



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: CY2612	Driver Details: CY1101	
Test Report	L1606273-C1	Description	Clusters of CREE XPE2 LED's	Type Commercial
Test Date	27 June 2016	Manufacturer	Cree	Description 71W
Report Date	7 July 2016	Catalog No.	LOG-HO-120-48-40K-50x80-SI-NO	Manufacturer Mean Well
Sphere Temperature	25.4°C	Serial No.	SRIS 2439	Catalog No. LPF-60-24
Humidity	47.3 %	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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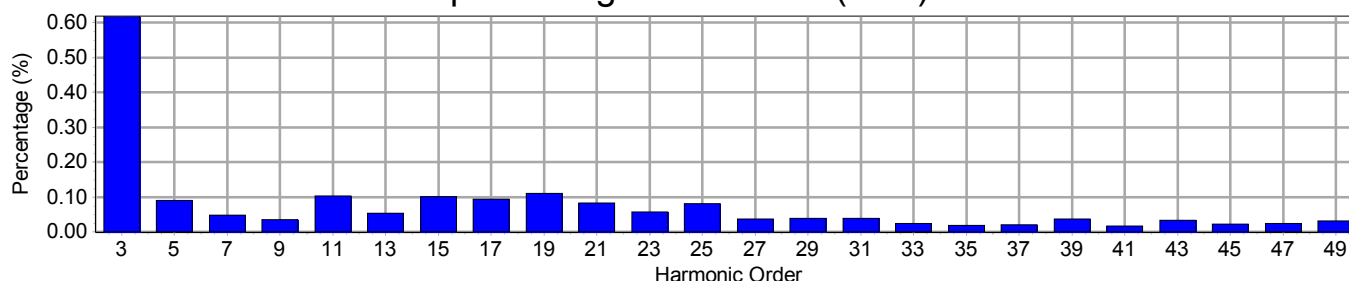
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Electrical Measurements

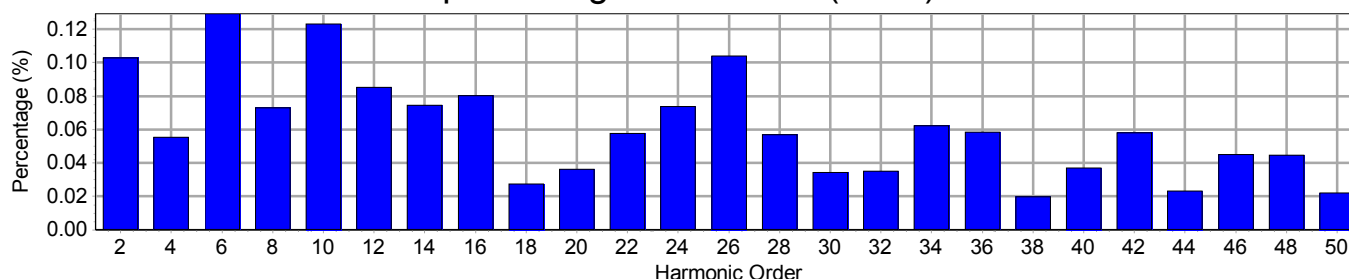
Input

Frequency	60 Hz	Active Power	62.19 W	THDV [ANSI]	0.76 %
Voltage	120.0 V(rms)	Apparent Power	62.58 VA	THDA [ANSI]	5.07 %
Current	0.5216 A(rms)	Power Factor	0.994	Max. Harmonic At	5th order

