



## Product Test Report - Radiometric/Photometric

Method: LM-79:2019

### Test results reported for:

LightArt

Product Description: Slim Ring L

### Issued Report:

LIGT009-010\_Slim Ring L

### Original issue date:

Tuesday, March 10, 2020

### Revision Issue Date:

First Issue

### Prepared for:

LightArt  
4770 Ohio Avenue S  
Seattle, Washington 98134

### Attn:

Caleb Patterson  
(801)-994-8111  
caleb.patterson@lightart.com

### Testing performed by:

CSA Group  
14833 NE 87th St  
Redmond, WA 98052  
425-605-8500  
[www.csagroupseattle.org/](http://www.csagroupseattle.org/)

Test report prepared by:

A handwritten signature in blue ink that reads 'Aaron Miller'.

Aaron Miller  
Laboratory Manager  
Test & Measurement Services

## Product Test Report - Radiometric/Photometric

**Manufacturer:** LightArt

**Report Number:** LIGT009-010

**Product Description:** Slim Ring L

**Release Date:** 3/10/2020

### TABLE OF CONTENTS

Subject	Page(s)
Sample Description .....	3
Optical Stabilization .....	4
Electrical Stabilization .....	5
Photometric Summary .....	6
Visible Spectrum .....	7
CIE 1931 .....	8
Candela Plots .....	9
Illuminance Plots .....	10
Candela Table .....	11 - 12
Equipment .....	13
Revision History .....	14

## Product Test Report - Radiometric/Photometric

**Manufacturer:** LightArt  
**Product Description:** Slim Ring L

**Report Number:** LIGT009-010  
**Release Date:** 3/10/2020

### SAMPLE DESCRIPTION

Lab sample identification: 1  
 Customer Identification: LIGT007  
 Manufacturer: LightArt  
 Part number: Slim Ring L  
 Model Number: -  
 Description: -

#### Manufacturer's ratings

Max Current (A): NA  
 Operating voltage: 120.0  
 CCT: NA  
 Frequency (Hz): 60  
 Type: LED

#### Sample Device as Received

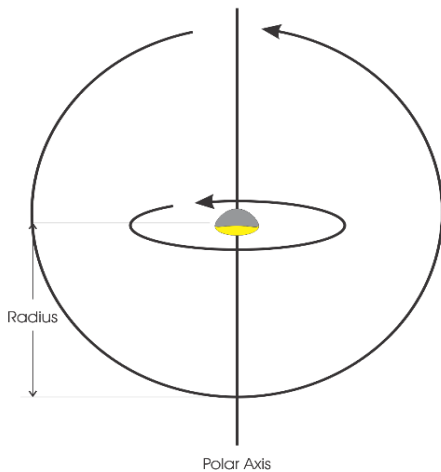


#### Sample Device Mounted to Test Apparatus

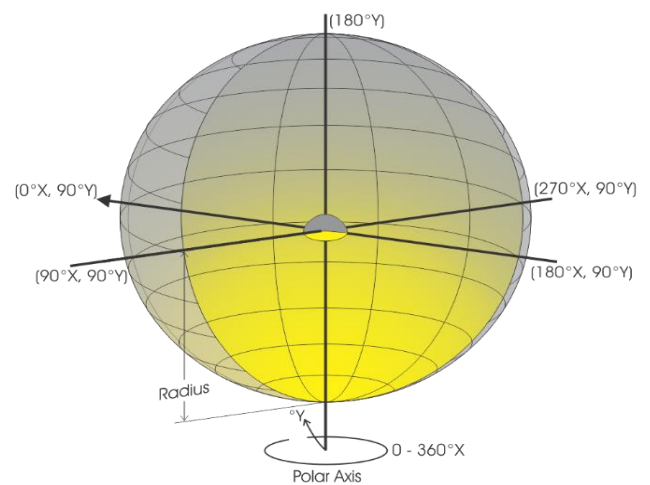


Image At 0° and 0°, See Equipment Geometry

#### Equipment Geometry - For Sample Device Mounted



#### Test Geometry - Type C Coordinates



#### Coordinate System Description

##### Reference: LM-75-01 Goniophotometer Types and Photometric Coordinates

Type C coordinate system, the polar axis is vertical. The angles measure in the vertical half planes of data are called vertical angles, and the angles to the horizontal half planes are called lateral angles. The vertical V angles range in value from 0° to 180°. The lateral L planes range in value from 0° to 360°.

