



Les Industries Spectralux Inc. Spectralux Industries Inc.

2750 Sabourin, Saint-Laurent (Quebec) H4S 1M2 Canada
Tel.: (514) 332-0082 Fax: (514) 332-3590 www.spectralux.ca

ISO/IEC 17025
NVLAP
NVLAP LAB CODE: 200899-0

Sphere Test Report

Standard(s) CIE 84-1989, IESNA LM-16-93, IESNA LM-58-94, IES LM-79-08, ANSI C82.77-2002

Customer Lumenpulse, 1751 Richardson, suite 1505, Montréal, Québec, Canada, H3K 1G6

General Information		Lamp Details: CY2619	Driver Details: CY1101	
Test Report	L1606286-C1	Description	Clusters of CREE XPE2 LED's	Type Commercial
Test Date	28 June 2016	Manufacturer	Cree	Description 71W
Report Date	7 July 2016	Catalog No.	LOG-HO-120-48-22K-10x60-SI-NO	Manufacturer Mean Well
Sphere Temperature	25.2°C	Serial No.	SRIS 2442	Catalog No. LPF-60-24
Humidity	41.6 %	Drive Current	300 mA	Voltage 120.00 V
Lamp Type	SSL	Color	White	Power Factor 0.9900

Stabilization Time: 55 minutes

Tested By: George Hedrei

Approved Signatory: Chrisnel Blot

Signature:

Notes

- 1) Field performance may differ from laboratory measurements. Results are valid for tested material only.
- 2) The original electronic file or paper report cannot be edited in whole or in part without written consent of Spectra Lux Industries Inc.
- 3) This test report describes the performance of a single product and does not necessarily represent the average performance of a group of the same SSL product.



Realization of Sphere Test

A 4π sphere-spectroradiometer equipped with auxiliary lamp to correct self-absorption was used during the measurements of electrical, photometric and colorimetric properties of the sample under test. The size of the integrating sphere used is large enough to ensure that the measurement errors due to effects of baffle and self-absorption by the sample test are not significant.

During the test, a commercial driver was used and adjusted to nominal electrical characteristics specified by the driver manufacturer or the client. Good electrical contacts have been used to ensure the control of electrical parameters of the commercial driver and an adequate stabilization period prior to collecting data. The self-absorbance was measured and a geometrical correction factor was applied to the luminous flux value to take into account the sphere configuration.

Results of the measurements are traceable to reference standards developed and maintained by the National Institute of Standards and Technology (NIST) and National Research Council of Canada (NRC).





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Electrical Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Auxiliary Power Supply	American Reliance	SPS150-7	B10155	N.P.C.R.	N.P.C.R.
Test Power Supply	iRDC	CIF-3000A	974997	N.P.C.R.	N.P.C.R.
Input Power Meter	Yokogawa	WT210	27E224420	2016/05/06	2017/05/06
Output Power Meter	N/A	N/A	N/A	N.P.C.R.	N.P.C.R.
Shunt Resistor	Fluke	Y5020	6010009	2015/07/08	2016/07/08
Current Multimeter	HP Agilent	HP34401A	MY41025831	2016/05/05	2017/05/05
Voltage Multimeter	HP Agilent	HP34401A	US36010444	2016/05/05	2017/05/05

Spectrometer Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Spectrometer	Ocean Optics	USB2000N	USB2E3364	2016/05/30	2017/05/30

Environment Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Temperature Humidity Sensor	Omega	HH311	091203915	2014/10/30	2016/10/30