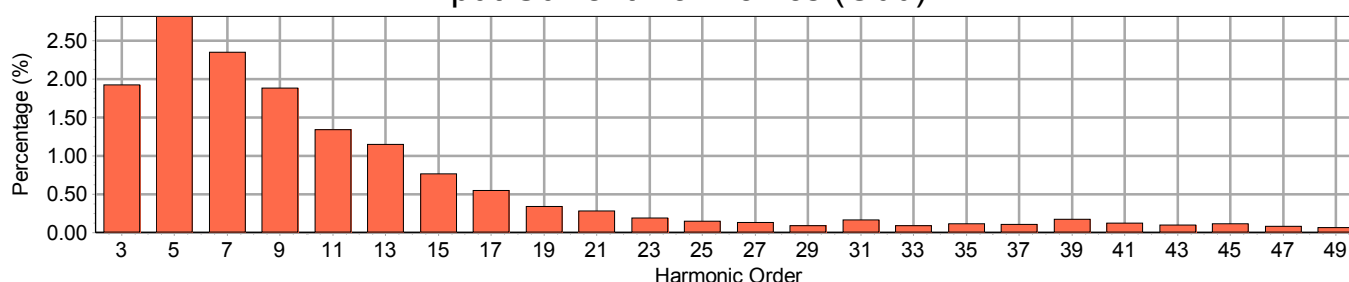
Input Voltage Harmonics (Odd)



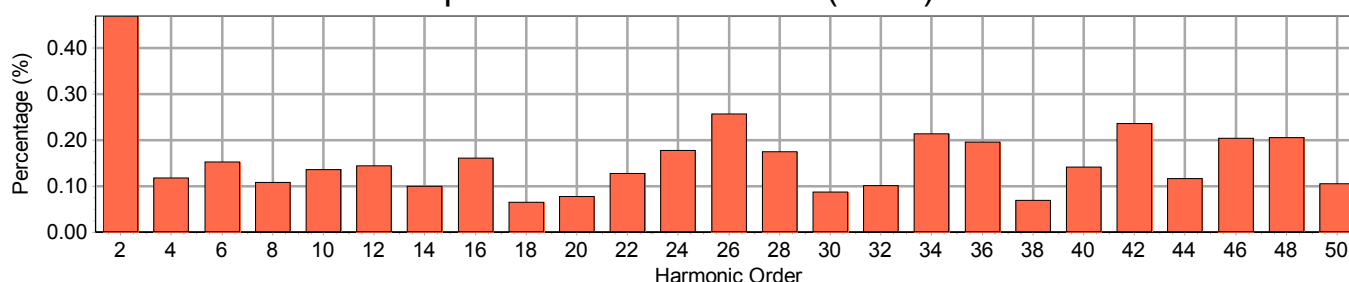
Input Voltage Harmonics (Even)



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	0.103	0.471
3	180	0.620	1.925	4	240	0.055	0.118
5	300	0.092	2.820	6	360	0.129	0.153
7	420	0.048	2.347	8	480	0.073	0.108
9	540	0.036	1.880	10	600	0.123	0.135
11	660	0.103	1.342	12	720	0.085	0.144
13	780	0.053	1.146	14	840	0.074	0.099
15	900	0.101	0.762	16	960	0.080	0.161
17	1020	0.095	0.548	18	1080	0.027	0.064
19	1140	0.111	0.341	20	1200	0.036	0.077
21	1260	0.083	0.280	22	1320	0.058	0.127
23	1380	0.057	0.192	24	1440	0.074	0.178
25	1500	0.082	0.148	26	1560	0.104	0.258
27	1620	0.037	0.133	28	1680	0.057	0.175
29	1740	0.040	0.092	30	1800	0.034	0.087
31	1860	0.039	0.167	32	1920	0.035	0.101
33	1980	0.025	0.089	34	2040	0.062	0.214
35	2100	0.020	0.111	36	2160	0.058	0.196
37	2220	0.021	0.103	38	2280	0.020	0.068
39	2340	0.038	0.168	40	2400	0.037	0.141
41	2460	0.017	0.121	42	2520	0.058	0.236
43	2580	0.035	0.097	44	2640	0.023	0.117
45	2700	0.023	0.112	46	2760	0.045	0.204
47	2820	0.024	0.076	48	2880	0.045	0.205
49	2940	0.032	0.062	50	3000	0.022	0.105



