

### SXT Calibration Note 25

#### Effective Area of SXT Mirror

Date: 17 June 1991  
 Subj: Derivation of effective area of SXT mirror.

K-lines	Wavelength (Å)	Cal eff area. (cm <sup>2</sup> )	Theory (cm <sup>2</sup> )	Cal/theory
C K	44.7581	1.722	1.723	0.99958728
O K	23.6197	1.551	1.571	0.9874677
Cr L	21.6446	1.472	1.556	0.94613979
Fe L	17.5858	1.46	1.529	0.95456058
Cu L	13.3355	1.42	1.523	0.93262371
Al K	8.339	1.454	1.509	0.96385462
Si K	7.125	1.32	1.442	0.91554686
Zr L	6.07	1.079	1.209	0.89247374
Ag L	4.154	0.219	0.392	0.55882406
Sn L	3.604	0.132	0.322	0.40935051
Ti K	2.749	0.0158	0.058	0.27114779

*NOTE: See Excel  
 "Mirror Interpolator"  
 spreadsheet for  
 details.*

	Area (in <sup>2</sup> )	Area (cm <sup>2</sup> )
MSFC (Cal)	0.39713	2.56212391
Flight	0.3809	2.45741444
Flight/Cal		0.95913177

The way that the flight mirror effective area (the one used in the Solar Physics article) was to use a smooth curve put through the above Cal/theory ratio data to derive a correction versus wavelength. This was then applied to the theoretical effective areas to derive a semi-empirical calibration. Finally, the slightly different (4%) geometrical areas of the MSFC2 and flight objective groups was taken into account by multiplying the semi-empirical values by the Flight/Cal ratio. The results of this process are illustrated in Figure 1. The response curves given in Tsuneta's Solar-Physics paper are based on the flight effective areas.

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 #26 1-MAR-1991 14:52:37.69

S\_P\_PAPER

From: SAG::LEMEN  
 To: ACTON  
 CC:  
 Subj: SXT obscuration factor

From: LPARL2::CLAFLIN 1-MAR-1991 01:46:38.71  
 To: SAG::LEMEN  
 CC:

Subj: SXT Obscuration Factor

>From: SAG::LEMEN 28-FEB-1991 14:02:19.06  
>To: LOCKHD::CLAFLIN  
>CC:  
>Subj: SXT obscuration factor

>Hello Scott,

>Loren wanted me to produce a table of our "best guess" for the SXT mirror  
>effective area. I am using the following number:

> .39713\*2.54^2 cm^2

>I recall that this includes the obscuration for the MSFC test configuration.  
>Is that correct? If so, what is the obscuration factor?

>Do you know what the appropriate value should be for the orbital configuration?  
>(I think you and Bruce calculated that number on Cadam, but I can't find  
>a record of it).

>Thanks,  
>Jim

Jim,

I have the CADAM printout made by Bruce Jurcevich. The inner and outer radii of the useful mirror surface are given as

r1 = 4.526138 in  
r2 = 4.540382 in } Cal Note 14

The annulus area is then

area = .405720 in^2

The areas diminished by obscuration were calculated by Cadam to be

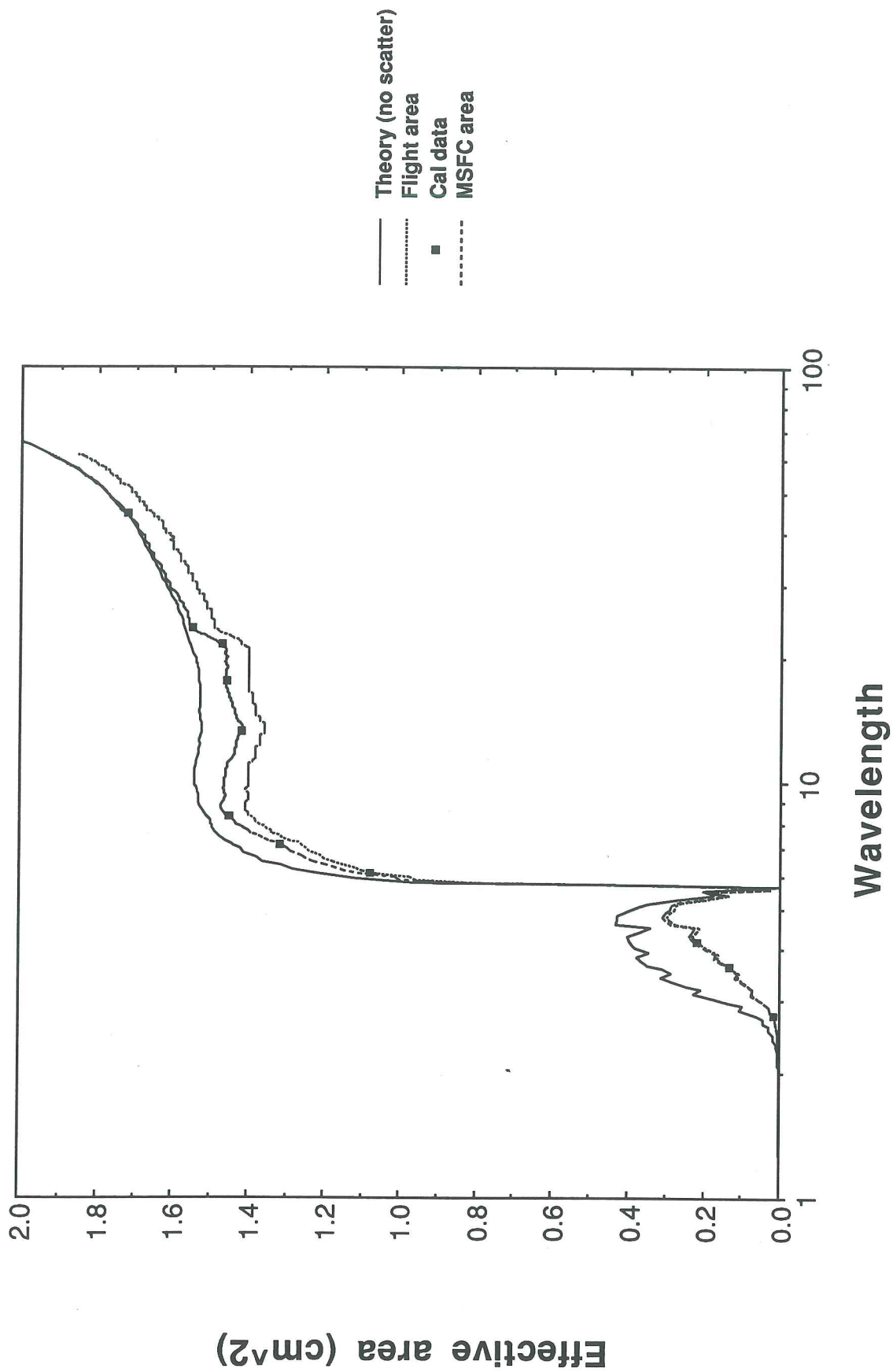
MSFC\_area = .39713 in^2  
Flight\_area = .38090 in^2

