



Report No.: BLC2012004E-L

## LM-79-08 Test Report

For

**ASmart LIGHT CO., LTD**

**(Brand Name: ASmart)**

506 N GARFIELD AVE SUITE#210 ALHAMBRA CA 91801

### High-Bay Luminaires (Commercial and Industrial)

Model name(s): AST-HB11-240WS1BT2H1-abcd

Remark: "a" can be any two letters to represent lamp colors; "b" can be "10SP", "20SP" or blank for Surge-Protective Device provided or not; "c" can be "M", "P" or blank for Motion Sensor, PIR sensor provided or not; "d" can be any digits to represent CCT, can be 35=3500K; 40=4000K; 45=4500K; 50=5000K; 57=5700K.

Representative (Tested) Model:  
AST-HB11-240WS1BT2H1-abc35  
AST-HB11-240WS1BT2H1-abc40  
AST-HB11-240WS1BT2H1-abc57

Model Different: All construction and rating are the same, except CCT

Test & Report By:

*Lily Yang*

Engineer: Lily Yang

Date:2021-01-11

Review By:

*Jason Luo*

Manager: Jason Luo

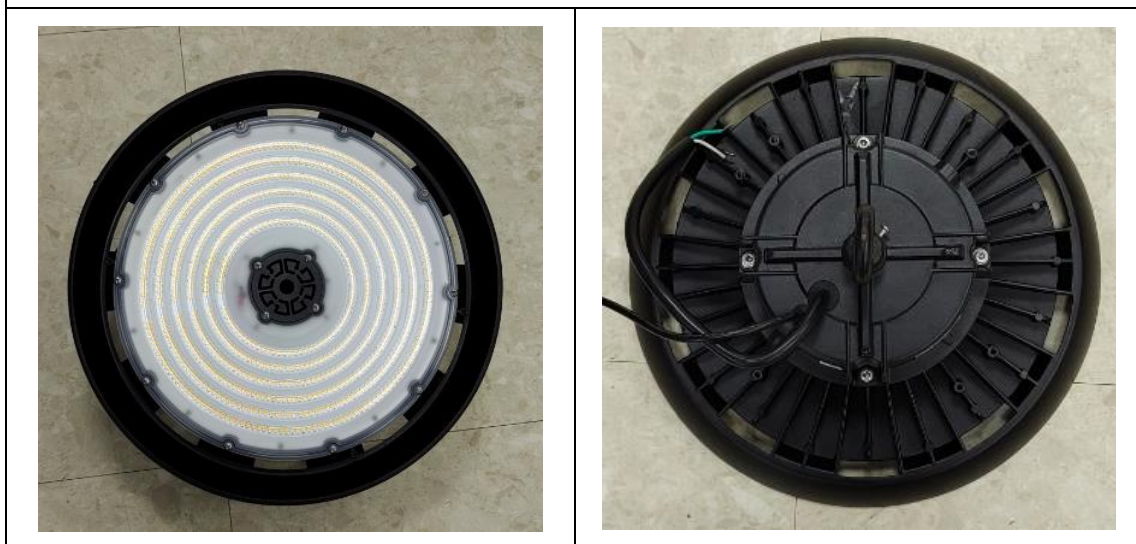


Report No.: BLC2012004E-L

### 1.1 Product Information:

Organization Name	ASmart LIGHT CO., LTD	
Brand Name	ASmart	
Model Number	AST-HB11-240WS1BT2H1-abcd	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	High-Bay Luminaires (Commercial and Industrial)	
Rated Voltage / Frequency	277-480Vac, 50/60 Hz	
Nominal Power	240W	
Rated Initial Lamp Lumen	--	
Declared CCT	3500K, 4000K, 4500K, 5000K, 5700K	
Dimmable or Not	Yes	
Dimming type	Continuous Dimming	
LED Manufacturer	Lumileds Holding B.V.	
LED Model	L128-XX80RA35000P1	
Sample Number	BLC2012004E-L1(3500K),L2(4000K), L3(5700K)	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

#### Photo





## 1.2 Test Specifications:

Date of Receipt	2020-10-18
Date of Test	2020-12-03
Test item	<ol style="list-style-type: none"><li>1. Total Luminous Flux</li><li>2. Luminous Distribution Intensity</li><li>3. Luminous Efficacy</li><li>4. Correlated Color Temperature</li><li>5. Color Rendering Index</li><li>6. Chromaticity Coordinate</li><li>7. Electrical Parameters</li></ol>
Reference Standard	<ol style="list-style-type: none"><li>1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products</li><li>2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products</li><li>3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources</li><li>4. CIE 15-2004 Technical Report Colorimetry</li><li>5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source</li><li>6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems</li></ol>
Reference Work Instruction	BL-QP-033

## 1.3 Test Methods

### 1) Photometric and Light Distribution Measurement – Goniophotometer Method:

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ , measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at  $1^{\circ}$  vertical intervals and  $22.5^{\circ}$  horizontal intervals.

### 2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm.

### 3) Electrical Measurements:

Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.

**2.1 Electrical, Photometric and Chromaticity Measurements***(Refer to Work Instruction BL-QP-033)*

<b>Test date</b>	2020-12-03	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	AST-HB11-240WS1BT2H1-abc35		

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC201200	277.0	60	0.874	241.65	0.998	3.75
4E-L1	480.0	60	0.512	239.12	0.973	6.58
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

**Chromaticity Measurement - Sphere-Spectroradiometer Method:**

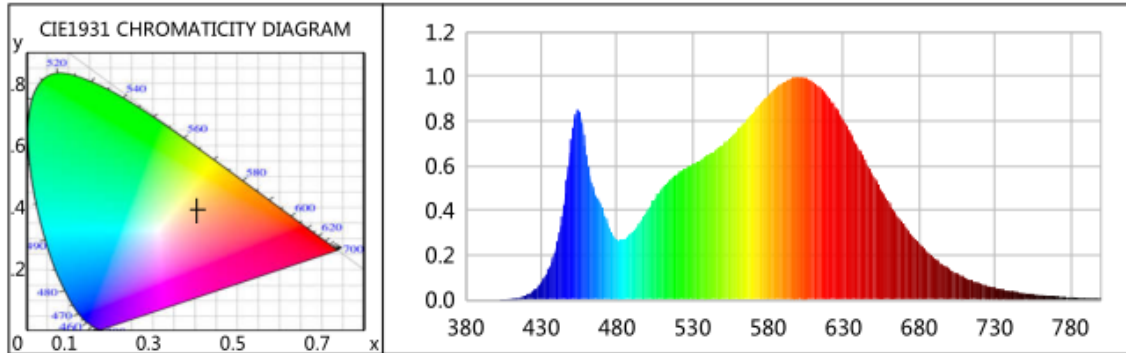
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	277.0	R1	83	R9	13
Frequency (Hz)	60	R2	92	R10	81
CCT (K)	3484	R3	96	R11	81
Duv	-0.0004	R4	82	R12	67
Chromaticity (x, y)	x=0.4059 y=0.3902	R5	83	R13	86
Chromaticity (u', v')	u(u')=0.2363 v'(v')=0.5111	R6	90	R14	99
Color Rendering Index (CRI)	84	R7	84	R15	76
R9	13	R8	63	--	--
Rf	85	--	--	--	--
Rg	95	--	--	--	--
Rcs,h1(%)	-11	--	--	--	--

**Photometric Measurement – Goniophotometer Method:**

Parameter	Result		DLC V5.1 Pass Criteria
Test Voltage (V)	277.0	480.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	32928.1	32298.2	>=10000(-10%)
Luminous Efficacy (lm/W)	136.26	135.07	Premium: >= 135(-3%)
Most worst Luminous/Highest	133.66		