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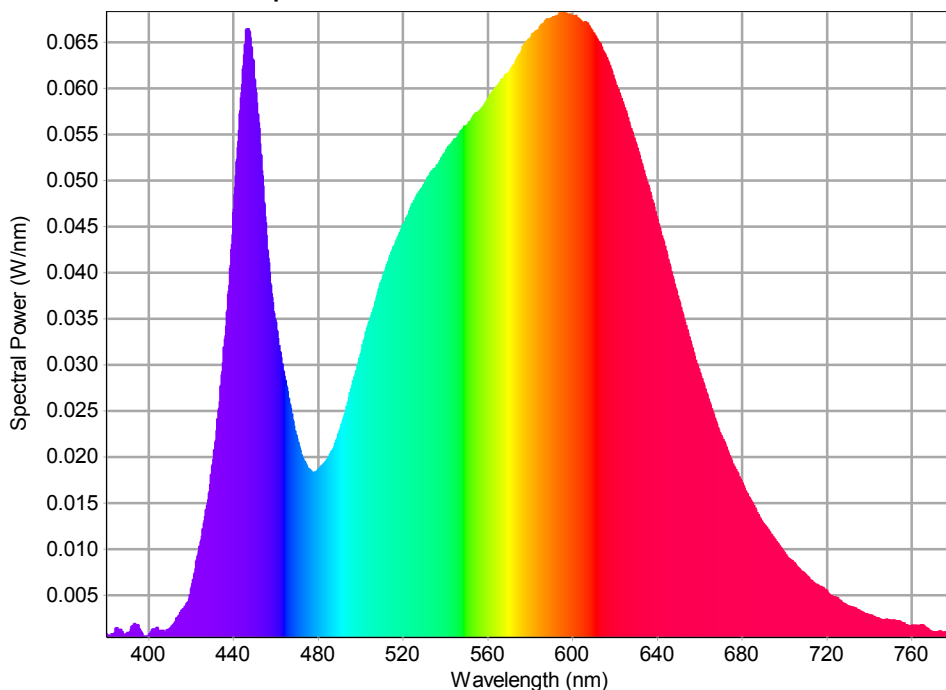
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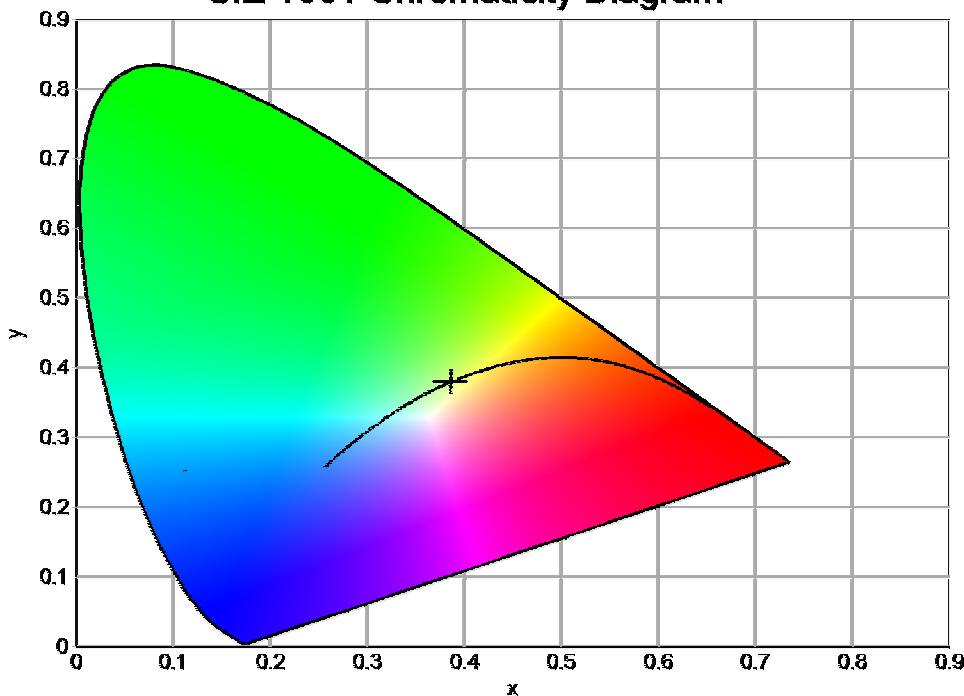
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Spectral Power Distribution



