

Test Report 測試報告

Applicant: Sharkoon Technologies GmbH
申請廠商 Gruninger Weg 48, 35415 Pohlheim,
Germany

Number : TWNC00877543
報告號碼

Issue Date : May 04, 2020
報告發行日期

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 : Sharkoon Light² 100

樣品名稱

Date Sample Received : Apr 14, 2020

收件日期

Date Test Started : Apr 14, 2020

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 Sample 測試樣品

Tested Components of
Submitted Samples

測試部位

Standard 標準

Restriction of Hazardous Substances (RoHS)

危害物質限制

– As per applicant's request with reference to 2011/65/EU

依據客戶要求參考歐盟指令 2011/65/EU

Result 結果

Pass 合格

Remarks: As per the request of the applicant, only the listed components were tested for the RoHS directive.

備註 依據客戶要求，只有表列於報告中的部位有依照 RoHS 指令作測試。

Authorized By:
On behalf of Intertek Testing Services
Taiwan Limited

Matt Wang
Sr. Manager



Signed by:

Thomas Chou

Thomas Chou
Manager



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Test Conducted 測試內容 :

Restriction of Hazardous Substances (RoHS) Test 危害物質限制測試

A. Test Result Summary 測試結果

	Tested Component 測試部位	Screening Test 篩檢測試		Screening Test 篩檢測試		
		Element 元素	Result 結果 (ppm)	Pb/Cd/Hg 鉛/鎘/汞 (ppm)	Cr(VI) 六價鉻 (ug/cm ² or ppm)	PBBs/PBDEs 多溴聯苯/ 多溴聯苯醚 (ppm)
1	Black/white plastic top cover	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			--
2	Black soft plastic button	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			--
3	Black plastic housing	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			--
4	Black plastic button	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			--
5	White plastic pad	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			--
6	Black plastic switch	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			--



Test Conducted 測試內容 :

	Tested Component 測試部位	Screening Test 篩檢測試		Screening Test 篩檢測試		
		Element 元素	Result 結果 (ppm)	Pb/Cd/Hg 鉛/鎘/汞 (ppm)	Cr(VI) 六價鉻 (ug/cm ² or ppm)	PBBs/PBDEs 多溴聯苯/ 多溴聯苯醚 (ppm)
7	Silvery metal screw for housing	Cd	ND	--	--	--
		Pb	ND	--		
		Hg	ND	--		
		Cr	236			
		Br	NA			
8	Transparent plastic sensor cover	Cd	ND	--	--	--
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND			
		Br	ND			
9	Semitransparent white plastic frame	Cd	ND	--	--	--
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND			
		Br	ND			
10	Silvery metal screw for PCBA board	Cd	ND	--	--	--
		Pb	ND	--		
		Hg	ND	--		
		Cr	523			
		Br	NA			
11	Wheel - black rubber tire	Cd	ND	--	--	--
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND			
		Br	ND			
12	Wheel - semitransparent plastic rim	Cd	ND	--	--	--
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND			
		Br	ND			



Test Conducted 測試內容 :

	Tested Component 測試部位	Screening Test 篩檢測試		Screening Test 篩檢測試		
		Element 元素	Result 結果 (ppm)	Pb/Cd/Hg 鉛/鎘/汞 (ppm)	Cr(VI) 六價鉻 (ug/cm ² or ppm)	PBBs/PBDEs 多溴聯苯/ 多溴聯苯醚 (ppm)
13	Black plastic cover	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			
14	Switch - green plastic button	Cd	ND	--		
		Pb	515	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			
15	Switch - black plastic housing	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			
16	Switch - grey plastic base	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			
17	LED - transparent molding part	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	2224			
18	LED - silvery metal pin	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	NA			



Test Conducted 測試內容 :

	Tested Component 測試部位	Screening Test 篩檢測試		Screening Test 篩檢測試		
		Element 元素	Result 結果 (ppm)	Pb/Cd/Hg 鉛/鎘/汞 (ppm)	Cr(VI) 六價鉻 (ug/cm ² or ppm)	PBBs/PBDEs 多溴聯苯/ 多溴聯苯醚 (ppm)
19	Capacitor - black/white plastic sleeve	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	276		--	
		Br	ND			
20	Capacitor - silvery metal can	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	1407		Negative	
		Br	NA			
21	Capacitor - black rubber seal	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			
22	Switch - silvery metal frame	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	NA			
23	Switch - black plastic frame	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			
24	Switch - black plastic gear	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			



Test Conducted 測試內容 :

