

Test Report issued under the responsibility of:

SAMSUNG

TEST REPORT IEC TR 62778 Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires	
Report Number.	21-05-02
Date of issue	2021-05-26
Total number of pages	11
Name of Testing Laboratory preparing the Report	SAMSUNG ELECTRONICS Co., Ltd.
Applicant's name	SAMSUNG ELECTRONICS Co., Ltd.
Address	1, Samsung-ro, Giheung-gu, Yongin-si, Gyeonggi-do, 17113, Korea
Test specification:	
Standard	IEC TR 62778:2014 (Second Edition)
Test procedure	N/A
Non-standard test method	N/A
Test Report Form No.	IEC62778A
Test Report Form(s) Originator	TÜV SÜD Product Service GmbH
Master TRF	Dated 2016-02
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General disclaimer:	
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Test item description :	Middle Power LED (Product name : LM301B EVO)	
Trade Mark :	SAMSUNG	
Manufacturer	SAMSUNG ELECTRONICS Co., Ltd.	
Model/Type reference :	SPMWHT32AMV5*****	
Ratings :	65 mA, Typ. 2,8 V	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
<input checked="" type="checkbox"/>	Testing Laboratory:	SAMSUNG ELECTRONICS Co., Ltd.
Testing location/ address		1, Samsung-ro, Giheung-gu, Yongin-si, Gyeonggi-do, 17113, Korea
Tested by (name, function, signature) :		Doosung Park 
Approved by (name, function, signature) .. :		Dosuk Oh 
<input type="checkbox"/>	Testing procedure: CTF Stage 1:	
Testing location/ address		
Tested by (name, function, signature) :		
Approved by (name, function, signature) .. :		
<input type="checkbox"/>	Testing procedure: CTF Stage 2:	
Testing location/ address		
Tested by (name + signature) :		
Witnessed by (name, function, signature) . :		
Approved by (name, function, signature) .. :		
<input type="checkbox"/>	Testing procedure: CTF Stage 3:	
<input type="checkbox"/>	Testing procedure: CTF Stage 4:	
Testing location/ address		
Tested by (name, function, signature) :		
Witnessed by (name, function, signature) . :		
Approved by (name, function, signature) .. :		
Supervised by (name, function, signature) :		

List of Attachments (including a total number of pages in each attachment): - Attachment 1 : Photographs (1 page)	
Summary of testing: - All clauses. - Performed by supplying DC 2,91 V, 200 mA to the representative model SPMWHT32AMV5XAP0SV.	
Tests performed (name of test and test clause): 7. MEASUREMENT INFORMATION FLOW 8. RISK GROUP CLASSIFICATION *) Only blue light hazard have been addressed.	Testing location: SAMSUNG ELETRONICS Co., Ltd 1, Samsung-ro, Giheung-gu, Yongin-si, Gyeonggi-do, 17113, Korea
Summary of compliance with National Differences (List of countries addressed): N/A	
Copy of marking plate:	

Test item particulars..... :	
Product evaluated..... :	<input checked="" type="checkbox"/> LED package <input type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire
Rated voltage (V)..... :	Typ. 2,8 V
Rated current (mA)..... :	DC 65 mA
Rated CCT (K)..... :	-
Rated Luminance (Mcd/m²)..... :	-
Component report data used..... :	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> LED package <input type="checkbox"/> LED module <input type="checkbox"/> Lamp Report number: N/A
Possible test case verdicts:	
- test case does not apply to the test object..... : N/A	
- test object does meet the requirement..... : P (Pass)	
- test object does not meet the requirement..... : F (Fail)	
Testing..... :	
Date of receipt of test item..... :	2021-05-11
Date (s) of performance of tests..... :	2021-05-21 ~ 2021-05-25
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.	
Throughout this report a <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator.	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60730-2:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies)..... :	APT Electronics Co., Ltd. No33, South of Huan Shi Road, Nansha Direct, Guangzhou, China

General product information and other remarks:

[Absolute Maximum Rating]

Item	Symbol	Rating	Unit	Condition
Ambient / Operating Temperature	T_a	-40 ~ +85	°C	-
Storage Temperature	T_{stg}	-40 ~ +120	°C	-
LED Junction Temperature	T_j	110	°C	-
Forward Current	I_f	200	mA	-
Pulse Forward Current	I_{fp}	300	mA	Duty 1/10, pulse width 10ms
Assembly Process Temperature	-	260 <10	°C s	-
ESD (HBM)	-	5	kV	-

