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Client: HAMEDATA TECHNOLOGY CO.,LIMITED

Contact Information: 1-3F & 6-8F, BLDG#A, Changfang Industrial Park, No.2 Guihua 5th Road, Pingshan District, Shenzhen, Guangdong, P.R. China

Test item(s): 113 materials

**Identification/
Model No(s):** MICRO ESS
B2500, BP-B2500, BC-B2500, BW2KWS, 10111, BSBS2240,B2500-A,B2500-B,
B2500-C,B2500-D,B2500H,B2500-i

Sample obtaining method: Sending by customer

Condition at delivery: Test item complete and undamaged.

Sample Receiving date: 2023-08-16, 2023-08-22, 2023-09-07

Testing Period: 2023-08-18 to 2023-09-12

Place of testing: Chemical laboratory Shenzhen

Test Specification:

1. Cadmium, Lead, Chromium (VI), Mercury, Polybrominated biphenyls (PBB) and Polybrominated diphenyl ethers (PBDE), ROHS Phthalates (BBP, DBP, DEHP, DIBP)
According to RoHS(recast): Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment, 2011/65/EU Annex II and its amendment Directive (EU) 2015/863

Test result:

PASS

For and on behalf of
TÜV Rheinland (Shenzhen) Co., Ltd.



2023-12-9

Grid Guo / Engineer

Date

Name/Position

Sample information is provided by customer. Test result is drawn according to the kind and extent of tests performed.
This test report relates to the above mentioned test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.
"Decision Rule" document announced in our website (<https://www.tuv.com/landingpage/en/qm-gcn/>) describes the statement of conformity and its rule of enforcement for test results are applicable throughout this test report.

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Material List:

Item: MICRO ESS
 B2500, BP-B2500, BC-B2500, BW2KWS, 10111, BSBS2240

Material No.	Material	Color	Location
M001	Metal + plating	Silvery/ black	Refer to photo
M002	Plastic	Transparent black	Refer to photo
M003	Metal	Silvery	Refer to photo
M004	Metal	Silvery	Refer to photo
M005	Plastic	Translucent	Refer to photo
M006	Metal	Silvery	Refer to photo
M007	Plastic	Translucent	Refer to photo
M008	Plastic	Brige	Refer to photo
M009	Metal	Silvery	Refer to photo
M010	Metal	Silvery	Refer to photo
M011	Plastic	Black	Refer to photo
M012	Plastic	Black	Refer to photo
M013	Metal	Golden	Refer to photo
M014	PCB board	Green	Refer to photo
M015	Plastic	Red	Refer to photo
M016	Plastic	White	Refer to photo
M017	Plastic	Brown	Refer to photo
M018	Plastic	Green	Refer to photo
M019	Metal	Silvery	Refer to photo
M020	Plastic + printing	White/ blue	Refer to photo
M021	Glue	Translucent	Refer to photo
M022	Plastic	Black	Refer to photo
M023	Plastic	Black	Refer to photo
M024	Metal	Silvery	Refer to photo
M025	Plastic	Red	Refer to photo
M026	Metal	Silvery	Refer to photo
M027	Plastic	Grey	Refer to photo
M028	Plastic	Black	Refer to photo

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M029	Plastic	Red	Refer to photo
M030	Metal	Silvery	Refer to photo
M031	Plastic + printing	White/ black	Refer to photo
M032	PCB board	Green	Refer to photo
M033	Plastic	Green	Refer to photo
M034	Plastic	White	Refer to photo
M035	Electronic components	Black/ white	Refer to photo
M036	Solder	Silvery	Refer to photo
M037	Plastic	Beige	Refer to photo
M038-1	Plastic	Black	Refer to photo
M039	Metal	Golden	Refer to photo
M040	Metal	Silvery	Refer to photo
M041	Plastic	Black	Refer to photo
M042	Glue	Black	Refer to photo
M043	Plastic	Green	Refer to photo
M044	Plastic	Orange	Refer to photo
M045	Plastic	Yellow	Refer to photo
M046	Plastic	White	Refer to photo
M047	Plastic	Red	Refer to photo
M048	Plastic	Black	Refer to photo
M049	Plastic	Black	Refer to photo
M050	Plastic	Red	Refer to photo
M051	Plastic	Black	Refer to photo
M052	Glue	Grey	Refer to photo
M053	Metal	Silvery	Refer to photo
M054	Plastic	Black	Refer to photo
M055	Metal	Golden	Refer to photo
M056	Metal	Silvery	Refer to photo
M057	Electronic components	Black	Refer to photo
M058	Electronic components	Black	Refer to photo
M059	Electronic components	Black	Refer to photo
M060	Electronic components	Black	Refer to photo