	Tested Component 測試部位	Screening Test 篩檢測試		Screening Test 篩檢測試		
		Element 元素	Result 結果 (ppm)	Pb/Cd/Hg 鉛/鎘/汞 (ppm)	Cr(VI) 六價鉻 (ug/cm ² or ppm)	PBBs/PBDEs 多溴聯苯/ 多溴聯苯醚 (ppm)
25	Switch - silvery metal pin	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	NA			
26	Switch - semitransparent white plastic button	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			
27	Switch - black plastic housing	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			
28	Switch - black plastic base	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			
29	Connector - white plastic socket	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			
30	Connector - silvery metal pin	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	23300		Negative	
		Br	NA			



Test Conducted 測試內容 :

	Tested Component 測試部位	Screening Test 篩檢測試		Screening Test 篩檢測試		
		Element 元素	Result 結果 (ppm)	Pb/Cd/Hg 鉛/鎘/汞 (ppm)	Cr(VI) 六價鉻 (ug/cm ² or ppm)	PBBs/PBDEs 多溴聯苯/ 多溴聯苯醚 (ppm)
31	Switch - silvery metal frame	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	NA			
32	Switch - black plastic part	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			
33	Switch - black plastic socket	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			
34	LED - transparent molding part	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	1040			
35	LED - silvery metal pin	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	350		--	
		Br	NA			
36	Sensor - blackish grey molding part	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			



Test Conducted 測試內容 :

	Tested Component 測試部位	Screening Test 篩檢測試		Screening Test 篩檢測試		
		Element 元素	Result 結果 (ppm)	Pb/Cd/Hg 鉛/鎘/汞 (ppm)	Cr(VI) 六價鉻 (ug/cm ² or ppm)	PBBs/PBDEs 多溴聯苯/ 多溴聯苯醚 (ppm)
37	PBCA [The all tested components were excluded]	Cd	--	ND		
		Pb	--	5		
		Hg	--	ND		
		Cr	--		ND	PBBs: ND PBDEs: ND
		Br	--			
38	Switch - white plastic button	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	--
		Br	ND			
39	Connector - light grey plastic plug	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	PBBs: ND PBDEs: ND
		Br	89000			
40	Connector - silvery metal pin	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	--
		Br	NA			
41	PBCA [The all tested components were excluded]	Cd	--	ND		
		Pb	--	6		
		Hg	--	ND		
		Cr	--		ND	PBBs: ND PBDEs: ND
		Br	--			
42	White/orange cable jacket	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	--
		Br	ND			



Test Conducted 測試內容 :

	Tested Component 測試部位	Screening Test 篩檢測試		Screening Test 篩檢測試		
		Element 元素	Result 結果 (ppm)	Pb/Cd/Hg 鉛/鎘/汞 (ppm)	Cr(VI) 六價鉻 (ug/cm ² or ppm)	PBBs/PBDEs 多溴聯苯/ 多溴聯苯醚 (ppm)
43	Silvery metal wire	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	NA			
44	White plastic connector	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			
45	Silvery metal pin of connector	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	NA			
46	USB plug - golden metal frame	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	NA			
47	USB plug - white plastic socket	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			
48	USB plug - golden metal pin	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	NA			



Test Conducted 測試內容 :

	Tested Component 測試部位	Screening Test 篩檢測試		Screening Test 篩檢測試		
		Element 元素	Result 結果 (ppm)	Pb/Cd/Hg 鉛/鎘/汞 (ppm)	Cr(VI) 六價鉻 (ug/cm ² or ppm)	PBBs/PBDEs 多溴聯苯/ 多溴聯苯醚 (ppm)
49	Black strain relief hood	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	--
		Br	ND			
50	Black core ring	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	341		--	--
		Br	ND			
51	Black fabric sheath	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	--
		Br	ND			
52	Black soft plastic cable tie	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	--
		Br	ND			
53	Black heat shrinkable tube	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	--
		Br	ND			
54	White paper film	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	--
		Br	ND			



Test Conducted 測試內容 :

	Tested Component 測試部位	Screening Test 篩檢測試		Screening Test 篩檢測試		
		Element 元素	Result 結果 (ppm)	Pb/Cd/Hg 鉛/鎘/汞 (ppm)	Cr(VI) 六價鉻 (ug/cm ² or ppm)	PBBs/PBDEs 多溴聯苯/ 多溴聯苯醚 (ppm)
55	Silvery metal wire shell	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	NA			
56	White fabric thread	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			
57	Red cable jacket	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			
58	Green cable jacket	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			
59	White cable jacket	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			
60	Black cable jacket	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND		--	
		Br	ND			



Test Conducted 測試內容 :

