



We

Smartron Power Co., Ltd.
#210 #307 #308, 61, Ganam-ro, Seo-gu, Incheon,
Korea

DECLARE ON OUR SOLE RESPONSIBILITY THAT THE PRODUCT

KIND OF EQUIPMENT : LED CONVERTER

TYPE-DESIGNATION : SPLW600-48,

SPLW400-24, SPLW400-36, SPLW400-48, SPLW400-56, SPLW500-24, SPLW500-36,
SPLW500-48, SPLW500-56, SPLW600-24, SPLW600-36, SPLW600-56, SPLW400-24D,
SPLW400-36D, SPLW400-48D, SPLW400-56D, SPLW500-24D, SPLW500-36D,
SPLW500-48D, SPLW500-56D, SPLW600-24D, SPLW600-36D, SPLW600-48D,
SPLW600-56D, SPLW500-24, SPLW600-340, SPLW600-340D, SPLW700-380,
SPLW700-380D

This EC-Declaration of conformity is following the provisions of RoHS DIRECTIVE 2011/65/EU and 2015/863/EU.

It is confirmed that a sample of the product has been tested and found in conformity with below standard(s):

RoHS EN 50581: 2012
IEC 62321-3-1 : 2013
IEC 62321-8 : 2017

Detailed specification of the tested product shown in the following test report(s):

RoHS Test Report : CA19RoHS053

Date of issue : 2019 / 7 / 22

Authorized By : HY Lim (President)

Smartron Power Co., Ltd.
#210 #307 #308, 61, Ganam-ro, Seo-gu,
Incheon, Korea

RoHS TEST REPORT

European Directive 2011/65/EU, 2015/863/EU

Evaluation of RoHS Requirements for Electrical and Electronic Equipment

Test report No..... : CA19RoHS053
Date of receipt : Jun 14, 2019
Date of issue : Jul 19, 2019
Test of period : Jun 17 ~ Jul 18, 2019

Applicant's name : Smartron Power Co., Ltd.
Address..... : #210 #307 #308, 61, Ganam-ro, Seo-gu, Incheon, Korea
Manufacturer name : The same as above
Address..... : The same as above
Factory name : The same as above
Address..... : The same as above

Product name : LED CONVERTER
Basic Model..... : SPLW600-48
Multiple Model(s)..... : Refer to the page 8.

Test Specifications :
Directive..... : 2011/65/EU, 2015/863/EU
Test Standard(s)..... : EN 50581 : 2012, IEC 62321-3-1 : 2013, IEC 62321-8 : 2017
Type of Category..... : Category 5. Lighting equipment.

Test Result : The equipment which was evaluated has fulfilled with requirement of
2011/65/EU, 2015/863/EU Directive for the materials :
Pb, Cd, Hg, Cr(VI), PBBs, PBDEs, DEHP, BBP, DBP, DIBP
Final test result ; PASS

RoHS TEST REPORT

European Directive 2011/65/EU, 2015/863/EU

Evaluation of RoHS Requirements for Electrical and Electronic Equipment

Trade mark



This publication may be reproduced in whole or in part for non-commercial purpose according to the of applicant. Also it is not allowed to copy this report even partly without the allowance of publisher.

Also this publication represent for the evaluation results of the issued test item only - any type of EEE, i.e. full product, module assembly, component or material including RoHS test result.

The evaluation results means only the tested item is complied with RoHS requirement according to the evaluation procedures which is described in this publication.

Project Engineer : Jung-Hyuk, Choi

Project Reviewer : Myung-Lyul, Lee



INDEX

1. RoHS Compliance based on test reports.....	4
1.1. Review of component's test reports according to BOM.....	4
1.2. Review of verification test reports according to sampling.....	4
1.3. Requirements of test report.....	4
1.4. Other information.....	4
2. Attachment	
2.1. Appendix I - Photos of product.....	5
2.2. Appendix II - Test method & Lab information.....	7
2.3. Appendix III - Cd, Pb, Hg, Br, Cr Verification XRF test results.....	9
2.4. Appendix IV - Phthalates (DEHP, BBP, DBP, DIBP) evaluation.....	20
2.5. Appendix V - Phthalates Chemical test result.....	26
2.6. Appendix VI - Reference document.....	30

Clause	Requirement - Test	Result	Verdict
1	RoHS Compliance based on test reports		
1.1	Review of component's test reports according to BOM	Checked	P
1.1.1	Dose evaluated product is composed by components which is listed in BOM?	Checked	P
1.1.2	Dose each components is complied with the requirement of employed directive or manufacturer declared limits?	Checked	P
1.2	Review of verification test reports according to sampling	Checked	P
1.2.1	If it was performed the item 1.1, did sampling was performed in appropriate?	Refer to Appendix III	P
1.2.2	If it was not performed the item 1.1, did it was fully considered the materials of component and does it was performed the sampling which is enough to represent the characteristics of population?		N/A
1.2.3	Is it complied with the requirements of employed directive or manufacturer declares limits for sample tested?		P
1.3	Requirements of test report		P
1.3.1	Is it included the information of manufacturer, sample, test lab or etc?	Refer to Appendix II	P
1.3.2	Is it clearly specified the test object as the port of components or product?		P
1.3.3	Is it described the information of directive or standards of test methods?		P
1.3.4	Is it described the results with accurately for interpretation, using or etc?		P
1.3.5	Is it confirmed the validity of test equipment and information of calibration?		P
1.4	Other information		
	Directive 2011/65/EU Directive 2015/863/EU EN 50581 : 2012 IEC 62321-3-1 : 2013 IEC 62321-8 : 2017 EN 62474 : 2012 IEC/TR 62476 : 2010		

Appendix I Photos of product



Front view



Rear view

Appendix I

Photos of product



Inner view

Appendix II

Test method & Lab information

1. General

1.1 Employed standard : EN 50581 : 2012, IEC 62321-3-1 : 2013, IEC 62321-8 : 2017

1.2 Applied sampling criteria

- Kind of components could be disassembled mechanically by using disassembly tools
- High risk components

2. Laboratory Information

- Laboratory's Name : Kiwa Korea Ltd.
- Address : #411, SJ Technoville, 278, Beotkkot-ro, Geumcheon-gu, Seoul, Korea
- Facilities used : ED-XRF (EA1000AIII, HITACHI), GC-MS (Subcontracted lab used)

3. Product Remark

- Kiwa Korea Ltd. tested the LED CONVERTER which was selected by applicant.
- The model SPLW600-48 is the basic model that was tested.
- The multi model type configuration see the following information.