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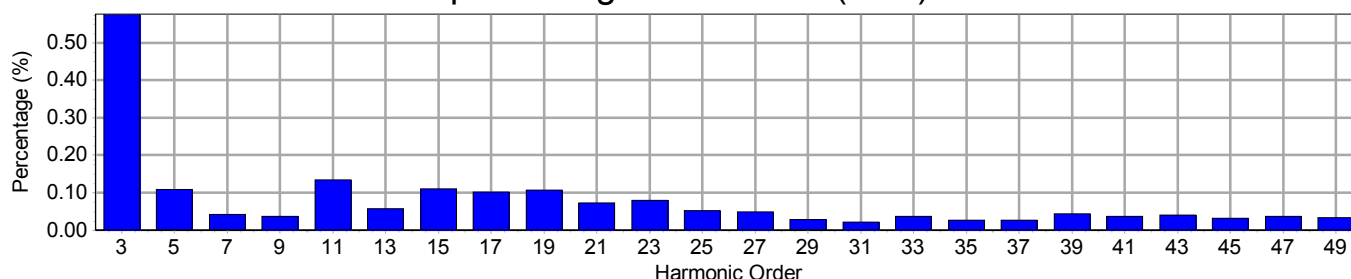
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Electrical Measurements

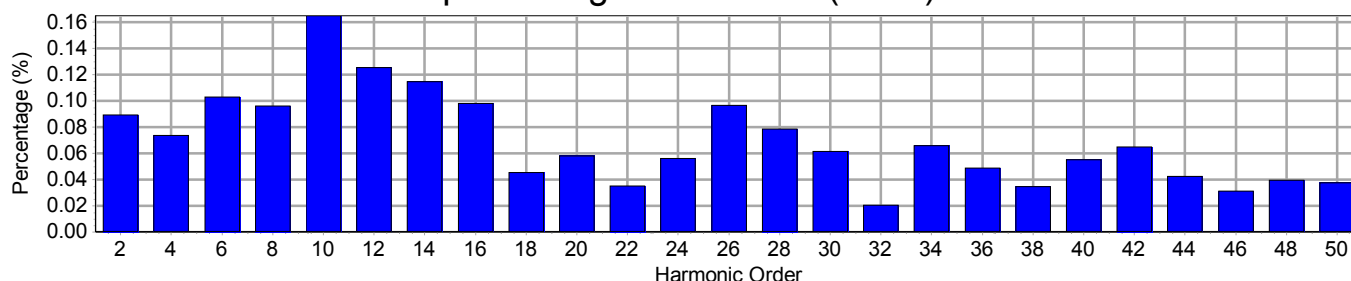
Input

Frequency	60 Hz	Active Power	61.52 W	THDV [ANSI]	0.75 %
Voltage	120.2 V(rms)	Apparent Power	61.94 VA	THDA [ANSI]	5.46 %
Current	0.5153 A(rms)	Power Factor	0.993	Max. Harmonic At	5th order

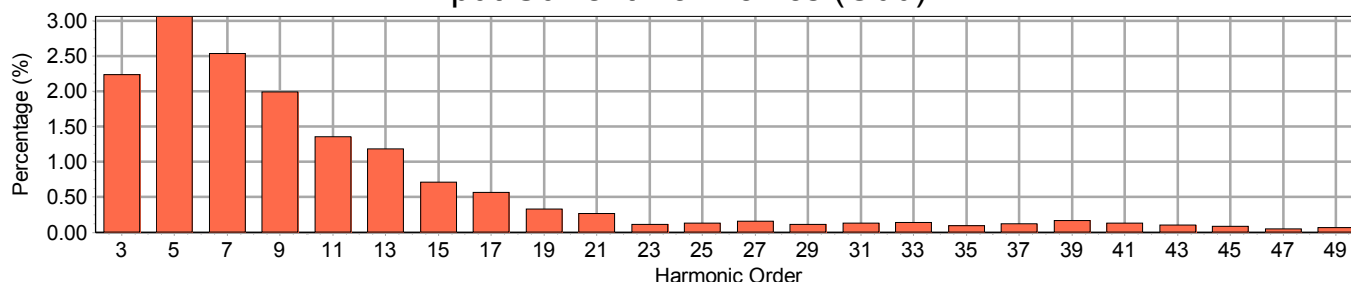
Input Voltage Harmonics (Odd)



