Radiated emission test setup photographs above 1 GHz
3	13941501Y-A-R3	December 13, 2021	P.17 - 24	Added Conducted emission test
3	13941501Y-A-R3	December 13, 2021	P.31 - 32	Added Radiated emission test
3	13941501Y-A-R3	December 13, 2021	P.33 - 36	Added Test Instruments
4	13941501Y-A-R4	December 17, 2021	P.6	Correction of errors for Procedures & results

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Telephone: +81 596 24 8750

Facsimile: +81 596 39 0232

Reference: Abbreviations (Including words undescribed in this report)

AAN	Asymmetric Artificial Network	ISED	Innovation, Science and Economic Development Canada
AC	Alternating Current	ISN	Impedance Stabilization Network
AM	Amplitude Modulation	ISO	International Organization for Standardization
AMN	Artificial Mains Network	JAB	Japan Accreditation Board
Amp, AMP	Amplifier	LAN	Local Area Network
ANSI	American National Standards Institute	LCL	Longitudinal Conversion Loss
Ant, ANT	Antenna	LIMS	Laboratory Information Management System
AP	Access Point	LISN	Line Impedance Stabilization Network
ASK	Amplitude Shift Keying	MRA	Mutual Recognition Arrangement
Atten., ATT	Attenuator	N/A	Not Applicable
AV	Average	NIST	National Institute of Standards and Technology
BPSK	Binary Phase-Shift Keying	NS	No signal detect.
BR	Bluetooth Basic Rate	NSA	Normalized Site Attenuation
BT	Bluetooth	NVLAP	National Voluntary Laboratory Accreditation Program
BT LE	Bluetooth Low Energy	OBW	Occupied Band Width
BW	BandWidth	OFDM	Orthogonal Frequency Division Multiplexing
C.F	Correction Factor	PK	Peak
Cal Int	Calibration Interval	P _{Lt}	long-term flicker severity
CAV	CISPR AV	POHC(A)	Partial Odd Harmonic Current
CCK	Complementary Code Keying	Pol., Pola.	Polarization
CDN	Coupling Decoupling Network	PR-ASK	Phase Reversal ASK
Ch., CH	Channel	P _{ST}	short-term flicker severity
CISPR	Comite International Special des Perturbations Radioelectriques	QAM	Quadrature Amplitude Modulation
Corr.	Correction	QP	Quasi-Peak
CPE	Customer premise equipment	QPSK	Quadri-Phase Shift Keying
CW	Continuous Wave	r.m.s., RMS	Root Mean Square
DBPSK	Differential BPSK	RBW	Resolution Band Width
DC	Direct Current	RE	Radio Equipment
DET	Detector	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		
ILAC	International Laboratory Accreditation Conference		

UL Japan, Inc.

Yokowa EMC Lab.

108 Yokowa-cho, Ise-shi, Mie-ken, 516-1106 JAPAN

Telephone: +81 596 24 8750

Facsimile: +81 596 39 0232

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SECTION 1: Customer information

Company Name : GIKEN TRASTEM CO.,LTD.
Address : 98, Nishi-Dankawara-cho, Takeda, Fushimi-ku, Kyoto, 612-8429 Japan
Telephone Number : +81-75-641-6000

The information provided from the customer is as follows:

- Applicant, Type of EUT, Model Number of EUT, FCC ID on the cover page 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 information in SECTION 2 and 4.

SECTION 2: Equipment under test (EUT)

2.1 Identification of EUT

Type : Number of people count sensor
Model Number : AIO360G
Serial Number : Refer to Clause 4.2
Rating : AC Adapter: DC 24 V, 10 W
PoE: DC 48 V
Country of Mass-production : Japan
Condition : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Size : 153.26 x 138.40 x 59.0 (Width x Depth x Height (mm))
Modification : No modification by the test lab.
Receipt Date : September 6, 2021
November 29, 2021

2.2 Product description

Model: AIO360G (referred to as the EUT in this report) is Number of people count sensor.

The clock frequencies used in the EUT: 1.6 GHz

SECTION 3: Test specification, procedures and 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 & 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	Class A	N/A	17.43 dB (0.34755 MHz, CAV, L, 1. PoE mode, AC 240 V / 60 Hz)	Complied a)	-
Radiated emission	FCC: ANSI C63.4: 2014 + C63.4a: 2017 8. Radiated emission measurements	Class A	N/A	7.10 dB (60.250 MHz, QP, Vertical, 1. PoE mode)	Complied b)	*1)
*1) Measurements have been performed up to 8 GHz since the highest frequency of internal source of the EUT is 1.6 GHz. Note: UL Japan's EMI Work Procedures No. 13-EM-W0420 a) Refer to APPENDIX 2 (data of Conducted disturbance) b) Refer to APPENDIX 2 (data of Radiated disturbance) 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 Confirmation

**UL Japan, Inc. hereby confirms that EUT, in the configuration tested, complies with the specifications
FCC Part 15 Subpart B:2021 Class A.**

UL Japan, Inc.
Yokowa EMC Lab.

108 Yokowa-cho, Ise-shi, Mie-ken, 516-1106 JAPAN
Telephone: +81 596 24 8750
Facsimile: +81 596 39 0232

3.5 Uncertainty

EMI

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 $k = 2$.

Conducted emission

		Uncertainty (+/-)	Ucisp (±)
LISN (AMN)	9 kHz - 150 kHz	3.4 dB	3.8 dB
	150 kHz - 30 MHz	3.0 dB	3.4 dB
ISN (LCL= 55 dB - 40 dB)	150 kHz - 30 MHz	3.6 dB	5.0 dB
ISN (LCL= 65 dB - 50 dB)	150 kHz - 30 MHz	4.1 dB	5.0 dB
ISN (LCL= 75 dB - 60 dB)	150 kHz - 30 MHz	4.6 dB	5.0 dB
ISN (Screened)	150 kHz - 30 MHz	2.7 dB	5.0 dB
ISN (75 ohm)	150 kHz - 30 MHz	2.7 dB	5.0 dB
Current probe	150 kHz - 30 MHz	1.9 dB	2.9 dB
Capacitive Voltage Probe	150 kHz - 30 MHz	3.2 dB	3.9 dB
Voltage probe	150 kHz - 30 MHz	2.0 dB	2.9 dB

Radiated emission

		Uncertainty (+/-)			Ucisp (±)
Site No.		No.1	No.2	No.3	
3 m	9 kHz - 30 MHz	3.5 dB	3.5 dB	3.5 dB	Not Defined
	30 MHz - 200 MHz (Horizontal)	4.6 dB	4.8 dB	4.8 dB	6.3 dB
	(Vertical)	4.7 dB	4.9 dB	4.9 dB	6.3 dB
	200 MHz - 1000 MHz (Horizontal)	4.9 dB	5.1 dB	5.1 dB	6.3 dB
	(Vertical)	6.0 dB	6.2 dB	6.2 dB	6.3 dB
	1 GHz - 6 GHz	4.7 dB			5.2 dB
10 m	6 GHz - 18 GHz	4.9 dB			5.5 dB
	9 kHz - 30 MHz	3.4 dB	3.4 dB	3.4 dB	Not Defined
	30 MHz - 200 MHz (Horizontal)	4.6 dB	4.8 dB	4.8 dB	6.3 dB
	(Vertical)	4.6 dB	4.8 dB	4.8 dB	6.3 dB
	200 MHz - 1000 MHz (Horizontal)	4.7 dB	5.0 dB	5.0 dB	6.3 dB
	(Vertical)	4.8 dB	5.0 dB	5.0 dB	6.3 dB

UL Japan, Inc.
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108 Yokowa-cho, Ise-shi, Mie-ken, 516-1106 JAPAN

Telephone: +81 596 24 8750

Facsimile: +81 596 39 0232

3.6 Test Location

UL Japan, Inc. Yokowa EMC Lab.
108 Yokowa-cho, Ise-shi, Mie-ken, 516-1106 JAPAN
Telephone : +81 596 24 8750
Facsimile : +81 596 39 0232
FCC Test Firm Registration Number: 788329

	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 open area test site	-	40 x 20	-
No.2 open area test site	-	20 x 18	-
No.3 open area test site	-	20 x 18	-
No.1 shielded room	5.5 x 6.4 x 2.7	5.5 x 6.4	-
No.2 shielded room	4.5 x 3.6 x 2.7	4.5 x 3.6	-
No.3 shielded room	3.6 x 7.2 x 2.4	3.6 x 7.2	-
No.4 shielded room	5.5 x 5.0 x 2.4	4.35 x 3.35	-
No.5 shielded room	5.5 x 4.3 x 2.5	5.54 x 3.0	-
No.6 shielded room	5.2 x 3.2 x 2.9	5.2 x 3.2	-
No.7 shielded room	9.3 x 3.4 x 2.7	9.3 x 3.4	-
No.1 EMS lab. (Full-anechoic chamber)	5.0 x 8.0 x 3.5	-	-
No.2 EMS lab. (Full-anechoic chamber)	4.0 x 7.0 x 3.5	-	-

3.7 Test result

Refer to APPENDIX 2.

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SECTION 4: Operation of EUT during testing

4.1 Operating modes

The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

Test sequence is used: 1. PoE mode
2. AC Adapter mode

Details of operation : 1. The power is supplied from PoE or AC adapter.
2. The camera mounted on the EUT captures the movement of people and counts the number of people from the image.
3. EUT is connected to a personal computer with a LAN cable, and the acquired information is sent to the personal computer.

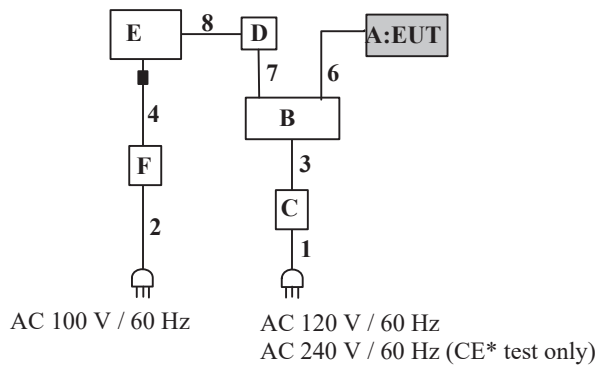
FW version: VC2020_2021090100
Software version: 0000.0006

Justification: The system was configured in typical fashion (as a customer would normally use it) for testing.

