



CONSUMER PRODUCTS SERVICES DIVISION

## TECHNO SOURCE

<b>Technical Report:</b>	<b>(5211)147-0742</b>	June 28, 2011
Date Received:	May 30, 2011	Page 1 of 7
Sample Description:	20Q ASSORTMENT 1. ) PINK 2. ) BLUE 3. ) RED	
Vendor:	N/A	Sample Size: 3
Manufacturer:	On File	Style No(s): 1060 / 1065 / 1089
Buyer:	N/A	SKN/SKU No.: N/A
Labeled Age Grade:	NOT PRESENT	PO No.: N/A
Appropriate Age Grade:	NOT REQUESTED	Ref #: N/A
Client Specified Age Grade:	6+	Country of Origin: NO INFORMATION
Tested Age Grade:	OVER 6 YEARS OF AGE	Assortment No.: 1061 & 1066 & 1086 (RED COLOR) 1062 & 1067 & 1087 (BLUE COLOR) 1063 & 1068 & 1088 (PINK COLOR)
UPC Code:	N/A	

### EXECUTIVE SUMMARY:

The sample(s) MEET the following requirement(s):

- The heavy metals and flame retardants content requirements of the European Communities 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

BUREAU VERITAS HONG KONG LIMITED

Lai Ka Yan, Margaret  
Manager  
Chemical Department

ML/bh



**RESULTS:**

**TEST RESULT**

**Restriction of Hazardous Substances Directive (RoHS), 2002/95/EC**

Test Item	Description	Location	Style	Test Result (ppm)					Conclusion
				Pb	Hg	Cd	Cr VI	PBBs & PBDEs	
1	Pink / black / white coated clear pink plastics	Logo & word	1	<100	<100	<50	<100	<200	PASS
2	Dull pink plastics	Buttons , switch , body & inner body	1	<100	<100	<50	<100	<200	PASS
3	Light red / black / white coated clear red plastics	Logo & word	2	<100	<100	<50	<100	<200	PASS
4	Red plastics	Buttons , switch , body & inner body	2	<100	<100	<50	<100	<200	PASS
5	Light blue / black / white coated clear blue plastics	Logo & word	2	<100	<100	<50	<100	<200	PASS
6	Deep blue plastics	Buttons , switch , body & inner body	3	<100	<100	<50	<100	<200	PASS
7	Silvery metal screws	Body	1-3	<200	<200	<50	<200	NA	PASS
8	Silvery metal screws	Battery compartment	1-3	<200	<200	<50	<200	NA	PASS
9	Clear plastic loop	Battery compartment	1-3	<100	<100	<50	<100	<200	PASS
10	Silvery metal plates	Battery compartment	1-3	<200	<200	<50	<200	NA	PASS
11	Silvery metal spring	Battery compartment	1-3	<200	<200	<50	<200	NA	PASS
12	Silvery solder	Battery compartment	1-3	<200	<200	<50	<200	NA	PASS
13	Silvery metal nut	Battery compartment	1-3	<200	<200	<50	<200	NA	PASS
14	Silvery metal screws	Speaker	1-3	<200	<200	<50	<200	NA	PASS
15	Silvery metal screw	Nut cover	1-3	<200	<200	<50	<200	NA	PASS
16	Silvery metal screws	Battery box	1-3	<200	<200	<50	<200	NA	PASS
17	Silvery metal screws	PCB	1-3	<200	<200	<50	<200	NA	PASS
18	White coated clear plastics	Inner body	1-3	<100	<100	<50	<100	<200	PASS
19	Dull clear plastics	Screen	1-3	<100	<100	<50	<100	<200	PASS
20	Bright clear glass	Screen	1-3	<200	<200	<50	<200	NA	PASS
21	Grey / black foam	Screen	1-3	<100	<100	<50	<100	<200	PASS
22	Clear black plastic films	Screen	1-3	<100	<100	<50	<100	<200	PASS
23	Silver / clear / black plastic film	Screen	1-3	<100	<100	<50	<100	<200	PASS
24	Deep green plastics	Speaker	1-3	<100	<100	<50	<100	80*	PASS
25	Black magnet	Speaker	1-3	<100	<100	<50	<100	<200	PASS
26	Silvery metal	Speaker	1-3	<200	<200	<50	<200	NA	PASS