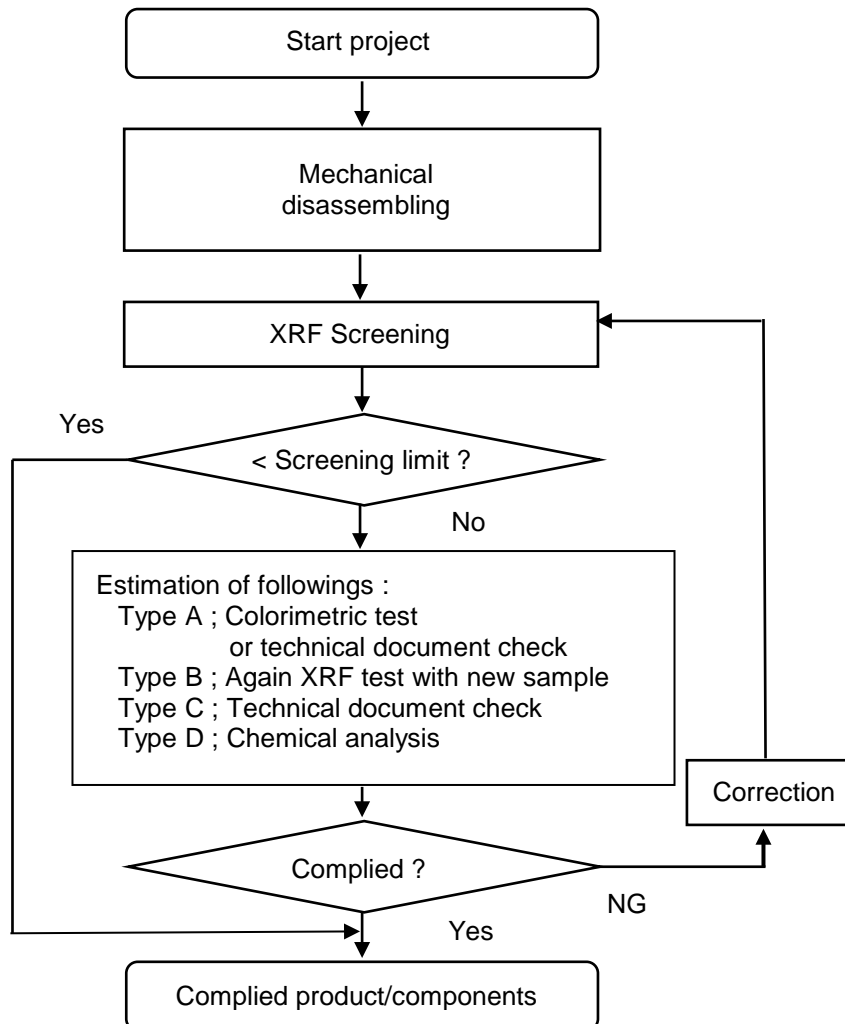
Appendix II

Test method & Lab information

4. The multi model type configuration

Basic model	Multi models
SPLW200-36	SPLW400-24, SPLW400-36, SPLW400-48, SPLW400-56, SPLW500-24,
	SPLW500-36, SPLW500-48, SPLW500-56, SPLW600-24, SPLW600-36,
	SPLW600-56, SPLW400-24D, SPLW400-36D, SPLW400-48D, SPLW400-56D,
	SPLW500-24D, SPLW500-36D, SPLW500-48D, SPLW500-56D, SPLW600-24D,
	SPLW600-36D, SPLW600-48D, SPLW600-56D, SPLW500-24, SPLW600-340,
	SPLW600-340D, SPLW700-380, SPLW700-380D

Appendix III Verification XRF Test Results



Note : 1. Basic acceptance criteria of XRF screening is IEC 62321-3-1 ; 2013 Annex A
(Screening limit refer to Appendix IV, 3 clause)

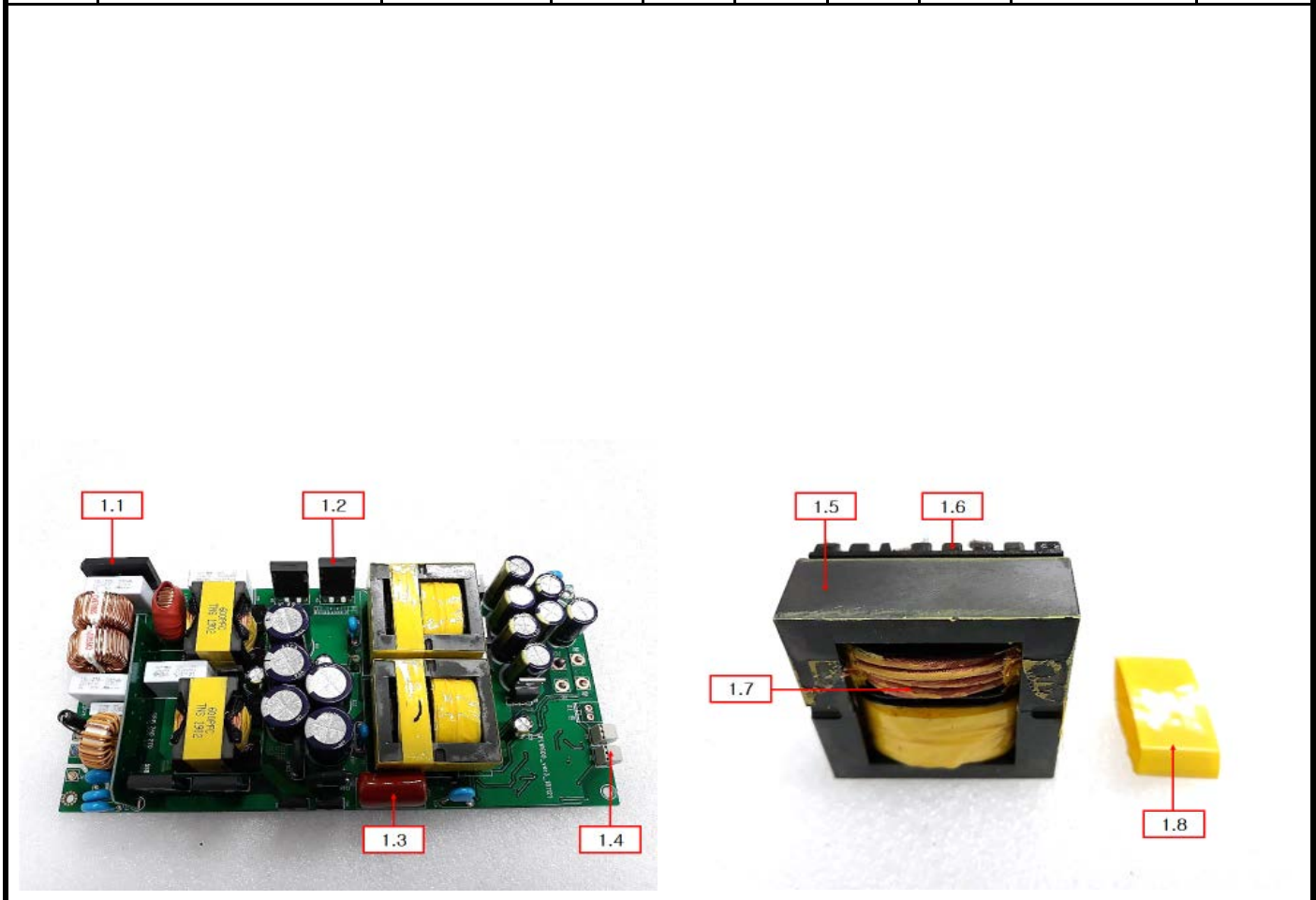
2. The additional investigation procedures are taken where doubtful test result for XRF screening