### Spectral Power Distribution & Chromaticity Diagram



WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0003	0.1975	525	0.5861	361.7370	670	0.3326	205.2715
385	0.0003	0.2137	530	0.6059	373.9195	675	0.2906	179.3511
390	0.0001	0.0792	535	0.6247	385.5602	680	0.2512	155.0392
395	0.0005	0.2815	540	0.6479	399.8369	685	0.2163	133.4831
400	0.0007	0.4369	545	0.6691	412.9065	690	0.1859	114.7363
405	0.0015	0.9002	550	0.6948	428.7891	695	0.1612	99.4531
410	0.0040	2.4933	555	0.7262	448.1701	700	0.1374	84.8051
415	0.0095	5.8442	560	0.7605	469.3662	705	0.1168	72.0694
420	0.0203	12.5266	565	0.7979	492.4411	710	0.1005	62.0240
425	0.0404	24.9363	570	0.8372	516.6892	715	0.0855	52.7787
430	0.0750	46.3000	575	0.8790	542.4765	720	0.0731	45.1345
435	0.1365	84.2112	580	0.9139	563.9854	725	0.0625	38.5819
440	0.2387	147.3026	585	0.9462	583.9602	730	0.0533	32.8632
445	0.4252	262.4181	590	0.9736	600.8256	735	0.0456	28.1444
450	0.7207	444.8000	595	0.9911	611.6356	740	0.0387	23.8690
455	0.8478	523.2219	600	0.9982	616.0053	745	0.0331	20.4129
460	0.6465	398.9789	605	0.9930	612.8500	750	0.0285	17.5941
465	0.4873	300.7105	610	0.9767	602.7483	755	0.0242	14.9113
470	0.4150	256.1174	615	0.9475	584.7318	760	0.0204	12.5693
475	0.3241	200.0142	620	0.9080	560.3699	765	0.0173	10.6537
480	0.2702	166.7357	625	0.8594	530.3551	770	0.0148	9.1429
485	0.2736	168.8766	630	0.8020	494.9509	775	0.0131	8.0571
490	0.2994	184.7526	635	0.7397	456.4882	780	0.0105	6.4537
495	0.3425	211.3644	640	0.6764	417.4574	785	0.0090	5.5268
500	0.3974	245.2255	645	0.6135	378.6113	790	0.0083	5.1285
505	0.4510	278.3060	650	0.5503	339.5966	795	0.0069	4.2290
510	0.5006	308.9276	655	0.4896	302.1585	800	0.0052	3.2277
515	0.5354	330.4164	660	0.4328	267.0720			
520	0.5632	347.5692	665	0.3802	234.6140			



**TM30**

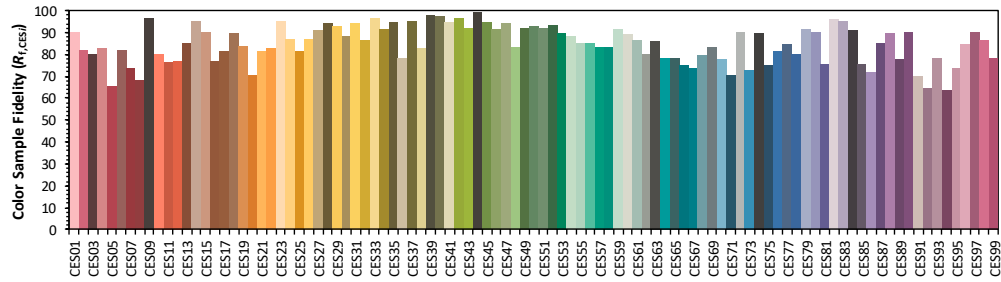
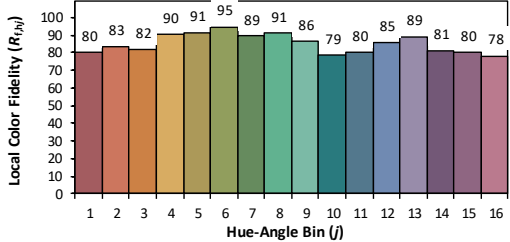
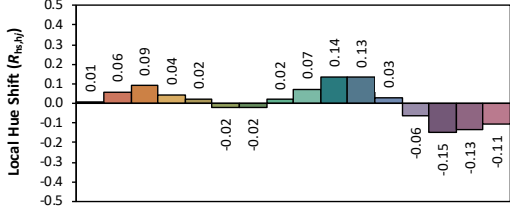
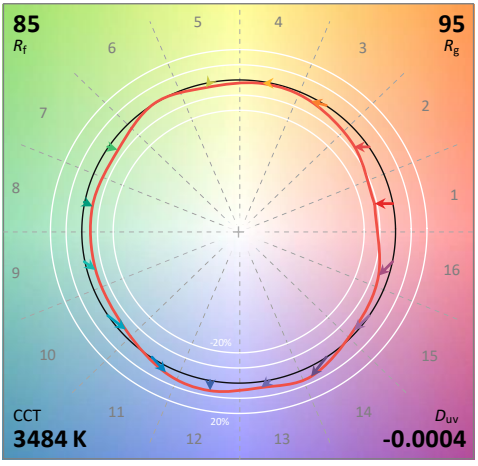
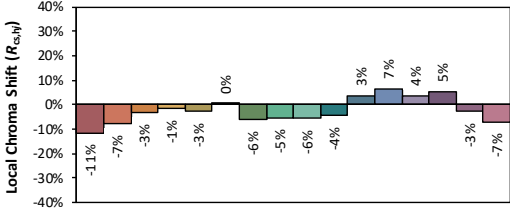
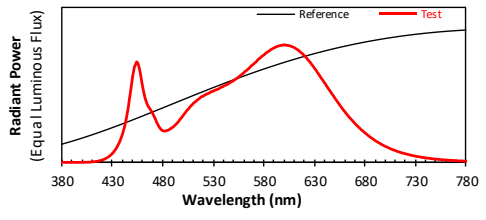
**ANSI/IES TM-30-18 Color Rendition Report**

**Source:** L128-XX80RA3500P1

**Date:** 2020/12/3

**Manufacturer:** ASmart LIGHT CO., LTD

**Model:** AST-HB11-240WS1BT2H1-abc35



**Notes:** This is a recommended method for displaying ANSI/IES TM-30-18 information.

$x$	<b>0.4059</b>	CIE 13.3-1995 (CRI)  $R_a$ 84  $R_9$ 13
$y$	<b>0.3902</b>	
$u'$	<b>0.2363</b>	
$v'$	<b>0.5111</b>	

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

**2.2 Electrical, Photometric and Chromaticity Measurements***(Refer to Work Instruction BL-QP-033)*

<b>Test date</b>	2020-12-03	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	AST-HB11-240WS1BT2H1-abc40		

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC201200	277.0	60	0.874	241.26	0.997	3.66
4E-L2	480.0	60	0.509	238.44	0.975	6.52
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

**Chromaticity Measurement - Sphere-Spectroradiometer Method:**

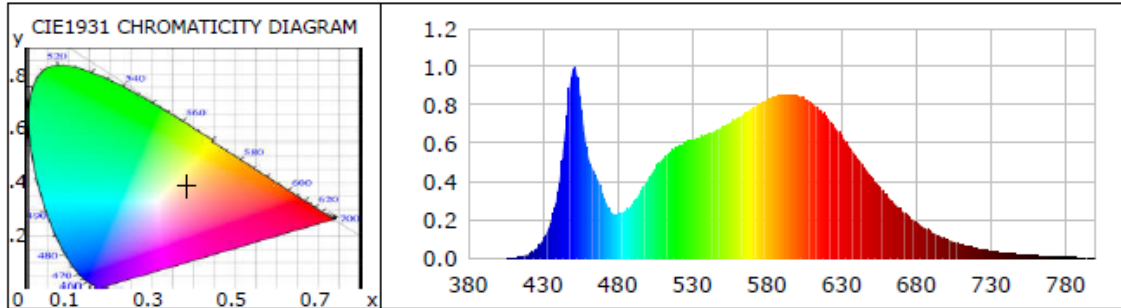
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	277.0	R1	80	R9	5
Frequency (Hz)	60	R2	88	R10	73
CCT (K)	3993	R3	95	R11	81
Duv	0.0022	R4	82	R12	59
Chromaticity (x, y)	x=0.3823 y=0.3825	R5	81	R13	82
Chromaticity (u', v')	u(u')=0.2240 v'=0.5044	R6	85	R14	97
Color Rendering Index (CRI)	83	R7	86	R15	74
R9	5	R8	63	--	--
Rf	84	--	--	--	--
Rg	95	--	--	--	--
Rcs,h1(%)	-12	--	--	--	--