4.2 Configuration and peripherals

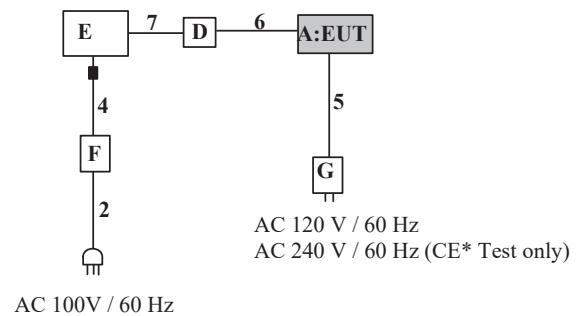
【1. PoE mode】

■: Ferrite Core



【2. AC Adapter mode】

■: Ferrite Core



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

* CE : Conducted emission

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108 Yokowa-cho, Ise-shi, Mie-ken, 516-1106 JAPAN

Telephone: +81 596 24 8750

Facsimile: +81 596 39 0232

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Number of people count sensor	AIO360G	ES2-02	GIKEN TRASTEM CO.,LTD.	EUT
B	PoE hub	PS-408	---	Pride Tech	-
C	AC Adapter	LTE50E-S5-108	143400605	LI TONE ELECTRONICS CO., LTD.	-
D	LAN ISOLATOR	LNx-007L	1BPWA214	HUMAN DATA	-
E	PC	Vostro 3500	---	DELL	-
F	AC Adapter	LA45NM140	---	DELL	-
G	AC Adapter	UN 318-2475	M05-0955854	UNIFIVE	-

List of cables used

No.	Name	Length (m)	Cable Shield	Connector Shield	Remark
1	AC Power Cable	1.7	Unshielded	Unshielded	-
2	AC Power Cable	0.85	Unshielded	Unshielded	-
3	DC Power Cable	1.2	Unshielded	Unshielded	-
4	DC Power Cable	1.7	Unshielded	Unshielded	-
5	DC Power Cable	1.5	Unshielded	Unshielded	-
6	LAN Cable	5.0	Unshielded	Unshielded	-
7	LAN Cable	1.5	Unshielded	Unshielded	-
8	LAN Cable	1.0	Unshielded	Unshielded	-

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SECTION 5: Radiated emission

5.1 Operating environment

This test was carried out in open area test site.

Temperature : See data

Humidity : See data

5.2 Test configuration

EUT was placed on a table which was consisted by polystyrene foam, polypropylene foam and polycarbonate of nominal size, 1 m by 1.5 m, raised 0.8 m above the conducting ground plane.

The rear of EUT was aligned and flushed with rear of tabletop.

The EUT was connected peripherals on the conducting ground plane.

The measurements were performed for vertical or horizontal antenna polarization or both as necessary.

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 1.

5.3 Test conditions

Frequency range : 30 MHz - 8000 MHz

Test distance : 30 MHz - 1000 MHz : 10 m
1000 MHz - 8000 MHz : 3 m

EUT position : Table top

5.4 Test procedure

<Below 1 GHz>

The Radiated Electric Field Strength intensity has been measured on open area test site with a ground plane at distance of 10 m*.

* Measuring distance

The boundary of the EUT is defined by an imaginary circular periphery.

Pre check measurements were performed in a screened room with a search coil at 30 MHz-1000 MHz to distinguish disturbances of EUT from the ambient noise

Measurements were performed with a quasi-peak detector.

The measuring antenna height was varied between 1 m 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 vertical or horizontal antenna polarization or both as necessary.

<Above 1 GHz>

The Radiated Electric Field Strength intensity has been measured on open area test site with a ground plane.

The distance is shown in Appendix 2.

Pre check measurements were performed in a screened room with a horn antenna at 1000 MHz - 8000 MHz to distinguish disturbances of EUT from the ambient noise.

Measurements were performed with a peak detector and an average detector.

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.

EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for vertical or horizontal antenna polarization or both as necessary.

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

Frequency	: 30 MHz - 1000 MHz	1000 MHz - 8000 MHz *1)
Instrument used	: Test Receiver	Test Receiver
Detector Type	: QP	AV PK
IF Band width	: 120 kHz	1 MHz 1 MHz

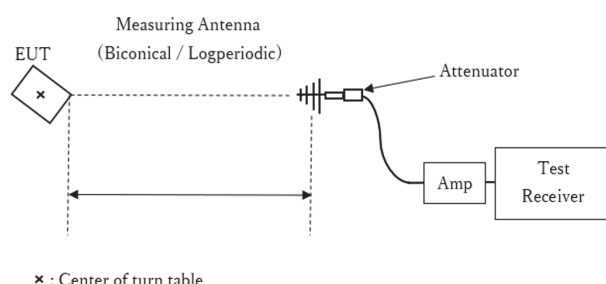
*1) The measurement data was adjusted to a 10 m distance using the following Distance Factor.

Distance factor: $20 \log (\text{Actual distance} / 10 \text{ m})$

Distance factor and actual distance are shown in APPENDIX 2

Figure 2: Test Setup

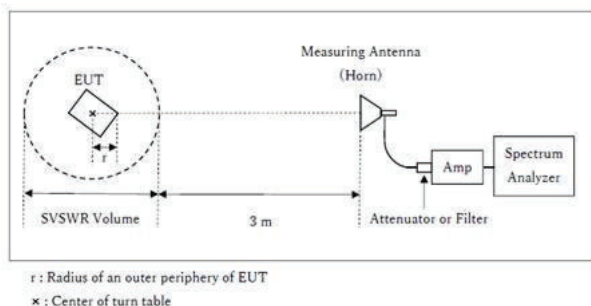
Below 1 GHz



Test Distance: 10 m

× : Center of turn table

1 GHz - 8 GHz



Distance Factor: $20 \times \log (4.15 \text{ m}^*/10.0 \text{ m}) = -7.63 \text{ dB}$

* Test Distance: $(3 + \text{SVSWR} / 2) - r = 4.15 \text{ m}$

SVSWR: 2.5 m

(SVSWR has been calibrated based on CISPR 16-1-4.)

$r = 0.10 \text{ m}$

5.5 Results

Summary of the test results: Pass

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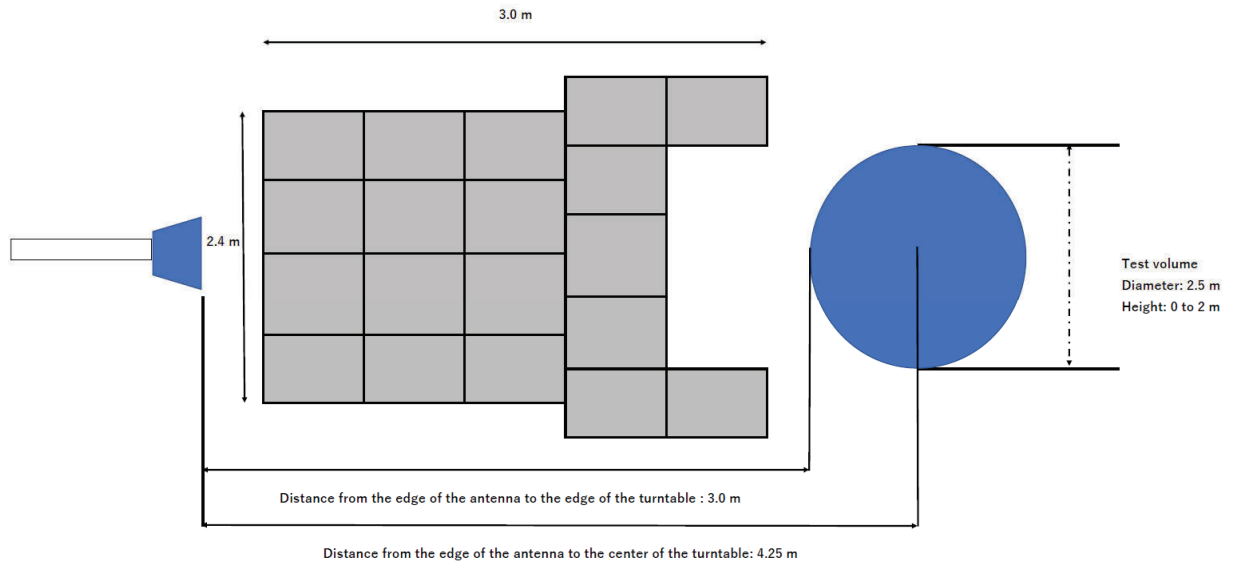
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Telephone: +81 596 24 8750

Facsimile: +81 596 39 0232

Figure. Absorber arrangement

2Site



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108 Yokowa-cho, Ise-shi, Mie-ken, 516-1106 JAPAN

Telephone: +81 596 24 8750

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DATA OF CONDUCTED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 1 Shielded Room
Date : 09/13/2021

Mode : 1. PoE mode
Order No. : 13941501
Power : AC 120 V / 60 Hz
Temp. / Humi. : 26 deg.C / 42 % RH

Remarks : LS-11 LISN with Adaptor HP OFF(2020-11-25)

