

# CPST

## Test Report

No. C160907030003

Date: Sep 14, 2016

Page 1 of 11

Dragino Technology Co., Limited

Room 7009, Zi'An Commercial Building, Qian Jin 1 Road. Xin'An 6th District, Bao'an District ; Shenzhen 518101,China

The following samples were submitted and identified on behalf of the clients as

Sample Name: Lora Shield  
CPST Internal Reference No.: C160907030  
Sample Received Date: Sep 07, 2016  
Test Period: Sep 07, 2016 to Sep 14, 2016  
Test Method: Please refer to next pages  
Test Result: Please refer to next pages

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**CONCLUSION :**

<u>TESTED SAMPLES</u>	<u>TEST ITEM</u>	<u>RESULT</u>
Lora Shield	1. Lead, Cadmium, Mercury, Hexavalent Chromium, PBBs and PBDEs Content — RoHS Directive 2011/65/EU Annex II	<b>PASS</b>

\*\*\*\*\*



Signed for and on behalf of  
Euronex Consumer Products Testing Service Co., Ltd

TESTED BY :

*Andy Wang*

Wang Guang Yu, Anndy  
Project Leader

REVIEWED BY:

*Cheryl Li*

Li Hui Lian, Cheryl  
Laboratory Supervisor

APPROVED BY:

*Will Pan*

Pan Jian Ding, Will  
Technical Supervisor

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400 111 6218

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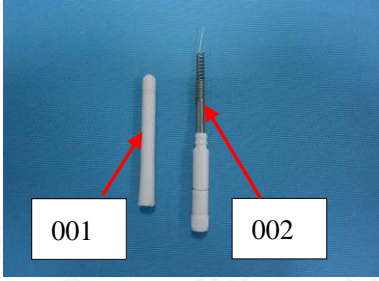
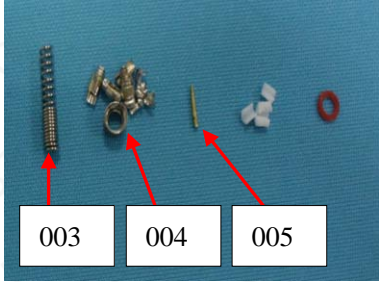
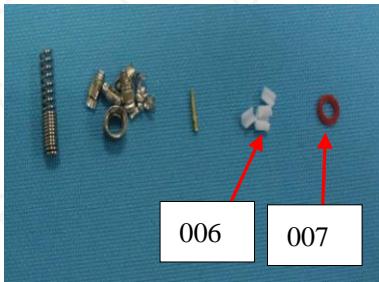

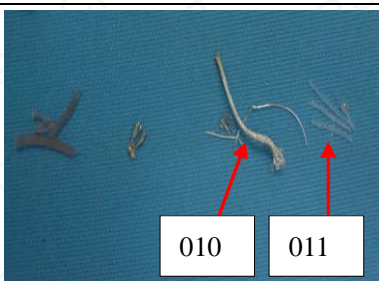
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3/F., Huafeng Building, No.77, Hetian Avenue, Houjie, Dongguan, Guangdong, China.

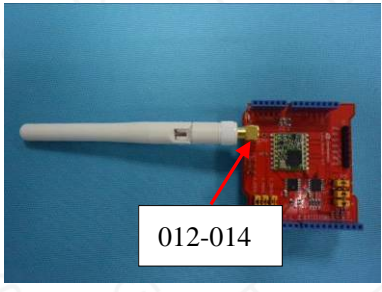
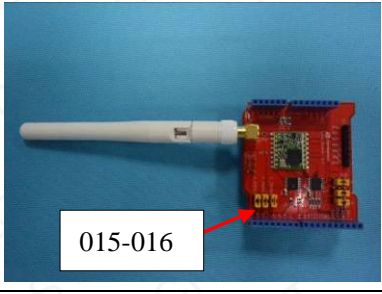
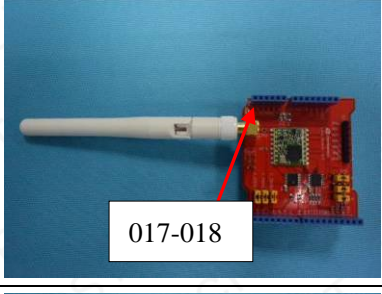
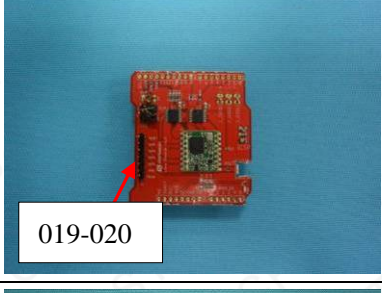
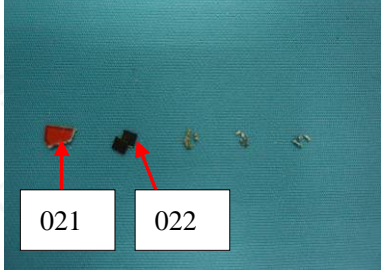
Postcode: 523945

