

## Test Report

No. C210820060001-1B

Date: Sep 09, 2021

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Applicant: Suzhou Wavelink Electronics Technology Co., Ltd.

Applicant address: No. 15-101, D Building, No.88 Tongqiu Road, Zhangpu Town,Suzhou,Jiangsu

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

Sample Name: 4G Antenna  
Model: 4G Rubber Duck Antenna  
Model/Type reference: 4G PCB Antenna,4G FPC Antenna,4G Magnetic Antenna,4G Outdoor Antenna  
Manufacturer: Suzhou Wavelink Electronics Technology Co., Ltd.  
Manufacturer Address: No. 15-101, D Building, No.88 Tongqiu Road, Zhangpu Town,Suzhou,Jiangsu  
CPST Internal Reference No.: C210820060  
Sample Received Date: Aug 20, 2021  
Sample Quantity: 01 pc  
Test Period: Aug 20, 2021 to Sep 09, 2021  
Test Method: Please refer to next page(s).  
Test Result: Please refer to next page(s).

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



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# CPST

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### CONCLUSION :

<u>TESTED SAMPLES</u>	<u>TEST ITEM</u>	<u>RESULT</u>
4G Antenna	1.RoHS Directive 2011/65/EU Annex II amending Directive (EU)2015/863	
	— Lead, Cadmium, Mercury, Hexavalent Chromium, PBBs and PBDEs Content	<b>PASS</b>
	—Di-(2-ethylhexyl) phthalate(DEHP), Benzylbutyl phthalate(BBP), Dibutyl phthalate (DBP), Diisobutyl phthalate(DIBP) Content	<b>PASS</b>

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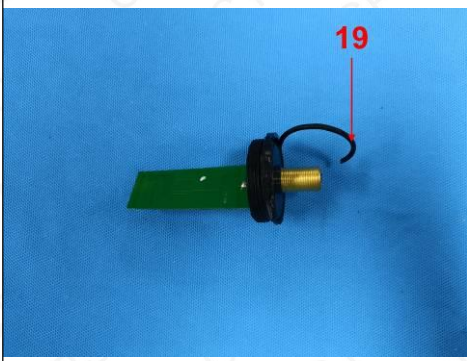
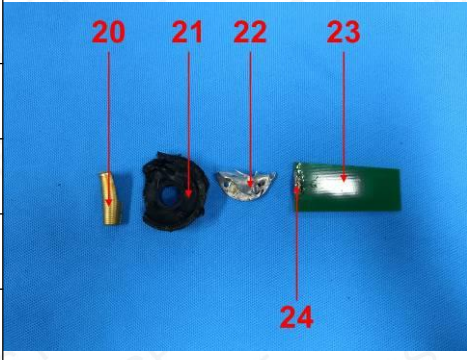

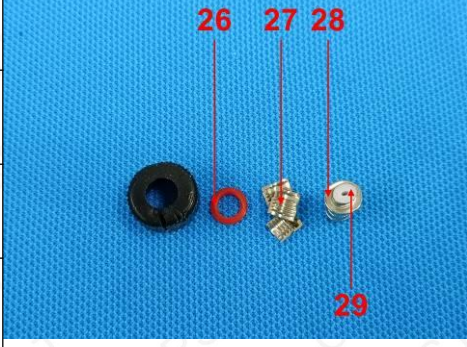
Eurones (Dongguan) Consumer Products Testing Service Co., Ltd. Tel: (86-769) 38937858 Fax: (86-769) 38937859 Http:// www.cpslab.com  
Room 1092, No.12, East of Houjie Avenue, Houjie, Dongguan, Guangdong, China Postcode: 523945 E-mail: service@cpslab.com