Dividing by the annulus area to get the obscuration factor

MSFC\_obsc = .97883  
Flight\_obsc = .93882

Let me know if you need to look at the Cadam printout. --Scott C.

Data from "d Corr mir eff area "



From JRL  
12/15/92

SXT Mirror Effective Area

$$\text{Area} = .304 \text{ (cm}^2\text{)} * (\text{OOC-OCC}) / (\text{OAO-OAC})$$

E (keV)	(Ang)	OOC	(s)	OCC	(s)	OAO	(s)	OAC	(s)	Area+/- (cm <sup>2</sup> )	Line
0.277	44.76	11412	40	15 200	2008	40	93	40	1.811	0.043	C K
0.277	44.76	11700	40	15 200	2069	40	50	40	1.761	0.042	C K
0.277	44.76	58111	200	15 200	10517	200	50	40	1.720	0.018	C K
0.277	44.76	10316	40	15 200	9478	200	50	40	1.699	0.024	C K
0.277	44.76	10293	40	12 200	9435	200	56	40	1.709	0.024	C K
0.277	44.76	10346	40	14 200	9492	200	51	40	1.702	0.024	C K
0.277	44.76	10107	40	14 200	9068	200	57	40	1.749	0.025	C K
0.277	44.76	10393	40	15 200	9516	200	60	40	1.714	0.024	C K
0.525	23.62	12277	200	31 200	7452	600	83	200	1.551	0.023	O K
0.573	21.64	19537	200	24 200	12447	600	60	100	1.472	0.017	Cr L
0.705	17.59	18350	400	18 200	11811	1200	62	200	1.460	0.017	Fe L
0.930	13.33	2269	20	40 40	935	40	42	40	1.531	0.058	Cu L
0.930	13.33	2330	20	40 40	1036	40	34	40	1.402	0.052	Cu L
0.930	13.33	2614	20	40 40	1145	40	37	40	1.423	0.050	Cu L
0.930	13.33	2563	20	40 40	1176	40	34	40	1.354	0.047	Cu L
0.930	13.33	2467	20	40 40	1089	40	33	40	1.409	0.051	Cu L
0.930	13.33	2369	20	40 40	5361	200	32	40	1.373	0.034	Cu L
0.930	13.33	2178	20	40 40	5127	200	31	40	1.319	0.034	Cu L
0.930	13.33	23642	200	40 40	10393	400	174	200	1.419	0.017	Cu L
0.930	13.33	11681	100	40 40	9864	400	81	100	1.476	0.020	Cu L
1.490	8.32	9800	20	41 40	2227	20	80	20	1.385	0.032	Al K
1.490	8.32	20663	40	41 40	4573	40	161	40	1.421	0.023	Al K
1.490	8.32	9549	20	41 40	2059	20	77	20	1.461	0.035	Al K
1.490	8.32	6790	20	41 40	2791	40	111	40	1.536	0.034	Al K
1.490	8.32	8369	20	41 40	3562	40	126	40	1.477	0.029	Al K
1.490	8.32	8232	20	41 40	3537	40	129	40	1.465	0.029	Al K
1.490	8.32	20704	40	32 200	4535	40	758	200	1.435	0.022	Al K
1.490	8.32	21378	40	25 200	11598	100	699	200	1.444	0.016	Al K
1.490	8.32	19955	40	32 200	10581	100	713	200	1.483	0.017	Al K
1.740	7.13	22078	200	31 200	15800	600	189	200	1.320	0.014	Si K
2.040	6.08	13809	40	37 200	20036	200	295	100	1.079	0.012	Zr L
2.980	4.16	10265	100	61 200	14304	100	272	200	0.220	0.003	Ag L
2.980	4.16	10127	100	65 200	14220	100	292	200	0.218	0.003	Ag L
2.980	4.16	10203	100	69 200	14180	100	264	200	0.220	0.003	Ag L
3.440	3.60	13579	400	56 200	15651	200	139	200	0.132	0.002	Sn L
4.510	2.75	25587	1200	79 200	16167	40	146	200	0.016	0.000	Ti K

From JRI  
12/15/92

### SXT Mirror Effective Area

#### Summary

E (keV)	(Ang)	cm <sup>2</sup>	+/-	#	Line
0.277	44.76	1.722	0.009	8	C K
0.525	23.62	1.551	0.023	1	O K
0.573	21.64	1.472	0.017	1	Cr L
0.705	17.59	1.460	0.017	1	Fe L
0.930	13.33	1.420	0.010	9	Cu L
1.490	8.32	1.454	0.008	9	Al K
1.740	7.13	1.320	0.014	1	Si K
2.040	6.08	1.079	0.012	1	Zr L
2.980	4.16	0.219	0.002	3	Ag L
3.440	3.60	0.132	0.002	1	Sn L
4.510	2.75	0.0158	0.0002	1	Ti K