**Photometric Measurement – Goniophotometer Method:**

Parameter	Result		DLC V5.1 Pass Criteria
Test Voltage (V)	277.0	480.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	34051.8	33228.6	>=10000(-10%)
Luminous Efficacy (lm/W)	141.14	139.36	Premium: >= 135(-3%)
Most worst Luminous/Highest	137.73		
Zonal lumens in the 20-50° (%)	64.00	--	>=30(-10)
Beam Angle (°)	89.4	--	--
Center Beam Candle Power (cd)	16534	--	--



**Spectral Power Distribution & Chromaticity Diagram**



WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0009	0.6171	525	0.6016	414.1197	670	0.2510	172.7915
385	0.0008	0.5214	530	0.6169	424.6574	675	0.2172	149.5339
390	0.0005	0.3469	535	0.6316	434.8271	680	0.1883	129.6588
395	0.0003	0.2192	540	0.6475	445.7577	685	0.1625	111.8888
400	0.0007	0.4871	545	0.6649	457.6932	690	0.1388	95.5508
405	0.0013	0.9115	550	0.6837	470.6829	695	0.1188	81.7886
410	0.0038	2.6174	555	0.7064	486.2625	700	0.1021	70.2724
415	0.0095	6.5730	560	0.7320	503.9349	705	0.0865	59.5506
420	0.0217	14.9552	565	0.7577	521.6284	710	0.0734	50.5370
425	0.0468	32.2427	570	0.7816	538.0768	715	0.0630	43.3762
430	0.0946	65.1491	575	0.8077	556.0240	720	0.0524	36.0912
435	0.1843	126.8782	580	0.8260	568.6424	725	0.0448	30.8458
440	0.3472	238.9808	585	0.8421	579.7153	730	0.0391	26.8932
445	0.6666	458.8856	590	0.8525	586.8341	735	0.0332	22.8559
450	0.9887	680.6450	595	0.8558	589.1452	740	0.0274	18.8337
455	0.8419	579.5480	600	0.8513	586.0202	745	0.0247	17.0204
460	0.5434	374.1088	605	0.8343	574.3380	750	0.0206	14.1618
465	0.4401	302.9653	610	0.8104	557.8789	755	0.0176	12.1231
470	0.3398	233.9389	615	0.7786	535.9616	760	0.0154	10.6136
475	0.2499	172.0275	620	0.7375	507.7160	765	0.0130	8.9401
480	0.2311	159.1023	625	0.6902	475.1320	770	0.0098	6.7499
485	0.2495	171.7632	630	0.6397	440.3777	775	0.0086	5.9144
490	0.2829	194.7599	635	0.5866	403.8153	780	0.0084	5.8074
495	0.3424	235.7211	640	0.5305	365.2154	785	0.0070	4.8525
500	0.4094	281.8269	645	0.4773	328.5779	790	0.0068	4.6715
505	0.4675	321.8443	650	0.4259	293.2093	795	0.0040	2.7224
510	0.5184	356.8485	655	0.3759	258.7533	800	0.0057	3.9268
515	0.5548	381.9167	660	0.3298	227.0129			
520	0.5810	399.9618	665	0.2883	198.4550			





**TM30**

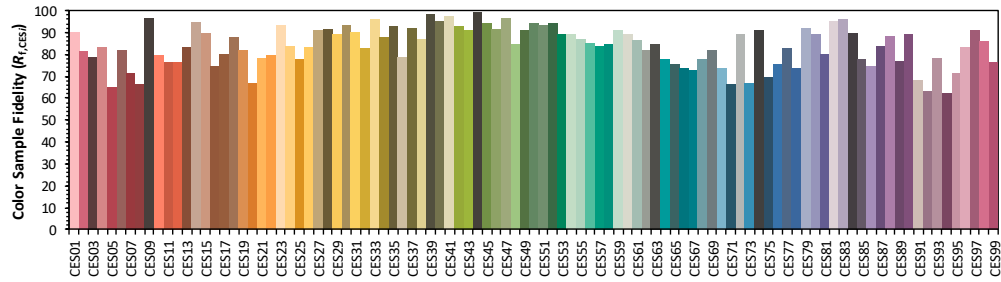
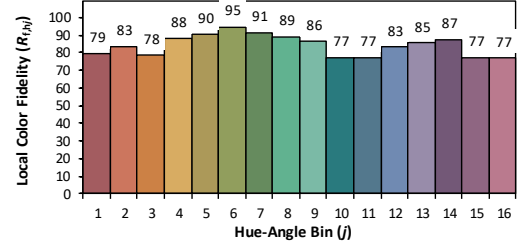
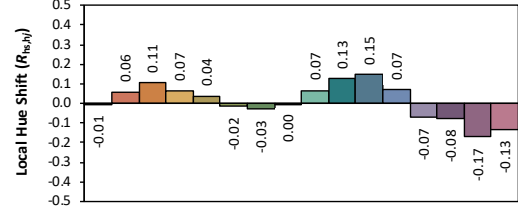
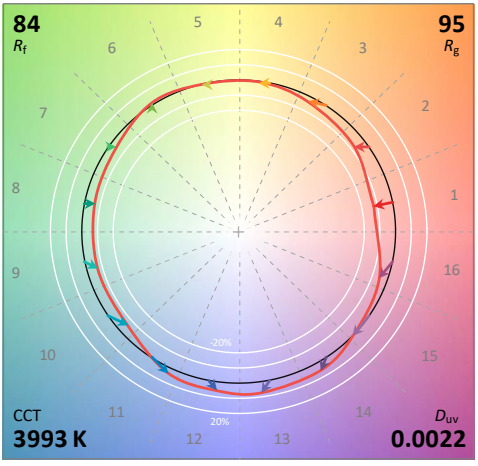
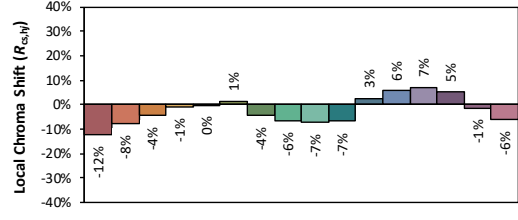
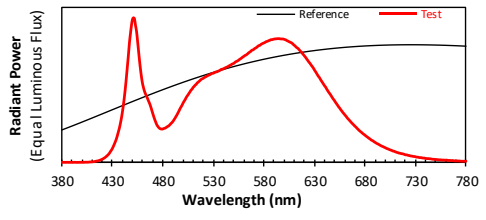
**ANSI/IES TM-30-18 Color Rendition Report**

**Source:** L128-XX80RA35000P1

**Date:** 2020/12/3

**Manufacturer:** ASmart LIGHT CO., LTD

**Model:** AST-HB11-240WS1BT2H1-abc40



**Notes:** This is a recommended method for displaying ANSI/IES TM-30-18 information.

$x$	<b>0.3823</b>	CIE 13.3-1995 (CRI) $R_a$ 83 $R_g$ 5
$y$	<b>0.3825</b>	
$u'$	<b>0.2240</b>	
$v'$	<b>0.5044</b>	

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.



