



China

Report No. 48.400.20.8024.00-00/01
Dated 2020-12-08

Technical Report

Client: Jiangsu Acrel Electrical Manufacturing. Co., Ltd.
No. 5, Dongmeng Road, Nanzha Street, Jiangyin, Jiangsu, P. R. China

Contact person: Han zhonghua

Test object: The submitted samples were received and described by client as:
Product: Power Meter
Model: DDSD1352



Tested sample description: Refer to next page(s).

Test specification: 2011/65/EU (RoHS) Directive and 2015/863/EU (RoHS amendment) Directive
Test with reference to EN 62321-1:2013, EN 62321-2:2014, EN 62321-3-1:2014, EN 62321-4:2014/A1:2017, EN 62321-5:2014, EN 62321-6:2015, EN 62321-7-1:2015, EN 62321-7-2:2017 and EN 62321-8:2017.

Test result: Refer to the data listed in following pages

Conclusion: With regard to the data of tested components, the requirements of Directive 2011/65/EU (RoHS) and 2015/863/EU are **complied**.

Remarks:

1. The tested samples were identified and appointed by client.
2. The result relates only to the items tested.

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1. Order

- 1.1 **Date of Purchase Order,**
2020-12-04
- 1.2 **Customer's Reference**
Nil
- 1.3 **Receipt Date of Test Sample**
2020-11-09
- 1.4 **Date of Testing**
2020-11-24 – 2020-12-02
- 1.5 **Location of Testing**
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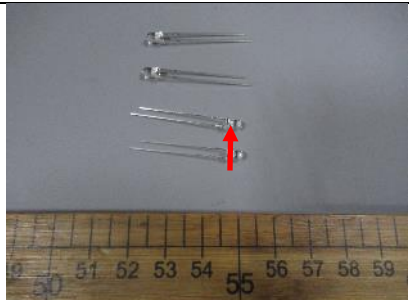

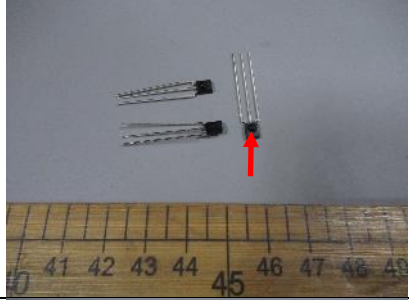
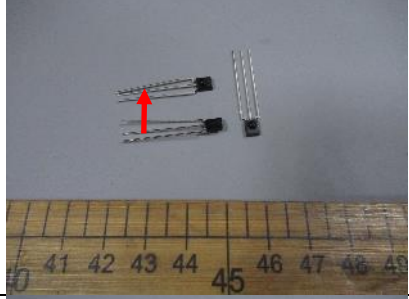

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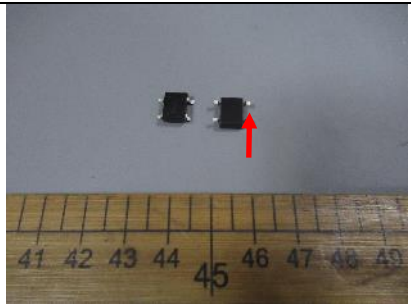
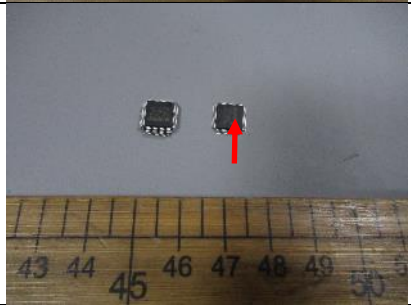
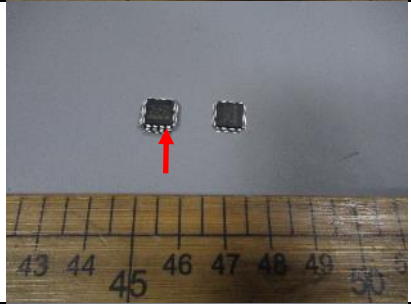

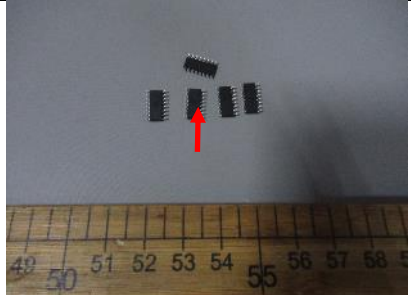
2. Description of the tested specimen

Sample No.	Result	Description (Material, colour)	Photograph/Location
01	Pass	Transparent hard Infrared receiving tube IR204C-A 用完为止, 用IR-T3AWMC06	
02	Pass	Silver metal pin	
03	Pass	Black hard Infrared receiving tube IRM-6638T 用完为止, 用IRM-T38D-F	
04	Pass	Silver metal pin	
05	Pass	Black hard patch bridge DB107S	

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Sample No.	Result	Description (Material, colour)	Photograph/Location
06	Pass	Silver metal pin	
07	Pass	Black hard IC NANO110SE3BN LQFP64 7*7mm	
08	Pass	Silver metal pin	
09	Pass	Golden hard SMD crystal SSP-T7-F 32.768khz(12.5PF, ±20PPM)	
10	Pass	Black hard IC RN8209C (编带)	

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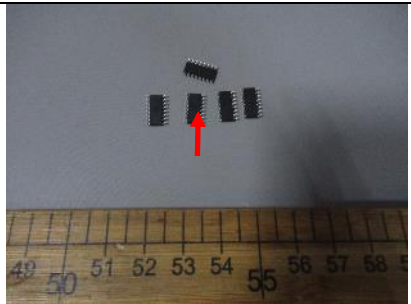

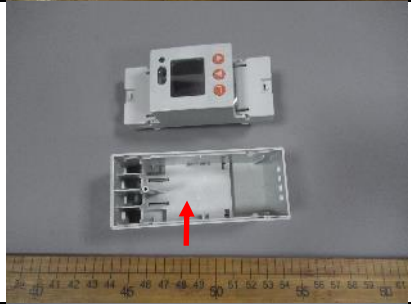


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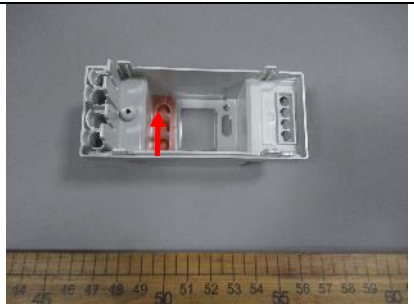