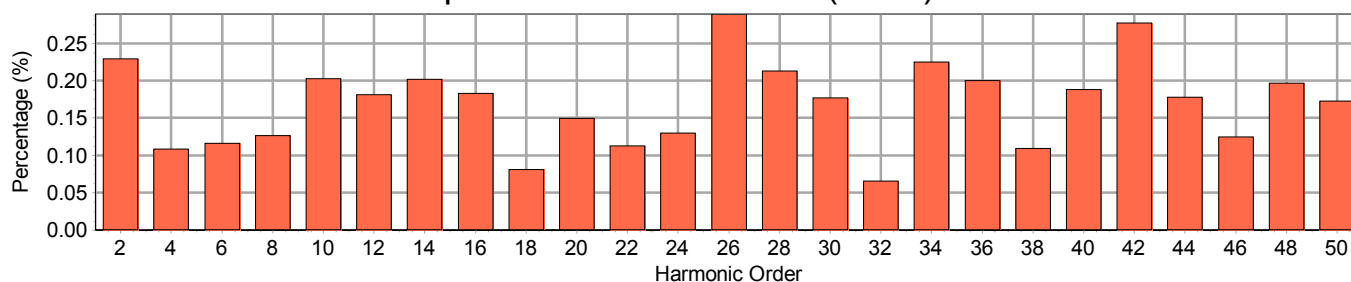
Input Voltage Harmonics (Even)



Input Current Harmonics (Odd)



Input Current Harmonics (Even)





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Harmonic Measurements

Odd Harmonics				Even Harmonics			
Harmonic Order	Frequency (HZ)	Voltage Harmonics (%)	Current Harmonics (%)	Harmonic Order	Frequency (HZ)	Voltage Harmonics (%)	Current Harmonics (%)
1	60	100.000	100.000	2	120	0.089	0.229
3	180	0.577	2.235	4	240	0.074	0.109
5	300	0.109	3.065	6	360	0.103	0.116
7	420	0.041	2.535	8	480	0.096	0.126
9	540	0.036	1.989	10	600	0.165	0.203
11	660	0.134	1.358	12	720	0.125	0.181
13	780	0.057	1.181	14	840	0.115	0.202
15	900	0.111	0.711	16	960	0.098	0.183
17	1020	0.101	0.564	18	1080	0.045	0.081
19	1140	0.107	0.334	20	1200	0.058	0.149
21	1260	0.073	0.271	22	1320	0.035	0.112
23	1380	0.080	0.118	24	1440	0.056	0.130
25	1500	0.052	0.133	26	1560	0.096	0.290
27	1620	0.049	0.156	28	1680	0.079	0.213
29	1740	0.028	0.117	30	1800	0.061	0.177
31	1860	0.022	0.130	32	1920	0.020	0.066
33	1980	0.037	0.142	34	2040	0.066	0.225
35	2100	0.027	0.092	36	2160	0.049	0.200
37	2220	0.026	0.120	38	2280	0.034	0.109
39	2340	0.043	0.166	40	2400	0.055	0.188
41	2460	0.037	0.128	42	2520	0.065	0.277
43	2580	0.040	0.104	44	2640	0.042	0.178
45	2700	0.031	0.083	46	2760	0.031	0.125
47	2820	0.036	0.053	48	2880	0.040	0.197
49	2940	0.033	0.072	50	3000	0.037	0.173



