



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: CY2617	Driver Details: CY1101	
Test Report	L1606284-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-120-48-40K-10x90-SI-NO	Manufacturer Mean Well
Sphere Temperature	25.4°C	Serial No.	SRIS 2435	Catalog No. LPF-60-24
Humidity	44.4 %	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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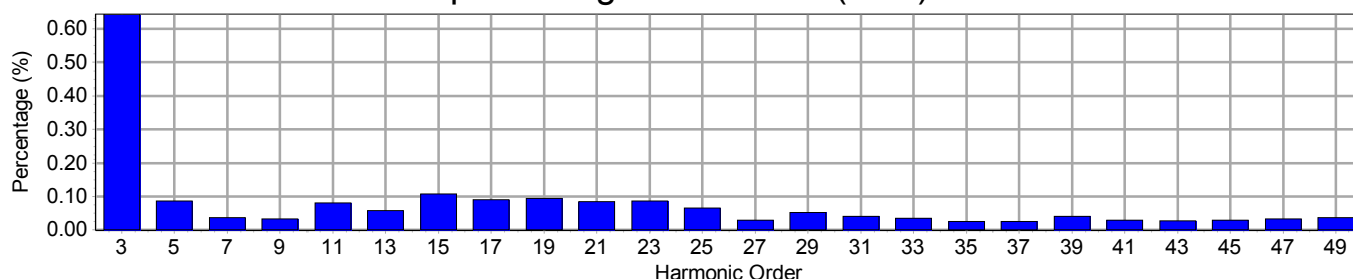
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Electrical Measurements

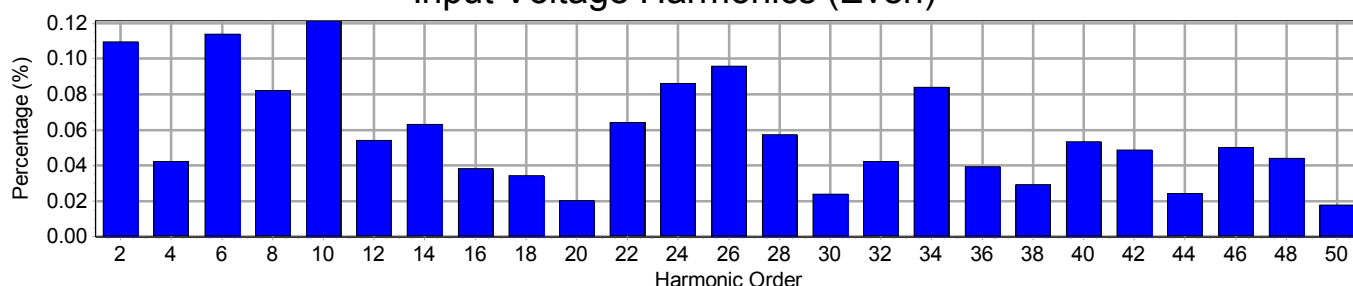
Input

Frequency	60 Hz	Active Power	62.22 W	THDV [ANSI]	0.77 %
Voltage	120.1 V(rms)	Apparent Power	62.63 VA	THDA [ANSI]	5.20 %
Current	0.5213 A(rms)	Power Factor	0.994	Max. Harmonic At	5th order

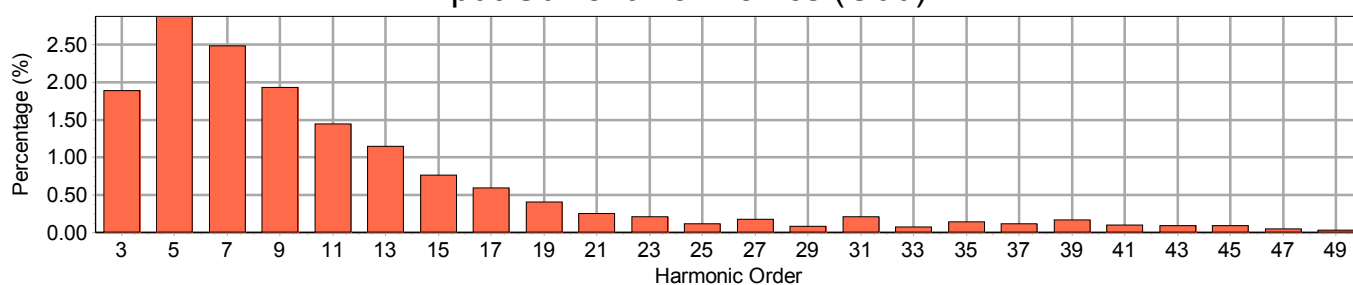
Input Voltage Harmonics (Odd)