### Zonal Lumen Tabulation

#### Zonal Lumen Summary

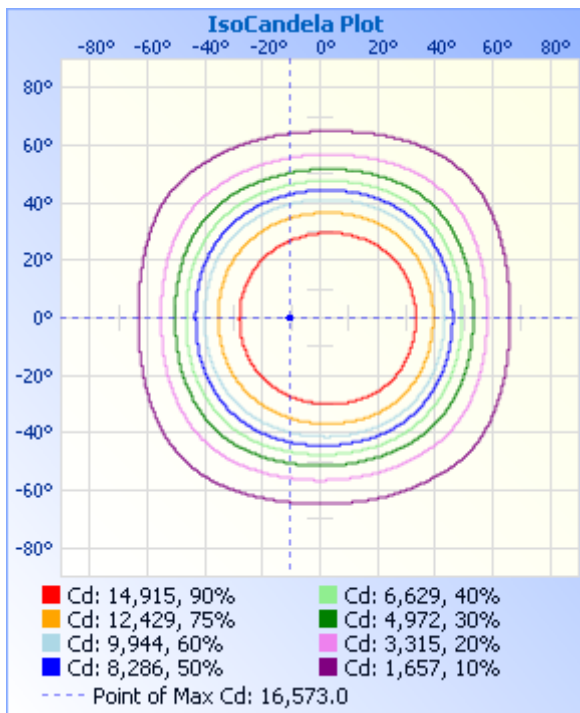
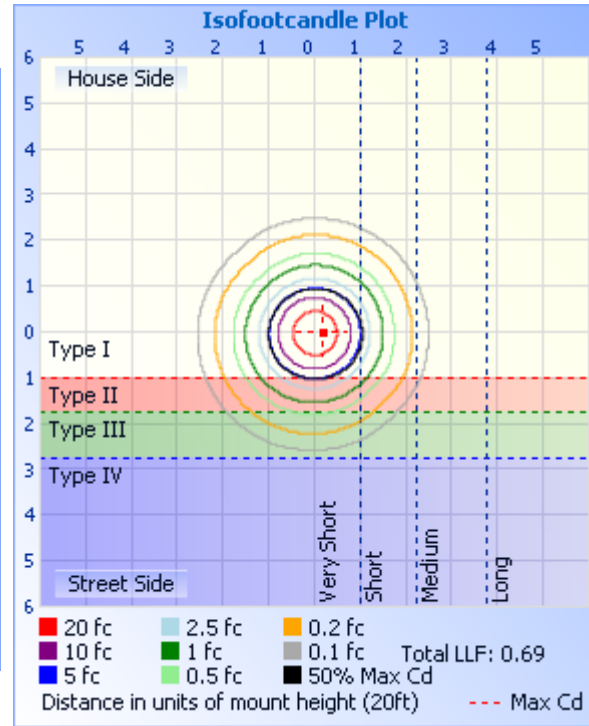
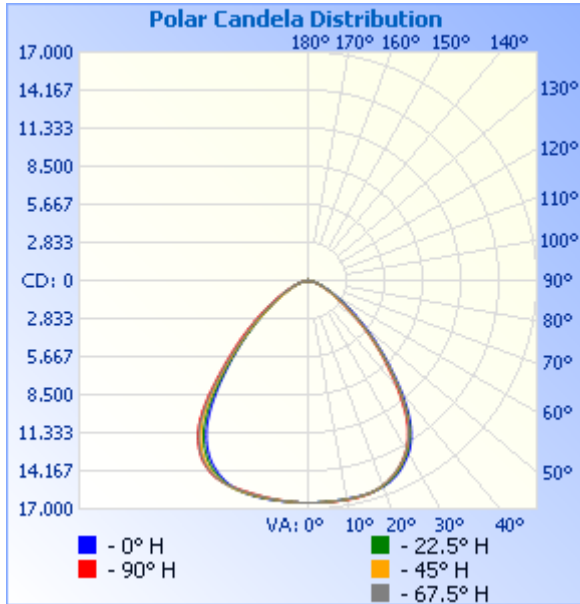
Zone	Lumens	% Luminaire	% Luminaire
0-30	13,519.4	39.7%	39.7%
0-40	21,777.6	64%	64%
0-60	31,478.7	92.4%	92.5%
60-90	2,419.6	7.1%	7.1%
70-100	816.4	2.4%	2.4%
90-120	49.1	0.1%	0.1%
0-90	33,898.3	99.5%	99.6%
90-180	148.6	0.4%	0.4%
0-180	34,046.9	100%	100%

#### Lumens Per Zone

Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	1,576.6	4.6%	90-100	16.6	0%
10-20	4,659.0	13.7%	100-110	16.3	0%
20-30	7,283.8	21.4%	110-120	16.2	0%
30-40	8,258.2	24.3%	120-130	18.1	0.1%
40-50	6,237.4	18.3%	130-140	21.1	0.1%
50-60	3,463.6	10.2%	140-150	22.3	0.1%
60-70	1,619.8	4.8%	150-160	19.9	0.1%
70-80	661.1	1.9%	160-170	13.4	0%
80-90	138.7	0.4%	170-180	4.7	0%



**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	57.2 fc	31.9 ft	33.6 ft
34.0ft	14.3 fc	63.8 ft	67.3 ft
51.0ft	6.4 fc	95.7 ft	100.9 ft
68.0ft	3.6 fc	127.6 ft	134.6 ft
85.0ft	2.3 fc	159.5 ft	168.2 ft
102.0ft	1.6 fc	191.4 ft	201.9 ft