## Product Test Report - Radiometric/Photometric

**Manufacturer:** LightArt

**Report Number:** LIGT009-010

**Product Description:** Slim Ring L

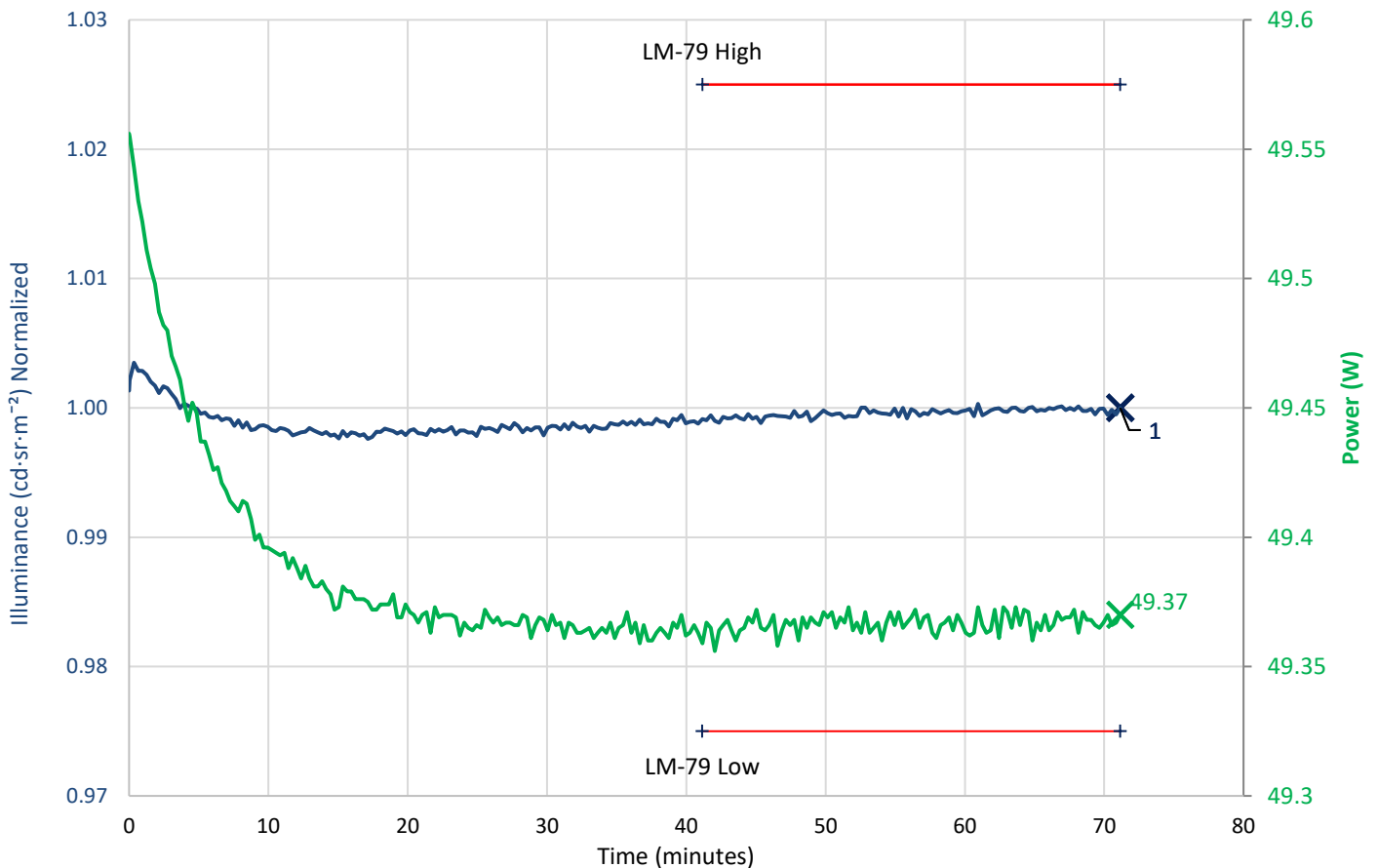
**Release Date:** 3/10/2020

### OPTICAL STABILIZATION

Stabilization Description - A series of 238 measurements are recorded during the stabilization period. The final stabilized measurement, as defined by LM-79:2019, is reported after 71 minutes of recorded device runtime. The 'Measurements in Range', provided below, are a histogram of measurements recorded during the 30 minute stabilization window.

% of range	(cd·sr·m <sup>-2</sup> ) Normalized	Measurements in Range
99.883%	1.00	12
99.897%	1.00	8
99.912%	1.00	14
99.927%	1.00	19
99.942%	1.00	15
99.957%	1.00	14
99.972%	1.00	19
99.987%	1.00	20
100.002%	1.00	7
100.017%	1.00	1
100.000%	1.00	Reported

% of range	Power (W)	Measurements in Range
99.972%	49.36	1
99.975%	49.36	3
99.979%	49.36	13
99.982%	49.36	3
99.985%	49.36	30
99.989%	49.36	38
99.992%	49.37	23
99.996%	49.37	25
99.999%	49.37	26
100.003%	49.37	15
100.000%	49.37	Reported



