EMC TEST REPORT

Test report No.: 12777555S-B

Applicant	:	**LEA Professional**
Type of Equipment	:	**Pro audio amplifier**
Model No.	:	**704D**
Test standard	:	**EN 55103-2: 2009**
Test Result	:	**Complied (Refer to Section 3.2)**

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 standard.
4. The test results in this test report are traceable to the national or international standards.
5. This test report covers EMC technical requirements.
   It does not cover administrative issues such as Manual or non-EMC test related Requirements. (if applicable)
6. The all test items in this test report are conducted by UL Japan, Inc. Shonan EMC Lab.
7. The information provided from the customer for this report is identified in Section 1.

Date of test: February 5 to July 15, 2020

Representative test engineer:

Masahide Ozaki
Engineer
Consumer Technology Division

Approved by :

Hikaru Shirasawa
Engineer
Consumer Technology Division

UL Japan, Inc.
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
Telephone: +81 463 50 6400
Facsimile: +81 463 50 6401

REVISION HISTORY

Original Test Report No.: 12777555S-B

Revision	Test report No.	Date	Page revised	Contents
-(Original)	12777555S-B	August 26, 2020	-	-

Reference: Abbreviations (Including words undescribed in this report)

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

CONTENTS **PAGE**

SECTION 1: Customer information

Company Name	:	LEA Professional
Address	:	635 S Lafayette Blvd Building 113 Suite 109, South Bend IN 46601, USA
Telephone Number	:	+1-574-286-1519
Contact Person	:	Jeremy Bules
Company Name	:	LEA Professional

The information provided from the customer is as follows;
- Applicant, Type of Equipment, Model No. 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 (E.U.T.)
- SECTION 4: Operation of E.U.T. 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 (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	:	Pro audio amplifier
Model No.	:	704D
Serial No.	:	Refer to SECTION 4, SECTION 4.2
Rating	:	AC 100 V – 240 V, 50/60 Hz
Receipt Date of Sample	:	January 31, 2020 (S/N: 296190140)
(Information from test lab.)		April 23, 2020 (S/N: 326190012)
Country of Mass-production	:	Costa Rica
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab.

2.2 Product description

Model: 704D (referred to as the EUT in this report) are Pro audio amplifier.

Similar models to the EUT: 702, 702D, 704, 352, 352D, 354, 354D
* D = DANTE ports added
* The third digit references either 2 = two channel, 4 = four channel

General Specification

Clock frequency(ies) in the system : 400 MHz

Radio Specification

WLAN

Radio Type	:	Transceiver
Frequency of Operation	:	2412 MHz - 2472 MHz
Modulation	:	DSSS, OFDM
Antenna type	:	External
Antenna Gain	:	2 dBi
Operating Temperature	:	0 deg. C to +60 deg. C

SECTION 3: Test specification, procedures and results

3.1 Test specification

EMS

Title	:	EN 55103-2: 2009 Electromagnetic compatibility - Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use Part 2. Immunity Environment: E1 – E3
Purpose of test	:	Compliance with the harmonized RE directive 2014/53/EU.

3.2 Procedures and results

EMS (Applied Environment: E1 – E3)

Requirement	Test Procedure *1)	Specification (Environments: E1 - E3)	Criterion	Actual Performance (Environments: E1 – E3)	Result
Radio Frequency electromagnetic field **(Enclosure port)**	EN 61000-4-3:2006 +A1:2008+A2:2010	80 MHz - 1 GHz, AM-1 kHz, 80 %, 3 V/m 1.4 GHz - 2.0 GHz, AM-1 kHz, 80 %, 3 V/m 2.0 GHz - 2.7 GHz, AM-1 kHz, 80 %, 1 V/m	A	80 MHz - 1 GHz, AM-1 kHz, 80 %, 3 V/m 1.4 GHz - 2.7 GHz, AM-1 kHz, 80 %, 3 V/m	Complied a)
Electrostatic discharge **(Enclosure port)**	EN 61000-4-2:2009	Contact discharge: ±4 kV Air discharge: ±8 kV	B	Contact discharge: ±4 kV Air discharge: ±2 kV, ±4 kV ±8 kV	Complied b)
Magnetic field **(Enclosure port)**	EN 55103-2:2009 (Annex A)	**3a Not Intended for rack mounting** Frequency range: 50 Hz - 10 kHz 1 A/m - 0.01 A/m for 50 Hz - 5 kHz 3 A/m – 0.03 A/m for 5 kHz - 10 kHz **3b Intended for rack mounting** Frequency range: 50 Hz - 10 kHz 4 A/m - 0.4 A/m for 50 Hz - 500 Hz 0.4 A/m for 500 Hz - 10 kHz	A	**3b Intended for rack mounting** Frequency range: 50 Hz - 10 kHz 4 A/m - 0.4 A/m for 50 Hz - 500 Hz 0.4 A/m for 500 Hz - 10 kHz	Complied c)
Fast transients, common mode **(AC power port)**	EN 61000-4-4:2012	±1.0 kV (5/50 ns, 5 kHz)	B	±1.0 kV (5/50 ns, 5 kHz)	Complied d)
(DC power port)		±0.5 kV (5/50 ns, 5 kHz)		N/A *2)	N/A
(Signal port)		±0.5 kV (5/50 ns, 5 kHz) * For the cable exceeded 3 m in length.		±0.5 kV (5/50 ns, 5 kHz)	Complied d)
(Functional earth port)		±0.5 kV (5/50 ns, 5 kHz)		±0.5 kV (5/50 ns, 5 kHz)	Complied d)
Radio Frequency common mode **(AC power port)**	EN 61000-4-6:2009	0.15 MHz - 80 MHz, AM-1 kHz, 80 % 3 V	A	0.15 MHz - 80 MHz, AM-1 kHz, 80 % 3 V	Complied e)
(DC power port)				N/A *2)	N/A
(Signal port)				0.15 MHz - 80 MHz, AM-1 kHz, 80 % 3 V	Complied e)
(Functional earth port)				0.15 MHz - 80 MHz, AM-1 kHz, 80 % 3 V	Complied e)
Voltage dips **(AC power port)**	EN 61000-4-11:2004	30 % reduction/0.5 period 60 % reduction/5 period	B C	30 % reduction/0.5 period 60 % reduction/5 period	Complied f)
Voltage interruptions **(AC power port)**	EN 61000-4-11:2004	>95 % reduction/5 s	C	30 % reduction/0.5 period 60 % reduction/5 period	Complied f)
Surges **(AC power port)**	EN 61000-4-5:2006	±1 kV (line-earth) ±1 kV (line-line) Five +ve Pulses Line 1 to earth at 90 deg. Five -ve Pulses Line 1 to earth at 270 deg. Five +ve Pulses Line 2 to earth at 270 deg. Five -ve Pulses Line 2 to earth at 90 deg. Five +ve pulses line 1 to line 2 at 90° phase Five -ve pulses line 1 to line 2 at 270° phase	B	±1 kV (line-earth) ±1 kV (line-line) Five +ve Pulses Line 1 to earth at 90 deg. Five -ve Pulses Line 1 to earth at 270 deg. Five +ve Pulses Line 2 to earth at 270 deg. Five -ve Pulses Line 2 to earth at 90 deg. Five +ve pulses line 1 to line 2 at 90° phase Five -ve pulses line 1 to line 2 at 270° phase	Complied f)
Audio frequency common mode **(Signal port)**	EN 55103-2:2009 (Annex B)	EN 55103-2:2009 (Annex B) * For the cable exceeded 10 m in length.	A	N/A *3)	N/A

Note: UL Japan's Work Procedures No.13-EM-W0417
*1) Refer to 3.3.
*2) The test is not applicable since the EUT does not have DC mains.
*3) The test is not applicable since the EUT does not have balanced audio input ports.

a) Refer to Appendix 2 (data of Radio frequency electromagnetic field)
b) Refer to Appendix 2 (data of Electrostatic discharge)
c) Refer to Appendix 2 (data of Power frequency magnetic field)
d) Refer to Appendix 2 (data of Electrical fast transient/burst)
e) Refer to Appendix 2 (data of Conducted disturbances, induced by radio frequency fields)
f) Refer to Appendix 2 (data of Voltage dips & Short interruptions)

3.3 Addition, deviation, exclusion to standards

Test Item	Normative reference (EN 55103-2: 2009)	Applied Test Procedure
Electrostatic discharge	EN 61000-4-2:1995 +A1:1998+A2:2001	EN 61000-4-2:2009
Radio-frequency electromagnetic field	EN 61000-4-3:2006 +A1:2008	EN 61000-4-3:2006 +A1:2008+A1:2010
Fast transients common mode	EN 61000-4-4:2004	EN 61000-4-4:2012
Radio Frequency common mode	EN 61000-4-6:2007	EN 61000-4-6:2009

Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Confirmation

UL Japan, Inc. hereby confirms that E.U.T., in the configuration tested, complies with the specifications EN 55103-2: 2009.

3.5 Performance criteria

3.5.1 EN 55103-2

A	The apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.
B	The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is, however, allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.
C	Temporary loss of function is allowed, provided that normal function is automatically restored when the test stimulus is removed, or can be restored by operation of the controls.

3.6 Uncertainty

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

EMS
These tests are qualitative tests and uncertainties do not apply directly to the results.
The uncertainty of the EMS testing of the laboratory is within the tolerance specified by the each standard.

3.7 Test Location

UL Japan, Inc. Shonan EMC Lab.
1-22-3 Megumigaoka Hiratsuka-shi Kanagawa-ken 259-1220 JAPAN
Telephone number : +81 463 50 6400
Facsimile number : +81 463 50 6401

Test room	Width*Depth*Height (m)	Test room	Width*Depth*Height (m)
No.1 Semi-Anechoic Chamber	20.6*11.3*7.65 Maximum measurement distance: 10 m	No.1 Shielded Room	6.8*4.1*2.7
No.2 Semi-Anechoic Chamber	20.6*11.3*7.65 Maximum measurement distance: 10 m	No.2 Shielded Room	6.8*4.1*2.7
No.3 Semi-Anechoic Chamber	12.7*7.7*5.35 Maximum measurement distance: 5 m	No.3 Shielded Room	6.3*4.7*2.7
No.4 Semi-Anechoic Chamber	8.1*5.1*3.55	No.4 Shielded Room	4.4*4.7*2.7
		No.5 Shielded Room	7.8*6.4*2.7
		No.6 Shielded Room	7.8*6.4*2.7
		No.8 Shielded Room	3.45 * 5.5 * 2.4

3.8 Test setup, data of EMI / EMS test and test instruments

Refer to Appendix 1 to 3.