Peak Wavelength	596 nm
Luminous Flux	3967 lm
Input Power	62.19 W
Lumens/Watt	63.8
Full Width/Half Maximum	150.44
Center Wavelength	578 nm
Centroid Wavelength	369 nm
Dominant Wavelength	487 nm
Excitation Purity	0.1594
Colorimetric Purity	0.1010

CIE 1931 Chromaticity Diagram



x	0.3855	CCT	3898 K
y	0.3810	CRI	83
u	0.2267	L*	25.67
v	0.3361	a*	-4.86
u'	0.2267	b*	-14.28
v'	0.5042	Duv	0.0005
R1	81.5	R9	12.1
R2	87.6	R10	70.5
R3	92.5	R11	82.0
R4	83.1	R12	65.1
R5	81.5	R13	82.6
R6	83.3	R14	95.6
R7	86.7		
R8	66.5		



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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	0.00089	405	0.00124	430	0.01907	455	0.04610
381	0.00077	406	0.00122	431	0.02079	456	0.04258
382	0.00065	407	0.00122	432	0.02287	457	0.04005
383	0.00091	408	0.00098	433	0.02515	458	0.03774
384	0.00100	409	0.00122	434	0.02771	459	0.03581
385	0.00150	410	0.00144	435	0.03024	460	0.03464
386	0.00113	411	0.00169	436	0.03283	461	0.03291
387	0.00127	412	0.00198	437	0.03572	462	0.03150
388	0.00082	413	0.00254	438	0.03870	463	0.03012
389	0.00073	414	0.00277	439	0.04257	464	0.02884
390	0.00101	415	0.00316	440	0.04658	465	0.02775
391	0.00104	416	0.00354	441	0.05057	466	0.02645
392	0.00168	417	0.00377	442	0.05360	467	0.02531
393	0.00194	418	0.00417	443	0.05728	468	0.02406
394	0.00187	419	0.00465	444	0.06047	469	0.02291
395	0.00184	420	0.00575	445	0.06366	470	0.02202
396	0.00126	421	0.00674	446	0.06639	471	0.02120
397	0.00087	422	0.00790	447	0.06652	472	0.02028
398	0.00060	423	0.00922	448	0.06558	473	0.01971
399	0.00055	424	0.01031	449	0.06324	474	0.01933
400	0.00071	425	0.01144	450	0.06112	475	0.01885
401	0.00101	426	0.01282	451	0.05847	476	0.01867
402	0.00134	427	0.01428	452	0.05631	477	0.01841
403	0.00128	428	0.01538	453	0.05290	478	0.01841
404	0.00155	429	0.01708	454	0.04945	479	0.01846



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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	0.01870	505	0.03538	530	0.04962	555	0.05743
481	0.01893	506	0.03612	531	0.05006	556	0.05761
482	0.01916	507	0.03689	532	0.05049	557	0.05785
483	0.01945	508	0.03786	533	0.05089	558	0.05812
484	0.01969	509	0.03861	534	0.05111	559	0.05848
485	0.02004	510	0.03921	535	0.05137	560	0.05885
486	0.02058	511	0.03997	536	0.05174	561	0.05929
487	0.02089	512	0.04062	537	0.05199	562	0.05964
488	0.02151	513	0.04124	538	0.05246	563	0.05996
489	0.02216	514	0.04194	539	0.05285	564	0.06023
490	0.02285	515	0.04253	540	0.05314	565	0.06042
491	0.02357	516	0.04297	541	0.05362	566	0.06083
492	0.02435	517	0.04360	542	0.05388	567	0.06112
493	0.02509	518	0.04414	543	0.05409	568	0.06139
494	0.02599	519	0.04469	544	0.05447	569	0.06165
495	0.02697	520	0.04525	545	0.05457	570	0.06182
496	0.02781	521	0.04564	546	0.05489	571	0.06221
497	0.02869	522	0.04619	547	0.05540	572	0.06258
498	0.02940	523	0.04675	548	0.05562	573	0.06291
499	0.03030	524	0.04739	549	0.05593	574	0.06343
500	0.03114	525	0.04771	550	0.05601	575	0.06375
501	0.03220	526	0.04818	551	0.05635	576	0.06421
502	0.03305	527	0.04863	552	0.05653	577	0.06478
503	0.03400	528	0.04898	553	0.05701	578	0.06507
504	0.03468	529	0.04926	554	0.05731	579	0.06532