## Product Test Report - Radiometric/Photometric

**Manufacturer:** LightArt

**Report Number:** LIGT009-010

**Product Description:** Slim Ring L

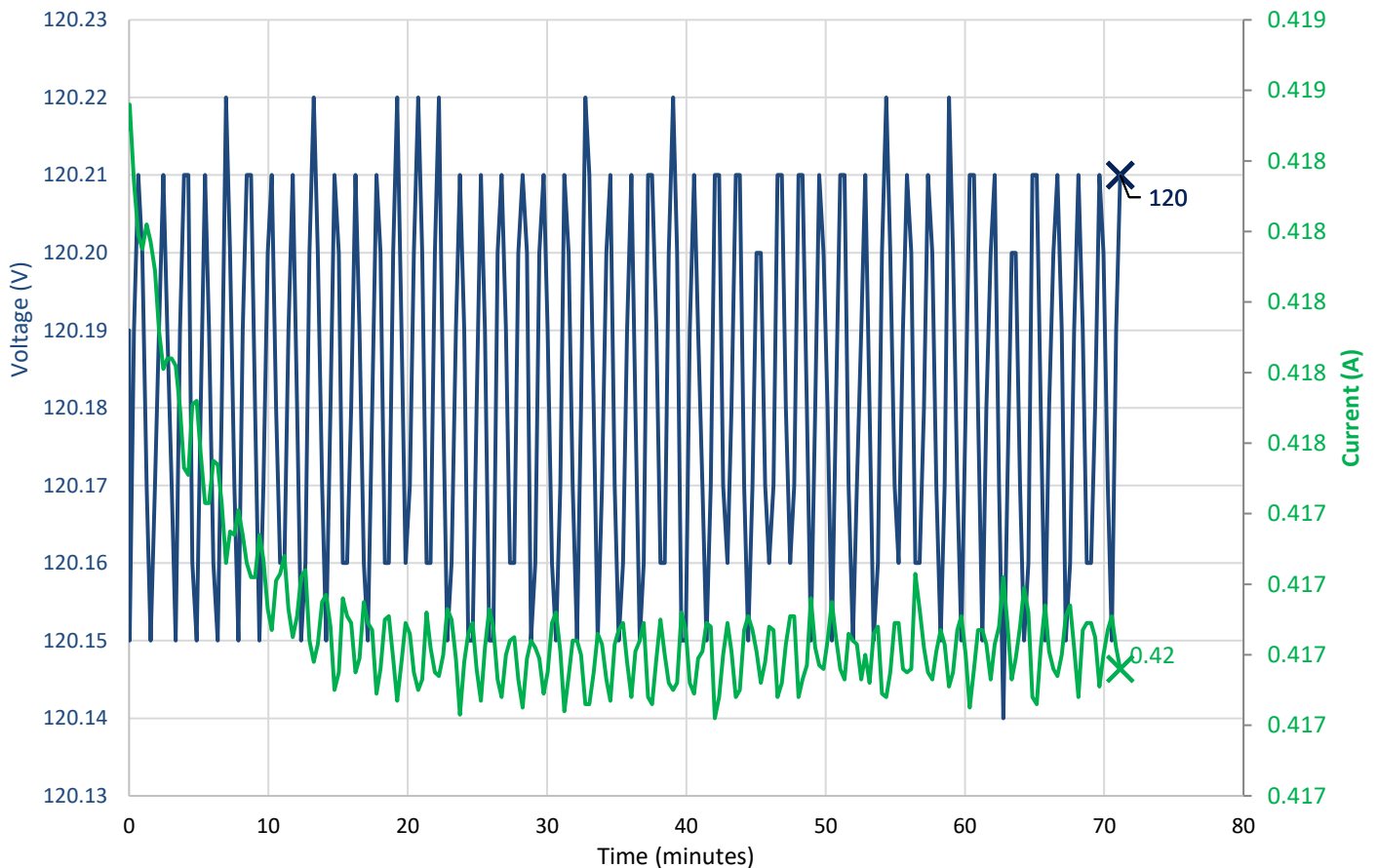
**Release Date:** 3/10/2020

### ELECTRICAL STABILIZATION

Stabilization Description - A series of 238 measurements are recorded during the stabilization period. The final stabilized measurement, as defined by LM-79:2019, is reported after 71 minutes of recorded device runtime. The 'Measurements in Range', provided below, are a histogram of measurements recorded during the 30 minute stabilization window.

% of range	Voltage (V)	Measurements in Range
99.942%	120.14	1
99.948%	120.15	36
99.955%	120.16	33
99.962%	120.16	29
99.968%	120.17	27
99.975%	120.18	27
99.982%	120.19	25
99.988%	120.20	32
99.995%	120.20	47
100.002%	120.21	9
100.000%	120.21	Reported

% of range	Current (A)	Measurements in Range
99.966%	0.417	3
99.976%	0.417	9
99.986%	0.417	12
99.996%	0.417	14
100.006%	0.417	16
100.016%	0.417	11
100.025%	0.417	21
100.035%	0.417	10
100.045%	0.417	2
100.055%	0.417	3
100.000%	0.417	Reported



## Product Test Report - Radiometric/Photometric

**Manufacturer:** LightArt  
**Product Description:** Slim Ring L

**Report Number:** LIGT009-010  
**Release Date:** 3/10/2020

### PHOTOMETRIC SUMMARY

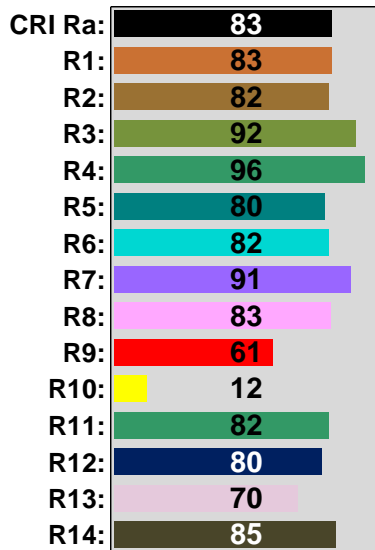
#### Radiometric Measurements

**Peak Wl:** 606.0 nm  
**FWHM:** 129.2 nm  
**Centroid Wl:** 585.4 nm

#### Photometric Measurements

**Photopic Power:** 6424 lm  
**Luminous Efficacy:** 130 lm/W  
**CCT:** 2971 K

#### Color Rendering Index



#### Color Coordinates

**Cx:** 0.4384  
**Cy:** 0.4035  
**u:** 0.2518  
**v:** 0.3476  
**u':** 0.2518  
**v':** 0.5214  
**Duv:** -0.0004  
**Du'v':** 0.0000