SECTION 4: Operation of E.U.T. during testing

4.1 Operating mode

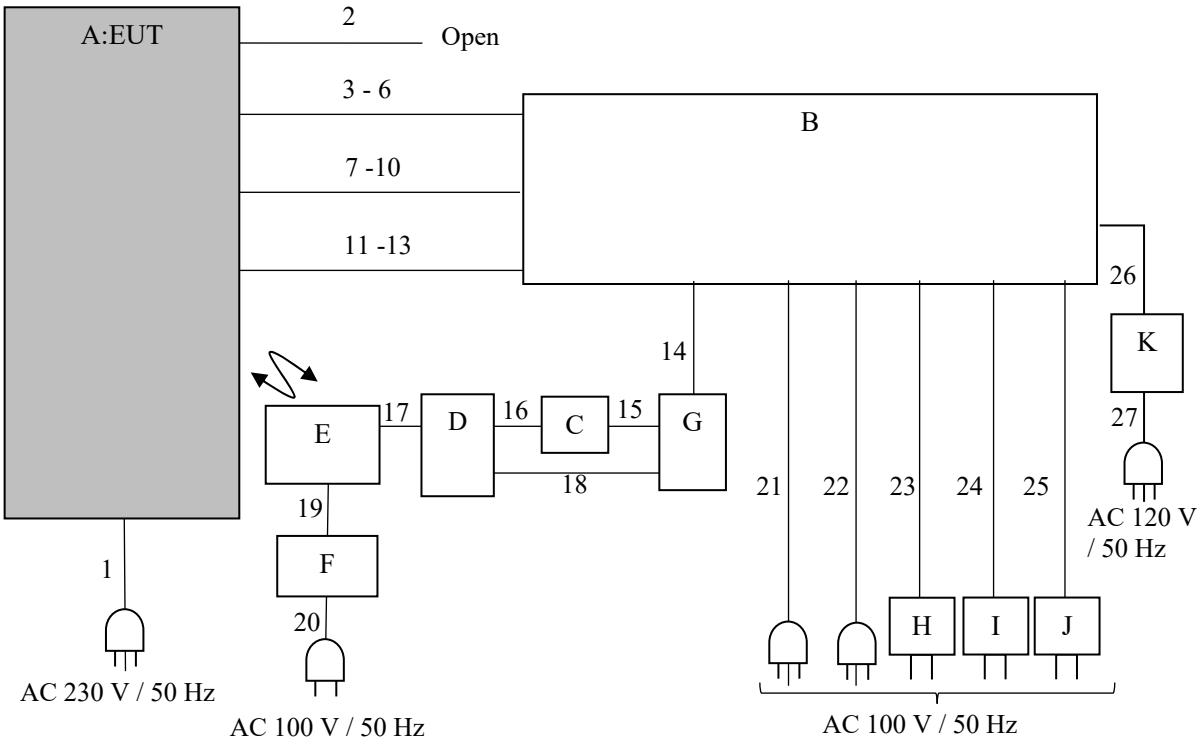
The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

Test sequence is used: Ethernet connection and DANTE audio enabled
WiFi connection and DANTE audio enabled

Software: Firmware Version 1.0.0.4
Firmware Version 1.1.1.1 *1) Used for Surge and Voltage dips & Short interruptions test.

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

4.2 Configuration and peripherals



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Pro audio amplifier	704D	296190140 326190012 *1)	LEA Professional	EUT
B	AE Box	-	-	-	-
C	USB LAN Adaptor	USB31000S	190614013037	StartTechcom	-
D	USB Hub	-	-	SABRENT	-
E	Laptop Computer	P82G	8LGT6Y2	Dell	-
F	AC Adaptor	HA45NM180	CN-01J12J-CH200-96S-06W6-A01	Dell	-
G	Mini Smart Router	GL-MT300N-V2	89fd8deec9c16999	GL.iNet	-
H	AC Adaptor	ZDA240100US	-	Radio Design Labs	-
I	AC Adaptor	SMI36-12	-	CUI INC	-
J	AC Adaptor	SMI36-12	-	CUI INC	-
K	Function / Arbitrary Waveform Generator	33120A	MY40003557	Agilent Technologies	-

List of cables used

No.	Cable	Length (m)	Shield-Cable	Shield-Connector	Remarks
1	AC	1.7	Unshielded	Unshielded	-
2	I/O	12.7	Shielded	Shielded	-
3	CH1	15.2 1.6 *1)	Unshielded	Unshielded	-
4	CH2	15.2 1.6 *1)	Unshielded	Unshielded	-
5	CH3	15.2 1.6 *1)	Unshielded	Unshielded	-
6	CH4	15.2 1.6 *1)	Unshielded	Unshielded	-
7	IN1	15.2 1.5 *1)	Shielded	Shielded	-
8	IN2	15.2 1.5 *1)	Shielded	Shielded	-
9	IN3	15.2 1.5 *1)	Shielded	Shielded	-
10	IN4	15.2 1.5 *1)	Shielded	Shielded	-
11	LAN	15.2 1.5 *1)	Unshielded	Unshielded	-
12	LAN(Primary)	15.2 1.5 *1)	Unshielded	Unshielded	-
13	LAN(Secondary)	15.2 1.5 *1)	Unshielded	Unshielded	-
14	LAN	15.2	Unshielded	Unshielded	-
15	LAN	0.3	Shielded	Shielded	-
16	USB	0.1	Shielded	Shielded	-
17	USB	0.4	Shielded	Shielded	-
18	USB	0.7	Shielded	Shielded	-
19	DC	1.7	Unshielded	Unshielded	-
20	AC	0.8	Unshielded	Unshielded	-
21	AC	1.1	Unshielded	Unshielded	-
22	AC	1.1	Unshielded	Unshielded	-
23	DC	1.1	Unshielded	Unshielded	-
24	DC	1.2	Unshielded	Unshielded	-
25	DC	1.2	Unshielded	Unshielded	-
26	BNC	0.7	Shielded	Shielded	-
27	AC	1.8	Unshielded	Unshielded	-

*1) Used for Surge and Voltage dips & Short interruptions test.

SECTION 5: Radio-frequency electromagnetic field

5.1 Operating environment

Test place	:	See test data
Temperature and humidity	:	See test data
Atmosphere	:	See test data

5.2 Test configuration

The EUT was placed on a non-metallic table height of 0.8 m with the mains cable placed horizontally.
Photographs of the set up are shown in Appendix1.

5.3 Test condition

Frequency range	:	80 MHz - 1000 MHz, 1400 MHz - 2700 MHz
Test level	:	3 V/m
Modulation	:	80 % AM (1 kHz)
Performance criterion	:	A
Frequency step size	:	1 %
Dwell time	:	2 sec.
Field orientation	:	Horizontal and Vertical
Antenna	:	Logperiodic antenna (80 MHz - 1000 MHz) Horn antenna (1400 MHz - 2700 MHz)
Antenna distance	:	2.5 m (80 MHz - 1000 MHz) 3 m (1400 MHz - 2700 MHz)
Antenna height	:	1.55 m
EUT position	:	Table top

5.4 Generation of the electromagnetic field

The electromagnetic field is generated from a signal generator controlled by a computer.
The output power is amplified and then radiated from logperiodic or horn antenna.
At every test frequency the field strength is checked prior to the actual test by placing the field sensor at the same distance from and in the same relative location to, the field generating antenna, as will be used by the EUT.

5.5 Test procedure

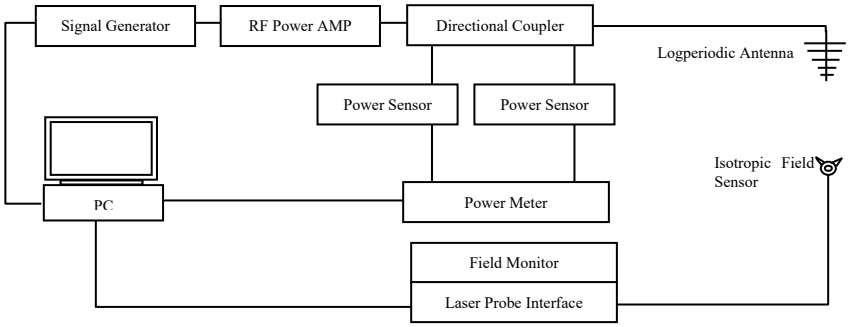
During test, the verification of performance was established by monitoring the EUT with a video camera.
The test was covered the complete frequency span; two polarization and specified sides of the EUT facing the antenna.

5.6 Results

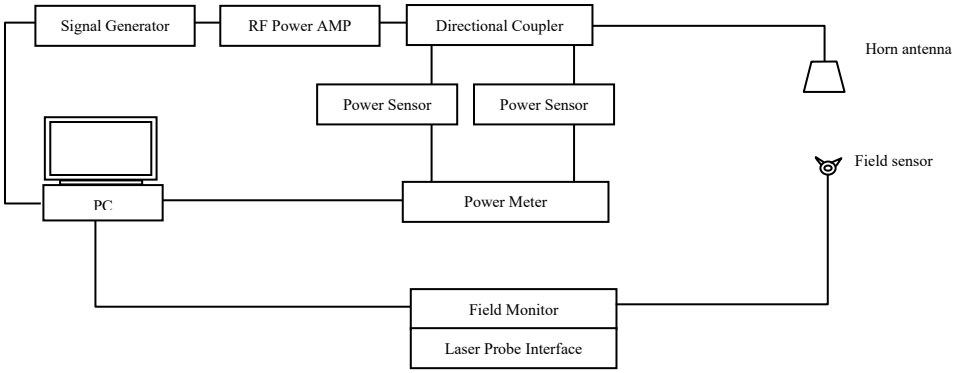
Summary of the test results : Pass
Refer to Appendix 2.

RS test system:

Frequency range from 80 MHz to 1000 MHz



Frequency range from 1.4 GHz to 2.7 GHz



Tested Frequency List: 80 MHz -1000 MHz (1 % Step)

80.000	102.582	131.539	168.681	216.305	277.386	355.714	456.163	584.982	750.187	962.052
80.800	103.607	132.854	170.367	218.468	280.159	359.271	460.724	590.831	757.688	971.672
81.608	104.643	134.182	172.070	220.652	282.960	362.863	465.331	596.739	765.264	981.388
82.424	105.689	135.523	173.790	222.858	285.789	366.491	469.984	602.706	772.916	991.201
83.248	106.745	136.878	175.527	225.086	288.646	370.155	474.683	608.733	780.645	1000.000
84.080	107.812	138.246	177.282	227.336	291.532	373.856	479.429	614.820	788.451	
84.920	108.890	139.628	179.054	229.609	294.447	377.594	484.223	620.968	796.335	
85.769	109.978	141.024	180.844	231.905	297.391	381.369	489.065	627.177	804.298	
86.626	111.077	142.434	182.652	234.224	300.364	385.182	493.955	633.448	812.341	
87.492	112.187	143.858	184.478	236.566	303.367	389.033	498.894	639.782	820.464	
88.366	113.308	145.296	186.322	238.931	306.40	392.923	503.882	646.179	828.668	
89.249	114.441	146.749	188.185	241.320	309.464	396.852	508.920	652.640	836.954	
90.141	115.585	148.216	190.066	243.733	312.558	400.820	514.009	659.166	845.323	
91.042	116.740	149.698	191.966	246.170	315.683	404.828	519.149	665.757	853.776	
91.952	117.907	151.195	193.885	248.631	318.839	408.876	524.340	672.414	862.313	
92.871	119.086	152.707	195.823	251.117	322.027	412.964	529.583	679.138	870.936	
93.799	120.276	154.234	197.781	253.628	325.247	417.093	534.878	685.929	879.645	
94.737	121.478	155.776	199.758	256.164	328.499	421.263	540.226	692.788	888.441	
95.684	122.692	157.333	201.755	258.725	331.784	425.475	545.628	699.715	897.325	
96.640	123.918	158.906	203.772	261.312	335.101	429.729	551.084	706.712	906.298	
97.606	125.157	160.495	205.809	263.925	338.452	434.026	556.594	713.779	915.361	
98.582	126.408	162.100	207.867	266.564	341.836	438.366	562.159	720.916	924.514	
99.567	127.672	163.721	209.945	269.229	345.254	442.749	567.780	728.125	933.759	
100.562	128.948	165.358	212.044	271.921	348.706	447.176	573.457	735.406	943.096	
101.567	130.237	167.011	214.164	274.640	352.193	451.647	579.191	742.760	952.527	

