



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: CY2615	Driver Details: CY1101	
Test Report	L1606282-C1	Description	Clusters of CREE XPE2 LED's	Type Commercial
Test Date	28 June 2016	Manufacturer	Cree	Description 71W
Report Date	2 July 2016	Catalog No.	LOG-HO-120-48-40K-8x8-SI-NO	Manufacturer Mean Well
Sphere Temperature	25.2°C	Serial No.	SRIS 2433	Catalog No. LPF-60-24
Humidity	42.3 %	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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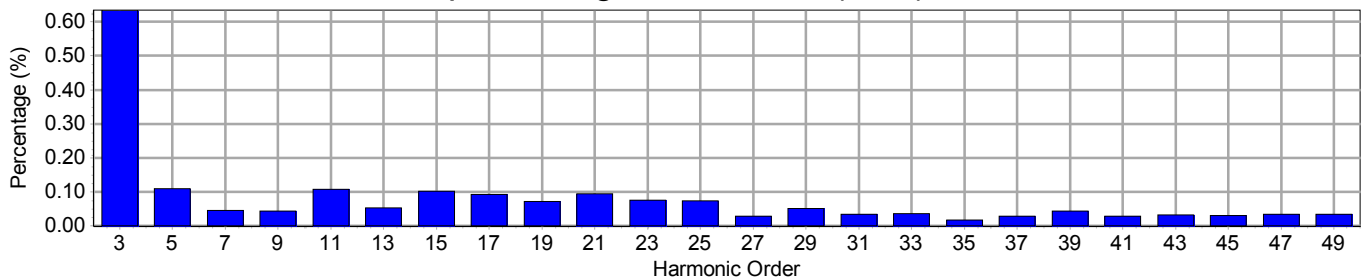
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Electrical Measurements

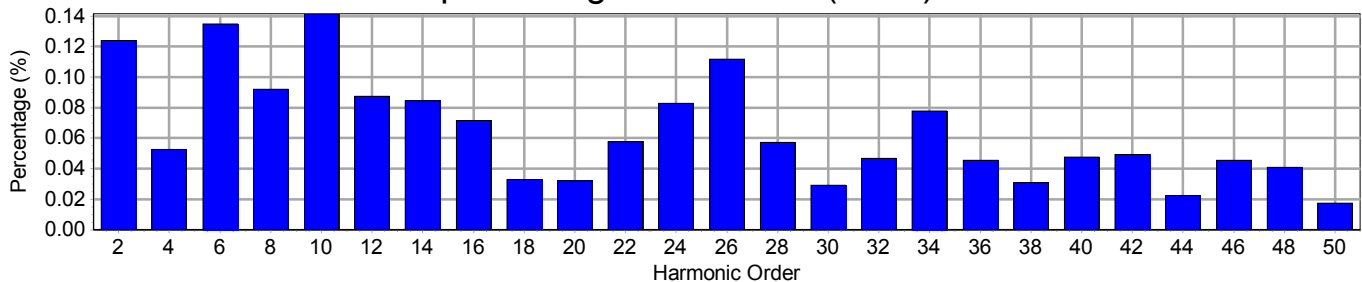
Input

Frequency	60 Hz	Active Power	62.62 W	THDV [ANSI]	0.78 %
Voltage	120.2 V(rms)	Apparent Power	63.03 VA	THDA [ANSI]	4.96 %
Current	0.5244 A(rms)	Power Factor	0.994	Max. Harmonic At	5th order