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M061	Electronic components	Black	Refer to photo
M062	Electronic components	Black	Refer to photo
M063	Metal	Silvery/ blue	Refer to photo
M064	Plastic	Black	Refer to photo
M065	Electronic components	Brown	Refer to photo
M066	Electronic components	Grey	Refer to photo
M067	Electronic components	Dark brown	Refer to photo
M068	Plastic + printing	Dark blue/ grey	Refer to photo
M069	Metal	Silvery	Refer to photo
M070	Plastic	Black	Refer to photo
M071	Metal	Copper	Refer to photo
M072	Ceramic	Black	Refer to photo
M073	Electronic components	Grey/ multicolor	Refer to photo
M074	Electronic components	Black	Refer to photo
M075	Electronic components	Black	Refer to photo
M076	Electronic components	Black	Refer to photo
M077	Electronic components	Black	Refer to photo
M078	Electronic components	Black	Refer to photo
M079	Electronic components	Silvery	Refer to photo
M080	Plastic	Black	Refer to photo
M081	Metal	Silvery	Refer to photo
M082	Electronic components	Black	Refer to photo
M083	Electronic components	Brown	Refer to photo
M084	Electronic components	Black	Refer to photo
M085	Metal + plating	Silvery/ black	Refer to photo
M086	Metal + plating	Silvery/ black	Refer to photo
M087	Metal	Silvery	Refer to photo
M088	Plastic + plating	White	Refer to photo
M089	Metal	Silvery	Refer to photo
M090	Metal	Silvery	Refer to photo
M091	Metal	Silvery	Refer to photo
M092	Metal	Silvery	Refer to photo

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M093	Metal	Silvery	Refer to photo
M094	Coating	Black	Refer to photo
M095	Metal	Silvery	Refer to photo
M096	Glue	White	Refer to photo
M097	Plastic	Black	Refer to photo
M098	Plastic	Black	Refer to photo
M099	Plastic	Black	Refer to photo
M100	Plastic	Black	Refer to photo
M101	Plastic	Black	Refer to photo
M102	Textile + adhesive	Black	Refer to photo
M103	Plastic	Red	Refer to photo
M104	Plastic	Black	Refer to photo
M105	Glue	Black	Refer to photo
M107	PCB board	Green	Refer to photo
M108-1	Solder	Silvery	Refer to photo
M109	Plastic	Black	Refer to photo
M110	Plastic	White	Refer to photo
M111	Plastic	Black	Refer to photo
M112	Plastic + adhesive	Black	Refer to photo
M113	Metal	Golden	Refer to photo
M114	PCB board	Blue	Refer to photo

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1.Screening Test by XRF spectroscopy

Test Method: Cadmium, Lead, Mercury, Chromium, Bromine
 -- With reference to IEC 62321-3-1:2013

Test Result:

Material No.	Cd	Cr	Pb	Hg	Br
M001	BL	d.(*1)	BL	BL	n.a.
M002	BL	BL	BL	BL	BL
M003	BL	BL	d.(*1)	BL	n.a.
M004	BL	d.(*1)	BL	BL	n.a.
M005	BL	BL	BL	BL	BL
M006	BL	BL	d.(*1)	BL	n.a.
M007	BL	BL	BL	BL	BL
M008	BL	BL	BL	BL	d.(*1)
M009	BL	d.(*1)	BL	BL	n.a.
M010	BL	BL	BL	BL	n.a.
M011	BL	BL	BL	BL	BL
M012	BL	BL	BL	BL	d.(*1)
M013	BL	BL	BL	BL	n.a.
M014	BL	BL	BL	BL	d.(*1)
M015	BL	BL	BL	BL	BL
M016	BL	BL	BL	BL	BL
M017	BL	BL	BL	BL	BL
M018	BL	BL	BL	BL	BL
M019	BL	BL	BL	BL	n.a.
M020	BL	BL	BL	BL	BL
M021	BL	BL	BL	BL	BL
M022	BL	BL	BL	BL	BL
M023	BL	BL	BL	BL	BL
M024	BL	BL	BL	BL	n.a.
M025	BL	BL	BL	BL	BL
M026	BL	BL	BL	BL	n.a.
M027	BL	BL	BL	BL	BL
M028	BL	BL	BL	BL	BL
M029	BL	BL	BL	BL	BL
M030	BL	BL	BL	BL	n.a.
M031	BL	BL	BL	BL	BL
M032	BL	BL	BL	BL	d.(*1)
M033	BL	BL	BL	BL	d.(*1)
M034	BL	BL	BL	BL	BL
M035	BL	BL	d.(*1)	BL	BL
M036	BL	BL	BL	BL	n.a.
M037	BL	BL	BL	BL	d.(*1)