	Wavelength	Cal/Mir	Cal data	Wavelength	Mir	Cal/Mir (interp)	Flight area	MSFC area	Std wavelengths	Cal flite mir
1	44.758	1.000	1.722	2.000	0.002	0.167	0.000	0.000	61.990	1.928
2	23.620	0.987	1.551	2.100	0.002	0.177	0.000	0.000	58.426	1.877
3	21.645	0.946	1.472	2.200	0.005	0.188	0.001	0.001	55.596	1.842
4	17.586	0.955	1.460	2.300	0.008	0.201	0.002	0.002	52.983	1.811
	13.336	0.933	1.420	2.400	0.014	0.216	0.003	0.003	50.606	1.781
	8.339	0.964	1.454	2.500	0.021	0.231	0.005	0.005	50.604	1.781
	7.125	0.916	1.320	2.600	0.029	0.247	0.007	0.007	48.620	1.765
8	6.070	0.892	1.079	2.700	0.043	0.263	0.011	0.011	46.785	1.749
9	4.154	0.559	0.219	2.800	0.085	0.280	0.023	0.024	44.758	1.727
10	3.604	0.409	0.132	2.900	0.098	0.296	0.028	0.029	43.681	1.713
11	2.749	0.271	0.016	3.000	0.154	0.312	0.046	0.048	43.680	1.713
12				3.100	0.223	0.327	0.070	0.073	42.170	1.696
13				3.200	0.210	0.341	0.069	0.072	40.783	1.691
14				3.300	0.265	0.356	0.090	0.094	39.775	1.678
15				3.400	0.312	0.371	0.111	0.116	38.503	1.674
16				3.500	0.284	0.389	0.106	0.110	36.465	1.662
17				3.600	0.323	0.408	0.126	0.132	34.439	1.647
18				3.700	0.356	0.432	0.148	0.154	32.626	1.630
19				3.800	0.378	0.458	0.166	0.173	31.595	1.619
20				3.900	0.349	0.485	0.162	0.169	31.364	1.619
21				4.000	0.376	0.514	0.185	0.193	30.996	1.617
22				4.100	0.389	0.543	0.203	0.211	30.995	1.617
23				4.200	0.395	0.572	0.217	0.226	29.519	1.606
24				4.300	0.399	0.599	0.229	0.239	28.177	1.586
25				4.400	0.368	0.626	0.221	0.230	27.417	1.578
26				4.500	0.340	0.651	0.212	0.221	27.285	1.576
27				4.600	0.425	0.675	0.275	0.287	27.284	1.576
28				4.700	0.431	0.698	0.289	0.301	26.379	1.570
29				4.800	0.428	0.720	0.296	0.308	25.563	1.562
30				4.900	0.409	0.741	0.291	0.303	24.796	1.557
31				5.000	0.382	0.760	0.278	0.290	24.248	1.557
32				5.100	0.365	0.779	0.273	0.284	24.248	1.557
33				5.200	0.337	0.796	0.257	0.268	23.620	1.550
34				5.300	0.258	0.812	0.201	0.209	23.318	1.543
35				5.400	0.170	0.827	0.135	0.141	23.318	1.543
36				5.500	0.233	0.840	0.188	0.196	21.991	1.485
37				5.600	0.027	0.852	0.022	0.023	21.990	1.485
38				5.700	0.177	0.863	0.147	0.153	20.733	1.462
39				5.800	0.966	0.873	0.809	0.843	19.451	1.460
40				5.900	1.140	0.881	0.960	1.001	19.372	1.459
41				6.000	1.140	0.888	0.974	1.015	19.372	1.459
42				6.100	1.230	0.894	1.060	1.101	18.319	1.461
43				6.200	1.280	0.899	1.100	1.147	17.586	1.461
44				6.300	1.300	0.902	1.120	1.170	17.526	1.460
45				6.400	1.320	0.904	1.150	1.197	17.526	1.460
46				6.500	1.360	0.906	1.180	1.230	15.973	1.449
47				6.600	1.370	0.908	1.200	1.248	15.915	1.449
				6.700	1.390	0.909	1.210	1.261	15.915	1.449
				6.800	1.410	0.910	1.230	1.281	14.560	1.434
				6.900	1.420	0.911	1.240	1.291	14.525	1.434
51				7.000	1.420	0.913	1.250	1.298	14.524	1.434
52				7.100	1.440	0.915	1.260	1.313	13.335	1.418
53				7.200	1.450	0.918	1.270	1.329	13.288	1.418
54				7.300	1.460	0.921	1.290	1.345	13.287	1.418
55				7.400	1.470	0.926	1.310	1.363	12.255	1.433
56				7.500	1.480	0.930	1.320	1.379	12.132	1.435
57				7.600	1.490	0.935	1.340	1.392	12.131	1.435
58				7.700	1.490	0.940	1.340	1.401	11.910	1.437
59				7.800	1.490	0.945	1.350	1.407	10.436	1.461
60				7.900	1.490	0.950	1.360	1.419	9.890	1.465
61				8.000	1.500	0.954	1.370	1.431	9.512	1.462
62				8.100	1.500	0.958	1.380	1.437	9.512	1.462
63				8.200	1.500	0.961	1.380	1.441	8.339	1.453
64				8.300	1.510	0.963	1.390	1.449	7.948	1.425
65				8.400	1.510	0.965	1.400	1.458	7.948	1.425
66				8.500	1.520	0.965	1.400	1.463	7.125	1.317
67				8.600	1.520	0.965	1.410	1.468	6.738	1.269
68				8.700	1.530	0.964	1.410	1.472	6.738	1.269
69				8.800	1.530	0.962	1.410	1.472	6.070	1.075
70				8.900	1.530	0.961	1.410	1.471	5.724	0.320
71				9.000	1.530	0.959	1.410	1.467	5.584	0.001
72				9.100	1.530	0.957	1.400	1.464	5.406	0.144
73				9.200	1.530	0.956	1.400	1.463	4.728	0.303
74				9.300	1.530	0.955	1.400	1.460	4.154	0.219
75				9.400	1.530	0.954	1.400	1.460	3.871	0.170
76				9.500	1.530	0.953	1.400	1.462	3.871	0.170
77				9.600	1.540	0.952	1.410	1.465	3.358	0.107
78				9.700	1.540	0.952	1.410	1.467	2.776	0.021
79				9.800	1.540	0.951	1.400	1.465	2.749	0.017
80				9.900	1.540	0.951	1.400	1.465	2.503	0.005
81				10.000	1.540	0.951	1.400	1.465		
82				10.100	1.540	0.950	1.400	1.463		
83				10.200	1.540	0.950	1.400	1.463		
84				10.300	1.540	0.950	1.400	1.463		
85				10.400	1.540	0.949	1.400	1.461		
86				10.500	1.540	0.949	1.400	1.461		
87				10.600	1.540	0.948	1.400	1.460		
88				10.700	1.540	0.947	1.400	1.458		
89				10.800	1.540	0.947	1.400	1.458		
				10.900	1.540	0.946	1.400	1.457		
				11.000	1.540	0.946	1.400	1.457		
				11.100	1.540	0.945	1.400	1.455		
93				11.200	1.540	0.944	1.400	1.455		
94				11.300	1.540	0.943	1.390	1.452		
95				11.400	1.540	0.943	1.390	1.449		
96				11.500	1.530	0.942	1.380	1.443		
97				11.600	1.530	0.941	1.380	1.439		