	Tested Component 測試部位	Screening Test 篩檢測試		Screening Test 篩檢測試		
		Element 元素	Result 結果 (ppm)	Pb/Cd/Hg 鉛/鎘/汞 (ppm)	Cr(VI) 六價鉻 (ug/cm ² or ppm)	PBBs/PBDEs 多溴聯苯/ 多溴聯苯醚 (ppm)
61	Coppery metal wire	Cd	ND	--		
		Pb	ND	--		
		Hg	ND	--		
		Cr	ND	--		
		Br	NA			

- Remarks: ppm = Parts per million based on weight of tested sample 百萬分之一 = mg/kg 毫克/仟克
 備註 ND = Not detected 未檢測出
 NA = Not applicable 不適用
 -- = Not tested 未檢測
 Negative = The negative result indicated the positive observation was not found by the spot test. Boiling water extraction shall be conducted when the spot test obtained the negative result.
 此陰性結果顯示樣品在點測試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, only spot test was conducted for chromium VI (Cr(VI)) for the metal material.
 依據客戶要求，金屬材質的部位僅以點測試六價鉻含量。
 - PCB assembly was ground first and randomly sampled the residue for test.
 印刷電路板先經粉碎及隨機均勻取樣後進行測試。

B. Information on Analysis 分析資訊

(I) Screening Test 篩檢測試

Test Item 測試項目	Test Method 測試方法	Reporting Limit 報告極限
XRF for regulated elements XRF 元素測試	With reference to IEC 62321-3-1: 2013, by X-ray fluorescence spectrometry. 參考 IEC 62321-3-1: 2013，以 X 射線螢光光譜法分析。	See Table II 見表 II



Test Conducted 測試內容 :

Table I: Screening Limits in mg/kg for Various Materials.

表格 I: 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 百萬分之一 = ppm
備註 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 :

(II) Confirmation Test 確認測試

Test Item 測試項目	Test Method 測試方法	Reporting Limit 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+AMD1:2017, by microwave or acid digestion and determined by ICP-OES. 參考 IEC 62321-4:2013+AMD1:2017, 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(VI)) content (for non-metal) 六價鉻含量	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(VI)) Content (for metal) 六價鉻含量	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		

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

(III) Other information on analysis 其他資訊

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

Date Sample Received 樣品收件日期 : Apr 14, 2020

Test Period 樣品測試期間 : Apr 14, 2020 to Apr 30, 2020



Test Conducted 測試內容 :

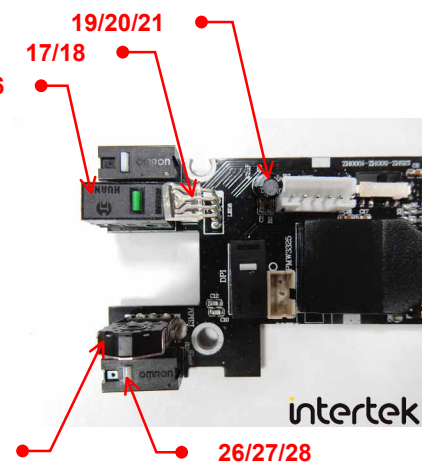
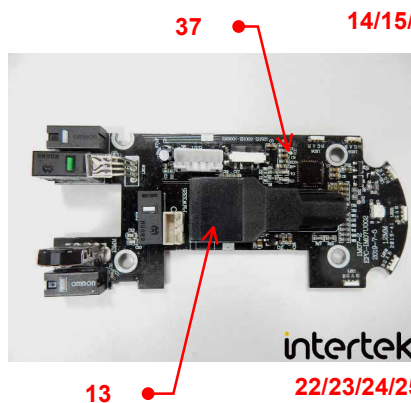
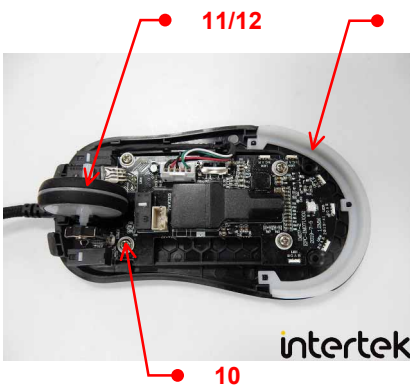
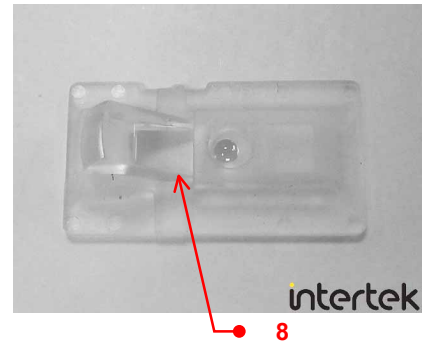
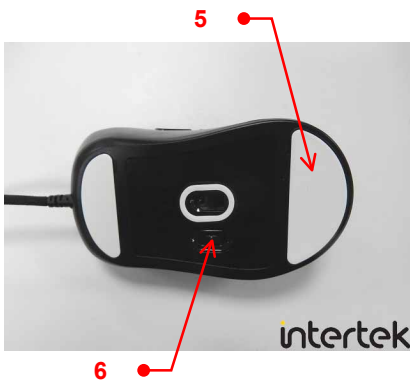
RoHS Limit RoHS 限值