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M038-1	BL	BL	BL	BL	BL
M039	BL	BL	d.(*1)	BL	n.a.
M040	BL	BL	d.(*1)	BL	n.a.
M041	BL	BL	BL	BL	d.(*1)
M042	BL	BL	BL	BL	BL
M043	BL	BL	BL	BL	BL
M044	BL	BL	BL	BL	BL
M045	BL	BL	BL	BL	BL
M046	BL	BL	BL	BL	BL
M047	BL	BL	BL	BL	BL
M048	BL	BL	BL	BL	BL
M049	BL	BL	BL	BL	BL
M050	BL	BL	BL	BL	BL
M051	BL	BL	BL	BL	BL
M052	BL	BL	BL	BL	BL
M053	BL	BL	BL	BL	n.a.
M054	BL	BL	BL	BL	d.(*1)
M055	BL	BL	BL	BL	n.a.
M056	BL	BL	BL	BL	n.a.
M057	BL	BL	BL	BL	BL
M058	BL	BL	d.(*1)	BL	BL
M059	BL	BL	BL	BL	BL
M060	BL	BL	BL	BL	BL
M061	BL	BL	BL	BL	BL
M062	BL	BL	BL	BL	BL
M063	BL	BL	BL	BL	n.a.
M064	BL	BL	BL	BL	BL
M065	BL	BL	BL	BL	BL
M066	BL	d.(*1)	BL	BL	n.a.
M067	BL	BL	BL	BL	BL
M068	BL	BL	BL	BL	BL
M069	BL	BL	BL	BL	n.a.
M070	BL	BL	BL	BL	BL
M071	BL	BL	BL	BL	n.a.
M072	BL	BL	BL	BL	BL
M073	BL	BL	BL	BL	BL
M074	BL	BL	d.(*1)	BL	BL
M075	BL	BL	BL	BL	BL
M076	BL	BL	BL	BL	BL
M077	BL	BL	BL	BL	BL
M078	BL	BL	BL	BL	BL
M079	BL	BL	BL	BL	n.a.
M080	BL	BL	BL	BL	BL

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M081	BL	BL	BL	BL	n.a.
M082	BL	BL	BL	BL	BL
M083	BL	BL	BL	BL	d.(*1)
M084	d.(*1)	BL	d.(*1)	BL	BL
M085	BL	d.(*1)	BL	BL	n.a.
M086	BL	d.(*1)	BL	BL	n.a.
M087	BL	d.(*1)	BL	BL	n.a.
M088	BL	BL	BL	BL	BL
M089	BL	BL	BL	BL	n.a.
M090	BL	d.(*1)	BL	BL	n.a.
M091	BL	BL	BL	BL	n.a.
M092	BL	d.(*1)	BL	BL	n.a.
M093	BL	d.(*1)	BL	BL	n.a.
M094	BL	BL	BL	BL	BL
M095	BL	BL	BL	BL	n.a.
M096	BL	BL	BL	BL	BL
M097	BL	BL	BL	BL	BL
M098	BL	BL	BL	BL	BL
M099	BL	BL	BL	BL	BL
M100	BL	BL	BL	BL	BL
M101	BL	BL	BL	BL	BL
M102	BL	BL	BL	BL	BL
M103	BL	BL	BL	BL	BL
M104	BL	BL	BL	BL	BL
M105	BL	BL	BL	BL	BL
M107	BL	BL	BL	BL	BL
M108-1	BL	BL	BL	BL	n.a.
M109	BL	BL	BL	BL	BL
M110	BL	BL	BL	BL	BL
M111	BL	BL	BL	BL	BL
M112	BL	BL	BL	BL	BL
M113	BL	BL	d.(*1)	BL	n.a.
M114	BL	BL	BL	BL	BL

Abbreviation: Pb = Lead
 Cd = Cadmium
 Hg = Mercury
 Cr = Chromium
 Br = Bromine
 n.a. = Not applicable
 BL = Below limit
 OL = Over limit
 d. = Detected

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Remark:

- (*1) The screening result was detected in the inconclusive region or over limits, thus the further wet chemistry tests are suggested.
- (*2) Component(s)/ materials(s) with an area of less than 2 mm x 2 mm will not be selected for testing according to RoHS Directive 2011/65/EU due to technical reason.
 For the test sample does not have detail materials information provided by client, visually identical materials (e.g. wire insulation, solder points, etc.) will be considered as the same material.
 Solder points on a printing circuit board will be examined several times based on optical anomalies or discoloration of the solder point(s) unless the solder point(s) is obviously generated automatically during production.
 All other materials will be sampled and tested at one test point representatively.

XRF Screening limits for different matrices :

Material	Concentration (%)				
	Cd	Cr	Pb	Hg	Br
Polymeric	BL≤0.006<X<0.014≤ OL	BL≤0.064<X	BL≤0.067<X<0.133≤ OL	BL≤0.066<X< 0.134≤OL	BL≤0.029<X
Metallic	BL≤0.006<X<0.014≤ OL	BL≤0.064<X	BL≤0.067<X<0.133≤ OL	BL≤0.066<X< 0.134≤OL	n.a.
Composite materials	BL≤0.004<X<0.016≤ OL	BL≤0.044<X	BL≤0.047<X<0.153≤ OL	BL≤0.046<X< 0.154≤OL	BL≤0.024<X

Remark: The symbol "X" marks the region where further investigation is necessary.