3. For maintaining product quality, the comparison and verification are required between analytical test reports and XRF screening results if possible

Appendix III

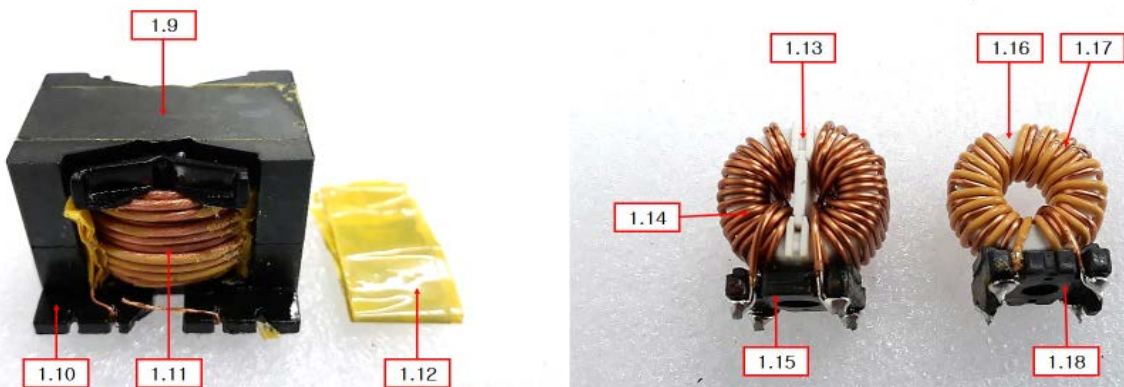
Verification XRF test results

No	Part name	Supplier	XRF Data (mg/kg)					Evaluation	Result
			Cd	Pb	Hg	Br	Cr		
1.1	BRIDGE DIODE	LRC	BL	BL	BL	6433	BL	Br - Type C	Pass
1.2	OSG60R092HF	ORIENTAL	BL	BL	BL	BL	BL	N.A.	Pass
1.3	BOX-CAP	DONGSUNG	BL	BL	BL	7179	BL	Br - Type C	Pass
1.4	VR	COPAL	BL	BL	BL	57904	BL	Br - Type C	Pass
1.5	TRANS	TNS KOREA	BL	BL	BL	N.A.	BL	N.A.	Pass
1.6			BL	BL	BL	BL	BL	N.A.	Pass
1.7			BL	BL	BL	N.A.	BL	N.A.	Pass
1.8			BL	BL	BL	BL	BL	N.A.	Pass



Appendix III Verification XRF test results

No	Part name	Supplier	XRF Data (mg/kg)					Evaluation	Result
			Cd	Pb	Hg	Br	Cr		
1.9	TRANS	TNS KOREA	BL	BL	BL	N.A.	BL	N.A.	Pass
1.10			BL	BL	BL	BL	BL	N.A.	Pass
1.11			BL	BL	BL	N.A.	BL	N.A.	Pass
1.12			BL	BL	BL	BL	BL	N.A.	Pass
1.13	FILTER COIL	TNC	BL	BL	BL	72882	BL	Br - Type C	Pass
1.14			BL	BL	BL	N.A.	BL	N.A.	Pass
1.15			BL	BL	BL	BL	BL	N.A.	Pass
1.16	FILTER COIL	TNC	BL	BL	BL	N.A.	BL	N.A.	Pass
1.17			BL	BL	BL	N.A.	BL	N.A.	Pass
1.18			BL	BL	BL	BL	BL	N.A.	Pass



Appendix III Verification XRF test results

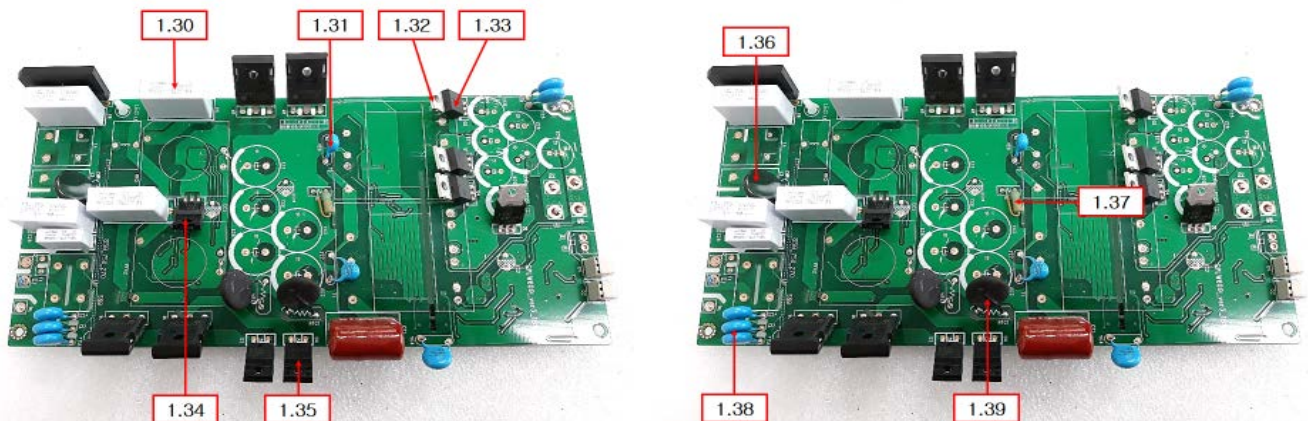
No	Part name	Supplier	XRF Data (mg/kg)					Evaluation	Result
			Cd	Pb	Hg	Br	Cr		
1.19	ELEC_CAP	SAMHWA	BL	BL	BL	BL	BL	N.A.	Pass
1.20			BL	BL	BL	N.A.	BL	N.A.	Pass
1.21			BL	BL	BL	BL	BL	N.A.	Pass
1.22			BL	BL	BL	N.A.	BL	N.A.	Pass
1.23			BL	BL	BL	BL	BL	N.A.	Pass
1.24	CHOKE COIL	TNS KOREA	BL	BL	BL	BL	BL	N.A.	Pass
1.25			BL	BL	BL	N.A.	BL	N.A.	Pass
1.26			BL	BL	BL	N.A.	BL	N.A.	Pass
1.27	FUZE	BUSSMAN	BL	BL	BL	N.A.	BL	N.A.	Pass
1.28			BL	BL	BL	BL	BL	N.A.	Pass
1.29			BL	BL	BL	BL	BL	N.A.	Pass