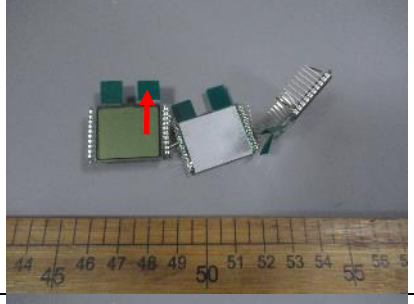
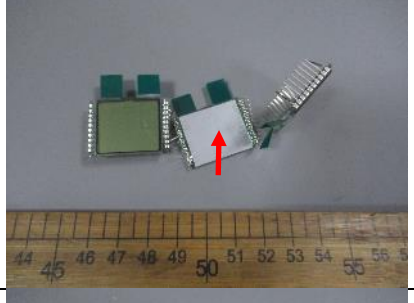

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Sample No.	Result	Description (Material, colour)	Photograph/Location
11	Pass	Silver metal pin	
12	Pass	Gray hard patch magnetic beads BLM18BD102SN1	
13	Pass	Gray hard plastic shell	
14	Pass	Gray hard plastic shell	
15	Pass	Orange rubber button	

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Sample No.	Result	Description (Material, colour)	Photograph/Location
16	Pass	Transparent hard plastic bracket	
17	Pass	Transparent Pen segment liquid crystal glass 3.3V-白底黑字-22*28-A(SDH-M12993-HP-4)	
18	Pass	Green soft plastic film	
19	Pass	Silvery soft plastic film	
20	Pass	Silver metal pin	

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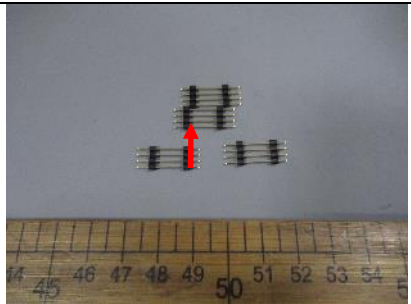
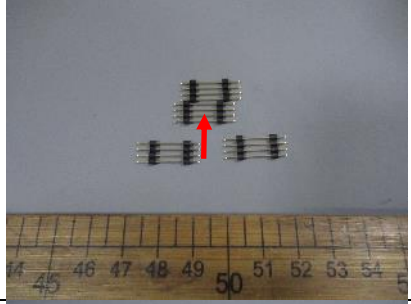



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Sample No.	Result	Description (Material, colour)	Photograph/Location
21	Pass	Black hard right angle pin 21N12050-04S22B-01G-4/13/3	
22	Pass	Silver metal pin	
23	Pass	Black hard plastic right angle socket 22N8241-05S10B-01G-2.6	
24	Pass	Silver metal pin	
25	Pass	Silvery copper alloy terminal DDSD1352 铜质接线柱 JXZ-DDSD1352-H59	

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Sample No.	Result	Description (Material, colour)	Photograph/Location
26	Pass	Silvery metal screw LD-M4x12-缩杆(镀镍)-02	
27	Pass	Black resistance CR0603-10kΩ (±1%, 100PPM)	
28	Pass	Black resistance CR0603-10kΩ(±1%, 100PPM)	
29	Pass	Black hard IC MB85RC16 (可与 FM24CL16B-GTR互相替换使用)	
30	Pass	Silver metal pin	

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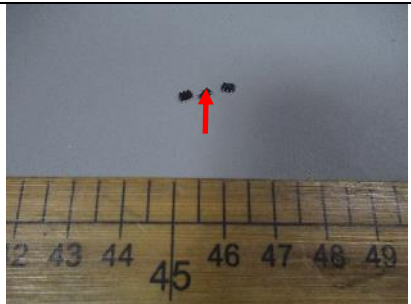
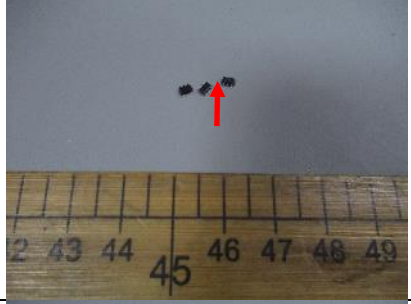



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Sample No.	Result	Description (Material, colour)	Photograph/Location
31	Pass	Black hard IC TLV70033DDCR	
32	Pass	Silver metal pin	
33	Pass	Black hard IC AMS431AM(BM)-SMD	
34	Pass	Silver metal pin	
35	Pass	Silvery metal chip electrolytic capacitor shell CD220μF/16V(±20%, 105°C)(6.3*7.7)	

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Sample No.	Result	Description (Material, colour)	Photograph/Location
36	Pass	Silver metal pin	
37	Pass	Black hard plastic cover	
38	Pass	Gray paper film	
39	Pass	Black rubber cushion	
40	Pass	Silvery metal chip electrolytic capacitor shell CD100μF/16V(±20%, 105°C)6.3*5.3 尺寸公差±0.1	

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Sample No.	Result	Description (Material, colour)	Photograph/Location
41	Pass	Silver metal pin	
42	Pass	Black hard plastic cover	
43	Pass	Gray paper film	
44	Pass	Black rubber cushion	
45	Pass	Brown capacitor CC0603X7R1 μ F/25V(\pm 10%)	

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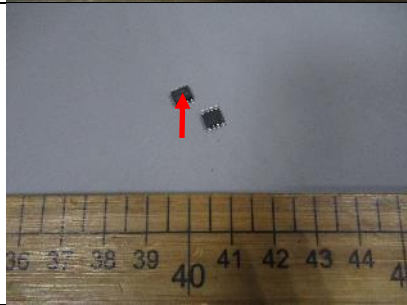
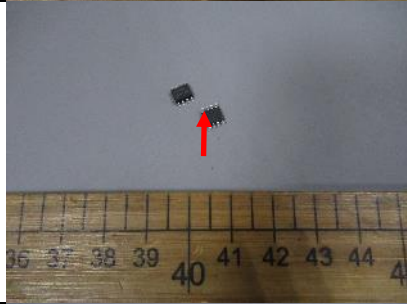


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Sample No.	Result	Description (Material, colour)	Photograph/Location
46	Pass	Golden diode LL4148-SMD	
47	Pass	black hard IC ISL3152EIBZ-T	
48	Pass	Silver metal pin	
49	Pass	black hard IC TNY286DG-TL SOP8	
50	Pass	Silver metal pin	

