

Test Report 測試報告

Applicant 申請廠商: Sharkoon Technologies GmbH
Siemensstrasse 38,
35440 Linden, Germany.

Number : TWNC00612596
報告號碼

Date 日期 : Jul 24, 2017

Sample Description 樣品敘述:

One (1) group of submitted samples said to be :

以下測試樣品乃供應商所提供及確認:

Sample Description : USB Keyboard

樣品名稱

Style / Item No. : Sharkoon SKILLER MECH SGK3

產品型號

Date Sample Received : Jun 12, 2017 / Jul 14, 2017

收件日期

Date Test Started : Jun 13 2017 / Jul 14, 2017

開始測試日期

Test Conducted 測試執行:

As requested by the applicant, for details please refer to attached pages.

依申請商之要求, 細節請參考附頁.

Conclusion:

結論

Tested Samples

測試樣品

Screening components of submitted samples

測試部位

Standard

標準

With reference to test method of IEC 62321 edition 1.0:2013 part 3-1, screening by XRF spectroscopy and chemical confirmation test for RoHS Directive (2011/65/EU)

依據危害物質限制指令 RoHS Directive (2011/65/EU), 參考測試方法 IEC 62321 版本 1.0:2013 part 3-1, 以 X 光螢光分析法作篩檢測試及進行化學確認測試

Result

結果

Pass

合格

Remark:

備註

As requested by the applicant, only components shown in this report were screened by XRF spectroscopy for 2011/65/EU.

Other components were not screened in this report.

依據客戶要求, 只有表列於報告中的部位有依照 2011/65/EU 以 X 光螢光分析法作篩檢測試, 此報告中其他部位未被篩檢.

Chemical confirmation tests were conducted to verify the inconclusive results of XRF tests.

為查證 X 光螢光分析法測試中的不確定結果, 已進行化學確認測試.

Authorized by:

On Behalf of Intertek Testing Services

Taiwan Limited



Matt Wang
Sr. Manager



Test Conducted 測試內容 :

XRF Screening Test

X 光螢光分析法篩檢測試

Contents of cadmium (Cd), lead (Pb), mercury (Hg), chromium (Cr) and bromine (Br) were measured by XRF spectroscopy. The further wet chemical tests will be conducted if necessary.

以 X 光螢光分析法進行鎘(Cd), 鉛(Pb), 汞(Hg), 鉻(Cr)與溴(Br) 的含量篩檢測試，必要時會以化學測試進行確認。

Test Result Summary 測試結果:

	Tested Component 測試部位	XRF screening X 光螢光分析法篩檢測試		Chemical testing 化學測試		
		Element 元素	Result (ppm) 結果(ppm)	Cr ⁶⁺ 六價鉻 (ppm)	Pb/Cd/Hg 鉛/鎘/汞 (ppm)	PBBs/PBDEs 多溴聯苯/多 溴聯苯醚 (ppm)
1	Black metal plate	Cd	ND	--	--	
		Pb	278		--	
		Hg	ND		--	
		Cr	ND			
		Br	NA		--	
2	Black/translucent plastic key	Cd	ND	--	--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND			
		Br	ND		--	
3	Black plastic bottom	Cd	ND	--	--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND			
		Br	ND		--	
4	Black soft plastic pad	Cd	ND	--	--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND			
		Br	ND		--	
5	Black plastic feet	Cd	ND	--	--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND			
		Br	ND		--	



Test Conducted 測試內容 :

	Tested Component 測試部位	XRF screening X 光螢光分析法篩檢測試		Chemical testing 化學測試		
		Element 元素	Result (ppm) 結果(ppm)	Cr ⁶⁺ 六價鉻 (ppm)	Pb/Cd/Hg 鉛/鎘/汞 (ppm)	PBBs/PBDEs 多溴聯苯/多 溴聯苯醚 (ppm)
6	Transparent plastic indicator	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		--	--
7	Black metal screw	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	1506	Negative		--
		Br	NA		--	--
8	Black plastic cable block	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		--
		Br	ND		--	--
9	Black plastic frame	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		--
		Br	ND		--	--
10	Black plastic stand	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		--
		Br	ND		--	--
11	Black plastic blue key frame	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		--
		Br	ND		--	--



