

Test Report

號碼(No.): ETR21B03234 日期(Date): 24-Nov-2021 頁數(Page): 1 of 12

欣興電子股份有限公司 (UNIMICRON TECHNOLOGY CORPORATION) 桃園市龜山區龜山工業區山鶯路179號 (NO. 179, SHAN YING ROAD, KWEI SHAN IND., PARK, TAOYUAN CITY TAIWAN, R.O.C.)

以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by/on behalf of the applicant as):

送樣廠商(Sample Submitted By)

欣興電子股份有限公司 (UNIMICRON TECHNOLOGY CORPORATION)

樣品名稱(Sample Name)

: Cu PLATING LAYER

收件日(Sample Receiving Date)

: 17-Nov-2021

測試期間(Testing Period)

: 17-Nov-2021 to 24-Nov-2021

測試需求(Test Requested)

(1) 依據客戶指定,參考RoHS 2011/65/EU Annex II及其修訂指令(EU) 2015/863測 試鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, BBP, DEHP, DIBP。 (As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).)

· (2) 其他測試項目請見下一頁。 (Please refer to next pages for the other item(s).)

測試結果(Test Results)

請參閱下一頁 (Please refer to following pages.)





PIN CODE: 6043B396



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測試部位敘述 (Test Part Description)

No.1 : 銅色片狀鍍層 (PLATING LAYER OF COPPER COLORED SHEET)

No.2 : 銅色片狀(含鍍層) (COPPER COLORED SHEET (INCLUDING THE PLATING LAYER))

測試結果 (Test Results)

測試項目	測試方法	單位	MDL	結果	
(Test Items)	(Method)	(Unit)		(Result)	
				No.1	No.2
鎘 (Cd) (Cadmium (Cd)) (CAS No.: 7440-43-9)	酸洗脫鍍層,參考IEC 62321-5: 2013 ,以感應耦合電漿發射光譜儀分析。 (IEC 62321-5: 2013 application of modified digestion by surface etching, analysis was performed by ICP-OES.)	mg/kg	2	n.d.	
鉛 (Pb) (Lead (Pb)) (CAS No.: 7439-92-1)	酸洗脫鍍層·參考IEC 62321-5: 2013 ·以感應耦合電漿發射光譜儀分析。 (IEC 62321-5: 2013 application of modified digestion by surface etching, analysis was performed by ICP-OES.)	mg/kg	2	n.d.	
汞 (Hg) (Mercury (Hg)) (CAS No.: 7439-97-6)	酸洗脫鍍層,參考IEC 62321-4: 2013 + AMD1: 2017,以感應耦合電 漿發射光譜儀分析。(IEC 62321-4: 2013 + AMD1: 2017 application of modified digestion by surface etching, analysis was performed by ICP-OES.)	mg/kg	2	n.d.	
六價鉻 (Hexavalent Chromium) Cr(VI) (CAS No.: 18540-29-9) (#2)	參考IEC 62321-7-1: 2015 · 以紫外光-可見光分光光度計分析。(With reference to IEC 62321-7-1: 2015, analysis was performed by UV-VIS.)	μg/cm²	0.1	n.d.	



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測試項目	測試方法	單位	MDL	結果	
(Test Items)	(Method)	(Unit)		(Result)	
				No.1	No.2
一溴聯苯 (Monobromobiphenyl)		mg/kg	5		n.d.
二溴聯苯 (Dibromobiphenyl)		mg/kg	5		n.d.
三溴聯苯 (Tribromobiphenyl)		mg/kg	5		n.d.
四溴聯苯 (Tetrabromobiphenyl)		mg/kg	5		n.d.
五溴聯苯 (Pentabromobiphenyl)		mg/kg	5		n.d.
六溴聯苯 (Hexabromobiphenyl)		mg/kg	5		n.d.
七溴聯苯 (Heptabromobiphenyl)		mg/kg	5		n.d.
八溴聯苯 (Octabromobiphenyl)		mg/kg	5		n.d.
九溴聯苯 (Nonabromobiphenyl)		mg/kg	5		n.d.
十溴聯苯 (Decabromobiphenyl)	參考IEC 62321-6: 2015,以氣相層析	mg/kg	5		n.d.
多溴聯苯總和 (Sum of PBBs)	儀/質譜儀分析。(With reference to	mg/kg	ı		n.d.
一溴聯苯醚 (Monobromodiphenyl ether)	IEC 62321-6: 2015, analysis was	mg/kg	5		n.d.
二溴聯苯醚 (Dibromodiphenyl ether)	performed by GC/MS.)	mg/kg	5		n.d.
三溴聯苯醚 (Tribromodiphenyl ether)		mg/kg	5		n.d.
四溴聯苯醚 (Tetrabromodiphenyl ether)		mg/kg	5		n.d.
五溴聯苯醚 (Pentabromodiphenyl ether)		mg/kg	5		n.d.
六溴聯苯醚 (Hexabromodiphenyl ether)		mg/kg	5		n.d.
七溴聯苯醚 (Heptabromodiphenyl ether)		mg/kg	5		n.d.
八溴聯苯醚 (Octabromodiphenyl ether)		mg/kg	5		n.d.
九溴聯苯醚 (Nonabromodiphenyl ether)		mg/kg	5		n.d.
十溴聯苯醚 (Decabromodiphenyl ether)		mg/kg	5		n.d.
多溴聯苯醚總和 (Sum of PBDEs)		mg/kg	ı		n.d.
鄰苯二甲酸丁苯甲酯 (BBP) (Butyl		mg/kg	50		n.d.
benzyl phthalate (BBP)) (CAS No.: 85-					
68-7)					
鄰苯二甲酸二丁酯 (DBP) (Dibutyl	參考IEC 62321-8: 2017,以氣相層析	mg/kg	50		n.d.
phthalate (DBP)) (CAS No.: 84-74-2)	儀/質譜儀分析。(With reference to				
鄰苯二甲酸二(2-乙基己基)酯 (DEHP)	IEC 62321-8: 2017, analysis was	mg/kg	50		n.d.
(Di-(2-ethylhexyl) phthalate (DEHP))	performed by GC/MS.)				
(CAS No.: 117-81-7)					
鄰苯二甲酸二異丁酯 (DIBP) (Diisobutyl		mg/kg	50		n.d.
phthalate (DIBP)) (CAS No.: 84-69-5)					