E-mail: [service@cpstlab.com](mailto:service@cpstlab.com)

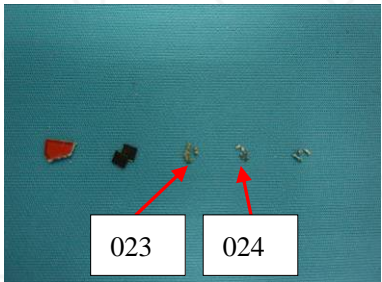
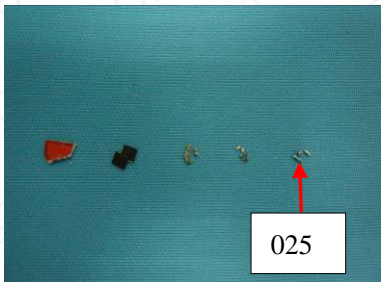
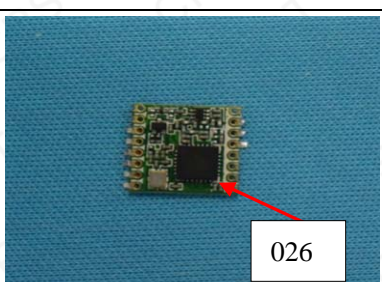

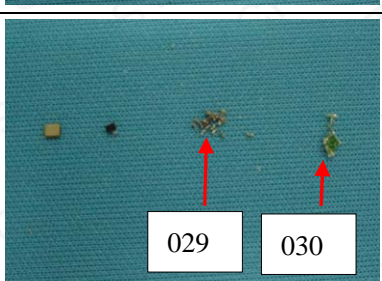
### Test Item Description And Photo List

Sample No.	Description	Photograph
001	White plastic shell	
002	Silvery metal tube	
003	Silvery metal spring	
004	Silvery metal	
005	Golden metal contact pin	
006	White plastic	
007	Red rubber ring	
008	Translucent plastic jacket	
009	Silvery metal solder	
010	Silvery metal wire	
011	Transparent plastic jacket	

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Sample No.	Description	Photograph
012	Copper metal	
013	Copper metal pin	
014	White plastic	
015	Yellow plastic	
016	Silvery metal	
017	Yellow plastic	
018	Copper metal contact pin	
019	Black plastic	
020	Silvery metal contact pin	
021	Red PCB	
022	Resists packs(U1,U2)	

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Sample No.	Description	Photograph
023	Chip resistor (C1,C4,C6,C8)	
024	Chip resistor (R2,R3,R4,R5)	
025	Silvery metal solder	
026	Black ceramic	
027	Silvery chip resistor	
028	Black ceramic	
029	Chip resistor	
030	Green PCB	

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### Test Results

#### Screening test for the specified hazardous substances of RoHS for the selected materials of the submitted sample:

- Heavy Metal (Cadmium, Chromium, Mercury, Lead) Content Test
- Bromine Content Test

According to IEC 62321:2013, and Quantification analyzed with Energy Dispersive X-ray Fluorescence Spectrometers.

Sample No.	Total Cadmium	Total Lead	Total Mercury	Total Chromium	Total Bromine
Sample 001	BL	BL	BL	BL	BL
Sample 002	BL	BL	BL	BL	N.A.
Sample 003	BL	BL	BL	BL	N.A.
Sample 004	BL	BL	BL	BL	N.A.
Sample 005	BL	OL <sup>^</sup>	BL	BL	N.A.
Sample 006	BL	BL	BL	BL	BL
Sample 007	BL	BL	BL	BL	BL
Sample 008	BL	BL	BL	BL	BL
Sample 009	BL	BL	BL	BL	N.A.
Sample 010	BL	BL	BL	BL	N.A.
Sample 011	BL	BL	BL	BL	BL
Sample 012	BL	OL <sup>^</sup>	BL	BL	N.A.
Sample 013	BL	OL <sup>^</sup>	BL	BL	N.A.
Sample 014	BL	BL	BL	BL	BL
Sample 015	BL	BL	BL	BL	Inconclusive <sup>^</sup>
Sample 016	BL	BL	BL	BL	N.A.
Sample 017	BL	BL	BL	BL	Inconclusive <sup>^</sup>
Sample 018	BL	BL	BL	BL	N.A.
Sample 019	BL	BL	BL	BL	Inconclusive <sup>^</sup>
Sample 020	BL	BL	BL	BL	N.A.
Sample 021	BL	BL	BL	BL	BL
Sample 022	BL	BL	BL	BL	BL
Sample 023	BL	BL	BL	BL	Inconclusive <sup>^</sup>
Sample 024	BL	BL	BL	Inconclusive <sup>^</sup>	BL

