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Shenzhen Hiwonder Technology Co., Ltd 2/F, Building B, DongJinYiHao Cultural Innovation Park, 227 AiNan Road, Longgang Street, Longgang District, Shenzhen, China

Report on the submitted samples said to be:

Sample Description : Bus Servo

Model : LX-824

Brand : Hiwonder

Sample Receiving Date : March 8, 2019

Testing Period : March 8, 2019 - March 20, 2019
Result : Please refer to the table below.

Summary of Test Result:

TEST REQUEST CONCLUSION

RoHS Directive 2011/65/EU and its amendment directives –XRF screening test and Wet Chemical Testing (Lead, Cadmium, Mercury, Hexavalent Chromium, PBBs & PBDEs content)

Pass

Signed for and on behalf of

BACL

Checked by:

May Chen Engineer Approved by:

Lance Lee Lab vice-Manager

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Result:

A. RoHS Directive 2011/65/EU and its amendment directives

XRF screening test

<u>Test method:</u> With reference to IEC62321-3-1:2013 screening by X-ray Fluorescence Spectroscopy (XRF).

Seq.	· I I I I I I I I I I I I I I I I I I I			Result		
No.	rested Part(s)	Pb	Cd	Hg	Cr	Br
1	Silvery metal (screw , parts)	BL	BL	BL	BL	
2	Silvery metal (big screw , parts)	BL	BL	BL	BL	
3	Black plated silvery metal (screw , parts)	BL	BL	BL	BL	
4	Black printed white paper (label , parts)	BL	BL	BL	BL	BL
5	Black plastic (wheel , parts)	BL	BL	BL	BL	BL
6	White plastic (connector , wire , parts)	BL	BL	BL	BL	BL
7	Silvery metal (pin , connector , wire , parts)	BL	BL	BL	BL	
8	Black soft plastic (wire jacket , parts)	BL	BL	BL	BL	BL
9	Silvery metal (wire , parts)	BL	BL	BL	BL	
10*	Black plated silvery metal (long screw)	BL	BL	BL	Х	
11	Black plastic (base)	BL	BL	BL	BL	BL
12	Black plastic (cover)	BL	BL	BL	BL	BL
13* ¹	Coppery metal (nut , cover)	OL	BL	BL	BL	
14*	Silvery metal (outer track , bearing , cover)	BL	BL	BL	Х	
15*	Silvery metal (inside track , bearing , cover)	BL	BL	BL	Х	
16	Silvery metal (ball , bearing , cover)	BL	BL	BL	BL	
17*	Silvery metal (ball holder , bearing , cover)	BL	BL	BL	Х	
18* ¹	Coppery metal (small gear)	OL	BL	BL	BL	
19*	Dark silvery metal (small gear)	Х	BL	BL	BL	
20*	Coppery metal (middle gear)	Х	BL	BL	BL	

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Seq.	To stad Davida	Result							
No.	Tested Part(s)	Pb	Cd	Hg	Cr	Br			
21*	Dark silvery metal (middle gear)	Χ	BL	BL	BL	1			
22	Silvery metal (transfer gear)	BL	BL	BL	BL				
23*	Dark silvery metal (transfer gear)	Х	BL	BL	BL				
24* ¹	Coppery metal (big gear)	OL	BL	BL	BL				
25*	Silvery metal (outer track , bearing , big gear)	BL	BL	BL	Х				
26*	Silvery metal (inside track , bearing , big gear)	BL	BL	BL	Х				
27*	Silvery metal (ball , bearing , big gear)	BL	BL	BL	Х				
28*	Silvery metal (ball holder , bearing , big gear)	BL	BL	BL	Х				
29*	Silvery metal (long shaft , middle gear)	BL	BL	BL	Х				
30*	Silvery metal (short shaft , small gear)	BL	BL	BL	Х				
31*	Black plastic (case)	BL	BL	BL	BL	Х			
32	Silvery metal (screw , case)	BL	BL	BL	BL				
33* ¹	Coppery metal (nut , case)	OL	BL	BL	BL				
34	Silvery metal (big screw , case)	BL	BL	BL	BL				
35	Black plastic (cover , switch)	BL	BL	BL	BL	BL			
36	Golden metal (contact plate , switch)	BL	BL	BL	BL				
37	Grey plastic (switch)	BL	BL	BL	BL	BL			
38	Black coated brown plastic (base , switch)	BL	BL	BL	BL	BL			
39	Silvery metal (pin , base , switch)	BL	BL	BL	BL				
40	Silvery solder (pin , base , switch)	BL	BL	BL	BL				