Wavelength	Cal/Mir	Cal data	Wavelength	Mir	Cal/Mir (interp)	Flight area	MSFC area	Std wavelengths	Cal flite mir
98			11.700	1.530	0.940	1.380	1.437		
99			11.800	1.530	0.940	1.380	1.438		
100			11.900	1.530	0.939	1.380	1.437		
101			12.000	1.530	0.938	1.380	1.435		
			12.100	1.530	0.938	1.380	1.435		
			12.200	1.530	0.937	1.380	1.434		
			12.300	1.530	0.936	1.370	1.432		
105			12.400	1.530	0.936	1.370	1.432		
106			12.500	1.530	0.935	1.370	1.431		
107			12.600	1.530	0.935	1.370	1.431		
108			12.700	1.530	0.934	1.370	1.429		
109			12.800	1.530	0.934	1.370	1.430		
110			12.900	1.530	0.933	1.370	1.428		
111			13.000	1.530	0.933	1.370	1.427		
112			13.100	1.530	0.933	1.370	1.424		
113			13.200	1.520	0.933	1.360	1.420		
114			13.300	1.520	0.933	1.360	1.418		
115			13.400	1.520	0.933	1.360	1.417		
116			13.500	1.520	0.933	1.360	1.418		
117			13.600	1.520	0.933	1.360	1.418		
118			13.700	1.520	0.933	1.360	1.418		
119			13.800	1.520	0.933	1.360	1.417		
120			13.900	1.520	0.934	1.360	1.420		
121			14.000	1.520	0.934	1.360	1.422		
122			14.100	1.530	0.935	1.370	1.427		
123			14.200	1.530	0.935	1.370	1.430		
124			14.300	1.530	0.936	1.370	1.433		
125			14.400	1.530	0.936	1.370	1.433		
126			14.500	1.530	0.937	1.380	1.434		
127			14.600	1.530	0.937	1.380	1.434		
128			14.700	1.530	0.938	1.380	1.435		
129			14.800	1.530	0.939	1.380	1.437		
130			14.900	1.530	0.940	1.380	1.438		
131			15.000	1.530	0.940	1.380	1.438		
132			15.100	1.530	0.941	1.380	1.440		
133			15.200	1.530	0.942	1.380	1.441		
134			15.300	1.530	0.943	1.380	1.443		
135			15.400	1.530	0.943	1.380	1.443		
136			15.500	1.530	0.944	1.390	1.444		
137			15.600	1.530	0.945	1.390	1.446		
138			15.700	1.530	0.945	1.390	1.446		
139			15.800	1.530	0.946	1.390	1.447		
140			15.900	1.530	0.947	1.390	1.449		
141			16.000	1.530	0.947	1.390	1.449		
142			16.100	1.530	0.948	1.390	1.450		
143			16.200	1.530	0.949	1.390	1.452		
144			16.300	1.530	0.949	1.390	1.452		
			16.400	1.530	0.950	1.390	1.454		
			16.500	1.530	0.950	1.390	1.454		
			16.600	1.530	0.951	1.400	1.455		
148			16.700	1.530	0.952	1.400	1.457		
149			16.800	1.530	0.952	1.400	1.457		
150			16.900	1.530	0.952	1.400	1.457		
151			17.000	1.530	0.953	1.400	1.458		
152			17.100	1.530	0.953	1.400	1.458		
153			17.200	1.530	0.954	1.400	1.460		
154			17.300	1.530	0.954	1.400	1.460		
155			17.400	1.530	0.954	1.400	1.460		
156			17.500	1.530	0.954	1.400	1.460		
157			17.600	1.530	0.955	1.400	1.461		
158			17.700	1.530	0.955	1.400	1.461		
159			17.800	1.530	0.955	1.400	1.461		
160			17.900	1.530	0.955	1.400	1.461		
161			18.000	1.530	0.955	1.400	1.461		
162			18.100	1.530	0.955	1.400	1.461		
163			18.200	1.530	0.955	1.400	1.461		
164			18.300	1.530	0.955	1.400	1.461		
165			18.400	1.530	0.955	1.400	1.461		
166			18.500	1.530	0.955	1.400	1.461		
167			18.600	1.530	0.954	1.400	1.460		
168			18.700	1.530	0.954	1.400	1.460		
169			18.800	1.530	0.954	1.400	1.460		
170			18.900	1.530	0.953	1.400	1.457		
171			19.000	1.530	0.953	1.400	1.457		
172			19.100	1.530	0.953	1.400	1.457		
173			19.200	1.530	0.952	1.400	1.457		
174			19.300	1.530	0.952	1.400	1.458		
175			19.400	1.540	0.951	1.400	1.460		
176			19.500	1.540	0.950	1.400	1.460		
177			19.600	1.540	0.950	1.400	1.462		
178			19.700	1.540	0.949	1.400	1.461		
179			19.800	1.540	0.948	1.400	1.460		
180			19.900	1.540	0.948	1.400	1.460		
181			20.000	1.540	0.947	1.400	1.458		
182			20.100	1.540	0.946	1.400	1.457		
183			20.200	1.540	0.945	1.400	1.456		
184			20.300	1.540	0.945	1.400	1.459		
185			20.400	1.550	0.944	1.400	1.459		
186			20.500	1.550	0.944	1.400	1.462		
			20.600	1.550	0.943	1.400	1.462		
			20.700	1.550	0.943	1.400	1.463		
			20.800	1.550	0.942	1.400	1.460		
190			20.900	1.550	0.942	1.400	1.460		
191			21.000	1.550	0.942	1.400	1.460		
192			21.100	1.550	0.942	1.400	1.460		
193			21.200	1.550	0.943	1.400	1.464		
194			21.300	1.560	0.943	1.410	1.466		