Test Conducted 測試內容 :

	Tested Component 測試部位	XRF screening X 光螢光分析法篩檢測試		Chemical testing 化學測試		
		Element 元素	Result (ppm) 結果(ppm)	Cr ⁶⁺ 六價鉻 (ppm)	Pb/Cd/Hg 鉛/鎘/汞 (ppm)	PBBs/PBDEs 多溴聯苯/多 溴聯苯醚 (ppm)
12	Blue plastic key	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		--	--
13	Transparent plastic key frame	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		--	--
14	Silvery metal spring	Cd	ND		--	
		Pb	425		--	
		Hg	ND		--	
		Cr	149509	Negative		
		Br	NA		--	--
15	Silvery metal contact	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	NA		--	--
16	Coppery metal contact	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	NA		--	--
17	Silvery metal support pin	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	310	--		
		Br	NA		--	--



Test Conducted 測試內容 :

	Tested Component 測試部位	XRF screening X 光螢光分析法篩檢測試		Chemical testing 化學測試		
		Element 元素	Result (ppm) 結果(ppm)	Cr ⁶⁺ 六價鉻 (ppm)	Pb/Cd/Hg 鉛/鎘/汞 (ppm)	PBBs/PBDEs 多溴聯苯/多 溴聯苯醚 (ppm)
18	PCBA (key board) [The all tested components were excluded]	Cd	--		ND	
		Pb	--		18	
		Hg	--		ND	
		Cr	--	ND		
		Br	--		PBBs: ND PBDEs: ND	
19	Connector - beige plastic socket	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	95067		PBBs: ND PBDEs: ND	
20	Connector - silvery metal pin	Cd	ND		--	
		Pb	341		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	NA		-- --	
21	LED - translucent molding part	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		-- --	
22	SMD LED - green/clear molding part	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		-- --	
23	Chip - black molding part	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		-- --	



Test Conducted 測試內容 :

	Tested Component 測試部位	XRF screening X 光螢光分析法篩檢測試		Chemical testing 化學測試		
		Element 元素	Result (ppm) 結果(ppm)	Cr ⁶⁺ 六價鉻 (ppm)	Pb/Cd/Hg 鉛/鎘/汞 (ppm)	PBBs/PBDEs 多溴聯苯/多 溴聯苯醚 (ppm)
24	Chip - silvery metal pin	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	NA		--	--
25	SMD - black molding part	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		--	--
26	Silvery metal screw	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	NA		--	--
27	Connector - white plastic socket	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		--	--
28	Connector - silvery metal pin	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	NA		--	--
29	White cable jacket	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		--	--



Test Conducted 測試內容 :

	Tested Component 測試部位	XRF screening X 光螢光分析法篩檢測試		Chemical testing 化學測試		
		Element 元素	Result (ppm) 結果(ppm)	Cr ⁶⁺ 六價鉻 (ppm)	Pb/Cd/Hg 鉛/鎘/汞 (ppm)	PBBs/PBDEs 多溴聯苯/多 溴聯苯醚 (ppm)
30	Green cable jacket	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		--	
31	Red cable jacket	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		--	
32	Black cable jacket	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		--	
33	Silvery metal wire	Cd	ND		--	
		Pb	338		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	NA		--	
34	Black heat shrink tube	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		--	
35	Black plastic core housing	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		--	



Test Conducted 測試內容 :

	Tested Component 測試部位	XRF screening X 光螢光分析法篩檢測試		Chemical testing 化學測試		
		Element 元素	Result (ppm) 結果(ppm)	Cr ⁶⁺ 六價鉻 (ppm)	Pb/Cd/Hg 鉛/鎘/汞 (ppm)	PBBs/PBDEs 多溴聯苯/多 溴聯苯醚 (ppm)
36	Black core ring	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		--	--
37	Black fabric cable insulator	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		--	--
38	Black plastic cable insulator	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		--	--
39	Translucent plastic side of Velcro	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		--	--
40	Black fabric pile side of Velcro	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		--	--
41	USB plug - black strain relief hood	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		--	--



