TEST REPORT

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1	Test Report No		002471			
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3	Manufacturer	▪ Name	GlobTek (Suzhou) Co., Ltd			
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		▪ Telephone No	62790301-189	▪ Fax No	N/A	
4	Use of Report		For SABS COC application.			
5	Kind of Product		ITE /ICT POWER SUPPLY			
6	Model Name		GT-21097-3005			
7	Variant Model		GT-21097-5012, GT-21097-5015, GT-21097-5024			
8	Sample Receipt Date		Jun. 29, 2021			
9	Issuance Date		Oct. 08, 2021			
10	Test Period		Jun. 30, 2021 ~ Sep. 02, 2021			
11	Test Standard(method) used		**SANS 2332:2017** **SANS 61000-3-2:2009** **SANS 61000-3-3:2009** **SANS 2335:2018**			
12	Test Results		**Pass**			

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
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Conformation	Reviewed by Pike Lee EMC Test Engineer	Approved by Andy Chiu Authorized Signatory

REPORT REVISION HISTORY

Date	Revision	Page No
Sep. 13, 2021	Issued (1)	All
Oct. 08, 2021	Updated manufacturer information.	1

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1.0 General Product Description

1.0.1 Product Specification

No.	ITEM	APPLICATION
1	Test Sample	ITE /ICT POWER SUPPLY
2	Model	GT-21097-3005
3	Variant Model/Type No.	GT-21097-5012, GT-21097-5015, GT-21097-5024
4	Test Sample Serial Number	N/A
5	Dimensions (L x H x D)	117 mm x 58 mm x 33 mm
6	Maximum Clock Frequency	60Hz
7	Test Sample	Engineering Sample No.: SH2021062834, SH2021062834-1, SH2021062834-2, SH2021062834-3

1.0.2 Electrical Ratings

Input: 100-240V~, 50-60Hz 1.6A MAX

GT-21097-3005: Output: 5V⎓5A

GT-21097-5012: Output: 12V⎓4.17A

GT-21097-5015: Output: 15V⎓3.3A

GT-21097-5024: Output: 24V⎓2.1A

1.0.3 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

Power supply voltage

- ■ 230V/50 Hz / 1ϕ
- ☐ 400V/50 Hz 3PE
- ☐ 12 V DC
- ☐ 220V/50 Hz / 1ϕ
- ☐ 115V/60Hz / 1ϕ
- ☐ 400V/50 Hz 3NPE
- ☐ 24 V DC

1.1 Model Differences

The output voltage, power and current are different.

1.2 Device Modifications

Not applicable

1.3 Difference Table between Basic Model and Variant Models

Not applicable

1.4 EUT Configuration(s)

See Appendix A for individual test set-up configuration(s). The following peripheral devices and/or interface cables were connected during the measurement:

☒ Peripheral Devices

Device	Model No.	Serial No.	Manufacturer
Dummy Load	N/A	N/A	N/A

☒ Cable Description

No.	From		To		Type of Cable		
	Device	I/O Port	Device	I/O Port	Length (m)	Shielded or Unshielded	Ferrite Core [Y/N]
1	Adapter	AC IN	AC mains	N/A	1.8	U	N
2	EUT	DC	Dummy Load	DC	1.8	U	NOTE(1)

NOTE
(1) GT-21097-3005, GT-21097-5012 and GT-21097-5015 with ferrite core, and GT-21097-5024 without ferrite core.
(2) Shielded or Unshielded: Unshielded=U, Shielded=S

1.5 Test Software

N/A

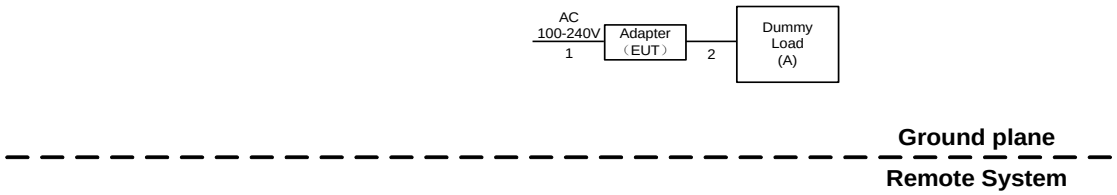
1.6 EUT Operating Mode(s)

Equipment under test was operated during the measurement under the following conditions:

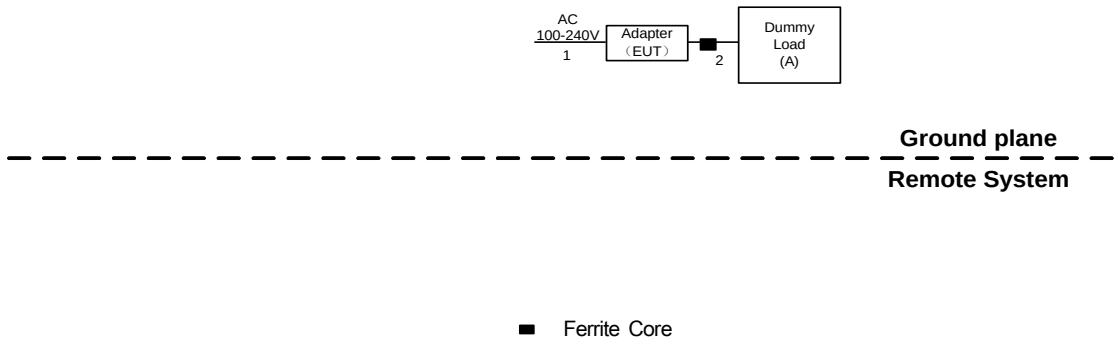
Operating Mode	Function	Test Item
1	FULL LOAD(Adapter: GT-21097-3005)	Article 3.1, 3.2, 3.3, 3.4, 3.5, 3.7, 3.8, 3.9, 3.10, 3.11, 3.12
2	FULL LOAD(Adapter: GT-21097-5024)	Pretest

1.7 Configuration

For GT-21097-3005:



GT-21097-5024:



1.8 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable, therefore, all test data recorded in this report is traceable.

1.9 Test Facility

The measurement facility is BTL Inc.

The sites are constructed in conformance with the requirements of **CISPR 16-1-4**.

1.10 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Registration Number	Logo
Taiwan	Taiwan Accreditation Forum (TAF)	**CISPR 32, CISPR 35, IEC 61000-3-2, IEC 61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11**	0659	ilac-MRA TAF Testing Laboratory 0659

1.11 Measurement Uncertainty

The reported uncertainty of measurement **y ± U**, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of **k=2**, providing a level of confidence of approximately 95%.
The measurement instrumentation uncertainty considerations contained in **CISPR 16-4-2**.
The BTL measurement uncertainty is less than the **CISPR 16-4-2** U_{CISPR} requirement.

1.11.1 Radiated disturbance (Up to 1 GHz)

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
CB11 (3m)	**CISPR 16-4-2**	30MHz ~ 200MHz	V	4.26
		30MHz ~ 200MHz	H	3.76
		200MHz ~ 1,000MHz	V	4.46
		200MHz ~ 1,000MHz	H	3.84

1.11.2 Conducted emissions AC mains power port

Test Site	Method	Measurement Frequency Range	U,(dB)
C05	**CISPR 16-4-2**	150 kHz ~ 30MHz	3.44

1.11.3 Voltage changes, voltage fluctuations and flicker

Test Site	Method	Test Item	U(%)
SR09	**IEC 61000-3-2 IEC 61000-3-3**	Voltage	1.28
		Current	0.42

1.11.4 Immunity

Test Site	Method	Test Item	U
SR02	**EN 61000-4-2**	Rise time	≤12.5 %
		Peak Current	≤6.0 %
		Current at 30ns	≤6.0 %
		Current at 60ns	≤6.0 %
CB17	**EN 61000-4-3**	General test 80MHz~1GHz 1GHz~6GHz	 2.10 dB 2.26 dB
SR01	**EN 61000-4-4**	voltage peak value(VP)	4.58 %
		voltage rise time (tr)	14.00 %
		voltage pulse width(pw)	11.40 %
		Pulse Freq.(kHz)	0.00 %
		Burst Duration(ms)	1.33 %
		Burst Period(ms)	0.07 %
		voltage peak value(VP)-with clamp(RJ-45)	12.04 %
		voltage rise time (tr) -with clamp(RJ-45)	2.00 %
		voltage pulse width(tw) -with clamp(RJ-45)	13.00 %
SR01	**EN 61000-4-5**	voltage peak value(VP)	8.99 %
		voltage rise time (Tfv)	13.25 %
		voltage duration time(td)	10.20 %
SR09	**EN 61000-4-6**	CDN M3 test process(3 power lines)	1.34 dB
		CDN M2 test process(2 power lines)	1.34 dB
SR01	**EN 61000-4-8**	PFMF mG Calibration	9.30 %
SR01	**EN IEC 61000-4-11**	DIP Amplitude	1.55 %
		DIP Time Event	1.00 %
		DIP Phase	1.22 %

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.
Our calculated Measurement Instrumentation Uncertainty is shown in the tables above. These are our U_{lab} values in **CISPR 16-4-2** terminology.
Since Table 1 of **CISPR 16-4-2** has values of measurement instrumentation uncertainty, called U_{CISPR}, as follows:
Conducted Disturbance (mains port) – 150 kHz – 30 MHz: 3.6 dB
Radiated Disturbance (electric field strength on an open area test site or alternative test site) – 30 MHz – 1000 MHz: 5.2 dB
It can be seen that our U_{lab} values are smaller than U_{CISPR}.

2.0 EMC Test Regulations/Standards

The tests were performed according to following regulations:

EMC – SANS 2332:2017
EMC – SANS 61000-3-2:2009
EMC – SANS 61000-3-3:2009
EMC – SANS 2335:2018

2.1 Emission and Immunity Test Regulations/Standards

Electromagnetic compatibility of multimedia equipment — Emission requirements

Electromagnetic compatibility (EMC)

Part 3-2: Limits — Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

Electromagnetic compatibility (EMC)

Part 3-3: Limits — Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16 A per phase and not subject to conditional connection

Information technology equipment — Immunity characteristics — Limits and methods of measurement

2.2 Purpose of Test

To determine whether the equipment under test fulfils the EMC emission and immunity requirements of the standards.

2.3 Name and Address of the Laboratory

Name: BTL Inc.
Address: No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)

2.4 Summary of Test Results

Applied standard	Title		Applied	Test Result
SANS 2332:2017	Radiated emissions up to 1 GHz		YES	**Pass**
	Radiated emissions above 1 GHz		NO	**N/A** **NOTE (2)**
	Radiated emissions from FM receivers		NO	**N/A** **NOTE (1)**
	Conducted emissions AC mains power port		YES	**Pass**
	Asymmetric mode conducted emissions	AAN	NO	**N/A** **NOTE (1)**
		Current Probe	NO	**N/A** **NOTE (1)**
		CVP	NO	**N/A** **NOTE (1)**
	Conducted differential voltage emissions		NO	**N/A** **NOTE (1)**

NOTE: (1) ”N/A” denotes test is not applicable in this Test Report.
(2) The EUT’s max operating frequency exceeds 108 MHz, so the test will be performed.

Applied standard	Title	Applied	Test Result
SANS 61000-3-2:2009	Harmonic current emissions	NO	**N/A** **NOTE (3)**
SANS 61000-3-3:2009	Voltage changes, voltage fluctuations and flicker	YES	**Pass**

NOTE: (1) ”N/A” denotes test is not applicable in this Test Report.
(2) The maximum clock frequency of the equipment is 60Hz, less than 108MHz, so the radiated emissions above 1 GHz does not need to be tested.
(3) For equipment with a rated power of 75 W or less, limits are not specified.

Applied standard	Title	Applied	Test Result
SANS 2335:2018	Electrostatic discharge immunity	YES	**Pass**
	Radiated, radio-frequency, electromagnetic field immunity	YES	**Pass**
	Electrical fast transient/burst immunity	YES	**Pass**
	Surge immunity	YES	**Pass**
	Immunity to conducted disturbances, induced by radio-frequency fields	YES	**Pass**
	Power frequency magnetic field immunity	YES	**Pass**
	Voltage dips, short interruptions and voltage variations immunity	YES	**Pass**

NOTE: (1) ”N/A” denotes test is not applicable in this Test Report.

3.0 Results of Individual Test

3.1 Radiated Disturbance (Up to 1 GHz)

3.1.1 Test Date

2021/08/19

3.1.2 Test Location

CB11: No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)

3.1.3 Limits for radiated disturbance

Table 1 – Requirements for radiated emissions at frequencies up to 1 GHz for Class A equipment.

Table clause	Frequency range MHz	Measurement			Class A limits dB(μV/m)
		Facility (see Table A.1)	Distance m	Detector type / bandwidth	
A2.1	30 to 230	OATS/SAC	10	Quasi Peak / 120 kHz	40
	230 to 1 000				47
A2.2	30 to 230	OATS/SAC	3		50
	230 to 1 000				57
A2.3	30 to 230	FAR	10	Quasi Peak / 120 kHz	42 to 35
	230 to 1 000				42
A2.4	30 to 230	FAR	3		52 to 45
	230 to 1 000				52
Apply only A2.1 or A2.2 or A2.3 or A2.4 across the entire frequency range.					

Table 2 – Requirements for radiated emissions at frequencies up to 1 GHz for Class B equipment.

Table clause	Frequency range MHz	Measurement			Class B limits dB(μV/m)
		Facility (see Table A.1)	Distance m	Detector type / bandwidth	
A4.1	30 to 230	OATS/SAC	10	Quasi Peak / 120 kHz	30
	230 to 1 000				37
A4.2	30 to 230	OATS/SAC	3		40
	230 to 1 000				47
A4.3	30 to 230	FAR	10	Quasi Peak / 120 kHz	32 to 25
	230 to 1 000				32
A4.4	30 to 230	FAR	3		42 to 35
	230 to 1 000				42
Apply only table clause A4.1 or A4.2 or A4.3 or A4.4 across the entire frequency range. These requirements are not applicable to the local oscillator and harmonics frequencies of equipment covered by Table A.6.					

The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)
Margin Level = Measurement Value - Limit Value

3.1.4 Test Procedure

The radiated emissions test will then be repeated on the open site or chamber to measure the amplitudes accurately and without the multiple reflections existing in the shielded room. The EUT and support equipment are set up on the turntable of 10 meter semi anechoic chamber. Desktop EUT are set up on a wooden stand 0.8 meter above the ground or floor-standing arrangement shall be placed on the horizontal ground reference plane. The test volume for a height of up to 30 cm may be obstructed by absorber placed on the ground plane.

Cables connecting to AE located outside the measurement area drop directly to, but be insulated from, the RGP (or turntable where applicable), and then be routed directly to the place where they leave the test site. The thickness of the insulation is not more than 150 mm. However, cables which would normally be bonded to ground should be bonded to the RGP in accordance with normal practice or the manufacturer's recommendation.

For the initial measurements, the receiving antenna is varied from 1-4 meter height and is changed in the vertical plane from vertical to horizontal polarization at each frequency. The highest emissions between 30 MHz to 1000 MHz were analyzed in details by operating the spectrum analyzer and/or EMI receiver in quasi-peak mode to determine the precise amplitude of the emissions.

At the highest amplitudes observed, the EUT is rotated in the horizontal plane while changing the antenna polarization in the vertical plane to maximize the reading. The interconnecting cables were arranged and moved to get the maximum measurement. Once the maximum reading is obtained, the antenna elevation and polarization will be varied between specified limits to maximize the readings.
All of the interface cables were manipulated according to CISPR 32 requirements.

3.1.5 Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
Log-Bicon Antenna	VULB 9168	Schwarzbeck	9168-1207	Jan. 24, 2022	YES
Attenuator	EMCI-N-6-05	Inmet	AT-N0690	Jan. 24, 2022	YES
Pre-Amplifier	EMC001330	EMCI	980144	May 11, 2022	YES
Test Cable	EMCCFD400-NM-NM-8000	EMCI	200346	May 11, 2022	YES
Test Cable	EMC104-SM-SM-2500	EMCI	150303	May 11, 2022	YES
Test Cable	EMC104-SM-NM-1000	EMCI	170311	May 11, 2022	YES
EMI Test Receiver	N9038A	Keysight	MY54130009	Jun. 07, 2022	YES
Measurement Software	EZ_EMC (Ver. NB-03A1-01)	Farad	N/A	N/A	YES

3.1.6 Test Software

N/A

3.1.7 Frequency Range of Measurement

30 MHz to 1 GHz

3.1.8 Instrument Setting

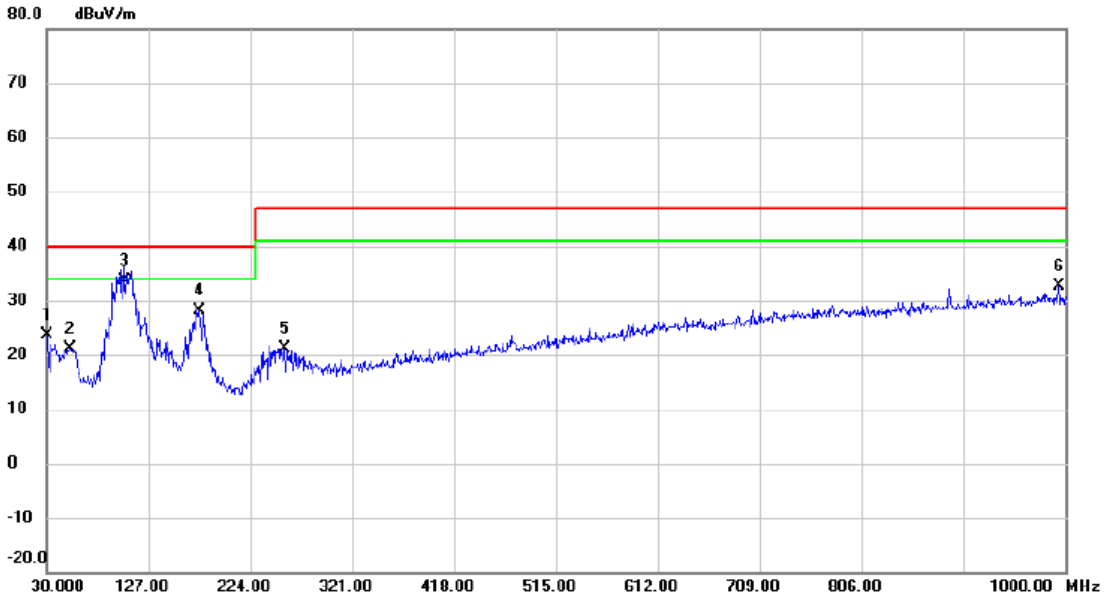
Band Width: 120 kHz.