Wavelength	Cal/Mir	Cal data	Wavelength	Mir	Cal/Mir (interp)	Flight area	MSFC area	Std wavelengths	Cal flite mir
195			21.400	1.560	0.944	1.410	1.470		
196			21.500	1.560	0.945	1.410	1.473		
197			21.600	1.560	0.946	1.420	1.477		
198			21.700	1.560	0.947	1.420	1.478		
			21.800	1.560	0.948	1.420	1.480		
			21.900	1.560	0.950	1.420	1.483		
			22.000	1.560	0.952	1.420	1.485		
202			22.100	1.560	0.954	1.430	1.488		
203			22.200	1.560	0.956	1.430	1.490		
204			22.300	1.560	0.959	1.430	1.495		
205			22.400	1.560	0.961	1.440	1.498		
206			22.500	1.560	0.963	1.440	1.501		
207			22.600	1.560	0.966	1.450	1.508		
208			22.700	1.560	0.968	1.450	1.512		
209			22.800	1.570	0.971	1.460	1.520		
210			22.900	1.570	0.973	1.460	1.525		
211			23.000	1.570	0.976	1.470	1.531		
212			23.100	1.570	0.978	1.470	1.535		
213			23.200	1.570	0.980	1.480	1.540		
214			23.300	1.570	0.982	1.480	1.543		
215			23.400	1.570	0.984	1.480	1.546		
216			23.500	1.570	0.986	1.480	1.548		
217			23.600	1.570	0.987	1.490	1.550		
218			23.700	1.570	0.988	1.490	1.551		
219			23.800	1.570	0.990	1.490	1.554		
220			23.900	1.570	0.990	1.490	1.554		
221			24.000	1.570	0.991	1.490	1.556		
222			24.100	1.570	0.991	1.490	1.556		
223			24.200	1.570	0.992	1.490	1.557		
224			24.300	1.570	0.992	1.490	1.557		
225			24.400	1.570	0.992	1.490	1.556		
226			24.500	1.570	0.992	1.490	1.556		
227			24.600	1.570	0.992	1.490	1.556		
228			24.700	1.570	0.991	1.490	1.556		
229			24.800	1.570	0.991	1.490	1.557		
230			24.900	1.570	0.991	1.500	1.559		
231			25.000	1.580	0.990	1.500	1.559		
232			25.100	1.580	0.990	1.500	1.561		
233			25.200	1.580	0.990	1.500	1.563		
234			25.300	1.580	0.989	1.500	1.563		
235			25.400	1.580	0.989	1.500	1.563		
236			25.500	1.580	0.989	1.500	1.563		
237			25.600	1.580	0.988	1.500	1.561		
238			25.700	1.580	0.988	1.500	1.561		
239			25.800	1.580	0.988	1.500	1.561		
240			25.900	1.580	0.988	1.500	1.561		
'1			26.000	1.580	0.988	1.500	1.562		
			26.100	1.580	0.988	1.500	1.564		
			26.200	1.590	0.988	1.500	1.566		
			26.300	1.590	0.988	1.500	1.568		
245			26.400	1.590	0.988	1.510	1.570		
246			26.500	1.590	0.988	1.510	1.571		
247			26.600	1.590	0.989	1.510	1.573		
248			26.700	1.590	0.989	1.510	1.573		
249			26.800	1.590	0.989	1.510	1.573		
250			26.900	1.590	0.989	1.510	1.573		
251			27.000	1.590	0.989	1.510	1.573		
252			27.100	1.590	0.990	1.510	1.574		
253			27.200	1.590	0.990	1.510	1.575		
254			27.300	1.590	0.990	1.510	1.576		
255			27.400	1.590	0.990	1.510	1.578		
256			27.500	1.600	0.990	1.520	1.580		
257			27.600	1.600	0.991	1.520	1.584		
258			27.700	1.600	0.991	1.520	1.585		
259			27.800	1.600	0.991	1.520	1.586		
260			27.900	1.600	0.991	1.520	1.587		
261			28.000	1.600	0.991	1.520	1.587		
262			28.100	1.600	0.991	1.520	1.586		
263			28.200	1.600	0.991	1.520	1.586		
264			28.300	1.600	0.992	1.520	1.587		
265			28.400	1.600	0.992	1.520	1.587		
266			28.500	1.600	0.992	1.520	1.588		
267			28.600	1.600	0.992	1.520	1.589		
268			28.700	1.600	0.992	1.530	1.590		
269			28.800	1.610	0.992	1.530	1.592		
270			28.900	1.610	0.992	1.530	1.594		
271			29.000	1.610	0.992	1.530	1.596		
272			29.100	1.610	0.992	1.530	1.598		
273			29.200	1.610	0.992	1.530	1.600		
274			29.300	1.620	0.992	1.540	1.602		
275			29.400	1.620	0.992	1.540	1.603		
276			29.500	1.620	0.992	1.540	1.605		
277			29.600	1.620	0.993	1.540	1.608		
278			29.700	1.620	0.993	1.540	1.609		
279			29.800	1.620	0.993	1.540	1.609		
280			29.900	1.620	0.993	1.540	1.609		
281			30.000	1.620	0.993	1.540	1.609		
282			30.100	1.620	0.993	1.540	1.609		
'3			30.200	1.620	0.993	1.540	1.608		
			30.300	1.620	0.993	1.540	1.608		
			30.400	1.620	0.993	1.540	1.609		
			30.500	1.620	0.993	1.540	1.610		
287			30.600	1.620	0.993	1.540	1.611		
288			30.700	1.620	0.993	1.550	1.612		
289			30.800	1.630	0.993	1.550	1.614		
290			30.900	1.630	0.993	1.550	1.616		
291			31.000	1.630	0.993	1.550	1.617		