Appendix III

Verification XRF test results

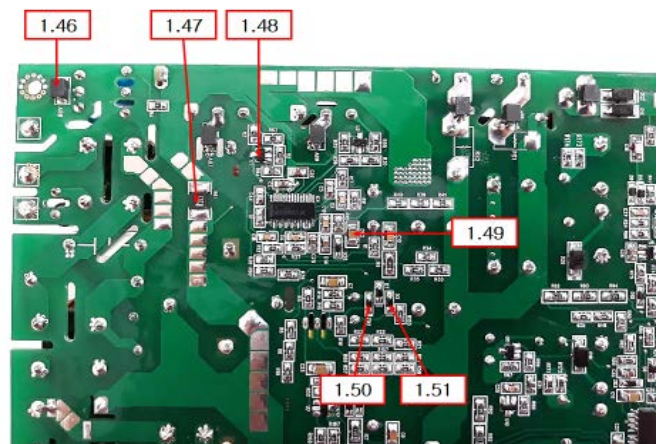
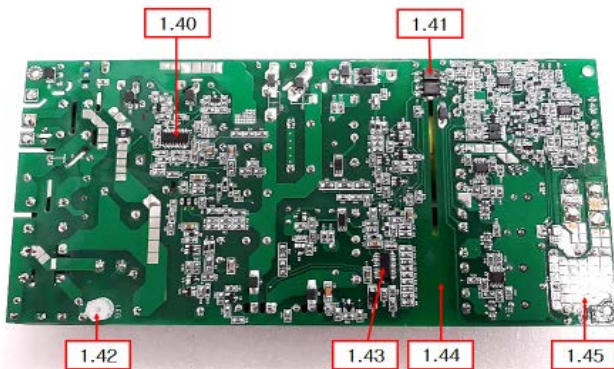
No	Part name	Supplier	XRF Data (mg/kg)					Evaluation	Result
			Cd	Pb	Hg	Br	Cr		
1.30	BOX-CAP	SUNIL	BL	BL	BL	123257	BL	Br - Type C	Pass
1.31	Y-CAP	NETRON TECH	BL	BL	BL	BL	BL	N.A.	Pass
1.32	NCE12T12	NCEPOWER	BL	BL	BL	N.A.	BL	N.A.	Pass
1.33			BL	BL	BL	2415	BL	Br - Type C	Pass
1.34	STF13NM60N	ST	BL	BL	BL	BL	BL	N.A.	Pass
1.35	SF10A600H	KODENSHI AUK	BL	BL	BL	BL	BL	N.A.	Pass
1.36	VARISTOR	NICON CAMICON	BL	BL	BL	24041	BL	Br - Type C	Pass
1.37	RESISTOR	RESCO	BL	BL	BL	BL	5782	Cr - Type A	Pass
1.38	Y-CAP	NETRON TECH	BL	BL	BL	BL	BL	N.A.	Pass
1.39	THERMISTOR	SAMKYUNG	BL	BL	BL	BL	2255	Cr - Type A	Pass



Appendix III

Verification XRF test results

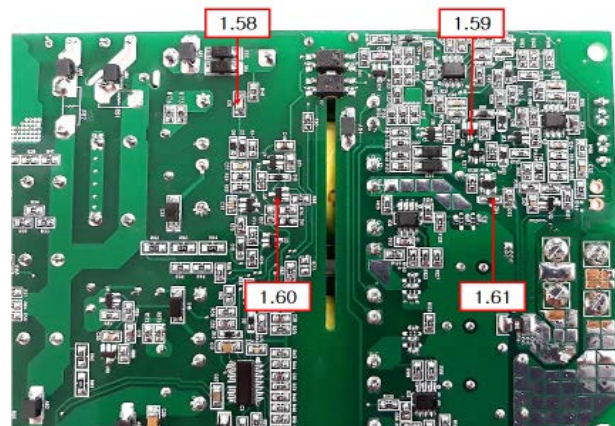
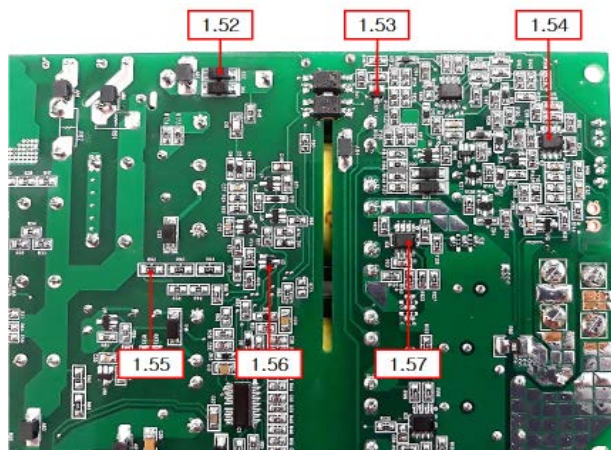
No	Part name	Supplier	XRF Data (mg/kg)					Evaluation	Result
			Cd	Pb	Hg	Br	Cr		
1.40	UCC28061	TI	BL	BL	BL	BL	BL	N.A.	Pass
1.41	Phototransistor	KODENSHI AUK	BL	BL	BL	BL	BL	N.A.	Pass
1.42	SCREW SUPPORT	DONG-A	BL	BL	BL	BL	BL	N.A.	Pass
1.43	NCP1396A	ON-SEMI	BL	BL	BL	BL	BL	N.A.	Pass
1.44	PCB	LEADERS PCB	BL	BL	BL	53260	BL	Br - Type C	Pass
1.45			BL	BL	BL	N.A.	BL	N.A.	Pass
1.46	CHIP-BEAD	Laird	BL	BL	BL	BL	BL	N.A.	Pass
1.47	RES-CHIP	RARA	BL	BL	BL	BL	7696	Cr - Type A	Pass
1.48	KTA1542T, PNP	KEC	BL	BL	BL	3656	BL	Br - Type C	Pass
1.49	CER-CHIP	SAMHWA	BL	BL	BL	BL	BL	N.A.	Pass
1.50	ZENER-DIODE	LRC	BL	BL	BL	BL	BL	N.A.	Pass
1.51	LMDL914T1G	LRC	BL	BL	BL	BL	BL	N.A.	Pass



