

LM-79-08 Test Report

for

ABOVE ALL LIGHTING INC

1501 Industrial Way N. Toms River, NJ 08755.

MT LED Area Light

Model: MT100406-VN

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

Tel: +86-571-56680806

www.ledtestlab.com

Report No.: HZ17080006e

The laboratory that conducted the testing detailed in this report has been accredited for SSL by NVLAP.

Test specifications:

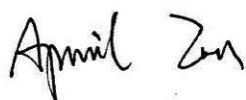
Date of Receipt : Jul. 24, 2017

Date of Test : Jul. 25, 2017

Test item : Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters

Reference Standard : IESNA LM-79-2008 Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products

Reviewed by:



Engineer: April Zou

Jul. 25, 2017

Approved by



Manager: Jim Zhang

Jul. 25, 2017

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Test Summary

Sample Tested: MT100406-VN

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
114.4	13282.0	116.13	0.9563
CCT (K)	CRI	Stabilization Time (Light & Power)	
3924	67.3	60	
IES Classification		Longitudinal Classification	
Type VS		Very Short	

Table 1: Executive Data Summary

Sample Photo



Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: MT LED Area Light
Model	: MT100406-VN
Electrical Ratings	: 347~480V, 50/60Hz, 100W
Product Description	: 4000K Manufacturer of light source: SAMSUNG Model of light source: LH351B
Manufacturer	: ABOVE ALL LIGHTING (SHANGHAI) Co., Ltd.
Address	: Room 1012, North Minch Fortune 108 Plaza, # 1839 Qixin road, Shanghai

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TEST RESULTS

Test ambient temperature was 25.1°C.

Sample orientation was Base up. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 60 minutes, and the total operating time including stabilization was 95 minutes.

Goniophotometer Method

The photometric distance is 2.47m.

Luminous data was taken at 0.5°vertical intervals and 5°horizontal intervals.

Parameter	Result	
Test Voltage (V)	347.0	480.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.350	0.277
Power Factor	0.9563	0.8880
Test Power (W)	116.13	117.86
THD A%	10.93	13.92
Luminous Efficacy (lm/W)	114.4	112.7
Total Luminous Flux (lm)	13282.0	13281.0
Color Rendering Index (CRI)	67.3	
R9	-46	
Correlated Color Temperature (CCT) (K)	3924	
Chromaticity (Chroma x, Chroma y)	(0.3873, 0.3907)	
Chromaticity (Chroma u, Chroma v)	(0.2240, 0.3391)	
Chromaticity (Chroma u', Chroma v')	(0.2240, 0.5086)	
Duv	0.0045	
Average Beam Angle (°)	70.1	
Center Beam Candle Power (cd)	9970	
Spacing Criteria	1.04 (0°-180°)/ 1.00 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	97.77%	
Zonal Lumens in the 60°-90°Zone	2.23%	
Zonal Lumens in the 90°-120°Zone	0.00%	
Zonal Lumens in the 120°-180°Zone	0.00%	

Special Rendering Indices	Color
R1	63
R2	74
R3	83
R4	66
R5	63
R6	63
R7	79
R8	47
R9	-46
R10	39
R11	59
R12	33
R13	64
R14	90

Table 2: Test data per Goniophotometer Method

Note: According to CIE 1976 (u',v') diagram, $u' = u = 4x/(-2x+12y+3)$, $v' = 3v/2 = 9y/(-2x+12y+3)$.