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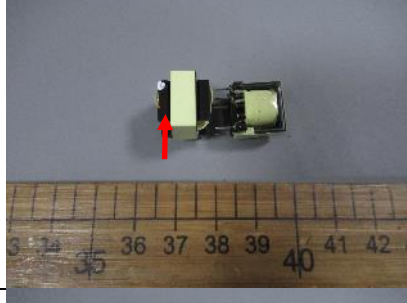

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Sample No.	Result	Description (Material, colour)	Photograph/Location
51	Pass	Black diode SMBJ150A	
52	Pass	Silver metal pin	
53	Pass	Gray capacitor CC0805X5R10µF/16V(±10%)	
54	Pass	Black hard switching transformer shell T-EE13-220V-5V-8V-3KV-2(EE13-58-2)	
55	Pass	Yellow soft plastic adhesive tape	

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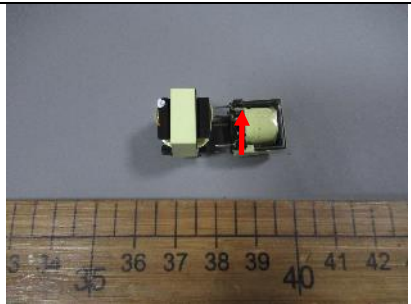
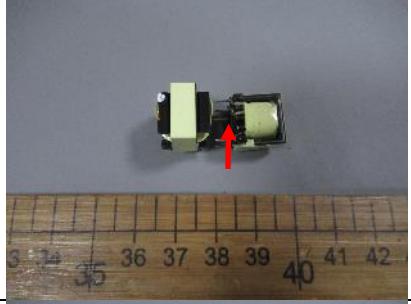



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Sample No.	Result	Description (Material, colour)	Photograph/Location
56	Pass	Black metal magnet	
57	Pass	Silver metal pin	
58	Pass	Yellow soft plastic wire jacket	
59	Pass	Transparent soft plastic wire jacket	
60	Pass	golden metal wire	

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Sample No.	Result	Description (Material, colour)	Photograph/Location
61	Pass	Black diode SOT-23 BAV199LT1G	
62	Pass	Black hard patch optocoupler LTV-816S-TA1-D (与LTV-816S-TA1-D3互为替换物料)	
63	Pass	Silver metal pin	
64	Pass	Black diode SO-123塑封 1N4148	
65	Pass	Green printed board hard PCB	

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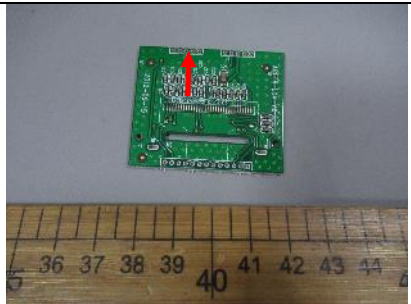

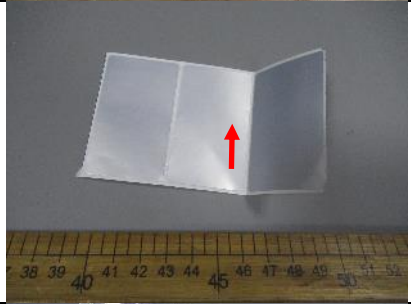

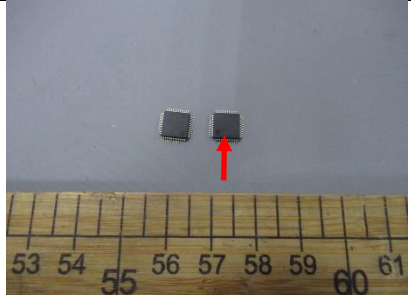
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Sample No.	Result	Description (Material, colour)	Photograph/Location
66	Pass	Silver metal solder	
67	Pass	Brown paper shell B-210X150X70-ZH-01	
68	Pass	Silvery soft plastic label 35*20	
69	Pass	Transparent soft plastic inflatable bag QT-14A142(ARCM300-J8)	
70	Pass	Black hard IC STM32F070CBT6	

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Sample No.	Result	Description (Material, colour)	Photograph/Location
71	Pass	Silver metal pin	

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3. Test Results

3.1 ED-XRF Spectrometer test for total Cadmium, Chromium, Mercury, Lead and Bromine according to EN 62321-3-1:2014

Criteria of XRF test results

Pass:

Because of the nature of the testing procedure (caused by the uncertainty of the used, XRF method), a definite pass is given only if the XRF test score is less than 60% of the respective RoHS limit.

Inconclusive:

If the XRF test score is between 60% and 150% of the respective RoHS limit, further chemical test on the sample is required.

Fail:

A definite FAIL is given if the XRF test score is above 150% of the respective RoHS limit

***Explanation for RoHS limit**

Regarding Chromium and Bromine, the XRF test score shows the total Chromium and the total Bromine, but the RoHS limit of 1000 mg/kg, according to the directive 2011/65/EU, is only for Hexavalent Chromium and Brominated Flame Retardants. Therefore, if the XRF test result for the total Chromium and the total Bromine is more than 600 mg/kg and 300 mg/kg respectively, further analytical tests are necessary to find out the exact amount of Hexavalent Chromium and Brominated Flame Retardants

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	TOTAL CADMIUM [mg/kg]	TOTAL LEAD [mg/kg]	TOTAL MERCURY [mg/kg]	TOTAL CHROMIUM [mg/kg]	TOTAL BROMINE [mg/kg]	OVERALL RESULT
ROHS LIMIT	100	1000	1000	1000	1000	
Pass result	< 60	< 600	< 600	< 600	< 300	
Inconclusive result	60 – 150	600 – 1500	600 – 1500	> 600	> 300	
Fail result	> 150	> 1500	> 1500	-	-	
01	<30	<30	<30	<30	<30	Pass
02	<30	<30	<30	<30	--	Pass
03	<30	<30	<30	<30	<30	Pass
04	<30	<30	<30	<30	--	Pass
05	<30	218	<30	<30	<30	Pass
06	<30	<30	<30	<30	--	Pass
07	<30	<30	<30	<30	<30	Pass
08	53	<30	<30	<30	--	Pass
09	104	45495***	<30	<30	<30	Inconclusive
10	<30	<30	<30	<30	<30	Pass
11	56	<30	<30	<30	--	Pass
12	<30	103	<30	<30	<30	Pass
13	<30	<30	<30	<30	<30	Pass
14	<30	<30	<30	<30	<30	Pass
15	<30	<30	<30	<30	<30	Pass
16	<30	<30	<30	<30	<30	Pass
17	<30	<30	<30	<30	--	Pass