Wavelength	Cal/Mir	Cal data	Wavelength	Mir	Cal/Mir (interp)	Flight area	MSFC area	Std wavelengths	Cal flite mir
292			31.100	1.630	0.993	1.550	1.619		
293			31.200	1.630	0.993	1.550	1.619		
294			31.300	1.630	0.993	1.550	1.620		
295			31.400	1.630	0.993	1.550	1.619		
			31.500	1.630	0.993	1.550	1.619		
			31.600	1.630	0.993	1.550	1.619		
			31.700	1.630	0.993	1.550	1.619		
299			31.800	1.630	0.993	1.550	1.619		
300			31.900	1.630	0.993	1.550	1.619		
301			32.000	1.630	0.993	1.550	1.620		
302			32.100	1.630	0.993	1.560	1.622		
303			32.200	1.630	0.993	1.560	1.623		
304			32.300	1.640	0.993	1.560	1.625		
305			32.400	1.640	0.993	1.560	1.626		
306			32.500	1.640	0.993	1.560	1.628		
307			32.600	1.640	0.994	1.560	1.630		
308			32.700	1.640	0.994	1.560	1.631		
309			32.800	1.640	0.994	1.560	1.631		
310			32.900	1.640	0.994	1.560	1.631		
311			33.000	1.640	0.994	1.560	1.630		
312			33.100	1.640	0.994	1.560	1.630		
313			33.200	1.640	0.994	1.560	1.630		
314			33.300	1.640	0.994	1.560	1.630		
315			33.400	1.640	0.994	1.560	1.630		
316			33.500	1.640	0.994	1.560	1.631		
317			33.600	1.640	0.994	1.570	1.632		
318			33.700	1.640	0.994	1.570	1.633		
319			33.800	1.640	0.994	1.570	1.634		
320			33.900	1.650	0.994	1.570	1.636		
321			34.000	1.650	0.994	1.570	1.637		
322			34.100	1.650	0.994	1.570	1.639		
323			34.200	1.650	0.994	1.570	1.641		
324			34.300	1.650	0.994	1.580	1.643		
325			34.400	1.650	0.995	1.580	1.646		
326			34.500	1.660	0.995	1.580	1.648		
327			34.600	1.660	0.995	1.580	1.649		
328			34.700	1.660	0.995	1.580	1.650		
329			34.800	1.660	0.995	1.580	1.651		
330			34.900	1.660	0.995	1.580	1.652		
331			35.000	1.660	0.995	1.580	1.652		
332			35.100	1.660	0.995	1.580	1.652		
333			35.200	1.660	0.995	1.580	1.652		
334			35.300	1.660	0.995	1.580	1.652		
335			35.400	1.660	0.995	1.580	1.652		
336			35.500	1.660	0.995	1.580	1.651		
337			35.600	1.660	0.995	1.580	1.651		
338			35.700	1.660	0.995	1.580	1.652		
			35.800	1.660	0.995	1.580	1.652		
			35.900	1.660	0.995	1.590	1.653		
			36.000	1.660	0.995	1.590	1.655		
342			36.100	1.660	0.995	1.590	1.656		
343			36.200	1.670	0.996	1.590	1.658		
344			36.300	1.670	0.996	1.590	1.660		
345			36.400	1.670	0.996	1.590	1.661		
346			36.500	1.670	0.996	1.590	1.662		
347			36.600	1.670	0.996	1.600	1.663		
348			36.700	1.670	0.996	1.600	1.663		
349			36.800	1.670	0.996	1.600	1.664		
350			36.900	1.670	0.996	1.600	1.663		
351			37.000	1.670	0.996	1.600	1.663		
352			37.100	1.670	0.996	1.600	1.663		
353			37.200	1.670	0.996	1.600	1.663		
354			37.300	1.670	0.996	1.600	1.663		
355			37.400	1.670	0.996	1.600	1.663		
356			37.500	1.670	0.996	1.600	1.663		
357			37.600	1.670	0.996	1.600	1.664		
358			37.700	1.670	0.996	1.600	1.665		
359			37.800	1.670	0.996	1.600	1.667		
360			37.900	1.680	0.996	1.600	1.668		
361			38.000	1.680	0.996	1.600	1.670		
362			38.100	1.680	0.996	1.600	1.671		
363			38.200	1.680	0.996	1.600	1.672		
364			38.300	1.680	0.996	1.600	1.673		
365			38.400	1.680	0.996	1.600	1.673		
366			38.500	1.680	0.996	1.610	1.674		
367			38.600	1.680	0.996	1.610	1.674		
368			38.700	1.680	0.996	1.610	1.674		
369			38.800	1.680	0.996	1.600	1.673		
370			38.900	1.680	0.996	1.600	1.673		
371			39.000	1.680	0.996	1.600	1.673		
372			39.100	1.680	0.996	1.600	1.673		
373			39.200	1.680	0.996	1.600	1.673		
374			39.300	1.680	0.996	1.600	1.673		
375			39.400	1.680	0.996	1.610	1.674		
376			39.500	1.680	0.996	1.610	1.675		
377			39.600	1.680	0.996	1.610	1.676		
378			39.700	1.680	0.996	1.610	1.677		
379			39.800	1.690	0.996	1.610	1.678		
380			39.900	1.690	0.996	1.610	1.680		
			40.000	1.690	0.996	1.610	1.681		
			40.100	1.690	0.996	1.610	1.683		
			40.200	1.690	0.996	1.620	1.684		
384			40.300	1.690	0.996	1.620	1.686		
385			40.400	1.690	0.996	1.620	1.687		
386			40.500	1.700	0.996	1.620	1.688		
387			40.600	1.700	0.996	1.620	1.689		
388			40.700	1.700	0.996	1.620	1.691		