**Color Purity:** - %  
**Dom Wl:** 583.1 nm  
**Comp Wl:** 482.6 nm  
**Gamut Area:** 0.496

#### Electrical Performance

**Voltage:** 120.190 V  
**Current:** 0.417 A  
**Frequency:** 99.955 Hz  
**Active Power (P):** 49.367 W  
**Apparent Power:** 50.121 W  
**Power Factor:** 0.985 cos  $\theta$   
**THD Voltage:** 9.0 %  
**THD Current:** 0.1 %

## Product Test Report - Radiometric/Photometric

Manufacturer: LightArt

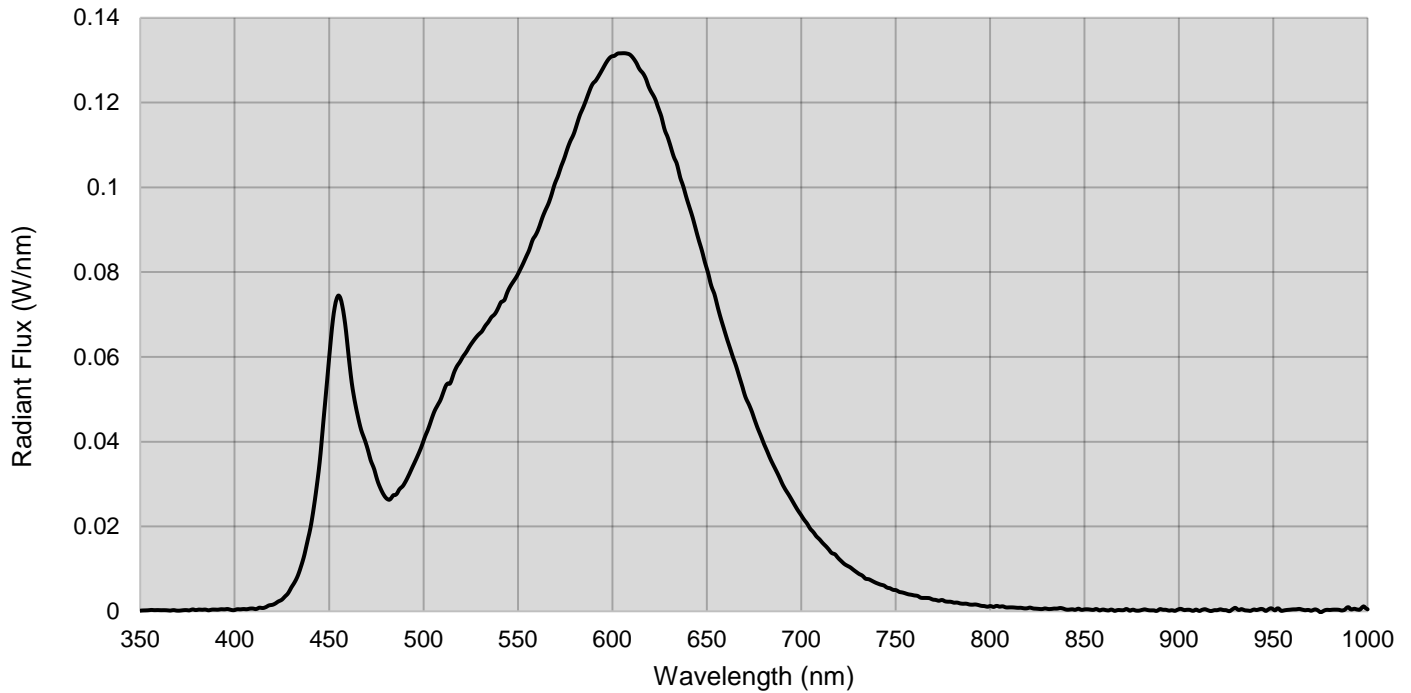
Report Number: LIGT009-010

Product Description: Slim Ring L