- Vert. Spread: 86.3°
- Horiz. Spread: 89.4°



Report No.: BLC2012004E-L

**Candela Table - Type C**

	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	16534	16534	16534	16534	16534	16534	16534	16534	16534	16534	16534	16534	16534	16534	16534	16534	16534
1	16526	16535	16536	16537	16538	16538	16537	16532	16531	16530	16534	16530	16531	16531	16534	16531	16526
2	16526	16534	16537	16536	16539	16540	16542	16532	16534	16527	16532	16526	16529	16520	16532	16528	16526
3	16519	16526	16537	16538	16544	16542	16549	16531	16529	16521	16531	16520	16522	16511	16533	16523	16519
4	16521	16525	16537	16536	16542	16540	16553	16530	16524	16516	16523	16510	16511	16498	16523	16513	16521
5	16515	16522	16539	16537	16548	16541	16560	16535	16519	16512	16518	16501	16499	16490	16516	16512	16515
6	16514	16518	16536	16538	16551	16548	16560	16542	16517	16505	16507	16490	16489	16483	16504	16498	16514
7	16510	16516	16531	16541	16559	16555	16563	16547	16520	16505	16497	16482	16475	16469	16492	16492	16510
8	16503	16514	16536	16541	16564	16555	16558	16547	16521	16503	16489	16473	16461	16462	16477	16481	16503
9	16496	16518	16536	16543	16567	16560	16558	16549	16528	16504	16483	16463	16450	16453	16461	16476	16496
10	16492	16524	16532	16543	16573	16563	16559	16551	16530	16505	16480	16459	16439	16436	16450	16467	16492
11	16486	16520	16531	16537	16572	16562	16563	16547	16531	16508	16478	16454	16422	16426	16439	16460	16486
12	16482	16518	16529	16531	16573	16559	16568	16546	16530	16503	16475	16440	16409	16410	16424	16455	16482
13	16481	16512	16517	16517	16565	16547	16559	16546	16527	16500	16475	16429	16391	16396	16414	16449	16481
14	16475	16503	16506	16500	16546	16529	16542	16534	16517	16497	16472	16424	16382	16380	16409	16447	16475
15	16472	16484	16488	16474	16525	16506	16523	16521	16503	16488	16468	16414	16372	16370	16404	16447	16472
16	16456	16462	16457	16444	16490	16471	16491	16497	16487	16482	16455	16405	16362	16366	16396	16440	16456
17	16439	16432	16421	16401	16445	16427	16449	16458	16466	16470	16449	16400	16352	16353	16390	16428	16439
18	16410	16393	16366	16347	16387	16370	16389	16407	16437	16454	16437	16391	16348	16340	16386	16414	16410
19	16375	16342	16306	16276	16311	16301	16325	16352	16397	16428	16425	16382	16337	16329	16375	16390	16375
20	16322	16273	16232	16192	16222	16209	16249	16280	16334	16387	16405	16373	16330	16322	16356	16357	16322
21	16249	16187	16140	16099	16125	16113	16148	16191	16258	16339	16376	16359	16320	16309	16333	16311	16249
22	16168	16089	16031	15983	16011	16005	16041	16088	16171	16273	16330	16328	16304	16286	16294	16245	16168
23	16069	15975	15905	15862	15881	15879	15918	15953	16059	16189	16267	16283	16276	16255	16243	16177	16069
24	15946	15855	15769	15717	15739	15739	15757	15818	15932	16090	16194	16230	16239	16209	16176	16083	15946
25	15819	15705	15620	15564	15590	15581	15615	15680	15807	15961	16111	16164	16184	16146	16089	15966	15819
26	15666	15547	15459	15399	15401	15413	15443	15514	15635	15838	16008	16077	16117	16065	15988	15830	15666
27	15497	15369	15285	15223	15220	15226	15259	15314	15464	15683	15881	15961	16008	15964	15864	15684	15497
28	15295	15154	15079	15037	15017	15021	15037	15110	15270	15511	15729	15842	15888	15851	15727	15516	15295
29	15101	14960	14870	14816	14801	14795	14805	14887	15054	15312	15560	15691	15743	15685	15555	15338	15101

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30	14895	14733	14632	14581	14555	14553	14552	14634	14818	15078	15365	15518	15586	15538	15376	15129	14895
31	14646	14468	14366	14325	14288	14255	14276	14353	14523	14831	15146	15316	15386	15331	15170	14914	14646
32	14363	14171	14069	14036	13967	13950	13970	14011	14233	14563	14907	15099	15160	15125	14939	14653	14363
33	14039	13836	13741	13718	13620	13594	13620	13651	13891	14251	14595	14813	14902	14866	14677	14370	14039
34	13679	13470	13378	13360	13242	13209	13191	13263	13521	13907	14274	14513	14616	14598	14409	14058	13679
35	13295	13084	12985	12969	12811	12789	12755	12824	13100	13520	13907	14174	14294	14297	14086	13707	13295
36	12846	12673	12570	12497	12348	12291	12296	12355	12593	13042	13505	13796	13945	13939	13678	13265	12846
37	12398	12177	12063	12017	11797	11799	11813	11866	12080	12558	13044	13355	13498	13520	13255	12842	12398
38	11858	11636	11558	11489	11275	11300	11256	11303	11543	12013	12473	12800	13018	13079	12771	12317	11858
39	11328	11106	11027	10999	10744	10780	10740	10780	10986	11421	11900	12230	12461	12519	12182	11751	11328
40	10783	10561	10473	10443	10202	10254	10225	10249	10421	10751	11280	11607	11856	11910	11612	11174	10783
41	10238	10013	9920	9878	9662	9719	9709	9723	9856	10122	10623	10953	11236	11284	11037	10602	10238
42	9648	9423	9374	9323	9080	9148	9202	9198	9252	9508	9978	10292	10548	10634	10454	10073	9648
43	9094	8906	8856	8837	8586	8663	8728	8663	8744	8948	9280	9591	9871	10035	9870	9485	9094
44	8636	8368	8330	8300	8100	8172	8205	8173	8240	8331	8686	8995	9270	9434	9286	8984	8636
45	8114	7894	7778	7832	7621	7641	7728	7688	7698	7801	8101	8391	8696	8778	8724	8422	8114
46	7623	7379	7291	7333	7102	7166	7253	7212	7216	7289	7549	7835	8135	8208	8133	7915	7623
47	7148	6888	6822	6865	6631	6688	6784	6744	6737	6783	7014	7307	7609	7723	7649	7424	7148
48	6689	6410	6377	6408	6178	6240	6333	6257	6279	6310	6463	6770	7120	7182	7146	6965	6689
49	6282	5989	5895	5992	5732	5798	5853	5822	5843	5804	5994	6309	6652	6726	6700	6481	6282
50	5858	5527	5463	5548	5275	5348	5438	5413	5396	5375	5551	5885	6191	6289	6224	6054	5858
51	5437	5119	5034	5152	4867	4936	5034	5012	5000	4961	5123	5470	5752	5806	5803	5627	5437
52	5069	4723	4647	4709	4487	4561	4653	4605	4631	4574	4720	5078	5322	5392	5396	5220	5069
53	4663	4353	4252	4372	4131	4199	4253	4246	4272	4208	4295	4658	4950	4996	5010	4831	4663
54	4336	4011	3915	4022	3799	3864	3917	3913	3944	3841	3940	4299	4560	4629	4643	4481	4336
55	3995	3697	3576	3695	3465	3522	3608	3608	3611	3541	3610	3962	4210	4288	4257	4119	3995
56	3692	3415	3276	3370	3185	3237	3317	3294	3327	3260	3305	3644	3857	3921	3952	3803	3692
57	3374	3151	2996	3101	2927	2974	3026	3030	3070	3006	2997	3323	3557	3620	3626	3489	3374
58	3106	2881	2730	2839	2688	2729	2779	2789	2828	2767	2742	3053	3240	3324	3321	3208	3106
59	2857	2650	2517	2605	2472	2481	2552	2567	2610	2529	2510	2804	2976	3042	3057	2973	2857
60	2625	2444	2289	2376	2267	2273	2344	2358	2382	2332	2294	2572	2749	2788	2795	2739	2625
61	2411	2249	2098	2187	2062	2084	2152	2151	2193	2151	2098	2362	2522	2569	2570	2507	2411