Spectral Power Distribution

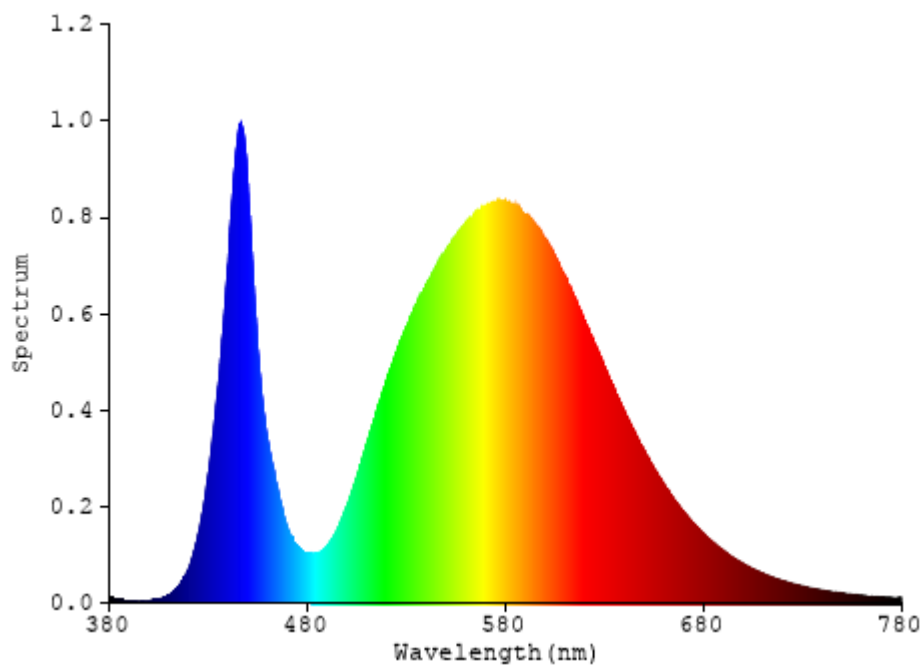


Chart 1: Spectral Power Distribution

IESNA Luminaire Flux Distribution Table

Zone	Lumens	Luminaire %
FL - Front-Low (0-30)	3244.9	24.4
FM - Front-Medium (30-60)	3016.9	22.7
FH - Front-High (60-80)	107.0	0.8
FVH - Front-Very High (80-90)	2.3	0.0
Total Forward Light	6371.1	47.9

BL - Back-Low (0-30)	3202.0	24.1
BM - Back-Medium (30-60)	3521.5	26.5
BH - Back-High (60-80)	175.6	1.3
BVH - Back-Very High (80-90)	11.6	0.1
Total Back Light	6910.7	52.0

UL - Uplight-Low (90-100)	0	0
UH - Uplight-High (100-180)	0	0
Total Up Light	0	0

BUG (Back, Up, Glare) Rating	B4-U0-G1
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Table 3: Flux Distribution Data

Zone	Downward Lumens	Upward Lumens	Total Lumens
House Side	6910.7	0	6910.7
Street Side	6371.1	0	6371.1

Table 4: Flux Distribution Table

Note: The Flux in this table might be a little different from the total flux in Table 2 due to software calculation deviation.

Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

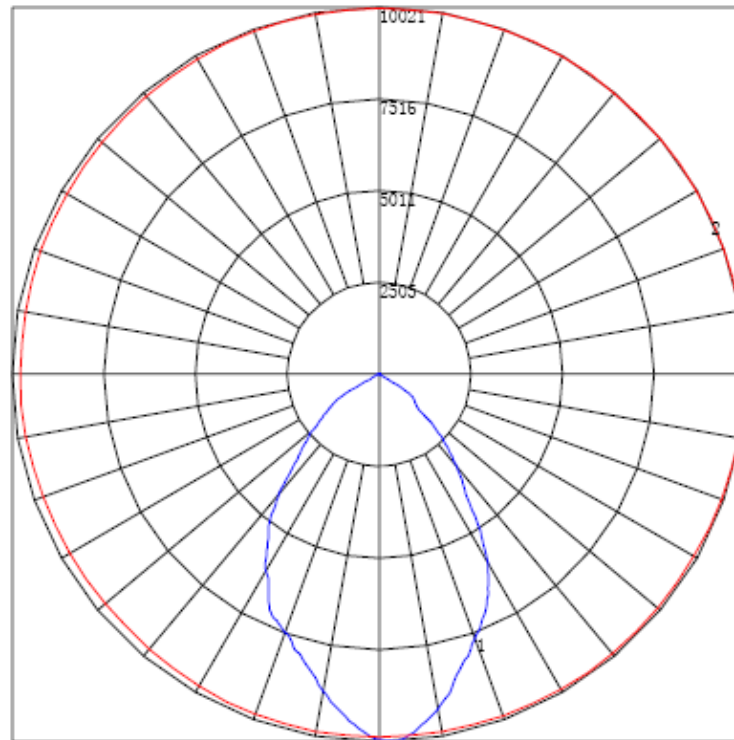


Chart 3: Maximum Plane and Cone Plots of Candela

Maximum Candela = 10021.21 Located At Horizontal Angle = 25, Vertical Angle = 2.5

1 - Vertical Plane Through Horizontal Angles (25 - 205) (Through Max. Cd.)

2 - Horizontal Cone Through Vertical Angle (2.5) (Through Max. Cd.)

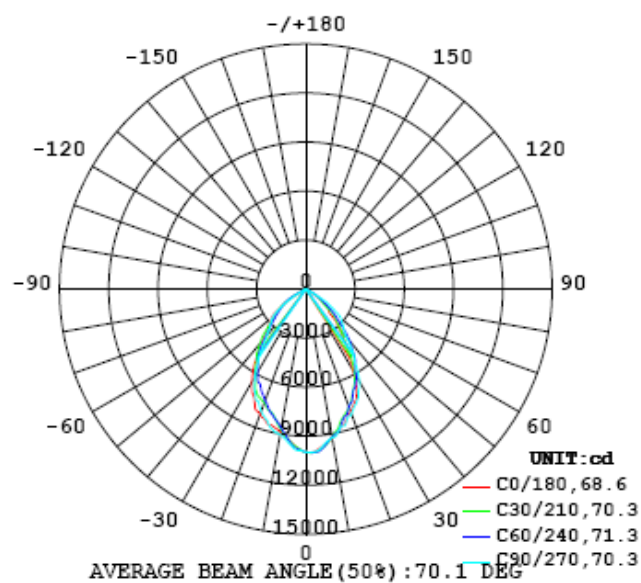


Chart 4: Polar Candela Distribution

Luminous Intensity Data

Table--1

UNIT: $\times 10\text{cd}$

C (DEG) y (DEG)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
0	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997
5	978	979	981	983	985	987	988	988	991	993	993	993	993	990	988	986	984	983	982
10	927	929	930	929	927	926	922	915	914	913	915	919	922	925	931	931	931	927	925
15	864	864	862	857	851	840	832	834	843	848	848	847	849	850	853	856	864	865	866
20	797	797	792	785	772	766	768	769	760	761	764	767	767	770	786	798	810	813	812
25	729	728	717	708	703	695	683	681	687	682	694	688	685	706	718	729	738	747	746
30	584	581	574	573	588	591	596	596	595	589	595	605	614	610	629	636	650	655	653
35	429	426	421	420	418	432	458	473	490	498	502	512	524	530	526	518	512	515	514
40	331	326	317	310	320	330	333	349	360	392	413	416	416	404	396	401	389	388	387
45	203	199	197	213	225	239	258	262	274	280	285	304	296	290	290	283	307	323	323
50	166	163	152	144	136	133	143	198	193	186	181	172	204	216	208	229	255	277	280
55	104	105	105	107	113	115	101	94.2	98.9	109	111	113	123	147	166	169	176	184	183
60	16.1	16.5	15.6	15.8	27.6	40.5	47.0	50.0	59.9	67.9	67.9	78.4	66.2	79.3	96.2	73.2	64.0	53.4	50.8
65	7.37	8.05	7.90	8.47	9.65	9.13	10.1	10.1	10.8	30.9	40.2	17.9	13.8	13.5	14.5	14.1	13.8	14.1	14.3
70	4.09	4.56	4.84	4.80	4.81	5.59	7.22	7.05	5.91	5.84	6.82	9.02	10.6	9.52	7.47	8.35	8.54	8.15	8.08
75	2.01	2.19	2.32	2.22	2.12	2.60	3.23	3.69	4.19	4.60	4.88	5.06	5.58	4.92	4.12	4.45	5.13	5.05	4.80
80	0.88	1.08	1.19	1.10	0.97	0.95	1.08	1.36	1.95	2.22	2.48	2.49	2.52	2.34	2.34	3.02	3.92	3.63	3.31
85	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.05	0.05	0.10	0.12	0.19	0.24	0.22	0.24	0.42	0.40	0.45	0.53
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 5: Luminous Intensity Data