	Cd	Cr(VI)	Pb	Hg	PBBs	PBDEs
Maximum permissible Limit (%)	0.01	0.1	0.1	0.1	0.1	0.1

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Cadmium, Lead, Chromium (VI), Mercury, Polybrominated biphenyls (PBB) and Polybrominated diphenyl ethers (PBDE)

Test Method: Total Cadmium, Lead, Mercury, Chromium
 - Ref. to IEC 62321-4:2013+AMD1:2017 and IEC 62321-5:2013

Chromium (VI)
 - For Metal material - Ref. to IEC 62321-7-1:2015
 - For Polymer, Electronic material or others materials – Ref. to IEC 62321-7-2:2017

PBBs, PBDEs – Ref. to IEC 62321-6:2015

Test Result:

	Cd	Cr(VI)	Pb	Hg	PBBs	PBDEs
Maximum Permissible Limit (%)	0.01	0.1	0.1	0.1	0.1	0.1

Material No.	(%)					
	Cd	Cr^{VI}	Pb	Hg	PBBs	PBDEs
	RL (%)					
	0.001	0.001	0.001	0.001	0.01	0.01
M003	n.a.	n.a.	2.40(*4)	n.a.	n.a.	n.a.
M006	n.a.	n.a.	2.67(*4)	n.a.	n.a.	n.a.
M008	n.a.	n.a.	n.a.	n.a.	< RL	< RL
M012	n.a.	n.a.	n.a.	n.a.	< RL	< RL
M014	n.a.	n.a.	n.a.	n.a.	< RL	< RL
M032	n.a.	n.a.	n.a.	n.a.	< RL	< RL
M033	n.a.	n.a.	n.a.	n.a.	< RL	< RL
M035	n.a.	n.a.	0.0552	n.a.	n.a.	n.a.
M037	n.a.	n.a.	n.a.	n.a.	< RL	< RL
M039	n.a.	n.a.	1.42(*4)	n.a.	n.a.	n.a.
M040	n.a.	n.a.	2.55(*4)	n.a.	n.a.	n.a.
M041	n.a.	n.a.	n.a.	n.a.	< RL	< RL
M054	n.a.	n.a.	n.a.	n.a.	< RL	< RL
M058	n.a.	n.a.	2.78(*5)	n.a.	n.a.	n.a.
M074	n.a.	n.a.	9.24(*5)	n.a.	n.a.	n.a.
M083	n.a.	n.a.	n.a.	n.a.	< RL	< RL
M084	<RL	n.a.	1.37(*5)	n.a.	n.a.	n.a.
M113	n.a.	n.a.	2.47(*4)	n.a.	n.a.	n.a.

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Material No.	Chromium VI content for metal materials ($\mu\text{g}/\text{cm}^2$) (*1) RL: 0.10 $\mu\text{g}/\text{cm}^2$
M001	Negative
M004	Negative
M009	Negative
M066	Negative
M085	Negative
M086	Negative
M087	Negative
M090	Negative
M092	Negative
M093	Negative

Abbreviation:

Pb	= Lead
Cd	= Cadmium
Hg	= Mercury
Cr	= Chromium
Cr (VI)	= Chromium (VI)
PBBs	= Total Polybrominated Biphenyls
PBDEs	= Total Polybrominated Diphenyl Ethers
<	= Less than
RL	= Reporting Limit
n.a.	= Not Applicable
^	= The total Chromium have been determined
%	= Percentage

Remark:

(*1) The Chromium (VI) content of metal sample in surface layer have been confirmed with reference to IEC 62321-7-1:2015 Annex.

	Chromium (VI) concentration	Qualitative result
Negative	$<0.1\mu\text{g}/\text{cm}^2$	The sample is negative (-ve) for Cr(VI). The Cr(VI) concentration is below the limit of quantification. The coating is considered a non-Cr(VI) based coating
Inconclusive	$\geq 0.1\mu\text{g}/\text{cm}^2$ and $\leq 0.13\mu\text{g}/\text{cm}^2$	The result is considered to be inconclusive. Unavoidable coating variations may influence the determination. Recommendation: if additional samples are available, perform a total of 3 trials to increase sampling surface area. Use the averaged result of the 3 trials for the final determination.
Positive	$>0.13\mu\text{g}/\text{cm}^2$	The sample is positive (+ve) for Cr(VI). Concentration is above the limit of quantification and the statistical margin of error. The sample coating is considered to contain Cr(VI).

(*4) According to (EU) 2018/741 and Annex III of directive 2011/65/EU, 6(c), as a copper alloy containing up to 4% lead by weight are exempted from requirement. This exemption applies to testing sample No.: M003, M006, M039, M040, M113.

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- (*5) According to (EU) 2018/736 and Annex III of directive 2011/65/EU, 7(c)-I, Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound is exempted from requirement. This exemption applies to testing sample No.: M058, M074, M084.