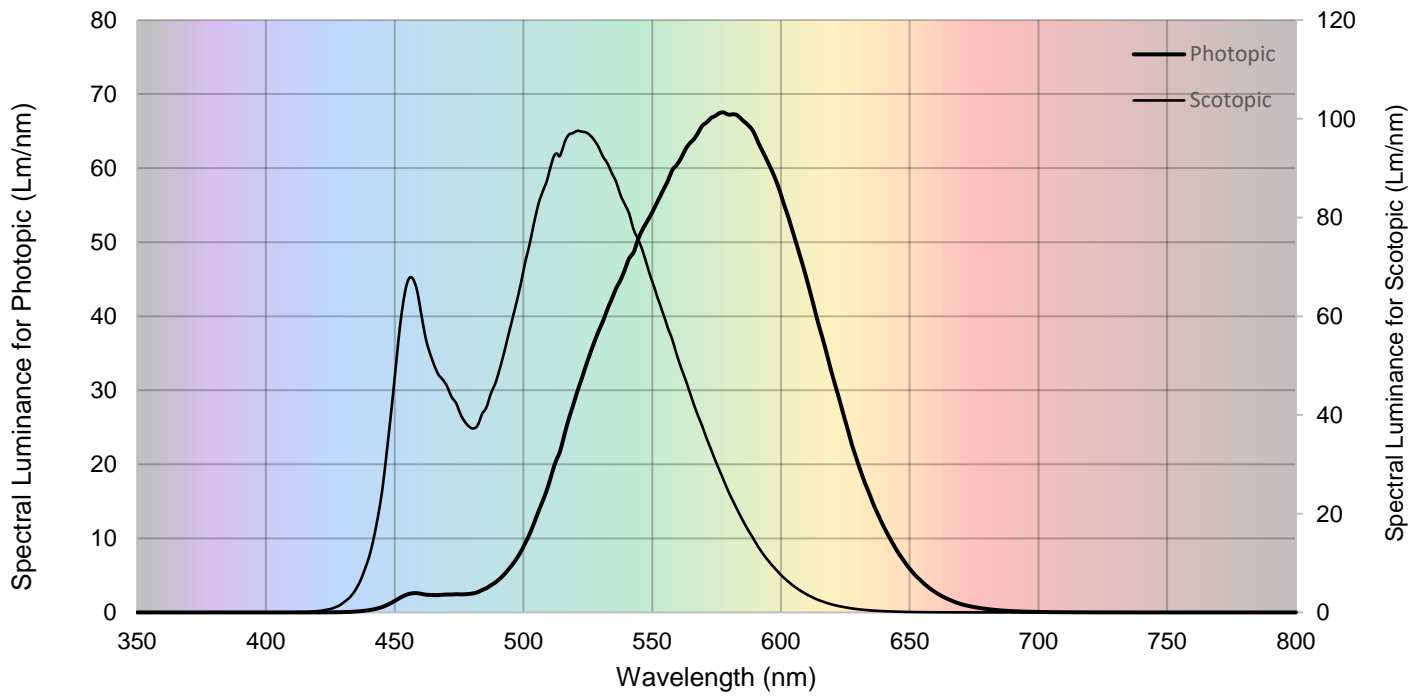
Release Date: 3/10/2020

### VISIBLE SPECTRUM

#### Radiometric Spectrum



#### Photopic and Scotopic Spectrum



## Product Test Report - Radiometric/Photometric

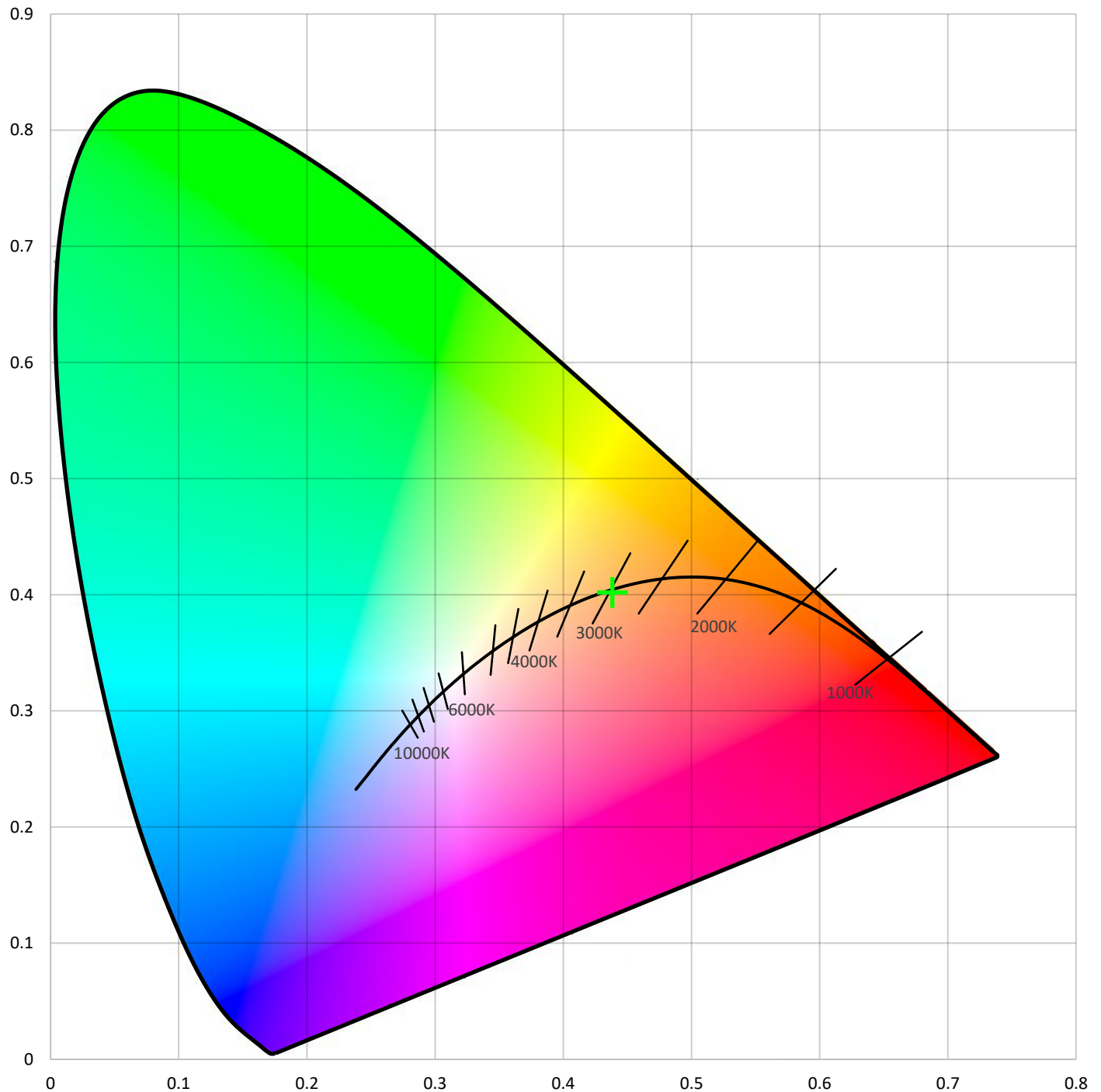
Manufacturer: LightArt

Report Number: LIGT009-010

Product Description: Slim Ring L

Release Date: 3/10/2020

CIE 1931





## Product Test Report - Radiometric/Photometric

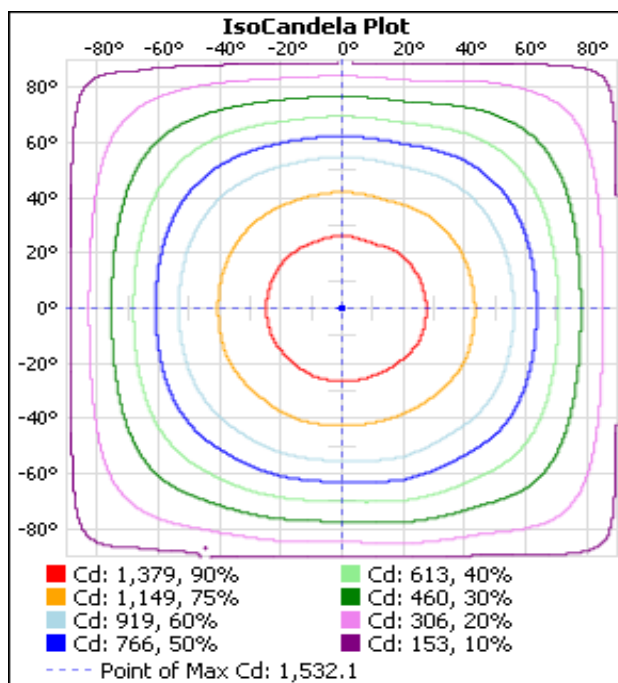
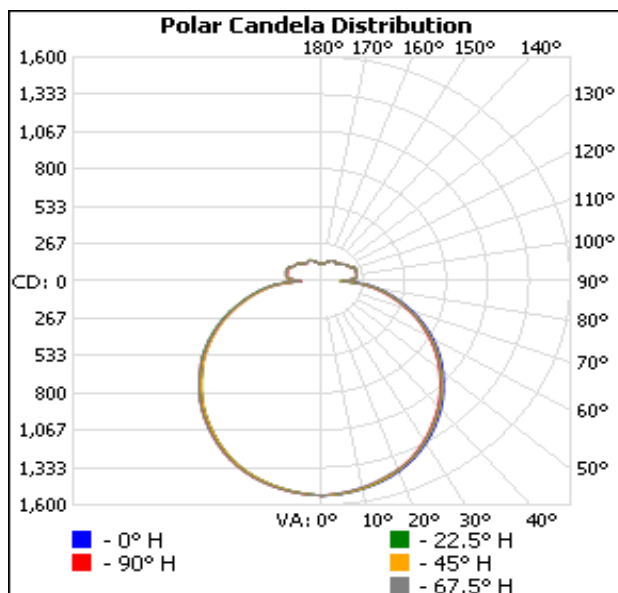
Manufacturer: LightArt

Report Number: LIGT009-010