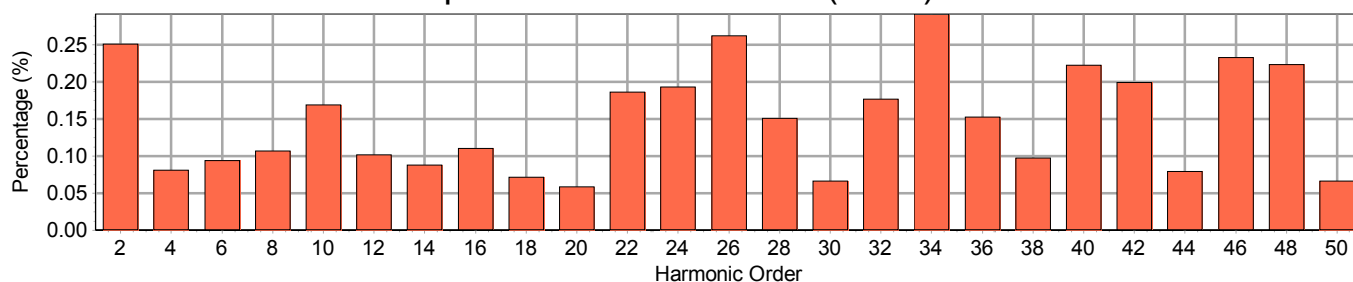
Input Voltage Harmonics (Even)



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	0.110	0.252
3	180	0.644	1.893	4	240	0.042	0.081
5	300	0.087	2.882	6	360	0.114	0.094
7	420	0.036	2.485	8	480	0.082	0.107
9	540	0.033	1.930	10	600	0.122	0.169
11	660	0.081	1.445	12	720	0.054	0.102
13	780	0.058	1.143	14	840	0.063	0.088
15	900	0.108	0.764	16	960	0.038	0.110
17	1020	0.091	0.592	18	1080	0.034	0.071
19	1140	0.094	0.407	20	1200	0.020	0.059
21	1260	0.084	0.253	22	1320	0.064	0.187
23	1380	0.086	0.206	24	1440	0.086	0.194
25	1500	0.065	0.114	26	1560	0.096	0.263
27	1620	0.029	0.171	28	1680	0.058	0.151
29	1740	0.053	0.082	30	1800	0.024	0.066
31	1860	0.042	0.211	32	1920	0.042	0.177
33	1980	0.036	0.070	34	2040	0.084	0.292
35	2100	0.025	0.141	36	2160	0.039	0.152
37	2220	0.026	0.112	38	2280	0.029	0.097
39	2340	0.041	0.169	40	2400	0.053	0.223
41	2460	0.029	0.102	42	2520	0.049	0.200
43	2580	0.028	0.089	44	2640	0.024	0.079
45	2700	0.030	0.092	46	2760	0.050	0.234
47	2820	0.033	0.048	48	2880	0.044	0.224
49	2940	0.037	0.027	50	3000	0.018	0.066