Appendix III

Verification XRF test results

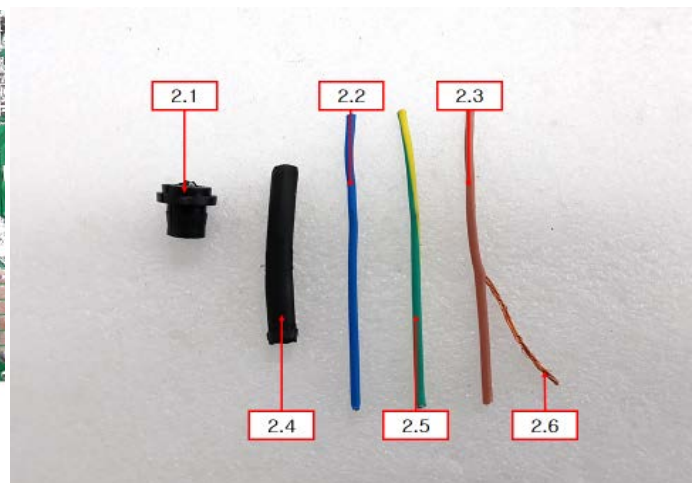
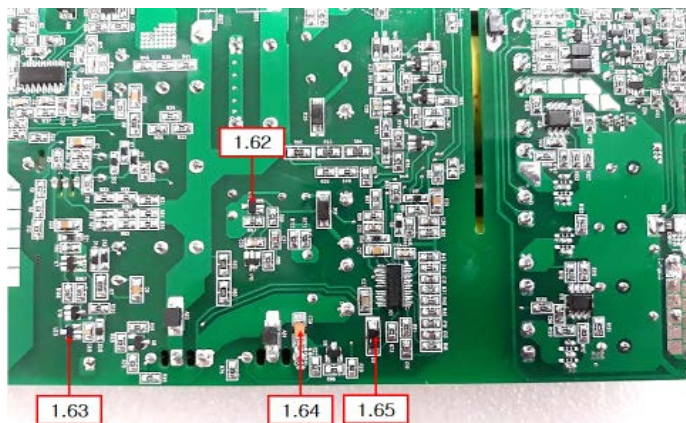
No	Part name	Supplier	XRF Data (mg/kg)					Evaluation	Result
			Cd	Pb	Hg	Br	Cr		
1.52	EFM108	LRC	BL	BL	BL	BL	BL	N.A.	Pass
1.53	Voltage Reference	HTC KOREA	BL	BL	BL	BL	BL	N.A.	Pass
1.54	LM258A	ST	BL	BL	BL	BL	BL	N.A.	Pass
1.55	RES-CHIP	VIKING	BL	BL	BL	BL	1603	Cr - Type A	Pass
1.56	KTA1504S	KEC	BL	BL	BL	5544	BL	Br - Type C	Pass
1.57	MP6922	MPS	BL	BL	BL	BL	BL	N.A.	Pass
1.58	CER-CHIP	SAMHWA	BL	BL	BL	BL	BL	N.A.	Pass
1.59	2N5551S	KEC	BL	BL	BL	BL	BL	N.A.	Pass
1.60	KTC3875	KEC	BL	BL	BL	BL	BL	N.A.	Pass
1.61	ZENER-DIODE	LRC	BL	BL	BL	BL	BL	N.A.	Pass



Appendix III

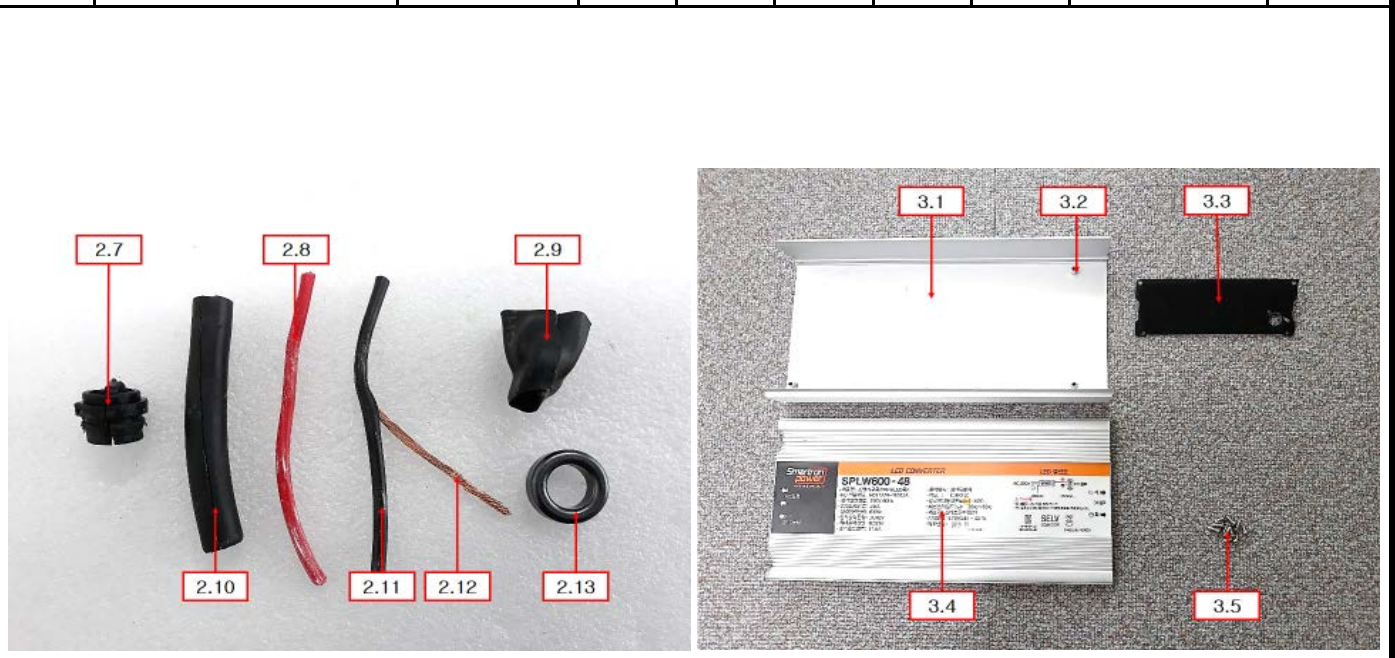
Verification XRF test results

No	Part name	Supplier	XRF Data (mg/kg)					Evaluation	Result	
			Cd	Pb	Hg	Br	Cr			
1.62	KTC3552T	KEC	BL	BL	BL	3550	BL	Br - Type C	Pass	
1.63	KRC102S	KEC	BL	BL	BL	BL	BL	N.A.	Pass	
1.64	CER-CHIP	WALSIN	BL	BL	BL	BL	BL	N.A.	Pass	
1.65	RFN1L6S	ROHM	BL	BL	BL	BL	BL	N.A.	Pass	
2.1	AC CABLE	GSE	BL	BL	BL	BL	BL	N.A.	Pass	
2.2			BL	BL	BL	BL	BL	BL	Type B	Pass
2.3			BL	BL	BL	BL	BL	BL	Type B	Pass
2.4			BL	BL	BL	BL	BL	BL	Type B	Pass
2.5			BL	BL	BL	BL	BL	BL	Type B	Pass
2.6			BL	BL	BL	N.A.	BL	BL	N.A.	Pass