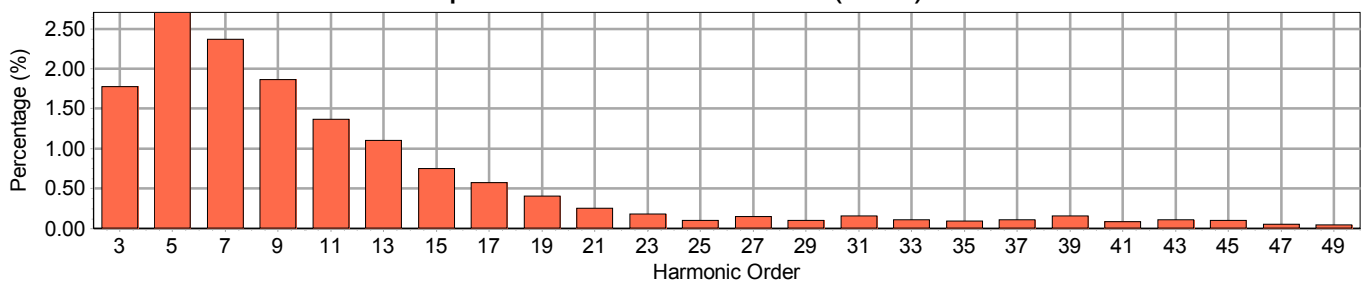
Input Voltage Harmonics (Odd)



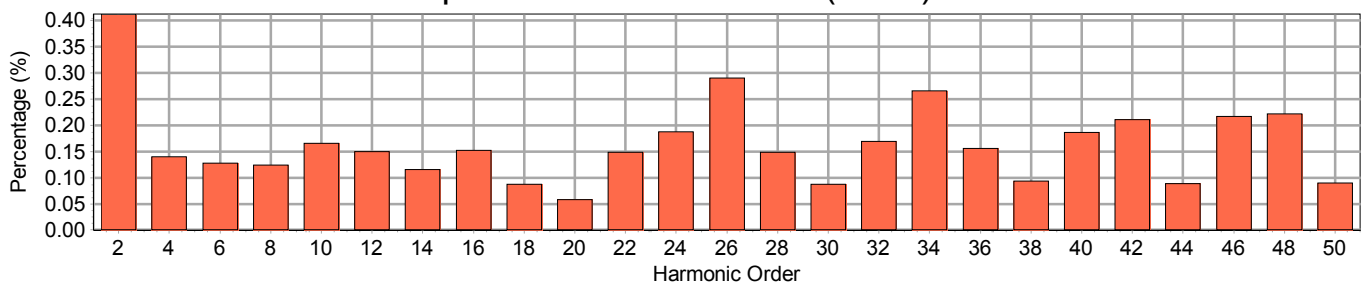
Input Voltage Harmonics (Even)



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	0.124	0.413
3	180	0.635	1.772	4	240	0.052	0.139
5	300	0.109	2.709	6	360	0.135	0.127
7	420	0.045	2.369	8	480	0.092	0.124
9	540	0.045	1.862	10	600	0.142	0.165
11	660	0.109	1.367	12	720	0.087	0.149
13	780	0.053	1.103	14	840	0.085	0.116
15	900	0.102	0.753	16	960	0.071	0.152
17	1020	0.092	0.575	18	1080	0.033	0.087
19	1140	0.073	0.404	20	1200	0.032	0.057
21	1260	0.095	0.249	22	1320	0.058	0.148
23	1380	0.075	0.179	24	1440	0.083	0.187
25	1500	0.074	0.097	26	1560	0.112	0.289
27	1620	0.029	0.148	28	1680	0.057	0.148
29	1740	0.051	0.104	30	1800	0.029	0.088
31	1860	0.035	0.159	32	1920	0.047	0.169
33	1980	0.036	0.111	34	2040	0.078	0.266
35	2100	0.018	0.096	36	2160	0.045	0.155
37	2220	0.029	0.108	38	2280	0.031	0.093
39	2340	0.045	0.156	40	2400	0.047	0.187
41	2460	0.030	0.083	42	2520	0.049	0.211
43	2580	0.033	0.106	44	2640	0.023	0.089
45	2700	0.032	0.101	46	2760	0.046	0.217
47	2820	0.035	0.056	48	2880	0.041	0.222
49	2940	0.035	0.043	50	3000	0.017	0.090



