# TEST REPORT

**REPORT No.: DTIBW20200847** Date: 2020-09-18 

**Applicant Company Name：Beijing StrongLink Technology Co.,Ltd.**

**Applicant Company Address：Building C No.39 Xi erqi strrrt Haiding district Beijing 100085 China**

**The following sample(s) was/were submitted and identified on behalf of the client as:**

| | | |
|---|---|---|
| Sample Name | : | MIRARE MODULE |
| Model No. | : | SL030_V3.1 / SL031_V3.0/SL025B_V3.0 / SL025M_V3.0 / SL032_V3.1 |
| Sample Receiving Date | : | September 11, 2020 |
| Testing Period | : | From September 11, 2020 to September 18, 2020 |
| Results | : | Please refer to next page(s). |

**********

**Summary of Test Results:**

| **TEST REQUEST** | **CONCLUSION** |
|---|---|
| A EU RoHS Directive 2011/65/EU and its amendment directives2015/863/EU (**RoHS 2.0**) | **Pass** |

**********

Shenzhen Deesev Testing International Corp

Approved by: Tomy. Jiang
lab manager

**Results:**

**1、EU RoHS Directive 2011/65/EU and its amendment directives on XRF**

Test method: With reference to IEC 62321-3-1:2013, Screening by X-ray Fluorescence Spectroscopy (XRF)

| Seq. No. | Tested Part(s) | Results | | | | |
|---|---|---|---|---|---|---|
| | | Pb | Cd | Hg | Cr | Br |
| 1 | White Printing | BL | BL | BL | BL | BL |
| 2 | Solder Point | BL | BL | BL | BL | BL |
| 3 | PCB | BL | BL | BL | BL | X |
| 4 | Black Ceramic Body Chip | BL | BL | BL | BL | BL |
| 5 | Crystal Oscillator | BL | BL | BL | BL | BL |
| 6 | Black Ceramic Body Chip | BL | BL | BL | BL | BL |
| 7 | Yellow Chip Capacitor | BL | BL | BL | BL | BL |
| 8 | Patch Resistor | BL | BL | BL | BL | BL |
| 9 | Multiplayer Ceramic Chip Capacitors | BL | BL | BL | BL | BL |
| 10 | Patch Resistor | BL | BL | BL | BL | BL |
| 11 | Patch LED | BL | BL | BL | BL | BL |

**********

Remark:

(1) Results were obtained by XRF for primary screening, and further chemical testing by ICP (for Cd, Pb, Hg), UV-Vis (for Cr(Ⅵ)) and GC-MS (for PBBs, PBDEs) are recommended to be performed, if the concentration exceeds the below warning value according to IEC 62321-3-1:2013.

| Element | Unit | Non-metal | Metal | Composite Material |
|---|---|---|---|---|
| Cd | mg/kg | BL≤70-3σ< X <130+3σ≤OL | BL≤70-3σ< X <130+3σ≤OL | BL≤50-3σ< X <150+3σ≤OL |
| Pb | mg/kg | BL≤700-3σ< X <1300+3σ≤OL | BL≤700-3σ< X <1300+3σ≤ OL | BL≤500-3σ< X <1500+3σ≤OL |
| Hg | mg/kg | BL≤700-3σ< X <1300+3σ≤OL | BL≤700-3σ< X <1300+3σ≤OL | BL≤500-3σ< X <1500+3σ≤OL |
| Cr | mg/kg | BL≤700-3σ< X | BL≤700-3σ< X | BL≤500-3σ< X |
| Br | mg/kg | BL≤300-3σ< X | -- | BL≤250-3σ< X |

Note:

BL = Below Limit

OL = Over Limit

X = Inconclusive

(2) The XRF screening test for RoHS elements – The reading may be different to the actual content in the sample be of non-uniformity composition.

**********

(3) The maximum permissible limit is quoted from the document 2011/65/EU and its amendment directives 2015/863/EU:

| **RoHS Restricted Substances** | **Maximum Concentration Value (mg/kg) (by weight in homogenous materials)** |
|---|---|
| Cadmium (Cd) | ≤100 |
| Lead (Pb) | ≤1000 |
| Mercury (Hg) | ≤1000 |
| Hexavalent Chromium (Cr(Ⅵ)) | ≤1000 |
| Polybrominated biphenyls (PBBs) | ≤1000 |
| Polybrominate ddiphenylethers (PBDEs) | ≤1000 |

**********

**2、The Test Results of Chemical Method:**

Test method:

Lead, Cadmium, Mercury Content:
With reference to IEC 62321-5:2013 and IEC62321-4:2013+AMD1:2017, by acid digestion and analysis was performed by Inductively Coupled Plasma- Atomic Emission Spectrophotometer (ICP-AES)

Hexavalent Chromium Content (For metal material):
With reference to IEC 62321-7-1:2015, by boiling-water-extraction and analysis was performed by UV-visible spectrophotometer (UV-Vis)

Hexavalent Chromium Content (For non-metal material):
With reference to IEC 62321-7-2:2017, by alkaline digestion and analysis was performed by UV-visible spectrophotometer (UV-Vis)

PBBs & PBDEs Content:
With reference to IEC 62321-6:2015, by solvent extraction and analysis was performed by gas chromatographic/ mass spectrometer (GC-MS)

DEHP, BBP, DBP&.DIBP content:
With reference to IEC 62321-8:2017 by solvent extraction and analysis was performed by gas chromatographic -mass spectrometer (GC-MS)

**********

1) The test results of PBBs & PBDEs

| Item | Unit | MDL | Results | Limit |
|---|---|---|---|---|
| | | | 3 | |
| **Polybrominated Biphenyls (PBBs)** | | | | |
| Monobromobiphenyl | mg/kg | 5 | N.D. | / |
| Dibromobiphenyl | mg/kg | 5 | N.D. | / |
| Tribromobiphenyl | mg/kg | 5 | N.D. | / |
| Tetrabromobiphenyl | mg/kg | 5 | N.D. | / |
| Pentabromobiphenyl | mg/kg | 5 | N.D. | / |
| Hexabromobiphenyl | mg/kg | 5 | N.D. | / |
| Heptabromobiphenyl | mg/kg | 5 | N.D. | / |
| Octabromobiphenyl | mg/kg | 5 | N.D. | / |
| Nonabromodiphenyl | mg/kg | 5 | N.D. | / |
| Decabromodiphenyl | mg/kg | 5 | N.D. | / |
| Total content | mg/kg | / | N.D. | ≤1000 |
| **Polybrominated Diphenylethers (PBDEs)(Mon-Deca)** | | | | |
| Monobromodiphenyl ether | mg/kg | 5 | N.D. | / |
| Dibromodiphenyl ether | mg/kg | 5 | N.D. | / |
| Tribromodiphenyl ether | mg/kg | 5 | N.D. | / |
| Tetrabromodiphenyl ether | mg/kg | 5 | N.D. | / |
| Pentabromodiphenyl ether | mg/kg | 5 | N.D. | / |
| Hexabromodiphenyl ether | mg/kg | 5 | N.D. | / |
| Heptabromodiphenyl ether | mg/kg | 5 | N.D. | / |
| Octabromodiphenyl ether | mg/kg | 5 | N.D. | / |
| Nonabromodiphenyl ether | mg/kg | 5 | N.D. | / |
| Decabromodiphenyl ether | mg/kg | 5 | N.D. | / |
| Total content | mg/kg | / | N.D. | ≤1000 |
| **Conclusion** | / | / | **Pass** | / |

Note:

- N.D. = Not Detected or less than MDL
- mg/kg = ppm
- MDL = Method Detection Limit

**********

2) The test results of DEHP, BBP, DBP & DIBP

| Item | Unit | MDL | Results | | | | | Limit |
|---|---|---|---|---|---|---|---|---|
| | | | 1 | 3 | 4 | 6 | 7 | |
| Di-2-ethylhexyl phthalate (DEHP) | mg/kg | 30 | N.D. | N.D. | N.D. | N.D. | N.D. | ≤1000 |
| Benzyl-n-butyl phthalate (BBP) | mg/kg | 30 | N.D. | N.D. | N.D. | N.D. | N.D. | ≤1000 |
| Di-n-butyl phthalate (DBP) | mg/kg | 30 | N.D. | N.D. | N.D. | N.D. | N.D. | ≤1000 |
| Di-iso-butyl phthalate (DIBP) | mg/kg | 30 | N.D. | N.D. | N.D. | N.D. | N.D. | ≤1000 |
| **Conclusion** | / | / | **Pass** | **Pass** | **Pass** | **Pass** | **Pass** | / |

| Item | Unit | MDL | Results | | | | Limit |
|---|---|---|---|---|---|---|---|
| | | | 8 | 9 | 10 | 11 | |
| Di-2-ethylhexyl phthalate (DEHP) | mg/kg | 30 | N.D. | N.D. | N.D. | N.D. | ≤1000 |
| Benzyl-n-butyl phthalate (BBP) | mg/kg | 30 | N.D. | N.D. | N.D. | N.D. | ≤1000 |
| Di-n-butyl phthalate (DBP) | mg/kg | 30 | N.D. | N.D. | N.D. | N.D. | ≤1000 |
| Di-iso-butyl phthalate (DIBP) | mg/kg | 30 | N.D. | N.D. | N.D. | N.D. | ≤1000 |
| **Conclusion** | / | / | **Pass** | **Pass** | **Pass** | **Pass** | / |

Note:

- N.D. = Not Detected or less than MDL
- mg/kg = ppm
- MDL = Method Detection Limit
- Flow chart appendix is included.
- Photo appendix is included.