Appendix III Verification XRF test results

No	Part name	Supplier	XRF Data (mg/kg)					Evaluation	Result
			Cd	Pb	Hg	Br	Cr		
2.7	DC CABLE	GSE	BL	BL	BL	BL	BL	N.A.	Pass
2.8			BL	BL	BL	BL	BL	N.A.	Pass
2.9			BL	BL	BL	BL	BL	N.A.	Pass
2.10			BL	BL	BL	BL	BL	N.A.	Pass
2.11			BL	BL	BL	BL	BL	N.A.	Pass
2.12			BL	BL	BL	N.A.	BL	N.A.	Pass
2.13			BL	BL	BL	N.A.	BL	N.A.	Pass
3.1	Case Bottom	UNI-WORLD	BL	BL	BL	N.A.	BL	N.A.	Pass
3.2	Machine Screw	TAEYUNG METAL	BL	BL	BL	N.A.	1386	Cr - Type A	Pass
3.3	GASKET	A-TEX	BL	BL	BL	BL	BL	N.A.	Pass
3.4	LABEL	SUNTECH	BL	BL	BL	BL	BL	N.A.	Pass
3.5	Tapping Screw	TAEYUNG METAL	BL	BL	BL	N.A.	167601	Cr - Type A	Pass



Appendix III Verification XRF test results

No	Part name	Supplier	XRF Data (mg/kg)					Evaluation	Result
			Cd	Pb	Hg	Br	Cr		
3.6	URETHANE Molding	ESP CAM.	BL	BL	BL	BL	BL	N.A.	Pass
3.7			BL	BL	BL	BL	BL	N.A.	Pass



Appendix III

Verification XRF test results

1. Results are obtained by ED XRF in regulated substances according to IEC 62321-3-1 ; 2013 Annex A.
2. It is the result on total Br while test item on restricted substances is PBBs & PBDEs.
Also, it is the result on total Cr while test item on restricted substance is hexavalent chromium.
3. Screening limits in mg/kg for regulated elements in various matrices

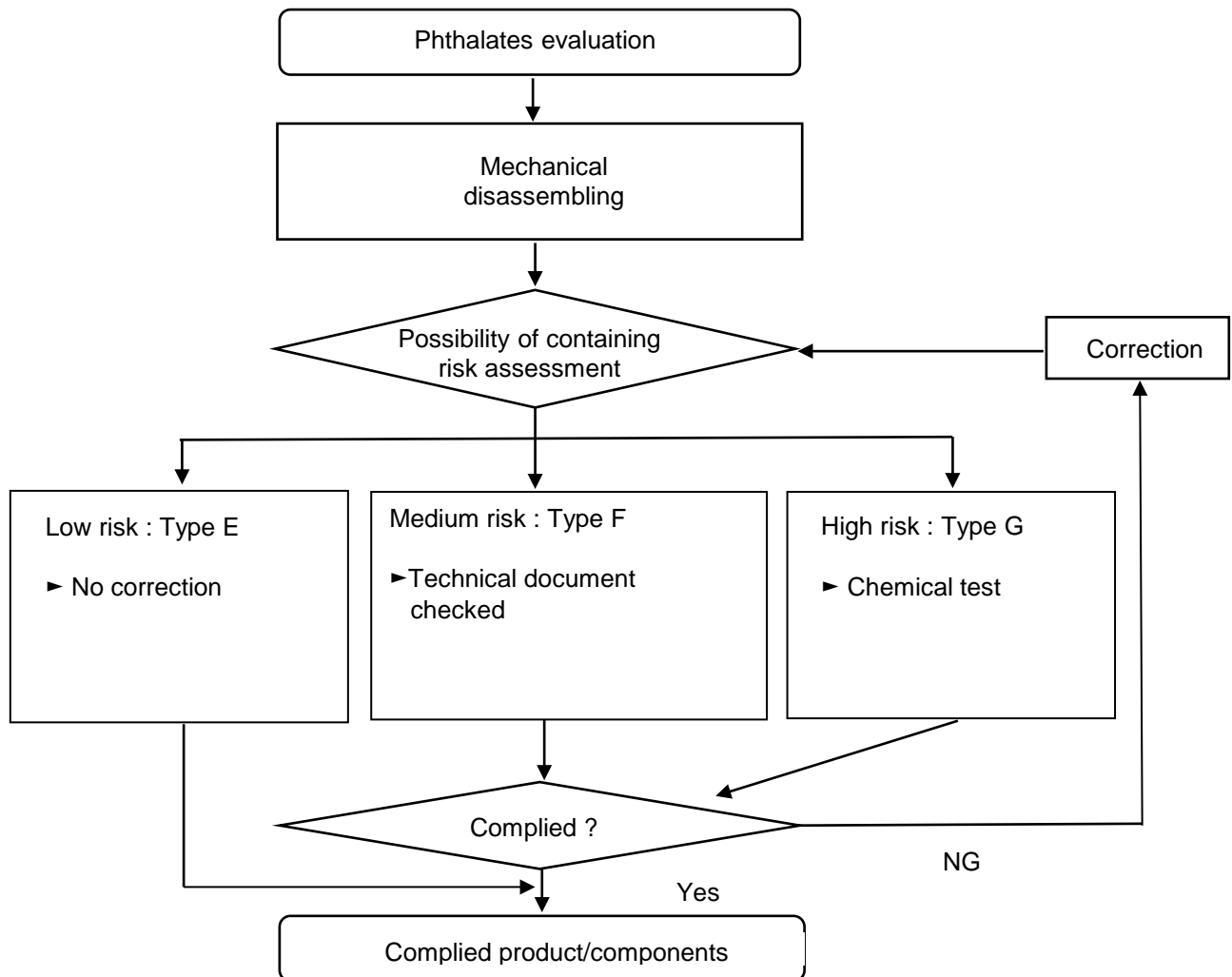
Element	Polymers	Metals	Composite material
Cd	X < 50 (BL) 50 < X < 150 (IN) 150 < X (OL)	X < 50 (BL) 50 < X < 150 (IN) 150 < X (OL)	X < 50 (BL) 50 < X < 150 (IN) 150 < X (OL)
Pb	X < 500 (BL) 500 < X < 1500 (IN) 1500 < X (OL)	X < 500 (BL) 500 < X < 1500 (IN) 1500 < X (OL)	X < 500 (BL) 500 < X < 1500 (IN) 1500 < X (OL)
Hg	X < 500 (BL) 500 < X < 1500 (IN) 1500 < X (OL)	X < 500 (BL) 500 < X < 1500 (IN) 1500 < X (OL)	X < 500 (BL) 500 < X < 1500 (IN) 1500 < X (OL)
Br	X < 500 (BL) 500 < X (IN)	N.A.	X < 500 (BL) 500 < X (IN)
Cr	X < 500 (BL) 500 < X (IN)	X < 500 (BL) 500 < X (IN)	X < 500 (BL) 500 < X (IN)

4. Abbreviation :
- | | |
|--|-----------------------|
| Pb = Lead | N.A. = Not Applicable |
| Cd = Cadmium | N.D. = Not Detected |
| Hg = Mercury | BL = Below limit |
| Cr = Chromium | OL = Over limit |
| Cr (VI) = Chromium (VI) | IN = Inconclusive |
| PBBs = Total Polybrominated Biphenyls | |
| PBDEs = Total Polybrominated Diphenyl Ethers | |

5. The type of estimation

Type A	Detected more than screening limits on total Cr and confirmed absence of Cr ⁶⁺ by diphenylcarbazide reagent.
Type B	Primary test result failed and replaced new sample. Finally confirmed through again XRF test.
Type C	Detected more than screening limits on total Br and confirmed absence PBBs/PBDEs through technical document of detected parts or material.
Type D	Detected components/materials was tested by chemical analysis

Appendix IV Phthalates evaluation



Note : 1. Basic acceptance criteria for possibility of containing phthalate is the following.