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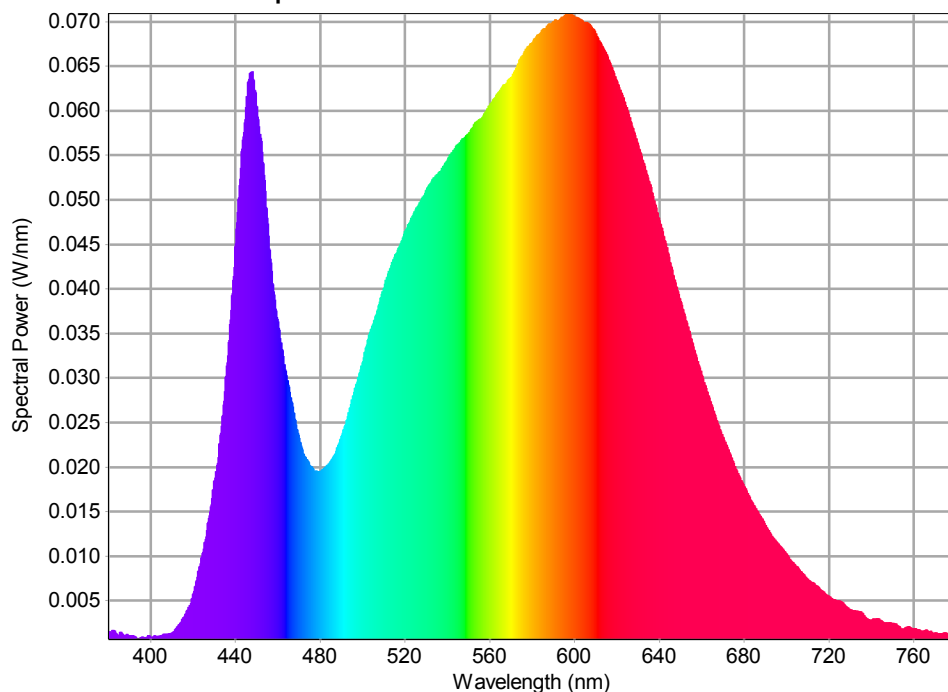
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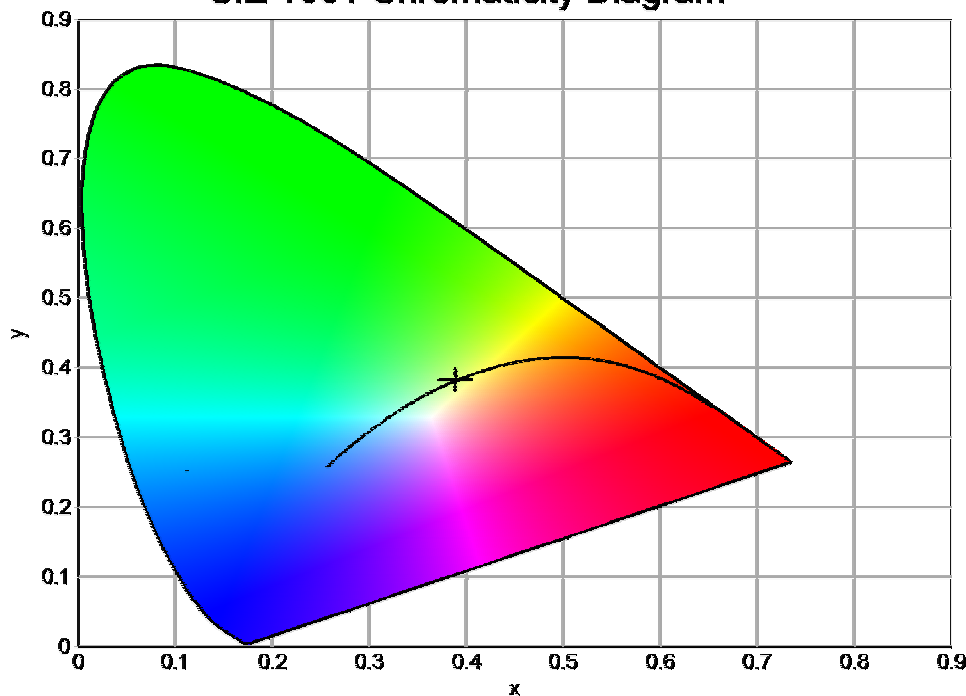
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Spectral Power Distribution