Product Description: Slim Ring L

Release Date: 3/10/2020

### CANDELA PLOTS

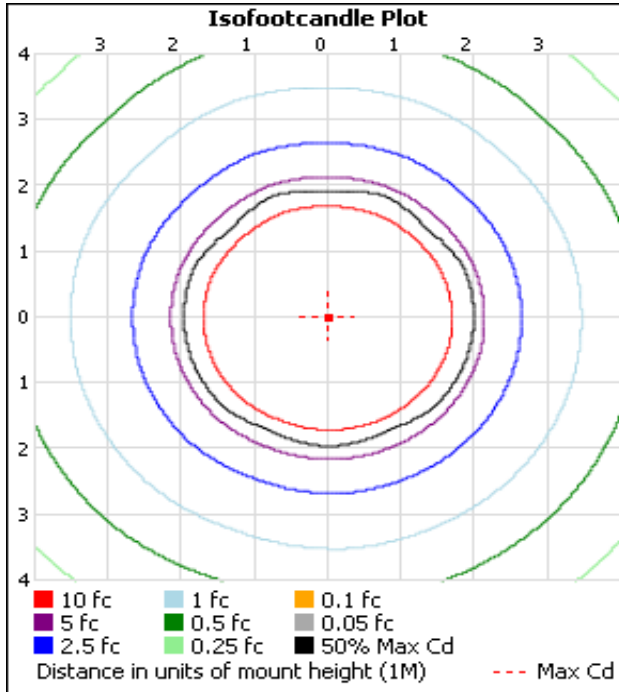


## Product Test Report - Radiometric/Photometric

**Manufacturer:** LightArt  
**Product Description:** Slim Ring L

**Report Number:** LIGT009-010  
**Release Date:** 3/10/2020

### ILLUMINANCE PLOTS



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
1.67M	51.2 fc	6.47 M	6.34 M
3.33M	12.8 fc	12.94 M	12.69 M
5.00M	5.70 fc	19.40 M	19.02 M
6.67M	3.20 fc	25.88 M	25.36 M
8.33M	2.05 fc	32.35 M	31.70 M
10.00M	1.42 fc	38.82 M	38.05 M