- If the XRF test result detected the Cl, the part is doubted to be PVC containing phthalate
- Polymer with elasticity and flexibility
- Kind of foreseeable skin-contact materials such as case, cable, rubber.
- Component / materials known to contain materials of high concern

2. Phthalates are materials that help to increase elasticity and flexibility when processing plastics.

3. For maintaining product quality, the comparison and verification are required between analytical test reports and risk assessment if possible

Appendix IV Phthalates evaluation

No	Part name	Supplier	XRF Data CI	Possibility of containing phthalate	Evaluation	Result
1.1	BRIDGE DIODE	LRC	BL	Low Risk	Type E	Pass
1.2	OSG60R092HF	ORIENTAL	BL	Low Risk	Type E	Pass
1.3	BOX-CAP	DONGSUNG	BL	Low Risk	Type E	Pass
1.4	VR	COPAL	BL	Low Risk	Type E	Pass
1.5	TRANS	TNS KOREA	N.A.	N.A.	N.A.	Pass
1.6			BL	Low Risk	Type E	Pass
1.7			N.A.	N.A.	N.A.	Pass
1.8			BL	High Risk	Type G	Pass
1.9	TRANS	TNS KOREA	N.A.	N.A.	N.A.	Pass
1.10			BL	Low Risk	Type E	Pass
1.11			N.A.	N.A.	N.A.	Pass
1.12			BL	High Risk	Type G	Pass
1.13	FILTER COIL	TNC	BL	Low Risk	Type E	Pass
1.14			N.A.	N.A.	N.A.	Pass
1.15			BL	Low Risk	Type E	Pass
1.16	FILTER COIL	TNC	N.A.	N.A.	N.A.	Pass
1.17			N.A.	N.A.	N.A.	Pass
1.18			BL	Low Risk	Type E	Pass

Appendix IV Phthalates evaluation

No	Part name	Supplier	XRF Data Cl	Possibility of containing phthalate	Evaluation	Result
1.19	ELEC_CAP	SAMHWA	BL	Medium Risk	Type F	Pass
1.20			N.A.	N.A.	N.A.	Pass
1.21			BL	Medium Risk	Type F	Pass
1.22			N.A.	N.A.	N.A.	Pass
1.23			BL	Medium Risk	Type F	Pass
1.24	CHOKE COIL	TNS KOREA	BL	High Risk	Type G	Pass
1.25			N.A.	N.A.	N.A.	Pass
1.26			N.A.	N.A.	N.A.	Pass
1.27	FUSE	BUSSMAN	N.A.	N.A.	N.A.	Pass
1.28			BL	Low Risk	Type E	Pass
1.29			BL	High Risk	Type G	Pass
1.30	BOX-CAP	SUNIL	BL	Low Risk	Type E	Pass
1.31	Y-CAP	NETRON TECH	BL	Low Risk	Type E	Pass
1.32	NCE12T12	NCEPOWER	N.A.	N.A.	N.A.	Pass
1.33			BL	Low Risk	Type E	Pass
1.34	STF13NM60N	ST	BL	Low Risk	Type E	Pass
1.35	SF10A600HE	KODENSHI AUK	BL	Low Risk	Type E	Pass
1.36	VARISTOR	NICON CAMICON	BL	Low Risk	Type E	Pass
1.37	RESISTOR	RESCO	BL	Low Risk	Type E	Pass

Appendix IV Phthalates evaluation

No	Part name	Supplier	XRF Data CI	Possibility of containing phthalate	Evaluation	Result
1.38	Y-CAP	NETRON TECH	BL	Low Risk	Type E	Pass
1.39	THERMISTOR	SAMKYUNG	BL	Low Risk	Type E	Pass
1.40	UCC28061	TI	BL	Low Risk	Type E	Pass
1.41	Phototransistor	KODENSHI AUK	BL	Low Risk	Type E	Pass
1.42	SCREW SUPPORT	DONG-A	BL	Low Risk	Type E	Pass
1.43	NCP1396A	ON-SEMI	BL	Low Risk	Type E	Pass
1.44	PCB	LEADERS PCB	BL	Low Risk	Type E	Pass
1.45			N.A.	N.A.	N.A.	Pass
1.46	CHIP-BEAD	Laird	BL	Low Risk	Type E	Pass
1.47	RES-CHIP	RARA	BL	Low Risk	Type E	Pass
1.48	KTA1542T	KEC	BL	Low Risk	Type E	Pass
1.49	CER-CHIP	SAMHWA	BL	Low Risk	Type E	Pass
1.50	ZENER-DIODE	LRC	BL	Low Risk	Type E	Pass
1.51	LMDL914T1G	LRC	BL	Low Risk	Type E	Pass
1.52	EFM108	LRC	BL	Low Risk	Type E	Pass
1.53	Voltage Reference	HTC KOREA	BL	Low Risk	Type E	Pass
1.54	LM258A	ST	BL	Low Risk	Type E	Pass
1.55	RES-CHIP	VIKING	BL	Low Risk	Type E	Pass
1.56	KTA1504S	KEC	BL	Low Risk	Type E	Pass

Appendix IV Phthalates evaluation

No	Part name	Supplier	XRF Data CI	Possibility of containing phthalate	Evaluation	Result
1.57	MP6922	MPS	BL	Low Risk	Type E	Pass
1.58	CER-CHIP	SAMHWA	BL	Low Risk	Type E	Pass
1.59	2N5551S	KEC	BL	Low Risk	Type E	Pass
1.60	KTC3875	KEC	BL	Low Risk	Type E	Pass
1.61	ZENER-DIODE	LRC	BL	Low Risk	Type E	Pass
1.62	KTC3552T	KEC	BL	Low Risk	Type E	Pass
1.63	KRC102S	KEC	BL	Low Risk	Type E	Pass
1.64	CER-CHIP	WALSIN	BL	Low Risk	Type E	Pass
1.65	RFN1L6S	ROHM	BL	Low Risk	Type E	Pass
2.1	AC CABLE	GSE	Detected	High Risk	Type G	Pass
2.2			Detected	High Risk	Type B, Type G	Pass
2.3			Detected	High Risk	Type B, Type G	Pass
2.4			Detected	High Risk	Type B, Type G	Pass
2.5			Detected	High Risk	Type B, Type G	Pass
2.6			N.A.	N.A.	N.A.	Pass
2.7	DC CABLE	GSE	Detected	High Risk	Type G	Pass
2.8			Detected	High Risk	Type G	Pass
2.9			BL	High Risk	Type G	Pass
2.10			Detected	High Risk	Type G	Pass