Wavelength	Cal/Mir	Cal data	Wavelength	Mir	Cal/Mir (interp)	Flight area	MSFC area	Std wavelengths	Cal flite mir
389			40.800	1.700	0.996	1.620	1.691		
390			40.900	1.700	0.996	1.620	1.692		
391			41.000	1.700	0.996	1.620	1.693		
392			41.100	1.700	0.996	1.620	1.693		
			41.200	1.700	0.997	1.630	1.695		
			41.300	1.700	0.997	1.630	1.695		
			41.400	1.700	0.997	1.630	1.695		
396			41.500	1.700	0.997	1.630	1.695		
397			41.600	1.700	0.997	1.630	1.695		
398			41.700	1.700	0.997	1.630	1.695		
399			41.800	1.700	0.997	1.630	1.695		
400			41.900	1.700	0.997	1.630	1.695		
401			42.000	1.700	0.997	1.630	1.695		
402			42.100	1.700	0.997	1.630	1.695		
403			42.200	1.700	0.997	1.630	1.696		
404			42.300	1.700	0.997	1.630	1.697		
405			42.400	1.700	0.997	1.630	1.698		
406			42.500	1.700	0.997	1.630	1.699		
407			42.600	1.710	0.997	1.630	1.700		
408			42.700	1.710	0.997	1.630	1.701		
409			42.800	1.710	0.997	1.630	1.703		
410			42.900	1.710	0.997	1.630	1.704		
411			43.000	1.710	0.997	1.640	1.705		
412			43.100	1.710	0.998	1.640	1.708		
413			43.200	1.710	0.998	1.640	1.709		
414			43.300	1.710	0.998	1.640	1.710		
415			43.400	1.710	0.998	1.640	1.711		
416			43.500	1.720	0.998	1.640	1.712		
417			43.600	1.720	0.998	1.640	1.713		
418			43.700	1.720	0.998	1.640	1.714		
419			43.800	1.720	0.998	1.640	1.715		
420			43.900	1.720	0.998	1.650	1.716		
421			44.000	1.720	0.998	1.650	1.717		
422			44.100	1.720	0.999	1.650	1.719		
423			44.200	1.720	0.999	1.650	1.720		
424			44.300	1.720	0.999	1.650	1.721		
425			44.400	1.720	0.999	1.650	1.722		
426			44.500	1.730	0.999	1.650	1.723		
427			44.600	1.730	0.999	1.650	1.724		
428			44.700	1.730	0.999	1.650	1.725		
429			44.800	1.730	1.000	1.660	1.728		
430			44.900	1.730	1.000	1.660	1.729		
431			45.000	1.730	1.000	1.660	1.730		
432			45.100	1.730	1.000	1.660	1.731		
433			45.200	1.730	1.000	1.660	1.732		
434			45.300	1.730	1.000	1.660	1.733		
435			45.400	1.730	1.001	1.660	1.736		
			45.500	1.740	1.001	1.670	1.737		
			45.600	1.740	1.001	1.670	1.738		
			45.700	1.740	1.001	1.670	1.739		
439			45.800	1.740	1.001	1.670	1.740		
440			45.900	1.740	1.001	1.670	1.740		
441			46.000	1.740	1.001	1.670	1.741		
442			46.100	1.740	1.001	1.670	1.742		
443			46.200	1.740	1.001	1.670	1.743		
444			46.300	1.740	1.001	1.670	1.744		
445			46.400	1.740	1.001	1.670	1.745		
446			46.500	1.740	1.001	1.670	1.746		
447			46.600	1.750	1.001	1.680	1.747		
448			46.700	1.750	1.001	1.680	1.748		
449			46.800	1.750	1.001	1.680	1.749		
450			46.900	1.750	1.001	1.680	1.750		
451			47.000	1.750	1.001	1.680	1.751		
452			47.100	1.750	1.001	1.680	1.752		
453			47.200	1.750	1.001	1.680	1.753		
454			47.300	1.750	1.001	1.680	1.754		
455			47.400	1.750	1.001	1.680	1.754		
456			47.500	1.750	1.001	1.680	1.755		
457			47.600	1.750	1.001	1.680	1.756		
458			47.700	1.760	1.001	1.680	1.757		
459			47.800	1.760	1.001	1.690	1.758		
460			47.900	1.760	1.001	1.690	1.759		
461			48.000	1.760	1.001	1.690	1.760		
462			48.100	1.760	1.001	1.690	1.761		
463			48.200	1.760	1.001	1.690	1.762		
464			48.300	1.760	1.001	1.690	1.763		
465			48.400	1.760	1.001	1.690	1.763		
466			48.500	1.760	1.001	1.690	1.764		
467			48.600	1.760	1.001	1.690	1.765		
468			48.700	1.760	1.001	1.690	1.766		
469			48.800	1.770	1.001	1.690	1.767		
470			48.900	1.770	1.001	1.700	1.768		
471			49.000	1.770	1.001	1.700	1.769		
472			49.100	1.770	1.000	1.700	1.768		
473			49.200	1.770	1.000	1.700	1.769		
474			49.300	1.770	1.000	1.700	1.769		
475			49.400	1.770	1.000	1.700	1.770		
476			49.500	1.770	1.000	1.700	1.771		
477			49.600	1.770	1.000	1.700	1.772		
			49.700	1.770	1.000	1.700	1.773		
			49.800	1.770	1.000	1.700	1.774		
			49.900	1.780	1.000	1.700	1.775		
481			50.000	1.780	1.000	1.700	1.776		
482			50.100	1.780	1.000	1.700	1.777		
483			50.200	1.780	1.000	1.710	1.778		
484			50.300	1.780	1.000	1.710	1.778		
485			50.400	1.780	1.000	1.710	1.779		