■ Vert. Spread: 125.5°  
■ Horiz. Spread: 124.5°

### ZONAL LUMEN SUMMARY

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1203.4	18.70%
0-40	1991.7	31.00%
0-60	3656.9	56.90%
60-90	1530.3	23.80%
70-100	1045.0	16.30%
90-120	690.8	10.80%
0-90	5187.2	80.70%
90-180	1236.8	19.30%
0-180	6423.9	100.00%

Lumens Per Zone		
Zone	Lumens	% Total
0-10	144.7	2.30%
10-20	417.2	6.50%
20-30	641.5	10.00%
30-40	788.3	12.30%
40-50	846.6	13.20%
50-60	818.5	12.70%
60-70	705.2	11.00%
70-80	526.3	8.20%
80-90	298.8	4.70%
90-100	219.9	3.40%
100-110	246.5	3.80%
110-120	224.4	3.50%
120-130	180.1	2.80%
130-140	136.6	2.10%
140-150	101.3	1.60%
150-160	74.9	1.20%
160-170	40.8	0.60%
170-180	12.2	0.20%

Lower Hemisphere

Upper Hemisphere

# Product Test Report - Radiometric/Photometric

Manufacturer: LightArt  
Product Description: Slim Ring L

Report Number: LIGT009-010  
Release Date: 3/10/2020

CANDELA TABLE

LOWER HEMISPHERE

0	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
South Pole	0	1532	1532	1532	1532	1532	1532	1532	1532	1532	1532	1532	1532	1532	1532	1532	1532
	2.5	1531	1530	1530	1525	1527	1527	1525	1527	1527	1526	1527	1530	1530	1531	1529	1530
	5	1525	1524	1523	1517	1520	1520	1518	1521	1521	1520	1524	1525	1525	1522	1522	1524
	7.5	1518	1515	1515	1508	1511	1511	1509	1514	1513	1512	1513	1518	1518	1519	1514	1517
	10	1508	1505	1504	1496	1500	1500	1498	1504	1504	1503	1503	1509	1510	1510	1505	1507
	12.5	1497	1493	1492	1482	1486	1487	1485	1492	1492	1491	1492	1499	1499	1499	1493	1495
	15	1483	1479	1477	1465	1471	1471	1469	1478	1478	1477	1478	1486	1486	1486	1478	1481
	17.5	1467	1461	1460	1446	1453	1453	1451	1461	1461	1460	1461	1471	1470	1471	1461	1464
	20	1448	1441	1440	1432	1431	1433	1430	1441	1442	1440	1441	1452	1451	1452	1440	1445
	22.5	1426	1418	1417	1411	1408	1409	1405	1418	1419	1417	1418	1431	1429	1429	1426	1422
	25	1400	1392	1390	1385	1380	1381	1377	1392	1393	1391	1391	1405	1404	1404	1403	1396
	27.5	1371	1362	1360	1354	1349	1351	1346	1363	1363	1360	1361	1377	1375	1375	1375	1366
	30	1339	1330	1327	1320	1316	1318	1313	1331	1331	1329	1330	1345	1343	1344	1343	1334
	32.5	1305	1295	1293	1285	1280	1282	1277	1296	1297	1294	1295	1312	1309	1309	1309	1300
	35	1269	1258	1256	1248	1242	1244	1240	1259	1260	1258	1258	1277	1274	1274	1273	1263
	37.5	1231	1221	1218	1211	1204	1206	1202	1222	1223	1221	1222	1240	1238	1237	1236	1225
	40	1193	1182	1179	1170	1164	1167	1162	1184	1185	1182	1183	1202	1199	1198	1197	1187
	42.5	1151	1140	1137	1128	1121	1125	1119	1143	1144	1140	1141	1162	1158	1157	1156	1145
	45	1106	1095	1093	1084	1076	1080	1075	1099	1100	1096	1097	1118	1114	1113	1112	1101
	47.5	1062	1050	1047	1038	1031	1035	1030	1054	1055	1052	1052	1074	1069	1068	1067	1056
	50	1017	1005	1002	995	987	990	985	1009	1011	1007	1007	1029	1025	1024	1022	1011
	52.5	972	961	958	951	942	945	939	965	966	963	962	985	981	980	978	967
	55	926	914	911	902	894	898	892	918	919	939	914	937	933	932	930	920
	57.5	877	864	862	853	845	848	842	870	870	890	864	888	884	883	881	871
	60	827	814	812	803	793	796	790	819	819	839	813	838	834	833	831	821
	62.5	775	761	759	750	742	745	739	766	767	788	761	785	781	780	778	767
	65	723	710	707	699	692	694	688	716	717	737	710	733	729	728	727	716
	67.5	671	659	655	646	638	640	633	662	663	685	656	682	677	676	675	664
	70	616	602	600	590	581	585	578	607	607	629	601	626	621	620	619	608
	72.5	562	549	545	535	527	531	524	553	553	574	547	571	566	565	565	555
	75	509	496	492	483	474	478	472	499	500	521	495	518	514	512	513	502
	77.5	458	446	442	432	422	427	421	448	449	470	444	467	463	461	461	450
	80	407	395	391	380	371	376	370	397	397	419	392	416	410	409	409	400
	82.5	355	342	339	328	318	323	317	346	345	367	340	363	357	357	358	348
	85	301	287	284	271	270	262	251	290	289	312	282	309	304	303	304	293
	87.5	222	198	193	173	208	164	153	200	199	239	187	234	227	226	226	207
Equator	90	128	121	123	129	126	140	154	140	141	149	142	140	134	133	130	122