3.1.9 Climate Condition

Temperature: 23°C
Relative Humidity: 52%

■ Operating Mode 1: Vertical

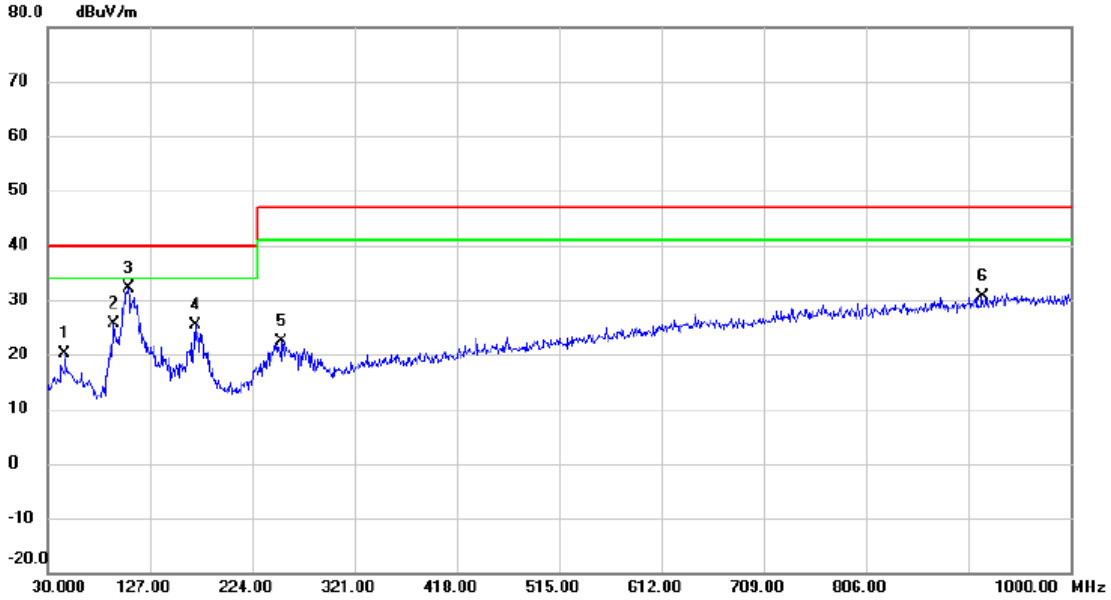
▪ Test Data & Graph



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		30.0000	36.57	-12.87	23.70	40.00	-16.30	QP	
2		52.3100	32.97	-11.79	21.18	40.00	-18.82	QP	
3	*	103.7200	49.63	-16.11	33.52	40.00	-6.48	QP	
4		175.9850	40.68	-12.58	28.10	40.00	-11.90	QP	
5		256.9800	33.47	-12.33	21.14	47.00	-25.86	QP	
6		994.1800	31.12	1.55	32.67	47.00	-14.33	QP	

■ Operating Mode 1: Horizontal

▪ Test Data & Graph



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		46.4900	31.91	-11.82	20.09	40.00	-19.91	QP	
2		93.0500	43.21	-17.68	25.53	40.00	-14.47	QP	
3	*	106.6300	47.57	-15.56	32.01	40.00	-7.99	QP	
4		169.6800	37.23	-11.91	25.32	40.00	-14.68	QP	
5		252.1300	34.96	-12.54	22.42	47.00	-24.58	QP	
6		916.0950	29.89	0.72	30.61	47.00	-16.39	QP	

3.2 Conducted emissions AC mains power port

3.2.1 Test Date

2021/08/20

3.2.2 Test Location

C05: No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)

3.2.3 Limits of conducted emissions AC mains power port

Table 5 – Requirements for conducted emissions from the AC mains power ports of Class A equipment.

Applicable to 1. AC mains power ports (3.1.1)				
Table clause	**Frequency range MHz**	**Coupling device (see Table A.8)**	**Detector type / bandwidth**	**Class A limits dB(μV)**
A9.1	0,15 to 0,5	AMN	Quasi Peak / 9 kHz	79
	0,5 to 30			73
A9.2	0,15 to 0,5	AMN	Average / 9 kHz	66
	0,5 to 30			60
Apply A9.1 and A9.2 across the entire frequency range.				

Table 6 – Requirements for conducted emissions from the AC mains power ports of Class B equipment.

Applicable to 1. AC mains power ports (3.1.1)				
Table clause	**Frequency range MHz**	**Coupling device (see Table A.8)**	**Detector type / bandwidth**	**Class B limits dB(μV)**
A10.1	0,15 to 0,5	AMN	Quasi Peak / 9 kHz	66 to 56
	0,5 to 5			56
	5 to 30			60
A10.2	0,15 to 0,5	AMN	Average / 9 kHz	56 to 46
	0,5 to 5			46
	5 to 30			50
Apply A10.1 and A10.2 across the entire frequency range.				

The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor (if use)
Margin Level = Measurement Value – Limit Value

3.2.4 Test Procedure

The EUT was placed on non-conduction table, which is 0.8 meters above an earth-grounded.

Power to the EUT was provided through the LISN which has the Impedance (50ohm/50uH) vs. Frequency Characteristic in accordance with the standard. Power to the LISNs were filtered to eliminate ambient signal interference and these filters were bonded to the ground plane. Peripheral equipment required to provide a functional system (support equipment) for EUT testing was powered from the second LISN through a ganged, metal power outlet box which is bonded to the ground plane at the LISN.

Cables connecting to AE located outside the measurement area drop directly to, but be insulated from, the R GP (or turntable where applicable), and then be routed directly to the place where they leave the test site. Th e thickness of the insulation is not more than 150 mm. However, cables which would normally be bonded to ground should be bonded to the RGP in accordance with normal practice or the manufacturer's recommenda tion.

The interconnecting cables were arranged and moved to get the maximum measurement. Both the line of power cord, hot and neutral, were measured. All of the interface cables were manipulated according to CISPR 32 requirements.

The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information which could be useful in reducing their amplitude.

3.2.5 Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
TWO-LINE V-NETWORK	ENV216	R&S	101051	May 25, 2022	YES
Test Cable	EMCRG58-BM-BM-9000	EMCI	210501	May 02, 2022	YES
EMI Test Receiver	ESR7	R&S	101433	Dec. 10, 2021	YES
Measurement Software	EZ_EMC (Ver. NB-03A1-01)	Farad	N/A	N/A	YES

3.2.6 Test Software

N/A

3.2.7 Frequency Range of Measurement

150 kHz to 30 MHz

3.2.8 Instrument Setting

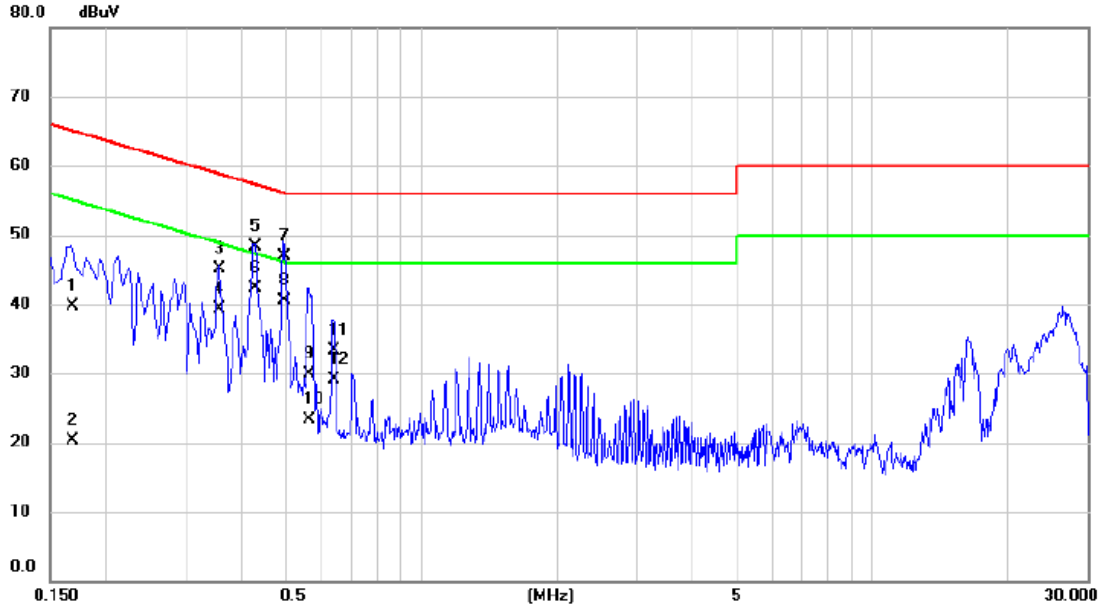
Band Width: 9 kHz.

3.2.9 Climate Condition

Temperature: 25°C
Relative Humidity: 57%

■ Operating Mode 1: Line L

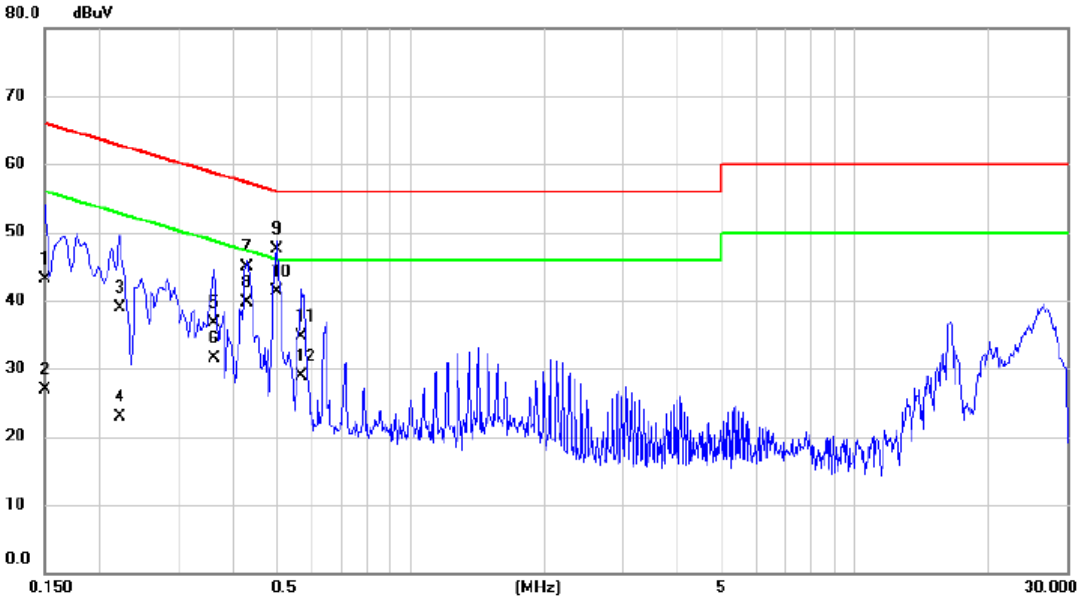
▪ Test Data & Graph



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1680	29.95	9.68	39.63	65.06	-25.43	QP	
2		0.1680	10.55	9.68	20.23	55.06	-34.83	AVG	
3		0.3570	35.40	9.68	45.08	58.80	-13.72	QP	
4		0.3570	29.60	9.68	39.28	48.80	-9.52	AVG	
5		0.4290	38.70	9.68	48.38	57.27	-8.89	QP	
6	*	0.4290	32.70	9.68	42.38	47.27	-4.89	AVG	
7		0.4965	37.21	9.68	46.89	56.06	-9.17	QP	
8		0.4965	30.91	9.68	40.59	46.06	-5.47	AVG	
9		0.5640	20.22	9.68	29.90	56.00	-26.10	QP	
10		0.5640	13.72	9.68	23.40	46.00	-22.60	AVG	
11		0.6404	23.53	9.68	33.21	56.00	-22.79	QP	
12		0.6404	19.33	9.68	29.01	46.00	-16.99	AVG	

■ Operating Mode 1: Line N

▪ Test Data & Graph



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	33.40	9.68	43.08	66.00	-22.92	QP	
2		0.1500	17.20	9.68	26.88	56.00	-29.12	AVG	
3		0.2220	29.14	9.67	38.81	62.74	-23.93	QP	
4		0.2220	13.24	9.67	22.91	52.74	-29.83	AVG	
5		0.3615	26.97	9.68	36.65	58.69	-22.04	QP	
6		0.3615	21.87	9.68	31.55	48.69	-17.14	AVG	
7		0.4290	35.28	9.68	44.96	57.27	-12.31	QP	
8		0.4290	29.98	9.68	39.66	47.27	-7.61	AVG	
9		0.5010	37.79	9.68	47.47	56.00	-8.53	QP	
10	*	0.5010	31.69	9.68	41.37	46.00	-4.63	AVG	
11		0.5685	25.00	9.68	34.68	56.00	-21.32	QP	
12		0.5685	19.30	9.68	28.98	46.00	-17.02	AVG	

3.3 Harmonic current emissions

3.3.1 Test Data

For equipment with a rated power of 75 W or less, limits are not specified. So the harmonic current emissions do not need to be tested.

3.4 Voltage changes, voltage fluctuations and flicker

3.4.1 Test Date

2021/08/28

3.4.2 Test Location

C05: No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)

3.4.3 Limits for voltage changes, voltage fluctuations and flicker

Table 9 – Limits for voltage changes, voltage fluctuations and flicker.

Tests	Limits	Descriptions
Pst	≤ 1.0, Tp= 10 min.	Short Term Flicker Indicator
Plt	≤ 0.65, Tp=2 hr.	Long Term Flicker Indicator
dc	≤ 3.3%	Relative Steady-State V-change
dmax	≤ 4%	Maximum Relative V-change
d (t)	≤ 500 ms	Relative V-change characteristic

3.4.4 Conditional Testing Procedure

Tests was performed according to the Test Conditions/Assessment of Voltage Fluctuations specified in **SANS 61000-3-3/IEC 61000-3-3** depend on which standard adopted for compliance measurement.

All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter.

3.4.5 Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
Signal conditioning unit	PACS-1	California	72345	Mar. 10, 2022	YES
Power Source	3001iX	California	56310	Mar. 10, 2022	YES
Measurement Software	CTS 4(Version 4.26)	TESEQ	N/A	N/A	YES

3.4.6 Test Software

N/A

3.4.7 Climate Condition

Temperature: 26°C
Relative Humidity: 57%

■ Operating Mode 1:

▪ Test Data & Graph

Pst and limit line **European Limits**



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	229.59			
Highest dt (%):		Test limit (%):		
T-max (mS):	0	Test limit (mS):	500.0	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	0.00	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.188	Test limit:	1.000	Pass
Highest Plt (2 hr. period):	0.082	Test limit:	0.650	Pass

3.5 Immunity Performance Criteria and Requirements

3.5.1 Performance Criteria

Criterion A	The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment 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, and by what the user product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Criterion B	After the test, the equipment shall continue to operate as intended without operator Intervention. No degradation of performance or loss of function is allowed, after the application of the phenomenon below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state if stored data allowed to persist after the test. 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, and by what the user may reasonably expect from the equipment if used as intended.
Criterion C	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

3.5.2 Requirements

Table 3 – Requirements for immunity

Environmental phenomenon and	Test Specification	Test Ports	Performance Criterion
Electrostatic discharge immunity	±8 kV air discharge ±4 kV contact discharge	Enclosure port	B
	±4 kV HCP discharge ±4 kV VCP discharge		B
Radiated, radio-frequency, electromagnetic field immunity	80 MHz to 1000 MHz 3V/m(unmodulated, r.m.s), 1 kHz, 80%, AM modulated	Enclosure port	A
	1800 MHz, 2600MHz, 3500 MHz, 5000MHz(±1 %) 3V/m(unmodulated, r.m.s), 1 kHz, 80%, AM modulated	Enclosure port	A
Electrical fast transient/burst immunity	±0.5kV(peak) 5/50ns Tr/Th 5kHz Repetition Frequency (100kHz Repetition Frequency for xDSL port)	Analogue/digital data ports	B
	±0.5kV(peak) 5/50ns Tr/Th 5kHz Repetition Frequency	DC network power ports	B
	±1 kV(peak) 5/50ns Tr/Th 5kHz Repetition Frequency	AC mains power ports	B

Surge immunity	Port Type: unshielded symmetrical Apply: lines to ground		
	Primary protection is Intended ±1 kV and ±4 kV 10/700(5/320)Tr/Th µs	Analogue/digital data ports	C
	Primary protection is not Intended ±1 kV 10/700(5/320) Tr/Th µs		C
	Port type: coaxial or shielded Apply: shield to ground		
	±0.5 kV 1.2/50(8/20) Tr/Th µs	Analogue/digital data ports	B
	line to reference ground for each individual line: ±0.5 kV(peak) 1.2/50(8/20) Tr/Th µs	DC network power ports	B
	±1 kV(peak) 1.2/50(8/20) Tr/Th µs (line to line) ±2 kV(peak) 1.2/50(8/20) Tr/Th µs (line to earth or ground)	AC mains power ports	B
Immunity to conducted disturbances, induced by radio-frequency fields	0.15 MHz to 10 MHz 3V(unmodulated, r.m.s), 10 MHz to 30 MHz 3V to 1V(unmodulated, r.m.s), 30 MHz to 80 MHz 1V(unmodulated, r.m.s), 1kHz 80%, AM 150Ω source impedance	Analogue/digital data ports	A
	0.15 MHz to 10 MHz 3V(unmodulated, r.m.s), 10 MHz to 30 MHz 3V to 1V(unmodulated, r.m.s), 30 MHz to 80 MHz 1V(unmodulated, r.m.s), 1kHz 80%, AM 150Ω source impedance	DC network power ports	A
	0.15 MHz to 10 MHz 3V(unmodulated, r.m.s), 10 MHz to 30 MHz 3V to 1V(unmodulated, r.m.s), 30 MHz to 80 MHz 1V(unmodulated, r.m.s), 1kHz 80%, AM 150Ω source impedance	AC mains power ports	A

Power frequency magnetic field immunity	50, 60 Hz, 1 A/m (r.m.s)	Enclosure port	A
Voltage dips, short interruptions and voltage variations immunity	Voltage dips: Residual voltage < 5% 0.5 Cycles Residual voltage < 70% 25 Cycles (50Hz), 30 Cycles (60Hz) Voltage interruptions: Residual voltage < 5% 250 Cycles (50Hz), 300 Cycles (60Hz)	Input a.c. power ports	B C C

3.6 Electrostatic discharge immunity

3.6.1 Test Date

2021/08/24

3.6.2 Test Location

SR02: No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)

3.6.3 Test Specification

Discharge Impedance	330 ohm / 150 pF
Required Performance	B
Discharge Voltage	Air Discharge: ±2 kV, ±4 kV, ±8 kV (Direct) Contact Discharge: ±2 kV, ±4 kV (Indirect)
Polarity	Positive & Negative
Number of Discharge	Air Discharge: min. 20 times at each test point Contact Discharge: min. 20 times at each test point
Discharge Mode	Single Discharge
Discharge Period	1 second minimum

3.6.4 Conditional Testing Procedure

The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

a. The test shall be performed with single discharges. On each pre-selected point at least 10single discharges (in the most sensitive polarity) shall be applied.
NOTE 1 The minimum number of discharges applied is depending on the EUT; for products with synchronized circuits the number of discharges should be larger. For the time interval between successive single discharges an initial value of 1 s is recommended. Longer intervals may be necessary to determine whether a system failure
has occurred. NOTE 2 The points to which the discharges should be applied may be selected by means of an exploration carried out at a repetition rate of 20 discharges per second, or more.
Vertical Coupling Plane (VCP):
The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the Discharge Electrode touching the coupling plane.
The four faces of the EUT will be performed with electrostatic discharge.
Horizontal Coupling Plane (HCP):
The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane.
The four faces of the EUT will be performed with electrostatic discharge.

b. Air discharges at insulation surfaces of the EUT.
It was at least ten single discharges with positive and negative at the same selected point.