Wavelength	Cal/Mir	Cal data	Wavelength	Mir	Cal/Mir (interp)	Flight area	MSFC area	Std wavelengths	Cal flite mir
486			50.500	1.780	1.000	1.710	1.780		
487			50.600	1.780	1.000	1.710	1.781		
488			50.700	1.780	1.000	1.710	1.781		
489			50.800	1.780	1.000	1.710	1.782		
			50.900	1.780	1.000	1.710	1.783		
			51.000	1.780	1.000	1.710	1.783		
			51.100	1.780	1.000	1.710	1.784		
493			51.200	1.790	1.000	1.710	1.785		
494			51.300	1.790	1.000	1.710	1.786		
495			51.400	1.790	1.000	1.710	1.787		
496			51.500	1.790	1.000	1.710	1.788		
497			51.600	1.790	1.000	1.720	1.789		
498			51.700	1.790	1.000	1.720	1.790		
499			51.800	1.790	1.000	1.720	1.792		
500			51.900	1.790	1.000	1.720	1.793		
501			52.000	1.800	1.000	1.720	1.795		
502			52.100	1.800	1.000	1.720	1.797		
503			52.200	1.800	1.000	1.730	1.799		
504			52.300	1.800	1.000	1.730	1.800		
505			52.400	1.800	1.000	1.730	1.802		
506			52.500	1.800	1.000	1.730	1.804		
507			52.600	1.810	1.000	1.730	1.806		
508			52.700	1.810	1.000	1.730	1.807		
509			52.800	1.810	1.000	1.740	1.809		
510			52.900	1.810	1.000	1.740	1.810		
511			53.000	1.810	1.000	1.740	1.811		
512			53.100	1.810	1.000	1.740	1.812		
513			53.200	1.810	1.000	1.740	1.813		
514			53.300	1.810	1.000	1.740	1.814		
515			53.400	1.810	1.000	1.740	1.814		
516			53.500	1.820	1.000	1.740	1.815		
517			53.600	1.820	1.000	1.740	1.816		
518			53.700	1.820	1.000	1.740	1.816		
519			53.800	1.820	1.000	1.740	1.817		
520			53.900	1.820	1.000	1.740	1.818		
521			54.000	1.820	1.000	1.740	1.819		
522			54.100	1.820	1.000	1.750	1.820		
523			54.200	1.820	1.000	1.750	1.821		
524			54.300	1.820	1.000	1.750	1.822		
525			54.400	1.820	1.000	1.750	1.824		
526			54.500	1.830	1.000	1.750	1.826		
527			54.600	1.830	1.000	1.750	1.827		
528			54.700	1.830	1.000	1.750	1.829		
529			54.800	1.830	1.000	1.760	1.831		
530			54.900	1.830	1.000	1.760	1.833		
531			55.000	1.830	1.000	1.760	1.834		
532			55.100	1.840	1.000	1.760	1.836		
			55.200	1.840	1.000	1.760	1.837		
			55.300	1.840	1.000	1.760	1.839		
			55.400	1.840	1.000	1.760	1.840		
536			55.500	1.840	1.000	1.770	1.841		
537			55.600	1.840	1.000	1.770	1.842		
538			55.700	1.840	1.000	1.770	1.843		
539			55.800	1.840	1.000	1.770	1.844		
540			55.900	1.850	1.000	1.770	1.845		
541			56.000	1.850	1.000	1.770	1.845		
542			56.100	1.850	1.000	1.770	1.846		
543			56.200	1.850	1.000	1.770	1.846		
544			56.300	1.850	1.000	1.770	1.847		
545			56.400	1.850	1.000	1.770	1.848		
546			56.500	1.850	1.000	1.770	1.848		
547			56.600	1.850	1.000	1.770	1.849		
548			56.700	1.850	1.000	1.770	1.850		
549			56.800	1.850	1.000	1.780	1.851		
550			56.900	1.850	1.000	1.780	1.853		
551			57.000	1.850	1.000	1.780	1.854		
552			57.100	1.860	1.000	1.780	1.855		
553			57.200	1.860	1.000	1.780	1.857		
554			57.300	1.860	1.000	1.780	1.858		
555			57.400	1.860	1.000	1.780	1.860		
556			57.500	1.860	1.000	1.790	1.862		
557			57.600	1.860	1.000	1.790	1.863		
558			57.700	1.870	1.000	1.790	1.865		
559			57.800	1.870	1.000	1.790	1.867		
560			57.900	1.870	1.000	1.790	1.868		
561			58.000	1.870	1.000	1.790	1.870		
562			58.100	1.870	1.000	1.800	1.872		
563			58.200	1.870	1.000	1.800	1.873		
564			58.300	1.880	1.000	1.800	1.875		
565			58.400	1.880	1.000	1.800	1.876		
566			58.500	1.880	1.000	1.800	1.878		
567			58.600	1.880	1.000	1.800	1.879		
568			58.700	1.880	1.000	1.800	1.881		
569			58.800	1.880	1.000	1.810	1.882		
570			58.900	1.880	1.000	1.810	1.884		
571			59.000	1.890	1.000	1.810	1.885		
572			59.100	1.890	1.000	1.810	1.887		
573			59.200	1.890	1.000	1.810	1.888		
574			59.300	1.890	1.000	1.810	1.889		
			59.400	1.890	1.000	1.810	1.891		
			59.500	1.890	1.000	1.810	1.892		
			59.600	1.890	1.000	1.820	1.894		
578			59.700	1.900	1.000	1.820	1.895		
579			59.800	1.900	1.000	1.820	1.897		
580			59.900	1.900	1.000	1.820	1.898		
581			60.000	1.900	1.000	1.820	1.899		
582			60.100	1.900	1.000	1.820	1.901		

Wavelength	Cal/Mir	Cal data	Wavelength	Mir	Cal/Mir (interp)	Flight area	MSFC area	Std wavelengths	Cal flite mir
583			60.200	1.900	1.000	1.820		1.902	
584			60.300	1.900	1.000	1.830		1.904	
585			60.400	1.910	1.000	1.830		1.905	
586			60.500	1.910	1.000	1.830		1.907	
			60.600	1.910	1.000	1.830		1.908	
			60.700	1.910	1.000	1.830		1.910	
			60.800	1.910	1.000	1.830		1.911	
590			60.900	1.910	1.000	1.830		1.913	
591			61.000	1.910	1.000	1.840		1.914	
592			61.100	1.920	1.000	1.840		1.915	
593			61.200	1.920	1.000	1.840		1.917	
594			61.300	1.920	1.000	1.840		1.918	
595			61.400	1.920	1.000	1.840		1.920	
596			61.500	1.920	1.000	1.840		1.921	
597			61.600	1.920	1.000	1.840		1.922	
598			61.700	1.920	1.000	1.850		1.924	
599			61.800	1.930	1.000	1.850		1.925	
600			61.900	1.930	1.000	1.850		1.927	
601			62.000	1.930	1.000	1.850		1.928	