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ROHS LIMIT	100	1000	1000	1000	1000	
Pass result	< 60	< 600	< 600	< 600	< 300	
Inconclusive result	60 – 150	600 – 1500	600 – 1500	> 600	> 300	
Fail result	> 150	> 1500	> 1500	-	-	
18	<30	<30	<30	<30	<30	Pass
19	<30	<30	<30	<30	<30	Pass
20	<30	<30	<30	63	--	Pass
21	<30	<30	<30	<30	56253	Inconclusive
22	<30	<30	<30	<30	--	Pass
23	<30	<30	<30	<30	55646	Inconclusive
24	<30	<30	<30	<30	--	Pass
25	<30	8126**	<30	<30	--	Inconclusive
26	<30	<30	<30	<30	--	Pass
27	<30	643***	<30	585	<30	Pass
28	<30	684***	<30	584	<30	Pass
29	<30	<30	<30	<30	4383	Inconclusive
30	<30	<30	<30	<30	--	Pass
31	<30	<30	<30	<30	<30	Pass
32	<30	<30	<30	<30	--	Pass
33	<30	<30	<30	<30	<30	Pass
34	<30	<30	<30	<30	--	Pass

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ROHS LIMIT	100	1000	1000	1000	1000	
Pass result	< 60	< 600	< 600	< 600	< 300	
Inconclusive result	60 – 150	600 – 1500	600 – 1500	> 600	> 300	
Fail result	> 150	> 1500	> 1500	-	-	
35	<30	387	<30	<30	--	Pass
36	55	<30	<30	<30	--	Pass
37	<30	<30	<30	<30	<30	Pass
38	<30	<30	<30	<30	<30	Pass
39	<30	<30	<30	<30	<30	Pass
40	<30	177	<30	<30	--	Pass
41	58	<30	<30	<30	--	Pass
42	<30	<30	<30	<30	<30	Pass
43	<30	<30	<30	<30	<30	Pass
44	<30	<30	<30	<30	<30	Pass
45	<30	<30	<30	<30	<30	Pass
46	53	41285***	<30	<30	<30	Pass
47	<30	<30	<30	<30	<30	Pass
48	<30	<30	<30	<30	--	Pass
49	<30	<30	<30	<30	<30	Pass
50	<30	<30	<30	<30	--	Pass
51	<30	195	<30	<30	<30	Pass

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	TOTAL CADMIUM [mg/kg]	TOTAL LEAD [mg/kg]	TOTAL MERCURY [mg/kg]	TOTAL CHROMIUM [mg/kg]	TOTAL BROMINE [mg/kg]	OVERALL RESULT
ROHS LIMIT	100	1000	1000	1000	1000	
Pass result	< 60	< 600	< 600	< 600	< 300	
Inconclusive result	60 – 150	600 – 1500	600 – 1500	> 600	> 300	
Fail result	> 150	> 1500	> 1500	-	-	
52	43	132	<30	96	--	Pass
53	<30	<30	<30	<30	<30	Pass
54	<30	<30	<30	<30	112	Pass
55	<30	<30	<30	<30	<30	Pass
56	<30	<30	<30	80	--	Pass
57	<30	<30	<30	<30	--	Pass
58	<30	<30	<30	<30	<30	Pass
59	<30	<30	<30	<30	<30	Pass
60	<30	<30	<30	<30	--	Pass
61	<30	<30	<30	<30	<30	Pass
62	<30	<30	<30	<30	13161	Inconclusive
63	<30	<30	<30	<30	--	Pass
64	<30	<30	<30	<30	<30	Pass
65	<30	123	<30	<30	<30	Pass
66	<30	79	<30	<30	--	Pass
67	<30	<30	<30	<30	<30	Pass
68	<30	<30	<30	<30	<30	Pass

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	TOTAL CADMIUM [mg/kg]	TOTAL LEAD [mg/kg]	TOTAL MERCURY [mg/kg]	TOTAL CHROMIUM [mg/kg]	TOTAL BROMINE [mg/kg]	OVERALL RESULT
ROHS LIMIT	100	1000	1000	1000	1000	
Pass result	< 60	< 600	< 600	< 600	< 300	
Inconclusive result	60 – 150	600 – 1500	600 – 1500	> 600	> 300	
Fail result	> 150	> 1500	> 1500	-	-	
69	<30	<30	<30	<30	<30	Pass
70	<30	<30	<30	<30	<30	Pass
71	<30	<30	<30	<30	--	Pass

Remark:

1. “<” means “less than”.
2. “mg/kg” denotes “milligram per kilogram”.
3. With regard to the stoichiometry of Br in PBBs and PBDEs, the lower limit for Br is set at 300 mg/kg.
4. “--” means the substance for this sample are not tested.
5. “**” means the result is exempted according to 2011/65/EU ANNEX item 6: Lead as an alloying element in steel containing up to 0.35 % lead by weight, aluminum containing up to 0.4 % lead by weight and as a copper alloy containing up to 4 % lead by weight.
6. “***” means the result is exempted according to 2011/65/EU ANNEX item 7(c)-I: Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors.

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7. 3.2 Wet chemical test

Main instruments used for wet chemical test

Testing Target	Instrument	Method
Lead & Cadmium	ICP-OES	EN 62321-5:2014
Mercury	ICP-OES	EN 62321-4:2014/A1:2017
Hexavalent Chromium	UV-Vis	EN 62321-7-1:2015 EN 62321-7-2:2017
PBBs & PBDEs	GC/MS	EN62321-6:2015
DEHP, BBP, DBP & DIBP	GC/MS	EN 62321-8:2017

Criteria of chemical test results

Pass:

A definite Pass is given If the chemical test result meets the requirements of RoHS.

Fail:

A definite Fail is given If the chemical test result exceeds the full respective RoHS limit.