Test Conducted 測試內容 :

	Tested Component 測試部位	XRF screening X 光螢光分析法篩檢測試		Chemical testing 化學測試		
		Element 元素	Result (ppm) 結果(ppm)	Cr ⁶⁺ 六價鉻 (ppm)	Pb/Cd/Hg 鉛/鎘/汞 (ppm)	PBBs/PBDEs 多溴聯苯/多 溴聯苯醚 (ppm)
42	USB plug - golden metal frame	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	NA		--	
43	USB plug - white plastic socket	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	ND		--	
44	USB plug - silvery/golden metal pin	Cd	ND		--	
		Pb	ND		--	
		Hg	ND		--	
		Cr	ND	--		
		Br	NA		--	

- Remarks: ppm = Parts per million = mg/kg
備註 = 百萬分之一 = 毫克/公斤
- ND = Not detected and pass, the screened sample is found to be under detection limit of table II.
未檢測出且合格, 測試部位的結果低於表格 II 中的偵測極限
- NA = Not applicable
不適用
- = Not tested 未檢測
- Negative = A negative test result indicated positive observation was not found at the time of test.
When the spot test showed a negative result, the boiling water extraction procedure shall be used to verify the result.
A negative test result indicated positive observation was not found at the time of test.
此陰性結果顯示樣品在分析過程中無發現任何陽性現象的存在。若點測試的結果為陰性，應以沸水萃取法查證結果。
- As per applicant's request, the Chromium VI (Cr⁶⁺) content of metal material was conducted spot test only.
依據客戶要求，金屬材質的部位僅以點測試測量六價鉻含量。
 - PCB assembly was ground and randomly selected for test.
印刷電路板經粉碎及隨機均勻取樣後進行測試。



Test Conducted 測試內容 :

Responsibility of Chemist 分析人員 : Pelly Hsiao/ Vita Fu

Date Sample Received 樣品收件日期 : Jun 12, 2017 / Jul 14, 2017

Test Period 樣品測試期間 : Jun 13, 2017 to Jun 27, 2017 / Jul 14, 2017 to Jul 19, 2017

Table I: XRF screening limits in mg/kg for regulated elements in various materials.

表格 I: X 光螢光分析法在不同材質中對不同元素的篩檢極限(mg/kg)

Element 元素	Polymer Materials 聚合物材質	Metallic Materials 金屬材質	Composite Materials 複合性材質
鎘 (Cd)	BL ≤ 70 < X < 130 ≤ OL	BL ≤ 70 < X < 130 ≤ OL	BL ≤ 70 < X < 150 ≤ OL
鉛 (Pb)	BL ≤ 700 < X < 1300 ≤ OL	BL ≤ 700 < X < 1300 ≤ OL	BL ≤ 500 < X < 1500 ≤ OL
汞 (Hg)	BL ≤ 700 < X < 1300 ≤ OL	BL ≤ 700 < X < 1300 ≤ OL	BL ≤ 500 < X < 1500 ≤ OL
鉻 (Cr)	BL ≤ 700 < X	BL ≤ 700 < X	BL ≤ 500 < X
溴 (Br)	BL ≤ 300 < X	Not Applicable 不適用	BL ≤ 250 < X

Remarks: mg/kg = Milligram per kilogram = ppm

備註 百萬分之一 = 毫克/公斤

BL = Below Limit
低於極限

X = Inconclusive result
不確定的結果

OL = Over Limit
高於極限

Table II: Estimated detection limits in mg/kg for regulated elements in various matrices.

