CPST

Test Report

No. C160907030001 Date: Sep 14, 2016 Page 1 of 17

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 GPS 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

****

CONCLUSION :

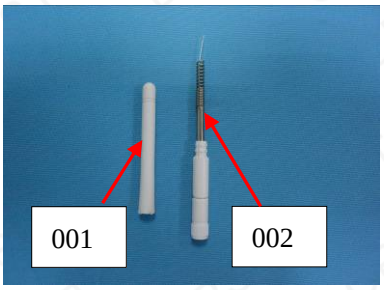
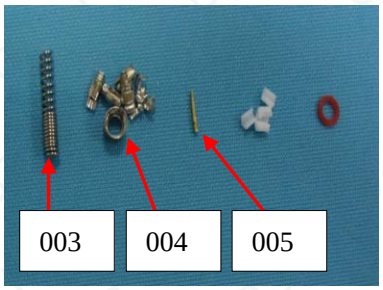
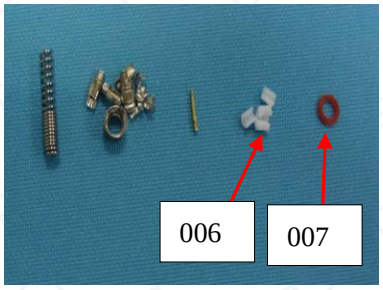
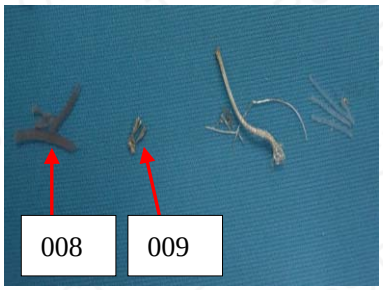
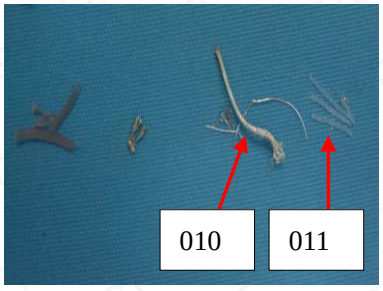
TESTED SAMPLES	TEST ITEM	RESULT
Lora GPS Shield	1. Lead, Cadmium, Mercury, Hexavalent Chromium, PBBs and PBDEs Content — RoHS Directive 2011/65/EU Annex II	**PASS**

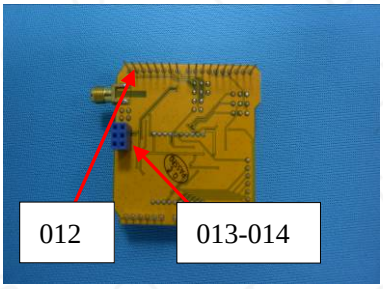
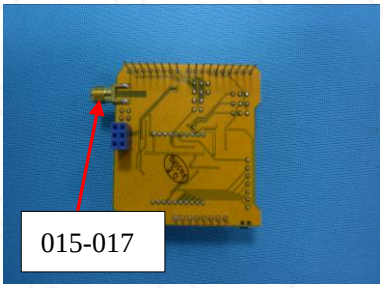
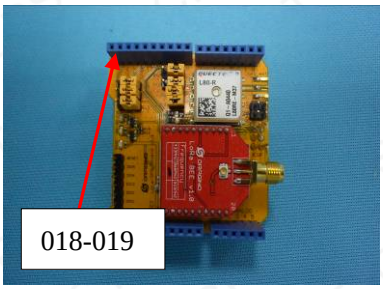
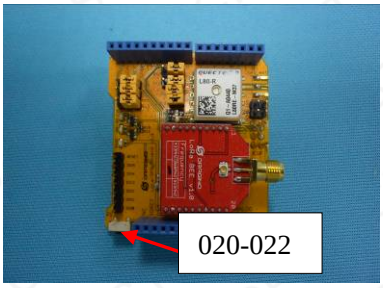
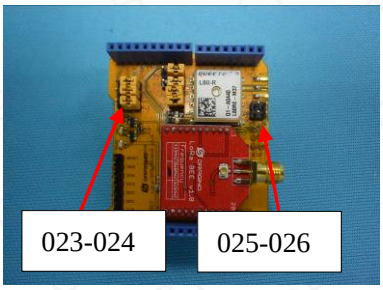
****