3.6.5 Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
ESD Simulator	GT-30RA	NoiseKen	ESS20X2776	Dec. 29, 2021	YES

3.6.6 Test Software

N/A

3.6.7 Climate Condition

Temperature: 25˚C
Relative Humidity: 42%
Atmospheric Pressure: 1008hPa

■ Operating Mode 1:

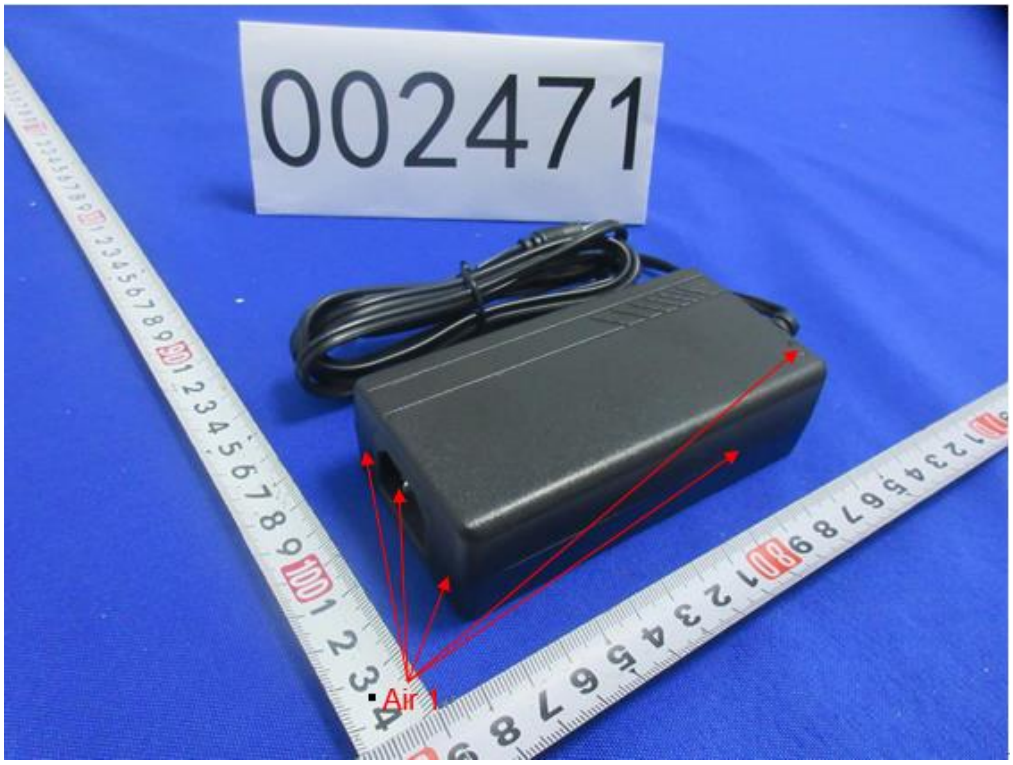
▪ Test Data & Graph

Mode	Air Discharge								Contact Discharge							
Level	2 kV		4 kV		8 kV		15 kV		2 kV		4 kV		6 kV		8 kV	
Location	P	N	P	N	P	N	P	N	P	N	P	N	P	N	P	N
1	A	A	A	A	A	A	-	-	-	-	-	-	-	-	-	-
2	A	A	A	A	A	A	-	-	-	-	-	-	-	-	-	-
Perform Criterion	B						-		-				-			
Result	A						-		-				-			
Judgment	PASS						-		-				-			

Mode	HCP Discharge								VCP Discharge							
Level	2 kV		4 kV		6 kV		8 kV		2 kV		4 kV		6 kV		8 kV	
Location	P	N	P	N	P	N	P	N	P	N	P	N	P	N	P	N
1	A	A	A	A	-	-	-	-	A	A	A	A	-	-	-	-
2	A	A	A	A	-	-	-	-	A	A	A	A	-	-	-	-
3	A	A	A	A	-	-	-	-	A	A	A	A	-	-	-	-
4	A	A	A	A	-	-	-	-	A	A	A	A	-	-	-	-
Perform Criterion	B				-				B				-			
Result	A				-				A				-			
Judgment	PASS				-				PASS				-			

NOTE: (1) P/N denotes the Positive/Negative polarity of the output voltage.
(2) Test condition:
Air discharges: Minimum 20 times (Positive/Negative) at each point.
Direct/Indirect (HCP/VCP) discharges: Minimum 20 times (Positive/Negative) at each point.
(3) Test location(s) in which discharge (Air and contact discharge) to be applied illustrated by photos shown in next page(s)
(4) The Indirect (HCP/VCP) discharges description of test point as following:
1. left side; 2.right side; 3.front side; 4.rear side.
(5) N/A - denotes test is not applicable in this test report

PHOTO(S) SHOWN THE LOCATION(S) OF ESD EVALUATED





3.7 Radiated, radio-frequency, electromagnetic field immunity

3.7.1 Test Date

2021/08/21

3.7.2 Test Location

CB17: No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)

3.7.3 Test Specification

Required Performance	A
Frequency Range	80 MHz - 1000 MHz 1800 MHz, 2600 MHz, 3500 MHz, 5000MHz
Field Strength	3 V/m (unmodulated, r.m.s.)
Modulation	1 kHz Sine Wave, 80%, AM Modulation
Frequency Step	1% of fundamental
Polarity of Antenna	Horizontal and Vertical
Test Distance	3 m
Antenna Height	1.55 m
Dwell Time	at least 3 seconds

3.7.4 Conditional Testing Procedure

The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber.
The testing distance from antenna to the EUT was 3 meters.
The other condition as following manner:

a. The field strength is 3 V/m (unmodulated, r.m.s.).
b. The frequency ranges are swept with the signal 80% amplitude modulated with a 1 kHz sine wave. The rate of sweep did not exceed 1.5x 10-3 decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
d. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

3.7.5 Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
Signal Generator	AT1080	KEYSIGHT	MY56200462	Aug. 09, 2022	YES
Log-Periodic Antenna	80RF1000-300	AR	320290	N/A	YES
Power Amplifier	STLP 9149	AMETEK	1079823	N/A	YES
Stacked Microwave Log.-Per. Antenna	AS0860B-50/50	SCHWARZBECK	524	N/A	YES
Power Amplifier	SMP2	AMETEK	1081874	N/A	YES
Readout Unit	WPF8	WAVECONTROL	20SN1431	Feb. 08, 2022	YES
E-Field Probe	4232A	WAVECONTROL	20WP041180	Feb. 08, 2022	YES
RF Power Meter	51075A	BOONTON	12871	Nov. 19, 2021	YES
Power Sensor	51075A	BOONTON	36942	Nov. 19, 2021	YES
Power Sensor	AT1080	BOONTON	36943	Nov. 19, 2021	YES
Measurement Software	i2(Version 5.161006)	AUDIX	N/A	N/A	YES

3.7.6 Test Software

N/A

3.7.7 Climate Condition

Temperature: 24°C
Relative Humidity: 60%

■ Operating Mode 1:

▪ Test Data

Frequency (MHz)	Applied Voltage(V/m) – 80% AM 1kHz	Polarity	Azimuth	Criterion	Observation	Result
80~1000	3	V & H	Rear	A	A	PASS
			Front		A	
			Left		A	
			Right		A	
1800(±1%)	3	V & H	Rear	A	A	PASS
			Front		A	
			Left		A	
			Right		A	
2600(±1%)	3	V & H	Rear	A	A	PASS
			Front		A	
			Left		A	
			Right		A	
3500(±1%)	3	V & H	Rear	A	A	PASS
			Front		A	
			Left		A	
			Right		A	
5000(±1%)	3	V & H	Rear	A	A	PASS
			Front		A	
			Left		A	
			Right		A	

NOTE: (1) N/A - denotes test is not applicable in this test report

3.8 Electrical fast transient/burst immunity

3.8.1 Test Date

2021/08/23

3.8.2 Test Location

SR01: No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)

3.8.3 Test Specification

Required Performance	B
Test Voltage	AC mains power ports: ±1 kV
Polarity	Positive & Negative
Impulse Frequency	5 kHz: except for xDSL ports
Impulse Wave shape	5/50 ns
Burst Duration	15 ms
Burst Period	300 ms
Test Duration	Not less than 1 min.
Dwell Time	at least 3 seconds

3.8.4 Conditional Testing Procedure

The EUT and support equipment(s) are placed on a table that is 0.8 meter high above a metal ground plane and should be located 0.1 m+/- 0.01m high above the Ground Reference Plane (1m*1m min. and 0.65mm thick min).
The other condition as following manner:
a. Both positive and negative polarity discharges were applied.
b. The duration time of each test sequential was 1 minute.

3.8.5 Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
EMC Immunity Test System	NSG 3060	TESEQ	4026	Nov. 17, 2021	YES
EMC Immunity Test System	CDN 3061	TESEQ	5012	Nov. 17, 2021	YES
Single motor driven variable transformer	VAR 3005-S16	TESEQ	3009	Nov. 17, 2021	YES
Measurement Software	SUI 3000 (V02.31)	TESEQ	N/A	N/A	YES

3.8.6 Test Software

N/A

3.8.7 Climate Condition

Temperature: 25˚C
Relative Humidity: 64%

■ Operating Mode 1:

▪ Test Data

AC Power Ports –5/50Tr/Th ns						
Tested on	Test Voltage(kV)		Pulse Rate	Criterion	Observation	Result
L	+/-	1	5kHz	B	A	PASS
N	+/-	1	5kHz	B	A	
PE	+/-	1	5kHz	B	A	
L+N	+/-	1	5kHz	B	A	
L+PE	+/-	1	5kHz	B	A	
N+PE	+/-	1	5kHz	B	A	
L+N+PE	+/-	1	5kHz	B	A	

NOTE: (1) +/- denotes the Positive/Negative polarity of the output voltage.
(2) N/A - denotes test is not applicable in this test report

3.9 Surge immunity

3.9.1 Test Date

2021/08/23

3.9.2 Test Location

SR01: No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)

3.9.3 Test Specification

Required Performance	B
Waveform	Input a.c. power ports: 1.2/50 µs Open Circuit Voltage 8 /20 µs Short Circuit Current
Test Voltage	Input a.c. power ports: Line to line: ±1 kV Line to earth: ±2 kV
Surge Input/Output	L-N, L-PE, N-PE
Generator Source Impedance	2 Ω of the low-voltage power supply network. 12 Ω (10Ω+2Ω) of the low-voltage power supply network and ground.
Phase Angle and Polarity:	Five positive pulses line-to-neutral at 90°phase Five negative pulses line-to-neutral at 270°phase
Pulse Repetition Rate	1 time / min. (maximum)
Number of Tests	5 positive and 5 negative at selected points

3.9.4 Conditional Testing Procedure

a. For EUT power supply:
The surge is to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks shall be 2meters in length (or shorter).

b. For test applied to unshielded unsymmetrically operated interconnection lines of EUT:
The surge is applied to the lines via the capacitive coupling. The coupling /decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

c. For test applied to unshielded symmetrically operated interconnection /telecommunication lines of EUT:
The surge is applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor cannot be specified. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

3.9.5 Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
EMC Immunity Test System	NSG 3060	TESEQ	4026	Nov. 17, 2021	YES
EMC Immunity Test System	CDN 3061	TESEQ	5012	Nov. 17, 2021	YES
Single motor driven variable transformer	VAR 3005-S16	TESEQ	3009	Nov. 17, 2021	YES
Measurement Software	SUI 3000 (V02.31)	TESEQ	N/A	N/A	YES

3.9.6 Test Software

N/A

3.9.7 Climate Condition

Temperature: 25°C
Relative Humidity: 64%

■ Operating Mode 1:

▪ Test Data

Test Result for AC Power – 1.2/50(8/20)Tr/Thμs									
Tested on	Phase	Polarity	Test Voltage(kV)				Criterion	Observation	Result
			0.5	1	2	4			
L-N	90°	+	-	A	-	-	B	A	PASS
	270°	-	-	A	-	-			
L-PE	90°	+	-	-	A	-	B	A	PASS
	270°	-	-	-	A	-			
N-PE	90°	+	-	-	A	-	B	A	PASS
	270°	-	-	-	A	-			

NOTE: (1) Polarity and Numbers of Impulses: 5 Pst / Ngt at each tested mode.
(2) N/A - denotes test is not applicable in this test report

3.10 Immunity to conducted disturbances, induced by radio-frequency fields

3.10.1 Test Date

2021/08/25

3.10.2 Test Location

SR01: No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)

3.10.3 Test Specification

Required Performance	A
Frequency Range	0.15 to 80 MHz
Field Strength	3 V (unmodulated, r.m.s.)
Modulation	1 kHz Sine Wave, 80 %, AM Modulation
Frequency Step	1 % of fundamental
Dwell Time	at least 3 seconds

3.10.4 Conditional Testing Procedure

The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1 m x 1 m minimum and 0.65 mm thick minimum.
The other condition as following manner:

a. The field strength is 3 V (unmodulated, r.m.s.).
b. The frequency range is swept from 0.15 to 80 MHz, with the signal 80% amplitude modulated with a 1 kHz sine wave. The rate of sweep did not exceed 1.5 x 10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1 % of fundamental.
c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.

3.10.5 Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
Test System for Conducted and Radiated Immunity	NSG 4070	TESEQ	30593	Aug. 02, 2022	YES
CDN (M3)	CDN M016	TESEQ	42157	Dec. 22, 2021	YES
Measurement Software	NSG 4070 Control Program(Version 1.2)	TESEQ	N/A	N/A	YES

3.10.6 Test Software

N/A

3.10.7 Climate Condition

Temperature: 26°C
Relative Humidity: 57%

■ Operating Mode 1:

▪ Test Data

Test Result for Power – 80% AM 1kHz					
Tested on	Frequency (MHz)	Applied Voltage (V (unmodulated, r.m.s.))	Criterion	Observation	Result
AC	0.15 - 10	3	A	A	PASS
	10 - 30	3 - 1	A	A	PASS
	30 - 80	1	A	A	PASS

NOTE: (1) N/A - denotes test is not applicable in this test report

3.11 Power frequency magnetic field immunity

3.11.1 Test Date

2021/08/26

3.11.2 Test Location

SR03: No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)

3.11.3 Test Specification

Required Performance	A
Frequency Range	50 or 60 Hz
Field Strength	1 A/m
Observation Time	1 minute
Inductance Coil	Rectangular type, 1mx1m

3.11.4 Conditional Testing Procedure

The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1 m x 1 m minimum and 0.65 mm thick minimum.
The other condition as following manner:

a. The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.
b. The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.