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BBP, DBP, DEHP, DIBP content

Test Method: ref. to IEC 62321-8:2017

Test Result:

	BBP	DBP	DEHP	DIBP
Maximum permissible Limit (%)	0.1	0.1	0.1	0.1

Test No.	Material No.	RL (%)			
		BBP	DBP	DEHP	DIBP
		RL (%)			
		0.005	0.005	0.005	0.005
T001	M002 + M005 + M008	< RL	< RL	< RL	< RL
T002	M011 + M049 + M098	< RL	< RL	< RL	< RL
T003	M015 + M016 + M017	< RL	< RL	0.011	< RL
T004	M018 + M028 + M029	< RL	< RL	0.013	< RL
T005	M020 + M022 + M023	< RL	< RL	< RL	< RL
T006	M007 + M021 + M064	< RL	< RL	0.005	< RL
T007	M033 + M034 + M041	< RL	< RL	< RL	< RL
T008	M043 + M044 + M045	< RL	0.008	< RL	< RL
T009	M046 + M047 + M048	< RL	< RL	< RL	< RL
T010	M012 + M054 + M068	< RL	< RL	< RL	< RL
T012	M027 + M031 + M102	< RL	< RL	0.026	< RL
T013	M099 + M101 + M103	< RL	< RL	< RL	< RL
T014	M014 + M032 + M107	< RL	< RL	< RL	< RL
T015	M037 + M070 + M080	< RL	< RL	< RL	< RL
T016	M042 + M052 + M096	< RL	< RL	< RL	< RL
T017	M094	< RL	< RL	< RL	< RL
T018	M050 + M051 + M105	< RL	< RL	< RL	< RL
T019	M088 + M097	< RL	< RL	< RL	< RL
T020	M100 + M104	< RL	< RL	< RL	< RL
T021	M025	< RL	< RL	< RL	< RL
T022	M038-1	< RL	< RL	< RL	< RL
T023	M109 + M110 + M111	< RL	< RL	< RL	< RL

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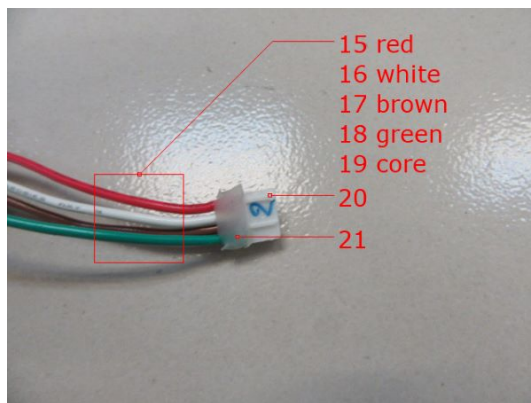
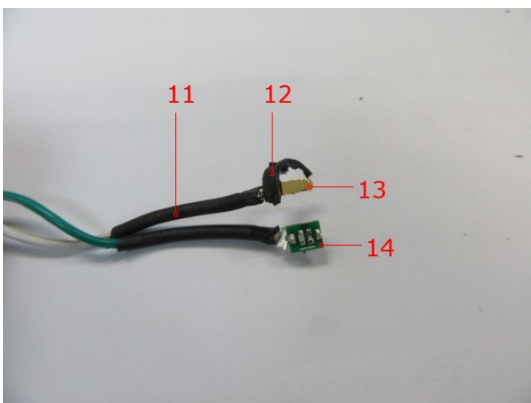
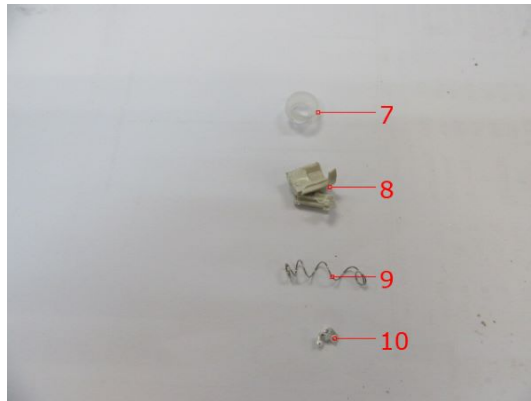
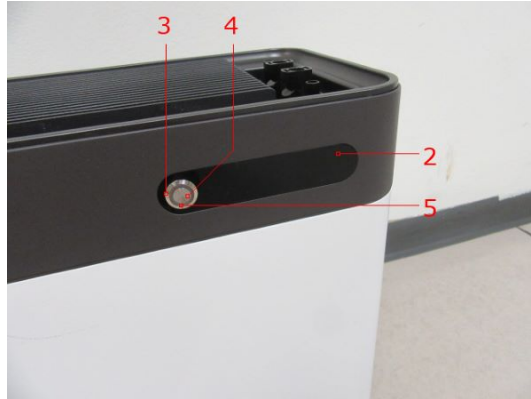
T024	M112	< RL	< RL	< RL	< RL
T025	M114	< RL	< RL	< RL	< RL

Abbreviation: BBP= Benzylbutyl phthalate
DBP= Dibutyl phthalate
DEHP= Bis(2-ethylhexyl) phthalate
DIBP= Diisobutyl phthalate
< = less than
RL = Reporting Limit
%= percentage

Remark:

- * The maximum permissible limit is required from the amendment (EU) 2015/863 of RoHS Directive 2011/65/EU.

