

## Test Report

Report No.: GNBZ240401135-02EN

Issue Date: Apr. 19, 2024

Page 1 of 9

The following information was/were submitted and identified by/on behalf of the client:

Applicant :

Applicant's Address :

Sample Name :

Tested Model : AST-MP647

Model/Type reference : Please refer to page 6

Manufacturer :

Manufacturer's Address :

Sample Receive Date : Apr. 01, 2024

Sample Testing Period : Apr. 01, 2024 - Apr. 10, 2024

Test Result Summary:

As requested by the applicant, for details refer to attached page(s).

TEST ITEM(S)	TEST REQUESTED	CONCLUSION(S)
Lead, Cadmium, Mercury, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers(PBDEs) and Phthalates(DBP, BBP, DEHP, DIBP)	As specified by client, to comply with the Limits for Restriction of the use of certain hazardous substance in electrical and electronic equipment (the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 (as amended), namely UKCA RoHS) on the submitted sample(s)	PASS

Authorized signature:



Lab Manager: Gavin Zhou



Apr. 19, 2024

This report is only responsible for the tested sample(s) from the client, the testing result(s) is used for scientific research, teaching or internal quality control. Without the writing agreement of the company, the client is not allowed to copy the report in part (entire copy is excepted).

## Test Report

Report No.: GNBZ240401135-02EN

Issue Date: Apr. 19, 2024

Page 2 of 9

## Test Result(s):

**Part 1. Lead(Pb), Cadmium(Cd), Mercury(Hg), Hexavalent chromium(Cr(VI)), Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers(PBDEs)**

## Test Method:

Screening Test by XRF spectrometry

With reference to IEC 62321-3-1:2013, Screening of Lead(Pb), Mercury(Hg), Cadmium(Cd), Total chromium(Cr) and Total bromine(Br) by X-ray fluorescence(XRF) spectrometry

Chemical Confirmation Test

Lead(Pb), Cadmium(Cd) – IEC 62321-5:2013, Acid digestion and determined by ICP-OES

Mercury(Hg) – IEC 62321-4:2013/AMD1:2017, Acid digestion and determined by ICP-OES

Cr(VI) – IEC 62321-7-1:2015, Boiling water extraction and determined colorimetrically by UV-vis

& IEC 62321-7-2:2017, Solution extraction and determined colorimetrically by UV-vis

PBBs, PBDEs – IEC 62321-6:2015, Solvent extraction and determined by GC-MS

Part No.	Description	XRF screening Results					Chemical Confirmation Results (mg/kg)	Conclusion(s)
		Pb	Cd	Hg	Total Cr	Total Br		
1-1	Black coating	BL	BL	BL	BL	BL	---	PASS
1-2	Metal (substrate)	BL	BL	BL	BL	---	---	PASS
2	Black plastic	BL	BL	BL	BL	BL	---	PASS
3	Double faced adhesive tape	BL	BL	BL	BL	BL	---	PASS
4	Green paper	BL	BL	BL	BL	BL	---	PASS
5	White tape	BL	BL	BL	BL	BL	---	PASS
6	Yellow tape	BL	BL	BL	BL	BL	---	PASS
7-1	Metal (conducting sheet)	BL	BL	BL	IN	---	Cr(VI): Negative	PASS
7-2	Metal (terminal)	BL	BL	BL	BL	---	---	PASS
8	Black wire sheath	BL	BL	BL	BL	BL	---	PASS
9-1	Red wire sheath	BL	BL	BL	BL	BL	---	PASS
9-2	Silvery metal wire	BL	BL	BL	BL	BL	---	PASS
10	Metal (screw)	BL	BL	BL	IN	---	Cr(VI): Negative	PASS
11-1	Silvery metal	BL	BL	BL	BL	---	---	PASS
11-2	Black plastic support	BL	BL	BL	BL	BL	---	PASS
11-3	Metal (contact pins)	BL	BL	BL	BL	---	---	PASS
12-1	Silvery metal	BL	BL	BL	BL	---	---	PASS
12-2	Black plastic support	BL	BL	BL	BL	BL	---	PASS
12-3	Metal (contact pins)	BL	BL	BL	BL	---	---	PASS
13-1	Black plastic button (switch)	BL	BL	BL	BL	BL	---	PASS
13-2	Silvery metal cover	BL	BL	BL	BL	---	---	PASS
13-3	White plastic shell	BL	BL	BL	BL	BL	---	PASS

This report is only responsible for the tested sample(s) from the client, the testing result(s) is used for scientific research, teaching or internal quality control. Without the writing agreement of the company, the client is not allowed to copy the report in part (entire copy is excepted).