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Test Sample	Cadmium [mg/kg]	Lead [mg/kg]	Mercury [mg/kg]	Chromium (VI) [mg/kg]	PBBs (Sum) [mg/kg]	PBDEs (Sum) [mg/kg]	OVERALL RESULT
Limit	100	1000	1000	1000	1000	1000	
09	<2	--	--	--	--	--	Pass
21	--	--	--	--	<50	<50	Pass
23	--	--	--	--	<50	<50	Pass
25	--	27913**	--	--	--	--	Pass
29	--	--	--	--	<50	<50	Pass
62	--	--	--	--	<50	<50	Pass

Remark:

1. ND = Not detected (Detected limit of Cd :2mg/kg;Pb, Hg, and Cr(VI):5mg/kg; PBBs and PBDEs: 5mg/kg)
2. " mg/kg " denotes " milligram per kilogram ".
3. "--" means the substance for this sample are not tested.
4. " ** " means the result is exempted according to 2011/65/EU ANNEX item 6: Lead as an alloying element in steel containing up to 0.35 % lead by weight, aluminum containing up to 0.4 % lead by weight and as a copper alloy containing up to 4 % lead by weight.

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Test Sample	DEHP [mg/kg]	DBP [mg/kg]	BBP [mg/kg]	DIBP [mg/kg]	RESULT
Limit	1000	1000	1000	1000	
01+03+05+07+09	<200	<200	<200	<200	Pass
10+12+13+14+16	<200	<200	<200	<200	Pass
15+18+19	<200	<200	<200	<200	Pass
21+23+27+28+29	<200	<200	<200	<200	Pass
31+33+37+42+45	<200	<200	<200	<200	Pass
38+39+43	<200	<200	<200	<200	Pass
44+55+58	<200	<200	<200	<200	Pass
46+47+49+51+53	<200	<200	<200	<200	Pass
54+61+62+64+65	<200	<200	<200	<200	Pass
59+67+68	<200	<200	<200	<200	Pass
69+70	<200	<200	<200	<200	Pass

Remark:

1. "<" means "less than".
2. "mg/kg" denotes "milligram per kilogram".
3. DEHP = Di-(2-ethyl-hexyl)phthalate, DBP = Di-butyl phthalate
BBP = Butyl-benzyl phthalate, DIBP = Di-iso-butyl phthalate

TÜV SÜD Certification and Testing (China) Co., Ltd.

Prepared by:



Mr. Yiwei CHEN

Checked by:



Mr. Feng ZHANG

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APPENDIX I: Product Model

Product: Power Meter	Test model: DDSD1352
	

Remark:

1. The report covers material testing on specified samples.

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APPENDIX II: Official Exemption Items

Below items are quoted based on Directives of 2011/65/EU and its valid Amending Directives.

Exemption		Scope and dates of applicability
1(a)	Single capped (compact) fluorescent lamps not exceeding (per burner): For general lighting purposes < 30W: 5 mg	Expires on 31 December 2011; 3.5 mg may be used per burner after 31 December 2011 Until 31 December 2012; 2.5 mg shall be used per burner after 31 December 2012
1(b)	Single capped (compact) fluorescent lamps not exceeding (per burner): For general lighting purposes ≥ 30 W and < 50 W: 5 mg	Expires on 31 December 2011; 3.5 mg may be used per burner after 31 December 2011
1(c)	Single capped (compact) fluorescent lamps not exceeding (per burner): For general lighting purposes ≥ 50 W and < 150 W: 5 mg	-
1(d)	Single capped (compact) fluorescent lamps not exceeding (per burner): For general lighting purposes ≥ 150 W: 15 mg	-
1(e)	Single capped (compact) fluorescent lamps not exceeding (per burner): For general lighting purposes with circular or square structural shape and tube diameter ≤ 17 mm	No limitation of use until 31 December 2011; 7 mg may be used per burner after 31 December 2011
1(f)	Single capped (compact) fluorescent lamps not exceeding (per burner): For special purposes: 5 mg	-
1(g)	Mercury in single capped (compact) fluorescent lamps not exceeding (per burner): For general lighting purposes < 30 W with a lifetime equal or above 20 000 h: 3.5 mg	Expires on 31 December 2017
2(a)(1)	Double-capped linear fluorescent lamps for general lighting purposes not exceeding (per lamp): Tri-band phosphor with normal lifetime and a tube diameter < 9 mm (e.g. T2): 5 mg	Expires on 31 December 2011; 4 mg may be used per lamp after 31 December 2011
2(a)(2)	Double-capped linear fluorescent lamps for general lighting purposes not exceeding (per lamp): Tri-band phosphor with normal lifetime and a tube diameter ≥ 9 mm and ≤ 17 mm (e.g. T5): 5 mg	Expires on 31 December 2011; 3 mg may be used per lamp after 31 December 2011
2(a)(3)	Double-capped linear fluorescent lamps for general lighting purposes not exceeding (per lamp): Tri-band phosphor with normal lifetime and a tube diameter > 17 mm and ≤ 28 mm (e.g. T8): 5 mg	Expires on 31 December 2011; 3.5 mg may be used per lamp after 31 December 2011
2(a)(4)	Double-capped linear fluorescent lamps for general lighting purposes not exceeding (per lamp): Tri-band phosphor with normal lifetime and a tube diameter > 28 mm (e.g. T12): 5 mg	Expires on 31 December 2012; 3.5 mg may be used per lamp after 31 December 2012
2(a)(5)	Double-capped linear fluorescent lamps for general lighting purposes not exceeding (per lamp): Tri-band phosphor with long lifetime (≥ 25 000 h): 8 mg	Expires on 31 December 2011; 5 mg may be used per lamp after 31 December 2011
2(b)(1)	Other fluorescent lamps not exceeding (per lamp): Linear halophosphate lamps with tube > 28 mm (e.g. T10 and T12): 10 mg	Expires on 13 April 2012
2(b)(2)	Other fluorescent lamps not exceeding (per lamp): Non-linear halophosphate lamps (all diameters): 15 mg	Expires on 13 April 2016