Tested Frequency List: 1400 MHz -2700 MHz (1% Step)

1400.000	1546.468	1708.259	1886.976	2084.390	2302.458	2543.342
1414.000	1561.932	1725.341	1905.845	2105.233	2325.482	2568.775
1428.140	1577.551	1742.594	1924.903	2126.285	2348.736	2594.462
1442.421	1593.326	1760.019	1944.152	2147.547	2372.223	2620.406
1456.845	1609.259	1777.619	1963.593	2169.022	2395.945	2646.610
1471.413	1625.351	1795.395	1983.228	2190.712	2419.904	2673.076
1486.127	1641.604	1813.349	2003.060	2212.619	2444.103	2699.806
1500.988	1658.020	1831.482	2023.090	2234.745	2468.544	2700.000
1515.997	1674.600	1849.796	2043.320	2257.092	2493.229	
1531.157	1691.346	1868.294	2063.753	2279.662	2518.161	

SECTION 6: Electrostatic discharge

6.1 Operating environment

Test place : See test data
Temperature and humidity : See test data
Atmosphere : See test data

6.2 Test configuration

The EUT was placed on the 0.5 mm thick insulating support above the horizontal coupling plane (HCP) in size of 1.6*0.8 m that was set on a non-metallic table height of 0.8 m on the reference ground plane.
Photographs of the set up are shown in Appendix 1.

6.3 Test conditions

Test levels	:	±4 kV for indirect discharge ±4 kV for direct discharge ±2 kV, ±4 kV and ±8 kV for air discharge
Performance criterion	:	B
Number of discharges	:	Total 20 times (10 times for each polarity and on each test point.)
EUT position	:	Table top

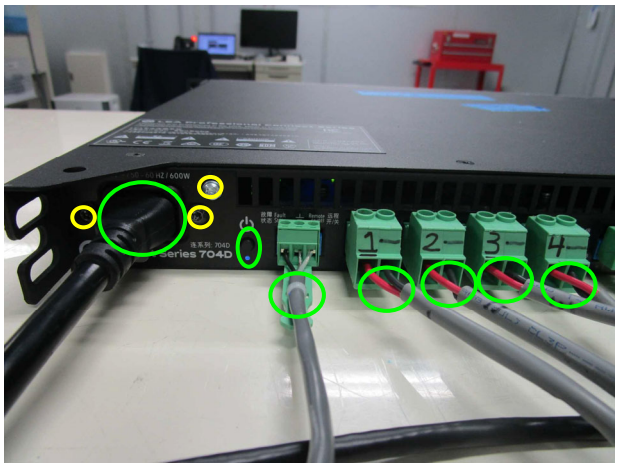
6.4 Test procedure

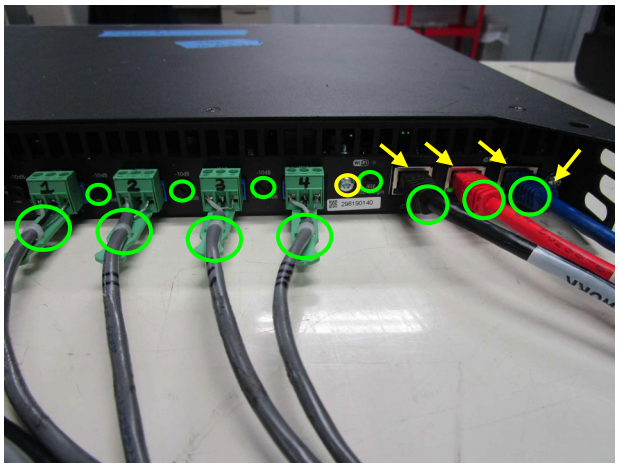
Air discharges were fired beginning with 2 kV at each selected test points.
The performance of the EUT was monitored continuously.

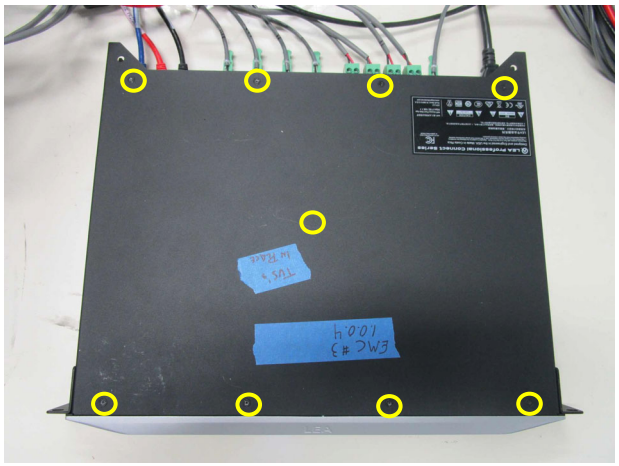
6.5 Results

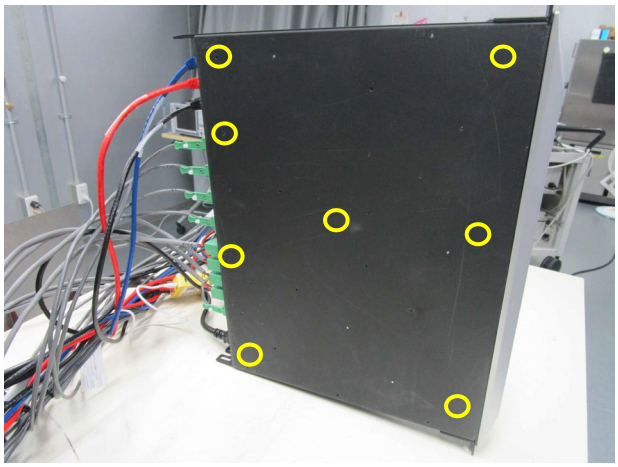
Summary of the test results : Pass
Refer to Appendix 2.

Selected test points for Electrostatic discharge









Yellow: Direct discharge
Green: Air discharge

UL Japan, Inc.
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
Telephone: +81 463 50 6400
Facsimile: +81 463 50 6401

SECTION 7: Magnetic field

7.1 Operating environment

Test place : See test data
Temperature and humidity : See test data
Atmosphere : See test data

7.2 Test configuration

The EUT was placed on a non-metallic pallet height of 0.8 m on the reference ground plane.
Photographs of the set up are shown in Appendix1.

7.3 Test condition

Frequency range : 50 Hz - 10 kHz
Test level : 4 A/m - 0.4 A/m for 50 Hz - 500 Hz
0.4 A/m for 500 Hz - 10 kHz
Performance criterion : A
EUT position : Table top

7.4 Test procedure

The test of power frequency magnetic fields was applied to EUT via induction coil.
The performance of the EUT was monitored continuously.

7.5 Results

Summary of the test results : Pass
Refer to Appendix 2.

SECTION 8: Fast transients, common mode

8.1 Operating Environment

Test place	:	See test data
Temperature and humidity	:	See test data
Atmosphere	:	See test data

8.2 Test configuration

The EUT was placed on a non-metallic pallet height of 0.1 m above the reference ground plane.
Photographs of the set up are shown in Appendix1.

8.3 Test conditions

Test level	:	±1.0 kV for CDN injection ±0.5 kV for Clamp injection
Performance criterion	:	B
Repetition rate	:	5 kHz
Application method	:	CDN injection, Clamp injection
Duration of each test	:	60 sec.
EUT position	:	Floor standing

8.4 Test procedure

The test voltage was applied to the line for 60 second.
The performance of the EUT was monitored continuously.

8.5 Results

Summary of the test results : Pass
Refer to Appendix 2.

SECTION 9: Radio-frequency common mode

9.1 Operating environment

Test place	:	See test data
Temperature and humidity	:	See test data
Atmosphere	:	See test data

9.2 Test configuration

The EUT was placed on a non-metallic pallet of 0.1 m above a reference ground plane.
Photographs of the set up are shown in Appendix 1.

9.3 Test condition

Frequency range	:	0.15 MHz - 80 MHz
Test level	:	3 V
Modulation	:	80 % AM (1 kHz)
Performance criterion	:	A
Frequency step size	:	1 %
Dwell time	:	2 sec.
EUT position	:	Floor standing

9.4 Test procedure

The test electromagnetic fields were applied to the line via CDN and EM injection clamp.
The performance of the EUT was monitored continuously.

9.5 Results

Summary of the test results : Pass
Refer to Appendix 2.

Tested Frequency List: 0.15 MHz - 80 MHz (1 % Step)