# Test Report

Report No.: GNBZ240401135-02EN

Issue Date: Apr. 19, 2024

Page 3 of 9

Part No.	Description	XRF screening Results					Chemical Confirmation Results (mg/kg)	Conclusion(s)
		Pb	Cd	Hg	Total Cr	Total Br		
13-4	Metal (reed)	BL	BL	BL	BL	---	---	PASS
13-5	Metal (pins)	BL	BL	BL	BL	---	---	PASS
14	Inductance	BL	BL	BL	BL	---	---	PASS
15	SMD resistor	BL	BL	BL	BL	BL	---	PASS
16	SMD capacitor	BL	BL	BL	BL	BL	---	PASS
17	SMD chip (IC)	BL	BL	BL	BL	BL	---	PASS
18	SMD LED	BL	BL	BL	BL	BL	---	PASS
19	Thermistor	BL	BL	BL	BL	BL	---	PASS
20	PCB	BL	BL	BL	BL	IN	PBBs: N.D. PBDEs: N.D.	PASS
21	Soldering tin (SMD)	BL	BL	BL	BL	---	---	PASS
22	Soldering tin (THC)	BL	BL	BL	BL	---	---	PASS
23	Soldering tin (wiring)	BL	BL	BL	BL	---	---	PASS

## Remark:

(^1) Screening Test by XRF spectrometry

- (a) XRF analysis of the result(s) may only related to the surface of the sample(s).
- (b) The results of total Cr and total Br only represent the total content of the elements, do not represent Cr(VI), PBBs and PBDEs content correspondingly. As restricted by the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 (as amended), namely UKCA RoHS., The result(s) is expressed as total Cr while test items on restricted substances is Cr(VI). The result(s) is expressed as total Br while test items on restricted substances are PBBs and PBDEs.
- (c) The results are obtained by XRF screening for primary judgment, further chemical confirmation by ICP-OES (for Pb, Cd, Hg), UV-vis (for Cr(VI)) and GC-MSD (for PBBs, PBDEs) may be performed, if the XRF screening result(s) exceeds the below limits according to IEC 62321-3-1:2013 Table A.2 - Screening limits in mg/kg for regulated elements in various matrices.

Element	Polymers	Metals	Composite material
Cd	BL $\leq$ (70-3 $\sigma$ ) <X < (130+3 $\sigma$ ) $\leq$ OL	BL $\leq$ (70-3 $\sigma$ ) <X < (130+3 $\sigma$ ) $\leq$ OL	LOD <X < (150+3 $\sigma$ ) $\leq$ OL
Pb	BL $\leq$ (700-3 $\sigma$ ) <X < (1300+3 $\sigma$ ) $\leq$ OL	BL $\leq$ (700-3 $\sigma$ ) <X < (1300+3 $\sigma$ ) $\leq$ OL	BL $\leq$ (500-3 $\sigma$ ) <X < (1500+3 $\sigma$ ) $\leq$ OL
Hg	BL $\leq$ (700-3 $\sigma$ ) <X < (1300+3 $\sigma$ ) $\leq$ OL	BL $\leq$ (700-3 $\sigma$ ) <X < (1300+3 $\sigma$ ) $\leq$ OL	BL $\leq$ (500-3 $\sigma$ ) <X < (1500+3 $\sigma$ ) $\leq$ OL
Br	BL $\leq$ (300-3 $\sigma$ ) <X	Not applicable	BL $\leq$ (250-3 $\sigma$ ) <X
Cr	BL $\leq$ (700-3 $\sigma$ ) <X	BL $\leq$ (700-3 $\sigma$ ) <X	BL $\leq$ (500-3 $\sigma$ ) <X

BL = Below limit, OL = Over limit, IN = Inconclusive, 3 $\sigma$  = Repeability of the analyser at the action level,

X = The region where further investigation is necessary, LOD = Limit of detection.