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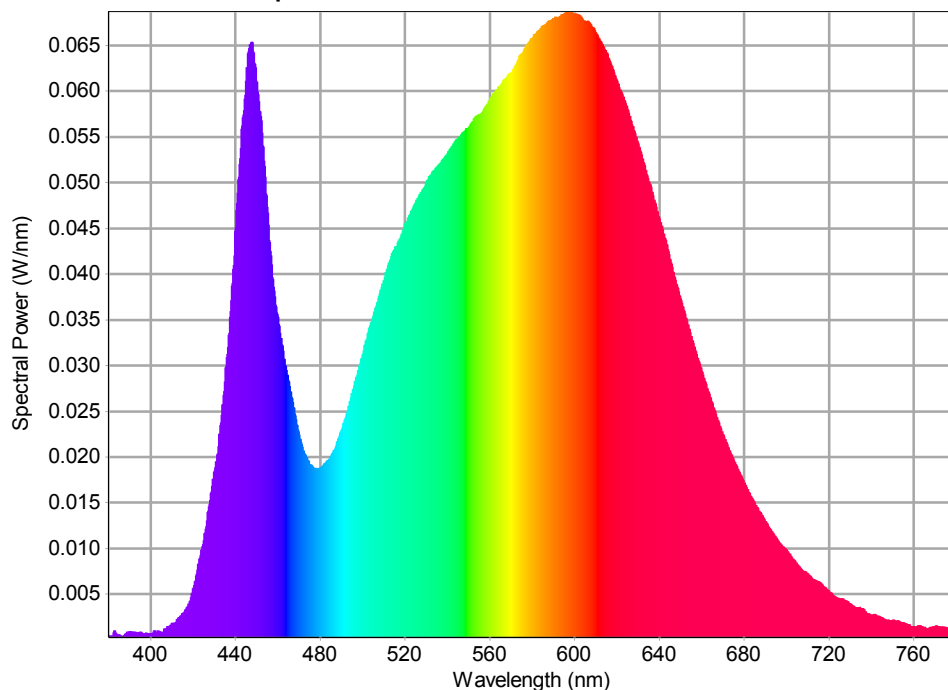
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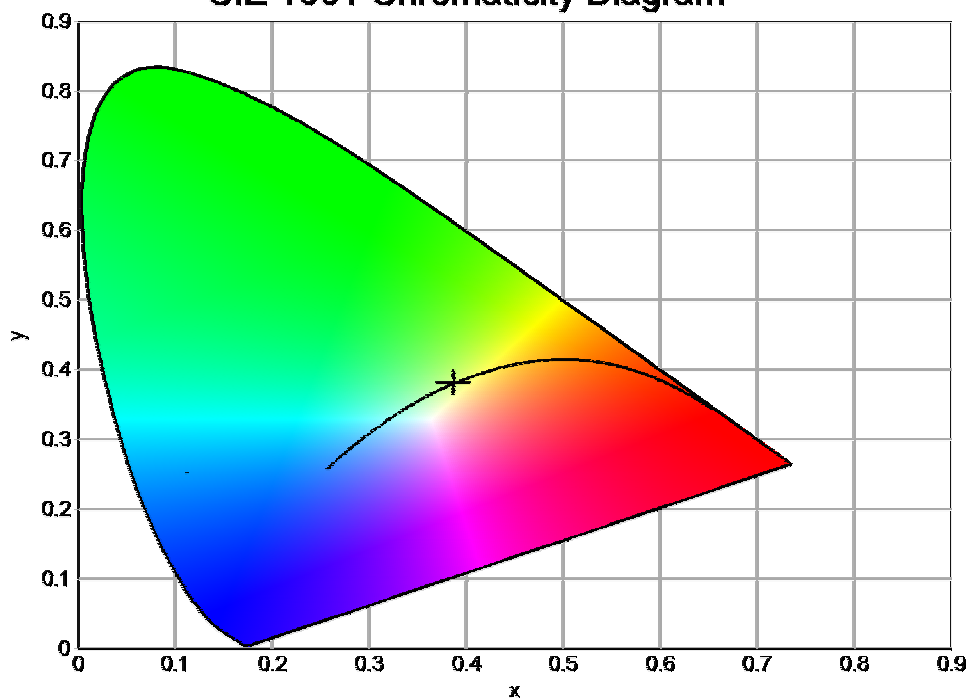
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Spectral Power Distribution