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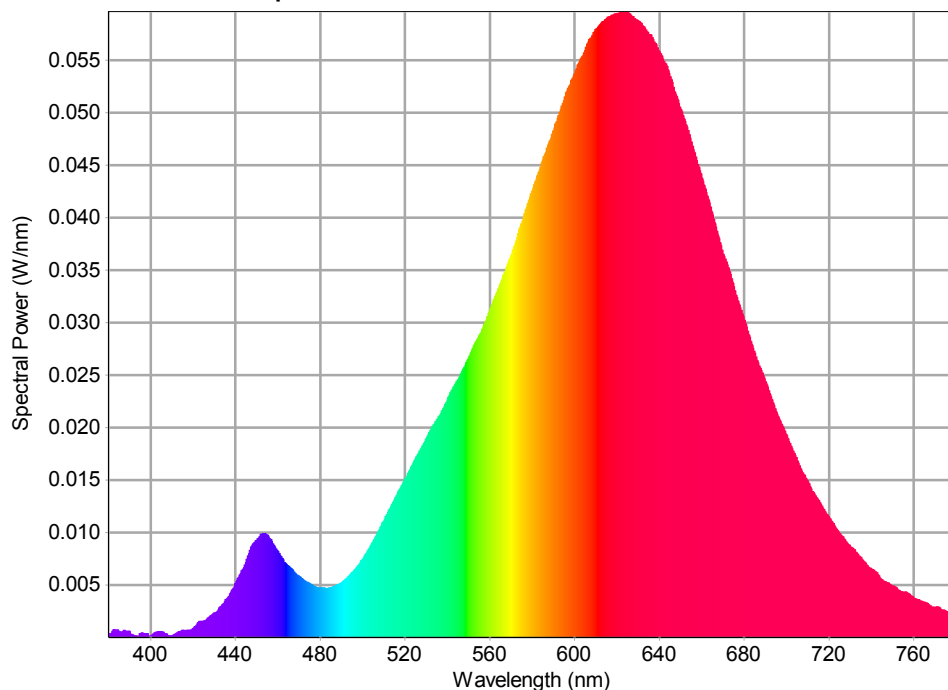
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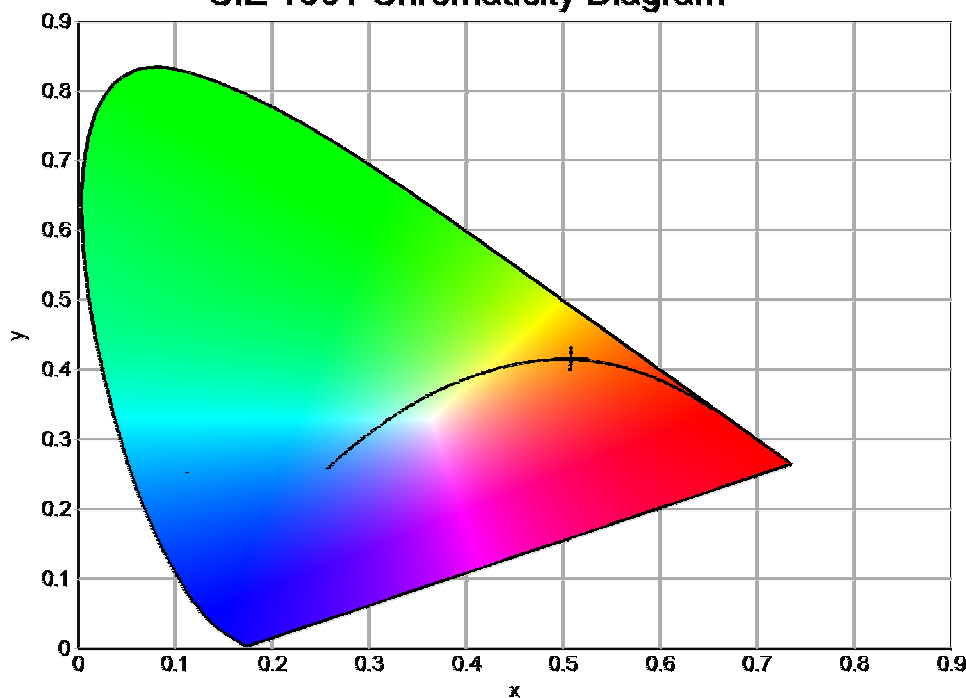
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Spectral Power Distribution



Peak Wavelength	622 nm
Luminous Flux	2371 lm
Input Power	61.52 W
Lumens/Watt	38.5
Full Width/Half Maximum	123.37
Center Wavelength	619 nm
Centroid Wavelength	464 nm
Dominant Wavelength	590 nm
Excitation Purity	0.4719
Colorimetric Purity	0.4827