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測試項目	測試方法	單位	MDL	結果	
(Test Items)	(Method)	(Unit)		(Result)	
				No.1	No.2
鄰苯二甲酸二異癸酯 (DIDP)		mg/kg	50		n.d.
(Diisodecyl phthalate (DIDP)) (CAS					
No.: 26761-40-0, 68515-49-1)	┃ ┪参考IEC 62321-8: 2017,以氣相層析				
鄰苯二甲酸二異壬酯 (DINP)	参与IEC 02321-0.2017,以照伯僧彻 儀/質譜儀分析。(With reference to	mg/kg	50		n.d.
(Diisononyl phthalate (DINP)) (CAS	IEC 62321-8: 2017, analysis was				
No.: 28553-12-0, 68515-48-0)	performed by GC/MS.)				
鄰苯二甲酸二正辛酯 (DNOP) (Di-n-	performed by GC/W3.)	mg/kg	50		n.d.
octyl phthalate (DNOP)) (CAS No.:					
117-84-0)					
六溴環十二烷及所有主要被辨別出的異	參考IEC 62321: 2008,以氣相層析儀/	mg/kg	5		n.d.
構物(HBCDD) (α- HBCDD, β- HBCDD,	質譜儀分析。(With reference to IEC				
γ- HBCDD)	62321: 2008, analysis was				
(Hexabromocyclododecane (HBCDD)	performed by GC/MS.)				
and all major diastereoisomers					
identified (α - HBCDD, β - HBCDD, γ -					
HBCDD)) (CAS No.: 25637-99-4,					
3194-55-6 (134237-51-7, 134237-					
50-6, 134237-52-8))					
氟 (F) (Fluorine (F)) (CAS No.: 14762-		mg/kg	50		311
94-8)					
氯 (CI) (Chlorine (CI)) (CAS No.:	參考BS EN 14582: 2016 · 以離子層析	mg/kg	50		n.d.
22537-15-1)	儀分析。(With reference to BS EN				
溴 (Br) (Bromine (Br)) (CAS No.:	14582: 2016, analysis was	mg/kg	50		n.d.
10097-32-2)	performed by IC.)				
碘 (I) (Iodine (I)) (CAS No.: 14362-44-		mg/kg	50		n.d.
8)					
全氟辛烷磺酸及其鹽類 (PFOS and its	参考CEN/TS 15968: 2010 · 以液相層	μg/m²	1	n.d.	
salts) (CAS No.: 1763-23-1 and its	析儀/質譜儀分析。(With reference to				
salts)	CEN/TS 15968: 2010, analysis was				
全氟辛酸及其鹽類 (PFOA and its salts)	performed by LC/MS.)	μg/m²	1	n.d.	
(CAS No.: 335-67-1 and its salts)	, ,,				



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測試項目	測試方法	單位	MDL	結果	
(Test Items)	(Method)	(Unit)		(Result)	
				No.1	No.2
銻 (Sb) (Antimony (Sb)) (CAS No.: 7440-36-0)	酸洗脫鍍層·參考US EPA 3050B: 1996·以感應耦合電漿發射光譜儀分析。(US EPA 3050B: 1996 application of modified digestion by surface etching, analysis was performed by ICP-OES.)	mg/kg	2	n.d.	
鈹 (Be) (Beryllium (Be)) (CAS No.: 7440-41-7)	酸洗脫鍍層,參考US EPA 3050B: 1996,以感應耦合電漿發射光譜儀分析。(US EPA 3050B: 1996 application of modified digestion by surface etching, analysis was performed by ICP-OES.)	mg/kg	2	n.d.	

備註(Note):

- 1. mg/kg = ppm; 0.1wt% = 1000ppm
- 2. MDL = Method Detection Limit (方法偵測極限值)
- 3. n.d. = Not Detected (未檢出); 小於MDL / Less than MDL
- 4. "-" = Not Regulated (無規格值)
- 5. "---" = Not Conducted (未測試項目)
- 6. 全氟辛烷磺酸及其鹽類包含 (PFOS and its salts including):

CAS No.: 29081-56-9, 2795-39-3, 29457-72-5, 70225-14-8, 56773-42-3, 251099-16-8, 307-35-7.