[Electro-optical Characteristics ($I_f = 65\text{mA}$, $T_s = 25\text{ °C}$)]

Item	Unit	Rank	Bin	Min.	Typ.	Max.
Forward Voltage (V_f)	V	XA	AY	2.6	-	2.7
			AZ	2.7	-	2.8
			A1	2.8	-	2.9
Reverse Voltage (@ 5 mA)	V			0.7	-	1.2
Color Rendering Index (R_a)	-			80	-	-
Thermal Resistance (junction to solder point)	°C/W			-	7.5	-
Beam Angle	°			-	120	-

Note:Samsung maintains measurement tolerance of: forward voltage = $\pm 0.1\text{ V}$, luminous flux = $\pm 5\%$, CRI = ± 3

[LuminousFluxBins (IF = Sorting Current)]

Item	CRI	Nominal CCT (K)	Luminous Flux (lm)													
			36.0	36.5	37.0	37.5	38.0	38.5	39.0	39.5	40.0	40.5	41.0	41.5	42.0	42.5
Luminous Flux (Φ_v)	80	2700	36.0						39.0							
		3000			37.0						40.0					
		3500					38.0						41.0			
		4000									39.5					42.5
		5000									39.5					42.5
		5700									39.5					42.5
		6500							38.5					41.5		

Note:Samsung maintains measurement tolerance of: forward voltage = $\pm 0.1\text{V}$, luminous flux = $\pm 5\%$, CRI = ± 3

[Product Code Information]
- SPMWHT32AMV5XAP0SV

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
S	P	M	W	H	D	3	2	A	M	V	5	X	A	R	0	S	V

Digit	PKG Information	Code	Specification
1 2 3	Samsung Package Middle Power	SPM	
4 5	Color	WH	White
6	Product Version	D	Dispensing
7 8 9	Form Factor	32A	3.0 x 3.0 x 0.80 mm; 2 pads;
10	Sorting Current (mA)	M	65 mA
11	Chromaticity Coordinates	V	ANSI Standard, MacAdam 3 step ellipse bin, MacAdam 5 step ellipse bin
12	CRI	5	Min. 80
13 14	Forward Voltage (V)	XA	2.6~2.9 Bin Code: AY 2.6~2.7 AZ 2.7~2.8 A1 2.8~2.9
15 16	Color bin	W ● V ● U ● T ● R ● Q ● P ●	2700 WA, WB, WC, WD, WE, WF, WG, WH, WJ, WK, WL, WM 3000 VA, VB, VC, VD, VE, VF, VG, VH, VI, VK, VL, VM 3500 UA, UB, UC, UD, UE, UF, UG, UH, UI, UK, UL, UM 4000 Bin Code TA, TB, TC, TD, TE, TF, TG, TH, TJ, TK, TL, TM 5000 RA, RB, RC, RD, RE, RF, RG, RH, RJ, RK, RL, RM 5700 QA, QB, QC, QD, QE, QF, QG, QH, QJ, QK, QL, QM 6500 PA, PB, PC, PD, PE, PF, PG, PH, PJ, PK, PL, PM
● : "0" (Whole bin) "3" (MacAdam 3-step ellipse bin) or "K" (K Kitting) or "S" (S Kitting)			
17 18	Luminous Flux	SV	Bin Code: SV 36.0 ~ 42.5

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict
7	MEASUREMENT INFORMATION FLOW		P
7.1	Basic flow		P
	'Law of conservation of luminance' applied		N/A
	Use of only true luminance/radiance values		P
	In case of luminaire: The light source is operated in the luminaire under similar conditions as when tested as a component		N/A
	In case E_{thr} value for RG2 was established the peak value was derived from angular light distribution		N/A
7.2	Conditions for the radiance measurement		P
	Standard condition applied (200mm distance, 0,011rad field of view)		N/A
	Non-standard condition applied		P
7.3	Special cases (I): Replacement by a lamp or LED module of another type		
	Light source is a white light source		N/A
	Evaluation done based on highest luminance		N/A
	Evaluation done based on CCT value		N/A
7.4	Special cases (II): Arrays and clusters of primary light sources		N/A
	LED package is evaluated as : <input type="checkbox"/> RG0 unlimited <input type="checkbox"/> RG1 unlimited		N/A
	E_{thr} of LED package applies to array		N/A
8	RISK GROUP CLASSIFICATION		P
	Risk group achieved:		P
	- .. Risk Group 0 unlimited		N/A
	- .. Risk Group 1 unlimited		N/A
	- E_{thr} (lx) : Distance to reach RG1 (m) :	1,12E+03	P