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Seq.	Tosted Part(a)	Result						
No.	Tested Part(s)	Pb	Cd	Hg	Cr	Br		
41	Red soft plastic (wire jacket , PCB)	BL	BL	BL	BL	BL		
42	Silvery metal (wire , PCB)	BL	BL	BL	BL			
43	White plastic (connector , small PCB)	BL	BL	BL	BL	BL		
44*	Black plastic (connector , small PCB)	BL	BL	BL	BL	Х		
45	Silvery metal (pin , connector , small PCB)	BL	BL	BL	BL			
46*	Green coated brown plastic with coppery metal (small PCB)	BL	BL	BL	BL	Х		
47	Silvery solder (small PCB)	BL	BL	BL	BL			
48	Brown body (SMD capacitor , PCB)	BL	BL	BL	BL	BL		
49	Black / white body (SMD resistor , PCB)	BL	BL	BL	BL	BL		
50	Silvery body (crystal oscillator , PCB)	BL	BL	BL	BL	BL		
51	Black body (SMD triode , PCB)	BL	BL	BL	BL	BL		
52	Black body (IC "HL004" , PCB)	BL	BL	BL	BL	BL		
53	Black body (IC "C25R" , PCB)	BL	BL	BL	BL	BL		
54	Black body (IC "4606", PCB)	BL	BL	BL	BL	BL		
55	Green coated brown plastic with coppery metal (PCB)	BL	BL	BL	BL	BL		
56	Silvery solder (PCB)	BL	BL	BL	BL			
57* ¹	Coppery metal (gear , motor)	OL	BL	BL	BL			
58	Silvery metal (case , motor)	BL	BL	BL	BL			
59	Coppery metal (bearing , case , motor)	BL	BL	BL	BL			
60	Black magnet (motor)	BL	BL	BL	BL			

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Seq.			Result							
No.	rested Part(s)	Pb	Cd	Hg	Cr	Br				
61	Silvery metal (base , motor)	BL	BL	BL	BL					
62	White plastic (base , motor)	BL	BL	BL	BL	BL				
63	Silvery metal (brush , motor)	BL	BL	BL	BL					
64	White fabric (brush , motor)	BL	BL	BL	BL	BL				
65	Silvery metal (pin , motor)	BL	BL	BL	BL					
66	Silvery solder (pin , motor)	BL	BL	BL	BL					
67	Coppery metal (bearing , base , motor)	BL	BL	BL	BL					
68	White plastic (ring , shaft , motor)	BL	BL	BL	BL	BL				
69	White plastic (base , connector , shaft , motor)	BL	BL	BL	BL	BL				
70	Silvery metal (contact plate , connector , shaft , motor)	BL	BL	BL	BL	-				
71	Grey ceramic (ring , connector , shaft , motor)	BL	BL	BL	BL	1				
72	Silvery solder (ring , connector , shaft , motor)	BL	BL	BL	BL	1				
73	Coppery metal (coil , motor)	BL	BL	BL	BL					
74	Silvery metal (plate , motor)	BL	BL	BL	BL					
75	Green plastic (cover , plate , motor)	BL	BL	BL	BL	BL				
76	Black glue (cover , plate , motor)	BL	BL	BL	BL	BL				
77	Green plastic (ring , shaft , motor)	BL	BL	BL	BL	BL				
78	Coppery metal (ring , shaft , motor)	BL	BL	BL	BL					
79*	Silvery metal (shaft , motor)	BL	BL	BL	Х					

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Note:

-- = Not Applicable

* = Screening by XRF and detected by chemical method. The test Results of chemical method please refer to next pages.

*1 = As claimed by the material declaration submitted by the client, the materials of the sample No. 13, 18, 24, 33, 57 are copper alloy. And according to RoHS directive 2011/65/EU and its amendments, Lead is exempted as an alloying element in Copper containing up to 4% (40000ppm) by weight.

Remark:

i Result 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 IEC62321-3-1:2013.