### 2. Test Item Description And Photo List

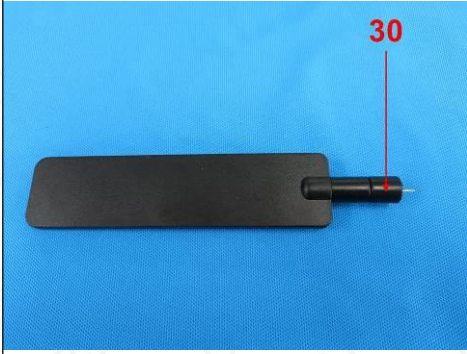

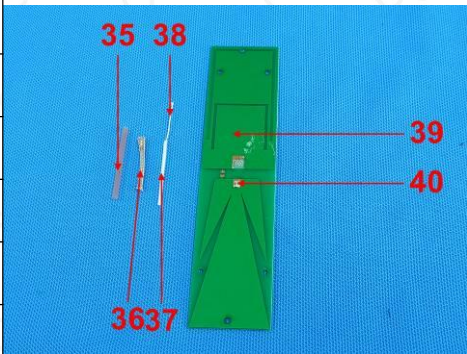

Sample No.	Description	Photograph	
001	Black soft plastic with white printing (casing)		
002	Golden metal		
003	Golden metal with silvery plating		
004	Silvery solder		
005	Golden metal		
006	Light red soft plastic		
007	Golden metal		
008	Golden metal		
009	White plastic		
010	Black soft plastic (cable jacket)		
011	Coppery metal		
012	Silvery foil		
013	Transparent soft plastic (wire jacket)		
014	Coppery metal (core)		
015	Black plastic		
016	Red plastic		
017	Silvery metal (gasket)		
018	Golden metal		

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Sample No.	Description	Photograph
019	Black soft plastic	
020	Golden metal	
021	Black plastic	
022	Silvery metal	
023	Green PCB	
024	Silvery solder	
025	Black plastic	
026	Gray soft plastic	
027	Golden metal with silvery plating	
028	Silvery metal	
029	White plastic	

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Sample No.	Description	Photograph
030	Black plastic	
031	Black plastic	
032	Black plastic	
033	Black plastic	
034	Golden metal	
035	Powder/transparent plastic (cable jacket)	
036	Silvery metal	
037	White plastic (wire jacket)	
038	Silvery metal (wire core)	
039	Green PCB	
040	Silvery solder	
041	Golden metal with black plating	

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Sample No.	Description	Photograph
042	Green/translucent soft plastic	
043	Black plastic	
044	Golden metal	
045	White plastic	
046	Silvery solder	
047	Golden metal	
048	Black soft plastic	
049	Black plastic	

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Sample No.	Description	Photograph
050	Black foam	
051	Double-sided tape	
052	Black soft plastic (tube)	
053	Silvery metal	
054	Brown soft plastic (cable jacket)	
055	Silvery metal	
056	Transparent soft plastic (wire jacket)	
057	Golden metal	
058	Silvery solder	
059	Silvery metal	
060	Black soft plastic (tube)	
061	Golden metal	

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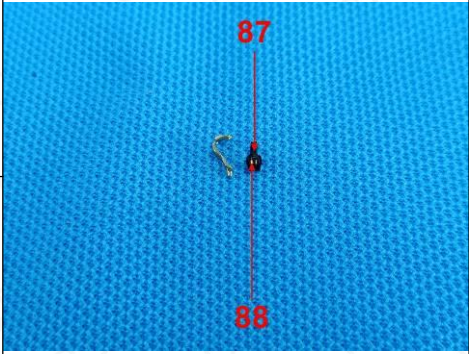
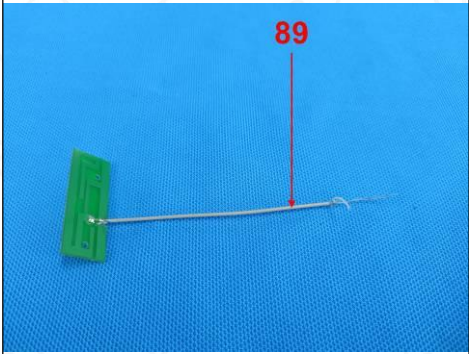
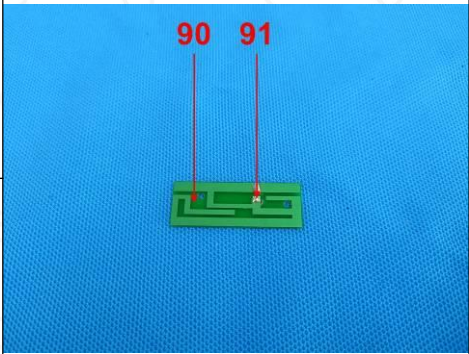