表格 II: 不同元素在不同材質中的偵測極限(/mg/kg)

Element 元素	Polymer Materials 聚合物材質	Metallic Materials 金屬材質	Composite Materials 複合性材質
鎘 (Cd)	50	70	70
鉛 (Pb)	100	200	200
汞 (Hg)	100	200	200
鉻 (Cr)	100	200	200
溴 (Br)	200	Not Applicable 不適用	200



Test Conducted 測試內容 :

Disclaimers:

聲明

The numerical test data of this XRF screening report is for reference purposes only due to the data variation incurred from various factors as described in next paragraph. The applicant shall make its/his/her own judgment as to whether the information provided in this XRF screening report is sufficient for its/his/her purposes.

此 X 光螢光分析法篩檢報告僅作為參考之用，因測試結果會受到多種因素的影響，細節於下個段落中說明。申請者應自行評估本報告中所提供的資訊是否符合其申請目的。

The results shown in this XRF screening report will differ based on various factors, including but not limited to, the sample size, thickness, area, surface flatness, equipment parameters and matrix effect (e.g. plastic, rubber, metal, glass, ceramic etc.). Further wet chemical pre-treatment with relevant chemical equipment analysis are required to obtain quantitative data.

X 光螢光分析法篩檢的結果會受到很多因素影響，包含但不限於樣品的大小,厚度,面積,表面平整度,設備參數,與基質效應 (舉例:塑膠,橡膠,金屬,陶瓷等)，需要進一步的化學前處理及相對應的化學分析設備以得到定量的數據。



Test Conducted 測試內容 :

Chemical Test Method 化學測試方法

<u>Test Item</u> 測試項目	<u>Test Method</u> 測試方法	<u>Reporting Limit</u> 報告極限
Cadmium (Cd) Content 鎘含量	With reference to IEC 62321-5: 2013, by microwave or acid digestion and determined by ICP-OES. 參考 IEC 62321-5: 2013, 以微波或酸液消化法消化樣品並用感應耦合電漿原子發射光譜儀分析。	2 ppm
Lead (Pb) Content 鉛含量	With reference to IEC 62321-5: 2013, by microwave or acid digestion and determined by ICP-OES. 參考 IEC 62321-5: 2013, 以微波或酸液消化法消化樣品並用感應耦合電漿原子發射光譜儀分析。	2 ppm
Mercury (Hg) Content 汞含量	With reference to IEC 62321-4: 2013, by microwave or acid digestion and determined by ICP-OES. 參考 IEC 62321-4: 2013, 以微波或酸液消化法消化樣品並用感應耦合電漿原子發射光譜儀分析。	2 ppm
Chromium VI (Cr ⁶⁺) Content 六價鉻含量 (for non-metal)	With reference to IEC 62321-7-2: 2017, organic solvent was used to dissolve or swell sample matrix, followed by alkaline digestion and determined by UV-Vis Spectrophotometer. 參考 IEC 62321-7-2:2017, 以有機溶劑溶解或使樣品基質膨脹, 再進行鹼液消化, 用紫外光-可見光分光光度計分析。	8 ppm
Chromium VI (Cr ⁶⁺) Content 六價鉻含量 (for metal)	With reference to IEC 62321: 2008, by spot test. 參考 IEC 62321:2008 第一版附錄 B, 以點測試法分析。	1 ppm
Polybrominated Biphenyls (PBBs) 多溴聯苯	With reference to IEC 62321-6: 2015, by solvent extraction and determined by GC-MS and further HPLC-DAD confirmation when necessary. 參考 IEC 62321-6: 2015, 以溶劑萃取並用氣相層析質譜儀分析, 必要時會以高效液相層析儀光二極體陣列偵測儀進行確認。	5 ppm
Polybrominated Diphenyl Ethers (PBDEs) 多溴聯苯醚	With reference to IEC 62321-6: 2015, by solvent extraction and determined by GC-MS and further HPLC-DAD confirmation when necessary. 參考 IEC 62321-6: 2015, 以溶劑萃取並用氣相層析質譜儀分析, 必要時會以高效液相層析儀光二極體陣列偵測儀進行確認。	5 ppm

Remark : Reporting Limit = Quantitation limit of analyte in sample 測試樣品之定量偵測極限備註



Test Conducted 測試內容 :