3.11.5 Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
Triaxial ELF Magnetic Fiedl Meter	4190	F.W. BELL	0932008	Jun. 14, 2022	YES
Magnetic Field Test Generator	MFO 6501	TESEQ	1010	Nov. 07, 2021	YES
Magnetic Field Immunity Loop	INA 702	TESEQ	334	Nov. 07, 2021	YES

3.11.6 Test Software

N/A

3.11.7 Climate Condition

Temperature: 21˚C
Relative Humidity: 52%

■ Operating Mode 1:

▪ Test Data

Test Frequency (Hz)	Magnetic Field (A/m)	Direction	Criterion	Observation	Result
50	1	X Y Z	A	A	PASS
60	1	X Y Z	A	A	PASS

NOTE: (1) N/A - denotes test is not applicable in this test report

3.12 Voltage dips, short interruptions and voltage variations immunity

3.12.1 Test Date

2021/08/23

3.12.2 Test Location

SR01: No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)

3.12.3 Test Specification

Required Performance	Voltage dips: (B) Residual voltage < 5% 0.5 cycles (C) Residual voltage70% 25 cycles(50Hz), 30 cycles(60Hz) Voltage interruptions: (C) Residual voltage < 5% 250 cycles(50Hz), 300 cycles(60Hz)
Test Duration Time	Minimum three test events in sequence
Interval between Event	10 s minimum
Phase Angle	0°/180°
Test Cycle	3 times

3.12.4 Conditional Testing Procedure

The EUT shall be tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10 s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

3.12.5 Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
EMC Immunity Test System	NSG 3060	TESEQ	4026	Nov. 17, 2021	YES
EMC Immunity Test System	CDN 3061	TESEQ	5012	Nov. 17, 2021	YES
Single motor driven variable transformer	VAR 3005-S16	TESEQ	3009	Nov. 17, 2021	YES
Measurement Software	SUI 3000(V02.31)	TESEQ	N/A	N/A	YES

3.12.6 Test Software

N/A

3.12.7 Climate Condition

Temperature: 25°C
Relative Humidity: 64%

■ Operating Mode 1:

▪ Test Data

100Vac/50Hz				
Voltage Residual	Periods	Criterion	Observation	Result
＜5%	0.5	B	A	PASS
70%	25	C	A	
＜5%	250	C	C	

230Vac/50Hz				
Voltage Residual	Periods	Criterion	Observation	Result
＜5%	0.5	B	A	PASS
70%	25	C	A	
＜5%	250	C	C	

240Vac/50Hz				
Voltage Residual	Periods	Criterion	Observation	Result
＜5%	0.5	B	A	PASS
70%	25	C	A	
＜5%	250	C	C	

NOTE: (1) N/A - denotes test is not applicable in this test report

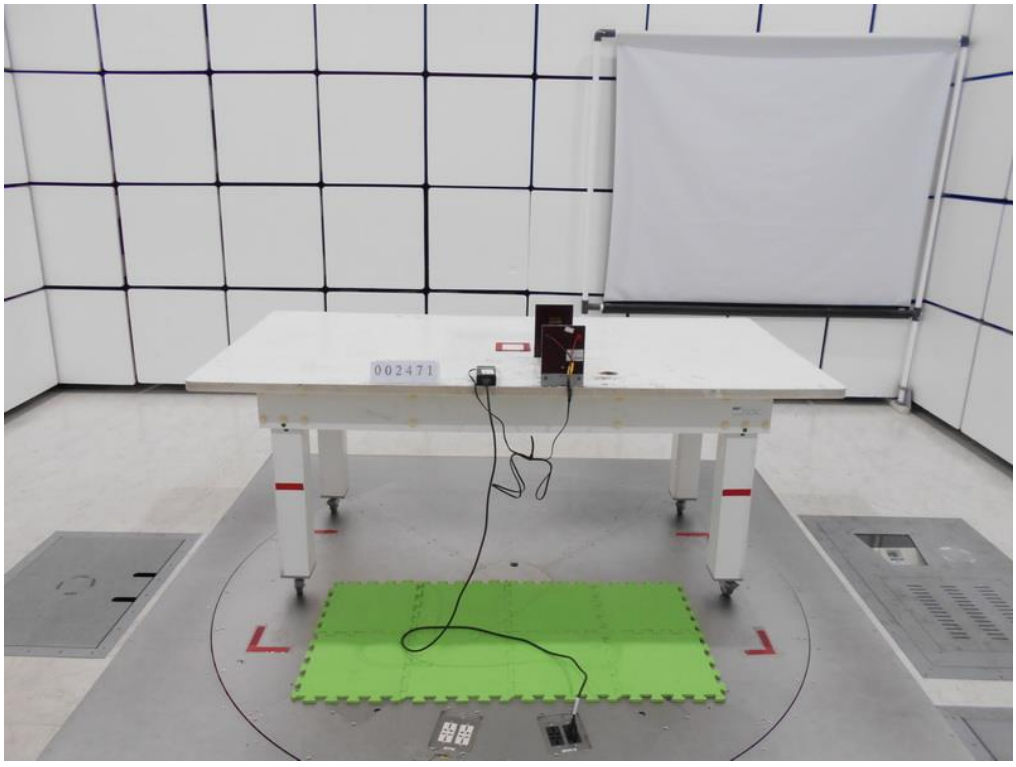
4.0 APPENDIX A - Test Setup Photos and Configuration

CONTINUE ON NEXT PAGE

4.1 Radiated disturbance (Up to 1 GHz)



[Front]

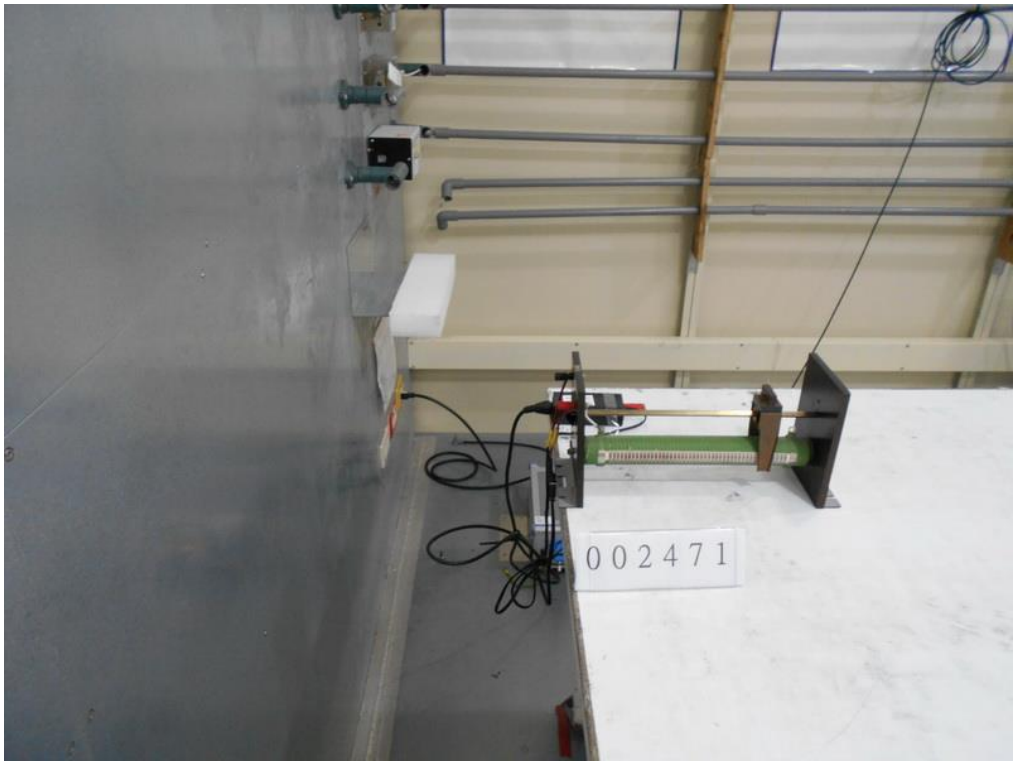


[Rear]

4.2 Conducted emissions AC mains power port

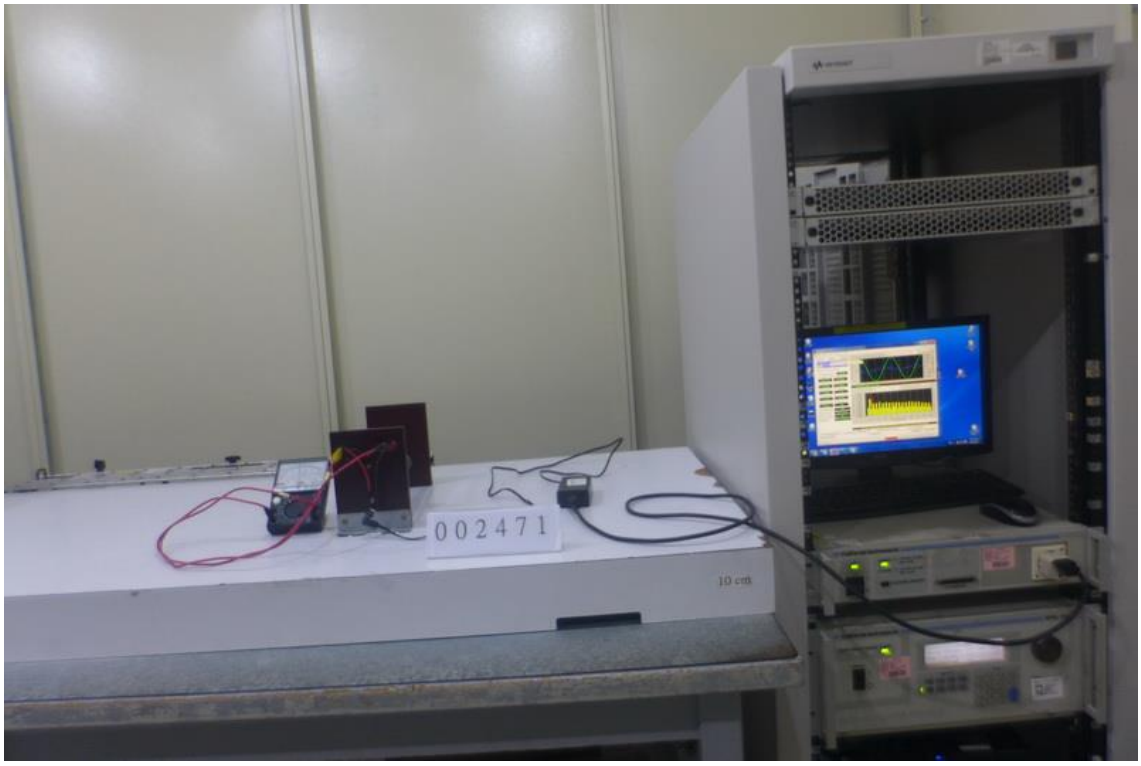


[Front]

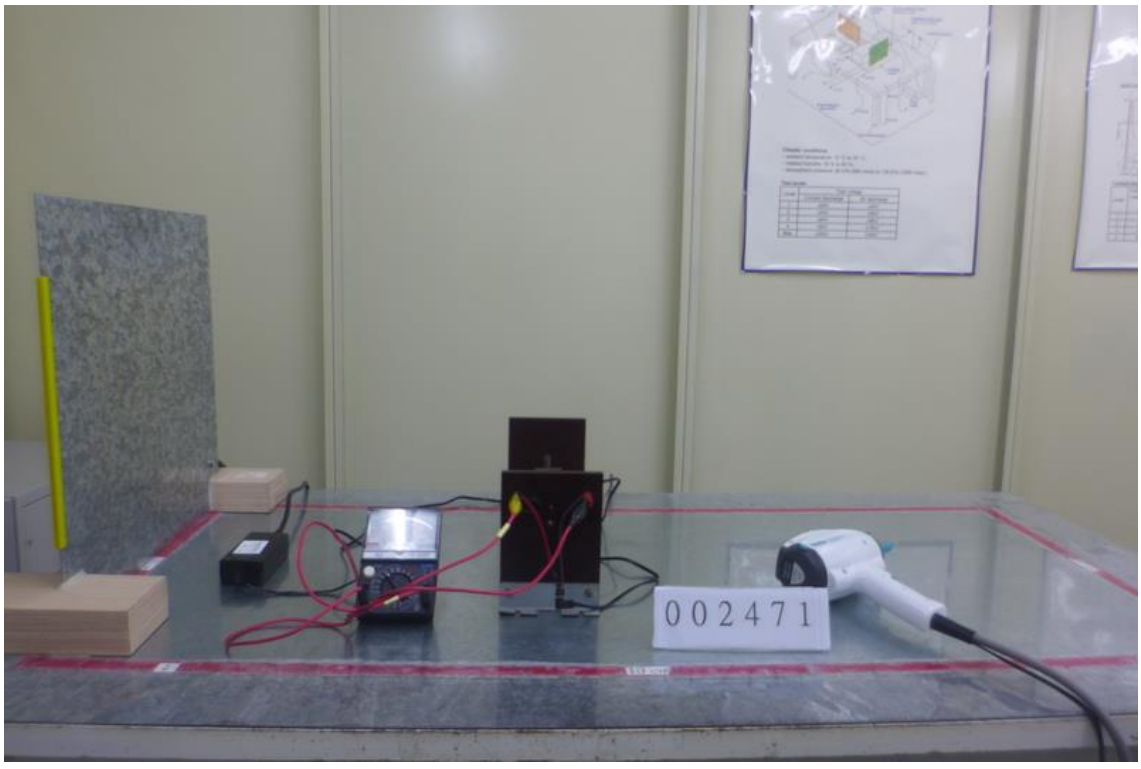


[Rear]

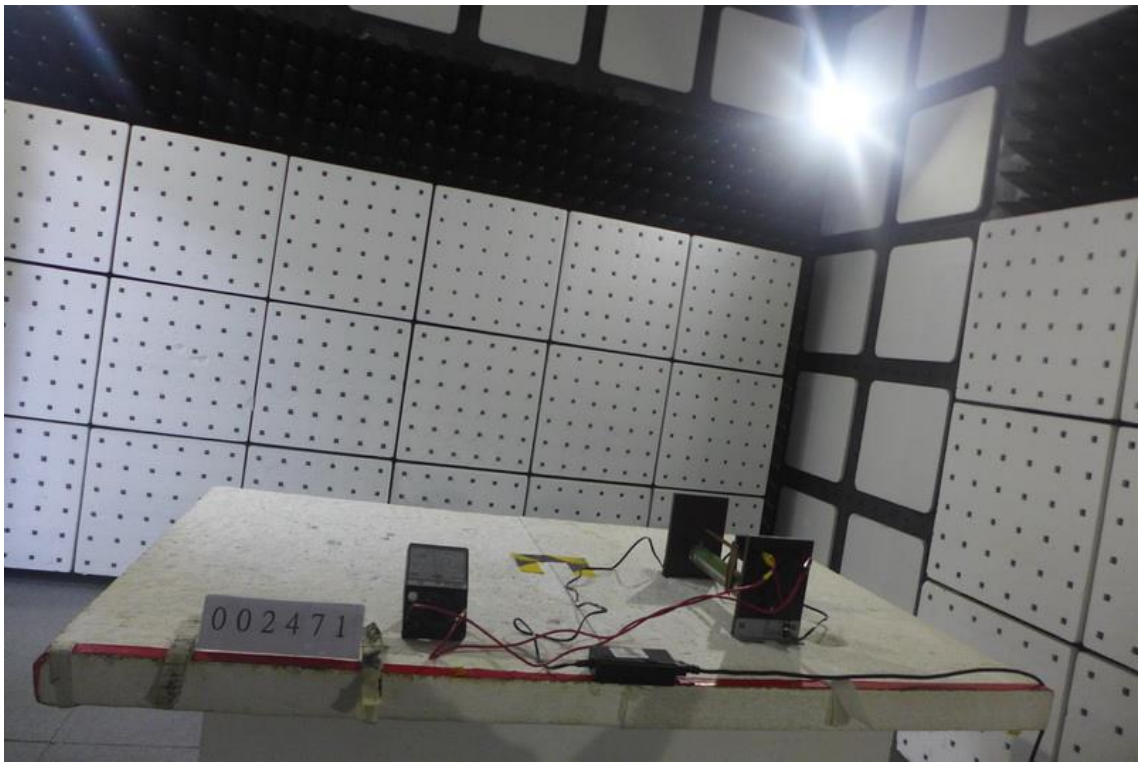
4.3 Voltage changes, voltage fluctuations and flicker



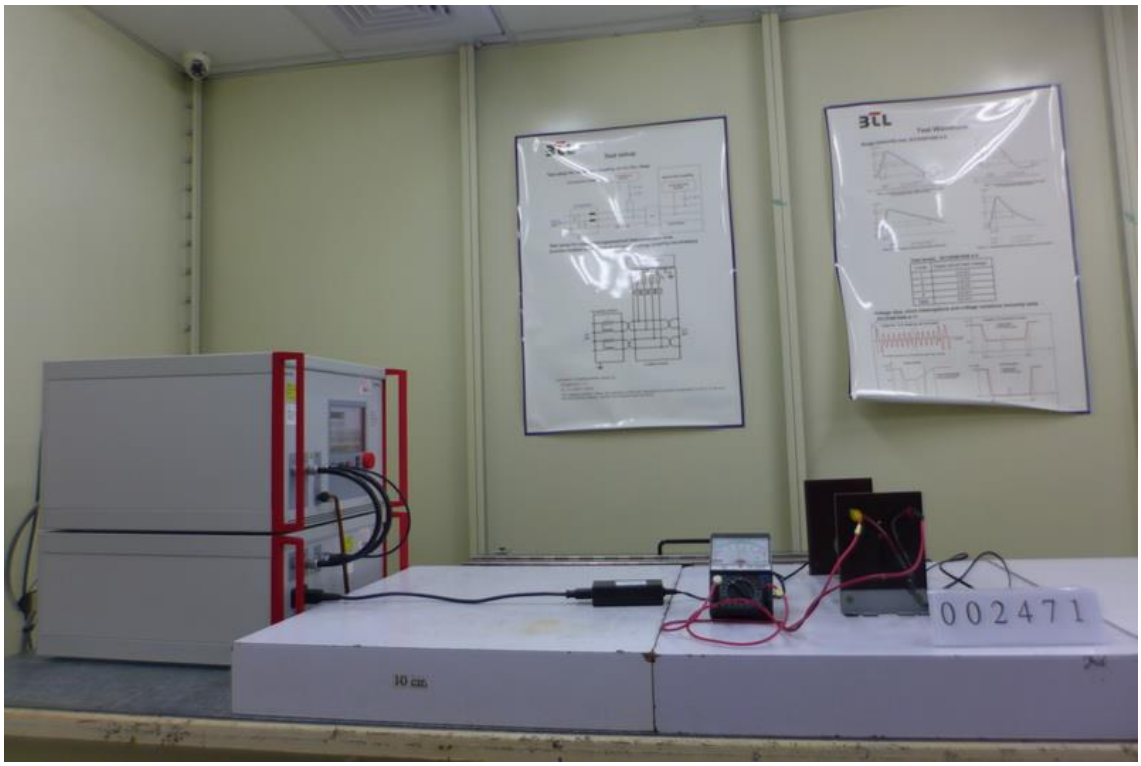
4.4 Electrostatic discharge immunity



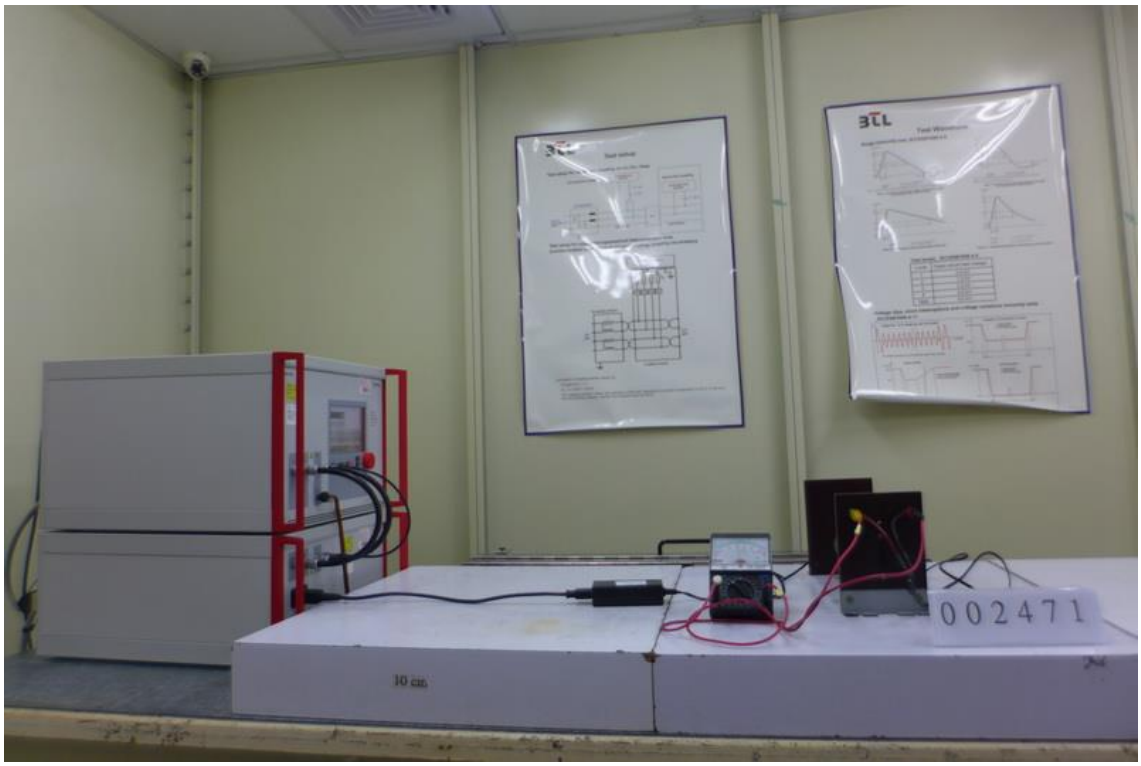
4.5 Radiated, radio-frequency, electromagnetic field immunity