- (d) The XRF screening test of selected elements - The result(s) was/ were only given for reference, as the result(s) may be different to the actual content in the non-uniformity composition, and the results differ based on various factors, including but not limited to the tested part(s)/component(s) size, thickness, surface flatness, equipment parameters and matrix effect etc.

This report is only responsible for the tested sample(s) from the client, the testing result(s) is used for scientific research, teaching or internal quality control. Without the writing agreement of the company, the client is not allowed to copy the report in part (entire copy is excepted).

# Test Report

Report No.: GNBZ240401135-02EN

Issue Date: Apr. 19, 2024

Page 4 of 9

## (^2) Chemical Confirmation Test

(a) 1000mg/kg = 0.1%; RL = Reporting Limit; N.D. = Not detected (< RL).

(b) RL and Limits of test items.

Test Item(s)	Reporting Limit (RL)	Limit
Lead(Pb)	10 mg/kg	1000 mg/kg (0.1%)
Cadmium(Cd)	10 mg/kg	100 mg/kg (0.01%)
Mercury(Hg)	10 mg/kg	1000 mg/kg (0.1%)
Chromium VI (Cr VI)	Polymer and composite material: 10 mg/kg, Metal: 0.10 ug/cm <sup>2</sup>	1000 mg/kg (0.1%)
Group PBBs	Single compound of PBBs: 50 mg/kg	1000 mg/kg (0.1%)
Group PBDEs	Single compound of PBDEs: 50 mg/kg	1000 mg/kg (0.1%)

(c) According to IEC 62321-7-1:2015, result of Cr(VI) for metal sample is shown as below:

If Cr(VI) concentration > 0.13 ug/cm<sup>2</sup>, the sample contains Cr(VI) which is positive for Cr(VI);

If Cr(VI) concentration < 0.10 ug/cm<sup>2</sup>, the sample does not contain Cr(VI) which is negative for Cr(VI);

If Cr(VI) concentration ≥ 0.10 ug/cm<sup>2</sup> and ≤ 0.13 ug/cm<sup>2</sup>, the result is considered to be inconclusive –  
Unavoidable coating variations may influence the determination.

ORIGINAL

This report is only responsible for the tested sample(s) from the client, the testing result(s) is used for scientific research, teaching or internal quality control. Without the writing agreement of the company, the client is not allowed to copy the report in part (entire copy is excepted).

## Test Report

Report No.: GNBZ240401135-02EN

Issue Date: Apr. 19, 2024

Page 5 of 9

Part 2. Phthalates - Dibutyl phthalate(DBP), Butyl benzyl phthalate(BBP), Bis(2-ethylhexyl) phthalate (DEHP), Diisobutyl phthalate(DIBP)

Test Method: IEC 62321-8:2017, Solvent extraction and determined by GC-MS

Part No.	Test Results (mg/kg)				Conclusion(s)
	DBP	BBP	DEHP	DIBP	
	RL (mg/kg)				
	50	50	50	50	
	Limit (mg/kg)				
	1000	1000	1000	1000	
1-1	N.D.	N.D.	N.D.	N.D.	PASS
2 + 11-2 + 12-2	N.D.	N.D.	N.D.	N.D.	PASS
3	130	N.D.	150	N.D.	PASS
4	N.D.	N.D.	N.D.	N.D.	PASS
5 + 6	N.D.	N.D.	N.D.	N.D.	PASS
8 + 9-1	N.D.	N.D.	N.D.	N.D.	PASS
13-1 + 13-3	N.D.	N.D.	N.D.	N.D.	PASS
20	N.D.	N.D.	N.D.	N.D.	PASS

- Note:**
1. 1000mg/kg = 0.1%;
  2. N.D. = Not detected (<RL);
  3. The test parts were analyzed on behalf of the applicant as mixing sample in one testing. The above results were only given as the informality value and only for reference.