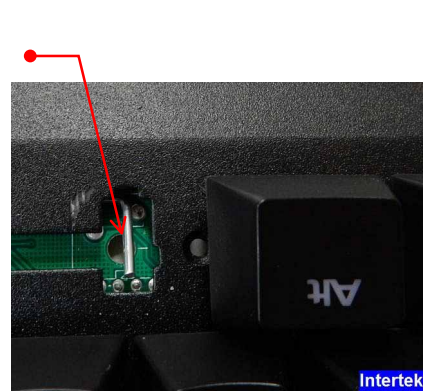
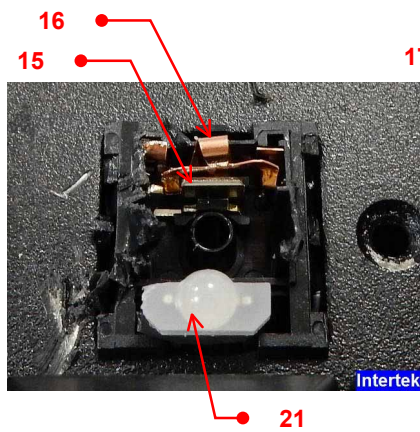
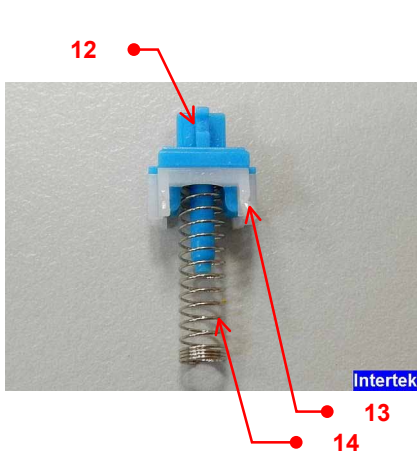
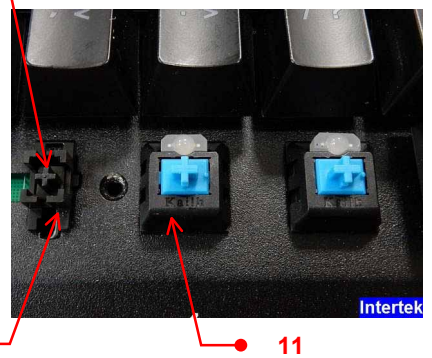
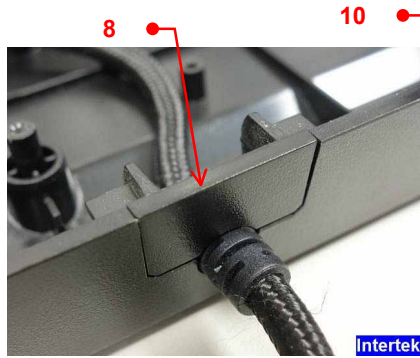
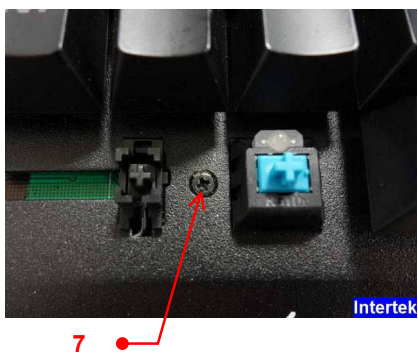
RoHS Limit RoHS 限值