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Sample No.	Total Cadmium	Total Lead	Total Mercury	Total Chromium	Total Bromine
Sample 025	BL	BL	BL	BL	N.A.
Sample 026	BL	BL	BL	BL	BL
Sample 027	BL	BL	BL	BL	BL
Sample 028	BL	BL	BL	BL	BL
Sample 029	BL	BL	BL	BL	BL
Sample 030	BL	BL	BL	BL	Inconclusive <sup>^</sup>

Note:

1. All Concentrations express in "mg/kg" (milligram per kilogram), mg/kg ~ ppm
2. "OL" denotes "over limit"
3. "BL" denotes "below limit"
4. "N.A." denotes "Not Applicable"
5. "Inconclusive" denotes result is intermediate between "OL" and "BL"
6. "<sup>^</sup>" denotes the screening result was inconclusive(X) or over limit (OL), thus further confirmation test was conducted, results are listed in 3.2 and 3.3.
7. "φ" denotes as the information (the submitted sample is electronic ceramic part) provided by the client, when Lead in electronic ceramic parts is exempted from RoHS Directive 2011/65/EU Annex III.

XRF screening limits for different materials:

Materials	Concentration (mg/kg)				
	Cd	Cr	Pb	Hg	Br
<b>Metal</b>	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	N.A.
<b>Polymers</b>	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (300-3\sigma) < X$
<b>Composite material</b>	$BL \leq (50-3\sigma) < X < (150+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$	$BL \leq (250-3\sigma) < X$

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### 3.2 Test for Heavy Metals

– Lead, Cadmium, Hexavalent Chromium and Mercury Tests according to IEC 62321-4:2013 & IEC 62321-5:2013 & IEC 62321-7-1:2015& IEC 62321:2008.

Element	Total Cadmium [mg/kg]	Total Lead [mg/kg]	Total Mercury [mg/kg]	Hexavalent Chromium [-]	Hexavalent Chromium [mg/kg]
Detection Limit	5	5	5	Δ	5
RoHS Requirements	100	1000	1000	#	1000
Sample 005	/	29481Φ	/	/	/
Sample 012	/	18049Φ	/	/	/
Sample 013	/	27351Φ	/	/	/
Sample 024	/	/	/	/	N.D.

#### Note:

1. All Concentrations express in “mg/kg”(milligram per kilogram), mg/kg ~ ppm.
2. “N.D.” = “Not Detected”.
3. Boiling-water-extraction:  
Negative = Absence of Cr(VI) coating / surface layer: the detected concentration in boiling-water-extraction solution is less than 0.10μg with 1cm<sup>2</sup> sample surface area.  
Positive = Presence of Cr(VI) coating / surface layer: the detected concentration in boiling-water-extraction solution is greater than 0.13μg with 1cm<sup>2</sup> sample surface area.  
Inconclusive =the detected concentration in boiling-water-extraction solution is greater than 0.10μg and less than 0.13μg with 1cm<sup>2</sup> sample surface area.
4. # =Positive indicates the presence of CrVI on the tested areas.  
Negative indicates the absence of CrVI on the tested areas.
5. “-” =Not regulated
6. “Φ”=the sample 005, sample 012, sample 013 are copper alloy.The lead content which is under 4% is exempted from the requirement of directive 2011/65/EU (Rohs) .

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### 3.3 Test for Flame retardants

– Test Method: With reference to IEC 62321-6:2015, extracted by toluene and analyzed by Gas Chromatography and Mass Spectrometry (GC-MS). [Reporting Limit: 5mg/kg]

Test Item		Result [mg/kg]		RoHS Requirement [mg/kg]
		Sample 015	Sample 017	
PBBs	Monobromobiphenyl	< 5	< 5	Sum of PBBs < 1000
	Dibromobiphenyl	< 5	< 5	
	Tribromobiphenyl	< 5	< 5	
	Tetrabromobiphenyl	< 5	< 5	
	Pentabromobiphenyl	< 5	< 5	
	Hexabromobiphenyl	< 5	< 5	
	Heptabromobiphenyl	< 5	< 5	
	Octabromobiphenyl	< 5	< 5	
	Nonabromobiphenyl	< 5	< 5	
	Decabromobiphenyl	< 5	< 5	
	Sum of PBBs	< 5	< 5	
PBDEs	Monobromodiphenyl Ether	< 5	< 5	Sum of PBDEs < 1000
	Dibromodiphenyl Ether	< 5	< 5	
	Tribromodiphenyl Ether	< 5	< 5	
	Tetrabromodiphenyl Ether	< 5	< 5	
	Pentabromodiphenyl Ether	< 5	< 5	
	Hexabromodiphenyl Ether	< 5	< 5	
	Heptabromodiphenyl Ether	< 5	< 5	
	Octabromodiphenyl Ether	< 5	< 5	
	Nonabromodiphenyl Ether	< 5	< 5	
	Decabromodiphenyl Ether	< 5	< 5	
	Sum of PBDEs	< 5	< 5	