0.1500	0.2461	0.4057	0.6704	1.1103	1.8415	3.0556	5.0722	8.4220	13.9861	23.2284	38.5809	64.0826
0.1515	0.2485	0.4097	0.6771	1.1214	1.8599	3.0861	5.1229	8.5062	14.1259	23.4606	38.9667	64.7234
0.1530	0.2509	0.4137	0.6838	1.1326	1.8784	3.1169	5.1741	8.5912	14.2671	23.6952	39.3563	65.3706
0.1545	0.2534	0.4178	0.6906	1.1439	1.8971	3.1480	5.2258	8.6771	14.4097	23.9321	39.7498	66.0243
0.1560	0.2559	0.4219	0.6975	1.1553	1.9160	3.1794	5.2780	8.7638	14.5537	24.1714	40.1472	66.6845
0.1575	0.2584	0.4261	0.7044	1.1668	1.9351	3.2111	5.3307	8.8514	14.6992	24.4131	40.5486	67.3513
0.1590	0.2609	0.4303	0.7114	1.1784	1.9544	3.2432	5.3840	8.9399	14.8461	24.6572	40.9540	68.0248
0.1605	0.2635	0.4346	0.7185	1.1901	1.9739	3.2756	5.4378	9.0292	14.9945	24.9037	41.3635	68.7050
0.1621	0.2661	0.4389	0.7256	1.2020	1.9936	3.3083	5.4921	9.1194	15.1444	25.1527	41.7771	69.3920
0.1637	0.2687	0.4432	0.7328	1.2140	2.0135	3.3413	5.5470	9.2105	15.2958	25.4042	42.1948	70.0859
0.1653	0.2713	0.4476	0.7401	1.2261	2.0336	3.3747	5.6024	9.3026	15.4487	25.6582	42.6167	70.7867
0.1669	0.2740	0.4520	0.7475	1.2383	2.0539	3.4084	5.6584	9.3956	15.6031	25.9147	43.0428	71.4945
0.1685	0.2767	0.4565	0.7549	1.2506	2.0744	3.4424	5.7149	9.4895	15.7591	26.1738	43.4732	72.2094
0.1701	0.2794	0.4610	0.7624	1.2631	2.0951	3.4768	5.7720	9.5843	15.9166	26.4355	43.9079	72.9314
0.1718	0.2821	0.4656	0.7700	1.2757	2.1160	3.5115	5.8297	9.6801	16.0757	26.6998	44.3469	73.6607
0.1735	0.2849	0.4702	0.7777	1.2884	2.1371	3.5466	5.8879	9.7769	16.2364	26.9667	44.7903	74.3973
0.1752	0.2877	0.4749	0.7854	1.3012	2.1584	3.5820	5.9467	9.8746	16.3987	27.2363	45.2382	75.1412
0.1769	0.2905	0.4796	0.7932	1.3142	2.1799	3.6178	6.0061	9.9733	16.5626	27.5086	45.6905	75.8926
0.1786	0.2934	0.4843	0.8011	1.3273	2.2016	3.6539	6.0661	10.0730	16.7282	27.7836	46.1474	76.6515
0.1803	0.2963	0.4891	0.8091	1.3405	2.2236	3.6904	6.1267	10.1737	16.8954	28.0614	46.6088	77.4180
0.1821	0.2992	0.4939	0.8171	1.3539	2.2458	3.7273	6.1879	10.2754	17.0643	28.3420	47.0748	78.1921
0.1839	0.3021	0.4988	0.8252	1.3674	2.2682	3.7645	6.2497	10.3781	17.2349	28.6254	47.5455	78.9740
0.1857	0.3051	0.5037	0.8334	1.3810	2.2908	3.8021	6.3121	10.4818	17.4072	28.9116	48.0209	79.7637
0.1875	0.3081	0.5087	0.8417	1.3948	2.3137	3.8401	6.3752	10.5866	17.5812	29.2007	48.5011	80.0000
0.1893	0.3111	0.5137	0.8501	1.4087	2.3368	3.8785	6.4389	10.6924	17.7570	29.4927	48.9861	
0.1911	0.3142	0.5188	0.8586	1.4227	2.3601	3.9172	6.5032	10.7993	17.9345	29.7876	49.4759	
0.1930	0.3173	0.5239	0.8671	1.4369	2.3837	3.9563	6.5682	10.9072	18.1138	30.0854	49.9706	
0.1949	0.3204	0.5291	0.8757	1.4512	2.4075	3.9958	6.6338	11.0162	18.2949	30.3862	50.4703	
0.1968	0.3236	0.5343	0.8844	1.4657	2.4315	4.0357	6.7001	11.1263	18.4778	30.6900	50.9750	
0.1987	0.3268	0.5396	0.8932	1.4803	2.4558	4.0760	6.7671	11.2375	18.6625	30.9969	51.4847	
0.2006	0.3300	0.5449	0.9021	1.4951	2.4803	4.1167	6.8347	11.3498	18.8491	31.3068	51.9995	
0.2026	0.3333	0.5503	0.9111	1.5100	2.5051	4.1578	6.9030	11.4632	19.0375	31.6198	52.5194	
0.2046	0.3366	0.5558	0.9202	1.5251	2.5301	4.1993	6.9720	11.5778	19.2278	31.9359	53.0445	
0.2066	0.3399	0.5613	0.9294	1.5403	2.5554	4.2412	7.0417	11.6935	19.4200	32.2552	53.5749	
0.2086	0.3432	0.5669	0.9386	1.5557	2.5809	4.2836	7.1121	11.8104	19.6142	32.5777	54.1106	
0.2106	0.3466	0.5725	0.9479	1.5712	2.6067	4.3264	7.1832	11.9285	19.8103	32.9034	54.6517	
0.2127	0.3500	0.5782	0.9573	1.5869	2.6327	4.3696	7.2550	12.0477	20.0084	33.2324	55.1982	
0.2148	0.3535	0.5839	0.9668	1.6027	2.6590	4.4132	7.3275	12.1681	20.2084	33.5647	55.7501	
0.2169	0.3570	0.5897	0.9764	1.6187	2.6855	4.4573	7.4007	12.2897	20.4104	33.9003	56.3076	
0.2190	0.3605	0.5955	0.9861	1.6348	2.7123	4.5018	7.4747	12.4125	20.6145	34.2393	56.8706	
0.2211	0.3641	0.6014	0.9959	1.6511	2.7394	4.5468	7.5494	12.5366	20.8206	34.5816	57.4393	
0.2233	0.3677	0.6074	1.0058	1.6676	2.7667	4.5922	7.6248	12.6619	21.0288	34.9274	58.0136	
0.2255	0.3713	0.6134	1.0158	1.6842	2.7943	4.6381	7.7010	12.7885	21.2390	35.2766	58.5937	
0.2277	0.3750	0.6195	1.0259	1.7010	2.8222	4.6844	7.7780	12.9163	21.4513	35.6293	59.1796	
0.2299	0.3787	0.6256	1.0361	1.7180	2.8504	4.7312	7.8557	13.0454	21.6658	35.9855	59.7713	
0.2321	0.3824	0.6318	1.0464	1.7351	2.8789	4.7785	7.9342	13.1758	21.8824	36.3453	60.3690	
0.2344	0.3862	0.6381	1.0568	1.7524	2.9076	4.8262	8.0135	13.3075	22.1012	36.7087	60.9726	
0.2367	0.3900	0.6444	1.0673	1.7699	2.9366	4.8744	8.0936	13.4405	22.3222	37.0757	61.5823	
0.2390	0.3939	0.6508	1.0779	1.7875	2.9659	4.9231	8.1745	13.5749	22.5454	37.4464	62.1981	
0.2413	0.3978	0.6573	1.0886	1.8053	2.9955	4.9723	8.2562	13.7106	22.7708	37.8208	62.8200	
0.2437	0.4017	0.6638	1.0994	1.8233	3.0254	5.0220	8.3387	13.8477	22.9985	38.1990	63.4482	

SECTION 10: Voltage dips and voltage interruptions

10.1 Operating environment

Test place	:	See test data
Temperature and humidity	:	See test data
Atmosphere	:	See test data

10.2 Test configuration

The EUT was placed on a non-metallic pallet height of 0.8 m on the reference ground plane.
Photographs of the set up are shown in Appendix1.

10.3 Test condition

(1) Voltage dips	:	70 % Ut, 0.5 periods (Voltage shift at 0 and 180 degree.)
		40 % Ut, 5 periods (Voltage shift at 0 degree.)
Performance criterion	:	70 % Ut, 0.5 periods =>B
		40 % Ut, 5 periods =>C
Number of events	:	3 at each level
Recovery time	:	10 sec.
EUT position	:	Table top
(2) Short interruptions	:	0 % Ut, 250 periods (Voltage shift at 0 degree.)
Performance criterion	:	C
Number of events	:	3 at each level
Recovery time	:	10 sec.
EUT position	:	Table top

10.4 Test procedure

The dips and interruptions are generated using a simulator with pre-programmed test sequences for each test level.
The performance of the EUT was monitored continuously.
The test was performed at AC 100 V for lower voltage and at AC 240 V for upper voltage, because the voltage range of EUT was AC 100 V – 240 V.

10.5 Results

Summary of the test results : Pass
Refer to Appendix 2.

SECTION 11 : Surge

11.1 Operating environment

Test place	:	See test data
Temperature and humidity	:	See test data
Atmosphere	:	See test data

11.2 Test configuration

The EUT was placed on a non-metallic pallet height of 0.8 m on the reference ground plane.
Photographs of the set up are shown in Appendix1.

11.3 Test condition

Test level	:	±0.5 kV, ±1.0 kV, ±2.0 kV (line to earth) ±0.5 kV, ±1.0 kV (line to line)
Polarity	:	Positive / Negative
Phase shifting	:	90 and 270 phase angle (degree)
Performance criterion	:	B
Repetition rate	:	60sec.
Number	:	5 points
EUT position	:	Table top

11.4 Test procedure

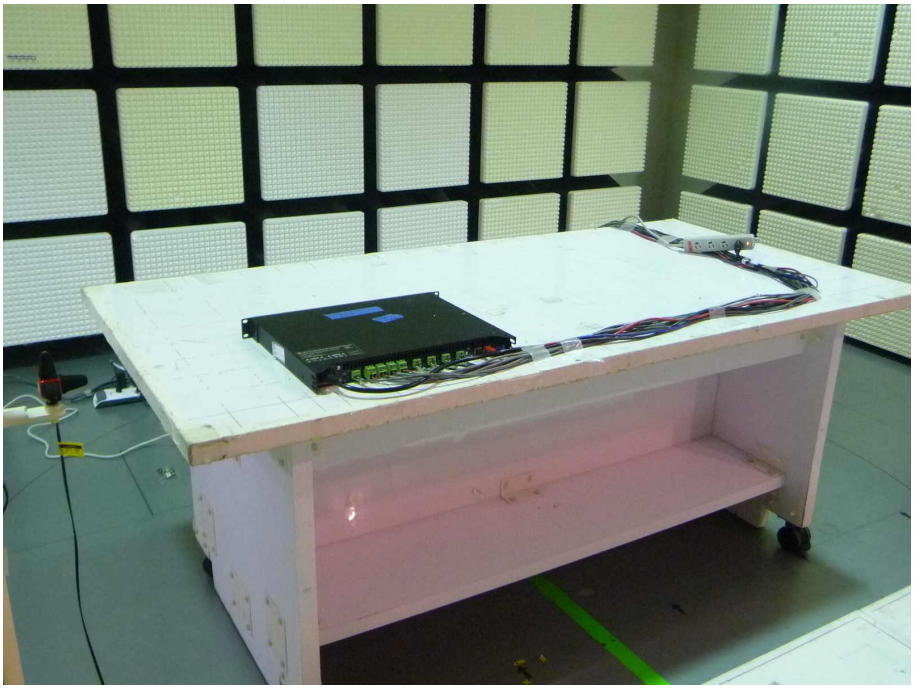
The test voltage was applied to the AC mains. The performance of the EUT was monitored continuously.

11.5 Results

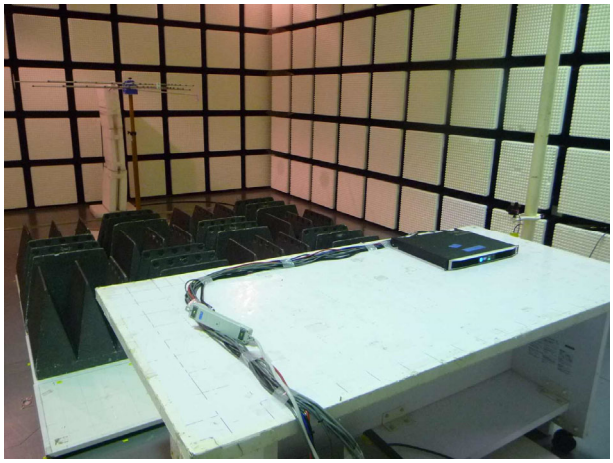
Summary of the test results : Pass
Refer to Appendix 2.