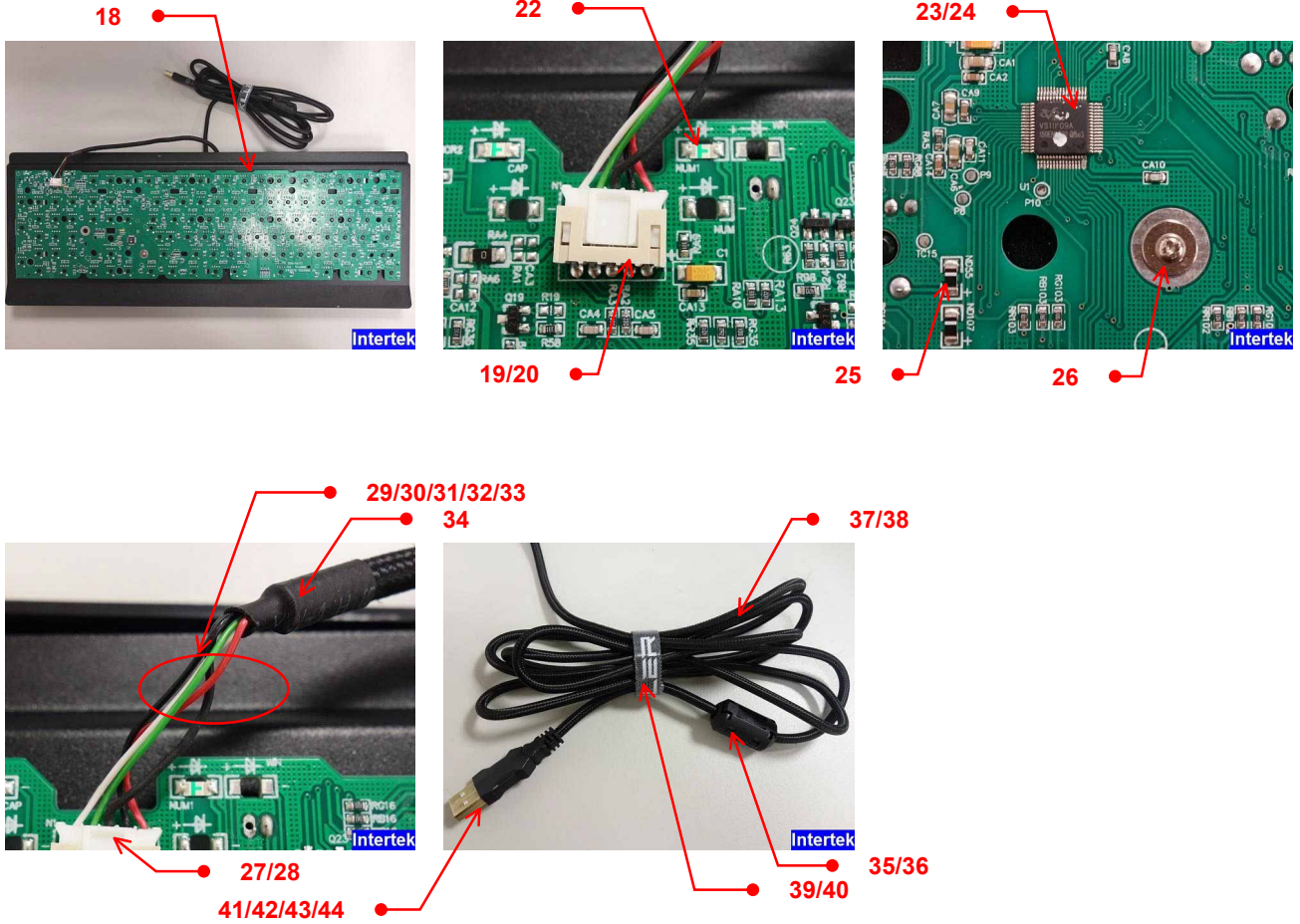
Restricted Substances 限用物質	Limits 限值
Cadmium (Cd) content 鎘含量	0.01% (100ppm)
Lead (Pb) content 鉛含量	0.1% (1000ppm)
Mercury (Hg) content 汞含量	0.1% (1000ppm)
Chromium VI (Cr ⁶⁺) content 六價鉻含量	0.1% (1000ppm)
Polybrominated Biphenyls (PBBs) 多溴聯苯	0.1% (1000ppm)
Polybrominated Diphenyl Ethers (PBDEs) 多溴聯苯醚	0.1% (1000ppm)

The limits were quoted from Annex II of 2011/65/EU for homogeneous material.

本限值是依據歐盟指令 2011/65/EU 附錄二針對均質材質所訂定。







End of Report

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