Appendix IV Phthalates evaluation

No	Part name	Supplier	XRF Data CI	Possibility of containing phthalate	Evaluation	Result
2.11	DC CABLE	GSE	Detected	High Risk	Type G	Pass
2.12			N.A.	N.A.	N.A.	Pass
2.13			N.A.	N.A.	N.A.	Pass
3.1	Case Bottom	UNI-WORLD	N.A.	N.A.	N.A.	Pass
3.2	Machine Screw	TAEYUNG METAL	N.A.	N.A.	N.A.	Pass
3.3	GASKET	A-TEX	BL	High Risk	Type G	Pass
3.4	LABEL	SUNTECH	BL	High Risk	Type G	Pass
3.5	Tapping Screw	TAEYUNG METAL	N.A.	N.A.	N.A.	Pass
3.6	Molding	ESP CAM.	BL	High Risk	Type G	Pass
3.7			BL	High Risk	Type G	Pass

Appendix V Phthalates Chemical test result

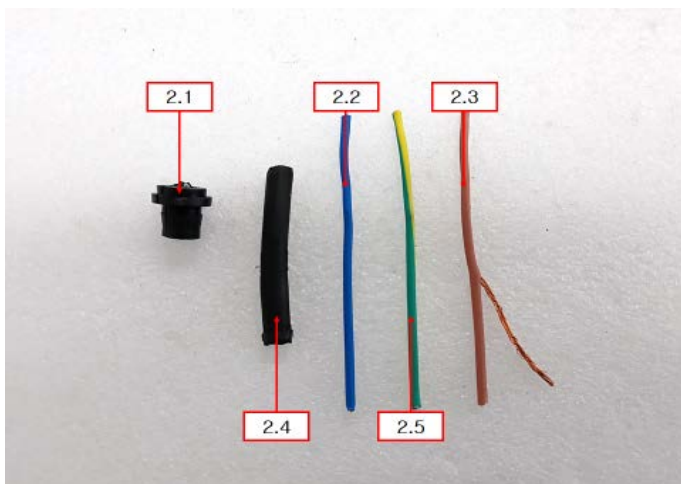
No	Part name	Test method	Chemical analysis data (mg/kg)				Evaluation	Result
			DEHP	BBP	DBP	DIBP		
1.8	Tape - Yellow	IEC 62321-8 ; 2017 GC/MS	N.D.	N.D.	N.D.	N.D.	Type G Chemical test	Pass
1.12	Tape - Yellow		N.D.	N.D.	N.D.	N.D.		Pass
1.24	Shrinkerble tube - Brown		N.D.	N.D.	N.D.	N.D.		Pass
1.29	Shrinkerble tube - Black		N.D.	N.D.	N.D.	N.D.		Pass



Appendix V

Phthalates Chemical test result

No	Part name	Test method	Chemical analysis data (mg/kg)				Evaluation	Result
			DEHP	BBP	DBP	DIBP		
2.1	AC Cable molding	IEC 62321-8 ; 2017 GC/MS	N.D.	N.D.	N.D.	N.D.	Type G Chemical test	Pass
2.2	AC Cable Blue		N.D.	N.D.	N.D.	N.D.		Pass
2.3	AC Cable Brown		N.D.	N.D.	N.D.	N.D.		Pass
2.4	AC Cable Outer		N.D.	N.D.	N.D.	N.D.		Pass
2.5	AC Cable Green		N.D.	N.D.	N.D.	N.D.		Pass
2.7	DC Cable Molding		N.D.	N.D.	N.D.	N.D.		Pass
2.8	AC Cable Red		N.D.	N.D.	N.D.	N.D.		Pass
2.9	Shrinkerble tube - Black		N.D.	N.D.	N.D.	N.D.		Pass
2.10	AC Cable Outer		N.D.	N.D.	N.D.	N.D.		Pass
2.11	AC Cable Black		N.D.	N.D.	N.D.	N.D.		Pass



Appendix V Phthalates Chemical test result

No	Part name	Test method	Chemical analysis data (mg/kg)				Evaluation	Result
			DEHP	BBP	DBP	DIBP		
3.3	GASKET	IEC 62321-8 ; 2017 GC/MS	N.D.	N.D.	N.D.	N.D.	Type G Chemical test	Pass
3.4	LABEL		N.D.	N.D.	N.D.	N.D.		Pass
3.6	URETHANE Molding - White		N.D.	N.D.	N.D.	N.D.		Pass
3.7	URETHANE Molding - Black		N.D.	N.D.	N.D.	N.D.		Pass



Appendix V

Phthalates Chemical test result

1. Chemical test results are obtained by GC/MS in regulated substances according to IEC 62321-8; 2017.

2. Phthalates are materials that help to increase elasticity and flexibility when processing plastics. Especially, PVC(Polyvinyl chloride) material is likely to contain phthalate.

- If the XRF test result detected the Cl, the part is doubted to be PVC containing phthalate
- There is at least a few percent of Cl in the PVC material
Therefore, XRF screen test results were recorded 'Detected' only at detection of at least 1 %.
- Other components/materials, including plastics, were evaluated according to a risk assessment of the possibility of containing phthalates.
- The following materials are not likely to contain phthalates.
Metal (Copper alloy, Steel alloy, Aluminum alloy etc), Ceramic, Glass, Paper, Wood

3. Abbreviation :

DEHP = Bis(2-ethylhexyl)phthalate	BL = Below limit
BBP = Butyl benzyl phthalate	Detected = Cl > 1%
DBP = Dibutyl phthalate	Cl = Chlorine
DIBP = Diisobutyl phthalate	
N.A. = Not Applicable	
N.D. = Not Detected	

4. The type of comprehension

Type E	It was evaluated no exist or remarkable low risk of the possibility for containing phthalates. Applied parts/materials were not required the corrective action
Type F	It was evaluated maybe of the possibility of containing phthalates. Applied parts/materials were confirmed absence phthalates through technical document
Type G	It was evaluated high risk of the possibility of containing phthalates. Applied parts/materials were tested by chemical analysis

Appendix VI

Reference document

1. Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
2. EN 50581 : 2012
Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.
3. IEC 62321-3-1 : 2013
Determination of certain substances in electrotechnical products - Part 3-1 : Screening - Lead, mercury, cadmium, total chromium and total bromine by X-ray fluorescence spectrometry.
4. IEC 62321-8 : 2017
Determination of certain substances in electrotechnical products – Part 8: Phthalates in polymers by gas chromatography-mass spectrometry(GC-MS), gas chromatography-mass spectrometry using a pyrolyzer/thermal desorption accessory (Py/TD-GC-MS)
5. IEC 62474 : 2018
Material declaration for products of and for the electrotechnical industry.
6. IEC/TR 62476 : 2010
Guidance for evaluation of products with respect to substance use restrictions in electrical and electronic products.
7. Directive 2015/863/EU of 31 March 2015 amending Annex II to Directive 2011/65/EU of the European Parliament and of the Council as regards the list of restricted substances

~~ THE END ~~