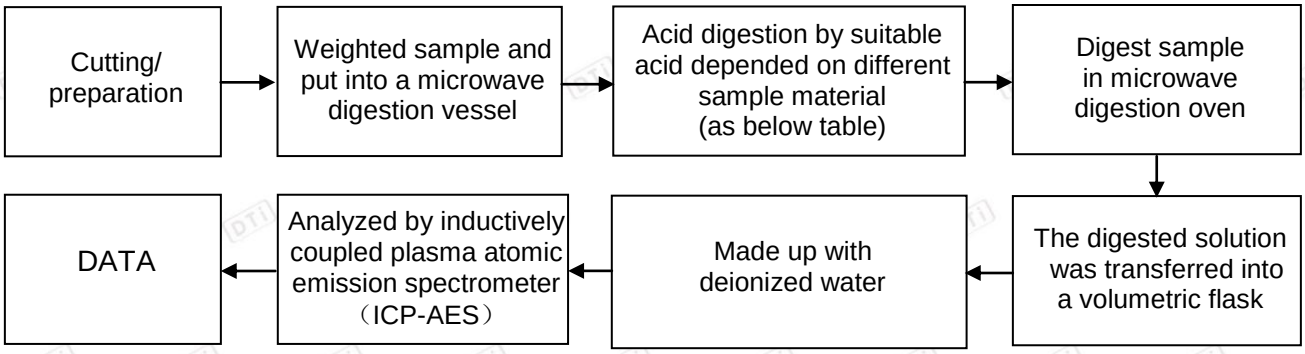
**********

# Appendix Ⅰ

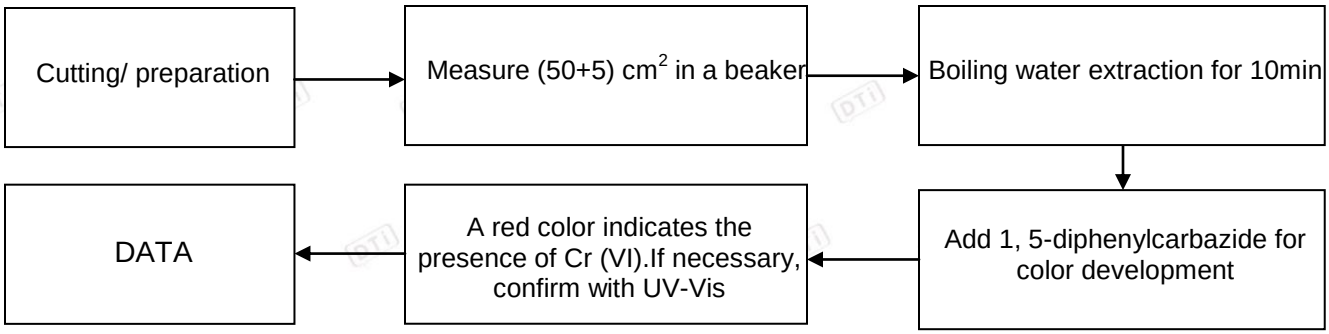
**Test Flow chart**

1. Test Flowchart for Cd / Pb /Hg content

These samples were dissolved totally by pre-conditioning method according to below flow chart.