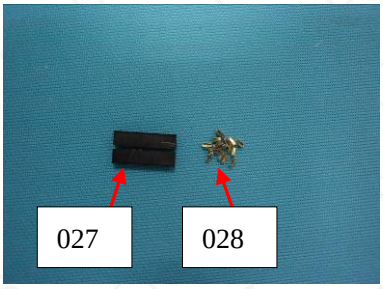
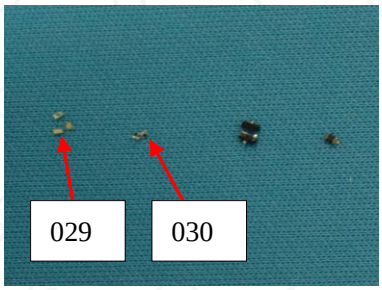
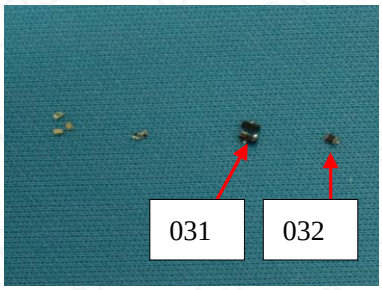
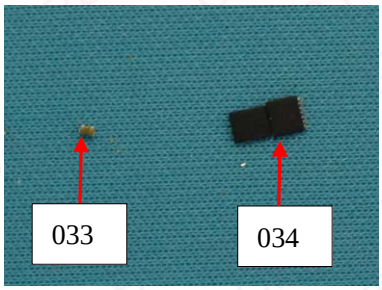
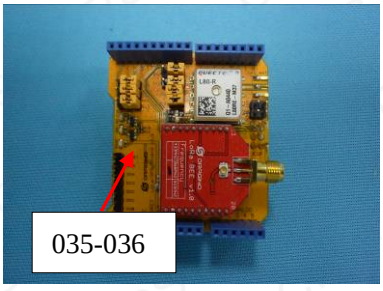
Signed for and on behalf of
Eurones Consumer Products Testing Service Co., Ltd

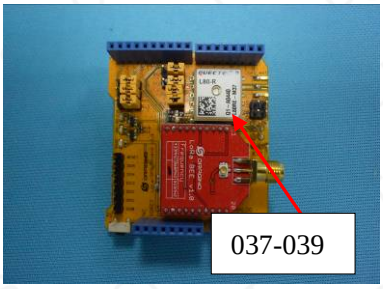
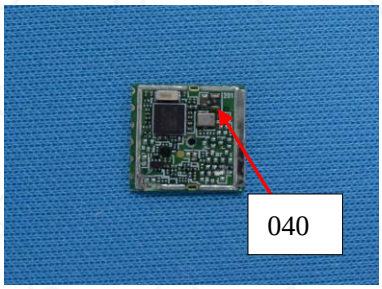
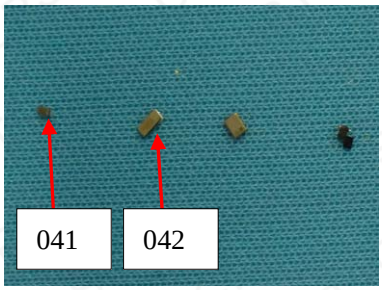
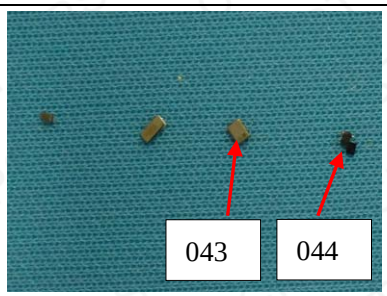
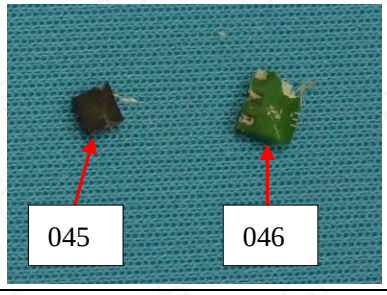
TESTED BY :	REVIEWED BY:	APPROVED BY:
Andy Wang	Chery Li	Will Pan
Wang Guang Yu, Anndy	Li Hui Lian, Cheryl	Pan Jian Ding, Will
Project Leader	Laboratory Supervisor	Technical Supervisor