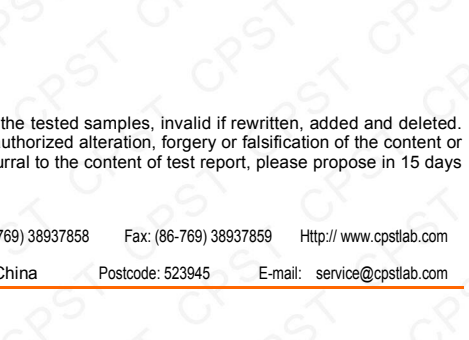
Sample No.	Description	Photograph
062	Red soft plastic	
063	Silvery metal	
064	Golden metal	
065	White plastic	
066	Golden metal	
067	Black soft plastic (cable jacket)	
068	Coppery metal	
069	Transparent soft plastic (wire jacket)	
070	Coppery metal (core)	
071	Black plastic	
072	White glue	
073	Silvery magnet	
074	Silvery metal	
075	Silvery metal	
076	Black plastic	
077	Silvery solder	
078	Golden metal	

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Sample No.	Description	Photograph
079	Black plastic	
080	Silvery metal with black plating	
081	Silvery metal with black plating	
082	Black soft plastic (cable jacket)	
083	Transparent soft plastic (wire jacket)	
084	Black FPC	
085	Silvery solder	
086	Golden metal	

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Sample No.	Description	Photograph
087	Black plastic	
088	Golden metal	
089	White soft plastic (wire jacket)	
090	Green PCB	
091	Silvery solder	

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### 3. Test Results

#### 3.1 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 62321-3-1:2013, 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	OL <sup>^</sup>	BL	BL	N.A.
Sample 003	BL	BL	BL	BL	N.A.
Sample 004	BL	OL <sup>^</sup>	BL	BL	N.A.
Sample 005	Inconclusive <sup>^</sup>	BL	BL	BL	N.A.
Sample 006	BL	BL	BL	BL	BL
Sample 007	BL	BL	BL	BL	N.A.
Sample 008	BL	OL <sup>^</sup>	BL	BL	N.A.
Sample 009	BL	BL	BL	BL	BL
Sample 010	BL	BL	BL	BL	BL
Sample 011	BL	BL	BL	BL	N.A.
Sample 012	BL	BL	BL	BL	BL
Sample 013	BL	BL	BL	BL	BL
Sample 014	BL	BL	BL	BL	N.A.
Sample 015	BL	BL	BL	BL	BL
Sample 016	BL	BL	BL	BL	BL
Sample 017	BL	BL	BL	BL	N.A.
Sample 018	BL	OL <sup>^</sup>	BL	BL	N.A.
Sample 019	BL	BL	BL	BL	BL
Sample 020	BL	OL <sup>^</sup>	BL	BL	N.A.
Sample 021	BL	BL	BL	BL	BL
Sample 022	BL	BL	BL	BL	N.A.
Sample 023	BL	BL	BL	BL	Inconclusive <sup>^</sup>
Sample 024	Inconclusive <sup>^</sup>	BL	BL	BL	N.A.
Sample 025	BL	BL	BL	BL	BL
Sample 026	BL	BL	BL	BL	BL