Table--2

UNIT: $\times 10\text{cd}$

C (DEG) y (DEG)	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
0	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997
5	981	982	979	976	975	974	972	969	965	962	959	957	954	952	949	948	946	947	946
10	921	914	908	899	888	880	875	871	872	877	883	888	893	893	895	892	890	890	886
15	858	845	827	812	805	802	803	810	806	800	805	815	824	836	848	858	861	859	850
20	800	786	767	748	731	731	736	747	735	744	756	757	758	776	797	810	815	816	806
25	734	713	697	687	675	676	681	680	671	695	704	707	723	718	724	736	743	743	736
30	643	621	609	601	597	602	611	621	626	627	614	624	620	630	634	643	652	655	647
35	500	481	476	490	513	526	538	528	538	536	529	530	533	530	525	518	528	535	524
40	371	355	359	376	388	416	438	453	453	455	455	441	421	405	396	387	397	404	396
45	302	279	271	273	294	308	333	358	363	365	356	325	311	295	284	296	313	323	313
50	257	231	218	218	218	238	246	239	251	254	242	246	231	216	220	238	264	274	261
55	179	177	179	186	187	174	166	152	147	147	162	174	175	171	166	171	174	176	175
60	53.0	64.2	77.1	113	137	112	92.6	101	92.5	87.2	95.2	95.8	115	95.2	66.6	54.4	38.1	26.5	27.4
65	14.9	14.2	14.7	16.1	15.7	15.2	20.9	44.5	60.4	51.3	20.4	16.4	15.3	16.7	14.6	14.0	14.5	13.8	15.0
70	9.04	9.21	9.05	9.57	10.0	10.9	10.8	9.57	9.64	12.2	12.3	12.5	10.4	9.32	9.21	9.45	9.59	8.80	10.1
75	5.54	5.80	5.43	5.77	6.55	7.18	7.70	7.99	8.08	8.06	7.91	7.59	6.91	6.47	6.50	6.79	6.72	6.17	6.70
80	3.90	4.18	3.97	4.06	4.32	4.91	5.58	6.01	6.03	5.79	5.22	5.00	4.83	4.98	5.45	5.97	5.62	5.21	5.64
85	0.60	0.49	0.68	0.85	1.12	1.40	1.76	1.93	2.23	2.64	3.05	3.49	3.49	3.78	4.26	4.71	4.80	4.76	4.55
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 6: Luminous Intensity Data