**RESULTS:**

**TEST RESULT**

**Restriction of Hazardous Substances Directive (RoHS), 2002/95/EC**

Test Item	Description	Location	Style	Test Result (ppm)					Conclusion
				Pb	Hg	Cd	Cr VI	PBBs & PBDEs	
27	Clear plastic film / yellow glue	Speaker	1-3	<100	<100	<50	<100	<200	PASS
28	Coppery metal wire	Speaker	1-3	<200	<200	<50	<200	NA	PASS
29	Green coated white PCB	Speaker	1-3	<100	<100	<50	<100	<500*	PASS
30	Silvery solder	Speaker	1-3	<200	<200	<50	<200	NA	PASS
31	Black glue	Speaker	1-3	<100	<100	<50	<100	<500*	PASS
32	White printed black PVC wire jacket	Wire	1-3	<100	<100	<50	<100	<200	PASS
33	Black printed red PVC wire jacket	Wire	1-3	<100	<100	<50	<100	<200	PASS
34	Black printed orange PVC wire jacket	Wire	1-3	<100	<100	<50	<100	<200	PASS
35	Black printed green PVC wire jacket	Wire	1-3	<100	<100	<50	<100	<200	PASS
36	Black printed yellow PVC wire jacket	wires	1-3	<100	<100	<50	<100	<200	PASS
37	Coppery metal wire	wires	1-3	<200	<200	<50	<200	NA	PASS
38	Green / white coated light brown PCB	Sub PCB	1-3	<100	<100	<50	<100	<200	PASS
39	Silvery solder	Sub PCB	1-3	<200	<200	<50	<200	NA	PASS
40	Green / black / white coated matt white PCB	Main PCB	1-3	<100	<100	<50	<100	<200	PASS
41	Silvery solder	Main PCB	1-3	<200	<200	<50	<200	NA	PASS
42	Black paste with die	IC on main PCB	1-3	<200	<200	<50	<200	<200	PASS
43	Clear plastic adhesive tape	Main PCB	1-3	<100	<100	<50	<100	<200	PASS
44	Silvery metal plates	Contact plates on main PCB	1-3	<200	<200	<50	Negative	NA	PASS
45	Black plastics	Slide switch on sub PCB	1-3	<100	<100	<50	<100	<200	PASS
46	Silvery metal case	Slide switch on sub PCB	1-3	<200	<200	<50	<200	NA	PASS
47	Silvery plated golden metal clip	Slide switch on sub PCB	1-3	<200	<200	<50	<200	NA	PASS
48	Red coated light brown plastics	Slide switch on sub PCB	1-3	<100	<100	<50	<100	<200	PASS
49	Silvery plated golden metal pins	Slide switch on sub PCB	1-3	<200	<200	<50	<200	NA	PASS
50	White printed milky green plastic sleeve	Capacitor on main PCB	1-3	<100	<100	<50	<100	<200	PASS



**RESULTS:**

**TEST RESULT**

**Restriction of Hazardous Substances Directive (RoHS), 2002/95/EC**

Test Item	Description	Location	Style	Test Result (ppm)					Conclusion
				Pb	Hg	Cd	Cr VI	PBBs & PBDEs	
51	White printed green plastic sleeve	Capacitor on main PCB	1-3	<100	<100	<50	<100	<200	PASS
52	Black / red printed clear glass / silvery metal	Chip diode on main PCB	1-3	>1500 <sup>#</sup>	<200	<50	<200	<200	EXEMPTED <sup>#</sup>
53	Brown printed black body with silvery metal	Chip transistors on main PCB	1-3	<200	<200	<50	<200	<500*	PASS
54	Black printed white body with silvery metal	Chip resistors on main PCB	1-3	>1500 <sup>#</sup>	<200	<50	<10*	<200	EXEMPTED <sup>#</sup>
55	Black printed white body with silvery metal	Chip jumper on main PCB	1-3	>1500 <sup>#</sup>	<200	<50	<10*	<200	EXEMPTED <sup>#</sup>
56	Beige body with silvery metal	Chip capacitors on main PCB	1-3	<200	<200	<50	<200	<200	PASS
57	Light brown body with silvery metal	Chip capacitors on main PCB	1-3	<200	<200	<50	<200	<200	PASS
58	Clear plastics / white body with silvery metal	Chip diodes (D1,3,4& 6) on main PCB	1-3	<200	<200	<50	<200	<200	PASS
59	Clear plastics	LED on main PCB	1-3	<100	<100	<50	<100	<500*	PASS
60	Silvery metal pins	LED on main PCB	1-3	<200	<200	<50	<200	NA	PASS

For item 52, 54, 55:

<sup>#</sup>According to the directive 2010/571/EC, 2005/717/EC and 2005/747/EC, the annex of 2002/95/EC was amended and Clause 7c-1 is reiterated here "Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound)." The sample as received was claimed by the client to be glass, therefore, this material containing the found heavy metals level should be exempted.