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Sample No.	Total Cadmium	Total Lead	Total Mercury	Total Chromium	Total Bromine
Sample 027	BL	OL <sup>^</sup>	BL	BL	N.A.
Sample 028	BL	BL	BL	BL	N.A.
Sample 029	BL	BL	BL	BL	BL
Sample 030	BL	BL	BL	BL	BL
Sample 031	BL	BL	BL	BL	BL
Sample 032	BL	BL	BL	BL	BL
Sample 033	BL	BL	BL	BL	BL
Sample 034	BL	BL	BL	BL	N.A.
Sample 035	BL	BL	BL	BL	BL
Sample 036	BL	BL	BL	BL	N.A.
Sample 037	BL	BL	BL	BL	BL
Sample 038	BL	BL	BL	BL	N.A.
Sample 039	BL	BL	BL	BL	BL
Sample 040	BL	BL	BL	BL	N.A.
Sample 041	BL	OL <sup>^</sup>	BL	BL	N.A.
Sample 042	BL	BL	BL	BL	BL
Sample 043	BL	BL	BL	BL	BL
Sample 044	BL	OL <sup>^</sup>	BL	BL	N.A.
Sample 045	BL	BL	BL	BL	BL
Sample 046	BL	BL	BL	BL	N.A.
Sample 047	BL	OL <sup>^</sup>	BL	BL	N.A.
Sample 048	BL	BL	BL	BL	BL
Sample 049	BL	BL	BL	BL	BL
Sample 050	BL	BL	BL	BL	BL
Sample 051	BL	BL	BL	BL	BL
Sample 052	BL	BL	BL	BL	BL
Sample 053	BL	BL	BL	BL	N.A.
Sample 054	BL	BL	BL	BL	BL
Sample 055	BL	BL	BL	BL	N.A.
Sample 056	BL	BL	BL	BL	BL
Sample 057	BL	OL <sup>^</sup>	BL	BL	N.A.
Sample 058	BL	BL	BL	BL	N.A.
Sample 059	BL	BL	BL	BL	N.A.
Sample 060	BL	BL	BL	BL	BL
Sample 061	BL	OL <sup>^</sup>	BL	BL	N.A.

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Sample No.	Total Cadmium	Total Lead	Total Mercury	Total Chromium	Total Bromine
Sample 062	BL	BL	BL	BL	BL
Sample 063	BL	BL	BL	BL	N.A.
Sample 064	BL	OL <sup>^</sup>	BL	BL	N.A.
Sample 065	BL	BL	BL	BL	BL
Sample 066	BL	OL <sup>^</sup>	BL	BL	N.A.
Sample 067	BL	BL	BL	BL	BL
Sample 068	BL	BL	BL	BL	N.A.
Sample 069	BL	BL	BL	BL	BL
Sample 070	BL	BL	BL	BL	N.A.
Sample 071	BL	BL	BL	BL	BL
Sample 072	BL	BL	BL	BL	BL
Sample 073	BL	BL	BL	BL	BL
Sample 074	BL	BL	BL	BL	N.A.
Sample 075	BL	BL	BL	BL	N.A.
Sample 076	BL	BL	BL	BL	BL
Sample 077	BL	Inconclusive <sup>^</sup>	BL	BL	N.A.
Sample 078	BL	OL <sup>^</sup>	BL	BL	N.A.
Sample 079	BL	BL	BL	BL	BL
Sample 080	BL	BL	BL	BL	N.A.
Sample 081	BL	BL	BL	BL	N.A.
Sample 082	BL	BL	BL	BL	BL
Sample 083	BL	BL	BL	BL	BL
Sample 084	BL	BL	BL	BL	BL
Sample 085	BL	BL	BL	BL	N.A.
Sample 086	BL	BL	BL	BL	N.A.
Sample 087	BL	BL	BL	BL	BL
Sample 088	BL	BL	BL	BL	N.A.
Sample 089	BL	BL	BL	BL	BL
Sample 090	BL	BL	BL	BL	Inconclusive <sup>^</sup>
Sample 091	Inconclusive <sup>^</sup>	BL	BL	BL	N.A.