Table--3

UNIT: $\times 10\text{cd}$

C (DEG) y (DEG)	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
0	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997
5	944	943	944	948	952	952	954	956	957	959	960	960	959	962	966	966	967	968	972
10	884	884	882	879	870	864	859	855	852	857	862	868	874	883	890	899	904	908	910
15	838	832	820	805	788	781	779	783	790	790	795	804	817	828	842	855	863	865	865
20	796	782	762	750	737	740	743	740	723	714	728	732	737	752	767	785	796	798	794
25	731	715	713	707	705	702	686	680	673	669	654	655	676	685	696	711	726	729	725
30	638	625	621	619	611	611	615	609	613	595	585	583	581	591	594	609	622	621	617
35	516	524	532	528	520	516	524	510	505	514	506	481	463	455	460	473	488	484	486
40	388	398	401	424	430	439	436	429	424	412	384	368	346	328	340	351	368	363	360
45	292	287	304	306	321	343	347	345	330	298	290	269	254	258	271	290	308	304	285
50	238	223	216	231	239	233	243	232	218	228	219	210	210	208	219	246	263	252	228
55	170	169	172	170	171	152	143	143	150	154	166	180	172	164	164	166	163	163	156
60	27.8	46.7	90.5	112	96.5	99.1	86.3	94.3	96.1	90.8	104	92.5	78.9	53.3	34.3	29.1	27.5	28.0	32.7
65	14.0	14.8	16.3	15.8	16.7	20.5	51.5	55.3	40.0	23.8	16.8	15.2	14.8	13.9	13.5	13.2	12.1	12.4	12.5
70	9.62	9.19	9.58	11.0	12.7	11.9	11.6	10.1	10.0	11.1	11.2	9.50	8.53	8.31	8.59	8.39	7.48	7.58	7.62
75	6.57	6.35	6.31	6.95	7.44	7.71	8.20	8.12	7.86	7.24	6.59	5.82	5.30	5.15	5.38	5.08	4.49	4.74	4.76
80	5.66	5.30	4.81	4.63	4.77	5.09	5.41	5.60	5.29	4.66	3.82	3.09	2.78	2.76	3.06	2.85	2.29	2.59	2.88
85	4.61	4.16	3.58	3.21	2.62	2.24	1.75	1.41	1.06	0.73	0.50	0.43	0.34	0.25	0.19	0.13	0.07	0.02	0.01
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 7: Luminous Intensity Data

Table--4

UNIT: $\times 10\text{cd}$

C (DEG) y (DEG)	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
0	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997				
5	975	978	981	984	984	985	984	982	979	978	977	975	974	977	978				
10	909	907	903	901	898	896	898	901	906	913	918	920	919	920	924				
15	859	853	847	839	834	833	834	829	823	820	827	838	848	853	858				
20	784	774	769	765	758	745	757	759	754	754	750	757	772	785	790				
25	712	697	687	670	678	680	674	674	672	678	681	688	697	715	724				
30	614	609	595	594	589	585	579	584	586	585	578	570	566	568	577				
35	491	491	507	509	501	493	487	479	460	449	422	417	409	412	418				
40	364	367	376	399	406	396	381	353	341	327	325	309	299	309	319				
45	262	265	273	274	273	264	269	261	258	254	232	208	193	184	191				
50	212	198	198	186	156	163	171	179	173	139	131	133	138	143	156				
55	158	159	133	110	103	96.4	90.5	90.0	86.2	98.1	112	111	107	105	105				
60	51.6	67.5	56.1	58.5	63.4	60.7	62.1	53.4	44.7	40.6	35.3	29.2	20.7	17.6	16.6				
65	12.8	12.7	12.5	12.7	17.2	30.0	21.9	8.46	8.91	9.31	8.81	9.46	8.29	7.85	8.73				
70	7.18	6.72	8.41	9.44	8.07	6.54	5.66	5.69	6.35	6.65	5.41	5.03	4.92	4.92	5.18				
75	4.05	3.77	4.18	4.51	4.47	4.46	4.32	3.99	3.52	3.06	2.59	2.20	2.25	2.34	2.44				
80	2.38	1.78	1.75	1.80	1.91	2.04	1.86	1.76	1.30	1.04	0.92	0.93	1.04	1.21	1.14				
85	0.01	0.01	0.02	0.05	0.04	0.04	0.03	0.02	0.02	0.01	0.01	0.01	0.02	0.01	0.01				
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				