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(VI)) 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)

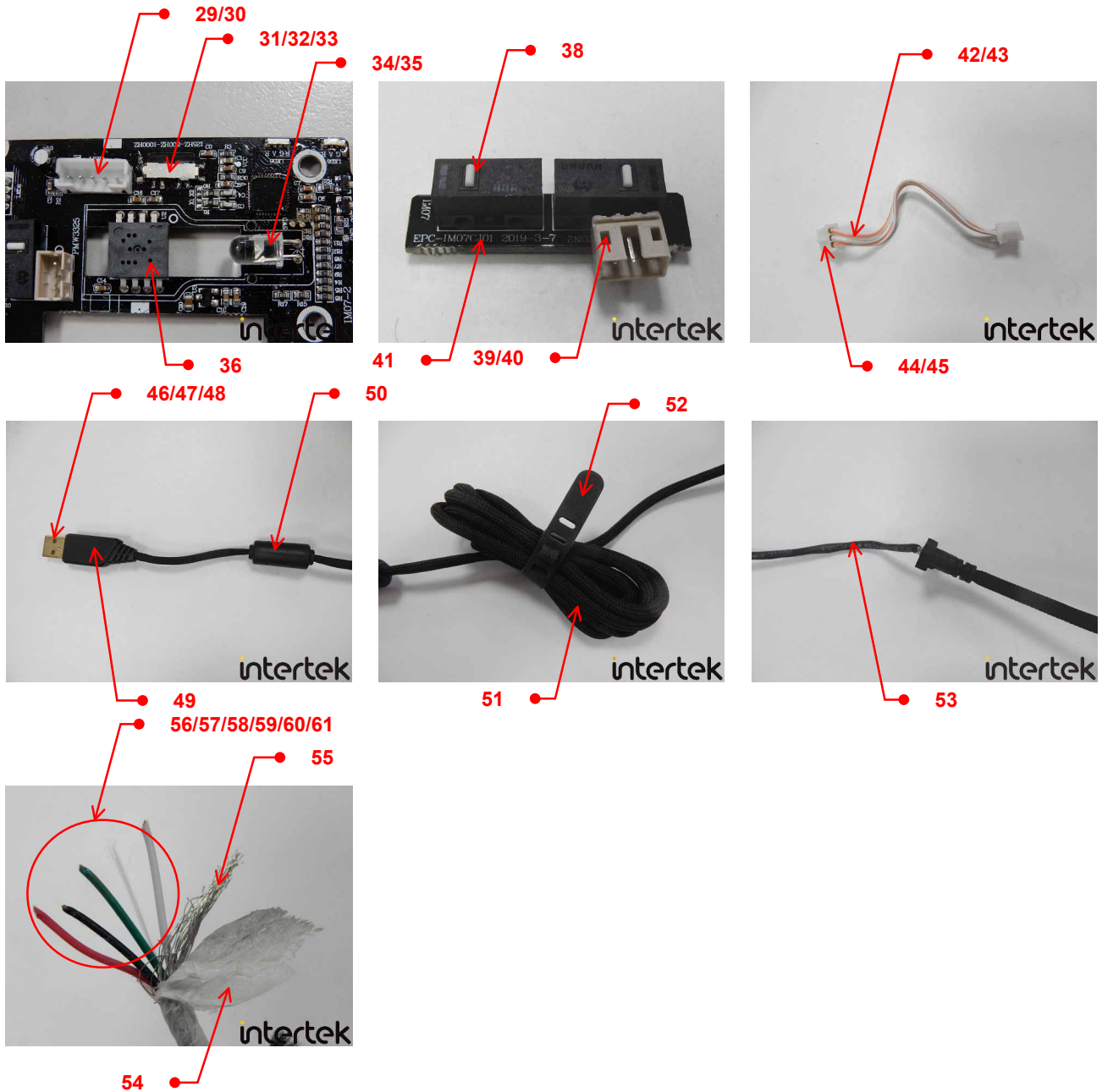
The limits were quoted from Annex II of Directive 2011/65/EU for homogeneous material.
本限值是依據歐盟指令 2011/65/EU 附錄二針對均質材質所訂定。



Sample photo 樣品照片 :



Sample photo 樣品照片 :



End of Report

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