**Note:**

1. All Concentrations express in “mg/kg” (milligram per kilogram), mg/kg ~ ppm
2. “OL” denotes “over limit”
3. “BL” denotes “below limit”

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4. "N.A." denotes "Not Applicable"
5. "Inconclusive" denotes result is intermediate between "OL" and "BL"
6. "^" 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.

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+A1:2017 & IEC 62321-5:2013 & IEC 62321-7-1:2015 & IEC 62321-7-2:2017, Analysis was conducted by ICP-OES, UV-VIS.

Element	Total Cadmium [mg/kg]	Total Lead [mg/kg]	Total Mercury [mg/kg]	Hexavalent Chromium [ $\mu\text{g}/\text{cm}^2$ ]	Hexavalent Chromium [mg/kg]
<b>Detection Limit</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>0.10</b>	<b>5</b>
<b>Limit</b>	<b>100</b>	<b>1000</b>	<b>1000</b>	<b>0.10</b>	<b>1000</b>
Sample 002	/	25915Φ	/	/	/
Sample 004	/	N.D.*	/	/	/
Sample 005	N.D.	/	/	/	/
Sample 008	/	27544Φ	/	/	/
Sample 018	/	26633Φ	/	/	/
Sample 020	/	10215Φ	/	/	/
Sample 024	N.D.	/	/	/	/
Sample 027	/	25796Φ	/	/	/
Sample 041	/	25762Φ	/	/	/
Sample 044	/	26962Φ	/	/	/
Sample 047	/	34902Φ	/	/	/
Sample 057	/	34636Φ	/	/	/
Sample 061	/	27336Φ	/	/	/
Sample 064	/	32017Φ	/	/	/
Sample 066	/	27397Φ	/	/	/
Sample 077	/	178	/	/	/
Sample 078	/	32982Φ	/	/	/
Sample 091	N.D.	/	/	/	/

#### Note:

- All Concentrations express in “mg/kg”(milligram per kilogram), mg/kg ~ ppm.
- “N.D.” = “Not Detected”.
- Boiling-water-extraction:
  - Negative = Absence of Cr(VI) coating / surface layer: the detected concentration in boiling-water-extraction solution is less than 0.10 $\mu\text{g}$  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 0.13 $\mu\text{g}$  with 1cm<sup>2</sup> sample surface area.
  - Inconclusive = the detected concentration in boiling-water-extraction solution is greater than 0.10 $\mu\text{g}$  and less than 0.13 $\mu\text{g}$  with 1cm<sup>2</sup> sample surface area.
- Positive = result be regarded as not comply with RoHS requirement  
Negative = result be regarded as comply with RoHS requirement
- “-” =Not regulated

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Date: Sep 09, 2021

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6. "Φ"= the sample 002,the sample 008, sample 018, sample 020, sample 027, sample 041, sample 044, sample 047, sample 057, sample 061, sample 064, sample 066, sample 078 are copper alloy.The lead content which is under 4% is exempted from the requirement of directive 2011/65/EU(RoHS)Annex III 6(c).

7. "\*"=The sample of test item was resubmitted by the customer on Sep 07, 2021.

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E-mail: service@cpstlab.com



### 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 023	Sample 090	
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	

Note:

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

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### 3.4 Di-(2-ethylhexyl) phthalate(DEHP), Benzylbutyl phthalate(BBP), Dibutyl phthalate (DBP), Diisobutyl phthalate (DIBP) Content—RoHS Directive 2011/65/EU Annex II amending Directive (EU)2015/863

Test method: According to IEC 62321-8:2017; Analysis was conducted by GC-MS&LC-MS#.

