Company name: Littelfuse, Inc.

Product Series: TVS Array for ESD Protection

Product #: SP0505BAJTG

Issue Date: August 31, 2010

It is hereby certified by Littelfuse, Inc. that there is neither RoHS (EU Directive 2002/95/EC)-restricted substance nor such use, for materials to be used for unit parts, for packing/packaging materials, and for additives and the like in the manufacturing processes. In addition, it is hereby reported to you that the parts and sub-materials, the materials to be used for unit parts, the packing/packaging materials, and the additives and the like in the manufacturing processes, are all composed of the following components.

Issued by:

KRISTEEN BACILA

<Global EHS Engineer>

(1) Parts, sub-materials and unit parts

This document covers the TVS Array for ESD Protection RoHS-Compliant series products manufactured by Littelfuse, Inc.

Raw Materials Used

Please see Table 1

(2) The ICP data on all measurable substances

Please see appropriate pages as identified in Table 1

Remarks:


Table 1: List of Raw Materials covered by this report

<table>
<thead>
<tr>
<th>Total Parts</th>
<th>Raw Material Part Number</th>
<th>Raw Material Description</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A194</td>
<td>Lead Frame</td>
<td>3-11</td>
</tr>
<tr>
<td>2</td>
<td>2200D</td>
<td>Adhesive</td>
<td>12-16</td>
</tr>
<tr>
<td>3</td>
<td>G600</td>
<td>Epoxy Molding Compound</td>
<td>17-24</td>
</tr>
<tr>
<td>4</td>
<td>N/A</td>
<td>Gold Wire</td>
<td>25-30</td>
</tr>
<tr>
<td>5</td>
<td>1865971</td>
<td>Pure Tin</td>
<td>31-35</td>
</tr>
<tr>
<td>6</td>
<td>N/A</td>
<td>IC Wafer</td>
<td>36-39</td>
</tr>
</tbody>
</table>
測試報告
Test Report

號碼(No.) : KA/2010/10449  日期(Date) : 2010/01/14  頁數(Page) : 1 of 9

ASM HK & ASM TECHNOLOGY SINGAPORE
4F, WATSON CENTER, 16 KUNG YIP ST., KWAI CHUNG, HONG KONG (ASM HK)., 2 YISHUN AVENUE 7, SINGAPORE(ASM TECHNOLOGY SINGAPORE)

以下測試樣品係由客戶送樣，且由客戶聲稱並經客戶確認如下(The following samples was/were submitted and identified by/on behalf of the client as):

樣品名稱(Sample Description) : A194 Cu ALLOY
收件日期(Sample Receiving Date) : 2010/01/08
測試期間(Testing Period) : 2010/01/08 TO 2010/01/14

測試結果(Test Results) : 請見下一頁(Please refer to next pages).

Ray Chang / Asst. Manager
Signed for and on behalf of SGS Taiwan Limited
測試結果(Test Results)

### 測試部位(PART NAME) NO.1 : 棕色 A194 Cu ALLOY (BROWN A194 Cu ALLOY)

<table>
<thead>
<tr>
<th>測試項目 (Test Items)</th>
<th>單位 (Unit)</th>
<th>測試方法 (Method)</th>
<th>方法偵測極限值 (MDL)</th>
<th>結果 (Result) NO.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>汞 / Mercury (Hg)</td>
<td>mg/kg</td>
<td>參考IEC 62321: 2008方法 / With reference to IEC 62321: 2008 and performed by ICP-AES.</td>
<td>2</td>
<td>n.d.</td>
</tr>
<tr>
<td>鉛 / Lead (Pb)</td>
<td>mg/kg</td>
<td>參考IEC 62321: 2008方法 / With reference to IEC 62321: 2008 and performed by ICP-AES.</td>
<td>2</td>
<td>34.8</td>
</tr>
<tr>
<td>汞 / Mercury (Hg)</td>
<td>mg/kg</td>
<td>參考IEC 62321: 2008方法 / With reference to IEC 62321: 2008 and performed by ICP-AES.</td>
<td>2</td>
<td>n.d.</td>
</tr>
<tr>
<td>六價鉻 / Hexavalent Chromium Cr(VI) by Spot test / boiling water extraction</td>
<td>**</td>
<td>參考IEC 62321: 2008方法 / With reference to IEC 62321: 2008 and performed by Spot test / boiling water extraction Method. (See Note 6)</td>
<td>0.02mg/kg with 50 cm² surface area</td>
<td>Negative</td>
</tr>
<tr>
<td>鎘 / Cadmium (Cd)</td>
<td>mg/kg</td>
<td>參考US EPA 3052方法 / With reference to US EPA Method 3052 for Antimony Content. Analysis was performed by ICP-AES.</td>
<td>2</td>
<td>n.d.</td>
</tr>
<tr>
<td>全氟辛烷磺酸 / Perfluorooctane sulfonates (PFOS)</td>
<td>μg/m²</td>
<td>參考US EPA 3540C: 1996方法 / With reference to US EPA 3540C: 1996 method for PFOS Content. Analysis was performed by LC/MS.</td>
<td>1</td>
<td>n.d.</td>
</tr>
<tr>
<td>PFOS – Acid PFOS – Metal Salt PFOS – Amide</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>全氟辛酸(銨) / PFOA (CAS No.: 000335-67-1)</td>
<td>μg/m²</td>
<td>參考US EPA 3540C: 1996方法 / With reference to US EPA 3540C: 1996 method for PFOA Content. Analysis was performed by LC/MS.</td>
<td>1</td>
<td>n.d.</td>
</tr>
</tbody>
</table>
測試報告
Test Report

ASM HK & ASM TECHNOLOGY SINGAPORE
4F, WATSON CENTER, 16 KUNG YIP ST., KWAI CHUNG, HONG KONG (ASM HK), 2 YISHUN AVENUE 7, SINGAPORE(ASM TECHNOLOGY SINGAPORE)

