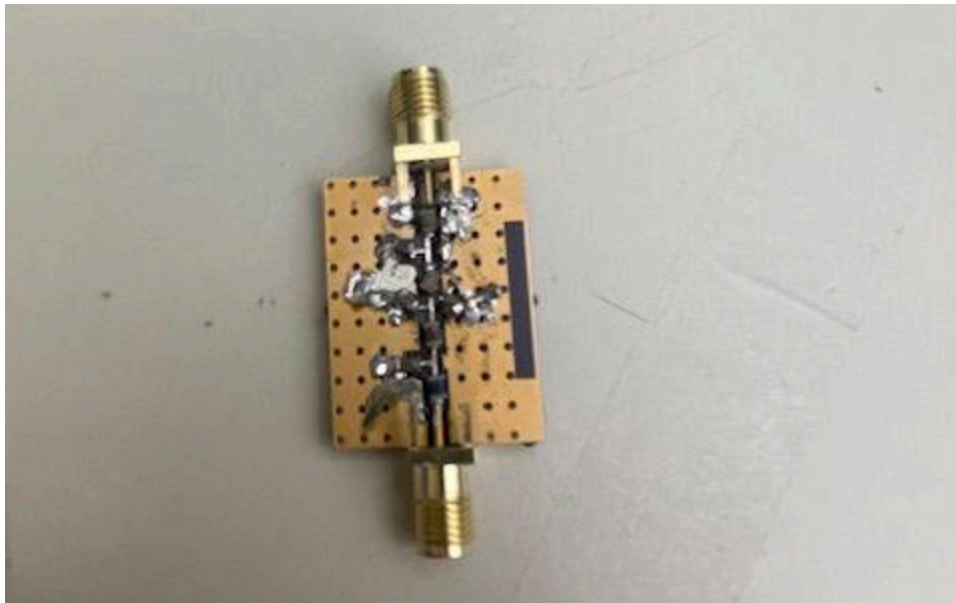


ELECTRICAL ENGINEERING DEPARTMENT
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EE 425