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62	2223	2070	1921	1988	1894	1906	1963	1980	2022	1982	1907	2148	2296	2337	2357	2310	2223
63	2020	1904	1754	1818	1738	1733	1800	1819	1845	1813	1747	1974	2107	2126	2158	2108	2020
64	1848	1737	1600	1660	1590	1583	1649	1667	1689	1666	1599	1805	1926	1947	1971	1935	1848
65	1693	1592	1455	1514	1441	1445	1504	1531	1552	1533	1465	1638	1756	1791	1790	1769	1693
66	1559	1462	1340	1391	1312	1319	1375	1388	1419	1404	1342	1502	1615	1631	1645	1628	1559
67	1411	1328	1216	1256	1191	1198	1244	1268	1299	1288	1213	1365	1468	1498	1499	1481	1411
68	1291	1220	1113	1134	1085	1080	1132	1155	1172	1165	1110	1245	1342	1361	1365	1349	1291
69	1163	1105	1009	1026	979	982	1031	1048	1071	1066	1013	1124	1212	1240	1253	1230	1163
70	1063	1006	915	936	886	894	944	953	978	972	932	1022	1103	1125	1129	1123	1063
71	968	917	834	848	803	810	849	874	889	890	838	929	1002	1018	1030	1025	968
72	885	832	766	769	723	726	770	791	808	802	765	846	917	930	946	927	885
73	800	756	692	691	649	658	699	718	727	728	703	766	821	845	848	848	800
74	725	676	621	621	585	596	632	643	658	659	630	691	741	761	778	766	725
75	654	608	561	558	525	534	567	585	592	591	572	620	672	683	695	690	654
76	591	553	503	501	469	480	505	522	534	528	513	558	602	615	622	622	591
77	526	498	450	449	416	421	449	465	475	476	464	498	540	557	565	562	526
78	463	438	404	402	367	374	402	408	416	420	417	439	474	488	502	496	463
79	416	389	358	360	317	329	355	362	369	369	364	391	422	432	444	444	416
80	363	336	315	306	274	285	300	312	318	317	318	341	372	386	387	386	363
81	309	289	267	267	224	235	265	265	267	273	274	293	311	328	333	329	309
82	260	246	224	221	182	194	216	212	219	233	235	241	267	284	288	276	260
83	212	199	179	179	149	152	166	166	175	181	186	200	220	226	233	236	212
84	170	155	143	141	108	117	117	119	135	143	139	158	176	181	180	180	170
85	130	118	100	108	67	77	66	85	87	92	93	116	133	134	135	141	130
86	85	78	54	59	31	42	36	53	51	55	51	75	82	83	84	88	85
87	45	39	34	39	11	21	18	26	25	37	31	41	48	55	49	49	45
88	21	29	23	27	0	12	16	22	21	21	25	25	20	23	17	29	21
89	22	22	21	23	0	8	17	19	18	22	20	18	9	16	18	21	22
90	19	21	22	25	0	11	19	19	15	19	20	20	12	12	20	21	19
91	22	18	17	25	0	10	19	17	20	20	14	19	8	18	14	20	22
92	16	15	22	19	0	12	14	16	19	16	17	16	10	11	20	20	16
93	22	18	21	20	0	9	11	16	17	10	22	19	12	13	16	16	22

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94	24	21	17	18	0	11	14	18	16	19	20	18	8	16	17	17	24
95	17	17	18	22	0	13	14	17	15	16	19	17	11	14	17	14	17
96	19	18	18	22	0	9	17	21	17	17	15	19	9	14	20	15	19
97	15	20	19	22	0	10	15	17	17	16	18	18	8	12	16	13	15
98	13	19	19	21	0	11	12	14	18	18	16	16	0	16	15	15	13
99	18	20	22	21	0	0	14	18	15	18	20	10	9	16	16	18	18
100	17	15	20	21	0	11	10	15	19	14	20	18	7	15	12	16	17
101	15	18	19	22	0	0	15	19	14	19	15	19	10	11	16	17	15
102	20	23	24	21	0	0	11	16	20	20	18	14	0	10	17	21	20
103	16	19	18	22	0	8	16	17	16	16	19	21	0	14	18	14	16
104	18	22	19	23	0	10	17	13	18	18	19	19	7	12	15	15	18
105	17	20	22	20	0	9	14	16	21	18	19	18	7	14	16	19	17
106	12	20	22	23	0	8	12	14	19	23	18	22	11	13	16	19	12
107	20	18	23	19	0	13	13	14	18	20	19	17	13	14	15	22	20
108	20	19	19	21	0	12	15	17	18	16	20	18	9	17	15	15	20
109	21	19	19	23	0	11	15	17	21	19	20	15	10	12	16	19	21
110	20	19	17	24	0	8	14	19	15	18	20	23	9	17	18	20	20
111	17	21	20	23	0	11	14	16	17	14	18	21	11	14	15	19	17
112	16	20	19	22	0	11	17	16	14	20	19	19	10	14	17	21	16
113	19	21	21	22	0	11	16	17	16	22	18	18	11	15	12	18	19
114	19	16	20	24	0	12	15	17	20	21	20	19	13	17	20	18	19
115	18	19	23	23	0	14	16	18	20	16	20	17	10	13	17	15	18
116	18	18	23	26	9	11	15	19	19	20	19	23	11	11	17	18	18
117	18	19	15	25	0	12	16	16	16	20	23	18	11	12	14	18	18
118	18	22	20	18	0	12	15	18	18	20	19	20	13	14	17	19	18
119	23	21	19	19	0	9	19	17	21	22	24	23	0	13	16	21	23
120	20	16	22	24	0	9	16	18	21	23	24	19	10	12	18	20	20
121	24	25	24	24	0	0	15	18	23	24	24	18	11	18	17	20	24
122	19	24	25	21	0	14	17	23	24	20	23	23	11	17	17	19	19
123	25	21	24	28	7	12	10	20	22	24	19	23	9	17	21	21	25
124	19	27	22	23	11	14	18	21	21	22	22	25	12	16	17	25	19
125	25	23	25	28	11	13	18	24	19	15	27	18	16	19	17	24	25

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126	22	24	21	25	11	16	23	27	24	24	26	26	15	19	22	22	22
127	24	27	23	28	13	17	12	22	15	24	25	24	17	19	23	26	24
128	19	20	19	27	11	20	24	25	27	27	27	25	14	18	20	19	19
129	25	26	29	30	17	16	24	24	27	27	28	26	15	17	16	27	25
130	21	26	27	27	11	14	23	25	20	32	27	30	16	21	26	26	21
131	25	24	24	26	15	19	26	26	29	25	28	19	17	24	25	20	25
132	26	32	23	22	15	19	24	26	28	34	28	30	21	22	25	25	26
133	32	24	29	31	18	18	23	25	30	29	28	28	21	21	21	26	32
134	30	28	24	33	15	22	27	27	25	35	31	30	15	22	22	34	30
135	32	33	33	33	17	17	25	22	24	34	32	32	24	24	26	21	32
136	29	33	37	32	19	21	29	29	31	30	35	33	25	22	30	27	29
137	25	32	25	37	17	18	29	34	31	33	33	33	28	29	33	35	25
138	33	36	37	35	21	24	33	28	30	22	39	31	28	26	32	33	33
139	36	33	37	35	16	28	32	35	34	32	36	30	21	23	30	32	36
140	35	37	36	33	21	21	35	36	31	37	36	32	24	29	29	33	35
141	36	38	34	32	23	28	25	35	31	24	29	36	22	27	32	35	36
142	34	37	35	33	21	21	34	38	31	39	37	33	21	31	31	34	34
143	43	41	33	19	24	29	28	33	36	42	37	31	30	26	35	38	43
144	42	42	37	40	27	33	34	40	36	43	40	42	32	33	34	35	42
145	38	34	40	45	23	22	36	38	35	37	41	38	19	37	29	34	38
146	32	46	43	41	28	31	37	30	41	37	38	38	35	30	42	39	32
147	40	43	45	44	29	30	37	37	42	46	42	44	27	33	37	42	40
148	49	33	43	44	32	24	43	37	43	46	42	36	35	41	40	37	49
149	43	46	47	45	26	33	41	41	44	47	44	37	28	33	40	44	43
150	44	47	46	46	33	33	40	44	46	44	46	44	39	39	40	39	44
151	50	38	44	49	34	31	42	40	44	37	41	41	34	35	39	43	50
152	48	46	47	44	34	21	43	41	44	47	49	40	33	41	45	37	48
153	43	48	50	45	28	39	31	42	48	46	41	48	32	41	47	48	43
154	48	49	41	50	32	35	44	41	32	48	52	45	37	29	43	47	48
155	48	48	48	50	32	34	45	47	43	53	45	45	34	46	49	47	48
156	47	52	52	44	25	36	45	42	50	51	48	49	28	41	40	44	47
157	47	48	55	46	36	37	46	46	47	41	49	50	33	43	42	50	47