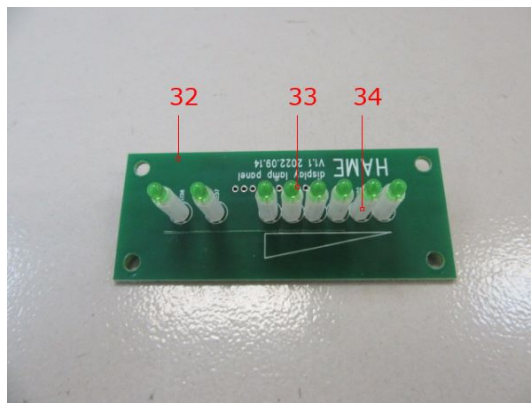
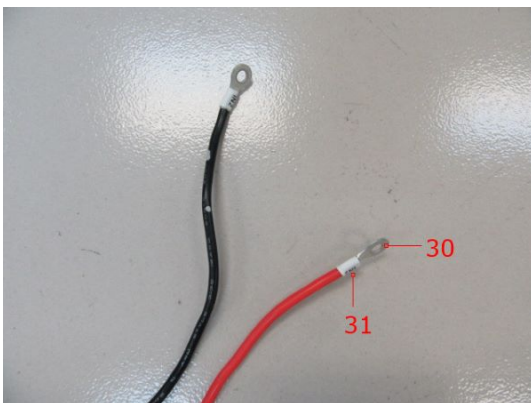
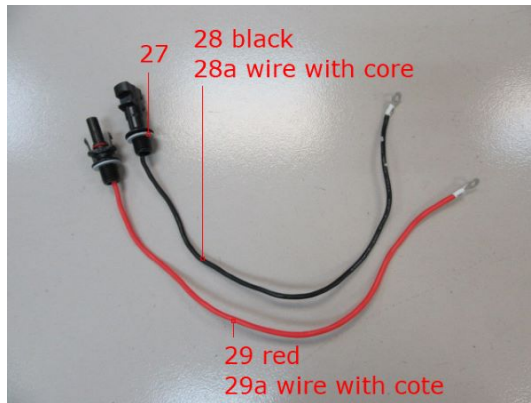
Sample Photos