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Exemption		Scope and dates of applicability
2(b)(3)	Other fluorescent lamps not exceeding (per lamp): Non-linear tri-band phosphor lamps with tube diameter > 17 mm (e.g. T9)	No limitation of use until 31 December 2011; 15 mg may be used per lamp after 31 December 2011
2(b)(4)	Other fluorescent lamps not exceeding (per lamp): Lamps for other general lighting and special purposes (e.g. induction lamps)	No limitation of use until 31 December 2011; 15 mg may be used per lamp after 31 December 2011
3(a)	Cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for special purposes not exceeding (per lamp): Short length (≤ 500 mm)	No limitation of use until 31 December 2011; 3.5 mg may be used per lamp after 31 December 2011
3(b)	Cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for special purposes not exceeding (per lamp): Medium length (> 500 mm and $\leq 1\,500$ mm)	No limitation of use until 31 December 2011; 5 mg may be used per lamp after 31 December 2011
3(c)	Cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for special purposes not exceeding (per lamp): Long length ($> 1\,500$ mm)	No limitation of use until 31 December 2011; 13 mg may be used per lamp after 31 December 2011
4(a)	Other low pressure discharge lamps (per lamp)	No limitation of use until 31 December 2011; 15 mg may be used per lamp after 31 December 2011
4(b)-I	High Pressure Sodium (vapour) lamps for general lighting purposes not exceeding (per burner) in lamps with improved colour rendering index $R_a > 60$: $P \leq 155$ W	No limitation of use until 31 December 2011; 30 mg may be used per burner after 31 December 2011
4(b)-II	High Pressure Sodium (vapour) lamps for general lighting purposes not exceeding (per burner) in lamps with improved colour rendering index $R_a > 60$: 155 W $< P \leq 405$ W	No limitation of use until 31 December 2011; 40 mg may be used per burner after 31 December 2011
4(b)-III	High Pressure Sodium (vapour) lamps for general lighting purposes not exceeding (per burner) in lamps with improved colour rendering index $R_a > 60$: $P > 405$ W	No limitation of use until 31 December 2011; 40 mg may be used per burner after 31 December 2011
4(c)-I	Other High Pressure Sodium (vapour) lamps for general lighting purposes not exceeding (per burner): $P \leq 155$ W	No limitation of use until 31 December 2011; 25 mg may be used per burner after 31 December 2011
4(c)-II	Other High Pressure Sodium (vapour) lamps for general lighting purposes not exceeding (per burner): 155 W $< P \leq 405$ W	No limitation of use until 31 December 2011; 30 mg may be used per burner after 31 December 2011
4(c)-III	Other High Pressure Sodium (vapour) lamps for general lighting purposes not exceeding (per burner): $P > 405$ W	No limitation of use until 31 December 2011; 40 mg may be used per burner after 31 December 2011
4(d)	High Pressure Mercury (vapour) lamps (HPMV)	Expires on 13 April 2015
4(e)	Metal halide lamps (MH)	-
4(f)	Other discharge lamps for special purposes not specifically mentioned in this Annex	-
4(g)	Hand crafted luminous discharge tubes used for signs, decorative or architectural and specialist lighting and light-artwork, where the mercury content shall be limited as follows: (a) 20 mg per electrode pair + 0.3 mg per tube length in cm, but not more than 80 mg, for outdoor applications and indoor applications exposed to temperatures below 20 °C;	Expires on 31 December 2018

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Exemption		Scope and dates of applicability
	(b)15 mg per electrode pair + 0.24 mg per tube length in cm, but not more than 80 mg, for all other indoor applications.	
5(a)	Glass of cathode ray tubes	-
5(b)	Glass of fluorescent tubes not exceeding 0.2 % by weight	-
6(a)	Alloying element in steel for machining purposes and in galvanised steel containing up to 0.35 % lead by weight	Expires on: —21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments; —21 July 2023 for category 8 in vitro diagnostic medical devices; —21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11.
6(a)-I	Lead as an alloying element in steel for machining purposes containing up to 0,35 % lead by weight and in batch hot dip galvanised steel components containing up to 0,2 % lead by weight	Expires on 21 July 2021 for categories 1-7 and 10.'
6(b)	Alloying element in aluminium containing up to 0.4 % lead by weight	Expires on: —21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments, —21 July 2023 for category 8 in vitro diagnostic medical devices, —21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11.
6(b)-I	Lead as an alloying element in aluminium containing up to 0,4 % lead by weight, provided it stems from lead-bearing aluminium scrap recycling	Expires on 21 July 2021 for categories 1-7 and 10
6(b)-II	Lead as an alloying element in aluminium for machining purposes with a lead content up to 0,4 % by weight	Expires on 21 July 2021 for categories 1-7 and 10
6(c)	Copper alloy containing up to 4 % lead by weight	Expires on: —21 July 2021 for categories 1-7 and 10; —21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments; —21 July 2023 for category 8 in vitro diagnostic medical devices; —21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11.
7(a)	High melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead)	Applies to categories 1-7 and 10 (except applications covered by point 24 of this Annex) and expires on 21 July 2021. For categories 8 and 9 other than in vitro diagnostic medical devices and industrial

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Exemption		Scope and dates of applicability
		<p>monitoring and control instruments expires on 21 July 2021.</p> <p>For category 8 in vitro diagnostic medical devices expires on 21 July 2023.</p> <p>For category 9 industrial monitoring and control instruments, and for category 11 expires on 21 July 2024.</p>
7(b)	Solders for servers, storage and storage array systems, network infrastructure equipment for switching, signalling, transmission, and network management for telecommunications	-
7(c)-I	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	<p>Applies to categories 1-7 and 10 (except applications covered under point 34) and expires on 21 July 2021.</p> <p>For categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments expires on 21 July 2021.</p> <p>For category 8 in vitro diagnostic medical devices expires on 21 July 2023.</p> <p>For category 9 industrial monitoring and control instruments, and for category 11 expires on 21 July 2024.</p>
7(c)-II	Dielectric ceramic in capacitors for a rated voltage of 125 V AC or 250 V DC or higher	<p>Does not apply to applications covered by point 7(c)-I and 7(c)-IV of this Annex.</p> <p>Expires on:</p> <ul style="list-style-type: none"> —21 July 2021 for categories 1-7 and 10; —21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments; —21 July 2023 for category 8 in vitro diagnostic medical devices; —21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11.
7(c)-III	Dielectric ceramic in capacitors for a rated voltage of less than 125 V AC or 250 V DC	Expires on 1 January 2013 and after that date may be used in spare parts for EEE placed on the market before 1 January 2013
7(c)-IV	PZT based dielectric ceramic materials for capacitors which are part of integrated circuits or discrete semiconductors	<p>Expires on:</p> <ul style="list-style-type: none"> —21 July 2021 for categories 1-7 and 10; —21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments; —21 July 2023 for category 8 in vitro diagnostic medical devices; —21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11.
8(a)	Cadmium and its compounds in one shot pellet type thermal cut-offs	Expires on 1 January 2012 and after that date may be used in spare parts for EEE placed on the market before 1 January 2012