APPENDIX 1: Photographs of test setup

Radio-frequency electromagnetic field



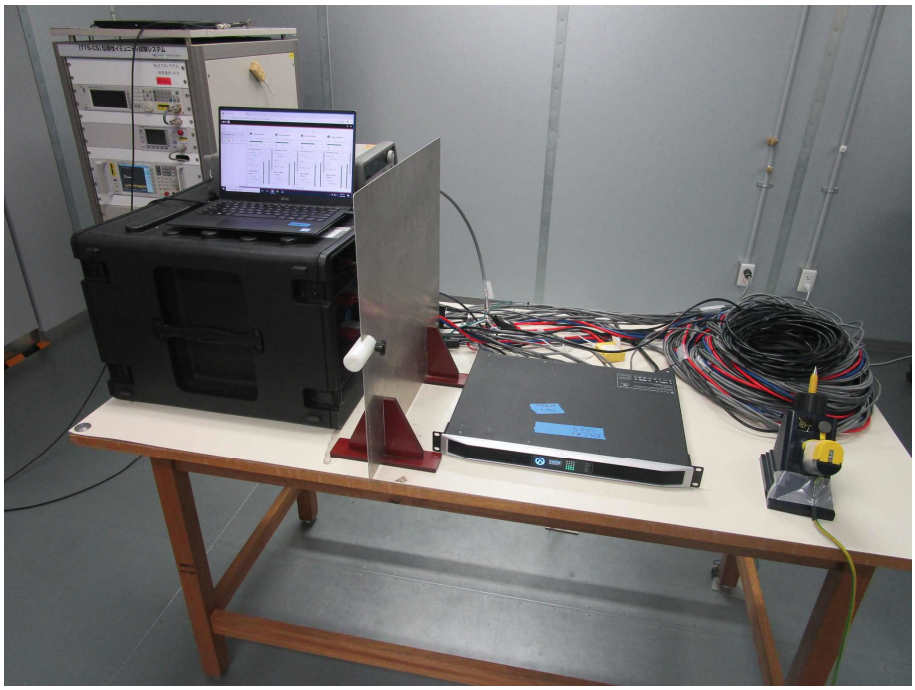
80 MHz – 1000 MHz

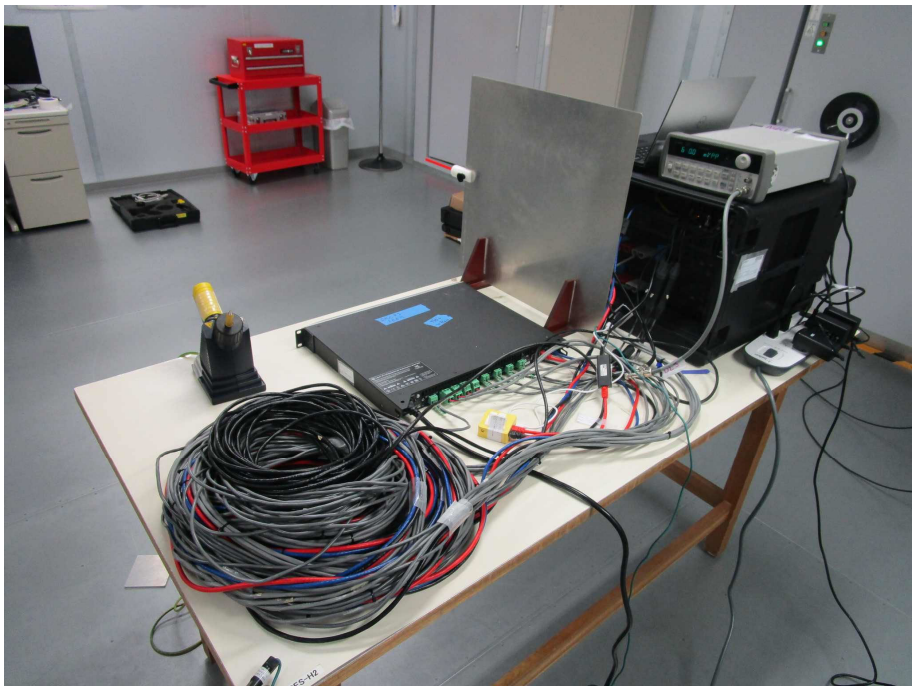


1400 MHz – 2700 MHz

UL Japan, Inc.
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
Telephone: +81 463 50 6400
Facsimile: +81 463 50 6401

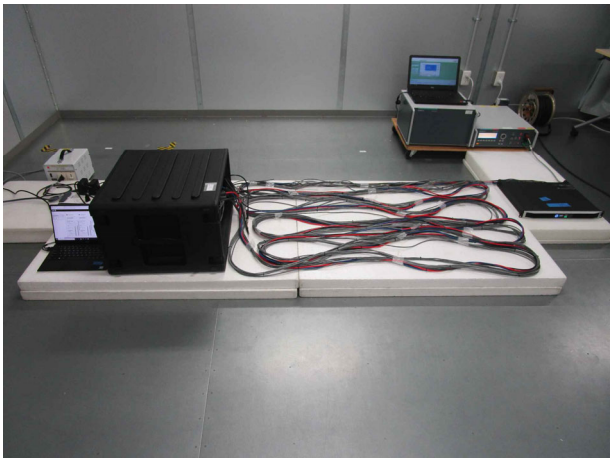
Electrostatic discharge

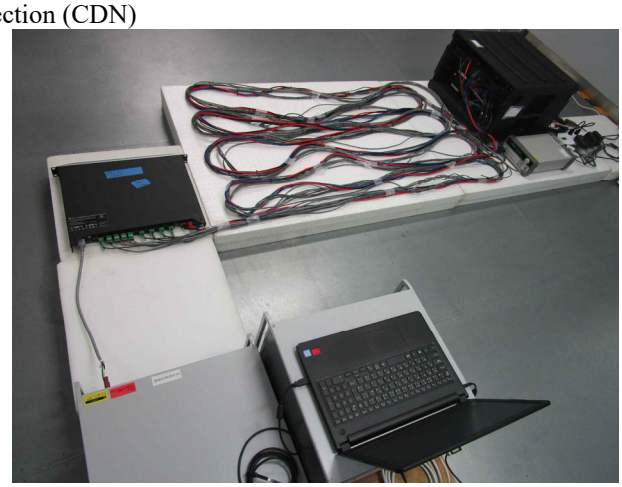




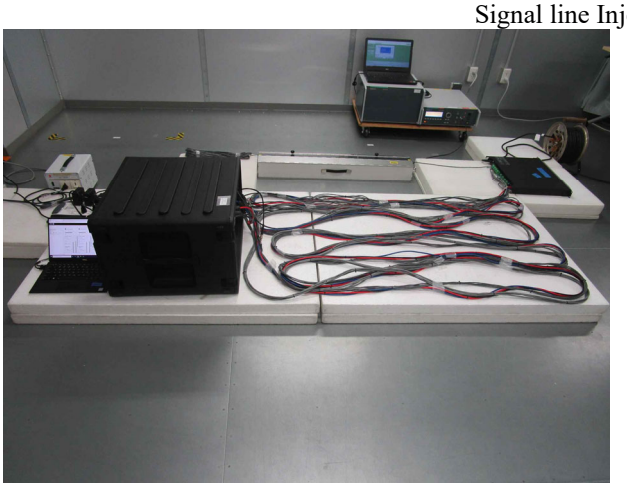
Fast transients, common mode

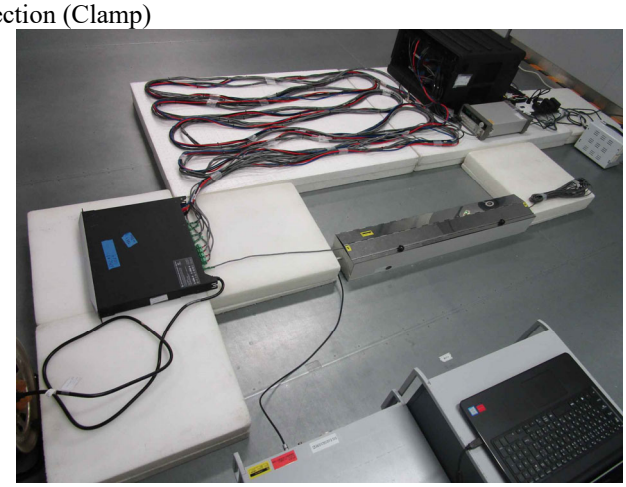
AC mains Injection (CDN)



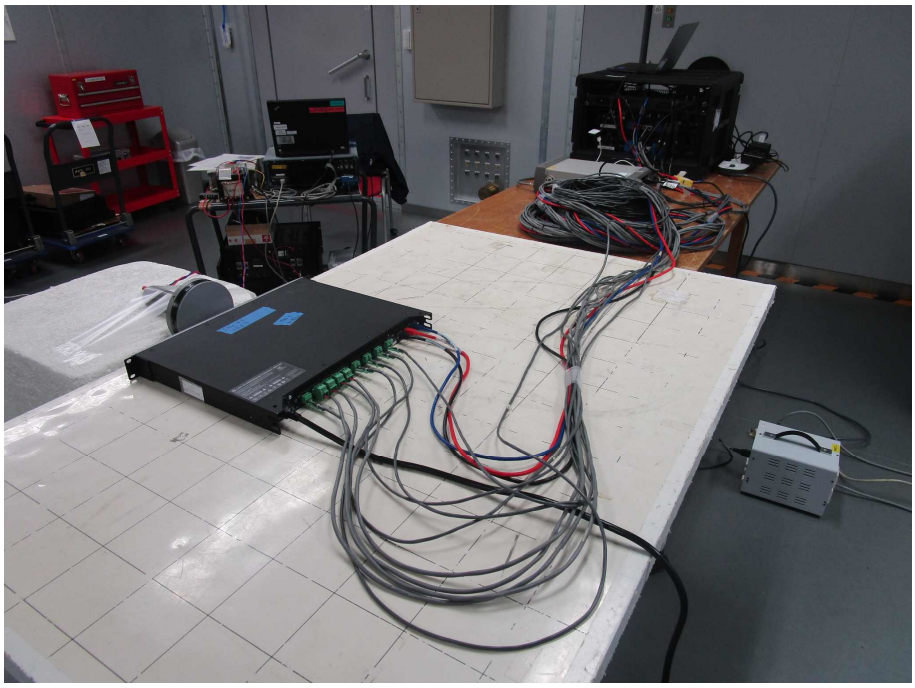


Signal line Injection (Clamp)