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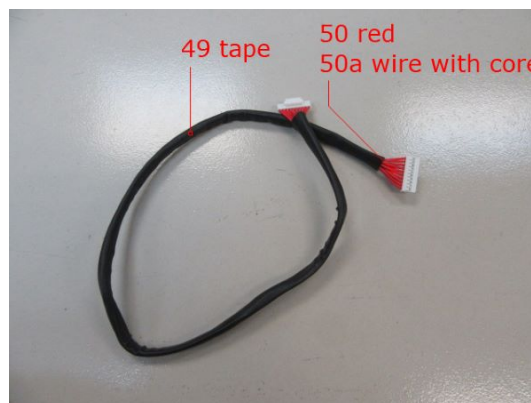
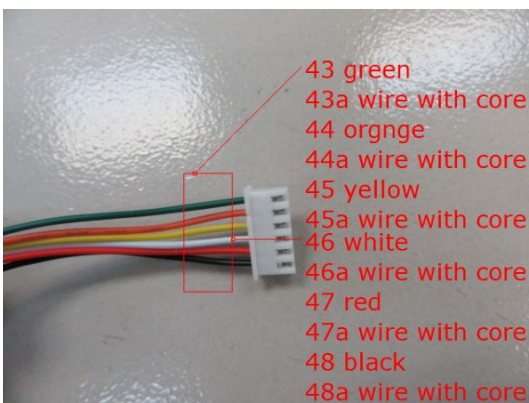
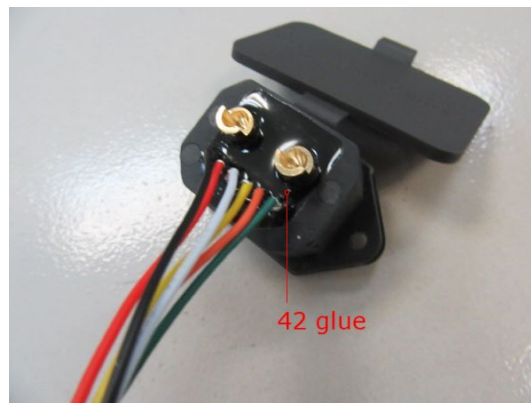
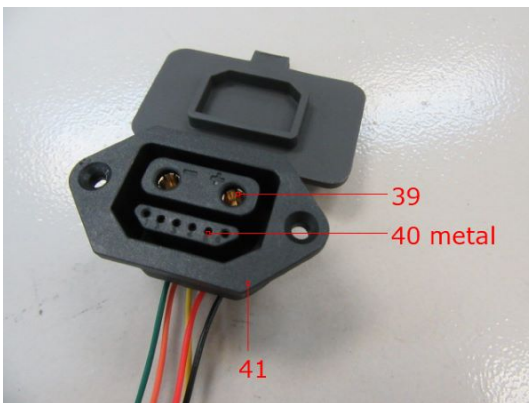
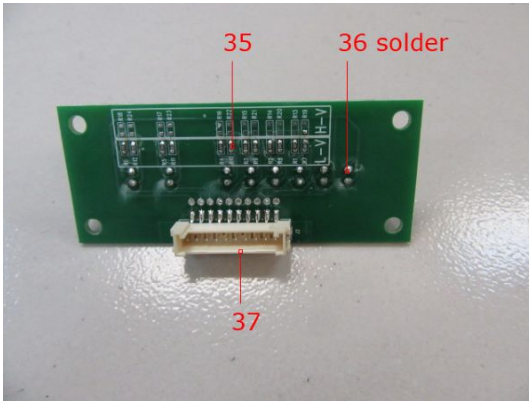
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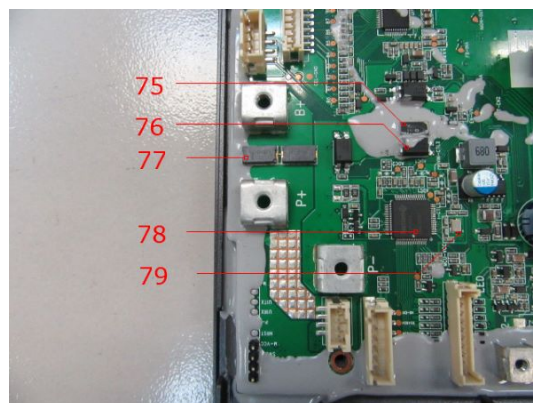
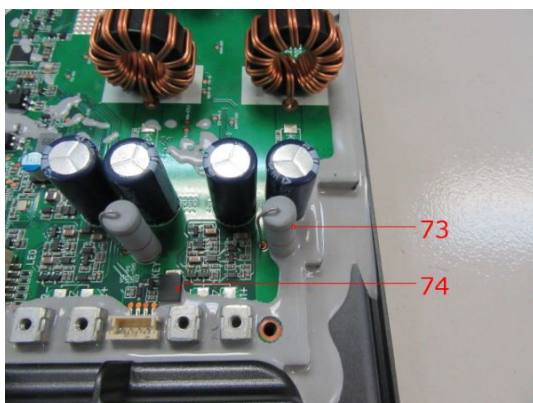
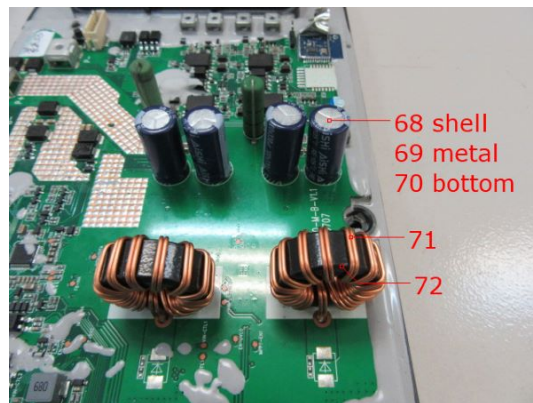
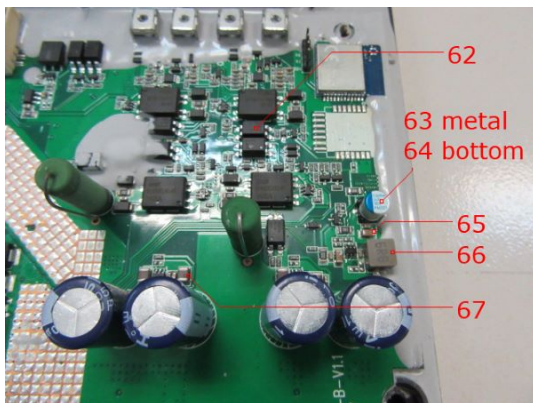
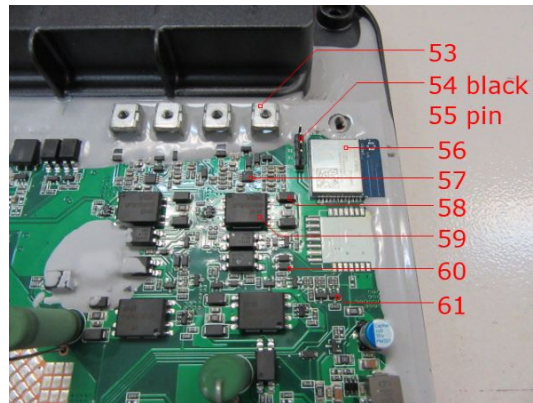
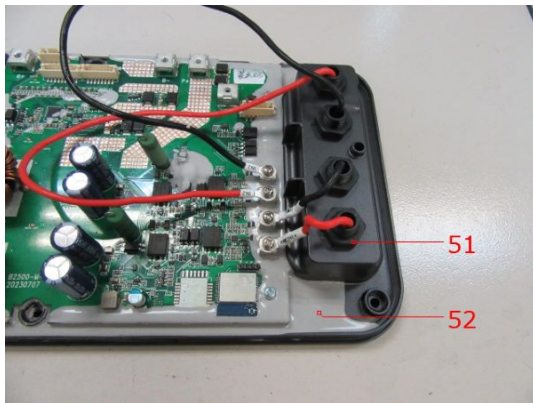
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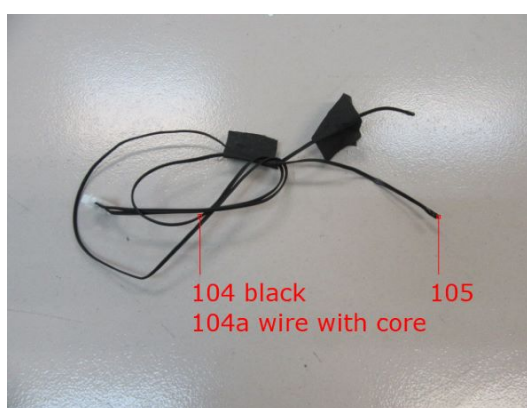
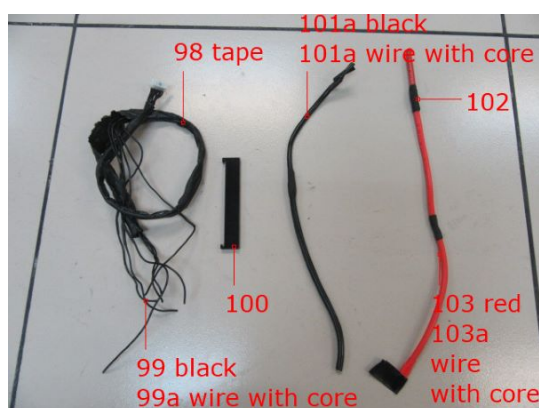
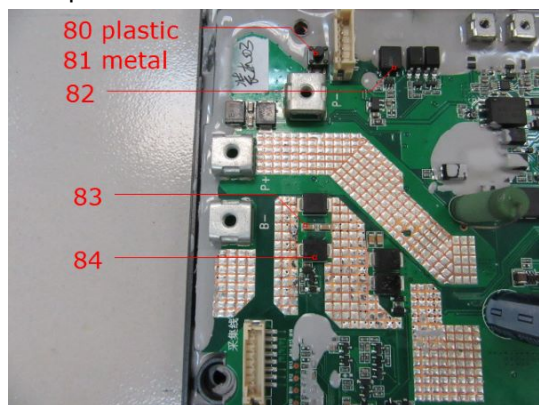
Sample Photos