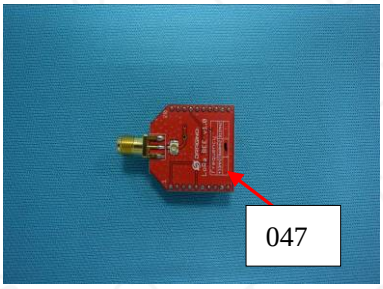
Test Item Description And Photo List

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

Sample No.	Description	Photograph
012	Copper metal contact pin	
013	Blue plastic	
014	Copper metal contact pin	
015	Copper metal	
016	Copper metal pin	
017	White plastic	
018	Blue plastic	
019	Copper metal contact pin	
020	Silvery metal thin sheet	
021	Black plastic	
022	Beige plastic	
023	Yellow plastic	
024	Silvery metal	
025	Black plastic	
026	Silvery metal contact pin	

Sample No.	Description	Photograph
027	Black plastic	
028	Silvery metal	
029	LED lamp	
030	Chip resistor(R6,R12,R9,R10,R11)	
031	Chip resistor (T1,T2)	
032	Chip resistor (L1)	
033	Chip resistor (C1)	
034	Resisters packs(U1,U2)	
035	Silvery metal solder	
036	PCB	

Sample No.	Description	Photograph
037	Label	
038	Beige ceramic	
039	Silvery metal sheet	
040	Black chip resistor	
041	Brown chip resistor	
042	Silvery chip resistor	
043	Silvery chip resistor	
044	Black ceramic	
045	Black ceramic pieces	
046	Green PCB	

Sample No.	Description	Photograph
047	Red PCB	

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^	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	BL	BL	BL	N.A.
Sample 013	BL	BL	BL	BL	Inconclusive^
Sample 014	BL	BL	BL	BL	N.A.
Sample 015	BL	OL^	BL	BL	N.A.
Sample 016	BL	OL^	BL	BL	N.A.
Sample 017	BL	BL	BL	BL	BL
Sample 018	BL	BL	BL	BL	Inconclusive^
Sample 019	BL	BL	BL	BL	N.A.
Sample 020	BL	BL	BL	BL	N.A.
Sample 021	BL	BL	BL	BL	Inconclusive^
Sample 022	BL	BL	BL	BL	BL
Sample 023	BL	BL	BL	BL	Inconclusive^
Sample 024	BL	BL	BL	BL	N.A.

Sample No.	Total Cadmium	Total Lead	Total Mercury	Total Chromium	Total Bromine
Sample 025	BL	BL	BL	BL	Inconclusive^
Sample 026	BL	BL	BL	BL	N.A.
Sample 027	BL	BL	BL	BL	Inconclusive^
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	Inconclusive^
Sample 035	BL	BL	BL	BL	N.A.
Sample 036	BL	BL	BL	BL	Inconclusive^
Sample 037	BL	BL	BL	BL	BL
Sample 038	BL	BL	BL	BL	BL
Sample 039	BL	BL	BL	BL	N.A.
Sample 040	BL	BL	BL	BL	BL
Sample 041	BL	BL	BL	BL	BL
Sample 042	BL	BL	BL	Inconclusive^	Inconclusive^
Sample 043	BL	BL	BL	BL	BL
Sample 044	BL	BL	BL	BL	BL
Sample 045	BL	BL	BL	BL	Inconclusive^
Sample 046	BL	BL	BL	BL	Inconclusive^
Sample 047	BL	BL	BL	BL	Inconclusive^