Peak Wavelength	596 nm
Luminous Flux	4092 lm
Input Power	62.62 W
Lumens/Watt	65.4
Full Width/Half Maximum	149.89
Center Wavelength	579 nm
Centroid Wavelength	371 nm
Dominant Wavelength	488 nm
Excitation Purity	0.1515
Colorimetric Purity	0.0989

CIE 1931 Chromaticity Diagram



x	0.3882	CCT	3848 K
y	0.3837	CRI	83
u	0.2274	L*	25.67
v	0.3372	a*	-4.86
u'	0.2274	b*	-13.41
v'	0.5057	Duv	0.0010
R1	81.4	R9	11.8
R2	87.9	R10	71.1
R3	93.0	R11	81.8
R4	83.1	R12	65.1
R5	81.4	R13	82.7
R6	83.7	R14	95.9
R7	86.9		
R8	66.2		



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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	0.00141	405	0.00113	430	0.01842	455	0.04795
381	0.00154	406	0.00132	431	0.01951	456	0.04455
382	0.00169	407	0.00124	432	0.02114	457	0.04199
383	0.00168	408	0.00126	433	0.02361	458	0.03971
384	0.00129	409	0.00135	434	0.02574	459	0.03776
385	0.00115	410	0.00140	435	0.02853	460	0.03631
386	0.00150	411	0.00155	436	0.03140	461	0.03451
387	0.00123	412	0.00190	437	0.03405	462	0.03329
388	0.00111	413	0.00222	438	0.03767	463	0.03156
389	0.00126	414	0.00253	439	0.04098	464	0.03029
390	0.00112	415	0.00297	440	0.04476	465	0.02924
391	0.00117	416	0.00333	441	0.04862	466	0.02786
392	0.00106	417	0.00390	442	0.05165	467	0.02678
393	0.00092	418	0.00429	443	0.05544	468	0.02546
394	0.00081	419	0.00472	444	0.05761	469	0.02424
395	0.00084	420	0.00575	445	0.06044	470	0.02325
396	0.00098	421	0.00662	446	0.06321	471	0.02238
397	0.00087	422	0.00769	447	0.06425	472	0.02156
398	0.00083	423	0.00882	448	0.06441	473	0.02111
399	0.00113	424	0.00986	449	0.06232	474	0.02072
400	0.00094	425	0.01081	450	0.06058	475	0.02022
401	0.00096	426	0.01190	451	0.05829	476	0.02002
402	0.00112	427	0.01372	452	0.05699	477	0.01963
403	0.00106	428	0.01502	453	0.05420	478	0.01958
404	0.00107	429	0.01654	454	0.05100	479	0.01954



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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	0.01954	505	0.03615	530	0.05110	555	0.05903
481	0.01972	506	0.03692	531	0.05155	556	0.05913
482	0.01993	507	0.03760	532	0.05189	557	0.05950
483	0.02016	508	0.03854	533	0.05231	558	0.05990
484	0.02037	509	0.03941	534	0.05252	559	0.06024
485	0.02070	510	0.04007	535	0.05287	560	0.06064
486	0.02113	511	0.04100	536	0.05310	561	0.06101
487	0.02146	512	0.04170	537	0.05332	562	0.06138
488	0.02220	513	0.04230	538	0.05377	563	0.06175
489	0.02280	514	0.04303	539	0.05413	564	0.06210
490	0.02345	515	0.04362	540	0.05454	565	0.06234
491	0.02420	516	0.04403	541	0.05501	566	0.06275
492	0.02488	517	0.04464	542	0.05529	567	0.06299
493	0.02571	518	0.04516	543	0.05558	568	0.06313
494	0.02662	519	0.04573	544	0.05601	569	0.06355
495	0.02757	520	0.04649	545	0.05627	570	0.06377
496	0.02845	521	0.04690	546	0.05644	571	0.06412
497	0.02932	522	0.04743	547	0.05690	572	0.06460
498	0.03008	523	0.04798	548	0.05699	573	0.06509
499	0.03093	524	0.04851	549	0.05727	574	0.06573
500	0.03175	525	0.04890	550	0.05748	575	0.06609
501	0.03290	526	0.04931	551	0.05785	576	0.06648
502	0.03373	527	0.04970	552	0.05813	577	0.06694
503	0.03482	528	0.05019	553	0.05866	578	0.06722
504	0.03549	529	0.05052	554	0.05886	579	0.06749