- 7. 全氟辛酸及其鹽類包含 (PFOA and its salts including):
 - CAS No.: 3825-26-1, 335-95-5, 2395-00-8, 335-93-3, 335-66-0.
- 8. (#2) =
 - a. 當六價鉻結果大於 $0.13~\mu g/cm^2$ ·表示樣品表層含有六價鉻。(The sample is positive for Cr(VI) if the Cr(VI) concentration is greater than $0.13~\mu g/cm^2$. The sample coating is considered to contain Cr(VI).)
 - b. 當六價鉻結果為n.d. (濃度小於0.10 μg/cm²)·表示表層不含六價鉻。(The sample is negative for Cr(VI) if Cr(VI) is n.d. (concentration less than 0.10 μg/cm²). The coating is considered a non-Cr(VI) based coating)
 - c. 當六價鉻結果介於 0.10 及 0.13 $\mu g/cm^2$ 時,無法確定塗層是否含有六價鉻。(The result between 0.10 $\mu g/cm^2$ and 0.13 $\mu g/cm^2$ is considered to be inconclusive unavoidable coating variations may influence the determination.)



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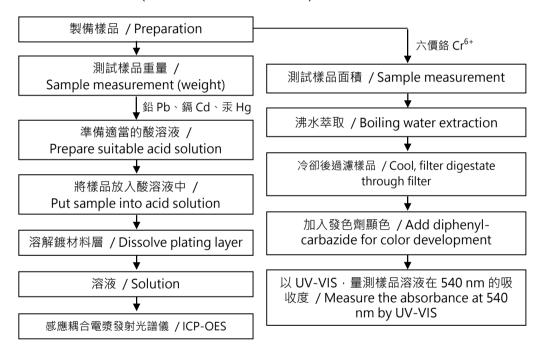
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鍍層重金屬測試流程圖 / Flow Chart of Stripping method for metal analysis

根據以下的流程圖之條件·樣品之外部鍍層已完全溶解。(六價鉻測試方法除外) / The plating layer of samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr⁶⁺ test method excluded)



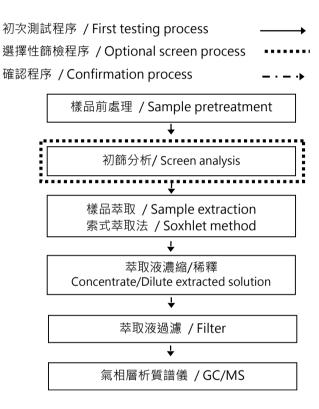


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多溴聯苯/多溴聯苯醚分析流程圖 / Analytical flow chart - PBBs/PBDEs





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可塑劑分析流程圖 / Analytical flow chart - Phthalate

【測試方法/Test method: IEC 62321-8】

樣品前處理/分樣 / Sample pretreatment/separation 樣品以 THF 四氫呋喃溶解萃取 / Sample dissolved/extracted by THF 萃取液稀釋 / Dilute extracted solution 氣相層析質譜儀分析 / Analysis was performed by GC/MS

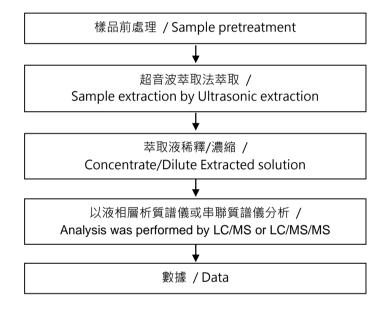


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全氟辛酸/全氟辛烷磺酸分析流程圖 / Analytical flow chart - PFOA/PFOS



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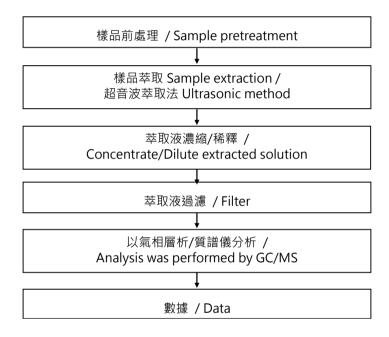


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六溴環十二烷分析流程圖 / Analytical flow chart - HBCDD



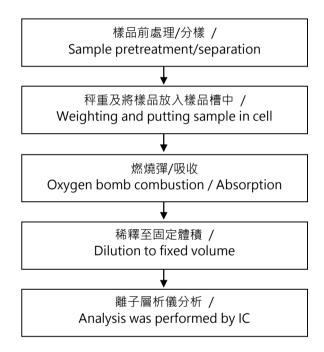


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鹵素分析流程圖 / Analytical flow chart - Halogen





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* 照片中如有箭頭標示,則表示為實際檢測之樣品/部位. * (The tested sample / part is marked by an arrow if it's shown on the photo.)

ETR21B03234 NO.1



ETR21B03234 NO.2



** 報告結尾 (End of Report) **