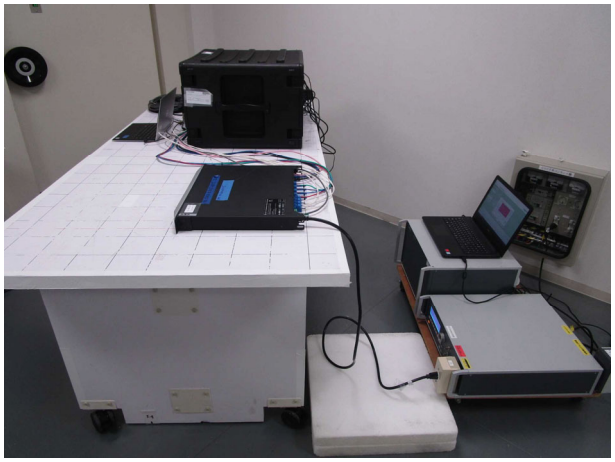


Magnetic field

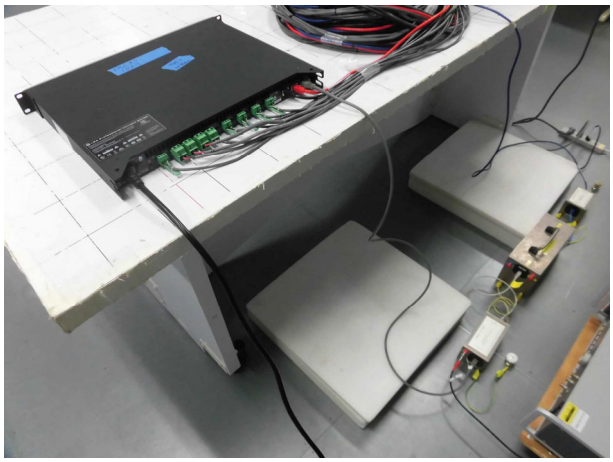


Fast transients, common mode

AC mains

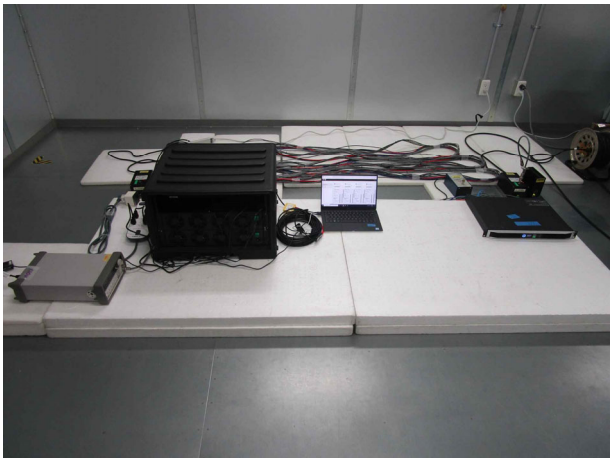


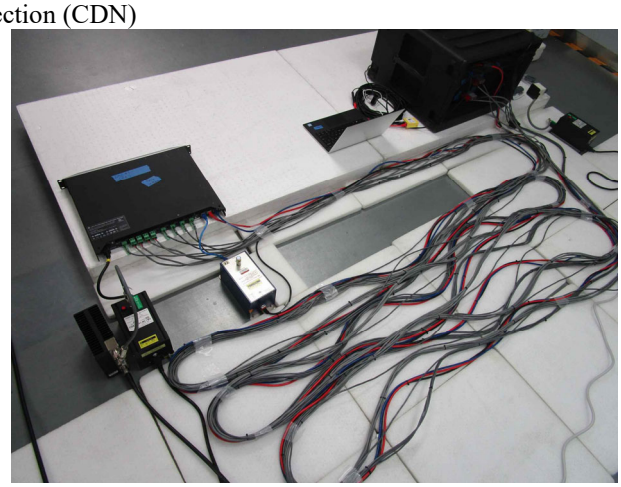
Signal line



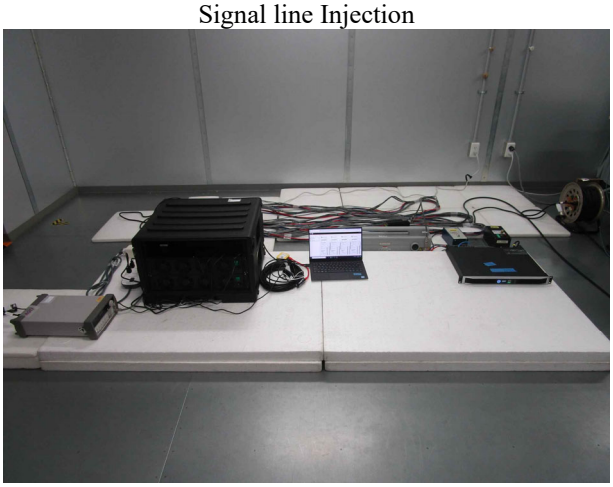
Radio-frequency common mode

AC Mains Injection (CDN)

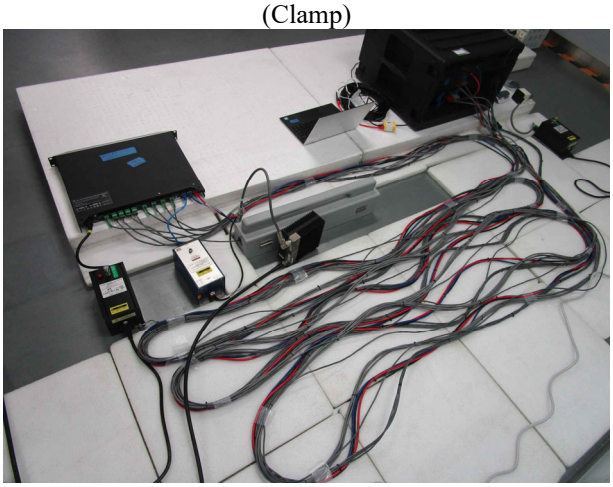




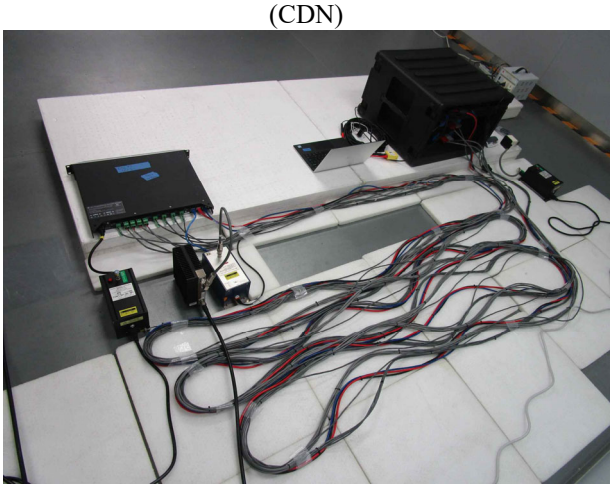
Signal line Injection



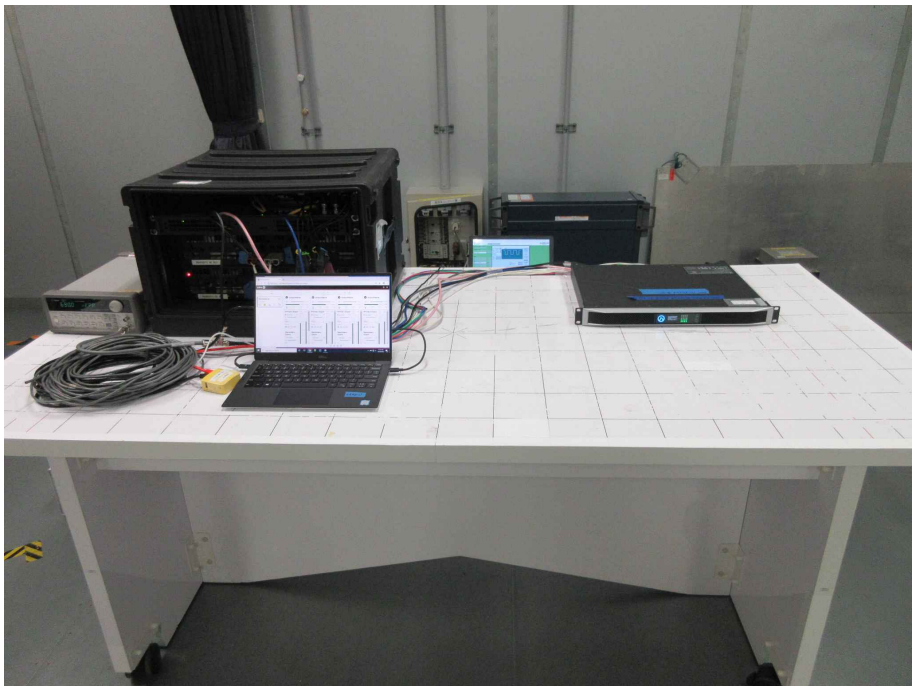
(Clamp)

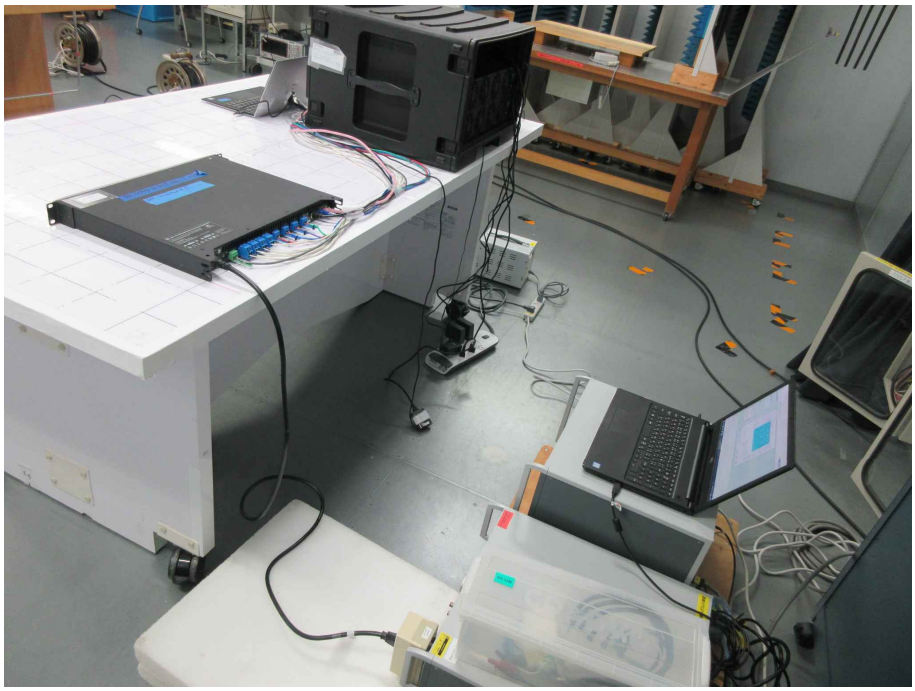


(CDN)



Voltage dips and Voltage interruptions

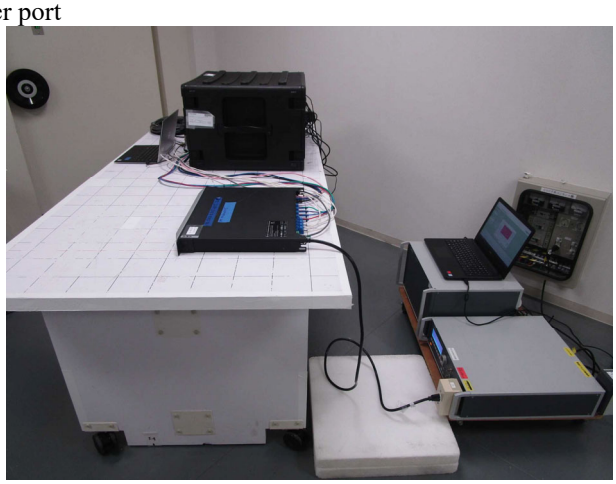




UL Japan, Inc.
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
Telephone: +81 463 50 6400
Facsimile: +81 463 50 6401

Surges

AC power port



Radio frequency electromagnetic field

UL Japan, Inc. Shonan EMC Lab.
Test Room : No.4 Semi-anechoic chamber
Job No. : 12777555S

Company : LEA Professional
Equipment : Pro audio amplifier
Model No. : 704D
Serial No. : 296190140
Test Mode : Refer to Section 4, Clause 4.2
Power : AC 230 V / 50 Hz
Standard : EN 55103-2
: EN 61000-4-3
Criterion : A

Date of test. : February 11 and 13, 2020
Temp. / Humid. : 21 deg.C / 44 %RH (2/11)
Atmosphere : 25 deg.C / 41 %RH (2/13)
1023 hPa(2/11) / 1010 hPa(2/13)
Engineer : Takahiro Suzuki, Masahide Ozaki

EUT Setup : ☑ Table Top (Non-metallic table height of 0.8m)
☐ Floor Standing (Non-metallic pallet height of 0.1m)
Freqency step size : 1 %
Dwell time : 2 sec

Freq. Range		80 - 1000 MHz	1400 - 2700 MHz	- MHz	Remarks
Test level		3.0 V/m	3.0 V/m	V/m	
Modulation		☑ AM 80% 1 kHz ☐ Pulse Hz % ☐ Unmodulated	☑ AM 80% 1 kHz ☐ Pulse Hz % ☐ Unmodulated	☐ AM 80% kHz ☐ Pulse Hz % ☐ Unmodulated	
Antenna	Height	1.55 m	1.55 m	m	
	Distance	2.5 m	3.0 m	m	
Note					
☑ Front	Hor.	Pass	Pass		
	Ver.	Pass	Pass		
☑ Rear	Hor.	Pass	Pass		
	Ver.	Pass	Pass		
☑ Right	Hor.	Pass	Pass		
	Ver.	Pass	Pass		
☑ Left	Hor.	Pass	Pass		
	Ver.	Pass	Pass		
☐ Top	Hor.				
	Ver.				
☐ Bottom	Hor.				
	Ver.				