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Exemption		Scope and dates of applicability
8(b)	Cadmium and its compounds in electrical contacts	Applies to categories 8, 9 and 11 and expires on: —21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments; —21 July 2023 for category 8 in vitro diagnostic medical devices; —21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11.
8(b)-I	Cadmium and its compounds in electrical contacts used in: —circuit breakers, —thermal sensing controls, —thermal motor protectors (excluding hermetic thermal motor protectors), —AC switches rated at: —6 A and more at 250 V AC and more, or —12 A and more at 125 V AC and more, —DC switches rated at 20 A and more at 18 V DC and more, and —switches for use at voltage supply frequency ≥ 200 Hz.	Applies to categories 1 to 7 and 10 and expires on 21 July 2021.
9	Hexavalent chromium as an anticorrosion agent of the carbon steel cooling system in absorption refrigerators up to 0,75 % by weight in the cooling solution	Applies to categories 8, 9 and 11 and expires on: —21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments, —21 July 2023 for category 8 in vitro diagnostic medical devices, —21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11.
9(a)-I	Up to 0,75 % hexavalent chromium by weight, used as an anticorrosion agent in the cooling solution of carbon steel cooling systems of absorption refrigerators (including minibars) designed to operate fully or partly with electrical heater, having an average utilised power input < 75 W at constant running conditions	Applies to categories 1-7 and 10 and expires on 5 March 2021.
9(a)-II	Up to 0,75 % hexavalent chromium by weight, used as an anticorrosion agent in the cooling solution of carbon steel cooling systems of absorption refrigerators: —designed to operate fully or partly with electrical heater, having an average utilised power input ≥ 75 W at constant running conditions, —designed to fully operate with non-electrical heater.	Applies to categories 1-7 and 10 and expires on 21 July 2021.
9(b)	Bearing shells and bushes for refrigerant-containing compressors for heating, ventilation, air conditioning and refrigeration (HVACR) applications	Applies to categories 8, 9 and 11; expires on: 21 July 2023 for category 8 in vitro diagnostic medical devices, 21 July 2024 for category 9 industrial monitoring and control instruments and for category 11,

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Exemption		Scope and dates of applicability
		21 July 2021 for other subcategories of categories 8 and 9.
9(b)-I	Bearing shells and bushes for refrigerant-containing hermetic scroll compressors with a stated electrical power input equal or below 9 kW for heating, ventilation, air conditioning and refrigeration (HVACR) applications	Applies to category 1; expires on 21 July 2019.
11(a)	C-press compliant pin connector systems	May be used in spare parts for EEE placed on the market before 24 September 2010
11(b)	Other than C-press compliant pin connector systems	Expires on 1 January 2013 and after that date may be used in spare parts for EEE placed on the market before 1 January 2013
12	Coating material for the thermal conduction module C-ring	May be used in spare parts for EEE placed on the market before 24 September 2010
13(a)	White glasses used for optical application	Applies to all categories; expires on: 21 July 2023 for category 8 in vitro diagnostic medical devices; 21 July 2024 for category 9 industrial monitoring and control instruments and for category 11; 21 July 2021 for all other categories and subcategories
13(b)	Filter glasses and glasses used for reflectance standards	Applies to categories 8, 9 and 11; expires on: 21 July 2023 for category 8 in vitro diagnostic medical devices; 21 July 2024 for category 9 industrial monitoring and control instruments and for category 11; 21 July 2021 for other subcategories of categories 8 and 9
13(b)-I	Ion coloured optical filter glass types	Applies to categories 1 to 7 and 10; expires on 21 July 2021 for categories 1 to 7 and 10
13(b)-II	Striking optical filter glass types; excluding applications falling under point 39 of this Annex	Applies to categories 1 to 7 and 10; expires on 21 July 2021 for categories 1 to 7 and 10
13(b)-III	Glazes used for reflectance standards	Applies to categories 1 to 7 and 10; expires on 21 July 2021 for categories 1 to 7 and 10
14	Solders consisting of more than two elements for the connection between the pins and the package of microprocessors with a lead content of more than 80 % and less than 85 % by weight	Expired on 1 January 2011 and after that date may be used in spare parts for EEE placed on the market before 1 January 2011
15	Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit flip chip packages	Applies to categories 8, 9 and 11 and expires on: —21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments; —21 July 2023 for category 8 in vitro diagnostic medical devices; —21 July 2024 for category 9 industrial

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Exemption		Scope and dates of applicability
		monitoring and control instruments, and for category 11.
15(a)	Lead in solders to complete a viable electrical connection between the semiconductor die and carrier within integrated circuit flip chip packages where at least one of the following criteria applies: —a semiconductor technology node of 90 nm or larger; —a single die of 300 mm ² or larger in any semiconductor technology node; —stacked die packages with die of 300 mm ² or larger, or silicon interposers of 300 mm ² or larger.	Applies to categories 1 to 7 and 10 and expires on 21 July 2021.
16	Linear incandescent lamps with silicate coated tubes	Expires on 1 September 2013
17	Lead halide as Radiant agent in high intensity discharge (HID) lamps used for professional reprography applications	-
18(a)	Lead as activator in the fluorescent powder (1 % lead by weight or less) of discharge lamps when used as speciality lamps for diazoprinting reprography, lithography, insect traps, photochemical and curing processes containing phosphors such as SMS ((Sr,Ba) ₂ MgSi ₂ O ₇ :Pb)	Expired on 1 January 2011
18(b)	Lead as activator in the fluorescent powder (1 % lead by weight or less) of discharge lamps when used as sun tanning lamps containing phosphors such as BSP (BaSi ₂ O ₅ :Pb)	expires on: —21 July 2021 for categories 1-7 and 10; —21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments; —21 July 2023 for category 8 in vitro diagnostic medical devices; —21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11.
18(b)-I	Lead as activator in the fluorescent powder (1 % lead by weight or less) of discharge lamps containing phosphors such as BSP (BaSi ₂ O ₅ :Pb) when used in medical phototherapy equipment	Applies to categories 5 and 8, excluding applications covered by entry 34 of Annex IV, and expires on 21 July 2021.
19	Lead with PbBiSn-Hg and PbInSn-Hg in specific compositions as main amalgam and with PbSn-Hg as auxiliary amalgam in very compact energy saving lamps (ESL)	Expires on 1 June 2011
20	Lead oxide in glass used for bonding front and rear substrates of flat fluorescent lamps used for Liquid Crystal Displays (LCDs)	Expires on 1 June 2011
21	Lead and cadmium in printing inks for the application of enamels on glasses, such as borosilicate and soda lime glasses	Applies to categories 8, 9 and 11 and expires on: —21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments; —21 July 2023 for category 8 in vitro diagnostic medical devices; —21 July 2024 for category 9 industrial