Limit : FCC Part 15 B CLASS A

Engineer : Ryuhei Yamamoto

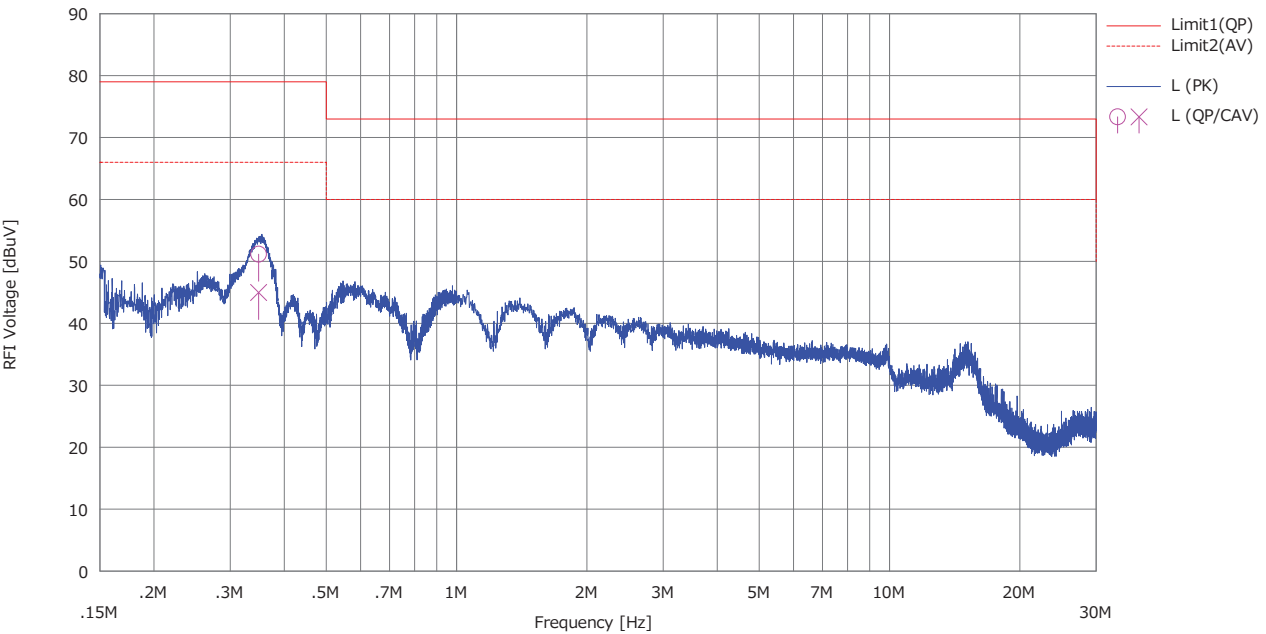
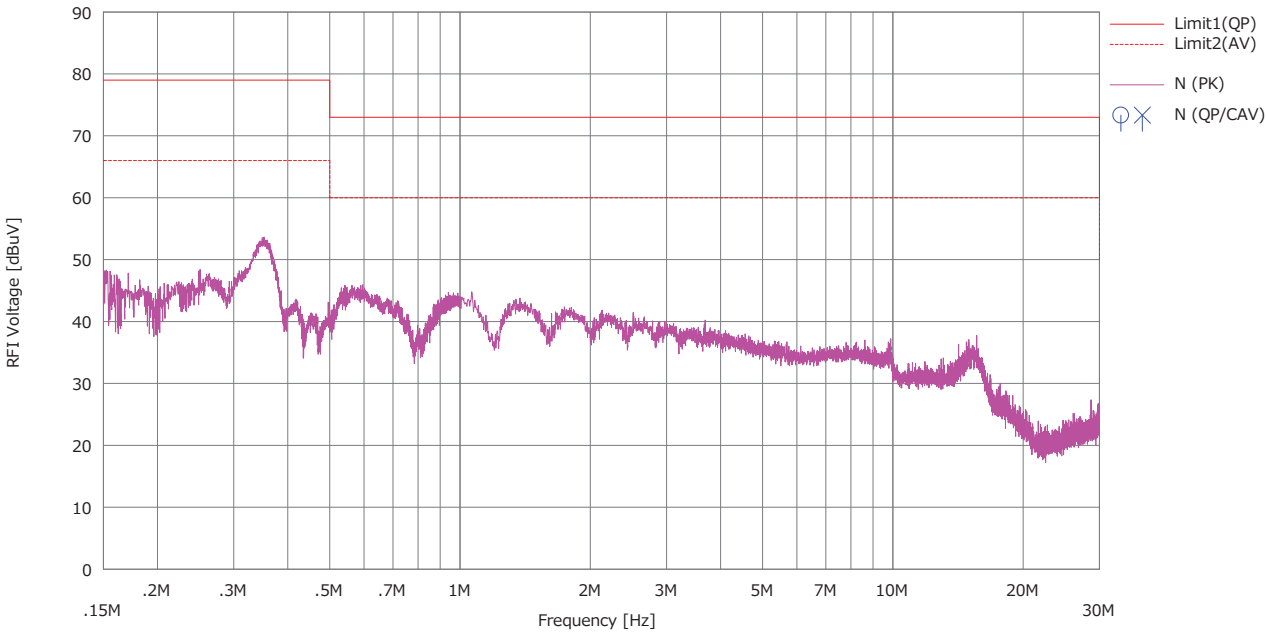


CHART:WITH FACTOR,Peak hold data. Except for the above table : adequate margin data below the limits.
CALCULATION:RESULT[dBuV]=READING[dBuV]+C.F(LOSS)[dB](LISN(or ISN or Probe)+CABLE+ATTEN(Except LS-11,12,13))

Date : 09/13/2021

Remarks : LS-11 LISN with Adaptor HP OFF(2020-11-25)

Limit : FCC Part 15 B CLASS A

Engineer : Ryuhei Yamamoto

<< QP/CAV DATA >>

CHART:WITH FACTOR,Peak hold data. Except for the above table : adequate margin data below the limits.
CALCULATION:RESULT[dBuV]=READING[dBuV]+C.F(LOSS)[dB](LISN(or ISN or Probe)+CABLE+ATTEN(Except LS-11,12,13))

DATA OF CONDUCTED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 1 Shielded Room
Date : 09/13/2021

Mode : 1. PoE mode
Order No. : 13941501
Power : AC 240 V / 60 Hz
Temp. / Humi. : 26 deg.C / 42 % RH

Remarks : LS-11 LISN with Adaptor HP OFF(2020-11-25)

Limit : FCC Part 15 B CLASS A

Engineer : Ryuhei Yamamoto

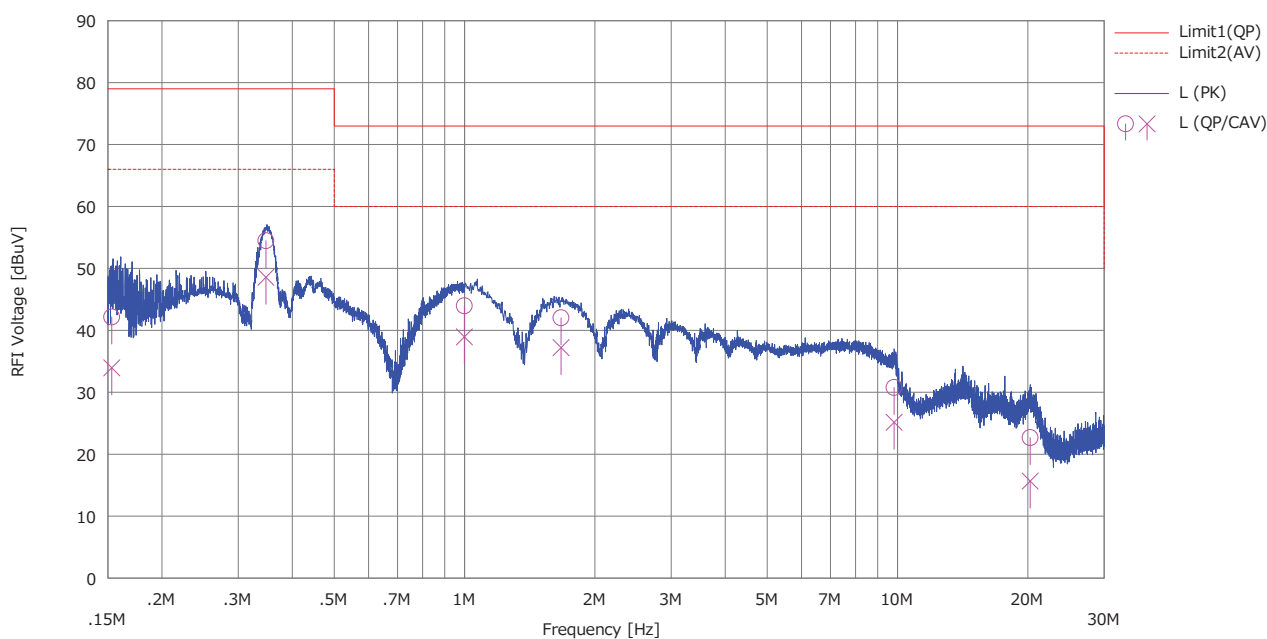
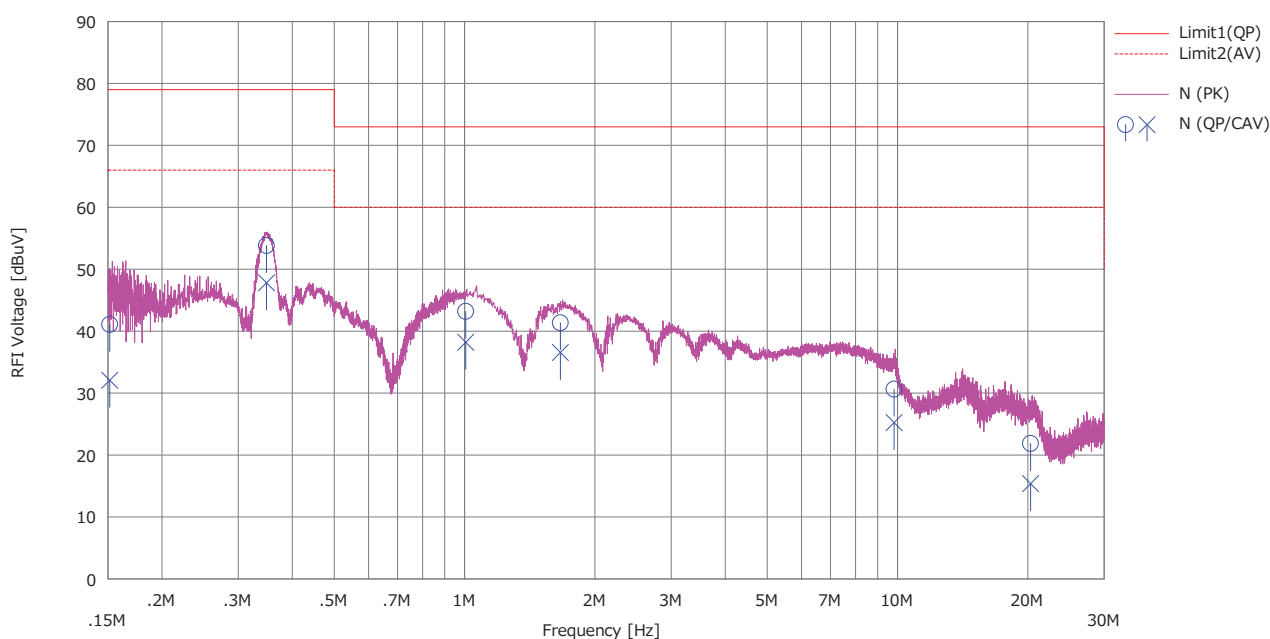