Table 8: Luminous Intensity Data

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Jul. 26, 2016	Jul. 25, 2017
Digital Power Meter	PF2010A	HZTE028-01	Jul. 26, 2016	Jul. 25, 2017
AC Power Supply	DPS1060	HZTE001-06	Dec. 25, 2016	Dec. 24, 2017
DC Power Supply	WY12010	HZTE004-03	Dec. 25, 2016	Dec. 24, 2017
Temperature Meter	TES1310	HZTE017-01	Aug. 08, 2016	Aug. 07, 2017
Standard Source	D908	HZTE012-01	Jul. 28, 2016	Jul. 27, 2017
Standard source	SCL-1400	HZTE012-02	Jul. 28, 2016	Jul. 27, 2017

Table 9: Test Equipment List

TEST METHODS

Seasoning of SSL Product

For the purpose of rating new SSL products, SSL products shall be tested with no seasoning. Therefore, no seasoning was performed.

Goniophotometer Method

Photometric and Electrical Measurements

An EVERFINE Type C Model GO-R5000 Goniophotometer was used to measure the intensity at each angle of distribution for each sample. The photometric distance is 2.475m for near-field measurement or 30m for far-field measurement. Bandwidth of spectroradiometer is 380nm-780nm.

Ambient temperature was measured at the same height of the sample mounted on the Goniophotometer equipment. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation.

The stabilization time typically ranges from 30 min (small integrated LED lamps) to 2 or more hours for large SSL luminaires). It can be judged that stability is reached when the variation (maximum – minimum) of at least 3 readings of the light output and electrical power over a period of 30 min, taken 15 minutes apart, is less than 0.5 %.

Electrical measurements including voltage, current, and power were measured using the Everfine Digital Power Meter.

Some graphics were created with Photometric Plus software.

The standard reference of the Goniophotometer system is halogen incandescent lamp, the intensity distribution type is omni-directional, and is traceable to the National Institute of Metrology P.R. China.

The uncertainty of goniophotometer system reported in this document is expanded uncertainty is 2.3% with a coverage factor $k=2$.

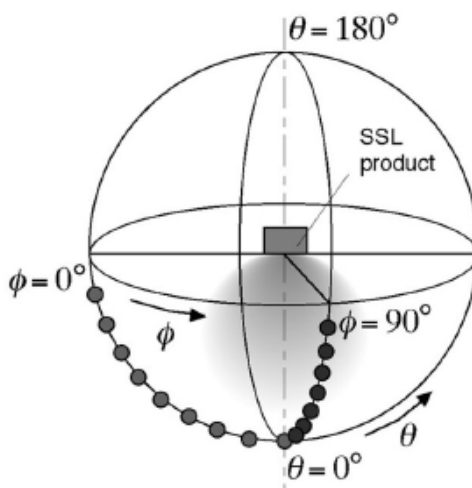
Color Characteristics Measurements

The color characteristics of SSL products include chromaticity coordinates, correlated color temperature, and color rendering index. These characteristics of SSL products may be spatially non-uniform, and thus, in order that they can be specified accurately, the color quantities shall be measured as values that are spatially average, weighted to intensity, over the angular range where light is intentionally emitted from the SSL product. The color characteristics measurements are using gonio-spectroradiometer.

Color Spatial Uniformity

The characteristics of SSL products may be spatially non-uniform, the chromaticity coordinate shall be measured at two vertical planes ($C=0^\circ/180^\circ$ and $C=90^\circ/270^\circ$) and at 10° or less intervals for vertical angle until the light output dropped to below 10% of the peak intensity. The averaged weighted chromaticity coordinate was calculated from these points. The data was then analyzed to check for delta color differences of the u' , v' chromaticity coordinates. The spatial non-uniformity of chromaticity, $\Delta u'v'$, is determined as the maximum deviation (distance on the CIE (u' , v') diagram) among all measured points from the spatially averaged chromaticity coordinate.

The geometry for the chromaticity measurement using gonio-spectroradiometer is shown as following.



*** End of Report ***

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