CIE 1931 Chromaticity Diagram



x	0.5072	CCT	2189 K
y	0.4159	CRI	83
u	0.2908	L*	25.67
v	0.3577	a*	6.36
u'	0.2908	b*	14.10
v'	0.5366	Duv	0.0002
R1	81.5	R9	25.8
R2	90.7	R10	77.8
R3	97.6	R11	76.5
R4	79.4	R12	72.4
R5	79.9	R13	83.1
R6	88.1	R14	98.0
R7	84.4		
R8	63.6		



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Spectral Power Distribution Table (1/4)

Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)
380	0.00021	405	0.00061	430	0.00238	455	0.00982
381	0.00044	406	0.00055	431	0.00246	456	0.00947
382	0.00061	407	0.00045	432	0.00266	457	0.00922
383	0.00081	408	0.00025	433	0.00298	458	0.00884
384	0.00068	409	0.00016	434	0.00317	459	0.00848
385	0.00058	410	0.00019	435	0.00345	460	0.00823
386	0.00057	411	0.00028	436	0.00373	461	0.00785
387	0.00062	412	0.00046	437	0.00397	462	0.00759
388	0.00062	413	0.00056	438	0.00440	463	0.00722
389	0.00063	414	0.00060	439	0.00472	464	0.00702
390	0.00060	415	0.00071	440	0.00518	465	0.00685
391	0.00031	416	0.00069	441	0.00565	466	0.00663
392	0.00027	417	0.00072	442	0.00596	467	0.00646
393	0.00020	418	0.00071	443	0.00638	468	0.00617
394	0.00009	419	0.00072	444	0.00672	469	0.00600
395	0.00041	420	0.00090	445	0.00719	470	0.00586
396	0.00049	421	0.00107	446	0.00783	471	0.00570
397	0.00043	422	0.00133	447	0.00838	472	0.00552
398	0.00042	423	0.00159	448	0.00883	473	0.00538
399	0.00020	424	0.00157	449	0.00907	474	0.00529
400	0.00015	425	0.00160	450	0.00929	475	0.00517
401	0.00032	426	0.00167	451	0.00949	476	0.00506
402	0.00047	427	0.00188	452	0.00987	477	0.00490
403	0.00049	428	0.00205	453	0.00992	478	0.00482
404	0.00063	429	0.00220	454	0.00992	479	0.00478



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Spectral Power Distribution Table (2/4)

Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)
480	0.00475	505	0.00922	530	0.01896	555	0.02879
481	0.00475	506	0.00960	531	0.01937	556	0.02915
482	0.00474	507	0.00996	532	0.01978	557	0.02965
483	0.00471	508	0.01038	533	0.02015	558	0.03012
484	0.00474	509	0.01077	534	0.02043	559	0.03062
485	0.00478	510	0.01113	535	0.02077	560	0.03116
486	0.00486	511	0.01158	536	0.02108	561	0.03172
487	0.00492	512	0.01198	537	0.02141	562	0.03228
488	0.00503	513	0.01234	538	0.02182	563	0.03274
489	0.00513	514	0.01277	539	0.02224	564	0.03325
490	0.00526	515	0.01317	540	0.02267	565	0.03372
491	0.00541	516	0.01357	541	0.02315	566	0.03429
492	0.00558	517	0.01398	542	0.02355	567	0.03481
493	0.00577	518	0.01433	543	0.02391	568	0.03532
494	0.00600	519	0.01472	544	0.02430	569	0.03593
495	0.00621	520	0.01512	545	0.02461	570	0.03639
496	0.00640	521	0.01545	546	0.02495	571	0.03697
497	0.00666	522	0.01589	547	0.02543	572	0.03758
498	0.00687	523	0.01632	548	0.02578	573	0.03819
499	0.00719	524	0.01671	549	0.02626	574	0.03898
500	0.00749	525	0.01707	550	0.02665	575	0.03948
501	0.00784	526	0.01745	551	0.02715	576	0.04010
502	0.00814	527	0.01780	552	0.02758	577	0.04081
503	0.00851	528	0.01819	553	0.02804	578	0.04137
504	0.00885	529	0.01853	554	0.02842	579	0.04201