**RESULTS:**

**TEST RESULT**

**Restriction of Hazardous Substances Directive (RoHS), 2002/95/EC**

**Remark:**

1. NA = Not Applicable;  
 ND = Not Detected, below the detection limit (See Note 1 & 2);  
 < = less than; > = greater than; ppm = mg/kg
2. Test results marked with \* are determined by wet chemistry. Others are screened by XRF.
3. For XRF screening, the reported Chromium VI result is determined as total chromium, and Polybrominated Biphenyls (PBBs) and Polybrominated Diphenyl Ethers (PBDEs) results are determined as total bromine.
4. For Chromium VI of a metal composite sample by wet chemistry, each individual metal component was tested.
5. Positive means the presence of hexavalent chromium on the tested areas and it is regarded as in conflict with RoHS requirements. According to the IEC 62321, the principle of this method was evaluated and supported by two studies organized by IEC TC111 WG3. The studies were focused on detecting the presence of Cr(VI) in metallic samples.
6. Only selected example(s) is / are indicated on the above photograph(s)

**Note:**

1. Detection limits (in ppm) of XRF for regulated substances in various matrices.

Elements	Plastics	Metals	Electronics
Lead (Pb)	100	200	200
Mercury (Hg)	100	200	200
Cadmium (Cd)	50	50	50
Chromium (Cr)	100	200	200
Bromine (Br)	200	NA	200

2. Detection limits of Wet Chemistry for the six regulated substances.

Elements	Detection Limit (ppm)
Lead (Pb)	10
Mercury (Hg)	10
Cadmium (Cd)	10
Chromium VI (CrVI)	10
Polybrominated Biphenyls (PBBs): <i>Bromobiphenyls</i> <i>Dibromobiphenyls</i> <i>Tribromobiphenyls</i> <i>Tetrabromobiphenyls</i> <i>Pentabromobiphenyls</i> <i>Hexabromobiphenyls</i> <i>Heptabromobiphenyls</i> <i>Octabromobiphenyls</i> <i>Nonabromobiphenyls</i> <i>Decabromobiphenyl</i>	25 (each)
Polybrominated Diphenyl Ethers (PBDEs): <i>Bromodiphenyl ethers</i> <i>Dibromodiphenyl ethers</i> <i>Tribromodiphenyl ethers</i> <i>Tetrabromodiphenyl ethers</i> <i>Pentabromodiphenyl ethers</i> <i>Hexabromodiphenyl ethers</i> <i>Heptabromodiphenyl ethers</i> <i>Octabromodiphenyl ethers</i> <i>Nonabromodiphenyl ethers</i> <i>Decabromodiphenyl ether</i>	25 (each)



**RESULTS:**

**TEST RESULT**

**Restriction of Hazardous Substances Directive (RoHS), 2002/95/EC**

3. Limit of Restriction of Hazardous Substances Directive (RoHS), 2005/618/EC:

Elements	RoHS' Limit (ppm)
Lead (Pb)	1000
Mercury (Hg)	1000
Cadmium (Cd)	100
Chromium VI (CrVI)	1000
Polybrominated Biphenyls (PBBs)	1000
Polybrominated Diphenyl Ethers (PBDEs)	1000

**Test Method:**

1. XRF Screening - IEC 62321:2008, "Electrotechnical Products- Determination of Levels of Six Regulated Substances" (Chapter 6)
2. Wet Chemistry Tests – Reference to IEC 62321:2008, "Electrotechnical Products- Determination of Levels of Six Regulated Substances"
  - i. Lead (Pb) and Cadmium (Cd): The sample is comminuted and digested with acid mixtures. Pb/ Cd contents are determined with ICP-AES technique. (Chapter 8, 9 & 10)
  - ii. Mercury (Hg): The sample is comminuted and digested with acid mixtures. Hg content is determined with ICP-AES, ICP-MS or AAS-VGA technique. (Chapter 7)
  - iii. Chromium (VI) (Cr VI) :
    - a. Metal: Qualitative method for the presence of hexavalent chromium on metal surface on "Test for the presence of Hexavalent Chromium (Cr (VI)) in colourless and coloured corrosion-protection coatings on metals". The presence of hexavalent chromium is indicated by the formation of a red to violet color. The method is applied in turn to 1) untreated surface; 2) surface got by gently rubbing to scratch possibly reduced chromate surface but without completely removing the whole coating layer; 3) surface got by forcibly scratching into the deeper layers, even reaching the substrate. The sample is further verified by boiling water extraction method if the result of spot test shows ahead is negative or uncertain. (Annex B)
    - b. Plastics & Electronics : The sample is comminuted and digested with alkaline mixtures. Chromium VI content is determined with UV-VIS spectroscopic technique. (Annex C)
  - iv. PBBs and PBDEs: The sample is extracted by appropriate solvent and quantified by GC-MS. (Annex A)
3. The testing approach reference to:
  - i. "RoHS Enforcement Guidance Document version 1" by EU RoHS Enforcement Authorities Informal Network (May 2006),
  - ii. "RoHS Regulations – Government Guidance Notes" by Department of Trade and Industry, UK (Jan 2007), and
  - iii. "RoHS substances (Hg, Pb, Cr(VI), Cd, PBB and PBDE) in electrical and electronic equipment in Belgium" by Belgium Federal Public Service, Health, Food Chain Safety and Environment, Belgium (Nov 2005)

**RESULTS:**



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END