CHART:WITH FACTOR,Peak hold data. Except for the above table : adequate margin data below the limits.
CALCULATION:RESULT[dBuV]=READING[dBuV]+C.F(LOSS)[dB](LISN(or ISN or Probe)+CABLE+ATTEN(Except LS-11,12,13))

DATA OF CONDUCTED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 1 Shielded Room
Date : 09/13/2021

Mode : 1. PoE mode
Order No. : 13941501
Power : AC 240 V / 60 Hz
Temp. / Humi. : 26 deg.C / 42 % RH

Remarks : LS-11 LISN with Adaptor HP OFF(2020-11-25)

Limit : FCC Part 15 B CLASS A

Engineer : Ryuhei Yamamoto

<< QP/CAV DATA >>

No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<CAV>		<QP>	<CAV>	<QP>	<AV>	<QP>	<AV>		
		[dBuV]	[dBuV]		[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15142	31.30	22.30	9.78	41.08	32.08	79.00	66.00	37.92	33.92	N	
2	0.34853	44.00	38.00	9.81	53.81	47.81	79.00	66.00	25.19	18.19	N	
3	1.00575	33.30	28.30	9.90	43.20	38.20	73.00	60.00	29.80	21.80	N	
4	1.66398	31.40	26.60	9.95	41.35	36.55	73.00	60.00	31.65	23.45	N	
5	9.82052	20.10	14.70	10.53	30.63	25.23	73.00	60.00	42.37	34.77	N	
6	20.29190	10.90	4.40	10.97	21.87	15.37	73.00	60.00	51.13	44.63	N	
7	0.15304	32.30	24.10	9.85	42.15	33.95	79.00	66.00	36.85	32.05	L	
8	0.34755	44.60	38.70	9.87	54.47	48.57	79.00	66.00	24.53	17.43	L	
9	0.99850	34.00	29.00	9.96	43.96	38.96	73.00	60.00	29.04	21.04	L	
10	1.67034	32.00	27.20	10.01	42.01	37.21	73.00	60.00	30.99	22.79	L	
11	9.81933	20.20	14.60	10.56	30.76	25.16	73.00	60.00	42.24	34.84	L	
12	20.23880	11.50	4.50	11.16	22.66	15.66	73.00	60.00	50.34	44.34	L	

CHART:WITH FACTOR,Peak hold data. Except for the above table : adequate margin data below the limits.

CALCULATION:RESULT[dBuV]=READING[dBuV]+C.F(LOSS)[dB](LISN(or ISN or Probe)+CABLE+ATTEN(Except LS-11,12,13))

DATA OF CONDUCTED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Shielded Room
Date : 12/01/2021

Mode : 2. Adapter mode
Order No. : 13941501
Power : AC 120 V / 60 Hz
Temp. / Humi. : 20 deg.C / 32 % RH

Remarks : LS-11 LISN with Tap HP OFF(2021-11-15)

Limit : FCC Part 15 B CLASS A

Engineer : Hiromichi Nakai

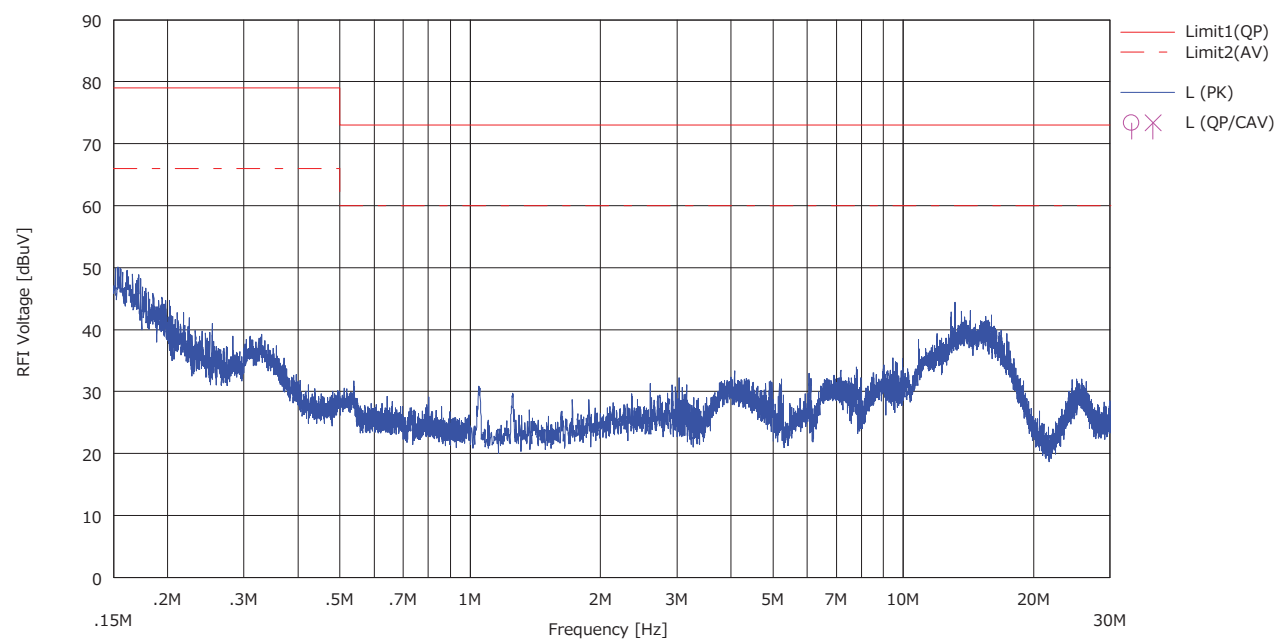
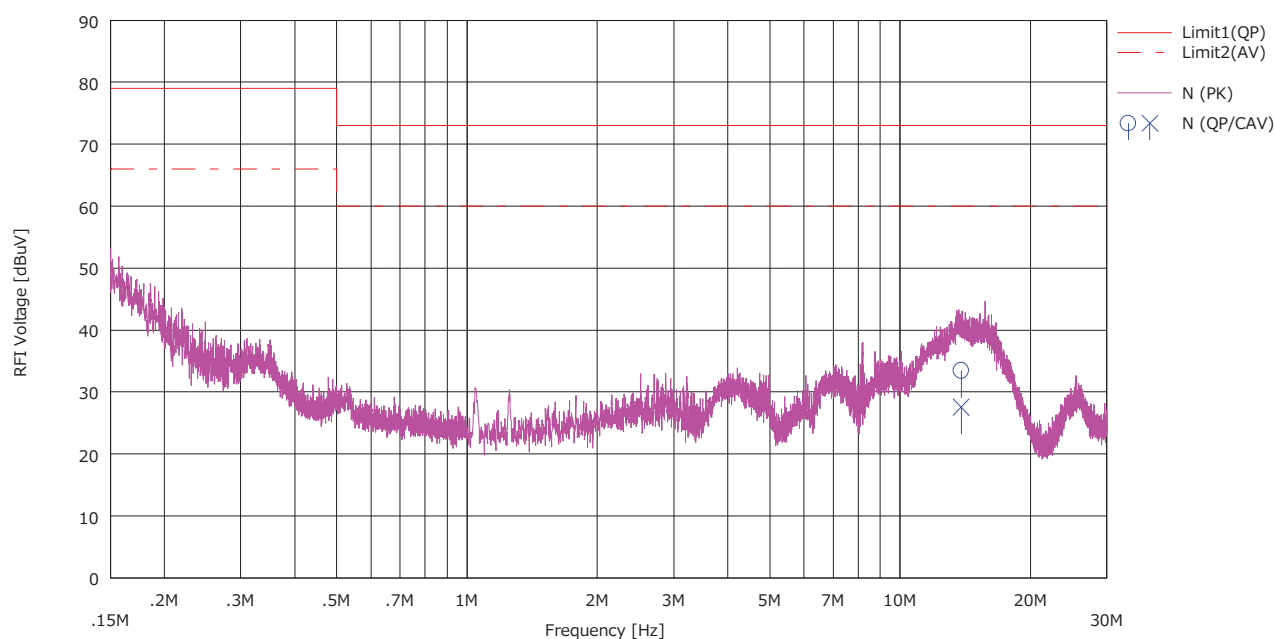


CHART:WITH FACTOR, Peak hold data. Except for the above table: adequate margin data below the limits.
CALCULATION:RESULT[dBuV]=READING[dBuV]+C.F(LOSS)[dB](LISN(or ISN or Probe)+CABLE+ATTEN(Except LS-11,12,13))

Date : 12/01/2021

Remarks : LS-11 LISN with Tap HP OFF(2021-11-15)

Limit : FCC Part 15 B CLASS A

Engineer : Hiromichi Nakai

No.	Freq.	Reading		USN	LOSS	Results		Limit		Margin		Phase	Comment
		⟨QP⟩	⟨CAV⟩			⟨QP⟩	⟨CAV⟩	⟨QP⟩	⟨A V⟩	⟨QP⟩	⟨A V⟩		
		[MHz]	[dBuV]			[dBuV]	[dB]	[dB]	[dBuV]	[dBuV]	[dBuV]		
1	13.84240	21.30	15.40	11.42	0.72	33.44	27.54	73.00	60.00	39.56	32.46	N	

CALCULATION: RESULT[dBuV]=READING[dBuV]+C.F(LOSS)[dB](LISN(or ISN or Probe)+CABLE+ATTEN(Except LS-11,12,13))

DATA OF CONDUCTED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Shielded Room
Date : 12/01/2021

Mode : 2. Adapter mode
Order No. : 13941501
Power : AC 240 V / 60 Hz
Temp. / Humi. : 20 deg.C / 32 % RH

Remarks : LS-11 LISN with Tap HP OFF(2021-11-15)