ORIGINAL

This report is only responsible for the tested sample(s) from the client, the testing result(s) is used for scientific research, teaching or internal quality control. Without the writing agreement of the company, the client is not allowed to copy the report in part (entire copy is excepted).

# Test Report

Report No.: GNBZ240401135-02EN

Issue Date: Apr. 19, 2024

Page 6 of 9

The Model/Type reference are as following:

AST-MP668, AST-MP648, AST-MP654, AST-MP653, AST-MP667, AST-MP650, AST-MP651, AST-MP595, AST-MP621, AST-MP556, AST-MP894B, AST-MP577, AST-MP896B, AST-MP017, AST-MP566, AST-MP328, AST-MP471, AST-MP002, AST-MP003, AST-MP011, AST-MP013, AST-MP021, AST-MP021C, AST-MP057, AST-MP067, AST-MP077, AST-MP079, AST-MP085, AST-MP104, AST-MP119, AST-MP156, AST-MP191, AST-MP213, AST-MP216, AST-MP248, AST-MP345, AST-MP197, AST-MP243, AST-MP012, AST-MP400, AST-MP104, AST-MP098, AST-MP314, AST-MP402, AST-MP118, AST-MP401, AST-MP347, AST-MP056, AST-MP183, AST-MP021P, AST-MP492, AST-MP473, AST-MP497, AST-MP497P, AST-MP121, AST-MP455, AST-MP450P, AST-MP450, AST-MP450C, AST-MP378P, AST-MP452, AST-MP856, AST-MP931, AST-MP902B, AST-MP009, AST-MP001, AST-MP984, AST-MP888, AST-MP927, AST-MP908, AST-MP926, AST-MP521, AST-MP951, AST-MP940, AST-MP914, AST-MP913, AST-MP841, AST-MP123, AST-MP851, AST-MP001, AST-MP021W, AST-MP986C, AST-MP524, AST-MP934, AST-MP513, AST-MP976, AST-MP985, AST-MP532F, AST-MP956, AST-MP984, AST-MP502, AST-MP880, AST-MP895B, AST-MP515, AST-MP969, AST-MP384, AST-MP957, AST-MP895, AST-MP893, AST-MP894, AST-MP917, AST-MP918, AST-MP538, AST-MP539, AST-MP839B, AST-MP927E, AST-MP893E, AST-MP927F, AST-MP926E, AST-MP894E, AST-MP961, AST-MP962, AST-MP902, AST-MP902C, AST-MP017, AST-MP906E, AST-MP987, AST-PD001, AST-PD002, AST-PD003, AST-PD004, AST-PD005, AST-PD006, AST-PD007, AST-PD008, AST-MP597, AST-MP598, AST-MP599, AST-MP663F, AST-MP652, AST-MP652B, AST-MP678, AST-MP681, AST-MP666, AST-MP672, AST-MP673, AST-MP670, AST-MP601, AST-MP620, AST-MP660, AST-MP660F, AST-MP661, AST-MP662, AST-MP661F, AST-MP662F, AST-MP841F

ORIGINAL

This report is only responsible for the tested sample(s) from the client, the testing result(s) is used for scientific research, teaching or internal quality control. Without the writing agreement of the company, the client is not allowed to copy the report in part (entire copy is excepted).