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Spectral Power Distribution Table (3/4)

Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)
580	0.04258	605	0.05600	630	0.05878	655	0.04728
581	0.04322	606	0.05658	631	0.05863	656	0.04657
582	0.04377	607	0.05705	632	0.05837	657	0.04589
583	0.04435	608	0.05723	633	0.05816	658	0.04516
584	0.04486	609	0.05769	634	0.05779	659	0.04455
585	0.04556	610	0.05800	635	0.05756	660	0.04387
586	0.04609	611	0.05820	636	0.05747	661	0.04319
587	0.04665	612	0.05846	637	0.05702	662	0.04249
588	0.04725	613	0.05871	638	0.05669	663	0.04183
589	0.04765	614	0.05878	639	0.05626	664	0.04111
590	0.04834	615	0.05900	640	0.05587	665	0.04035
591	0.04897	616	0.05919	641	0.05554	666	0.03961
592	0.04952	617	0.05927	642	0.05496	667	0.03879
593	0.05006	618	0.05938	643	0.05470	668	0.03805
594	0.05069	619	0.05950	644	0.05417	669	0.03737
595	0.05124	620	0.05950	645	0.05351	670	0.03660
596	0.05197	621	0.05950	646	0.05296	671	0.03610
597	0.05238	622	0.05969	647	0.05213	672	0.03555
598	0.05279	623	0.05969	648	0.05167	673	0.03495
599	0.05333	624	0.05959	649	0.05097	674	0.03427
600	0.05376	625	0.05963	650	0.05041	675	0.03350
601	0.05431	626	0.05949	651	0.04983	676	0.03272
602	0.05478	627	0.05914	652	0.04922	677	0.03215
603	0.05521	628	0.05907	653	0.04871	678	0.03150
604	0.05552	629	0.05893	654	0.04802	679	0.03092



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Spectral Power Distribution Table (4/4)

Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)	Wavelength (nm)	Spectral Power (W/nm)
680	0.03030	706	0.01644	732	0.00841	758	0.00413
681	0.02966	707	0.01595	733	0.00810	759	0.00398
682	0.02894	708	0.01557	734	0.00782	760	0.00378
683	0.02830	709	0.01524	735	0.00767	761	0.00371
684	0.02761	710	0.01487	736	0.00739	762	0.00367
685	0.02712	711	0.01445	737	0.00718	763	0.00350
686	0.02649	712	0.01399	738	0.00687	764	0.00345
687	0.02593	713	0.01371	739	0.00666	765	0.00339
688	0.02552	714	0.01339	740	0.00657	766	0.00333
689	0.02499	715	0.01313	741	0.00646	767	0.00319
690	0.02443	716	0.01274	742	0.00627	768	0.00306
691	0.02392	717	0.01239	743	0.00601	769	0.00296
692	0.02328	718	0.01208	744	0.00571	770	0.00295
693	0.02273	719	0.01180	745	0.00555	771	0.00297
694	0.02216	720	0.01147	746	0.00535	772	0.00291
695	0.02158	721	0.01116	747	0.00529	773	0.00267
696	0.02111	722	0.01090	748	0.00522	774	0.00269
697	0.02063	723	0.01048	749	0.00508	775	0.00258
698	0.02018	724	0.01023	750	0.00492	776	0.00251
699	0.01976	725	0.00996	751	0.00488	777	0.00239
700	0.01925	726	0.00967	752	0.00472	778	0.00226
701	0.01876	727	0.00946	753	0.00454	779	0.00228
702	0.01829	728	0.00916	754	0.00440	780	0.00219
703	0.01783	729	0.00893	755	0.00434		
704	0.01740	730	0.00869	756	0.00437		
705	0.01692	731	0.00857	757	0.00428		