Limit : FCC Part 15 B CLASS A

Engineer : Hiromichi Nakai

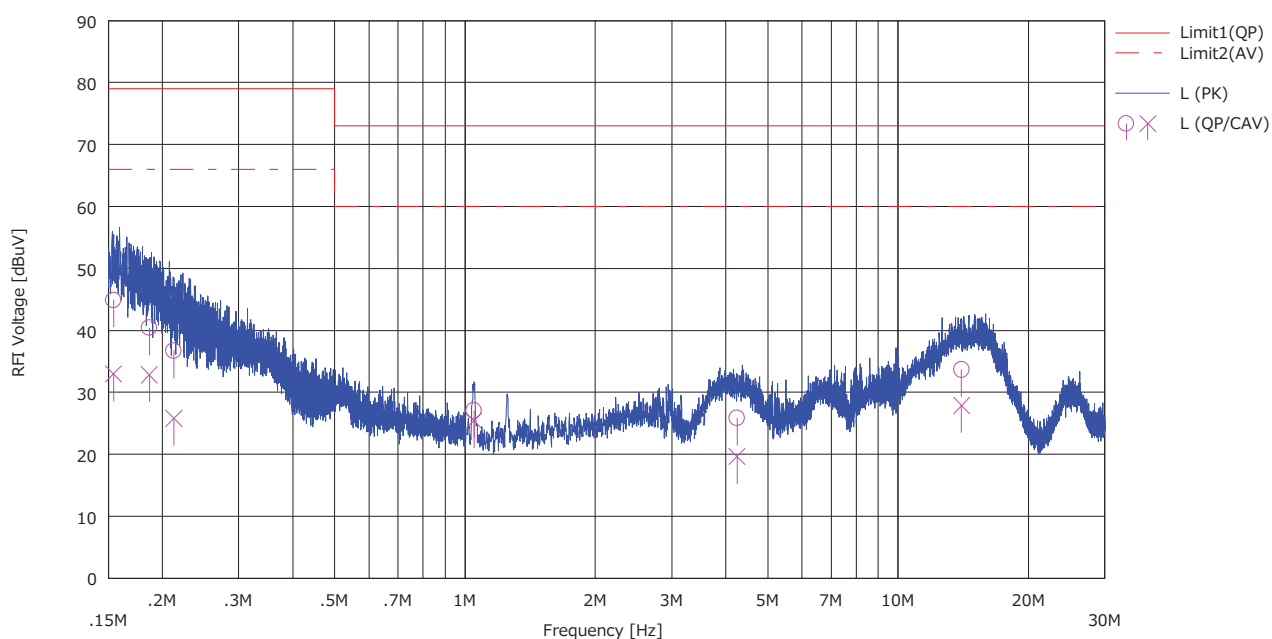
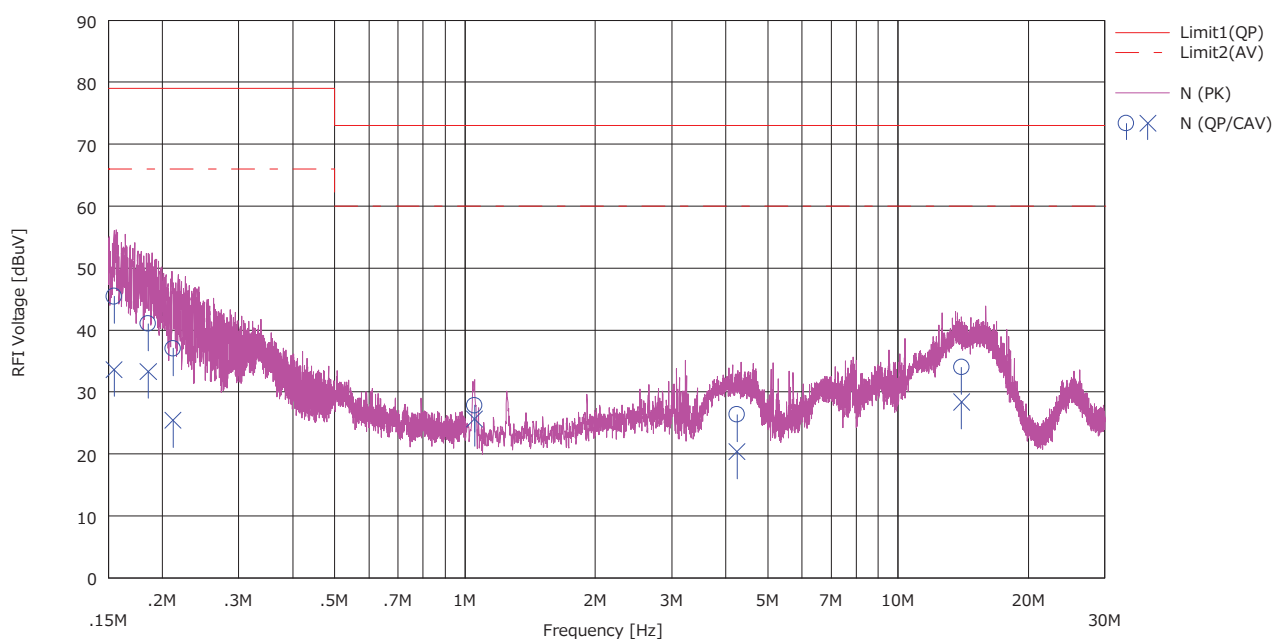


CHART:WITH FACTOR, Peak hold data. Except for the above table: adequate margin data below the limits.
CALCULATION:RESULT[dBuV]=READING[dBuV]+C.F(LOSS)[dB](LISN(or ISN or Probe)+CABLE+ATTEN(Except LS-11,12,13))

DATA OF CONDUCTED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Shielded Room
Date : 12/01/2021

Mode : 2. Adapter mode
Order No. : 13941501
Power : AC 240 V / 60 Hz
Temp. / Humi. : 20 deg.C / 32 % RH

Remarks : LS-11 LISN with Tap HP OFF(2021-11-15)

Limit : FCC Part 15 B CLASS A

Engineer : Hiromichi Nakai

<< QP/CAV DATA >>

No.	Freq. [MHz]	Reading		LISN [dB]	LOSS [dB]	Results		Limit		Margin		Phase	Comment
		<QP>	<CAV>			<QP>	<CAV>	<QP>	<AV>	<QP>	<AV>		
		[dBuV]	[dBuV]			[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15473	35.50	23.70	9.71	0.20	45.41	33.61	79.00	66.00	33.59	32.39	N	
2	0.18553	31.10	23.40	9.70	0.21	41.01	33.31	79.00	66.00	37.99	32.69	N	
3	0.21195	27.10	15.50	9.70	0.21	37.01	25.41	79.00	66.00	41.99	40.59	N	
4	1.05203	17.80	15.60	9.73	0.30	27.83	25.63	73.00	60.00	45.17	34.37	N	
5	4.24604	15.90	9.90	9.96	0.49	26.35	20.35	73.00	60.00	46.65	39.65	N	
6	14.01522	21.80	16.20	11.45	0.73	33.98	28.38	73.00	60.00	39.02	31.62	N	
7	0.15438	35.00	23.10	9.69	0.20	44.89	32.99	79.00	66.00	34.11	33.01	L	
8	0.18675	30.50	22.90	9.70	0.21	40.41	32.81	79.00	66.00	38.59	33.19	L	
9	0.21265	26.80	15.90	9.70	0.21	36.71	25.81	79.00	66.00	42.29	40.19	L	
10	1.04802	17.00	15.40	9.72	0.30	27.02	25.42	73.00	60.00	45.98	34.58	L	
11	4.24802	15.40	9.20	9.96	0.49	25.85	19.65	73.00	60.00	47.15	40.35	L	
12	14.01530	21.40	15.60	11.53	0.73	33.66	27.86	73.00	60.00	39.34	32.14	L	

CHART: WITH FACTOR, Peak hold data. Except for the above table: adequate margin data below the limits.
CALCULATION: RESULT[dBuV]=READING[dBuV]+C.F(LOSS)[dB](LISN(or ISN or Probe)+CABLE+ATTEN(Except LS-11,12,13))