Peak Wavelength	596 nm
Luminous Flux	3984 lm
Input Power	62.22 W
Lumens/Watt	64.0
Full Width/Half Maximum	150.31
Center Wavelength	579 nm
Centroid Wavelength	370 nm
Dominant Wavelength	488 nm
Excitation Purity	0.1566
Colorimetric Purity	0.1010

CIE 1931 Chromaticity Diagram



x	0.3863	CCT	3885 K
y	0.3822	CRI	83
u	0.2268	L*	25.67
v	0.3366	a*	-4.91
u'	0.2268	b*	-13.93
v'	0.5048	Duv	0.0009
R1	81.5	R9	12.0
R2	87.8	R10	70.8
R3	92.8	R11	82.0
R4	83.1	R12	64.9
R5	81.5	R13	82.7
R6	83.5	R14	95.8
R7	86.9		
R8	66.4		



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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	0.00055	405	0.00088	430	0.01840	455	0.04739
381	0.00045	406	0.00092	431	0.01955	456	0.04372
382	0.00037	407	0.00124	432	0.02116	457	0.04109
383	0.00101	408	0.00150	433	0.02351	458	0.03862
384	0.00062	409	0.00157	434	0.02571	459	0.03665
385	0.00062	410	0.00186	435	0.02829	460	0.03532
386	0.00051	411	0.00186	436	0.03095	461	0.03356
387	0.00038	412	0.00205	437	0.03338	462	0.03234
388	0.00067	413	0.00244	438	0.03715	463	0.03075
389	0.00091	414	0.00265	439	0.04054	464	0.02952
390	0.00096	415	0.00292	440	0.04470	465	0.02843
391	0.00091	416	0.00314	441	0.04891	466	0.02719
392	0.00090	417	0.00358	442	0.05206	467	0.02602
393	0.00082	418	0.00396	443	0.05592	468	0.02477
394	0.00081	419	0.00466	444	0.05790	469	0.02356
395	0.00089	420	0.00563	445	0.06112	470	0.02246
396	0.00077	421	0.00644	446	0.06418	471	0.02161
397	0.00074	422	0.00766	447	0.06515	472	0.02073
398	0.00080	423	0.00887	448	0.06534	473	0.02020
399	0.00075	424	0.00985	449	0.06311	474	0.01974
400	0.00073	425	0.01089	450	0.06113	475	0.01927
401	0.00078	426	0.01213	451	0.05889	476	0.01912
402	0.00101	427	0.01397	452	0.05730	477	0.01880
403	0.00080	428	0.01534	453	0.05409	478	0.01882
404	0.00097	429	0.01688	454	0.05064	479	0.01877



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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	0.01879	505	0.03550	530	0.05003	555	0.05750
481	0.01902	506	0.03628	531	0.05047	556	0.05760
482	0.01930	507	0.03694	532	0.05084	557	0.05795
483	0.01955	508	0.03789	533	0.05123	558	0.05838
484	0.01973	509	0.03865	534	0.05141	559	0.05865
485	0.02009	510	0.03931	535	0.05174	560	0.05908
486	0.02057	511	0.04022	536	0.05200	561	0.05951
487	0.02094	512	0.04098	537	0.05226	562	0.05984
488	0.02170	513	0.04156	538	0.05263	563	0.06014
489	0.02231	514	0.04229	539	0.05293	564	0.06045
490	0.02293	515	0.04276	540	0.05324	565	0.06057
491	0.02368	516	0.04302	541	0.05363	566	0.06101
492	0.02442	517	0.04364	542	0.05396	567	0.06137
493	0.02514	518	0.04417	543	0.05428	568	0.06152
494	0.02607	519	0.04478	544	0.05470	569	0.06193
495	0.02701	520	0.04552	545	0.05489	570	0.06206
496	0.02784	521	0.04585	546	0.05504	571	0.06238
497	0.02874	522	0.04643	547	0.05550	572	0.06284
498	0.02950	523	0.04693	548	0.05564	573	0.06323
499	0.03035	524	0.04749	549	0.05596	574	0.06388
500	0.03119	525	0.04787	550	0.05605	575	0.06412
501	0.03225	526	0.04831	551	0.05647	576	0.06443
502	0.03298	527	0.04873	552	0.05673	577	0.06497
503	0.03408	528	0.04912	553	0.05719	578	0.06525
504	0.03472	529	0.04950	554	0.05735	579	0.06555