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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	0.06766	605	0.06992	630	0.05608	655	0.03445
581	0.06812	606	0.06988	631	0.05537	656	0.03356
582	0.06836	607	0.06977	632	0.05453	657	0.03275
583	0.06859	608	0.06936	633	0.05381	658	0.03190
584	0.06877	609	0.06917	634	0.05293	659	0.03116
585	0.06917	610	0.06867	635	0.05215	660	0.03041
586	0.06926	611	0.06814	636	0.05144	661	0.02955
587	0.06951	612	0.06773	637	0.05043	662	0.02885
588	0.06980	613	0.06729	638	0.04953	663	0.02810
589	0.06978	614	0.06680	639	0.04860	664	0.02744
590	0.07002	615	0.06640	640	0.04771	665	0.02672
591	0.07024	616	0.06574	641	0.04694	666	0.02600
592	0.07014	617	0.06517	642	0.04595	667	0.02530
593	0.07027	618	0.06458	643	0.04512	668	0.02462
594	0.07051	619	0.06389	644	0.04413	669	0.02397
595	0.07064	620	0.06329	645	0.04303	670	0.02341
596	0.07093	621	0.06262	646	0.04213	671	0.02284
597	0.07083	622	0.06208	647	0.04111	672	0.02226
598	0.07078	623	0.06149	648	0.04027	673	0.02165
599	0.07076	624	0.06066	649	0.03945	674	0.02110
600	0.07053	625	0.06003	650	0.03863	675	0.02046
601	0.07048	626	0.05929	651	0.03775	676	0.01984
602	0.07038	627	0.05833	652	0.03695	677	0.01932
603	0.07027	628	0.05765	653	0.03619	678	0.01879
604	0.06999	629	0.05690	654	0.03536	679	0.01835



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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	0.01788	706	0.00851	732	0.00392	758	0.00210
681	0.01735	707	0.00823	733	0.00387	759	0.00196
682	0.01688	708	0.00800	734	0.00380	760	0.00187
683	0.01637	709	0.00767	735	0.00377	761	0.00187
684	0.01593	710	0.00745	736	0.00356	762	0.00182
685	0.01556	711	0.00722	737	0.00323	763	0.00169
686	0.01515	712	0.00711	738	0.00299	764	0.00156
687	0.01476	713	0.00695	739	0.00290	765	0.00165
688	0.01438	714	0.00673	740	0.00282	766	0.00176
689	0.01397	715	0.00657	741	0.00300	767	0.00158
690	0.01350	716	0.00627	742	0.00300	768	0.00161
691	0.01310	717	0.00610	743	0.00299	769	0.00138
692	0.01270	718	0.00587	744	0.00290	770	0.00140
693	0.01230	719	0.00566	745	0.00272	771	0.00139
694	0.01201	720	0.00555	746	0.00256	772	0.00133
695	0.01170	721	0.00533	747	0.00255	773	0.00138
696	0.01143	722	0.00520	748	0.00255	774	0.00141
697	0.01114	723	0.00512	749	0.00256	775	0.00144
698	0.01088	724	0.00504	750	0.00249	776	0.00136
699	0.01058	725	0.00503	751	0.00245	777	0.00135
700	0.01028	726	0.00488	752	0.00231	778	0.00111
701	0.00992	727	0.00464	753	0.00216	779	0.00103
702	0.00954	728	0.00441	754	0.00186	780	0.00121
703	0.00931	729	0.00420	755	0.00186		
704	0.00903	730	0.00402	756	0.00201		
705	0.00883	731	0.00396	757	0.00211		