<table>
<thead>
<tr>
<th>測試項目 (Test Items)</th>
<th>單位 (Unit)</th>
<th>測試方法 (Method)</th>
<th>方法偵測極限值 (MDL)</th>
<th>結果 (Result)</th>
</tr>
</thead>
<tbody>
<tr>
<td>多溴聯苯締和 / Sum of PBBS</td>
<td>mg/kg</td>
<td>參考 IEC 62321: 2008方法，以氣相層析儀/質譜儀檢測. / With reference to IEC 62321: 2008 and performed by GC/MS.</td>
<td>-</td>
<td>n.d.</td>
</tr>
<tr>
<td>一溴聯苯 / Monobromobiphenyl</td>
<td>5</td>
<td>n.d.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>二溴聯苯 / Dibromobiphenyl</td>
<td>5</td>
<td>n.d.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>三溴聯苯 / Tribromobiphenyl</td>
<td>5</td>
<td>n.d.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>四溴聯苯 / Tetrabromobiphenyl</td>
<td>5</td>
<td>n.d.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>五溴聯苯 / Pentabromobiphenyl</td>
<td>5</td>
<td>n.d.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>六溴聯苯 / Hexabromobiphenyl</td>
<td>5</td>
<td>n.d.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>七溴聯苯 / Heptabromobiphenyl</td>
<td>5</td>
<td>n.d.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>八溴聯苯 / Octabromobiphenyl</td>
<td>5</td>
<td>n.d.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>九溴聯苯 / Nonabromobiphenyl</td>
<td>5</td>
<td>n.d.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>十溴聯苯 / Decabromobiphenyl</td>
<td>5</td>
<td>n.d.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 多溴聯苯醚締和 / Sum of PBDEs | mg/kg | 參考 IEC 62321: 2008方法，以氣相層析儀/質譜儀檢測. / With reference to IEC 62321: 2008 and performed by GC/MS. | - | n.d. |
| 一溴聯苯醚 / Monobromodiphenyl ether | 5 | n.d. |
| 二溴聯苯醚 / Dibromodiphenyl ether | 5 | n.d. |
| 三溴聯苯醚 / Tribromodiphenyl ether | 5 | n.d. |
| 四溴聯苯醚 / Tetrabromodiphenyl ether | 5 | n.d. |
| 五溴聯苯醚 / Pentabromodiphenyl ether | 5 | n.d. |
| 六溴聯苯醚 / Hexabromodiphenyl ether | 5 | n.d. |
| 七溴聯苯醚 / Heptabromodiphenyl ether | 5 | n.d. |
| 八溴聯苯醚 / Octabromodiphenyl ether | 5 | n.d. |
| 九溴聯苯醚 / Nonabromodiphenyl ether | 5 | n.d. |
| 十溴聯苯醚 / Decabromodiphenyl ether | 5 | n.d. |

鹵素 / Halogen

| 鹵素 (氯) / Halogen-Fluorine (F) (CAS No.: 014762-94-8) | mg/kg | 參考 BS EN 14582:2007, 以離子層析儀分析. / With reference to BS EN 14582:2007. Analysis was performed by IC. | 50 | n.d. |
| 鹵素 (氯) / Halogen-Chlorine (Cl) (CAS No.: 022537-15-1) | mg/kg | 參考 BS EN 14582:2007, 以離子層析儀分析. / With reference to BS EN 14582:2007. Analysis was performed by IC. | 50 | n.d. |
| 鹵素 (溴) / Halogen-Bromine (Br) (CAS No.: 010097-32-2) | mg/kg | 參考 BS EN 14582:2007, 以離子層析儀分析. / With reference to BS EN 14582:2007. Analysis was performed by IC. | 50 | n.d. |
| 鹵素 (碘) / Halogen-Iodine (I) (CAS No.: 014362-44-8) | mg/kg | 參考 BS EN 14582:2007, 以離子層析儀分析. / With reference to BS EN 14582:2007. Analysis was performed by IC. | 50 | n.d. |
テスト報告
Test Report

ASM HK & ASM TECHNOLOGY SINGAPORE
4F, WATSON CENTER, 16 KUNG YIP ST., KWAI CHUNG, HONG KONG (ASM HK), 2 YISHUN AVENUE 7, SINGAPORE (ASM TECHNOLOGY SINGAPORE)

備註(Note):
1. mg/kg = ppm；0.1wt% = 1000ppm
2. n.d. = Not Detected（未検出）
3. MDL = Method Detection Limit（方法検出極限値）
4. "-" = Not Regulated（無規格値）
5. **= Qualitative analysis (No Unit) 定性分析(無単位)
6. Spot-test:
   Negative = Absence of Cr(VI) coating / surface layer（鍍層中検測不到六価鉻）
   Positive = Presence of Cr(VI) coating / surface layer（鍍層中検測到六価鉻）
   The tested sample should be further verified by boiling-water-extraction method if the spot test result cannot be confirmed.
   (當該測項無法確認時，測試樣品可藉由boiling-water-extraction測試方法進一步確認)
   Boiling-water-extraction:
   Negative = Absence of Cr(VI) coating / surface layer（鍍層中検測不到六価鉻）
   Positive = Presence of Cr(VI) coating / surface layer（鍍層中検測到六価鉻）
   the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm² sample surface area.
   該溶液濃度≧0.02 mg/kg with 50 cm² (sample surface area)

(1) 該物質不可置於市場上或使用於特殊物質或配置成分重量濃度等於或大於0.005%。
   (May not be placed on the market or used as a substance or constituent of preparations in a concentration equal to or higher than 0.005 % by mass.)
(2) 該物質不可置於市場上的半成品或商品或其物件：假若零件上明顯地具有PFOS並參照結構上及微細構造上計算PFOS重量濃度等於或大於0.1%，而紡織品或其他覆蓋物質，如果PFOS在覆蓋物質中含量等於或大於1µg/m²。
   (May not be placed on the market in semi-finished products or articles, or parts thereof, if the concentration of PFOS is equal to or higher than 0.1 % by mass calculated with reference to the mass of structurally or microstructurally distinct parts that contain PFOS or, for textiles or other coated materials, if the amount of PFOS is equal to or higher than 1µg/m² of the coated material.)
測試報告