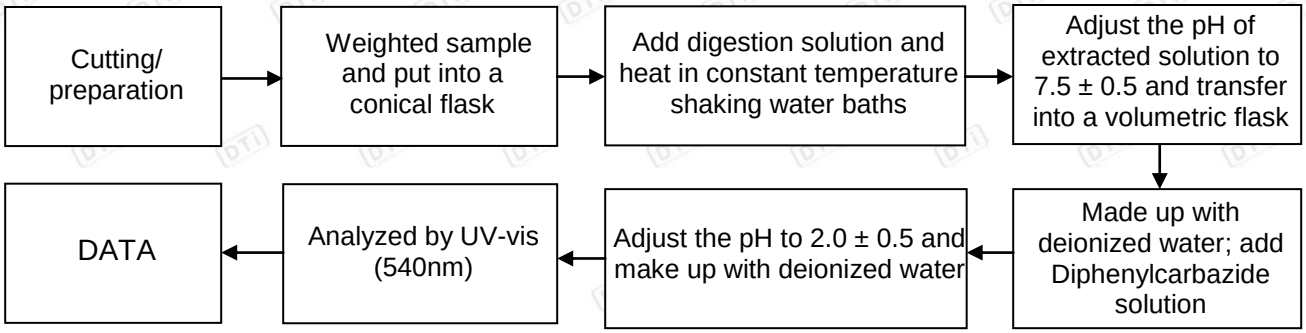



2. Test Flowchart for $Cr^{6+}$ content (Metal material)

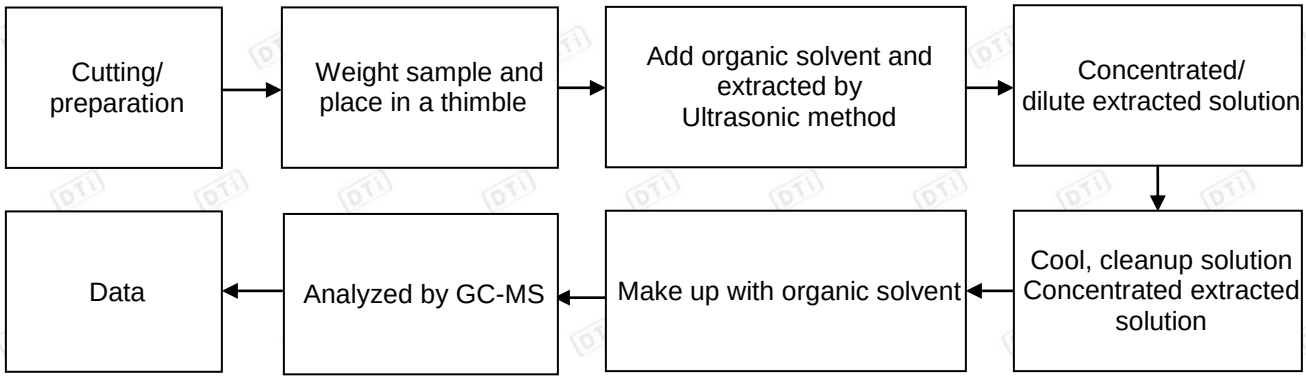



**********

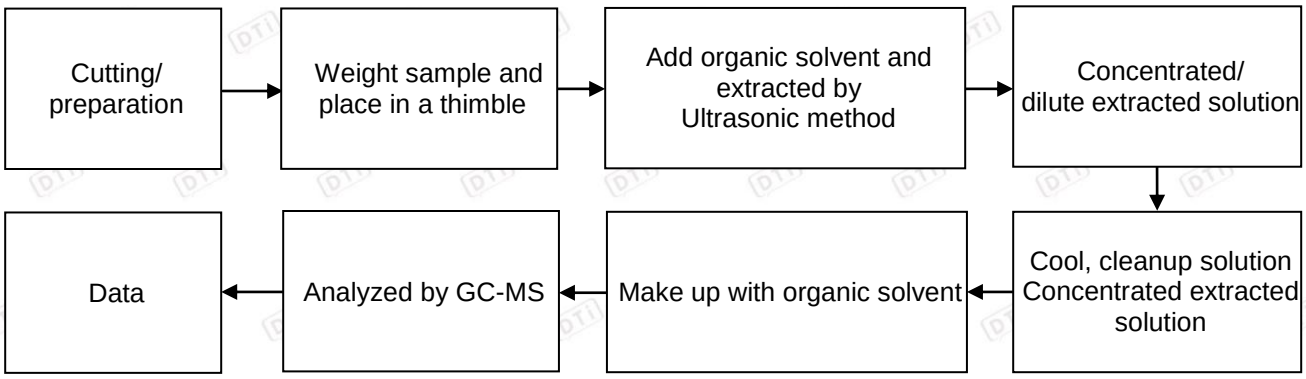
3. Test Flowchart for $Cr^{6+}$ content (Non-metal material)