4.6 Electrical fast transient/burst immunity



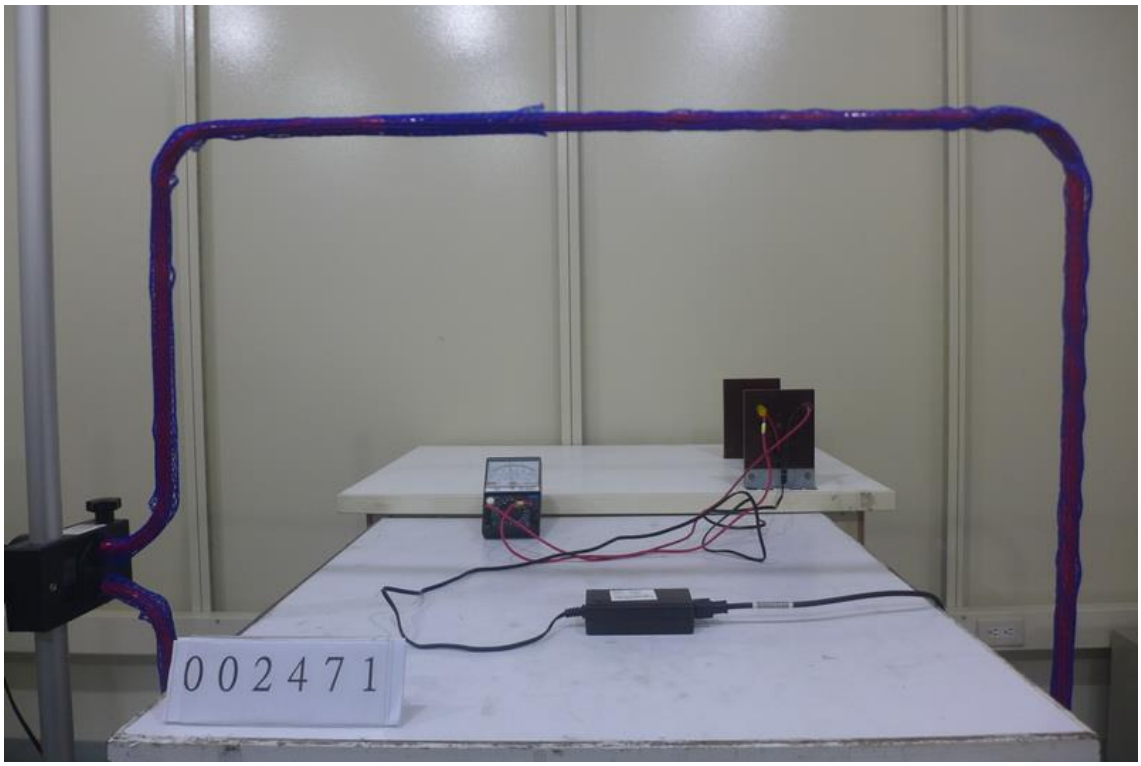
4.7 Surge immunity



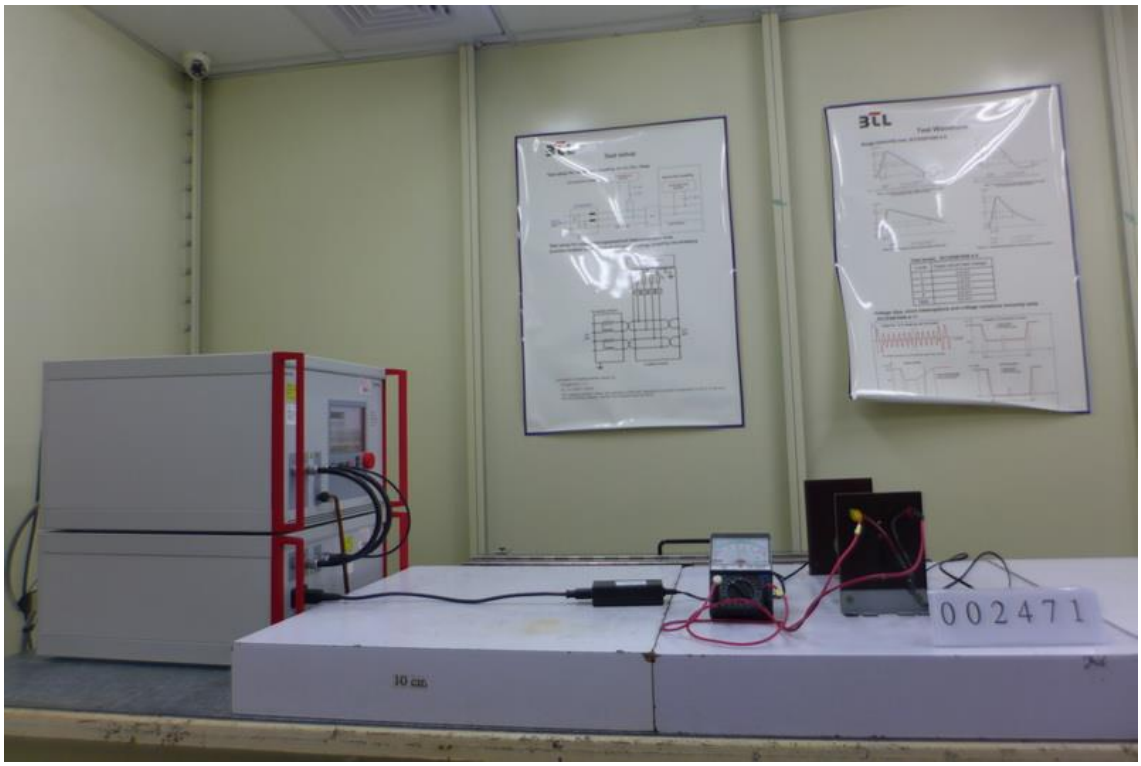
4.8 Immunity to conducted disturbances, induced by radio-frequency fields



4.9 Power frequency magnetic field immunity



4.10 Voltage dips, short interruptions and voltage variations immunity



5.0 APPENDIX B – EUT Photographs

CONTINUE ON NEXT PAGE

5.1 EUT External Photographs

GT-21097-3005



[Front & Side]



[Rear & Side]



[I/O Ports]

GT-21097-5012



[Front & Side]



[Rear & Side]



[I/O Ports]

GT-21097-5015



[Front & Side]



[Rear & Side]



[I/O Ports]

GT-21097-5024



[Front & Side]



[Rear & Side]

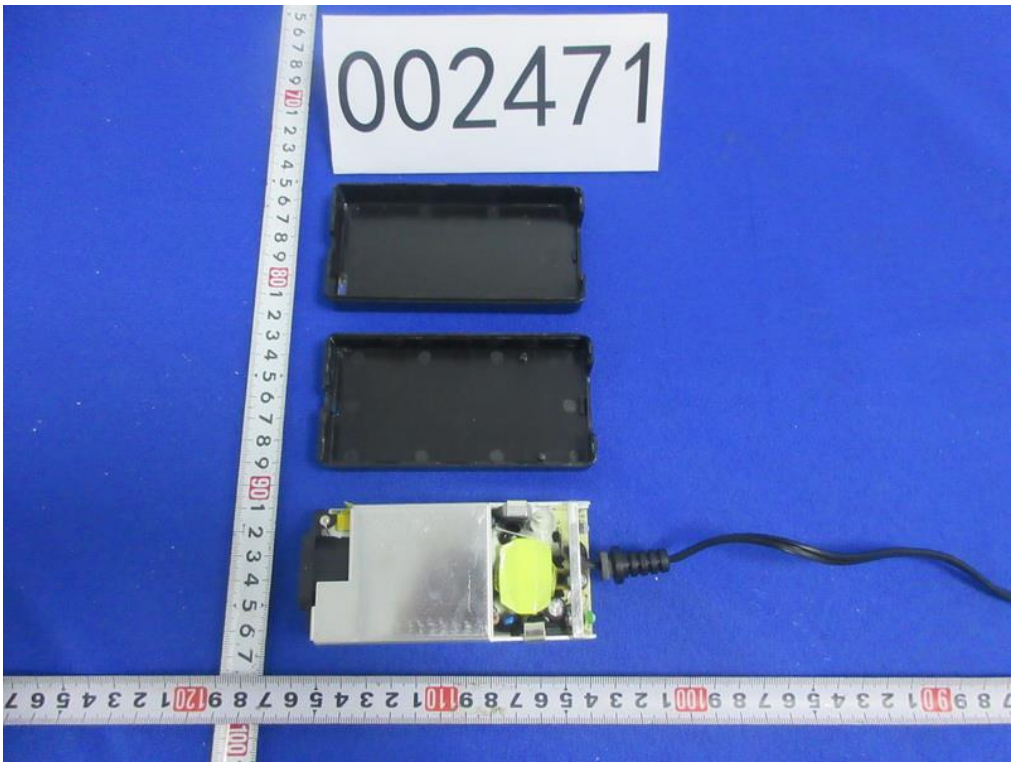


[I/O Ports]

5.2 EUT Internal Photographs

CONTINUE ON NEXT PAGE

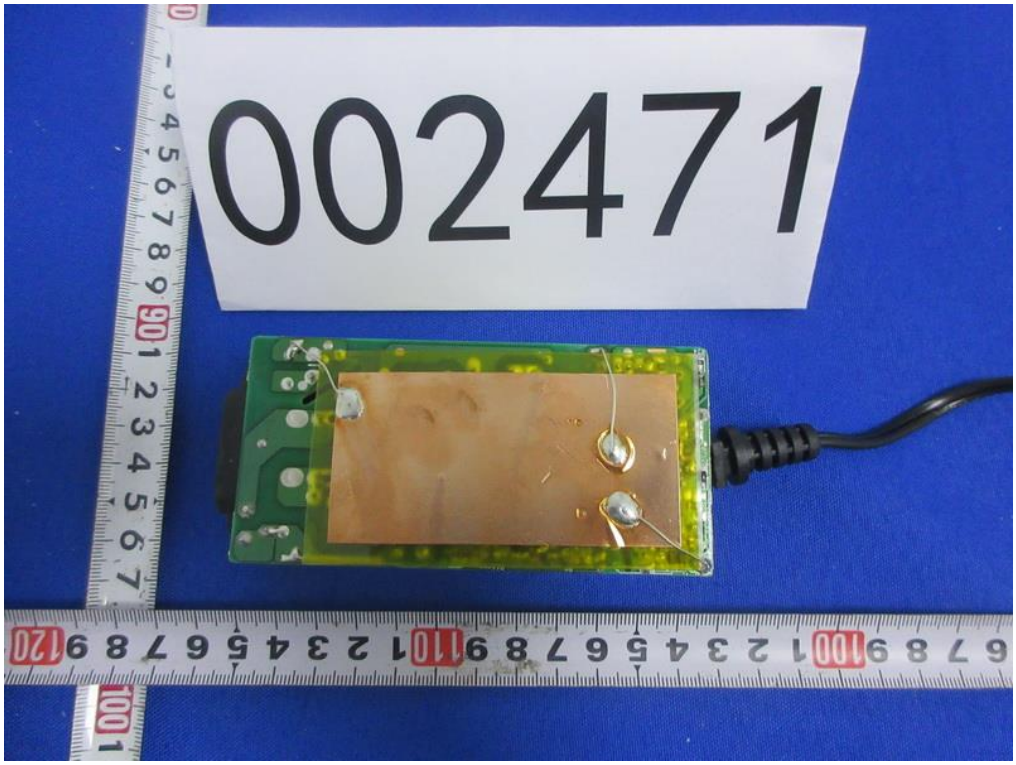
GT-21097-3005



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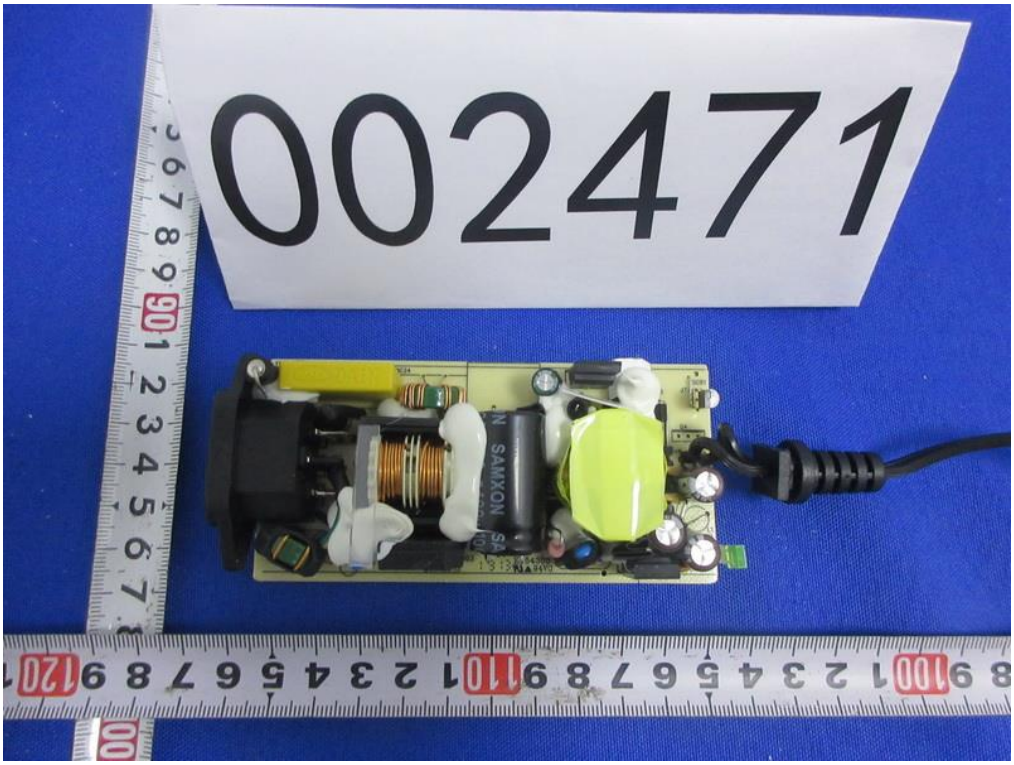
[Main unit]



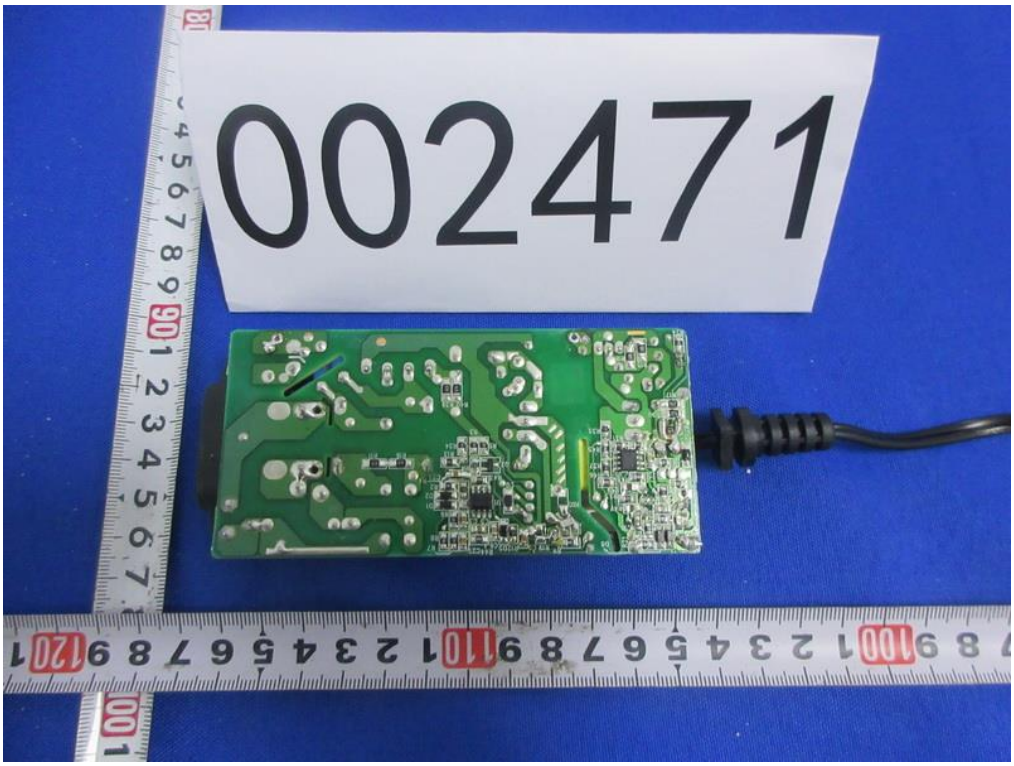
[Main unit]