Electrostatic discharge

UL Japan, Inc. Shonan EMC Lab.
Test Room : No.5 Shielded room
Job No. : 12777555S

Company : LEA Professional
Equipment : Pro audio amplifier
Model No. : 704D
Serial No. : 296190140
Test Mode : Refer to Section 4, Clause 4.2
Power : AC 230 V / 50 Hz
Standard : EN 55103-2
: EN 61000-4-2
Criterion : B

Date of test. : February 13, 2020
Temp. / Humid. : 23 deg.C / 47 %RH
Atmosphere : 1010 hPa

Engineer : Takahiro Suzuki

EUT Setup : ☑ Table Top (Non-metallic table height of 0.8m)
☐ Floor Standing (Non-metallic pallet height of 0.1m)
EUT Type : ☑ Grounded ☐ Ungrounded (*1)
*1 ☐ Remained the cable with bleeder resistors(2x470kΩ) on the EUT during the ESD test.
☐ The enough time interval b/w discharge.
☐ Touching of the EUT with a grounded brush with bleeder resistors(2x470kΩ) in the grounding cable.
☐ An air-ionizer.

Contact discharge method(HCP, VCP) : Number of discharges for each polarity at each test point. ☑ 10 ☐ 25

Test Level / Polarity		Front HCP	Front VCP	Rear HCP	Rear VCP	Right HCP	Right VCP	Left HCP	Left VCP	Top HCP	Top VCP	Bottom HCP	Bottom VCP	Remarks
4.0 kV	+	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	
	-	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	
kV	+													
	-													
kV	+													
	-													
kV	+													
	-													

Contact discharge method(Direct) : Number of discharges for each polarity at each test point. ☑ 10 ☐ 25

Test Level / Polarity		Test Points						Remarks
4.0 kV	+	Pass						Refer to "Selected test points"
	-	Pass						
kV	+							
	-							
kV	+							
	-							
kV	+							
	-							

Air Discharge method : Number of discharges for each polarity at each test point. ☑ 10

Test Level / Polarity		Test Points						Remarks
2.0 kV	+	Pass						Refer to "Selected test points"
	-	Pass						
4.0 kV	+	Pass						
	-	Pass						
8.0 kV	+	Pass						
	-	Pass						
kV	+							
	-							

Power frequency magnetic field

UL Japan, Inc. Shonan EMC Lab.
Test Room : No.5 Shielded room
Job No. : 12777555S

Company : LEA Professional
Equipment : Pro audio amplifier
Model No. : 704D
Serial No. : 296190140
Test Mode : Refer to Section 4, Clause 4.2
Power : AC 230 V / 50 Hz
Standard : EN 55103-2
:
Criterion : A

Date of test. : February 13, 2020
Temp. / Humid. : 22 deg.C / 46 %RH
Atmosphere : 1010 hPa

Engineer : Takahiro Suzuki

EUT Setup : ☑ Table Top (Non-metallic table height of 0.8m)
☐ Floor Standing (Non-metallic pallet height of 0.1m)
Induction Coil : Loop

Test level	4 A/m to 0.4 A/m	0.4 A/m	A/m	A/m	Remarks
Frequency	50 Hz to 500 Hz	500 Hz to 10 kHz			
Front	Pass	Pass			
Rear	Pass	Pass			
Right	Pass	Pass			
Left	Pass	Pass			
Top	Pass	Pass			
Bottom	Pass	Pass			

Electrical fast transient/burst

UL Japan, Inc. Shonan EMC Lab.
Test Room : No.5 Shielded room
Job No. : 12777555S

Company : LEA Professional
Equipment : Pro audio amplifier
Model No. : 704D
Serial No. : 296190140
Test Mode : Refer to Section 4, Clause 4.2
Power : AC 230 V / 50 Hz
Standard : EN 55103-2
: EN 61000-4-4
Criterion : B

Date of test. : February 07, 2020
Temp. / Humid. : 21 deg.C / 33 %RH
Atmosphere : 1021 hPa

Engineer : Masahide Ozaki

EUT Setup : ☐ Table Top (Non-metallic table height of 0.8m)
☑ Floor Standing (Non-metallic pallet height of 0.1m)
Elevated Ground Plane : ☑ Not used ☐ Used (*1 Refer to line name)
Duration : 1 min

Line / Injection	☐ AC ☑ DC / ☑ CDN ☐ Clamp								Remarks
Test level	1.0 kV		kV		kV		kV		
Repetation rate	5 kHz		kHz		kHz		kHz		
Polarity	+	-	+	-	+	-	+	-	
N+L+PE	Pass	Pass							
☐ *1									

Line / Injection	☑ Signal Line / ☑ Clamp								Remarks
Test level	0.5 kV		kV		kV		kV		
Repetation rate	5 kHz		kHz		kHz		kHz		
Polarity	+	-	+	-	+	-	+	-	
I/O ☐ *1	Pass	Pass							
CH1 ☐ *1	Pass	Pass							
CH2 ☐ *1	Pass	Pass							
CH3 ☐ *1	Pass	Pass							
CH4 ☐ *1	Pass	Pass							
IN1 ☐ *1	Pass	Pass							
IN2 ☐ *1	Pass	Pass							
IN3 ☐ *1	Pass	Pass							
IN4 ☐ *1	Pass	Pass							
LAN ☐ *1	Pass	Pass							
LAN(Primary) ☐ *1	Pass	Pass							
LAN(Secondary) ☐ *1	Pass	Pass							
☐ *1									
☐ *1									
☐ *1									
☐ *1									
☐ *1									

Test Result: ☑ **Pass** ☐ **Fail**

Conducted disturbances, induced by radio frequency fields

UL Japan, Inc. Shonan EMC Lab.
Test Room : No.5 Shielded room
Job No. : 12777555S

Company : LEA Professional
Equipment : Pro audio amplifier
Model No. : 704D
Serial No. : 296190140
Test Mode : Refer to Section 4, Clause 4.2
Power : AC 230 V / 50 Hz
Standard : EN 55103-2
: EN 61000-4-6
Criterion : A

Date of test. : February 04, 05 and 07, 2020
Temp. / Humid. : 26 deg.C / 47 %RH (February 04)
Temp. / Humid. : 23 deg.C / 48 %RH (February 05)
Temp. / Humid. : 21 deg.C / 33 %RH (February 07)
Atmosphere : 1006 hPa (February 04)
Atmosphere : 1006 hPa (February 05)
Atmosphere : 1021 hPa (February 07)
Engineer : Masahide Ozaki

EUT Setup : ☑ Floor Standing (Non-metallic pallet height of 0.1m)
Elevated Ground Plane : ☑ Not used ☐ Used (*1 Refer to line name)
Frequency step size : 1 %
Dwell time : 2 sec

Freq. Range	0.15 - 80 MHz	- MHz	- MHz	Remarks
Test level	3 V	V	V	
Modulation	☑ AM 80% 1 kHz ☐ Pulse Hz % ☐ Unmodulated	☐ AM 80% kHz ☐ Pulse Hz % ☐ Unmodulated	☐ AM 80% kHz ☐ Pulse Hz % ☐ Unmodulated	
Note				
AC Mains ☐ *1	Pass			☑ CDN M3 ☐ EM Clamp
I/O ☐ *1	Pass			☐ CDN ☑ EM Clamp
CH1 ☐ *1	Pass			☐ CDN ☑ EM Clamp
CH2 ☐ *1	Pass			☐ CDN ☑ EM Clamp
CH3 ☐ *1	Pass			☐ CDN ☑ EM Clamp
CH4 ☐ *1	Pass			☐ CDN ☑ EM Clamp
IN1 ☐ *1	Pass			☐ CDN ☑ EM Clamp
IN2 ☐ *1	Pass			☐ CDN ☑ EM Clamp
IN3 ☐ *1	Pass			☐ CDN ☑ EM Clamp
IN4 ☐ *1	Pass			☐ CDN ☑ EM Clamp
LAN ☐ *1	Pass			☑ CDN T8 ☐ EM Clamp
LAN(Primary) ☐ *1	Pass			☑ CDN T8 ☐ EM Clamp
LAN(Secondary) ☐ *1	Pass			☑ CDN T8 ☐ EM Clamp
☐ *1				☐ CDN ☐ EM Clamp

Test Result: ☑ **Pass** ☐ **Fail**

Voltage dips & Short interruptions

UL Japan, Inc.		Shonan EMC Lab.
Test Room	:	No.6 Shielded room
Job No.	:	12777555S

Company	:	LEA Professional			
Equipment	:	Pro audio amplifier			
Model No.	:	704D			
Serial No.	:	326190012			
Test Mode	:	Refer to Section 4, Clause 4.2			
Power	:	AC 100-240 V / 50 Hz	Date of test.	:	June 30, 2020
Standard	:	EN 55103-2	Temp. / Humid.	:	21 deg.C / 57 %RH
	:	EN 61000-4-11	Atmosphere	:	997 hPa
Criterion	:	Refer to following table.			
			Engineer	:	Masahide Ozaki

EUT Setup : ☑ Table Top (Non-metallic table height of 0.8m)
☐ Floor Standing (Non-metallic pallet height of 0.1m)

Number of events : 3

Intervals : 10 sec

Test level (Ut)		Voltage dips						Short interruptions		Remarks
		70 %		40 %		%		0 %		
Performance Criteria		B		C				C		
Duration ☑ 50Hz ☐ 60Hz		0.5 Periods		5 Periods		Periods		250 Periods		
Phase (degree)		0deg.	180deg.	0deg.	180deg.	0deg.	180deg.	0deg.	180deg.	
☑ L1-N	100 V	Pass	Pass	Pass				Pass		
	240 V	Pass	Pass	Pass				Pass		
☐ L2-N	V									
	V									
☐ L3-N	V									
	V									
☐ L1-L2	V									
	V									
☐ L2-L3	V									
	V									
☐ L3-L1	V									
	V									
☐ All the three phases	V									
	V									