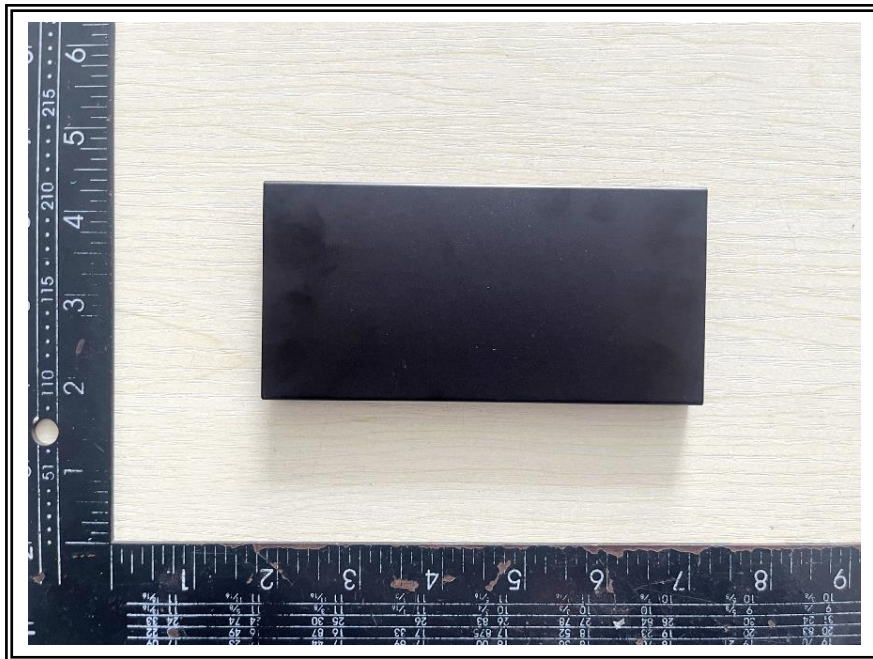
## Test Report

Report No.: GNBZ240401135-02EN

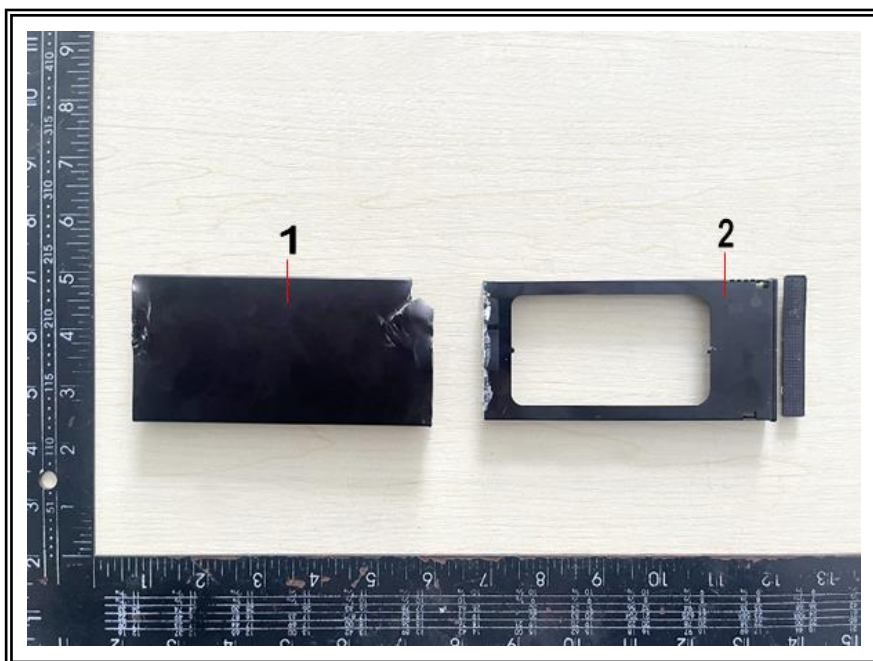
Issue Date: Apr. 19, 2024

Page 7 of 9

Sample photo(s):