DATA OF RADIATED DISTURBANCE TEST

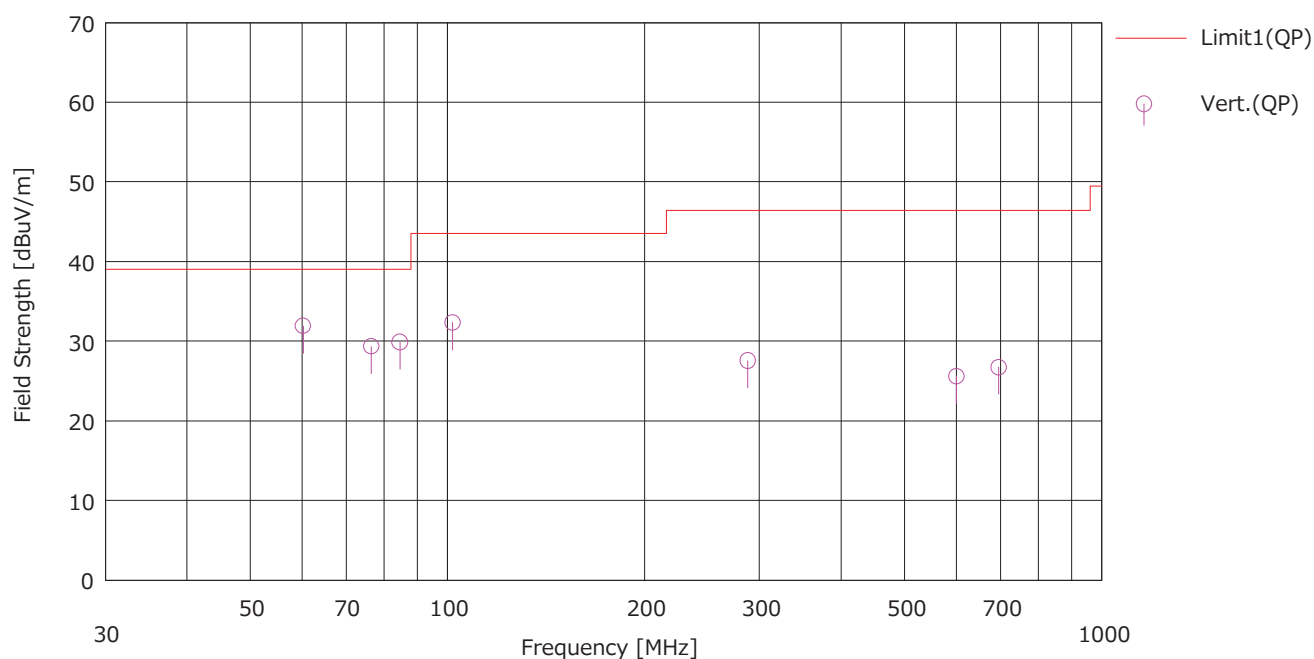
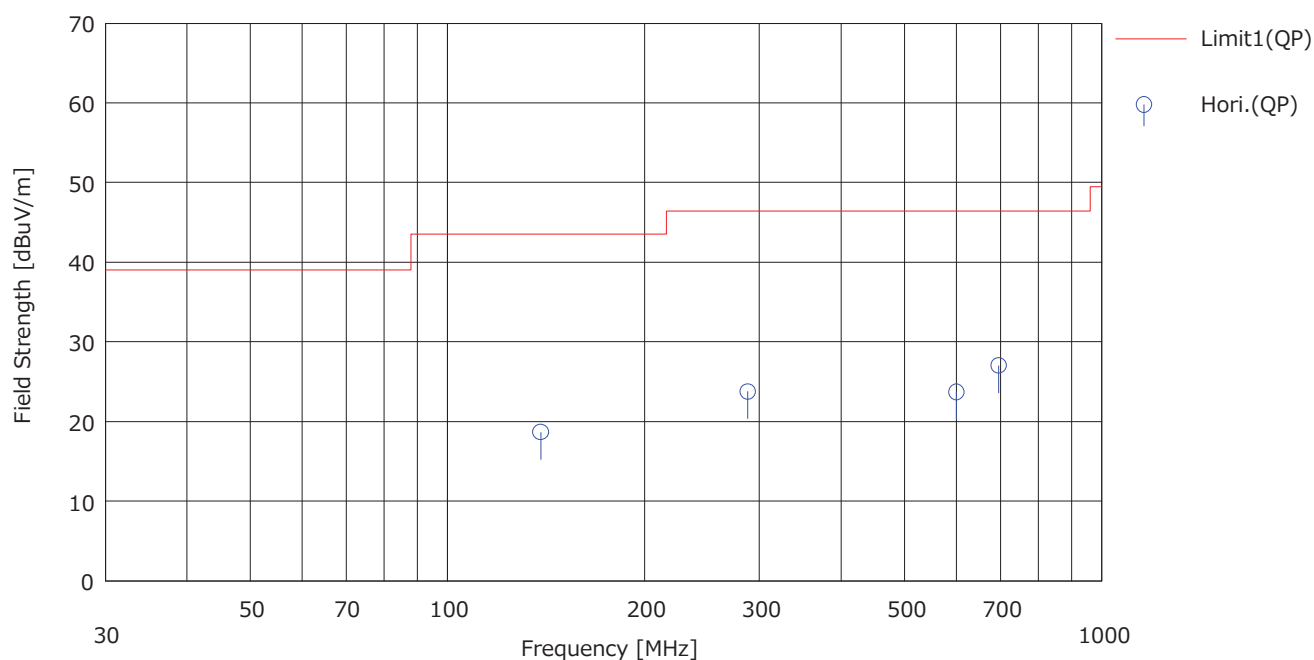
UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 09/07/2021

Mode : 1. PoE mode
Order No. : 13941501
Power : DC 48 V
Temp. / Humi. : 22 deg. C / 57 % RH

Remarks :

Limit : FCC Part 15B CLASS A (10m)

Engineer : Tatsuhisa Nakai



DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 09/07/2021

Mode : 1. PoE mode
Order No. : 13941501
Power : DC 48 V
Temp. / Humi. : 22 deg. C / 57 % RH

Remarks :

Limit : FCC Part 15B CLASS A (10m)

Engineer : Tatsuhisa Nakai

<< QP DATA >>

No.	Freq. [MHz]	Reading <QP>	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	S.Fac [dB]	Result <QP>	Limit <QP>	Margin <QP>	Pola [H/V]	Ant. Type	Comment
		[dBuV]					[dBuV/m]	[dBuV/m]	[dB]			
1	60.250	44.30	9.34	7.67	29.24	-0.17	31.90	39.00	7.10	Vert.	BA	
2	76.525	41.70	8.93	7.92	29.21	-0.01	29.33	39.00	9.67	Vert.	BA	
3	84.660	41.90	8.97	8.04	29.20	0.16	29.87	39.00	9.13	Vert.	BA	
4	101.875	43.30	9.78	8.29	29.18	0.14	32.33	43.50	11.17	Vert.	BA	
5	138.950	27.50	11.67	8.71	29.16	-0.08	18.64	43.50	24.86	Hori.	BA	
6	288.000	35.70	13.71	7.34	29.20	0.00	27.55	46.40	18.85	Vert.	LA	
7	288.050	31.90	13.71	7.34	29.20	0.00	23.75	46.40	22.65	Hori.	LA	
8	600.000	26.00	19.37	9.73	29.53	0.00	25.57	46.40	20.83	Vert.	LA	
9	600.000	24.10	19.37	9.73	29.53	0.00	23.67	46.40	22.73	Hori.	LA	
10	696.000	26.00	19.99	10.31	29.59	0.00	26.71	46.40	19.69	Vert.	LA	
11	696.000	26.30	19.99	10.31	29.59	0.00	27.01	46.40	19.39	Hori.	LA	

DATA OF RADIATED DISTURBANCE TEST

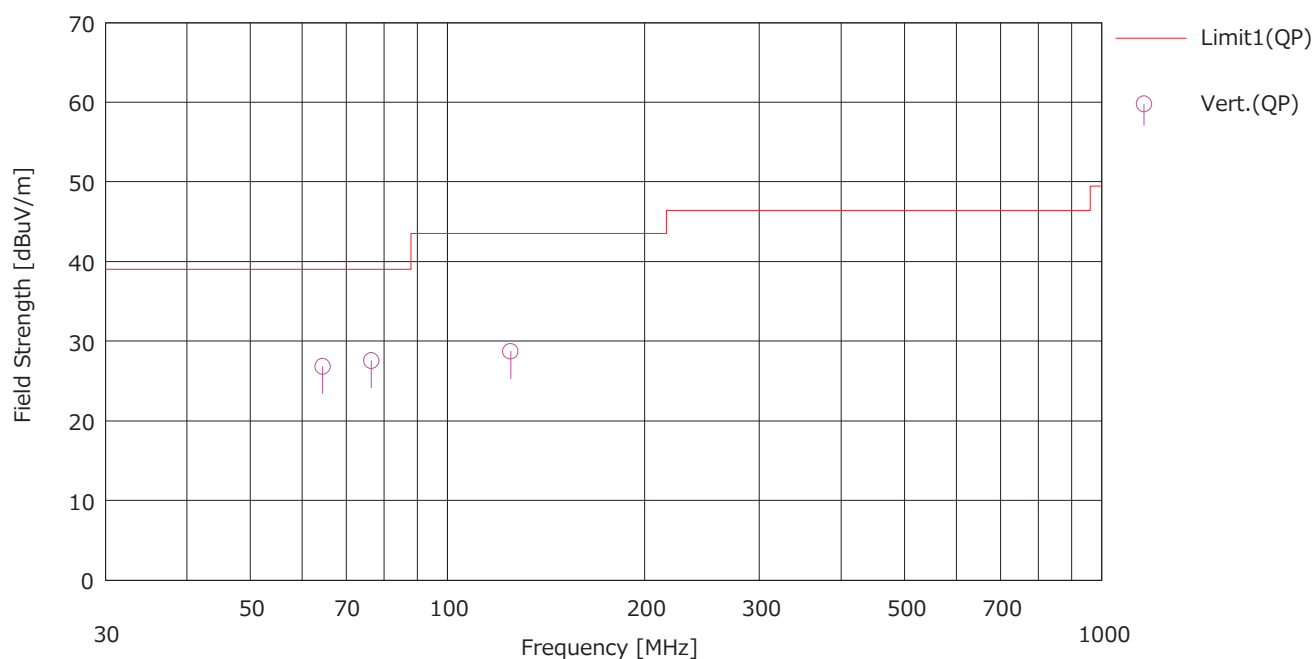
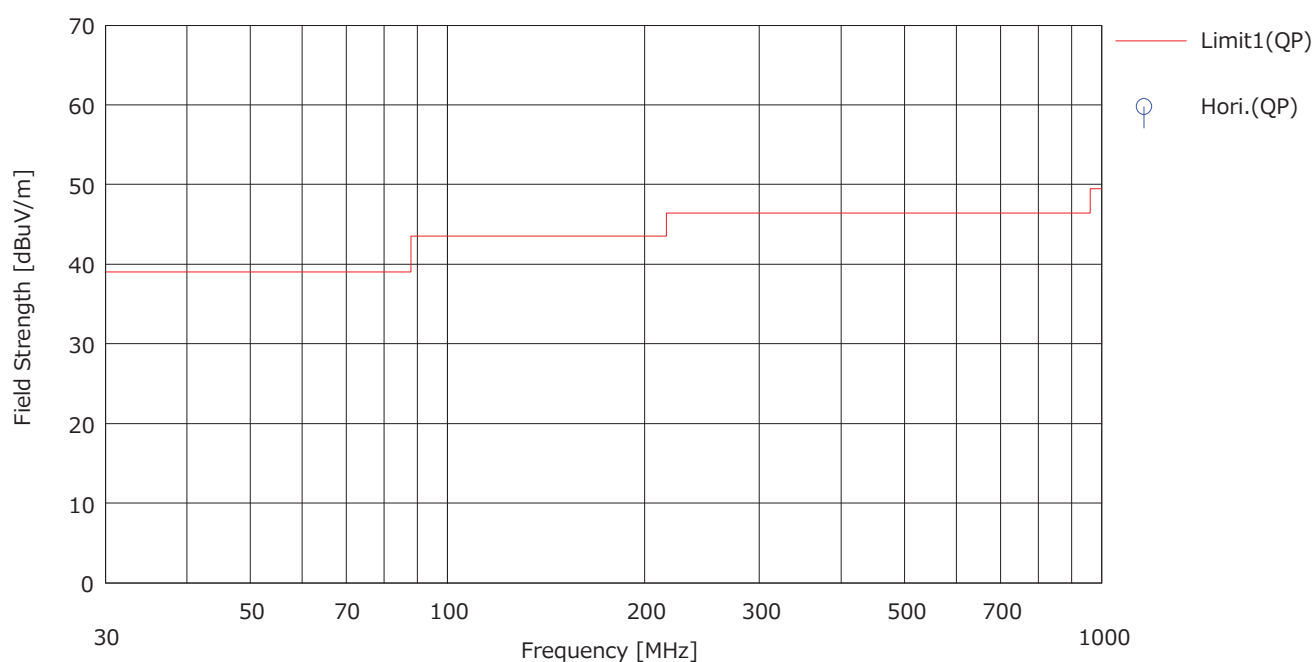
UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 09/07/2021