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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	0.06585	605	0.06768	630	0.05429	655	0.03322
581	0.06623	606	0.06769	631	0.05351	656	0.03247
582	0.06641	607	0.06753	632	0.05268	657	0.03166
583	0.06668	608	0.06711	633	0.05190	658	0.03088
584	0.06688	609	0.06697	634	0.05097	659	0.03019
585	0.06720	610	0.06644	635	0.05017	660	0.02943
586	0.06729	611	0.06599	636	0.04955	661	0.02868
587	0.06751	612	0.06556	637	0.04862	662	0.02795
588	0.06775	613	0.06520	638	0.04783	663	0.02724
589	0.06780	614	0.06464	639	0.04688	664	0.02656
590	0.06804	615	0.06426	640	0.04609	665	0.02585
591	0.06813	616	0.06364	641	0.04535	666	0.02518
592	0.06810	617	0.06306	642	0.04445	667	0.02440
593	0.06820	618	0.06250	643	0.04373	668	0.02380
594	0.06845	619	0.06180	644	0.04274	669	0.02318
595	0.06847	620	0.06115	645	0.04166	670	0.02254
596	0.06875	621	0.06043	646	0.04081	671	0.02198
597	0.06864	622	0.05996	647	0.03980	672	0.02139
598	0.06854	623	0.05939	648	0.03899	673	0.02078
599	0.06854	624	0.05869	649	0.03816	674	0.02030
600	0.06845	625	0.05804	650	0.03733	675	0.01973
601	0.06846	626	0.05733	651	0.03649	676	0.01922
602	0.06836	627	0.05642	652	0.03567	677	0.01873
603	0.06816	628	0.05577	653	0.03490	678	0.01822
604	0.06774	629	0.05504	654	0.03408	679	0.01773



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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	0.01721	706	0.00802	732	0.00364	758	0.00167
681	0.01674	707	0.00775	733	0.00355	759	0.00155
682	0.01625	708	0.00754	734	0.00354	760	0.00148
683	0.01580	709	0.00746	735	0.00347	761	0.00149
684	0.01540	710	0.00726	736	0.00346	762	0.00158
685	0.01499	711	0.00704	737	0.00315	763	0.00160
686	0.01457	712	0.00676	738	0.00287	764	0.00145
687	0.01415	713	0.00665	739	0.00285	765	0.00143
688	0.01383	714	0.00652	740	0.00271	766	0.00127
689	0.01340	715	0.00643	741	0.00281	767	0.00124
690	0.01303	716	0.00629	742	0.00276	768	0.00143
691	0.01267	717	0.00602	743	0.00263	769	0.00146
692	0.01222	718	0.00579	744	0.00258	770	0.00149
693	0.01191	719	0.00556	745	0.00252	771	0.00152
694	0.01156	720	0.00535	746	0.00230	772	0.00151
695	0.01121	721	0.00516	747	0.00218	773	0.00147
696	0.01088	722	0.00491	748	0.00223	774	0.00143
697	0.01053	723	0.00472	749	0.00212	775	0.00140
698	0.01025	724	0.00462	750	0.00218	776	0.00135
699	0.01008	725	0.00456	751	0.00214	777	0.00107
700	0.00982	726	0.00452	752	0.00210	778	0.00080
701	0.00950	727	0.00439	753	0.00207	779	0.00081
702	0.00919	728	0.00431	754	0.00194	780	0.00067
703	0.00890	729	0.00416	755	0.00196		
704	0.00864	730	0.00396	756	0.00177		
705	0.00829	731	0.00379	757	0.00177		