TABLE: Spectroradiometric measurement				
Measurement performed on:		<input checked="" type="checkbox"/> LED package <input type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire		
Model number		SPMWHT32AMV5XAP0SV		
Test voltage (V)		DC 2,91 V		
Test current (mA)		200 mA		
Test frequency (Hz).....		-		
Ambient, t (°C).....		25,0		
Measurement distance		<input checked="" type="checkbox"/> 20 cm <input type="checkbox"/> ... cm		
Source size		<input type="checkbox"/> Non-small <input checked="" type="checkbox"/> Small : 7,5 mrad (1,51 x 1,5 mm)		
Field of view		<input type="checkbox"/> 100 mrad <input checked="" type="checkbox"/> 11 mrad <input type="checkbox"/> 1,7 mrad (for small sources)		
Item	Symbol	Units	Result	Remark
Correlated colour temperature	CCT	K	6 780	
x/y colour coordinates			0,3086 / 0,3239	
Blue light hazard radiance	L _B	W/(m ² •sr ¹)	-	
Blue light hazard irradiance	E _B	W/m ²	0,928	
Luminance	L	cd/m ²	-	
Illuminance	E	lx	1,12E+03	
Supplementary information:				

	TABLE: Angular light distribution	N/A
N/A		

List of test equipment used:

A completed list of used test equipment shall be provided in the Test Reports when a Manufacturer Testing

Laboratory according to CTF stage 1 or CTF stage 2 procedure has been used.

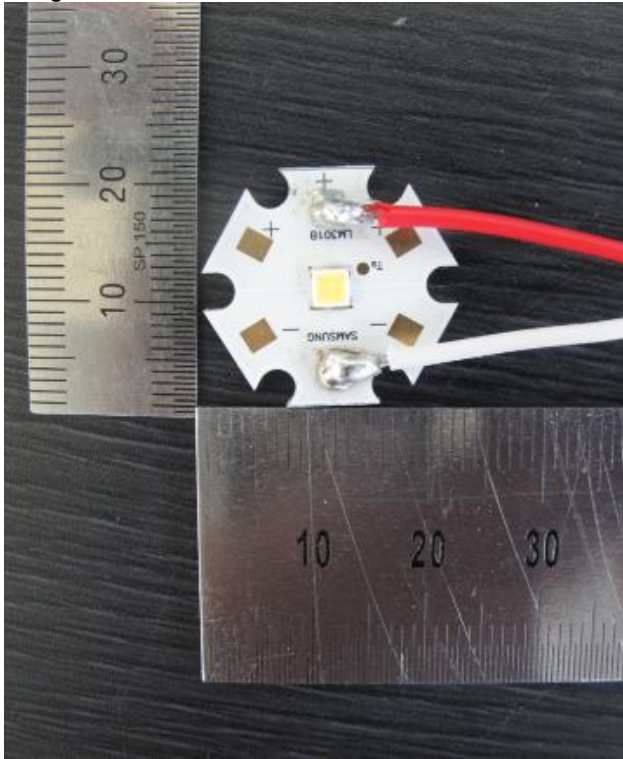
Note: This page may be removed when CTF stage 1 CTF stage 2 are not used. See also clause 4.8 in OD

2020 for more details.

Clause	Measurement / testing	Testing / measuring equipment / material used, (Equipment ID)	Range used	Last Calibration date	Calibration due date
7	Irradiance measurements Radiance measurements	IDR 300 Monochromator (15702)	200 nm-3000 nm	- / -	- / -
7	Radiance measurements	TEL309 Telescope (15334/3)	300 nm-1400 nm	- / -	- / -
7	Radiance measurements	SRS 12 Radiance Standard (15474/3)	300 nm-1400 nm	2019/07/15	2021/07/15
7	Irradiance measurements	CL6 Spectral irradiance standard (15265/5)	200 nm-3000 nm	2019/07/11	2021/07/11
7	Irradiance measurements	CL7 Spectral irradiance standard (15472/3)	200 nm-400 nm	2019/07/11	2021/07/11

Attachment : Photographs

< Fig. 1 >



< Fig. 2 >