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158	45	48	48	51	29	31	46	45	48	52	46	49	40	41	49	40	45
159	53	54	51	47	32	27	36	50	47	50	50	46	39	45	44	43	53
160	54	50	51	49	33	41	44	50	51	49	49	46	40	44	45	43	54
161	46	55	54	51	27	31	44	49	51	40	43	53	41	48	48	51	46
162	53	50	55	30	27	44	47	50	47	52	53	52	40	46	48	48	53
163	50	44	55	46	38	45	44	50	51	56	52	51	40	42	34	48	50
164	46	53	53	56	35	46	45	49	44	37	49	54	37	47	50	49	46
165	43	53	52	51	31	39	40	53	51	44	48	53	40	48	46	49	43
166	51	54	50	50	34	32	49	48	49	53	50	38	41	46	44	53	51
167	51	48	52	42	38	46	50	47	53	51	52	53	43	43	49	48	51
168	49	56	55	53	37	40	46	50	53	57	54	58	43	49	54	46	49
169	55	51	53	55	42	37	54	48	50	56	52	62	39	38	54	51	55
170	53	58	50	54	39	45	52	54	56	52	51	60	43	51	47	46	53
171	53	40	45	48	38	40	52	56	48	57	48	59	45	48	52	52	53
172	55	50	55	57	40	46	51	56	34	44	56	53	46	44	50	52	55
173	53	51	52	44	40	42	49	52	50	54	59	58	46	45	50	45	53
174	43	51	58	47	33	39	49	51	54	59	56	58	42	51	50	52	43
175	52	54	41	54	40	47	54	52	55	54	50	57	43	52	52	45	52
176	53	52	46	47	35	45	47	52	54	57	51	54	39	50	29	53	53
177	52	49	51	57	37	46	47	47	51	54	46	46	37	49	38	54	52
178	50	53	45	54	35	41	49	46	55	52	52	50	38	36	42	53	50
179	55	53	50	56	41	43	45	47	43	54	50	52	41	50	46	52	55
180	43	54	56	55	34	40	44	47	52	43	54	57	40	44	47	52	43



**UGR**

**UGR Table - Corrected**

Reflectances

Ceiling Cavity	70	70	50	50	30	70	70	50	50	30
Walls	50	30	50	30	30	50	30	50	30	30
Floor Cavity	20	20	20	20	20	20	20	20	20	20

Room Size		UGR Viewed Crosswise					UGR Viewed Endwise				
X=2H	Y=2H	25.3	26.7	25.7	27.0	27.3	24.6	26.0	25.0	26.3	26.6
	3H	26.1	27.3	26.4	27.6	28.0	25.3	26.5	25.7	26.8	27.2
	4H	26.3	27.4	26.7	27.8	28.1	25.4	26.6	25.8	26.9	27.3
	6H	26.4	27.5	26.8	27.8	28.2	25.5	26.6	26.0	26.9	27.3
	8H	26.4	27.4	26.9	27.8	28.2	25.5	26.5	26.0	26.9	27.3
	12H	26.4	27.4	26.9	27.8	28.2	25.5	26.5	25.9	26.8	27.3
4H	2H	25.5	26.7	25.9	27.0	27.4	24.8	26.0	25.2	26.3	26.7
	3H	26.4	27.4	26.8	27.8	28.2	25.6	26.6	26.1	27.0	27.4
	4H	26.7	27.6	27.2	28.0	28.4	25.9	26.7	26.3	27.1	27.6
	6H	27.0	27.7	27.4	28.1	28.6	26.1	26.8	26.5	27.2	27.7
	8H	27.0	27.7	27.5	28.1	28.6	26.1	26.8	26.5	27.2	27.7
	12H	27.0	27.6	27.5	28.1	28.6	26.1	26.7	26.6	27.2	27.6
8H	4H	26.8	27.5	27.2	27.9	28.4	25.9	26.6	26.4	27.1	27.5
	6H	27.1	27.6	27.6	28.1	28.6	26.2	26.7	26.7	27.2	27.7
	8H	27.1	27.7	27.7	28.2	28.7	26.2	26.7	26.7	27.2	27.7
	12H	27.2	27.7	27.7	28.1	28.7	26.2	26.7	26.7	27.2	27.7
12H	4H	26.8	27.4	27.3	27.8	28.3	25.9	26.5	26.4	27.0	27.5
	6H	27.1	27.6	27.6	28.0	28.6	26.2	26.7	26.7	27.1	27.7
	8H	27.2	27.6	27.7	28.1	28.7	26.2	26.7	26.7	27.2	27.7

Maximum UGR = 28.7

**2.3 Electrical, Photometric and Chromaticity Measurements***(Refer to Work Instruction BL-QP-033)*

<b>Test date</b>	2020-12-03	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	As intended	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	AST-HB11-240WS1BT2H1-abc57		

**Electrical Measurement:**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
BLC201200	277.0	60	0.876	242.11	0.998	3.47
4E-L3	480.0	60	0.511	239.24	0.975	6.96
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

**Chromaticity Measurement - Sphere-Spectroradiometer Method:**

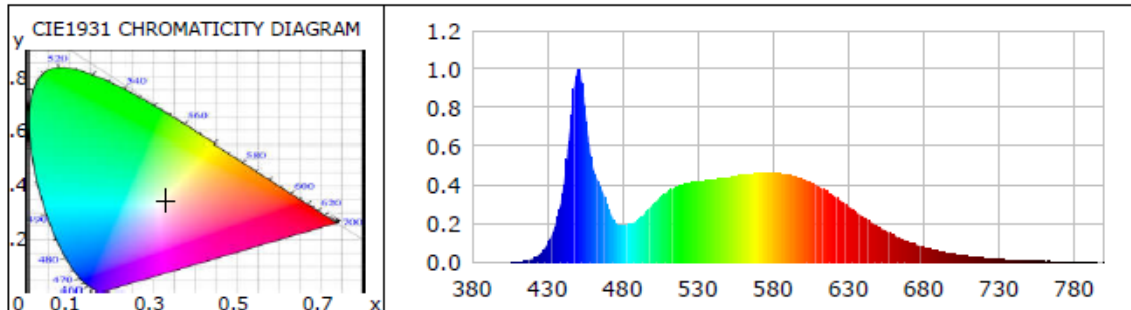
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	277.0	R1	81	R9	3
Frequency (Hz)	60	R2	87	R10	70
CCT (K)	5680	R3	91	R11	82
Duv	0.0022	R4	83	R12	58
Chromaticity (x, y)	x=0.3284 y=0.3417	R5	82	R13	83
Chromaticity (u', v')	u(u')=0.2039 v'(v')=0.4772	R6	82	R14	95
Color Rendering Index (CRI)	82	R7	87	R15	76
R9	3	R8	67	--	--
Rf	83	--	--	--	--
Rg	95	--	--	--	--
Rcs,h1(%)	-13	--	--	--	--

**Photometric Measurement – Sphere-Spectroradiometer Method:**

Parameter	Result		DLC V5.1 Pass Criteria
Test Voltage (V)	277.0	480.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	33972.2	33161.2	>= 10000(-10%)
Luminous Efficacy (lm/W)	140.32	138.61	Premium: >= 135(-3%)
Most worst Luminous/Highest	136.97		