Test Report

號碼(No.) : KA/2010/10449 日期(Date) : 2010/01/14 頁數(Page) : 5 of 9

ASM HK & ASM TECHNOLOGY SINGAPORE
4F, WATSON CENTER, 16 KUNG YIP ST., KWAI CHUNG, HONG KONG (ASM HK), 2 YISHUN AVENUE 7, SINGAPORE (ASM TECHNOLOGY SINGAPORE)

1) 根據以下的流程圖之條件，樣品已完全溶解。 ( 六價鉻測試方法除外 ) / These samples were dissolved totally by pre-conditioning method according to below flow chart. ( Cr⁶⁺ test method excluded )

2) 測試人員：李宏明 / Name of the person who made measurement: Hungming Li

3) 測試負責人：張伯睿 / Name of the person in charge of measurement: Ray Chang

剪裁、製備樣品 / Cutting, Preparation
測試樣品重量 / Sample Measurement
鉛 Pb、鈎Cd

硝酸, 鹽酸, 氫氟酸的微波消化 / Microwave digestion with HNO₃/HCl/HF
加熱至適當溫度進行萃取 / Heat to appropriate temperature to extract
冷卻後過濾樣品 / Cool, filter digestate through filter
加入發色劑顯色 / Add diphenyl-carbazide for color development
以紫外光-可見光光譜儀, 量測樣品溶液在 540 nm 的吸收度 / measure the absorbance at 540 nm by UV-VIS

<table>
<thead>
<tr>
<th>樣品材質 / Sample Material</th>
<th>消化酸液種類 / Digestion Acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>鋼, 銅, 鋁, 焊錫 / Steel, copper, aluminum, solder</td>
<td>王水, 硝酸, 盐酸, 氫氟酸, 雙氧水 / Aqua regia, HNO₃, HCl, HF, H₂O₂</td>
</tr>
<tr>
<td>玻璃 / Glass</td>
<td>硝酸, 氫氧化鉀 / HNO₃/KOH</td>
</tr>
<tr>
<td>金, 銠, 鉑, 陶瓷 / Gold, platinum, palladium, ceramic</td>
<td>王水 / Aqua regia</td>
</tr>
<tr>
<td>銀 / Silver</td>
<td>硝酸 / HNO₃</td>
</tr>
<tr>
<td>塑膠 / Plastic</td>
<td>氫氧化銅, 硝酸, 硫酸 / H₂SO₄, HNO₃, H₂O₂</td>
</tr>
<tr>
<td>其他 / Others</td>
<td>加入任何酸至完全溶解 / Any acid to total digestion</td>
</tr>
</tbody>
</table>

以紫外光-可見光光譜儀，量測樣品溶液在 540 nm 的吸收度 / measure the absorbance at 540 nm by UV-VIS

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This test report cannot be reproduced, except in full, without prior written permission of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.
多溴聯苯/多溴聯苯醚 分析流程圖 / PBB/PBDE analytical FLOW CHART

1) 測試人員: 曹嘉琪 / Name of the person who made measurement: Anson Tsao
2) 測試負責人: 張伯睿 / Name of the person in charge of measurement: Ray Chang

初次測試程序 / First testing process
選擇性篩檢程序 / Optional screen process
確認程序 / Confirmation process

Sample / 樣品
Sample pretreatment / 樣品前處理
Screen analysis / 初篩分析
Sample extraction 樣品萃取/ Soxhlet method 索式萃取法
Concentrate/Dilute Extracted solution 萃取液濃縮/稀釋
Filter 萃取液過濾
Analysis by GC/MS 氣相層析質譜儀分析
Issue Report 撰打報告
測試報告
Test Report

號碼(No.) : KA/2010/10449 日期(Date) : 2010/01/14 頁數(Page) : 7 of 9

ASM HK & ASM TECHNOLOGY SINGAPORE
4F, WATSON CENTER, 16 KUNG YIP ST., KWAI CHUNG, HONG KONG (ASM HK), 2 YISHUN AVENUE 7, SINGAPORE (ASM TECHNOLOGY SINGAPORE)

全氟辛酸(銨)/全氟辛烷磺酸分析流程圖 /
Analytical flow chart of PFOA/PFOS content

1)測試人員：曹嘉琪 / Name of the person who made measurement: Anson Tsao

2)測試負責人：張伯睿 / Name of the person in charge of measurement: Ray Chang
卤素分析流程图 / Analytical flow chart of halogen content

1) 测试人员: 李宏明/ Name of the person who made measurement: Hungming Li
2) 测试负责人: 张伯睿/ Name of the person in charge of measurement: Ray Chang
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This test report cannot be reproduced, except in full, without prior written permission of the Company. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this Test Report is advised that information contained hereon reflects the Company’s findings at the time of its intervention only and within the limits of Client’s instructions, if any. The Company’s sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

**報告結尾(End of Report)**
Test Report

No.: CE/2009/B2959 Date: 2009/11/18 Page: 1 of 5

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

Sample Description: ADHESIVE
Style/Item No.: 2200D
Sample Receiving Date: 2009/11/11

===============================================================================

Test Requested: In accordance with the RoHS Directive 2002/95/EC, and its amendment directives.


(1) Determination of Cadmium by ICP-AES.
(2) Determination of Lead by ICP-AES.
(3) Determination of Mercury by ICP-AES.
(4) Determination of Hexavalent Chromium by UV/Vis Spectrometry.
(5) Determination of PBB and PBDE by GC/MS.

Test Result(s): Please refer to next page(s).