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. “^”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
Metal	BL≤(70-3σ)<X<(130+3σ)≤OL	BL≤(700-3σ)<X	BL≤(700-3σ)<X<(1300+3σ)≤OL	BL≤(700-3σ)<X<(1300+3σ)≤OL	N.A.
Polymers	BL≤(70-3σ)<X<(130+3σ)≤OL	BL≤(700-3σ)<X	BL≤(700-3σ)<X<(1300+3σ)≤OL	BL≤(700-3σ)<X<(1300+3σ)≤OL	BL≤(300-3σ)<X
Composite material	BL≤(50-3σ)<X<(150+3σ)≤OL	BL≤(500-3σ)<X	BL≤(500-3σ)<X<(1500+3σ)≤OL	BL≤(500-3σ)<X<(1500+3σ)≤OL	BL≤(250-3σ)<X

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 015	/	39472Φ	/	/	/
Sample 016	/	37478Φ	/	/	/
Sample 042	/	/	/	/	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 1cm2 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 1cm2 sample surface area.
   Inconclusive =the detected concentration in boiling-water-extraction solution is greater than 0.10μg and less than 0.13μg with 1cm2 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 015, sample 016 are copper alloy.The lead content which is under 4% is exempted from the requirement of directive 2011/65/EU（Rohs）.

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 013	Sample 018	
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	

Test Item		Result [mg/kg]		RoHS Requirement [mg/kg]
		Sample 021	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	

Test Item		Result [mg/kg]		RoHS Requirement [mg/kg]
		Sample 025	Sample 027	
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	

Test Item		Result [mg/kg]		RoHS Requirement [mg/kg]
		Sample 034	Sample 036	
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	

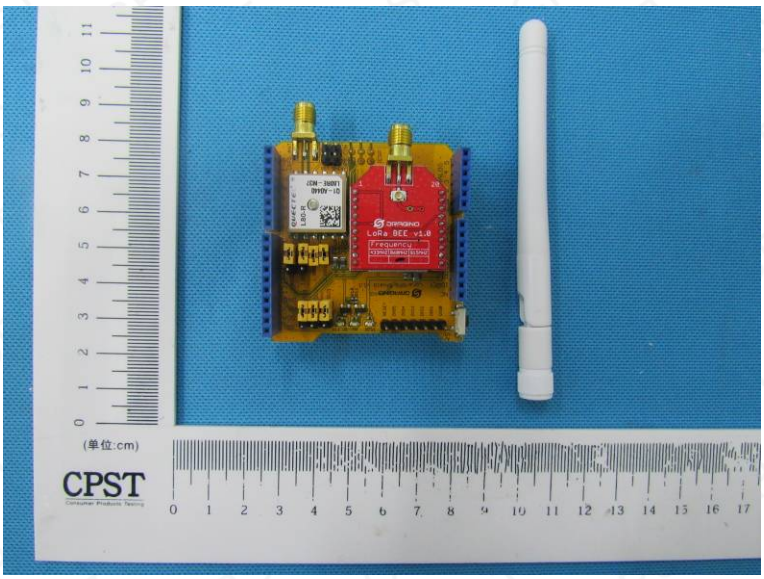
Test Item		Result [mg/kg]		RoHS Requirement [mg/kg]
		Sample 042	Sample 045	
PBBs	Monobromobiphenyl	< 5	< 5	Sum of PBBs < 1000
	Dibromobiphenyl	< 5	< 5	
	Tribromobiphenyl	< 5	< 5	
	Tetrabromobiphenyl	< 5	< 5	
	Pentabromobiphenyl	< 5	< 5	
	Hexabromobiphenyl	< 5	< 5	
	Heptabromobiphenyl	< 5	< 5	
	Octabromobiphenyl	< 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	

Test Item		Result [mg/kg]		RoHS Requirement [mg/kg]
		Sample 046	Sample 047	
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

Photo of the Submitted Sample



*** End of Report ***