[Main unit]

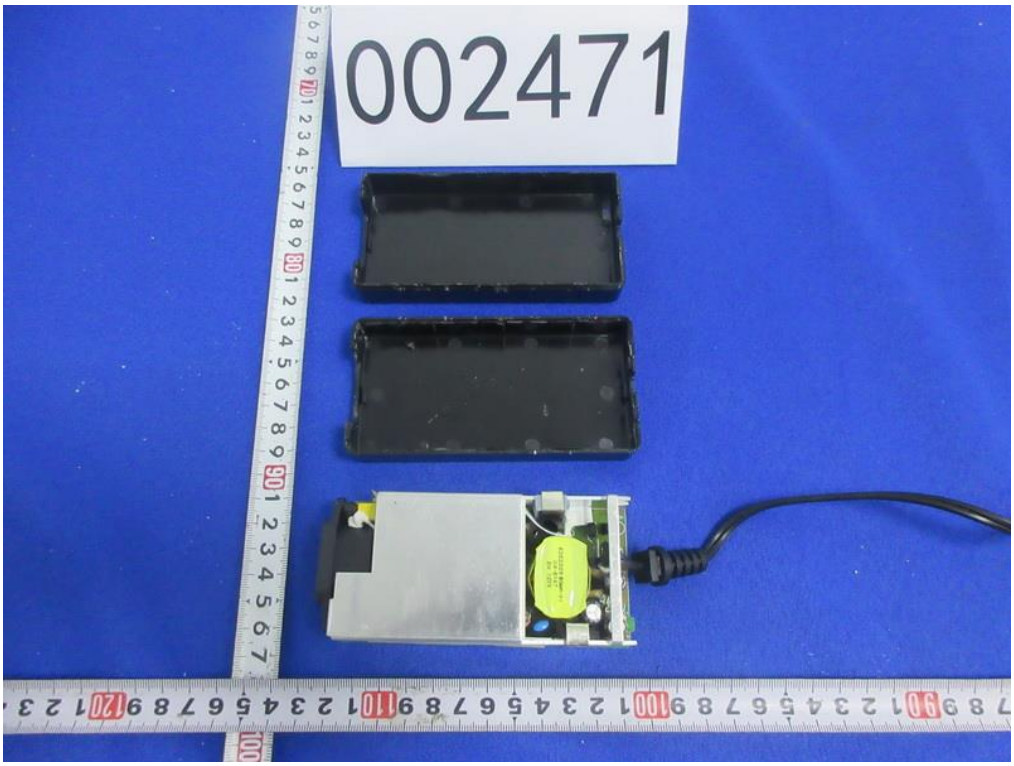


Main Board [Front]



Main Board [Rear]

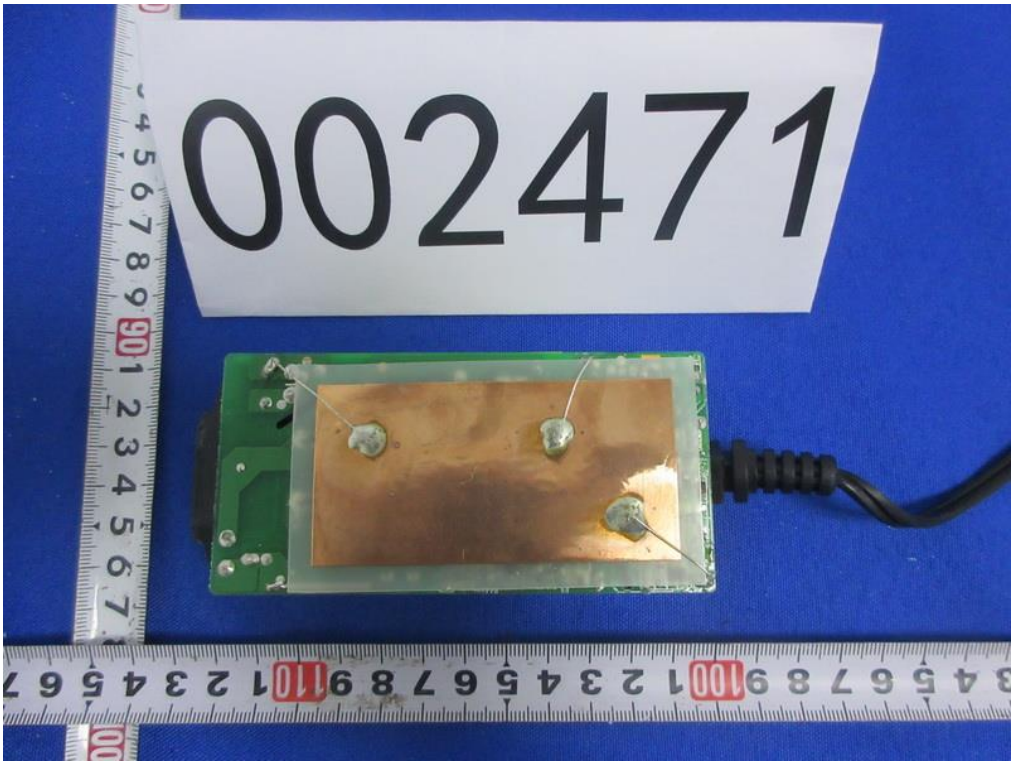
GT-21097-5012



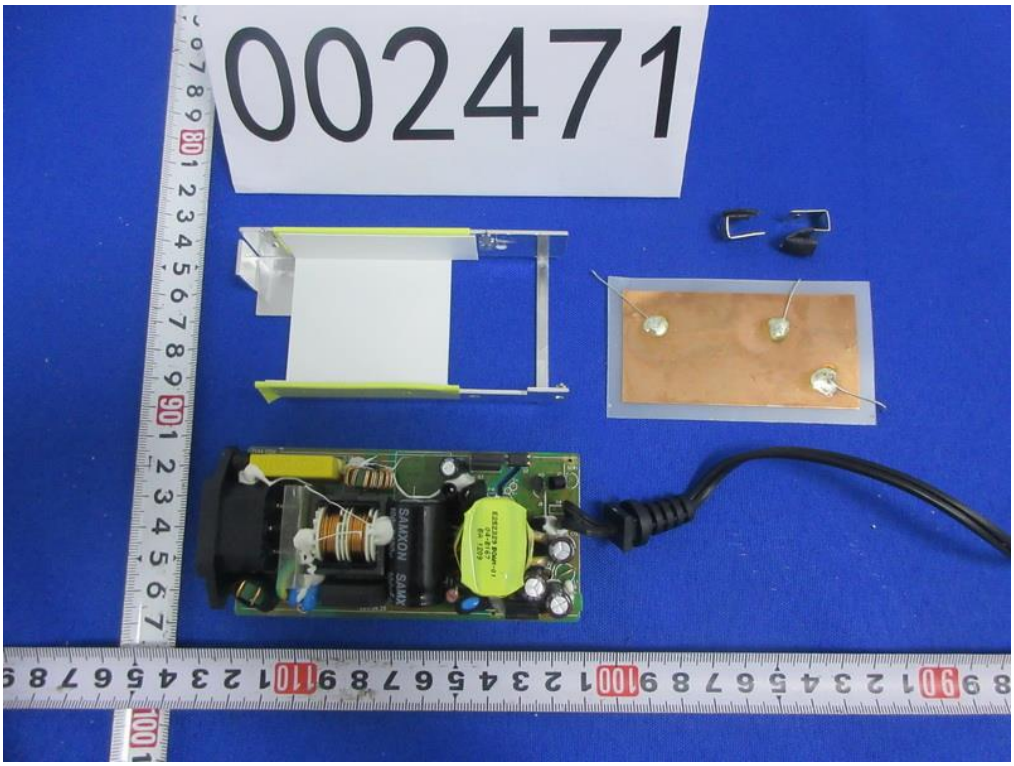
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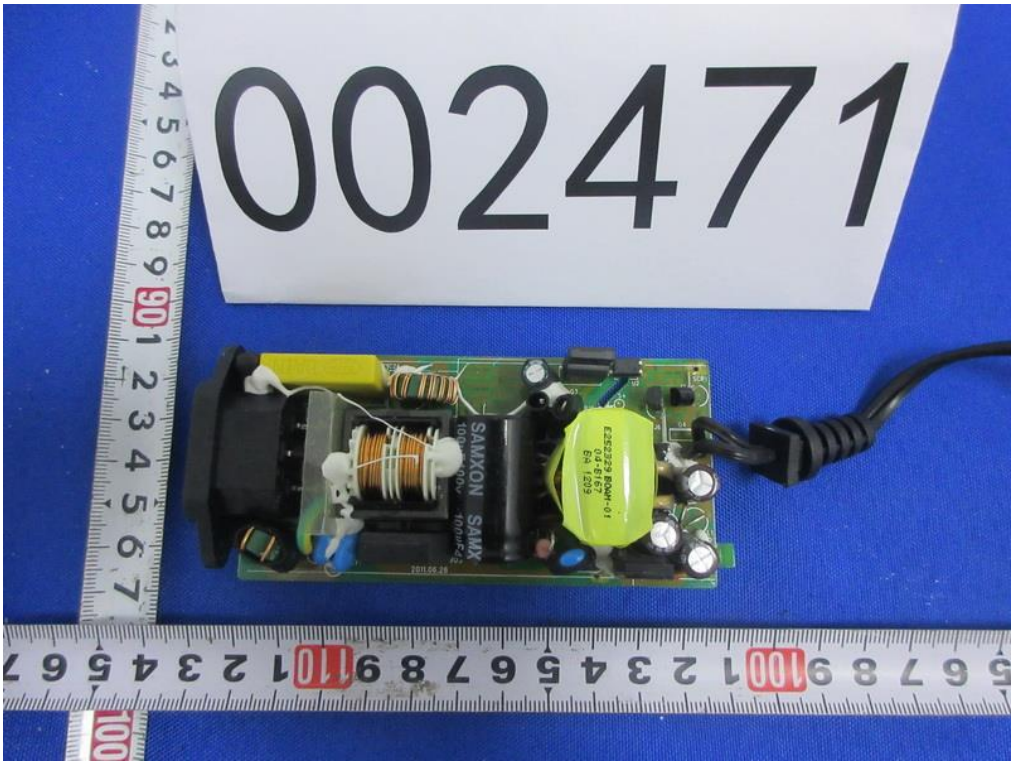
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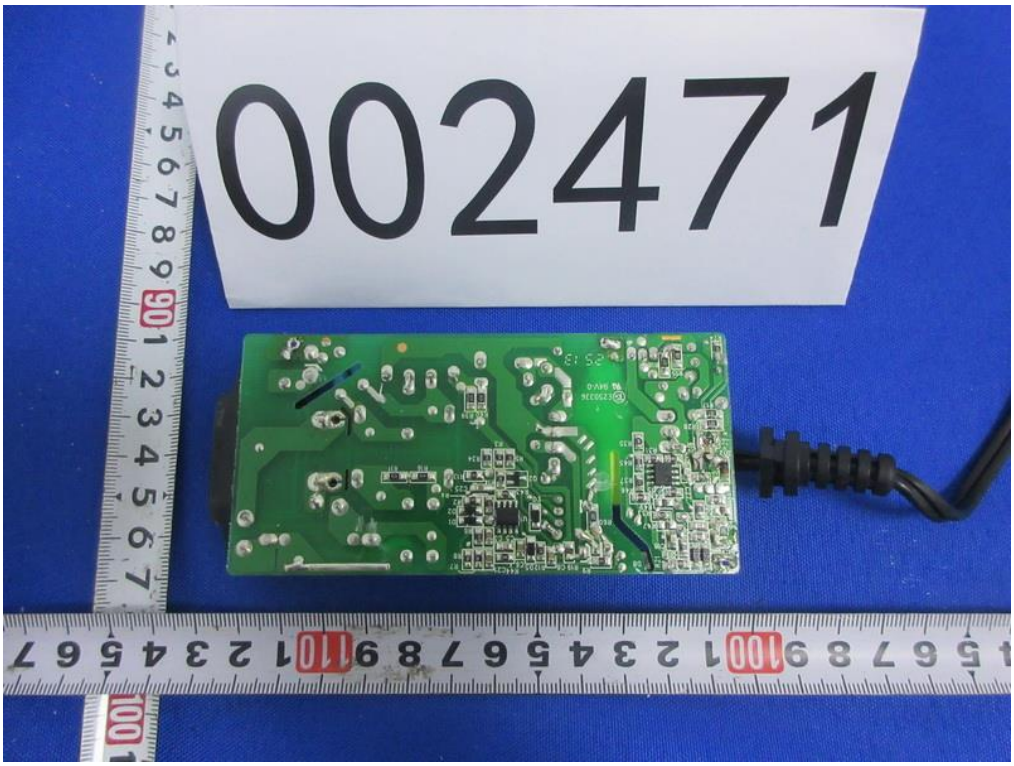
[Main unit]



[Main unit]

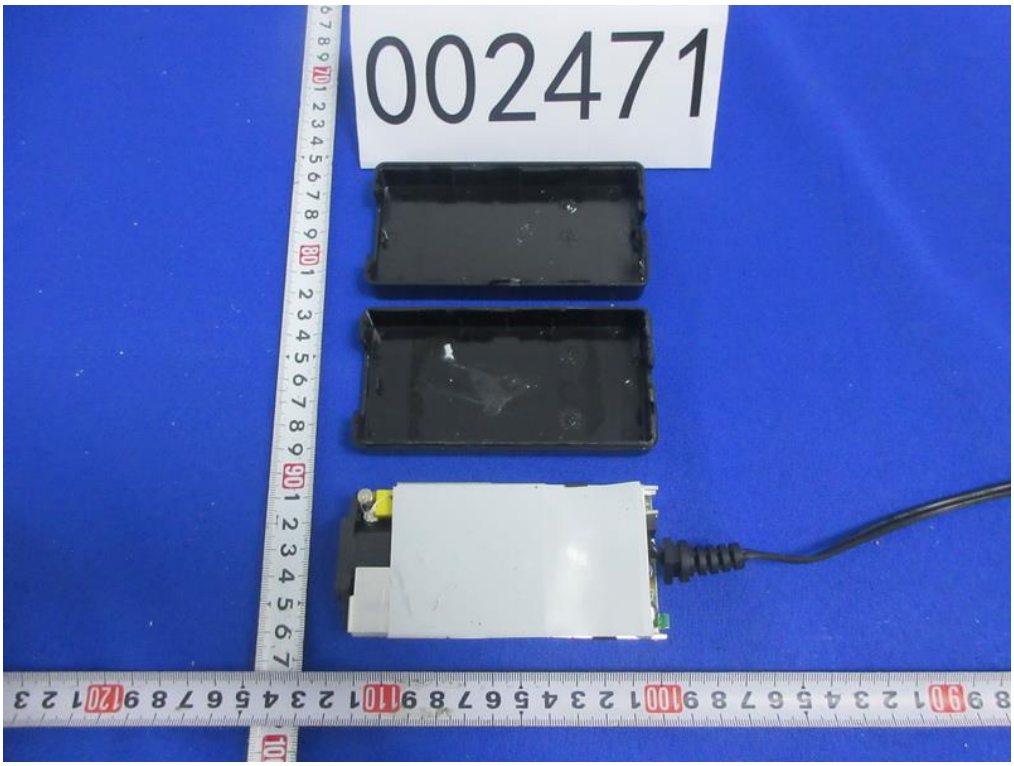


Main Board [Front]

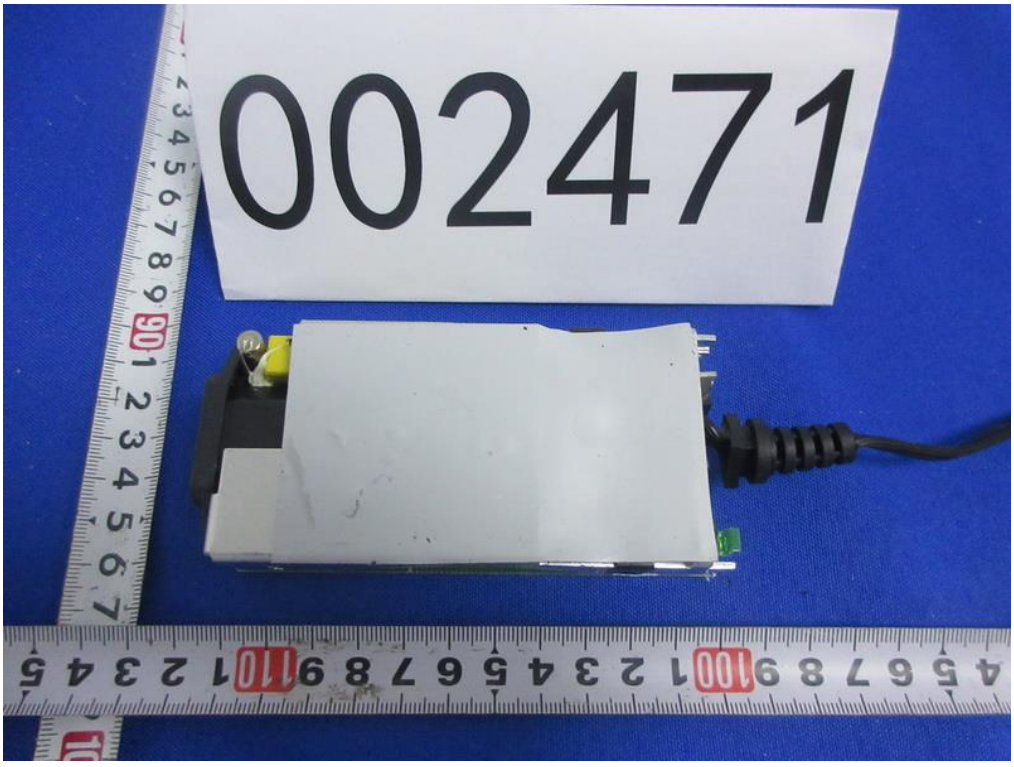


Main Board [Rear]