Mode : 2. AC Adapter mode
Order No. : 13941501
Power : DC 24 V
Temp. / Humi. : 22 deg. C / 57 % RH

Remarks :

Limit : FCC Part 15B CLASS A (10m)

Engineer : Tatsuhisa Nakai



Date : 09/07/2021

Remarks :

Limit : FCC Part 15B CLASS A (10m)

Engineer : Tatsuhiro Nakai

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz:-HORN
CALCULATION:RESULT = READING+ANT.Fac.+LOSS(CABLE+ATTEN(Below 1GHz only)) - GAIN(AMP)+S.Fac(ANSI C63.5 ΔAF)

DATA OF RADIATED DISTURBANCE TEST

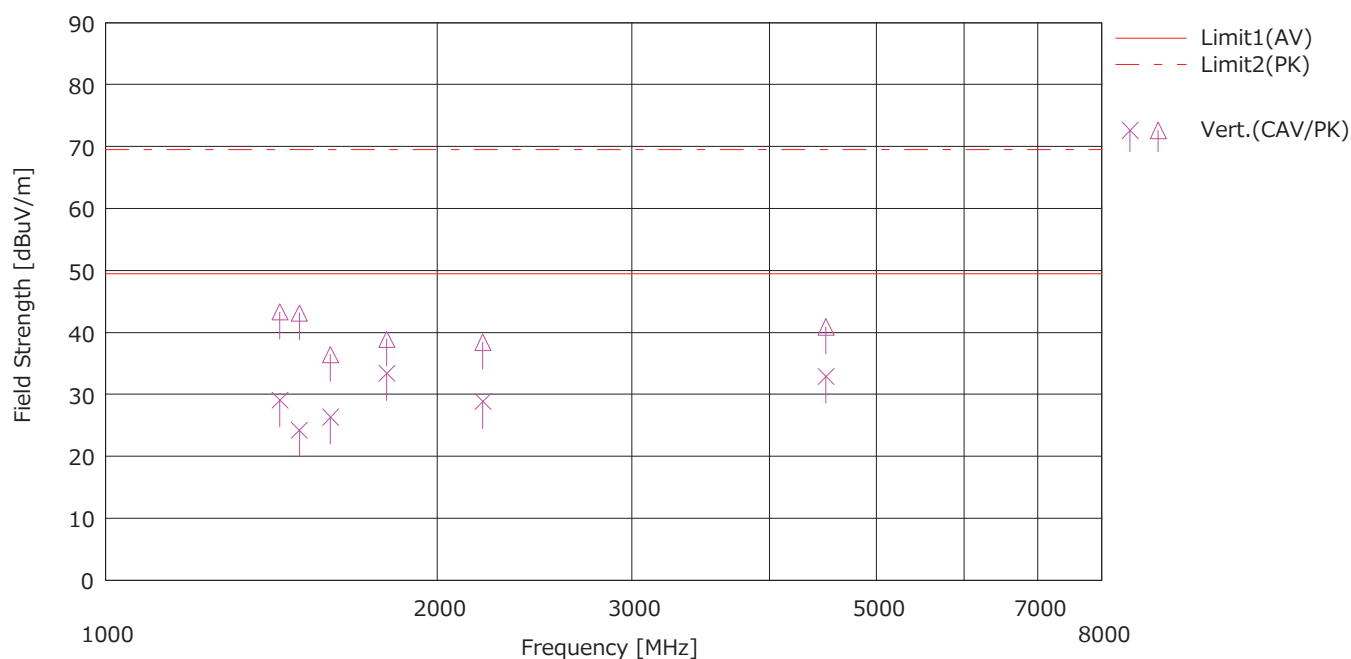
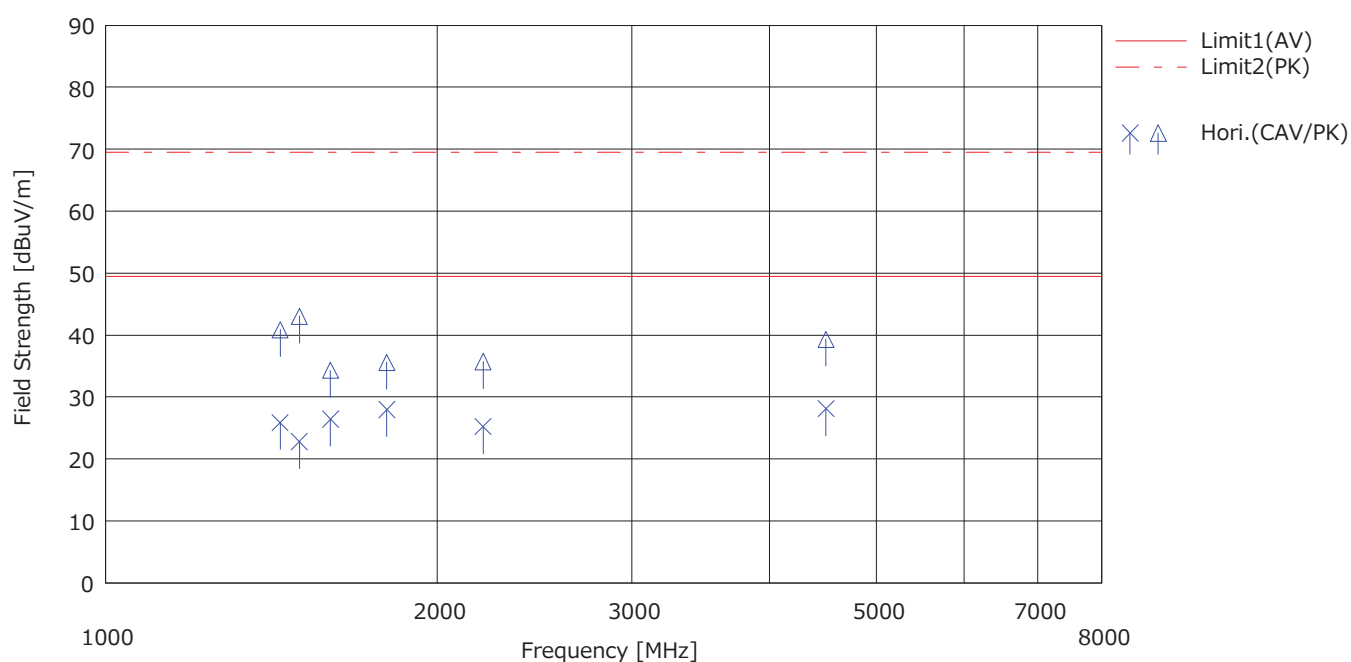
UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 09/07/2021

Mode : 1. PoE mode
Order No. : 13941501
Power : DC 48 V
Temp. / Humi. : 24 deg. C / 48 % RH

Remarks :

Limit : FCC Part 15B CLASS A (GHz, 10m)

Engineer : Tatsuhisa Nakai



DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 09/07/2021

Mode : 1. PoE mode
Order No. : 13941501
Power : DC 48 V
Temp. / Humi. : 24 deg. C / 48 % RH

Remarks :

Limit : FCC Part 15B CLASS A (GHz, 10m)

Engineer : Tatsuhisa Nakai

<< CAV/PK DATA >>

No.	Freq. [MHz]	Reading		Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	S.Fac [dB]	Result		Limit		Margin		Pola. [H/V]	Ant. Type	Comment
		<CAV>	<PK>					<CAV>	<PK>	<AV>	<PK>	<AV>	<PK>			
		[dBuV]	[dBuV]					[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]			
1	1439.980	48.30	62.50	24.81	3.41	39.82	-7.63	29.07	43.27	49.50	69.50	20.43	26.23	Vert.	HA	
2	1440.100	45.10	60.10	24.81	3.41	39.82	-7.63	25.87	40.87	49.50	69.50	23.63	28.63	Hori.	HA	
3	1499.970	41.80	62.00	24.89	3.48	39.73	-7.63	22.81	43.01	49.50	69.50	26.69	26.49	Hori.	HA	
4	1500.100	43.20	62.10	24.89	3.49	39.73	-7.63	24.22	43.12	49.50	69.50	25.28	26.38	Vert.	HA	
5	1600.000	45.20	53.10	24.81	3.61	39.58	-7.63	26.41	34.31	49.50	69.50	23.09	35.19	Hori.	HA	
6	1600.000	45.10	55.20	24.81	3.61	39.58	-7.63	26.31	36.41	49.50	69.50	23.19	33.09	Vert.	HA	
7	1799.950	51.20	56.70	25.25	3.85	39.29	-7.63	33.38	38.88	49.50	69.50	16.12	30.62	Vert.	HA	
8	1800.000	45.80	53.40	25.25	3.85	39.29	-7.63	27.98	35.58	49.50	69.50	21.52	33.92	Hori.	HA	
9	2199.750	43.10	52.70	28.09	4.31	39.07	-7.63	28.80	38.40	49.50	69.50	20.70	31.10	Vert.	HA	
10	2199.950	39.50	50.00	28.09	4.31	39.07	-7.63	25.20	35.70	49.50	69.50	24.30	33.80	Hori.	HA	
11	4499.870	42.90	50.90	30.43	6.30	39.11	-7.63	32.89	40.89	49.50	69.50	16.61	28.61	Vert.	HA	
12	4499.880	38.10	49.30	30.43	6.30	39.11	-7.63	28.09	39.29	49.50	69.50	21.41	30.21	Hori.	HA	