Element	Di-(2-ethylhexyl) phthalate (DEHP) [mg/kg]	Benzylbutyl phthalate (BBP) [mg/kg]	Dibutyl phthalate (DBP) [mg/kg]	Diisobutyl phthalate(DIBP) [mg/kg]
<b>Detection Limit</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>
<b>Limit</b>	<b>1000</b>	<b>1000</b>	<b>1000</b>	<b>1000</b>
Sample 001	N.D.	N.D.	N.D.	N.D.
Sample 006	N.D.	N.D.	N.D.	N.D.
Sample 009	N.D.	N.D.	N.D.	N.D.
Sample 010	N.D.	N.D.	N.D.	N.D.
Sample 012	N.D.	N.D.	N.D.	N.D.
Sample 013	N.D.	N.D.	N.D.	N.D.
Sample 015	N.D.	N.D.	N.D.	N.D.
Sample 016	N.D.	N.D.	N.D.	N.D.
Sample 019	N.D.	N.D.	N.D.	N.D.
Sample 021	N.D.	N.D.	N.D.	N.D.
Sample 023	N.D.	N.D.	N.D.	N.D.
Sample 025	N.D.	N.D.	N.D.	N.D.
Sample 026	N.D.	N.D.	N.D.	N.D.
Sample 029	N.D.	N.D.	N.D.	N.D.
Sample 030	N.D.	N.D.	N.D.	N.D.
Sample 031	N.D.	N.D.	N.D.	N.D.
Sample 032	N.D.	N.D.	N.D.	N.D.
Sample 033	N.D.	N.D.	N.D.	N.D.
Sample 035	N.D.	N.D.	N.D.	N.D.
Sample 037	N.D.	N.D.	N.D.	N.D.
Sample 039	N.D.	N.D.	N.D.	N.D.
Sample 042	N.D.	N.D.	N.D.	N.D.
Sample 043	N.D.	N.D.	N.D.	N.D.
Sample 045	N.D.	N.D.	N.D.	N.D.
Sample 048	N.D.	N.D.	N.D.	N.D.
Sample 049	N.D.	N.D.	N.D.	N.D.
Sample 050	N.D.	N.D.	N.D.	N.D.
Sample 051	190	N.D.	N.D.	N.D.
Sample 052	N.D.	N.D.	N.D.	N.D.

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Element	Di-(2-ethylhexyl) phthalate (DEHP) [mg/kg]	Benzylbutyl phthalate (BBP) [mg/kg]	Dibutyl phthalate (DBP) [mg/kg]	Diisobutyl phthalate(DIBP) [mg/kg]
<b>Detection Limit</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>
<b>Limit</b>	<b>1000</b>	<b>1000</b>	<b>1000</b>	<b>1000</b>
Sample 054	N.D.	N.D.	N.D.	N.D.
Sample 056	N.D.	N.D.	N.D.	N.D.
Sample 060	110	N.D.	N.D.	N.D.
Sample 062	N.D.	N.D.	N.D.	N.D.
Sample 065	N.D.	N.D.	N.D.	N.D.
Sample 067	150	N.D.	N.D.	N.D.
Sample 069	170	N.D.	N.D.	N.D.
Sample 071	N.D.	N.D.	N.D.	N.D.
Sample 072	N.D.	N.D.	N.D.	N.D.
Sample 073	N.D.	N.D.	N.D.	N.D.
Sample 076	N.D.	N.D.	N.D.	N.D.
Sample 079	N.D.	N.D.	N.D.	N.D.
Sample 082	N.D.	N.D.	N.D.	N.D.
Sample 083	N.D.	N.D.	N.D.	N.D.
Sample 084	N.D.	N.D.	N.D.	N.D.
Sample 087	N.D.	N.D.	N.D.	N.D.
Sample 089	N.D.	N.D.	N.D.	N.D.
Sample 090	N.D.	N.D.	N.D.	N.D.

Note:

1. All Concentrations express in "mg/kg"(milligram per kilogram), mg/kg ~ ppm.
2. "N.D." = "Not Detected".
3. "#" LC-MS is not authorized by CNAS.

Declaration: Report C210820060001-1A was repealed and replaced by Report C210820060001-1B.

Remark: As specified by applicant, to test content in the selected materials of the submitted samples. The test results are only responsible for the submitted sample. The test report is only for customer research, teaching, internal quality control, product development and other purposes, for reference only.

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### Photo of the Submitted Sample



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

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