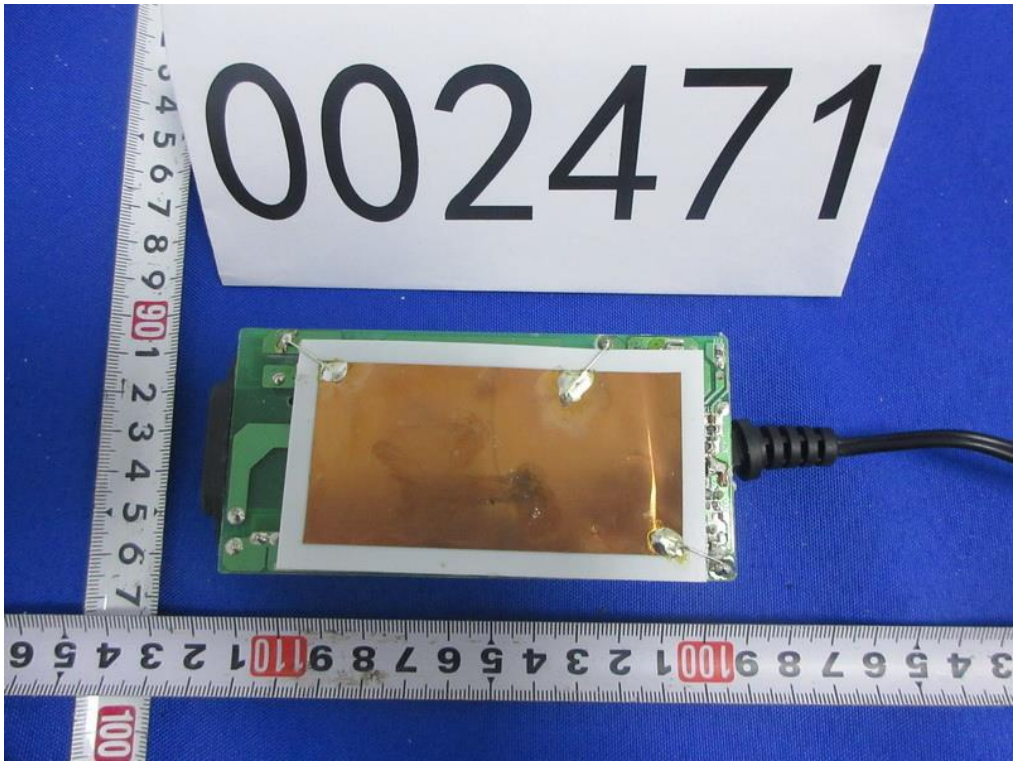
GT-21097-5015



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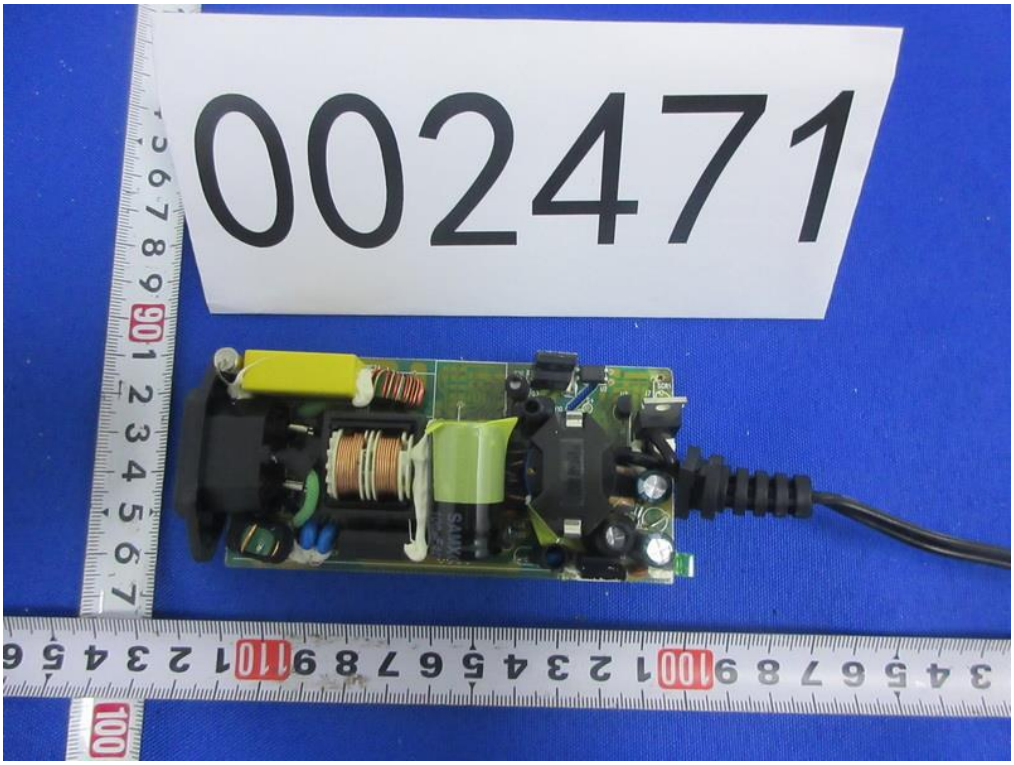
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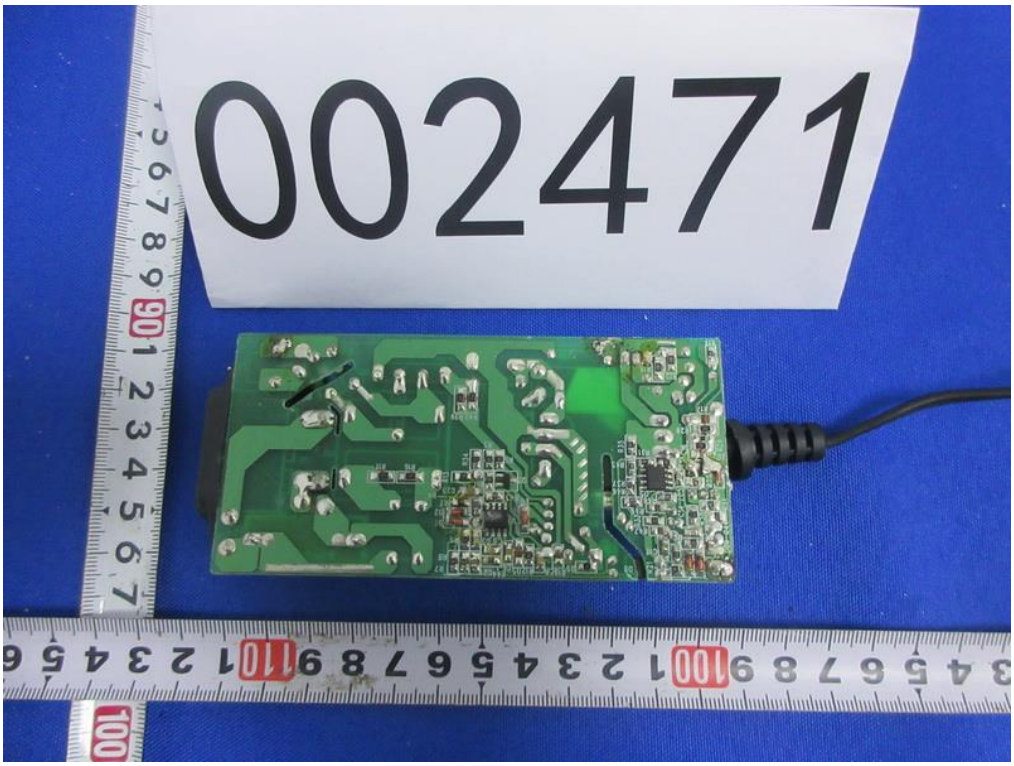
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[Main unit]

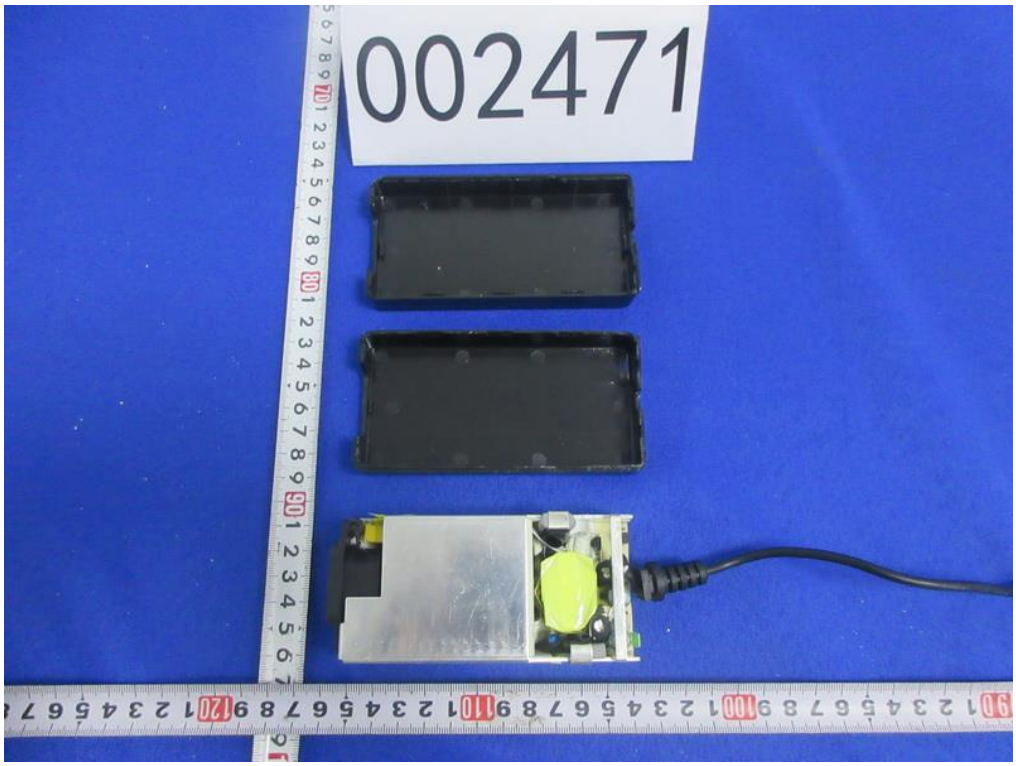


Main Board [Front]



Main Board [Rear]

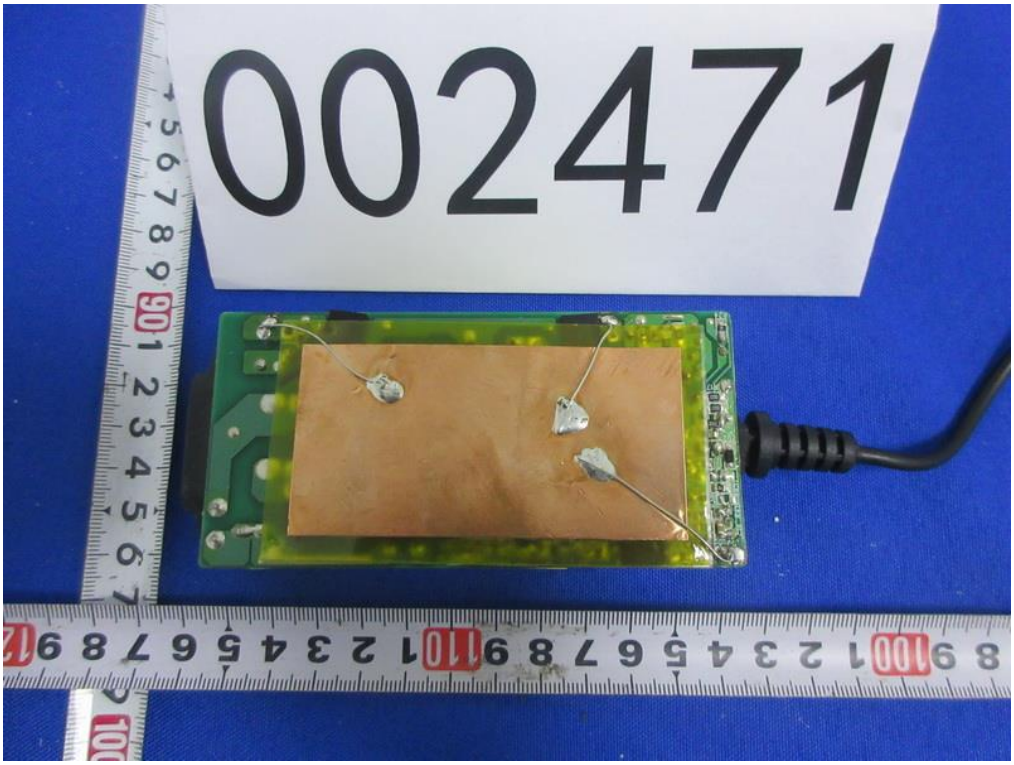
GT-21097-5024



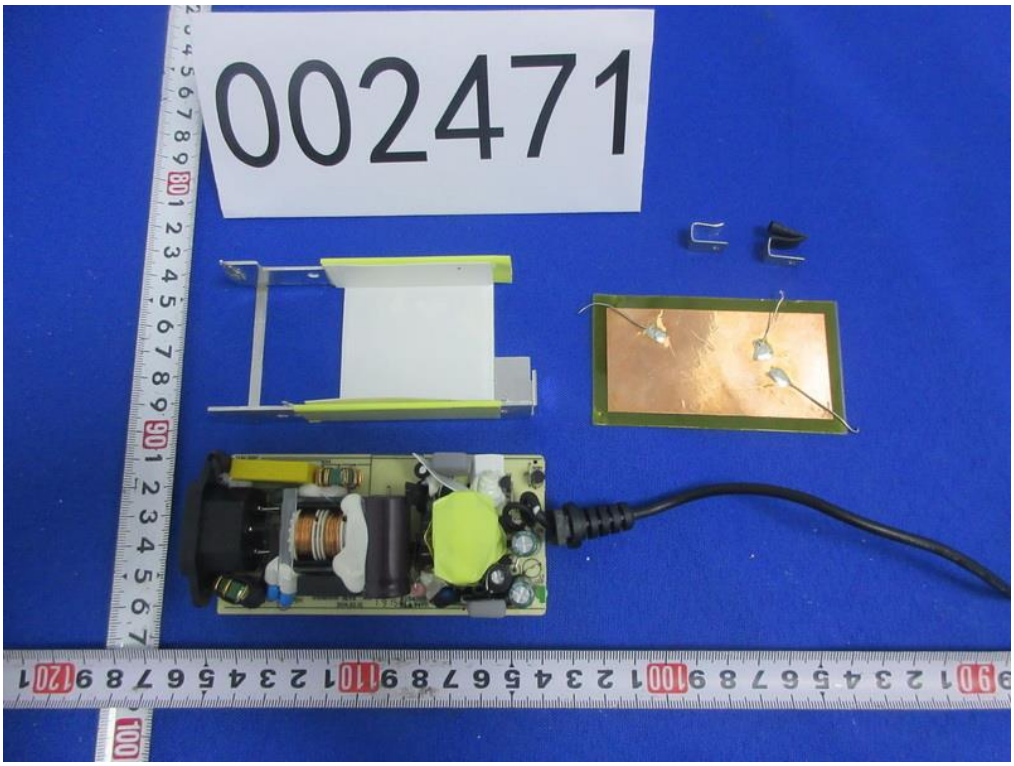
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[Main unit]



[Main unit]



[Main unit]

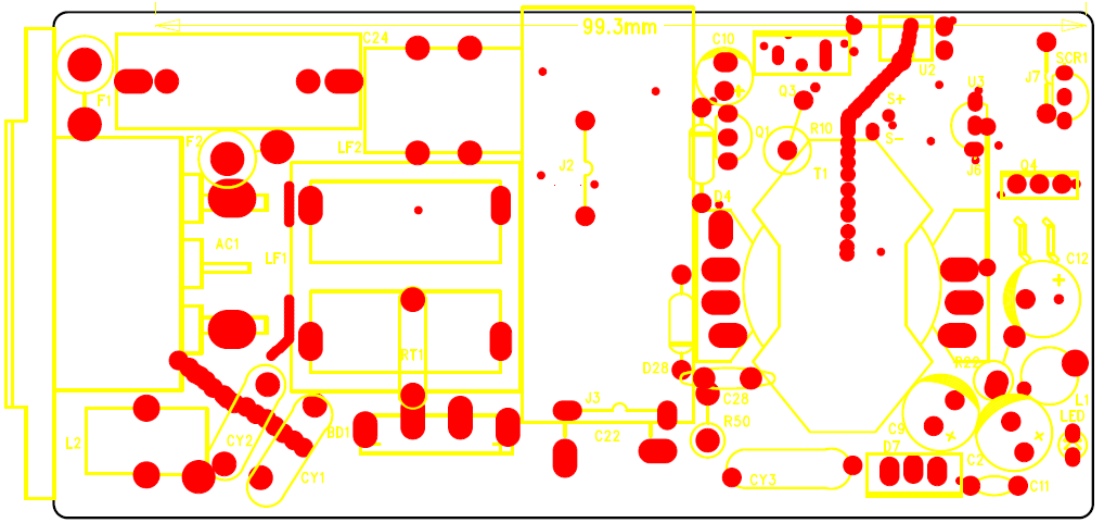


Main Board [Front]