Chenyu Kung / Operation Manager
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory – Taipei

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This test report cannot be reproduced, except in full, without prior written permission of the Company.

This Test Report is issued by the Company under its General Conditions of Service printed overleaf or available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this Test Report is advised that information contained herein reflects the Company’s findings at the time of its intervention only and within the limits of Client’s instructions. If any, The Company’s sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

HENKEL
MANUFACTURING SITES: USA, KOREA, CHINA, UK, AND JAPAN.
MAIN OFFICE: 20021 SUSANA ROAD, RANCHO DOMINGUEZ,
CALIFORNIA, 90221, USA

Test results by chemical method (Unit: mg/kg)

<table>
<thead>
<tr>
<th>Test Item (s):</th>
<th>Method (Refer to)</th>
<th>Result No.1</th>
<th>MDL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium (Cd)</td>
<td>(1)</td>
<td>n.d.</td>
<td>2</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>(2)</td>
<td>n.d.</td>
<td>2</td>
</tr>
<tr>
<td>Mercury (Hg)</td>
<td>(3)</td>
<td>n.d.</td>
<td>2</td>
</tr>
<tr>
<td>Hexavalent Chromium Cr(VI) by alkaline extraction</td>
<td>(4)</td>
<td>n.d.</td>
<td>2</td>
</tr>
<tr>
<td>Sum of PBBs</td>
<td></td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Monobromobiphenyl</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Dibromobiphenyl</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Tribromobiphenyl</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Tetrabromobiphenyl</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Pentabromobiphenyl</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Hexabromobiphenyl</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Heptabromobiphenyl</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Octabromobiphenyl</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Nonabromobiphenyl</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Decabromobiphenyl</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Sum of PBDEs</td>
<td></td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Monobromodiphenyl ether</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Dibromodiphenyl ether</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Tribromodiphenyl ether</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Tetrabromodiphenyl ether</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Pentabromodiphenyl ether</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Hexabromodiphenyl ether</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Heptabromodiphenyl ether</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Octabromodiphenyl ether</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Nonabromodiphenyl ether</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Decabromodiphenyl ether</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
</tbody>
</table>

TEST PART DESCRIPTION:
NO.1 : SILVER COLORED PASTE

Note: 1. mg/kg = ppm; 0.1wt% = 1000ppm
2. n.d. = Not Detected
3. MDL = Method Detection Limit
4. "-" = Not Regulated
1) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr⁶⁺ test method excluded)

2) Name of the person who made measurement: Climbgreat Yang

3) Name of the person in charge of measurement: Troy Chang

---

**Sample Material**

| Steel, copper, aluminum, solder | Aqua regia, HNO₃, HCl, HF, H₂O₂ |
| Glass | HNO₃/HF |
| Gold, platinum, palladium, ceramic | Aqua regia |
| Silver | HNO₃ |
| Plastic | H₂SO₄, H₂O₂, HNO₃, HCl |
| Others | Any acid to total digestion |

---

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This test report cannot be reproduced, except in full, without prior written permission of the Company. Any errors or omissions are the responsibility of the Company. The information contained herein reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company is solely responsible for the content of this report. Any unauthorized alteration, forgery or falsification of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.
PBB/PBDE analytical FLOW CHART

1) Name of the person who made measurement: Roman Wong
2) Name of the person in charge of measurement: Shinyyh Chen

First testing process → Sample
Optional screen process → Sample pretreatment
Confirmation process → Screen analysis

Sample extraction/ Soxhlet method
Concentrate/Dilute Extracted solution
Filter
Analysis by GC/MS
Issue Report
** End of Report **
The following sample(s) was/were submitted and identified by/on behalf of the client as:

Sample Description : EME-G600
Type : Type
Lot No. : 0032203
Manufacturing Date : 3/17/10
Contact Name : Chen Yi Jun
Contact Tel : +65-67503782
Contact Email : yijun@sbs.sumibe.co.jp

Sample Receiving Date : 15-Apr-10
Testing Period : 15-Apr-10 to 26-Apr-10
Test Requested : In accordance with the RoHS Directive 2002/95/EC, and its amendment directives.

Test Result(s) : Please refer to next page(s).

Conclusion : Based on the performed tests on submitted sample(s), the results comply with the RoHS Directive 2002/95/EC and its subsequent amendments.

Signed for and on behalf of
SGS Testing & Control Services Singapore Pte Ltd

Y.C. Tham
Laboratory Manager

Test Location: 26 Ayer Rajah Crescent, #07-08, Singapore 139944
This document is issued by the Company under its General Conditions of Service accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company’s findings at the time of its intervention only and within the limits of Client’s instructions, if any. The Company’s sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only. This document cannot be reproduced except in full, without prior approval of the Company.
### Test Result(s):  

**Sample Description:** EME-G600  
**Type:** Type  
**Lot No.:** 0032203  
**Manufacturing Date:** 3/17/10  

<table>
<thead>
<tr>
<th>Test Item(s):</th>
<th>Unit</th>
<th>Method</th>
<th>Results</th>
<th>MDL</th>
<th>RoHS Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium(Cd)</td>
<td>mg/kg</td>
<td>With reference to IEC62321, Ed1:2008. Analysis was performed by ICP/AES</td>
<td>n.d.</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>mg/kg</td>
<td>With reference to IEC62321, Ed1:2008. Analysis was performed by ICP/AES</td>
<td>n.d.</td>
<td>2</td>
<td>1000</td>
</tr>
<tr>
<td>Mercury (Hg)</td>
<td>mg/kg</td>
<td>With reference to IEC62321, Ed1:2008. Analysis was performed by ICP/AES</td>
<td>n.d.</td>
<td>2</td>
<td>1000</td>
</tr>
<tr>
<td>Hexavalent Chromium (CrVI)</td>
<td>mg/kg</td>
<td>With reference to IEC62321, Ed1:2008. Analysis was performed by UV/Vis Spectrometry</td>
<td>n.d.</td>
<td>2</td>
<td>1000</td>
</tr>
</tbody>
</table>

#### Sum of PBBs
- Monobromobiphenyl mg/kg: n.d.  
- Dibromobiphenyl mg/kg: n.d.  
- Tribromobiphenyl mg/kg: n.d.  
- Tetrabromobiphenyl mg/kg: n.d.  
- Hexabromobiphenyl mg/kg: n.d.  
- Pentabromobiphenyl mg/kg: n.d.  
- Heptabromobiphenyl mg/kg: n.d.  
- Octabromobiphenyl mg/kg: n.d.  
- Nonabromobiphenyl mg/kg: n.d.  
- Decabromobiphenyl mg/kg: n.d.  