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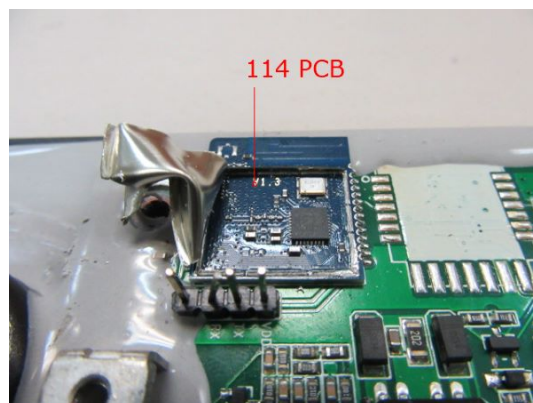
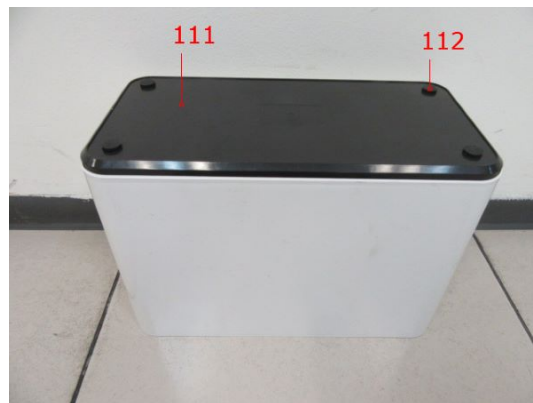
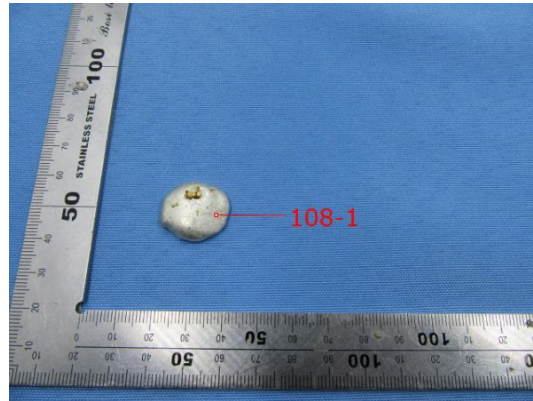
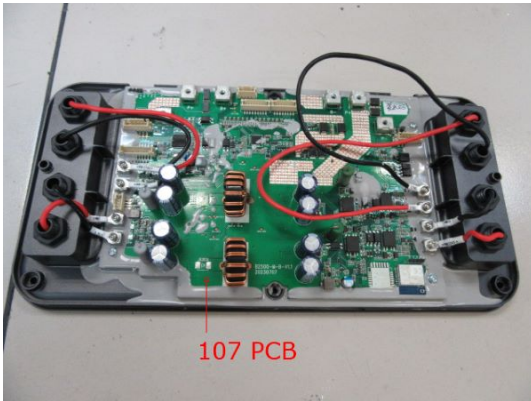
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Product

- END -

This GTCB is only used for TÜV Rheinland Business Stream Products
Version 5.0/February 2023