Tested Model: AST-MP647



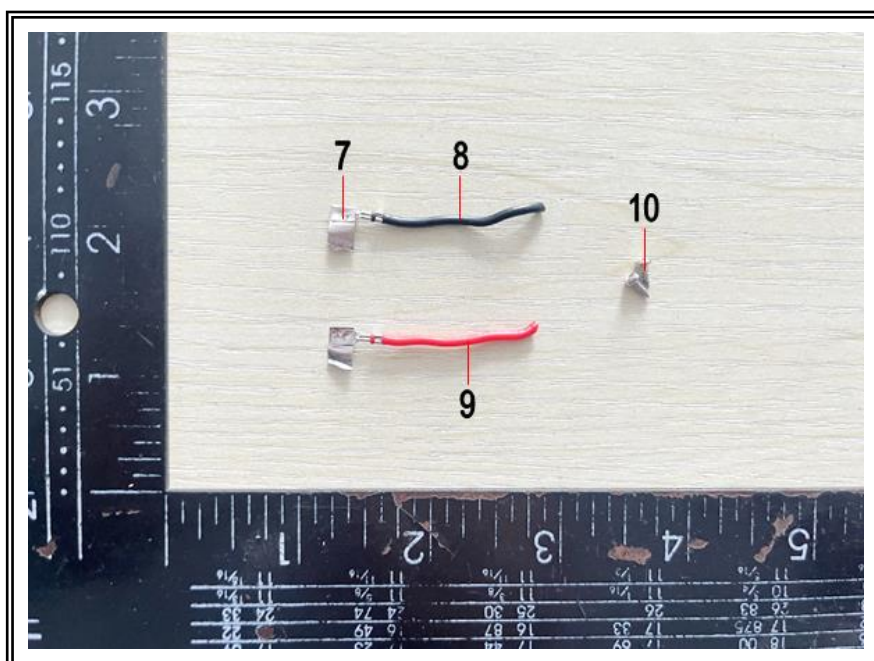
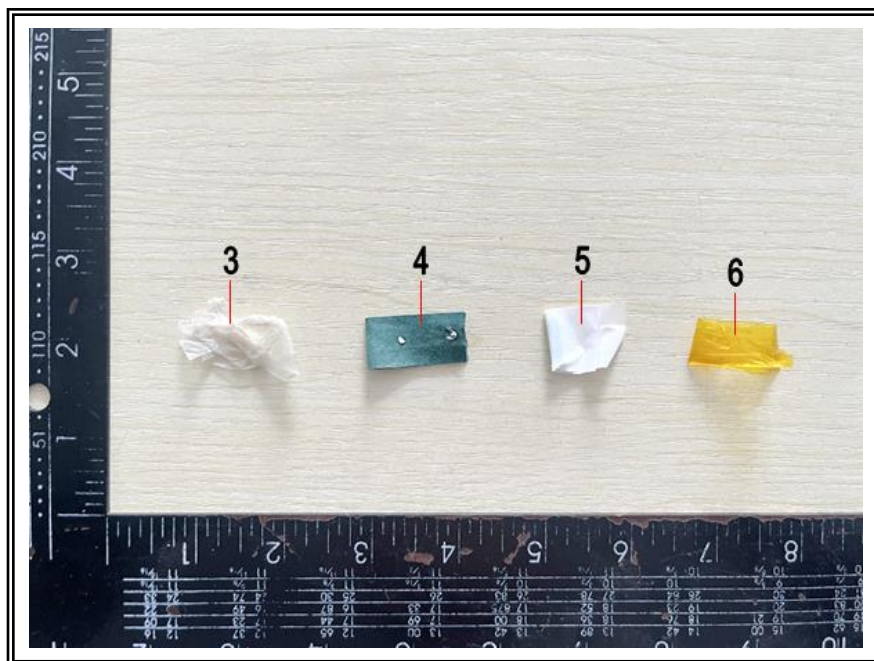
This report is only responsible for the tested sample(s) from the client, the testing result(s) is used for scientific research, teaching or internal quality control. Without the writing agreement of the company, the client is not allowed to copy the report in part (entire copy is excepted).