**Spectral Power Distribution & Chromaticity Diagram**



WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0003	0.2994	525	0.4122	472.2566	670	0.1073	122.9973
385	0.0005	0.5837	530	0.4183	479.3362	675	0.0925	105.9948
390	0.0004	0.4574	535	0.4239	485.7187	680	0.0806	92.3485
395	0.0006	0.7172	540	0.4297	492.3754	685	0.0694	79.4927
400	0.0009	1.0768	545	0.4341	497.3686	690	0.0587	67.2282
405	0.0012	1.3419	550	0.4388	502.8370	695	0.0503	57.6522
410	0.0029	3.3511	555	0.4455	510.4625	700	0.0430	49.2734
415	0.0077	8.7718	560	0.4516	517.4280	705	0.0367	42.0882
420	0.0186	21.3218	565	0.4567	523.2621	710	0.0315	36.0676
425	0.0431	49.3723	570	0.4604	527.4918	715	0.0263	30.1313
430	0.0924	105.9269	575	0.4631	530.6156	720	0.0225	25.7712
435	0.1864	213.5652	580	0.4632	530.7023	725	0.0200	22.9433
440	0.3551	406.8527	585	0.4587	525.5735	730	0.0166	19.0711
445	0.6832	782.8001	590	0.4539	520.0460	735	0.0146	16.6985
450	0.9945	1139.5687	595	0.4441	508.8683	740	0.0117	13.3783
455	0.8096	927.7006	600	0.4316	494.4825	745	0.0097	11.0728
460	0.5041	577.6093	605	0.4147	475.1274	750	0.0089	10.1715
465	0.3990	457.2062	610	0.3942	451.6312	755	0.0072	8.2111
470	0.2946	337.5794	615	0.3715	425.6250	760	0.0067	7.6351
475	0.2111	241.8784	620	0.3472	397.8388	765	0.0047	5.4352
480	0.1902	217.8882	625	0.3192	365.7626	770	0.0038	4.3661
485	0.1978	226.6850	630	0.2911	333.5630	775	0.0033	3.7797
490	0.2172	248.9178	635	0.2637	302.1151	780	0.0032	3.6118
495	0.2556	292.8173	640	0.2357	270.0844	785	0.0026	3.0099
500	0.2990	342.6209	645	0.2097	240.3053	790	0.0024	2.7306
505	0.3356	384.5120	650	0.1855	212.5475	795	0.0018	2.0571
510	0.3664	419.8278	655	0.1634	187.2559	800	0.0026	2.9443
515	0.3877	444.2761	660	0.1425	163.2688			
520	0.4026	461.3491	665	0.1244	142.5066			

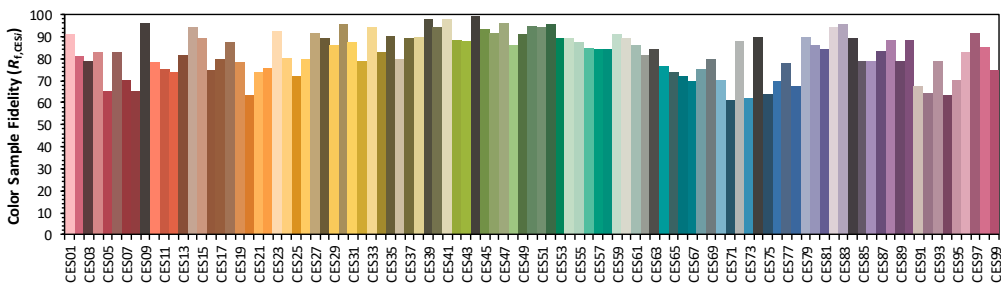
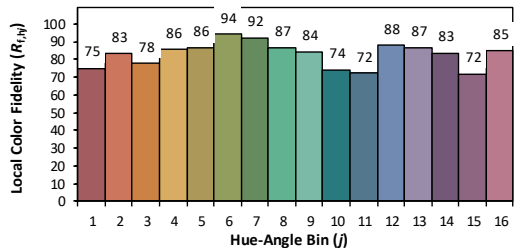
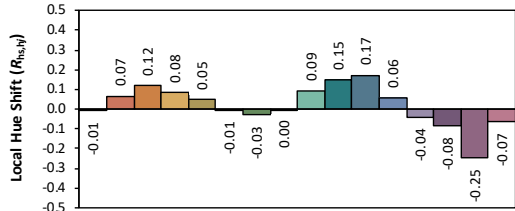
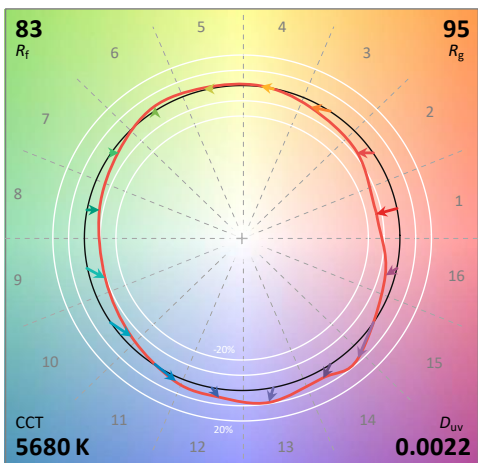
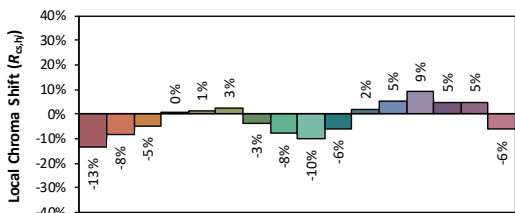
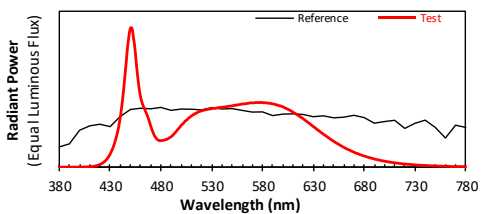


**TM-30**

**ANSI/IES TM-30-18 Color Rendition Report**

**Source:** L128-XX80RA35000P1  
**Date:** 2020/12/3

**Manufacturer:** ASmart LIGHT CO., LTD  
**Model:** AST-HB11-240WS1BT2H1-abc57



**Notes:** This is a recommended method for displaying ANSI/IES TM-30-18 information.

$x$  0.3284  
 $y$  0.3417  
 $u'$  0.2039  
 $v'$  0.4772

CIE 13.3-1995 (CRI)  
 $R_a$  82  
 $R_9$  3

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.



Certificate#4810.01

Report No.: BLC2012004E-L

### Calculated Efficacy Data for family models:

Model Number	Luminous Flux (lm)	Power (W)	Efficacy (lm/W)
AST-HB11-240WS1BT2H1-abc35	32928.1	241.65	136.26
AST-HB11-240WS1BT2H1-abc40	34051.8	241.26	141.14
AST-HB11-240WS1BT2H1-abc45	34025.3	241.69	140.78
AST-HB11-240WS1BT2H1-abc50	33998.7	241.69	140.67
AST-HB11-240WS1BT2H1-abc57	33972.2	242.11	140.32

\*1: This value is calculated and the calculation formula is as below:

$$34025.3 = ( 33972.2 - 34051.8 ) / 3 + 34051.8$$

$$33998.7 = ( 33972.2 - 34051.8 ) / 3 + 34025.3$$

\*2: This value is calculated and the calculation formula is as below:

$$241.69 = ( 242.11 + 241.26 ) / 2$$

\*3: This value is calculated and the calculation formula is as below:

$$140.78 = 34025.3 / 241.69$$

$$140.67 = 33998.7 / 241.69$$



Report No.: BLC2012004E-L

### 3. Test Equipment

Equipment Name	Model No.	Serial No.	Next Calibration Date
Goniophotometric System	GPM-3000	DYHXF120001	2021-02-26
AC Power Source	CHP-500C	N/A	2021-03-29
Total Luminous Flux Standard Lamp	24V/150W	DYJYR040040	2021-03-01
Digital Power Meter	WT500	DYDWQ200006	2021-03-29
Integral Sphere (2M)	2M	DYJCE120067	2021-02-26
Digital Power Meter	WT500	DYDWQ200006	2021-03-29
Optical Color and Electrical Measurement System	CMS-3000S	DYJCE120067	2021-02-26

Expand Uncertainty:  
Photometric Measurement (Sphere): 2.08%, k=2  
Chromaticity Measurement(Sphere):25.6K, k=2  
Photometric Measurement(Goniophotometer):2.645%, k=2

**\*\*\*\*\* END OF REPORT \*\*\*\*\***