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Test Item		Result [mg/kg]		RoHS Requirement [mg/kg]
		Sample 019	Sample 023	
PBBs	Monobromobiphenyl	< 5	< 5	Sum of PBBs < 1000
	Dibromobiphenyl	< 5	< 5	
	Tribromobiphenyl	< 5	< 5	
	Tetrabromobiphenyl	< 5	< 5	
	Pentabromobiphenyl	< 5	< 5	
	Hexabromobiphenyl	< 5	< 5	
	Heptabromobiphenyl	< 5	< 5	
	Octabromobiphenyl	< 5	< 5	
	Nonabromobiphenyl	< 5	< 5	
	Decabromobiphenyl	< 5	< 5	
	Sum of PBBs	< 5	< 5	
PBDEs	Monobromodiphenyl Ether	< 5	< 5	Sum of PBDEs < 1000
	Dibromodiphenyl Ether	< 5	< 5	
	Tribromodiphenyl Ether	< 5	< 5	
	Tetrabromodiphenyl Ether	< 5	< 5	
	Pentabromodiphenyl Ether	< 5	< 5	
	Hexabromodiphenyl Ether	< 5	< 5	
	Heptabromodiphenyl Ether	< 5	< 5	
	Octabromodiphenyl Ether	< 5	< 5	
	Nonabromodiphenyl Ether	< 5	< 5	
	Decabromodiphenyl Ether	< 5	< 5	
	Sum of PBDEs	< 5	< 5	

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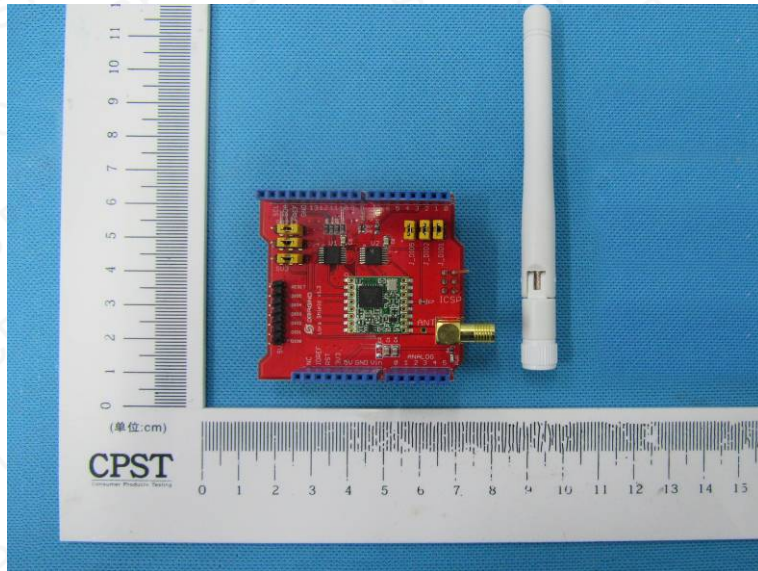
Test Item		Result [mg/kg]	RoHS Requirement [mg/kg]
		Sample 030	
PBBs	Monobromobiphenyl	< 5	Sum of PBBs < 1000
	Dibromobiphenyl	< 5	
	Tribromobiphenyl	< 5	
	Tetrabromobiphenyl	< 5	
	Pentabromobiphenyl	< 5	
	Hexabromobiphenyl	< 5	
	Heptabromobiphenyl	< 5	
	Octabromobiphenyl	< 5	
	Nonabromobiphenyl	< 5	
	Decabromobiphenyl	< 5	
	Sum of PBBs	< 5	
PBDEs	Monobromodiphenyl Ether	< 5	Sum of PBDEs < 1000
	Dibromodiphenyl Ether	< 5	
	Tribromodiphenyl Ether	< 5	
	Tetrabromodiphenyl Ether	< 5	
	Pentabromodiphenyl Ether	< 5	
	Hexabromodiphenyl Ether	< 5	
	Heptabromodiphenyl Ether	< 5	
	Octabromodiphenyl Ether	< 5	
	Nonabromodiphenyl Ether	< 5	
	Decabromodiphenyl Ether	< 5	
	Sum of PBDEs	< 5	

Note:

1. All Concentrations express in "mg/kg" (milligram per kilogram), mg/kg ~ ppm.
2. "<" denotes less than

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### Photo of the Submitted Sample



\*\*\* End of Report \*\*\*

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