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Exemption		Scope and dates of applicability
		monitoring and control instruments, and for category 11.
21(a)	Cadmium when used in colour printed glass to provide filtering functions, used as a component in lighting applications installed in displays and control panels of EEE	Applies to categories 1 to 7 and 10 except applications covered by entry 21(b) or entry 39 and expires on 21 July 2021.
21(b)	Cadmium in printing inks for the application of enamels on glasses, such as borosilicate and soda lime glasses	Applies to categories 1 to 7 and 10 except applications covered by entry 21(a) or 39 and expires on 21 July 2021.
21(c)	Lead in printing inks for the application of enamels on other than borosilicate glasses	Applies to categories 1 to 7 and 10 and expires on 21 July 2021.
23	Finishes of fine pitch components other than connectors with a pitch of 0.65 mm and less	May be used in spare parts for EEE placed on the market before 24 September 2010
24	Solders for the soldering to machined through hole discoidal and planar array ceramic multilayer capacitors	Expires on: —21 July 2021 for categories 1-7 and 10, —21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments, —21 July 2023 for category 8 in vitro diagnostic medical devices, —21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11.
25	Lead oxide in surface conduction electron emitter displays (SED) used in structural elements, notably in the seal frit and frit ring	-
26	Lead oxide in glass envelope of black light blue lamps	Expires on 1 June 2011
27	Lead alloys as solder for transducers used in high-powered (designated to operate for several hours at acoustic power levels of 125 dB SPL and above) loudspeakers	Expired on 24 September 2010
29	Lead bound in crystal glass as defined in Annex I (Categories 1, 2, 3 and 4) of Council Directive 69/493/EEC	Expires on: —21 July 2021 for categories 1-7 and 10; —21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments; —21 July 2023 for category 8 in vitro diagnostic medical devices; —21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11.
30	Cadmium alloys as electrical/mechanical solder joints to electrical conductors located directly on the voice coil in transducers used in high-powered loudspeakers with sound pressure levels of 100 dB (A) and more	-
31	Soldering materials in mercury free flat fluorescent lamps (which, e.g. are used for liquid crystal displays, design or industrial lighting)	-
32	Lead oxide in seal frit used for making window assemblies for Argon and Krypton laser tubes	Expires on: —21 July 2021 for categories 1-7 and 10,

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Exemption		Scope and dates of applicability
		—21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments, —21 July 2023 for category 8 in vitro diagnostic medical devices, —21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11.
33	Solders for the soldering of thin copper wires of 100 µm diameter and less in power transformers	-
34	Cermet-based trimmer potentiometer elements	Expires on: —21 July 2021 for categories 1-7 and 10; —21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments; —21 July 2023 for category 8 in vitro diagnostic medical devices; —21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11.
36	Cathode sputtering inhibitor in DC plasma displays with a content up to 30 mg per display	Expired on 1 July 2010
37	Plating layer of high voltage diodes on the basis of a zinc borate glass body	Expires on: —21 July 2021 for categories 1-7 and 10; —21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments; —21 July 2023 for category 8 in vitro diagnostic medical devices; —21 July 2024 for category 9 industrial monitoring and control instruments, and for category 11.
38	Cadmium and cadmium oxide in thick film pastes used on aluminium bonded beryllium oxide	-
39(a)	Cadmium selenide in downshifting cadmium-based semiconductor nanocrystal quantum dots for use in display lighting applications (< 0.2 µg Cd per mm ² of display screen area)	Expires for all categories on 31 October 2019
40	Photoresistors for analogue optocouplers applied in professional audio equipment	Expires on 31 December 2013
41	Lead in solders and termination finishes of electrical and electronic components and finishes of printed circuit boards used in ignition modules and other electrical and electronic engine control systems, which for technical reasons must be mounted directly on or in the crankcase or cylinder of hand-held combustion engines (classes SH:1, SH:2, SH:3 of Directive 97/68/EC of the European Parliament and of the Council (*1))	Applies to all categories and expires on: —31 March 2022 for categories 1 to 7, 10 and 11; —21 July 2021 for categories 8 and 9 other than in vitro diagnostic medical devices and industrial monitoring and control instruments; --21 July 2023 for category 8 in vitro

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Exemption		Scope and dates of applicability
		diagnostic medical devices; —21 July 2024 for category 9 industrial monitoring and control instruments.
42	Lead in bearings and bushes of diesel or gaseous fuel powered internal combustion engines applied in non-road professional use equipment: —with engine total displacement \geq 15 litres; or —with engine total displacement < 15 litres and the engine is designed to operate in applications where the time between signal to start and full load is required to be less than 10 seconds; or regular maintenance is typically performed in a harsh and dirty outdoor environment, such as mining, construction, and agriculture applications.	Applies to category 11, excluding applications covered by entry 6(c) of this Annex. Expires on 21 July 2024.'
43	Bis(2-ethylhexyl) phthalate in rubber components in engine systems, designed for use in equipment that is not intended solely for consumer use and provided that no plasticised material comes into contact with human mucous membranes or into prolonged contact with human skin and the concentration value of bis(2-ethylhexyl) phthalate does not exceed: (a) 30 % by weight of the rubber for (i) gasket coatings; (ii) solid-rubber gaskets; or (iii) rubber components included in assemblies of at least three components using electrical, mechanical or hydraulic energy to do work, and attached to the engine. (b) 10 % by weight of the rubber for rubber-containing components not referred to in point (a). For the purposes of this entry, "prolonged contact with human skin" means continuous contact of more than 10 minutes duration or intermittent contact over a period of 30 minutes, per day.	Applies to category 11 and expires on 21 July 2024.
44	Lead in solder of sensors, actuators, and engine control units of combustion engines within the scope of Regulation (EU) 2016/1628 of the European Parliament and of the Council (*1), installed in equipment used at fixed positions while in operation which is designed for professionals, but also used by non-professional users	Applies to category 11 and expires on 21 July 2024.

--END OF REPORT--

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