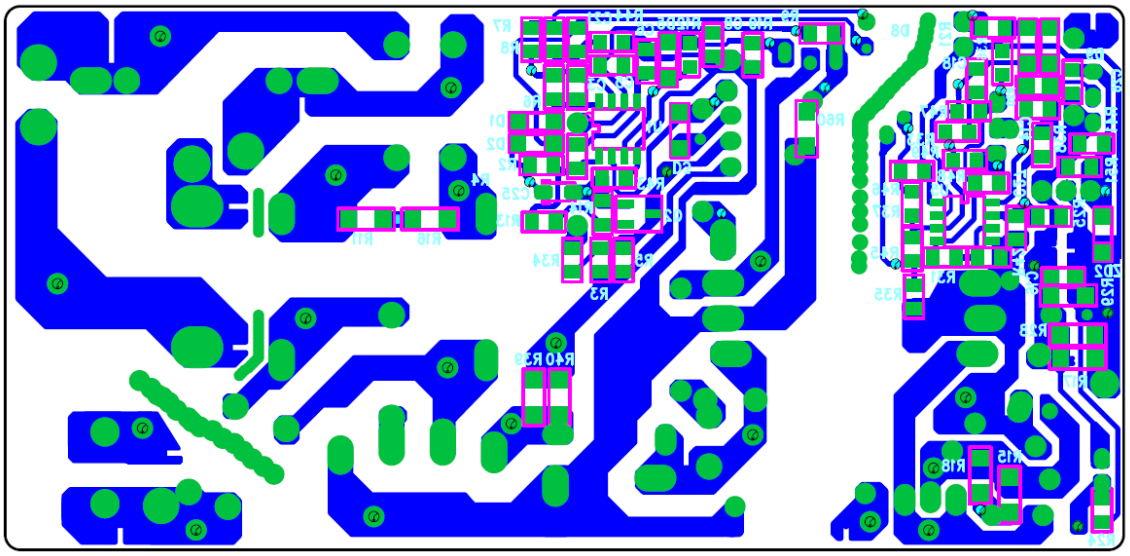


Main Board [Rear]

5.3 PCB



[Main board]



[Main board]

5.4 Label and Location



[Label 1]



[Location]

6.0 APPENDIX C – Critical Component List

CONTINUE ON NEXT PAGE

Critical Component List

Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity[1])
Plastic enclosure	SABIC	C2950	V-0, 75°C, Min. 2.0mm thickness	UL 94	UL
Alt.)	SABIC	CX7211(GG)	V-0, 90°C, Min. 2.0mm thickness	UL 94	UL
Alt.)	SABIC	945(GG)	V-0, 120°C, Min. 1.5mm thickness	UL 94	UL
Alt.)	SABIC	HF500R(f2)	V-0, 125°C, Min. 1.5mm thickness	UL 94	UL
Alt.)	SABIC	940(f1)	V-0, 120°C, Min. 2.0mm thickness	UL 94	UL
Alt.)	TEIJIN LIMITED RESIN AND PLASTIC	LN-1250P(#)(f1)	V-0, 115°C, Min. 1.5mm thickness	UL 94	UL
Alt.)	TEIJIN LIMITED RESIN AND PLASTIC	LN-1250G(#)(*)	V-0, 115°C, Min. 1.5mm thickness	UL 94	UL
Appliance inlet (AC1)	Rich Bay Co., Ltd.	R-301	AC 250V, 10A , 70°C, C14 type	IEC/EN 60320-1	VDE
Alt.)	TECX-UNIONS TECHNOLOGY CORP	TU-301 series	AC 250V, 10A , 70°C, C14 type	IEC/EN 60320-1	ENEC 15
Alt.)	Zhe Jiang Bei Er Jia Electronic Co., Ltd.	ST-A01 series	AC 250V, 10A , 70°C, C14 type	IEC/EN 60320-1	VDE
Alt.)	Kunshan DLK Electronics Technology Co., Ltd	CDJ-3	AC 250V, 10A , 70°C, C14 type	IEC/EN 60320-1	VDE
Alt.)	Zhejiang LECI Electronics Co., Ltd	DB-14	AC 250V, 10A , 70°C, C14 type	IEC/EN 60320-1	VDE
Alt.)	Steady Electronics Corporation	2107	AC 250V, 10A , 70°C, C14 type	IEC/EN 60320-1	VDE
Fuse (F1)	Bel Fuse Ltd.	5ST	AC 250V, T1.6A	IEC/EN 60127-1, IEC/EN 60127-2	VDE

Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity[1])
Alt.)	Cooper Bussmann LLC	S506	AC 250V, T1.6A	IEC/EN 60127-1, IEC/EN 60127-2	VDE
Alt.)	Conquer Electronics Co., Ltd.	UTE, UTE-A, UDA / UDA-A	AC 250V, T1.6A	IEC/EN 60127-1, IEC/EN 60127-2	VDE
Alt.)	Littelfuse Inc.	218-series	AC 250V, T1.6A	IEC/EN 60127-1, IEC/EN 60127-2	VDE
Alt.)	Suzhou Walter Electronic Co. Ltd.	TSD-Serie(s)	AC 250V, T1.6A	IEC/EN 60127-1, IEC/EN 60127-2	VDE
Alt.)	XC Electronics (Shen Zhen) Corp. Ltd.	5TE	AC 250V, T1.6A	IEC/EN 60127-1, IEC/EN 60127-2	VDE
Alt.)	Sun Electric Co. O/B Heroday Ltd.	5B	AC 250V, T1.6A	IEC/EN 60127-1, IEC/EN 60127-2	VDE
Alt.)	Sunny East Enterprise Co. Ltd.	GTL	AC 250V, T1.6A	IEC/EN 60127-1, IEC/EN 60127-2, UL 248-1, UL 248-14	VDE, UL
X-Capacitor (C24) (optional)	Okaya Electric Industries Co. LTD	RE	Max. 0.47µF Min. 250Vac, Min. 100°C, X2 type	IEC/EN 60384-14	VDE
Alt.)	Europtronic (SuZhou) Co. Ltd	MPX	Max. 0.47µF Min. 250Vac, Min. 100°C, X2 type	IEC/EN 60384-14	VDE
Alt.)	Vishay Electrónica Portugal, Lda	F 1772 Serie(s)	Max. 0.47µF Min. 250Vac, Min. 100°C, X2 type	IEC/EN 60384-14	VDE
Alt.)	Ultra Tech Xiphi Enterprise Co. Ltd.	HQX	Max. 0.47µF Min. 250Vac, Min. 100°C, X2 type	IEC/EN 60384-14	VDE
Alt.)	Cheng Tung Industrial Co Ltd	CTX	AC 250V, 0.47µF min.100°C (Min.X2)	IEC/EN 60384-14	ENEC 15
Alt.)	Shantou High-New Technology	MPX	AC 250V, 0.47µF min.100°C (Min.X2)	IEC/EN 60384-14	VDE
Alt.)	Sinhua Electronics (Huzhou) Co., Ltd	MPX	Max. 0.47µF Min. 250Vac, Min. 100°C, X1 type	IEC/EN 60384-14	VDE
Alt.)	Jiangsu Xinghua Huayu Electronics Co., Ltd.	MPX-Series	Max. 0.47µF Min. 250Vac, Min. 100°C, X2 type	IEC/EN 60384-14	VDE

Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity[1])
Alt.)	Dain Electronics Co., Ltd.	MEX, MPX, NPX	Max. 0.47µF Min. 250Vac, Min. 100°C, X2 type	IEC/EN 60384-14, UL 60284-14	VDE, UL
Alt.)	WINDAY ELECTRONIC (DONG GUAN) CO., LTD	MPX series	Max. 0.47µF Min. 250Vac, Min. 100°C, X2 type	IEC/EN 60384-14, UL 60284-14	VDE, UL
Alt.)	Tenta Electric Industrial Co. Ltd.	MEX	Max. 0.47µF Min. 250Vac, Min. 100°C, X2 type	IEC/EN 60384-14, UL 60284-14	VDE, UL
Alt.)	Foshan Shunde Chuang Ge Electronic Industrial Co., Ltd.	MKP-X2	Max. 0.47µF Min. 250Vac, Min. 100°C, X2 type	IEC/EN 60384-14, UL 60284-14	VDE, UL
Protective bonding conductor (Green/Yellow)	Interchangeable	Interchangeable	Min. VW-1, Min. 18AWG, Min. 300V, Min. 105°C	UL 758	UL
Output wire	Interchangeable	Interchangeable	Min. VW-1, Min. 22AWG, Min. 300V, Min. 80°C	UL 758	UL
Bleeder Resistor (R11, R16) (located after fuse)	Yageo Components (Suzhou)	HHV series	470kΩ, 0.25W, (two in series)	IEC 62368-1:2018 G.10	VDE
Alt.)	Futaba Electric Co., Ltd.	RM series	470kΩ, 0.25W, (two in series)	EN 60065:2014	VDE
Rectifier bridge (BD1)	Interchangeable	Interchangeable	Min. 2A, min. 500V	IEC 62368-1	Tested in equipment
Transistor (Q3)	Interchangeable	Interchangeable	Min. 4A, Min. 600V	IEC 62368-1	Tested in equipment
Y-Capacitor (CY1, CY2) (Optional)	Murata Mfg. Co., Ltd.	KX	Max. 2200pF, Min. 250Vac, Min. 85 °C, Y1 type	IEC/EN 60384-14	VDE
Alt.)	Success Electronics Co., Ltd.	SF, SB, SE	Max. 2200pF, Min. 250Vac, Min. 85 °C, Y1 type	IEC/EN 60384-14	VDE
Alt.)	TDK Corporation	CD	Max. 2200pF, Min. 250Vac, Min. 85 °C, Y1 type	IEC/EN 60384-14	VDE

Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity[1])
Alt.)	Shantou High-New Technology	CD	Max. 2200pF, Min. 250Vac, Min. 85 °C, Y1 type	IEC/EN 60384-14	VDE
Alt.)	Welson Industrial Co., Ltd.	WD	Max. 2200pF, Min. 250Vac, Min. 85 °C, Y1 type	IEC/EN 60384-14	VDE
Alt.)	Zhi Wei Electronics Co. Ltd.	DJ	Max. 2200pF, Min. 250Vac, Min. 85 °C, Y1 type	IEC/EN 60384-14	VDE
Bridging capacitor (CY3) (Optional)	Murata Mfg. Co., Ltd.	KX	Max. 2200pF, Min. 250Vac, Min. 85 °C, Y1 type	IEC/EN 60384-14	VDE
Alt.)	Walsin Technology Corp.	AH	Max. 2200pF, Min. 250Vac, Min. 85 °C, Y1 type	IEC/EN 60384-14	VDE
Alt.)	Success Electronics Co., Ltd.	SB, SE	Max. 2200pF, Min. 250Vac, Min. 85 °C, Y1 type	IEC/EN 60384-14	VDE
Alt.)	TDK Corporation	CD	Max. 2200pF, Min. 250Vac, Min. 85 °C, Y1 type	IEC/EN 60384-14	VDE
Alt.)	Shantou High-New Technology	CD	Max. 2200pF, Min. 250Vac, Min. 85 °C, Y1 type	IEC/EN 60384-14	VDE
Alt.)	Welson Industrial Co., Ltd.	WD	Max. 2200pF, Min. 250Vac, Min. 85 °C, Y1 type	IEC/EN 60384-14	VDE
Alt.)	Zhi Wei Electronics Co. Ltd.	DJ	Max. 2200pF, Min. 250Vac, Min. 85 °C, Y1 type	IEC/EN 60384-14	VDE
Inductor (L2) (optional) *1)* (No bobbin)	SYN / GlobTek / Haopuwei / BOAM / ENG	04C117	130°C	IEC 62368-1	Tested in equipment
Line filter (LF1) *1)*	SYN / GlobTek / Haopuwei / BOAM / ENG	04A052	130°C	IEC 62368-1	Tested in equipment
- Bobbin of LF1	CHANG CHUN PLASTICS CO LTD	T373J, T375J, T375HF	Phenolic, V-0, 150°C, Min. 1.2mm thickness	UL 94	UL

Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity[1])
Alt.)	SUMITOMO BAKELITE CO LTD	PM-9820, PM-9630, PM-9823	Phenolic, V-0, 150°C, Min. 1.2mm thickness	UL 94	UL
Alt.)	HITACHI CHEMICAL CO LTD	CP-J-8800	Phenolic, V-0, 150°C, Min. 1.2mm thickness	UL 94	UL
Line filter (LF2) (optional) *1)* (No bobbin)	SYN / GlobTek / Haopuwei / BOAM / ENG	04C106	130°C	IEC 62368-1	Tested in equipment
Bulk Capacitor (C22)	Interchangeable	Interchangeable	Max. 150 µF, Min. 400V, 105°C	IEC 62368-1	Tested in equipment
PCB	Interchangeable	Interchangeable	Min. V-1, 105°C	UL 796	UL
Heat shrinkable tube	Interchangeable	Interchangeable	600V, 125°C, VW-1	UL 224	UL
Optocoupler (U2)	Lite-On Technology Corporation	LTV-817	Ext. Dcr&Cl: ≥7.0mm, DTI: ≥0.4mm Thermal cycling test, 115°C	IEC/EN 60747-5-5, IEC/EN 62368-1	VDE
Alt.)	Everlight Electronics Co., Ltd.	EL817	Ext. Dcr&Cl: ≥7.6mm, DTI: ≥0.4mm Thermal cycling test, 110°C	IEC/EN 60747-5-5, IEC/EN 62368-1	VDE
Alt.)	Bright Led Electronics Corp.	BPC-817	Ext. Dcr&Cl: ≥7.6mm, DTI: ≥0.4mm Thermal cycling test, 110°C	IEC/EN 60747-5-5, IEC/EN 60950-1, IEC/EN 60065	VDE, S
Alt.)	Sharp Corporation Electronic Components and Devices Division	PC817, PC123	Ext. Dcr&Cl: ≥6.4mm, DTI: ≥0.4mm Thermal cycling test, 110°C	IEC/EN 60747-5-5, UL 1577	VDE, UL
Alt.)	COSMO	K1010, KP1010	Ext. Dcr&Cl: ≥6.5mm, DTI: ≥0.4mm Thermal cycling test, 115°C	IEC/EN 60747-5-5, UL 1577	VDE, UL
Alt.)	Fairchild Semiconductor Pte Ltd	H11A817B, H11A817C, FOD817B	Ext. Dcr&Cl: ≥7.0mm, DTI: ≥0.4mm Thermal cycling test, 115°C	IEC/EN 60747-5-5, IEC 62368-1, UL 1577	VDE, UL

Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity[1])
Transformer (T1) (3-7.5V) *1)*	GLOBTEK	04B273	Class B, UL insulation system GTX-130-TM (E243347)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	HAOPUWEI	04B273	Class B, UL insulation system ZT-130 (E315275)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	ENG	04B273	Class B, UL insulation system ENG130-1 (E308897)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	BOAM	04B273	Class B, UL insulation system BOAM-01 or B1 (E252329)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	SUNNY ELECTRONICS	04B273	Class B, UL insulation system DASH 2 B-19 (183163)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Transformer (T1) (7.6-12.9V) *1)*	GLOBTEK	04B167	Class B, UL insulation system GTX-130-TM (E243347)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	HAOPUWEI	04B167	Class B, UL insulation system ZT-130 (E315275)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	ENG	04B167	Class B, UL insulation system ENG130-1 (E308897)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	BOAM	04B167	Class B, UL insulation system BOAM-01 or B1 (E252329)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	SUNNY ELECTRONICS	04B167	Class B, UL insulation system DASH 2 B-19 (183163)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment

Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity[1])
Transformer (T1) (13-18V) *1)*	GLOBTEK	04B173	Class B, UL insulation system GTX-130-TM (E243347)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	HAOPUWEI	04B173	Class B, UL insulation system ZT-130 (E315275)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	ENG	04B173	Class B, UL insulation system ENG130-1 (E308897)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	BOAM	04B173	Class B, UL insulation system BOAM-01 or B1 (E252329)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	SUNNY ELECTRONICS	04B173	Class B, UL insulation system DASH 2 B-19 (183163)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Transformer (T1) (18.1-20V) *1)*	GLOBTEK	04B172	Class B, UL insulation system GTX-130-TM (E243347)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	HAOPUWEI	04B172	Class B, UL insulation system ZT-130 (E315275)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	ENG	04B172	Class B, UL insulation system ENG130-1 (E308897)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	BOAM	04B172	Class B, UL insulation system BOAM-01 or B1 (E252329)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	SUNNY ELECTRONICS	04B172	Class B, UL insulation system DASH 2 B-19 (183163)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment

Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity[1])
Transformer (T1) (20.1-24V) *1)*	GLOBTEK	04B171	Class B, UL insulation system GTX-130-TM (E243347)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	HAOPUWEI	04B171	Class B, UL insulation system ZT-130 (E315275)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	ENG	04B171	Class B, UL insulation system ENG130-1 (E308897)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	BOAM	04B171	Class B, UL insulation system BOAM-01 or B1 (E252329)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	SUNNY ELECTRONICS	04B171	Class B, UL insulation system DASH 2 B-19 (183163)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Transformer (T1) (24.1-35.9V) *1)*	GLOBTEK	04B212	Class B, UL insulation system GTX-130-TM (E243347)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	HAOPUWEI	04B212	Class B, UL insulation system ZT-130 (E315275)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	ENG	04B212	Class B, UL insulation system ENG130-1 (E308897)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	BOAM	04B212	Class B, UL insulation system BOAM-01 or B1 (E252329)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment
Alt.)	SUNNY ELECTRONICS	04B212	Class B, UL insulation system DASH 2 B-19 (183163)	IEC 62368-1 and evaluated acco. to IEC 60085, UL 1446	Tested in equipment

Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity[1])
- Insulation tube for all the transformer	Interchangeable	Interchangeable	Min. 600V, 200°C, min. 0.4 mm thick , VW-1	UL 224	UL
- TIW for all the transformer	Furukawa	TEX-E	130°C	UL 60950-1, UL 2353	UL
Alt.)	GREAT LEOFLON INDUSTRIAL CO LTD	TRW(B)	130°C	UL 60950-1, UL 2353	UL
Alt.)	KBI COSMOLINK CO.,LTD.	TIW-M	130°C	UL 60950-1, UL 2353	UL
Optional insulator between AC inlet and LF1	Interchangeable	Interchangeable	Min. V-1, Min. 0.4mm thickness	UL 94	UL
Current sensor resistor (R10)	Interchangeable	Interchangeable	Min.0.1Ω, 2W.	IEC 62368-1	Tested in equipment

End of Test Report