# Product Test Report - Radiometric/Photometric

Manufacturer: LightArt  
Product Description: Slim Ring L

Report Number: LIGT009-010  
Release Date: 3/10/2020

CANDELA TABLE

LOWER HEMISPHERE

Equator

0	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
90	128	121	123	129	126	140	154	140	141	149	142	140	134	133	130	129	122
92.5	163	178	180	191	170	201	210	188	192	169	196	165	166	164	163	161	172
95	218	219	218	219	216	222	224	221	225	219	225	214	215	216	215	216	220
97.5	227	226	225	225	223	226	227	229	230	229	231	225	225	225	226	226	227
100	230	229	228	228	226	228	229	231	233	232	233	229	228	228	229	229	230
102.5	232	231	231	230	228	229	230	232	235	235	236	232	229	230	231	231	232
105	233	232	233	231	230	230	233	235	239	239	239	234	230	231	232	233	233
107.5	234	234	234	233	231	232	234	238	241	241	240	237	233	232	233	233	234
110	234	234	234	233	232	233	236	239	241	241	240	239	236	232	233	234	234
112.5	233	234	234	233	232	231	235	239	239	241	239	239	237	232	233	233	233
115	230	229	228	225	228	221	223	231	230	236	228	234	234	230	231	230	229
117.5	219	217	215	211	215	208	212	218	217	222	215	221	222	219	219	219	217
120	207	207	206	203	204	204	208	212	211	214	212	212	212	210	206	207	206
122.5	202	202	202	200	199	202	205	208	209	209	208	208	208	206	201	201	202
125	199	198	199	197	196	198	201	205	206	206	206	205	205	203	199	197	199
127.5	194	195	195	192	193	194	196	201	201	203	202	202	201	199	196	193	194
130	188	188	188	184	187	185	187	193	194	197	196	196	195	194	191	188	188
132.5	178	177	179	175	178	177	180	185	186	188	188	188	186	184	181	178	178
135	170	172	172	170	172	172	174	179	180	182	181	180	179	177	174	173	171
137.5	166	167	166	165	167	166	168	173	174	176	175	174	173	170	168	167	166
140	161	161	160	159	161	161	163	167	167	169	169	168	166	164	162	161	160
142.5	157	157	157	156	158	158	159	164	164	166	165	163	162	159	158	156	156
145	153	154	153	153	154	158	162	162	163	162	161	159	157	155	154	153	153
147.5	157	159	160	163	161	167	169	170	170	169	168	165	162	160	157	156	158
150	166	166	166	166	167	167	167	169	170	171	170	168	167	166	165	166	166
152.5	165	165	164	164	166	165	164	166	167	168	168	166	165	164	164	165	165
155	163	162	161	161	162	162	160	162	163	165	164	162	162	162	162	162	164
157.5	159	158	157	157	158	158	155	157	158	160	159	158	158	158	158	159	160
160	154	153	153	152	153	153	150	152	153	155	154	153	153	153	154	154	156
162.5	149	148	148	147	148	148	144	147	147	150	149	148	148	148	148	149	151
165	144	143	143	142	143	143	139	141	142	144	143	143	143	143	143	144	146
167.5	139	138	138	137	138	138	134	136	137	139	138	138	138	138	139	139	141
170	134	133	133	132	133	133	129	132	132	134	133	133	132	133	134	134	136
172.5	130	129	129	128	129	128	126	127	128	129	129	128	128	128	129	129	131
175	126	126	126	125	126	125	124	125	125	126	125	124	124	125	125	126	127
177.5	125	124	125	125	124	124	124	124	124	124	123	123	123	123	124	124	125
180	124	124	125	125	125	125	125	125	124	124	123	123	123	123	124	124	124

North Pole

## Product Test Report - Radiometric/Photometric

**Manufacturer:** LightArt

**Report Number:** LIGT009-010

**Product Description:** Slim Ring L

**Release Date:** 3/10/2020

### EQUIPMENT

Item	Description/use	Manufacturer	Model	Serial #	Calibration Due
Spectrometer	Spectrum	Orb Optronix	SP-75	4013726	7/16/2020
Power Supply	DUT power supply	Chroma	31015	QT3101500128	-
Type C Goniometer	Light Distribution	Orb Optronix		GONI003	at use
Power Meter	Luminous Intensity	Newport	2936-R	18963	-
Power Analyzer	Electrical Power	Yokogawa	WT210	91L127852	8/16/2020

## Product Test Report - Radiometric/Photometric

Manufacturer: LightArt

Report Number: LIGT009-010

Product Description: Slim Ring L

Release Date: 3/10/2020

### REVISION HISTORY

REVISION	DATE	APPROVED	DESCRIPTION OF REVISION
010	3/10/2020	ACM	① ORIGINAL

END OF REPORT