#### Sum of PBDEs
- Monobromodiphenyl ether mg/kg: n.d.  
- Dibromodiphenyl ether mg/kg: n.d.  
- Tribromodiphenyl ether mg/kg: n.d.  
- Tetrabromodiphenyl ether mg/kg: n.d.  
- Pentabromodiphenyl ether mg/kg: n.d.  
- Hexabromodiphenyl ether mg/kg: n.d.  
- Heptabromodiphenyl ether mg/kg: n.d.  
- Octabromodiphenyl ether mg/kg: n.d.  
- Nonabromodiphenyl ether mg/kg: n.d.  
- Decabromodiphenyl ether ## mg/kg: n.d.  
- Decabromodiphenyl ether ### mg/kg: n.d.
**Sample Description:**
Lot No.: 0032203
Manufacturing Date: 3/17/10

**Test Item(s):**

<table>
<thead>
<tr>
<th>Sample Description</th>
<th>Unit</th>
<th>Method</th>
<th>Results</th>
<th>MDL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antimony (Sb)</strong></td>
<td>mg/kg</td>
<td>With reference to US EPA3051A. Analysis was performed by ICP/AES</td>
<td>n.d.</td>
<td>2</td>
</tr>
<tr>
<td><strong>Perfluorooctane Sulfonates (PFOS)</strong>*</td>
<td>mg/kg</td>
<td>With reference to US EPA 3540C: 1996 method for PFOS Content. Analysis was performed by LC/MS.</td>
<td>n.d.</td>
<td>10</td>
</tr>
<tr>
<td><strong>PFOA (CAS No.: 000335-67-1)</strong>*</td>
<td>mg/kg</td>
<td>With reference to US EPA 3540C: 1996 method for PFOA Content. Analysis was performed by LC/MS.</td>
<td>n.d.</td>
<td>10</td>
</tr>
<tr>
<td><strong>Halogen</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Halogen - Bromine (Br)</strong></td>
<td>mg/kg</td>
<td>With reference to BS EN 14582. Analysis was performed by IC</td>
<td>n.d.</td>
<td>50</td>
</tr>
<tr>
<td><strong>Halogen - Chlorine (Cl)</strong></td>
<td>mg/kg</td>
<td>With reference to BS EN 14582. Analysis was performed by IC</td>
<td>n.d.</td>
<td>50</td>
</tr>
<tr>
<td><strong>Halogen - Fluorine (F)</strong></td>
<td>mg/kg</td>
<td>With reference to BS EN 14582. Analysis was performed by IC</td>
<td>n.d.</td>
<td>50</td>
</tr>
<tr>
<td><strong>Halogen - Iodine (I)</strong></td>
<td>mg/kg</td>
<td>With reference to BS EN 14582. Analysis was performed by IC</td>
<td>n.d.</td>
<td>50</td>
</tr>
</tbody>
</table>

Notes:
(1) mg/kg = ppm; 0.1wt% = 1000ppm
(2) n.d.= Not Detected
(3) MDL = Method Detection Limit

Remarks: Sample received was totally dissolved by pre-conditioning method.
Lab Analyst(s): Jenny

* **Tested by SGS Lab (Ref: CE/2010/43692)**

**PFOS Reference Information: Directive 2006/122/EC**

(1) May not be placed on the market or used as a substance or constituent of preparations in a concentration equal to or higher than 0.005 % by mass.

(2) May not be placed on the market in semi-finished products or articles, or parts thereof, if the concentration of PFOS is equal to or higher than 0.1 % by mass calculated with reference to the mass of structurally or microstructurally distinct parts that contain PFOS or, for textiles or other coated materials, if the amount of PFOS is equal to or higher than 1μg/m² of the coated material.
Note:  
(1) mg/kg = ppm ; 0.1wt% = 1000ppm  
(2) n.d. = Not Detected  
(3) MDL = Method Detection Limit  
(4) ## = The exemption of DecaBDE in polymeric application according 2005/717/EC was overruled by the European Court of Justice by its decision of 01.04.2008. Subsequently DecaBDE will be included in the sum of PBDE after 01.07.2008.  
(5) "-" = Not regulated  
(6) *: Exceeds limit

Remarks: Sample received was totally dissolved by preconditioning method.
Lab Analyst(s): Jay, Ruihan and Jojo

Sample photo:  
Sample Description : EME-G600  
Type : Type  
Lot No. : 0032203  
Manufacturing Date : 3/17/10  
Sample Submission Qty : 50gm

SGS authenticate the photo on original report only
Process Flow of BS EN 14582 (Halogen Analysis)

1. Cutting / Preparation
2. Sample Measurement
3. Combustion in Oxygen Bomb
4. Dissolved in absorption solution
5. Analyze by Ion-Chromatography
Process Flow of PFOS/PFOA

1. Sample pre-treatment
2. Sample extraction by Soxhlet extraction (Reference method US EPA3540C)
3. Concentrate/Dilute extracted solution
4. Analyze by LC/MS
5. Data
Process Flow of IEC 62321 (Pb, Cd, Hg & Cr⁶⁺)

Cutting / Preparation

Sample Measurement

Pb, Cd

Acid digestion by suitable acid depended on different sample material

Hg

Microwave digestion with HNO₃/HCl/HF

Cr (VI)

Add appropriate amount of digestion reagent

Heat to appropriate temperature to extract

Cool, filter digestate through filter

Residue

1) Alkali Fusion
2) HCl to dissolve

Add diphenyl-carbazide for color development

Measure the absorbance at 540 nm by UV-VIS

Solution

ICP-AES

Remarks: Sample received was totally dissolved by preconditioning method. (CrVI method excluded)
Process Flow of PBBs and PBDEs by GC/MS (IEC 62321)

First Testing Process

Optional screen process …… Confirmation process ...