Element	Unit Polymers		Metal	Composite Material
Cd	ma/ka	BL≤70-3σ <x< td=""><td>BL≤70-3σ<x< td=""><td>BL≤50-3σ<x< td=""></x<></td></x<></td></x<>	BL≤70-3σ <x< td=""><td>BL≤50-3σ<x< td=""></x<></td></x<>	BL≤50-3σ <x< td=""></x<>
Cd mg/kg		<130+3σ≤OL	<130+3σ≤OL	<150+3σ≤OL
Pb	ma/ka	BL≤700-3σ <x< td=""><td>BL≤700-3σ<x< td=""><td>BL≤500-3σ<x< td=""></x<></td></x<></td></x<>	BL≤700-3σ <x< td=""><td>BL≤500-3σ<x< td=""></x<></td></x<>	BL≤500-3σ <x< td=""></x<>
Pb mg/kg	<1300+3σ≤OL	<1300+3σ≤OL	<1500+3σ≤OL	
Цα	ma/ka	BL≤700-3σ <x< td=""><td>BL≤700-3σ<x< td=""><td>BL≤500-3σ<x< td=""></x<></td></x<></td></x<>	BL≤700-3σ <x< td=""><td>BL≤500-3σ<x< td=""></x<></td></x<>	BL≤500-3σ <x< td=""></x<>
Hg	mg/kg	<1300+3σ≤OL	<1300+3σ≤OL	<1500+3σ≤OL
Cr	mg/kg	BL≤700-3σ <x< td=""><td>BL≤700-3σ<x< td=""><td>BL≤500-3σ<x< td=""></x<></td></x<></td></x<>	BL≤700-3σ <x< td=""><td>BL≤500-3σ<x< td=""></x<></td></x<>	BL≤500-3σ <x< td=""></x<>
Br	mg/kg	BL≤300-3σ <x< td=""><td></td><td>BL≤250-3σ<x< td=""></x<></td></x<>		BL≤250-3σ <x< td=""></x<>

Note:

BL = Below Limit
OL = Over Limit

IN / X = Inconclusive (questionable, need further chemical analysis)

- ii The XRF screening test for RoHS elements The reading may be different to the actual content in the sample be of non-uniformity composition.
- iii The maximum permissible limit is quoted from the RoHS directive 2011/65/EU:

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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
Polybrominated diphenylethers (PBDEs)	1000

Disclaimers:

This XRF Screening report is for reference purposes only. 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.

The result 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.

Wet Chemical Testing:

The Test Result of Chemical Method:

Test method:

Lead Content:

With reference to IEC62321-5:2013, by acid digestion and analysis was performed by inductively coupled plasma atomic emission spectrometer (ICP-AES) or Atomic Absorption Spectrometry (AAS).

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).

PBBs & PBDEs Content:

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

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1) The test Result of Pb

Item	l lmit	MDI		Res	sult		Limit
	Unit	MDL	(19) ^{*3}	(20) ^{*2}	(21) ^{*3}	(23) ^{*3}	Limit
Lead Content (Pb)	mg/kg	10	2830	32552	3203	2791	1000
Conclusion	1	1	Pass	Pass	Pass	Pass	1

2) The test Result of Cr (VI)

Item	MDL		Re	sult		Limit
	IVIDE	(10)	(14)	(15)	(17)	Lillin
Hexavalent Chromium (Cr (VI))	**	Negative	Negative	Negative	Negative	#
Conclusion	1	Pass	Pass	Pass	Pass	1

Itom	MDL		Re	sult		Limit	
Item	MIDE	(25)	(26)	(27)	(28)	Limit	
Hexavalent Chromium (Cr (VI))	**	Negative	Negative	Negative	Negative	#	
Conclusion	1	Pass	Pass	Pass	Pass	1	

ltom	MDL		Result		Limit
Item	MIDE	(29)	(30)	(79)	Limit
Hexavalent Chromium (Cr (VI))	**	Negative	Negative	Negative	#
Conclusion	1	Pass	Pass	Pass	1
	•	*******	**********	*****	•

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Note:

- Negative = Absence of Cr(VI) on the tested areas
- MDL = Method Detection Limit
 - ** = Spot-test:

Negative = Absence of Cr(VI) coating/ surface layer, Positive = Presence of Cr(VI) coating/ surface layer; (The tested sample should be further verified by boiling-water-extraction method if the spot test result cannot be confirmed)

Boiling-water-extraction:

Negative = Absence of Cr(VI) coating/ surface layer, Positive = Presence of Cr(VI) coating/ surface layer; The detected concentration in boiling- water-extraction solution is equal or greater than 0.02 mg/kg with $50cm^2$ sample surface areas.