## Test Report

Report No.: GNBZ240401135-02EN

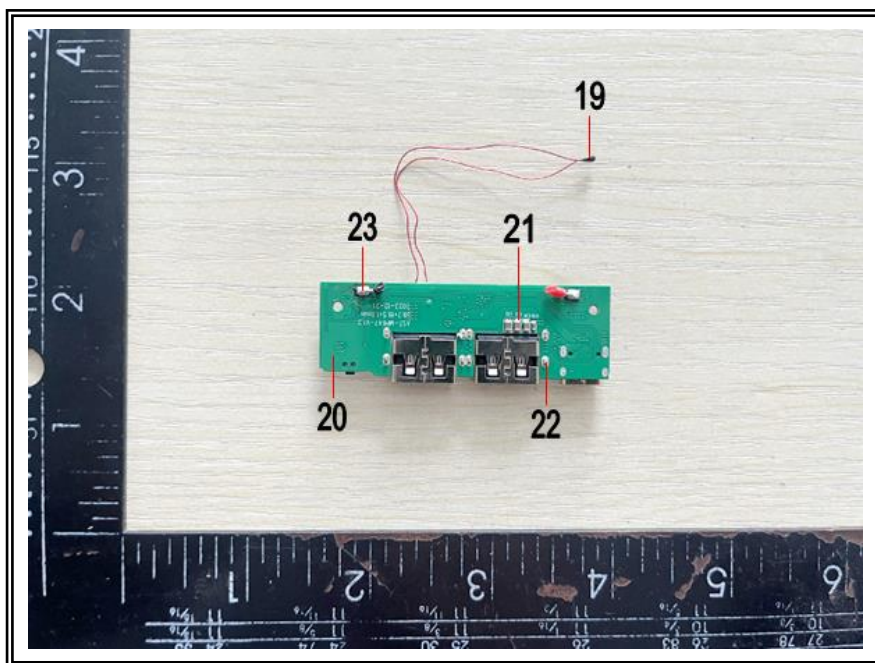
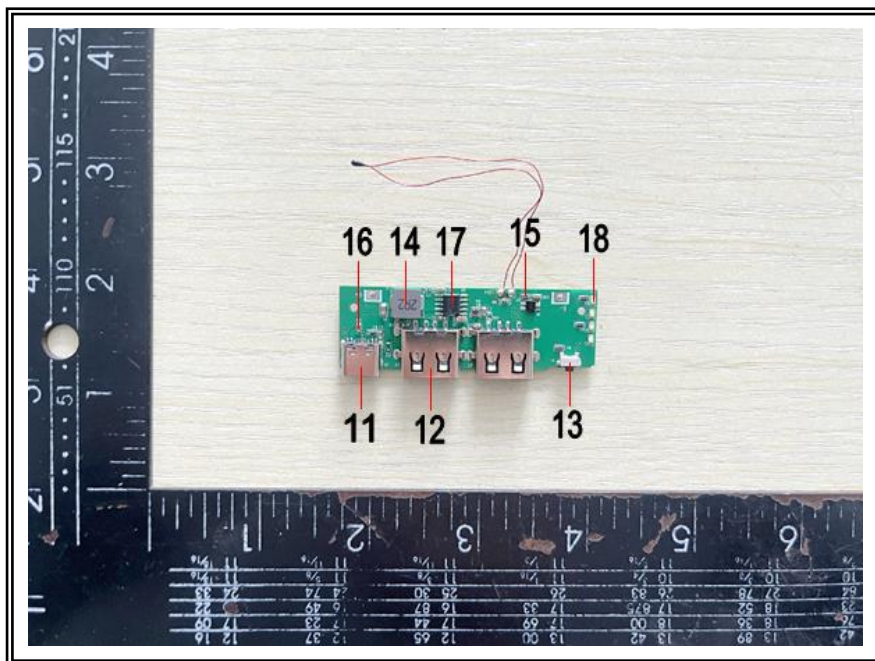
Issue Date: Apr. 19, 2024

Page 8 of 9



This report is only responsible for the tested sample(s) from the client, the testing result(s) is used for scientific research, teaching or internal quality control. Without the writing agreement of the company, the client is not allowed to copy the report in part (entire copy is excepted).





GIG authenticate the photo(s) on original report only

\*\*\*\*End of Report\*\*\*\*

This report is only responsible for the tested sample(s) from the client, the testing result(s) is used for scientific research, teaching or internal quality control. Without the writing agreement of the company, the client is not allowed to copy the report in part (entire copy is excepted).