- Cutting/Preparation
- Sample Pre-treatment
- Screening Analysis
- Solvent Extraction
- Concentrate/Dilute extracted solution
- Filter
- High Mass Range GC/MS
- Data

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

Sample Description: AU BONDING WIRE
Sample Receiving Date: 2009/12/15
Testing Period: 2009/12/15 TO 2009/12/18

Test Requested: In accordance with the RoHS Directive 2002/95/EC, and its amendment directives.
1. Determination of Cadmium by ICP-AES.
2. Determination of Lead by ICP-AES.
3. Determination of Mercury by ICP-AES.
4. Determination of Hexavalent Chromium by UV/Vis Spectrometry.
5. Determination of PBB and PBDE by GC/MS.

Test Result(s): Please refer to next page(s).

Ray Chang / Asst. Manager
Signed for and on behalf of SGS Taiwan Limited
### Test Results by Chemical Method (Unit: mg/kg)

<table>
<thead>
<tr>
<th>Test Item(s):</th>
<th>Method (Refer to)</th>
<th>Result No.1</th>
<th>MDL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium (Cd)</td>
<td>(1)</td>
<td>n.d.</td>
<td>2</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>(2)</td>
<td>n.d.</td>
<td>2</td>
</tr>
<tr>
<td>Mercury (Hg)</td>
<td>(3)</td>
<td>n.d.</td>
<td>2</td>
</tr>
<tr>
<td>Hexavalent Chromium Cr(VI) by alkaline extraction</td>
<td>(4)</td>
<td>n.d.</td>
<td>2</td>
</tr>
<tr>
<td>Sum of PBBS</td>
<td></td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Monobromobiphenyl</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Dibromobiphenyl</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Tribromobiphenyl</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Tetrabromobiphenyl</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Pentabromobiphenyl</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Hexabromobiphenyl</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Heptabromobiphenyl</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Octabromobiphenyl</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Nonabromobiphenyl</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Decabromobiphenyl</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Sum of PBDEs</td>
<td></td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Monobromodiphenyl ether</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Dibromodiphenyl ether</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Tribromodiphenyl ether</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Tetrabromodiphenyl ether</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Pentabromodiphenyl ether</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Hexabromodiphenyl ether</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Heptabromodiphenyl ether</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Octabromodiphenyl ether</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Nonabromodiphenyl ether</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
<tr>
<td>Decabromodiphenyl ether</td>
<td></td>
<td>n.d.</td>
<td>5</td>
</tr>
</tbody>
</table>

#### TEST PART DESCRIPTION:

**NO. 1** : GOLD AU BONDING WIRE
Note:
1. mg/kg = ppm : 0.1wt% = 1000ppm
2. n.d. = Not Detected
3. MDL = Method Detection Limit
4. "-" = Not Regulated
5. This is the additional test report of KA/2009/C1254 which was issued on 2009/12/18.
   Please refer to KA/2009/C1254 for original information.
1) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr⁶⁺ test method excluded)

2) Name of the person who made measurement: Hungming Li

3) Name of the person in charge of measurement: Ray Chang

<table>
<thead>
<tr>
<th>Sample Material</th>
<th>Digestion Acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel, copper, aluminum, solder</td>
<td>Aqua regia, HNO₃, HCl, HF, H₂O₂</td>
</tr>
<tr>
<td>Glass</td>
<td>HNO₃/HF</td>
</tr>
<tr>
<td>Gold, platinum, palladium, ceramic</td>
<td>Aqua regia</td>
</tr>
<tr>
<td>Silver</td>
<td>HNO₃</td>
</tr>
<tr>
<td>Plastic</td>
<td>H₂SO₄, H₂O₂, HNO₃, HCl</td>
</tr>
<tr>
<td>Others</td>
<td>Any acid to total digestion</td>
</tr>
</tbody>
</table>

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This test report cannot be reproduced, except in full, without prior written permission of the Company. This Test Report is issued by the Company under its General Conditions of Service printed overleaf or available on request and accessible at http://www.sgs.com/terms_and_conditions.html. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this Test Report is advised that information contained herein reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.
PBB/PBDE analytical FLOW CHART

1) Name of the person who made measurement: Anson Tsao

2) Name of the person in charge of measurement: Ray Chang

First testing process → Optional screen process — — Confirmation process — —

Sample

Sample pretreatment

Screen analysis

Sample extraction/ Soxhlet method

Concentrate/Dilute Extracted solution

Filter

Analysis by GC/MS

Issue Report

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This test report cannot be reproduced, except in full, without prior written permission of the Company. This Test Report is issued by the Company under its General Conditions of Service printed overleaf or available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this Test Report is advised that information contained herein reflects the Company’s findings at the time of its intervention only and within the limits of Client’s instructions, if any. The Company’s sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS Taiwan Ltd.
No. 61, Kai-Fu Road, Nanhsiung Processing Zone, Kaohsiung, Taiwan / 九華 Creek 彰化 基隆河 資源回收園區
T +886 (0) 77301 2121 F +886 (0) 77301 2867
www.tw.sgs.com

Member of the SGS Group
** End of Report **
The following sample(s) was/were submitted and identified by/on behalf of the client as:

Sample Description: Tin
Sample No.: 1865971
Sample Condition: As per attached photograph
Part No.: Sn 100A
Batch/Lot No.: 497
Sample Receiving Date: 11-May-2010
Testing Period: 11-May-2010 to 18-May-2010
Test Requested: In accordance with the RoHS Directive 2002/95/EC and its amendment directives

Test Method:
1. With reference to IEC 62321:2008 for Lead content, Analysis was performed by ICP-OES.
2. With reference to IEC 62321:2008 for Cadmium content, Analysis was performed by ICP-OES.
3. With reference to IEC 62321:2008 for Mercury content, Analysis was performed by ICP-OES.
4. With reference to IEC 62321:2008 for Hexavalent Chromium by Colorless and Colored Chromate Coating on Metals/ Colorimetric Method, Analysis was performed by UV-Vis spectrometry.
5. With reference to IEC 62321:2008 for PBB/PBDE content, Analysis was performed by GC/MS.