For corrosion protection coatings on metals: Information on storage conditions and production date of the tested sample is unavailable and thus Result of Cr(VI) represent status of the sample at the time of testing. # =

Positive indicates the presence of Cr(VI) on the tested areas and result be regarded as conflict with RoHS requirement.

Negative indicates the absence of Cr(VI) on the tested areas and result be regarded as no conflict with RoHS requirement.

=As claimed by the material declaration submitted by the client, the material of the sample No. 20 is copper alloy. And according to RoHS directive 2011/65/EU and its amendments, Lead is exempted as an alloying element in Copper containing up to 4% (40000ppm) by weight.

As claimed by the material declaration submitted by the client, the materials of the sample No. 19, 21, 23 are steel. And according to RoHS directive 2011/65/EU and its amendments, Lead as an alloying element in steel for machining purposes and in galvanised steel containing up to 0,35 % lead by weight.

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3) The test Result of PBBs & PBDEs

ltom	l lmi4	MDI			Limit	
ltem	Unit	MDL	(31)	(44)	(46)	Limit
Polybrominated Biphenyls (PBBs)						
Monobromobiphenyl	mg/kg	5	<5	<5	<5	1
Dibromobiphenyl	mg/kg	5	<5	<5	<5	1
Tribromobiphenyl	mg/kg	5	<5	<5	<5	1
Tetrabromobiphenyl	mg/kg	5	<5	<5	<5	1
Pentabromobiphenyl	mg/kg	5	<5	<5	<5	1
Hexabromobiphenyl	mg/kg	5	<5	<5	<5	1
Heptabromobiphenyl	mg/kg	5	<5	<5	<5	1
Octabromobiphenyl	mg/kg	5	<5	<5	<5	1
Nonabromodiphenyl	mg/kg	5	<5	<5	<5	1
Decabromodiphenyl	mg/kg	5	<5	<5	<5	1
Total content	mg/kg	1	1	1	/	1000
Polybrominated Diphenylethers (PBDEs)(Mon-Deca)						
Monobromodiphenyl ether	mg/kg	5	<5	<5	<5	1
Dibromodiphenyl ether	mg/kg	5	<5	<5	<5	1
Tribromodiphenyl ether	mg/kg	5	<5	<5	<5	1
Tetrabromodiphenyl ether	mg/kg	5	<5	<5	<5	1
Pentabromodiphenyl ether	mg/kg	5	<5	<5	<5	1
Hexabromodiphenyl ether	mg/kg	5	<5	<5	<5	1
Heptabromodiphenyl ether	mg/kg	5	<5	<5	<5	1
Octabromodiphenyl ether	mg/kg	5	<5	<5	<5	1
Nonabromodiphenyl ether	mg/kg	5	<5	<5	<5	1
Decabromodiphenyl ether	mg/kg	5	<5	<5	<5	1
Total content	mg/kg	1	1	1	/	1000
Conclusion	1	1	Pass	Pass	Pass	1

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Note:

- <=Less than</p>
- MDL = Method Detection Limit
- The Result less than MDL are not taken into account while calculating the sum contents.
- Photo appendix is included.

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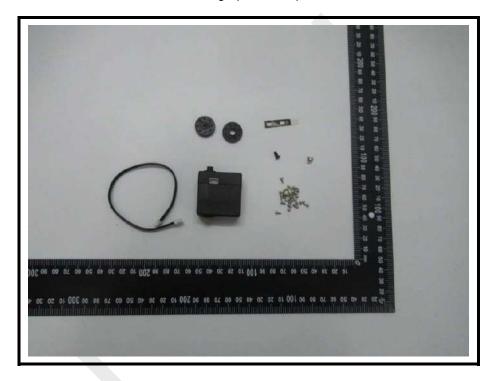
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Appendix

Photograph of Sample



BACL authenticate the photo on original report only

*** End of Report ***

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