4. Test Flowchart for PBBs & PBDEs content




5. Test Flowchart for DEHP, BBP, DBP & DIBP content




**********

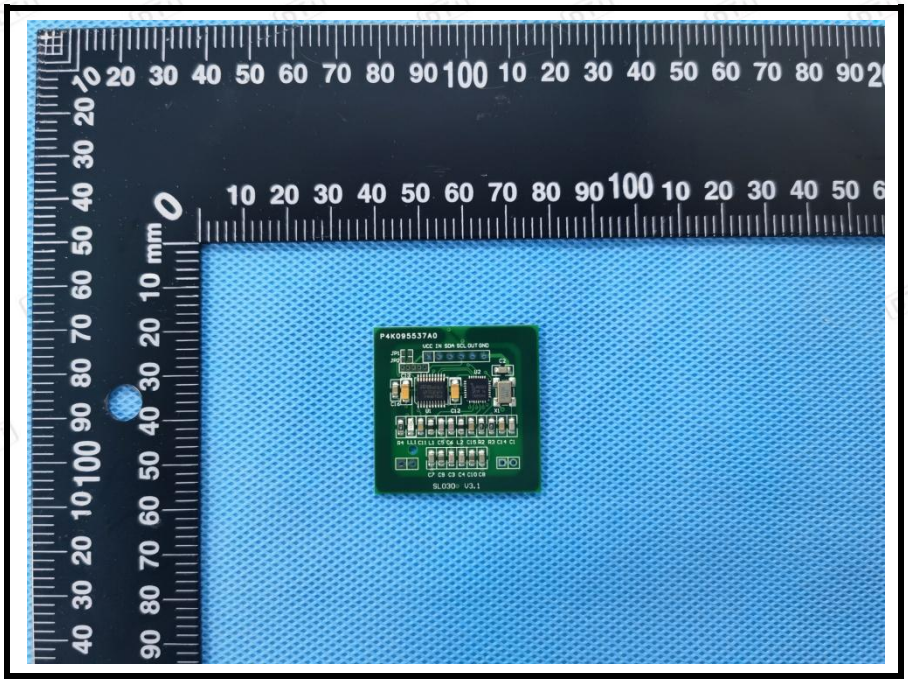
Table:

| Sample material | Digestion Acid |
|---|---|
| Steel, copper, aluminum, solder | Aqua regia, $HNO_3$, HCl, HF, $H_2O_2$ |
| Glass | $HNO_3$/HF |
| Gold, platinum, palladium, ceramic | Aqua regia |
| Silver | $HNO_3$ |
| Plastic | $H_2SO_4$, $H_2O_2$, $HNO_3$, HCl |
| Others | Any acid to total digestion |

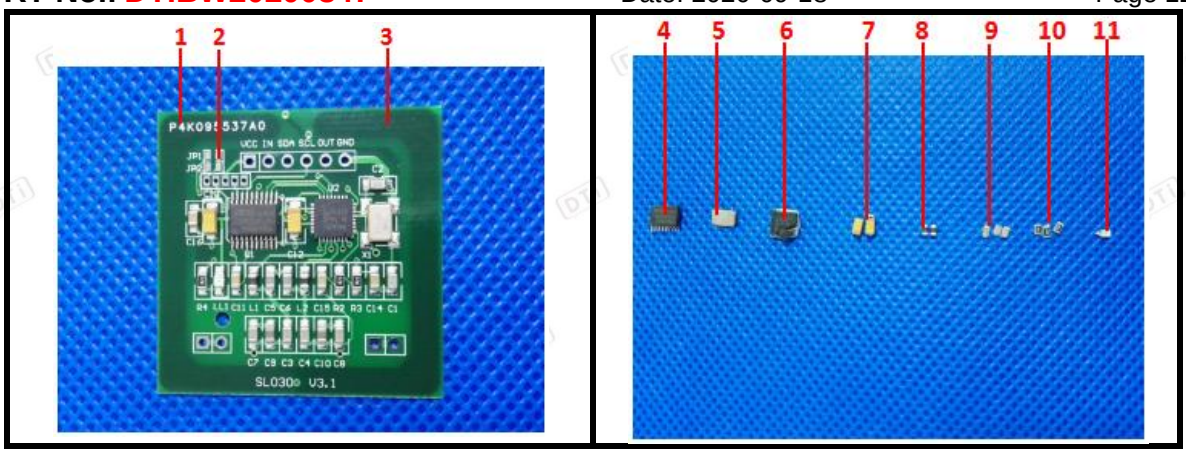
**********

# Appendix Ⅱ

Photograph of Sample



**********




*** End of Report ***




Shenzhen Deesev Testing International Corp.
深圳市德泽威技术检测有限公司
9th Flr., Building B, Feiyang Science & Technology Park, Longchang Rd.No.8,Bao'an,Shenzhen, Guangdong, China
中国 广东省 深圳市 宝安区 隆昌路 8号 飞扬科技园 B座9楼
Tel: +86-0755-32936716, E-mail: DTI@deesev.cn