Test Results: Please refer to next page.

CONCLUSION

Based on the performed tests on submitted samples, the result comply with the RoHS Directive 2002/95/EC and its subsequent amendments.

Signed for and on behalf of
SGS (Thailand) Limited

Pompana Lirathpong
Hardlines Testing Manager
# Test Report

## TEST RESULTS

Test results by chemical method (Unit: mg/kg)

<table>
<thead>
<tr>
<th>Test Item (s):</th>
<th>Method (Refer to)</th>
<th>Result (1)</th>
<th>MDL</th>
<th>RoHS Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead (Pb)</td>
<td>(1)</td>
<td>34</td>
<td>2</td>
<td>1000</td>
</tr>
<tr>
<td>Cadmium (Cd)</td>
<td>(2)</td>
<td>n.d.</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>Mercury (Hg)</td>
<td>(3)</td>
<td>n.d.</td>
<td>2</td>
<td>1000</td>
</tr>
<tr>
<td>Hexavalent Chromium (Cr/VI) by Spot test / boiling water extraction (optional)</td>
<td>(4)</td>
<td>Negative</td>
<td>-</td>
<td>#</td>
</tr>
<tr>
<td>sum of PBBs</td>
<td>(5)*</td>
<td>n.d.</td>
<td>-</td>
<td>1000</td>
</tr>
<tr>
<td>Monobromobiphenyl</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dibromobiphenyl</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tribromobiphenyl</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetrabromobiphenyl</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pentabromobiphenyl</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hexabromobiphenyl</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heptabromobiphenyl</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Octabromobiphenyl</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonabromobiphenyl</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decabromobiphenyl</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Test Results

<table>
<thead>
<tr>
<th>Test Item(s):</th>
<th>Method (Refer to)</th>
<th>Result (1)</th>
<th>MDL</th>
<th>RoHS Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum of PBDEs</td>
<td>(5)*</td>
<td>n.d.</td>
<td>-</td>
<td>1000</td>
</tr>
<tr>
<td>Monobromodiphenyl ether</td>
<td>n.d.</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Dibromodiphenyl ether</td>
<td>n.d.</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tribromodiphenyl ether</td>
<td>n.d.</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tetrabromodiphenyl ether</td>
<td>n.d.</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Pentabromodiphenyl ether</td>
<td>n.d.</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Hexabromodiphenyl ether</td>
<td>n.d.</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Heptabromodiphenyl ether</td>
<td>n.d.</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Octabromodiphenyl ether</td>
<td>n.d.</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Nonabromodiphenyl ether</td>
<td>n.d.</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Decabromodiphenyl ether</td>
<td>n.d.</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Test Part Description**

Result (1) metal

1. **Note:**
   - (a) mg/kg = ppm; 0.1 wt% = 1000 ppm
   - (b) The results shown are based on the total weight of dry sample
   - (c) n.d. = Not Detected
   - (d) MDL = Method Detection Limit
   - (e) The exemption of DecaBDE in polymeric applications according 2005/17/EC was overruled by the European Court of Justice by its decision of 01.04.2008. Subsequently DecaBDE will be included in the sum of PBDE after 01.07.2008
   - (f) Spot-test: Negative - Absence of Cr VI coating, Positive = Presence of Cr VI coating.
     (The tested sample should be further verified by boiling-water-extraction method if the spot test result cannot be confirmed.)
   - (g) Boiling-water-extraction: Negative = Absence of Cr VI coating, Positive = Presence of Cr VI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm² sample area.
   - (h) **Not regulated**

"Test(s) marked * on this Report are not included in the TISI Accreditation Schedule for our Laboratory"
Flow Chart for RoHS: Pb/Cd/Hg/Cr6+/PBBs/PBDEs Testing

1. Operator: Slam Polawut
2. Section Chief: Laddawan Uramitt
3. The sample was dissolved totally by pre-conditioning method according to below flowchart. (Cr6+ and PBBs/PBDEs test method excluded)

Mechanical Sample Preparation

Sample Measurement

Pb/Cd/Hg
- Acid digestion with microwave/hotplate
  - Filtration
    - Residue
      - Yes
        - Total Digestion
          - ICP-OES/AAS
            - DATA
      - No
        - ICP-OES/AAS
          - DATA
  - No
    - Total Digestion
      - ICP-OES/AAS
        - DATA

PBBs/PBDEs
- Sample solvent extraction
  - Concentration/Dilution of extraction solution
    - Filtration
      - Heating to 90-95 degree C for extraction
        - Filtration and pH adjustment
          - Adding 1.1-diphenylcarbazide for color development
            - UV-Vis
              - DATA
          - Negative
            - Spot Test
              - Positive
                - Boiling water extraction
                  - Adding 1.1-diphenylcarbazide for color development
                    - A red color indicates the presence of Cr6+ if necessary, confirm with UV-Vis
                  - DATA
                - Negative
                  - Boiling water extraction
                    - Adding 1.1-diphenylcarbazide for color development
                      - A red color indicates the presence of Cr6+ if necessary, confirm with UV-Vis
                      - DATA