DATA OF RADIATED DISTURBANCE TEST

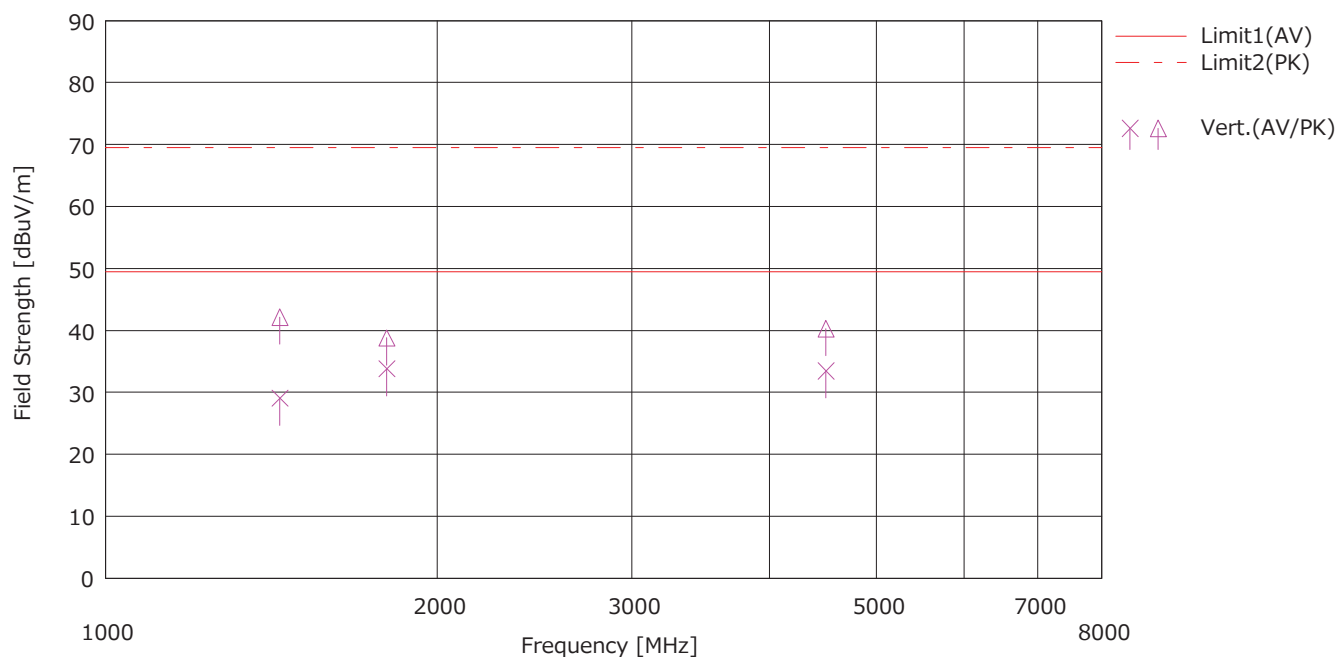
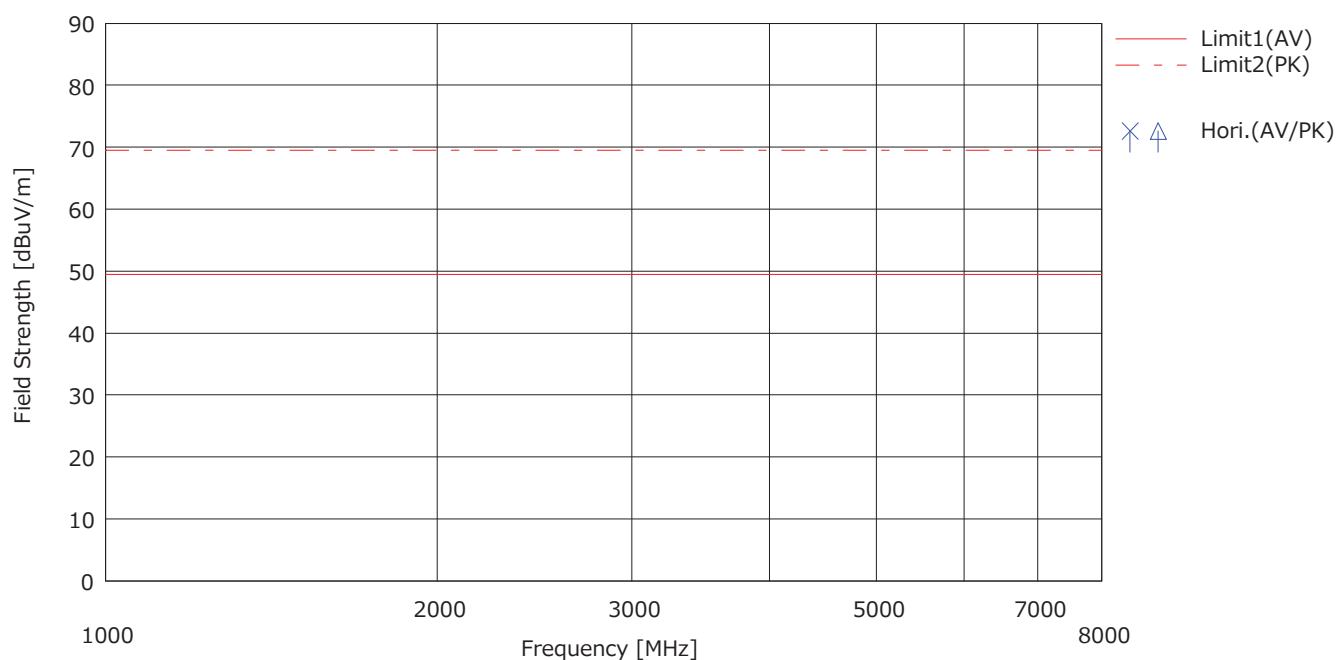
UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 12/01/2021

Mode : 2. AC Adapter mode
Order No. : 13941501
Power : DC 24 V
Temp. / Humi. : 21 deg. C / 48 % RH

Remarks :

Limit : FCC Part 15B CLASS A (GHz, 10m)

Engineer : Hiromichi Nakai



DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 12/01/2021

Mode : 2. AC Adapter mode
Order No. : 13941501
Power : DC 24 V
Temp. / Humi. : 21 deg. C / 48 % RH

Remarks :

Limit : FCC Part 15B CLASS A (GHz, 10m)

Engineer : Hiromichi Nakai

<< AV/PK DATA >>

No.	Freq. [MHz]	Reading		Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	S.Fac [dB]	Result		Limit		Margin		Pda. [H/V]	Ant. Type	Comment
		(AV)	(PK)					(AV)	(PK)	(AV)	(PK)	(AV)	(PK)			
		[dBuV]	[dBuV]					[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]			
1	1440.001	47.90	61.00	24.81	3.50	39.56	-7.63	29.02	42.12	49.50	69.50	20.48	27.38	Vert.	HA	
2	1799.956	51.10	56.10	25.25	3.96	38.91	-7.63	33.77	38.77	49.50	69.50	15.73	30.73	Vert.	HA	
3	4500.000	42.30	49.10	30.43	6.52	38.17	-7.63	33.45	40.25	49.50	69.50	16.05	29.25	Vert.	HA	

APPENDIX 3

Test Instruments

***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

CE : Conducted disturbance

RE : Radiated disturbance

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
CE	CC-2S	146874	Yokowa No.2 shield coaxial(0.01MHz-1000MHz)	UL Japan	CC-25,CC-27,CC-28,CC-29,SW-21,SW-22	YS0201	2021/06/02	12
CE	OS-34	178908	Thermo-Hygrometer	Baumer	CTH-201	A30C5	2021/04/09	12
CE	LS-12	146973	LISN (AMN)	Rohde & Schwarz	ENV216	101055	2021/10/21	12
CE	TA-07	146746	Terminator	TME	CT-01	-	2021/03/03	12
CE	TA-08	146747	Terminator	TME	CT-01	-	2021/02/01	12
RE	YCC-C01	199203	Microwave Cable	Huber+Suhner	Sucoflex 126EA	802271/126EA	2021/05/18	12
CE RE	TR-12	146893	EMI Test Receiver	Rohde & Schwarz	ESU 26	100413	2021/09/10	12
CE	DM-01	146647	Tester	SANWA	PC500	7019221	2021/06/02	12
CE	YJM-22	199754	Measure	Shinwa Sokutei	80814	-	-	-
CE	CC-1S	146804	Yokowa No.1 shield coaxial(0.009MHz-1000MHz)	UL Japan	CC-14,CC-15,CC-16,CC-18,CC-19,SW-11,SW-12	YS0101	2021/07/05	12
CE	OS-29	146734	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	510Q05R-1	2021/03/22	12
CE	LS-11	146972	LISN (AMN)	Rohde & Schwarz	ENV216	101054	2021/11/15	12
RE	YAJ-01	147319	Antenna Tilt Jig	Intelligent System Engineering Co., Ltd	Antenna Tilt Jig	T-0004	-	-
RE	SC-02	147517	Search Coil	UL Japan	-	-	-	-
RE	OS-36	197155	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	510Q05R-6	2021/03/22	12

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	AF-03	146611	Pre Amplifier	Anritsu Corporation	MH648A	M97457	2021/07/08	12
RE	AT-02	146625	Attenuator	Anritsu Corporation	MP721A	6200239014	2021/07/07	12
RE	AT-40	146572	Attenuator	Anritsu Corporation	MP721B	6201150481	2021/07/07	12
RE	CC-2ORC	146806	Yokowa No.2 open coaxial(0.1-1000MHz)	UL Japan	CC-21,CC-22,CC-24,CC-25,CC-27,SW-21,SW-22	YO0201	2021/09/09	12
RE	YOATS-02(NSA)	146944	Open area test site	JSE	3m、10m	2	2021/09/22	12
RE	BA-14	159920	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHBB 9124 + BBA 9106	9124-1022	2021/03/15	12
RE	LA-15	146964	Logperiodic Antenna	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	185	2021/03/15	12
RE	AF-06	146601	Pre Amplifier	Keysight Technologies Inc	HP8449B	3008A01672	2020/11/16	12
RE	HA-07	146712	Broad-Band Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA 9120 D	9120D-684	2021/05/14	12
RE	YOATS-02(SVSWR)	146820	Open area test site	JSE	3m,10m	2	2021/02/04	12
RE	CC-C15	178392	Microwave Cable	Junkosha INC.	JUNFLON MWX315	1511-023	2021/03/13	12
RE	YCC-C02	199204	Microwave Cable	Huber+Suhner	Sucoflex 126EA	802274/126EA	2021/05/18	12
CE RE	COTS-YW-EMI-TSJ	146923	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
CE RE	RT-62	146757	EMI Test Receiver	Rohde & Schwarz	ESW26	101277	2021/07/21	12
CE RE	DM-02	146648	Tester	SANWA	PC500	7019227	2021/06/02	12

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
CE RE	YJM-21	176229	Measure	Shinwa Sokutei	80814	-	-	-
CE RE	BM-1A01	146833	Barometer	Sunoh	SBR121	002347	2021/09/09	36

End of Report