Test level (Ut)		Voltage dips						Short interruptions		Remarks
		%		%		%		%		
Performance Criteria										
Duration ☐ 50Hz ☐ 60Hz		Periods		Periods		Periods		Periods		
Phase (degree)		0deg.	180deg.	0deg.	180deg.	0deg.	180deg.	0deg.	180deg.	
☐ L1-N	V									
	V									
☐ L2-N	V									
	V									
☐ L3-N	V									
	V									
☐ L1-L2	V									
	V									
☐ L2-L3	V									
	V									
☐ L3-L1	V									
	V									
☐ All the three phases	V									
	V									

Test Result: ☑ **Pass** ☐ **Fail**

Surge

UL Japan, Inc.		Shonan EMC Lab.
Test Room	:	No.1 and No.3 Shielded room
Job No.	:	12777555S

Company	:	LEA Professional			
Equipment	:	Pro audio amplifier			
Model No.	:	704D			
Serial No.	:	326190012			
Test Mode	:	Refer to Section 4, Clause 4.2			
Power	:	AC 230 V / 50 Hz	Date of test.	:	July 14 and 15, 2020
Standard	:	EN 55103-2	Temp. / Humid.	:	22 deg.C / 59 %RH (7/14)
	:	EN 61000-4-5		:	26 deg.C / 59 %RH (7/15)
Criterion	:	B	Atmosphere	:	1005 hPa (7/14) , 995 hPa (7/15)
			Engineer	:	Takahiro Suzuki, Masahide Ozaki

EUT Setup : ☑ Table Top (Non-metallic table height of 0.8m)
☐ Floor Standing (Non-metallic pallet height of 0.1m)

Number of surge pulses : 5

Repetition rate : 60 sec

Test level		0.5 kV		1.0 kV		2.0 kV		kV		Remarks
Polarity		+	-	+	-	+	-	+	-	
N-PE	0 deg.									
	90 deg.	Pass	Pass	Pass	Pass	Pass	Pass			
	180 deg.									
	270 deg.	Pass	Pass	Pass	Pass	Pass	Pass			
L1-PE	0 deg.									
	90 deg.	Pass	Pass	Pass	Pass	Pass	Pass			
	180 deg.									
	270 deg.	Pass	Pass	Pass	Pass	Pass	Pass			
	0 deg.									
	90 deg.									
	180 deg.									
	270 deg.									
	Async									
	Async									
	Async									

Test level		0.5 kV		1.0 kV		kV		kV		Remarks
Polarity		+	-	+	-	+	-	+	-	
L1-N	0 deg.									
	90 deg.	Pass	Pass	Pass	Pass					
	180 deg.									
	270 deg.	Pass	Pass	Pass	Pass					
	0 deg.									
	90 deg.									
	180 deg.									
	270 deg.									
	0 deg.									
	90 deg.									
	180 deg.									
	270 deg.									
	0 deg.									
	90 deg.									
	180 deg.									
	270 deg.									
	0 deg.									
	90 deg.									
	180 deg.									
	270 deg.									
	0 deg.									
	90 deg.									
	180 deg.									
	270 deg.									
	Async									
	Async									

Test Result: ☑ **Pass** ☐ **Fail**

EMS test equipment

Test Name	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Interval (Month)
CS	COTS-SCS	144911	Radio-frequency conducted disturbances soft	TSJ (Techno Science Japan)	TEPT-CS2	-	-	-
CS	SAT6-CS02	145159	Attenuator	Bird Electronic	100-SA-FFN-06	1002479	2020/04/06	12
CS	SCN-07	145210	Coupling Decoupling Network	LUTHI	CDN L801-M2/M3	2505	2019/11/08	12
CS	SCN-08	145014	Coupling Decoupling Network	LUTHI	CDN L801-M2/M3	2506	2019/11/08	12
CS	SCN-24	145452	Coupling Decoupling Network	FCC	TSCDN-T8-RJ45	9224	2019/11/08	12
CS	SDCPL-07	145466	Directional Coupler	WERLATONE	C5086-10	81074	2020/04/06	12
CS	SPA-07	145609	RF Power Amplifier	AMPLIFIER RESEARCH	75A250	330791	2020/04/08	12
CS	SPM-04	146265	Power Meter	Keysight Technologies Inc	E4418B	MY45109229	2019/12/04	12
CS	SPSO-06	146278	Power Sensor	Keysight Technologies Inc	E9304A	MY41498833	2019/12/04	12
CS	SSG-06	145805	Signal Generator	Keysight Technologies Inc	N5181A	MY48181112	2019/12/04	12
CS	STM-18	146197	Terminator	TME	CT-01 BP	-	2020/01/30	12
CS	STM-21	145767	Terminator	TME	CT-01 BP	-	2020/01/30	12
CS,EFT/B,ESD,MF	SBM-09	144962	Barometer	Sunoh	SBR121	1074	2017/12/13	36
CS,EFT/B,ESD,MF	SJM-17	145339	Measure	ASKUL	-	-	-	-
CS,EFT/B,ESD,MF	SOS-27	191845	Humidity Indicator	CUSTOM	CTH-201	-	2019/12/12	12
CS,EFT/B,ESD,MF	STS-05	146212	Digital Hitester	Hioki	3805-50	80997828	2019/10/01	12
Dip	SBM-04	145052	Barometer	Sunoh	SBR121	1072	2017/10/27	36
Dip	SJM-09	145336	Measure	PROMART	SEN1935	-	-	-
Dip	SMV-01	145717	Motor Variac	EM Test (Ametek)	MV2616	V084710447	-	-
Dip	SMV-02	145747	Motor Variac	EM Test (Ametek)	MV2616	V084710448	-	-
Dip	SOS-22	191839	Humidity Indicator	CUSTOM	CTH-201	-	2019/12/12	12
Dip,EFT/B,SG	COTS-SEMS	144869	EFT/B, Surge,MF,Dip test program	EM Test (Ametek)	-	-	-	-
Dip,EFT/B,SG	SPG-01	146240	Pulse Generator	EM Test (Ametek)	UCS500N4	V0847104443	2020/04/01	12
EFT/B	SCL-01	145201	Capacitive Clamp	EM Test (Ametek)	HFK	1208-75	2020/04/02	12
EFT/B	SCL-01C	145284	Capacitive Clamp Cable	EM Test (Ametek)	-	-	-	-
EFT/B	SIC-01	145819	Induction Coil	EM Test (Ametek)	MS100	0908-10	-	-
ESD	SES-02	154825	ESD Simulator	Teseq	NSG435	6195	2020/05/07	12
ESD	SES-H2	145225	Horizontal Coupling Plane	NAKANO EMC	-	-	-	-
ESD	SES-V2	145368	Vertical Coupling Plane	NAKANO EMC	-	-	-	-
MF	COTS-KTS03S-03	144915	EN55103 EMS Software	TSJ (Techno Science Japan)	EN103S.exe	-	-	-
MF	SAP-01	146132	Audio Amplifier	Yamaha	PC2002M	M101018	-	-
MF	SARS-01	145326	Resistor Simulator (1Ω)	UL Apex	-	-	-	-
MF	SDM-01	145468	Digital Multimeter	ADVANTEST	R6451A	77841190	2020/04/09	12
MF	SFG-01	145299	Function Generator	Rohde & Schwarz	AFG	31400091	2020/02/17	12
MF	SLPS-03	145775	Loop sensor	YTSC	RD-13	-	-	-
MF	SMM-01	146284	Exposure Level Tester	NARDA	ELT-400	M-0163	2019/09/13	12
MF	SMS-01	146315	Magnetic Field Probe 100cm^2	NARDA	ELT-400	M-0180	2019/09/13	12
RS	COTS-SRS	159176	Radiated RF electromagnetic field soft	TSJ (Techno Science Japan)	TEPTO-DV(RS)	-	-	-
RS	SAEC-04(UFA)	145567	Semi-Anechoic Chamber	TDK	SAEC-04(UFA)	4	2020/03/19	12
RS	SBM-07	145027	Barometer	Sunoh	SBR121	1075	2017/12/13	36

EMS test equipment

Test Name	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Interval (Month)
RS	SDCPL-04	145390	Directional Coupler	WERLATONE	C3908-10	80906	2019/09/01	12
RS	SDCPL-05	145391	Directional Coupler	RLC	CHP-1040-D-50-50-MF	909002	2019/09/01	12
RS	SFS-04	146657	Isotropic field Probe	ETS LINDGREN	HI-6005/HI-4413P	00033981	2019/07/25	12
RS	SHA-RS02	145823	Horn Antenna	Schwarzbeck Mess - Elektronik	BBHA9120B	488	-	-
RS	SJM-15	145338	Measure	ASKUL	-	-	-	-
RS	SLA-RS02	145829	Logperiodic Antenna	Schwarzbeck Mess - Elektronik	VULP9118E	VULP9118 E-846	-	-
RS	SOS-25	191843	Humidity Indicator	CUSTOM	CTH-201	-	2019/12/12	12
RS	SPA-04	145607	RF Power Amplifier	PRANA	AP32MT235	0302-929	2019/12/02	12
RS	SPA-05	145608	RF Power Amplifier	PRANA	AP32SW210	0902-330	2020/07/14	12
RS	SPM-02	146245	Power Meter	Keysight Technologies Inc	E4419B	MY45104213	2020/01/27	12
RS	SPSO-03	146305	Power Sensor	Keysight Technologies Inc	E9304A	MY41498835	2020/01/27	12
RS	SPSO-04	146306	Power Sensor	Keysight Technologies Inc	E9304A	MY41498831	2020/01/27	12
RS	SSG-04	146228	Signal Generator	Keysight Technologies Inc	N5181A	MY48181114	2020/05/26	12
RS	SSW-02	145736	RF Switch	TSJ (Techno Science Japan)	RFM-3SA3CIL	4333	-	-
RS	STS-04	146211	Digital Hitester	Hioki	3805-50	80997827	2020/04/09	12
SG	KJM-02	146432	Measure	TAJIMA	GL19-55	-	-	-
SG	KJM-09	145929	Measure	KOMELON	KMC-36	-	-	-
SG	SBM-02	145051	Barometer	Sunoh	SBR121	1004	2017/11/10	36
SG	SBM-06	144961	Barometer	Sunoh	SBR121	1071	2017/10/27	36
SG	SJM-18	147480	Measure	ASKUL	-	-	-	-
SG	SOS-16	167990	Humidity Indicator	CUSTOM	CTH-202	708Q08R	2019/12/19	12
SG	SOS-24	191841	Humidity Indicator	CUSTOM	CTH-201	-	2019/12/12	12
SG	STS-01	145792	Digital Hitester	Hioki	3805-50	80997812	2019/10/01	12
SG	STS-03	146210	Digital Hitester	Hioki	3805-50	80997823	2019/10/01	12
SG,Dip	KTS-06	145110	Digital Tester	SANWA	PC500	7019240	2020/04/09	12
SG,Dip	SBM-11	144964	Barometer	Sunoh	SBR121	1077	2017/11/10	36
SG,Dip	SOS-18	175822	Humidity Indicator	CUSTOM	CTH-201	-	2019/12/19	12
SG,Dip	SPG-03	146262	Pulse Generator	EM Test (Ametek)	UCS500N4	V0847104442	2019/11/13	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:

ESD: Electrostatic discharge,
RS: Radiated RF electromagnetic field,
EFT/B: Electrical fast transient burst,
SG: Surge,
CS: Radio-frequency conducted disturbances,
MF: Power frequency magnetic field,
Dip: Voltage dips and short interruptions

End of Report