Nonmetallic material
- Adding extraction solution
  - GC/MS
    - DATA
    - Positive
      - Spot Test
        - Negative
        - Negative
          - Positive
            - Boiling water extraction
              - Adding 1.1-diphenylcarbazide for color development
                - A red color indicates the presence of Cr6+ if necessary, confirm with UV-Vis
                - DATA
            - Negative
              - Boiling water extraction
                - Adding 1.1-diphenylcarbazide for color development
                  - A red color indicates the presence of Cr6+ if necessary, confirm with UV-Vis
                  - DATA

Metallic material
- Adding extraction solution
  - GC/MS
    - DATA
    - Negative
      - Spot Test
        - Positive
          - Boiling water extraction
            - Adding 1.1-diphenylcarbazide for color development
              - A red color indicates the presence of Cr6+ if necessary, confirm with UV-Vis
              - DATA
            - Negative
              - Boiling water extraction
                - Adding 1.1-diphenylcarbazide for color development
                  - A red color indicates the presence of Cr6+ if necessary, confirm with UV-Vis
                  - DATA

This Test Report is issued by the Company under its General Conditions of Service printed overhead and accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitations of liability, indemnification and jurisdiction issues defined therein.

Any other holder of this document is advised that information contained herein reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to the Client and this document does not constitute parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this report is unlawful and offenders may be prosecuted to the fullest extent of the law.

Unless otherwise stated the results shown in this Test Report refer only to the sample(s) tested and such sample(s) are retained for 30 days only. This Test Report cannot be reproduced, except in full, without prior written permission of the Company.

SGS (Thailand) Limited
Laboratory Services 41/23 Soi Rama III 58 Rama III Road Chongnonsee Yannawa Bangkok 10120
Tel: +66 (0)2 294 74 85-90 Fax: +66 (0)2 294 74 84
www.sgs.com

Member of the SGS Group
SAMPLE/ATTACHMENT PICTURE

1865971

End of Report
Test Report

No. : CE/2010/12431  Date : 2010/01/20  Page : 1 of 4

EPISIL TECHNOLOGIES INC.
NO. 3, INNOVATION RD 1, SCIENCE BASED INDUSTRIAL PARK,
HSIN-CHU, TAIWAN, R. O. C.

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

Sample Description : IC WAFER
Style/Item No. : ALUMINUM PROCESS
Sample Receiving Date : 2010/01/13
Testing Period : 2010/01/13 TO 2010/01/20

Test Requested : In accordance with the RoHS Directive 2002/95/EC, and its amendment directives.

(1) Determination of Cadmium by ICP-AES.
(2) Determination of Lead by ICP-AES.
(3) Determination of Mercury by ICP-AES.
(4) Determination of Hexavalent Chromium by UV/Vis Spectrometry.

Test Result(s) : Please refer to next page(s).

Nicole Chien / Supervisor
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory - Taipei

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This test report cannot be reproduced, except in full, without prior written permission of the Company. This Test Report is issued by the Company under its General Conditions of Service printed overleaf or available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this Test Report is advised that information contained hereon reflects the Company’s findings at the time of its intervention only and within the limits of Client’s instructions, if any. The Company’s sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Member of the SGS Group (SGS SA)
Test Report

EPISIL TECHNOLOGIES INC.
NO. 3, INNOVATION RD 1, SCIENCE BASED INDUSTRIAL PARK,
HSIN-CHU, TAIWAN, R. O. C.

Test results by chemical method (Unit: mg/kg)

<table>
<thead>
<tr>
<th>Test Item (s):</th>
<th>Method (Refer to)</th>
<th>Result No.1</th>
<th>MDL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium (Cd)</td>
<td>(1)</td>
<td>n.d.</td>
<td>2</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>(2)</td>
<td>n.d.</td>
<td>2</td>
</tr>
<tr>
<td>Mercury (Hg)</td>
<td>(3)</td>
<td>n.d.</td>
<td>2</td>
</tr>
<tr>
<td>Hexavalent Chromium Cr(VI) by alkaline extraction</td>
<td>(4)</td>
<td>n.d.</td>
<td>2</td>
</tr>
</tbody>
</table>

TEST PART DESCRIPTION:

NO. 1 : MULTICOLOR WAFER

Note:
1. mg/kg = ppm; 0.1wt% = 1000ppm
2. n.d. = Not Detected
3. MDL = Method Detection Limit
1) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr\(^{6+}\) test method excluded)

2) Name of the person who made measurement: Climbgreat Yang

3) Name of the person in charge of measurement: Troy Chang

Sample Material Digestion Acid

| Steel, copper, aluminum, solder | Aqua regia, HNO\(_3\), HCl, HF, H\(_2\)O\(_2\) |
| Glass | HNO\(_3\)/HF |
| Gold, platinum, palladium, ceramic | Aqua regia |
| Silver | HNO\(_3\) |
| Plastic | H\(_2\)SO\(_4\), H\(_2\)O\(_2\), HNO\(_3\), HCl |
| Others | Any acid to total digestion |

Solution

ICP-AES

Add appropriate amount of digestion reagent

Heat to appropriate temperature to extract

Cool, filter digestate through filter

Add diphenyl-carbazide for color development

measure the absorbance at 540 nm by UV-VIS

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This test report cannot be reproduced, except in full, without prior written permission of the Company.

This Test Report is issued by the Company under its General Conditions of Service printed overleaf or available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this Test Report is advised that information contained hereon reflects the Company’s findings at the time of its intervention only and within the limits of Client’s instructions, if any. The Company’s sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgeroy or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.
Test Report

No. : CE/2010/12431 Date : 2010/01/20 Page : 4 of 4

EPISIL TECHNOLOGIES INC.
NO. 3, INNOVATION RD 1, SCIENCE BASED INDUSTRIAL PARK,
HSIN-CHU, TAIWAN, R. O. C.

** End of Report **