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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	0.06550	605	0.06717	630	0.05392	655	0.03309
581	0.06595	606	0.06729	631	0.05318	656	0.03223
582	0.06610	607	0.06714	632	0.05234	657	0.03142
583	0.06629	608	0.06669	633	0.05154	658	0.03056
584	0.06646	609	0.06639	634	0.05067	659	0.02991
585	0.06692	610	0.06603	635	0.04990	660	0.02920
586	0.06709	611	0.06564	636	0.04925	661	0.02854
587	0.06736	612	0.06521	637	0.04837	662	0.02783
588	0.06762	613	0.06492	638	0.04765	663	0.02704
589	0.06745	614	0.06426	639	0.04665	664	0.02640
590	0.06772	615	0.06391	640	0.04583	665	0.02570
591	0.06781	616	0.06341	641	0.04500	666	0.02500
592	0.06788	617	0.06286	642	0.04406	667	0.02426
593	0.06792	618	0.06219	643	0.04336	668	0.02359
594	0.06824	619	0.06154	644	0.04251	669	0.02298
595	0.06820	620	0.06078	645	0.04153	670	0.02240
596	0.06836	621	0.06011	646	0.04068	671	0.02193
597	0.06821	622	0.05957	647	0.03970	672	0.02143
598	0.06806	623	0.05897	648	0.03884	673	0.02081
599	0.06803	624	0.05828	649	0.03806	674	0.02020
600	0.06793	625	0.05765	650	0.03715	675	0.01965
601	0.06793	626	0.05688	651	0.03631	676	0.01907
602	0.06779	627	0.05596	652	0.03550	677	0.01868
603	0.06761	628	0.05537	653	0.03465	678	0.01823
604	0.06732	629	0.05465	654	0.03388	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	0.01725	706	0.00813	732	0.00376	758	0.00176
681	0.01667	707	0.00788	733	0.00367	759	0.00173
682	0.01619	708	0.00763	734	0.00354	760	0.00180
683	0.01574	709	0.00753	735	0.00344	761	0.00177
684	0.01534	710	0.00727	736	0.00334	762	0.00180
685	0.01498	711	0.00705	737	0.00320	763	0.00175
686	0.01453	712	0.00670	738	0.00303	764	0.00174
687	0.01402	713	0.00657	739	0.00298	765	0.00186
688	0.01361	714	0.00636	740	0.00291	766	0.00171
689	0.01319	715	0.00626	741	0.00287	767	0.00148
690	0.01286	716	0.00607	742	0.00275	768	0.00132
691	0.01257	717	0.00601	743	0.00264	769	0.00118
692	0.01223	718	0.00589	744	0.00262	770	0.00109
693	0.01191	719	0.00571	745	0.00246	771	0.00110
694	0.01156	720	0.00552	746	0.00241	772	0.00104
695	0.01124	721	0.00517	747	0.00237	773	0.00114
696	0.01090	722	0.00501	748	0.00245	774	0.00111
697	0.01060	723	0.00487	749	0.00243	775	0.00104
698	0.01027	724	0.00487	750	0.00232	776	0.00099
699	0.00997	725	0.00475	751	0.00235	777	0.00099
700	0.00961	726	0.00451	752	0.00234	778	0.00102
701	0.00928	727	0.00426	753	0.00226	779	0.00090
702	0.00903	728	0.00416	754	0.00226	780	0.00105
703	0.00885	729	0.00401	755	0.00211		
704	0.00869	730	0.00388	756	0.00205		
705	0.00846	731	0.00383	757	0.00189		