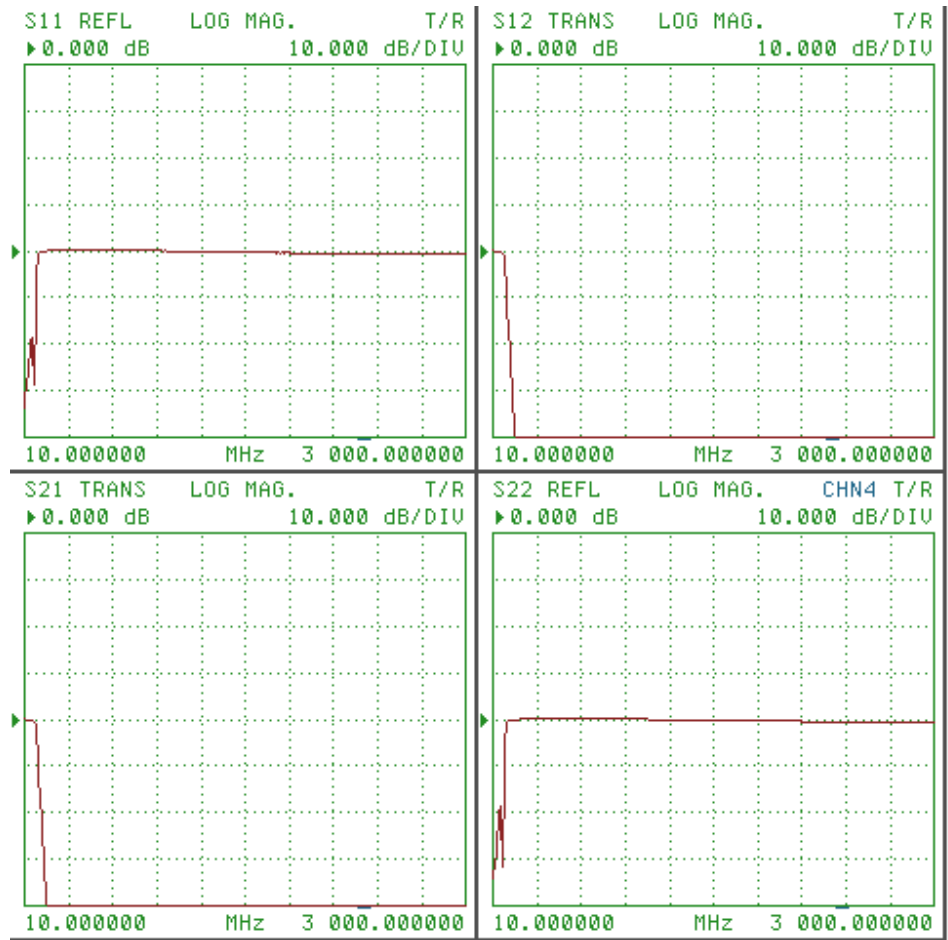
May 13th

Low Pass Filter Design Board Testing



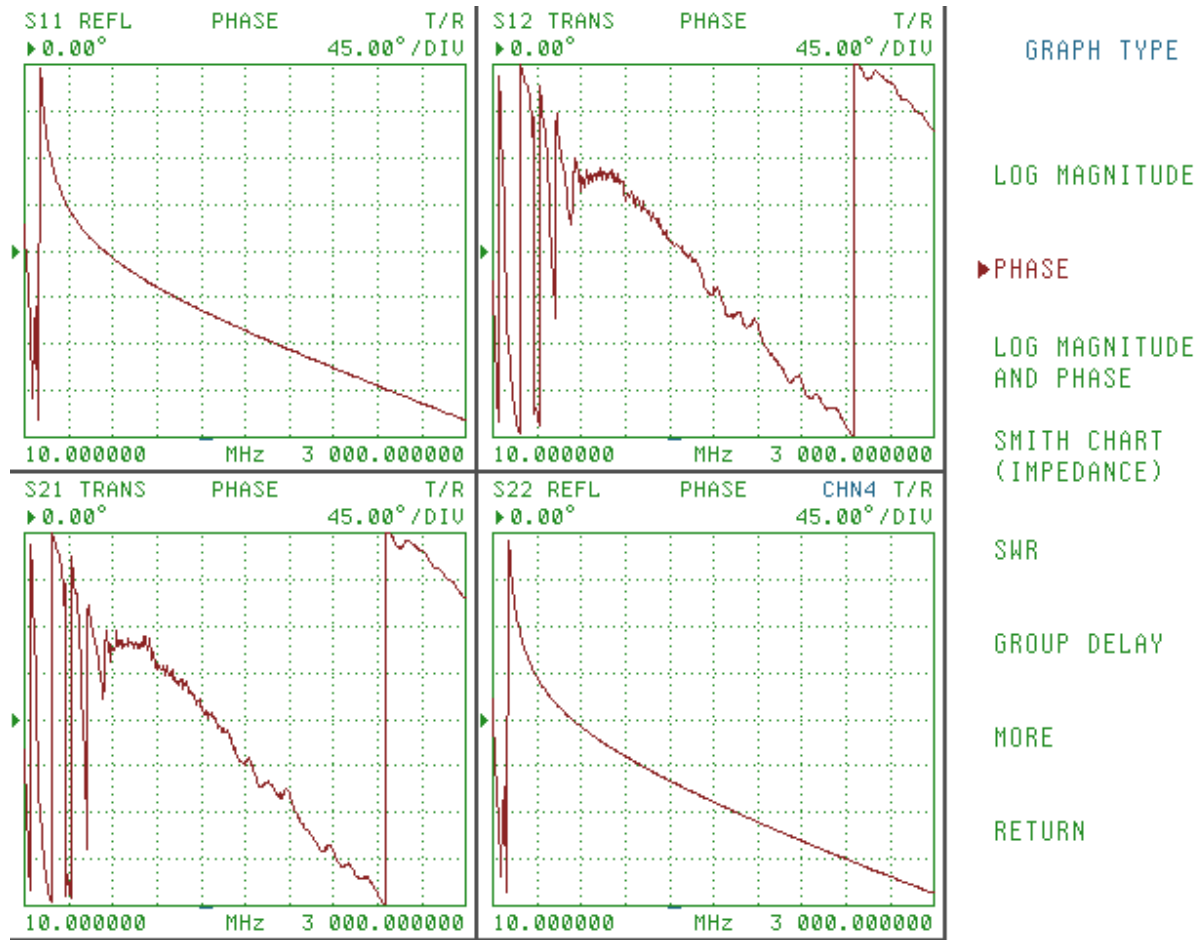
A continuity test was done on the circuit to prove functionality. From the SMA port on the right to left, the circuit passed the continuity test. As seen, there is extra solder from the circuit ends to ground, due to fixing soldering mistakes. It is my first time soldering surface mount components. The circuit works but has lots of extra impedance from the extra soldering.

Magnitude



- GRAPH TYPE
- ▶ LOG MAGNITUDE
- PHASE
- LOG MAGNITUDE AND PHASE
- SMITH CHART (IMPEDANCE)
- SWR
- GROUP DELAY
- MORE
- RETURN

Phase



GRAPH TYPE

LOG MAGNITUDE

▶PHASE

LOG MAGNITUDE AND PHASE

SMITH CHART (IMPEDANCE)

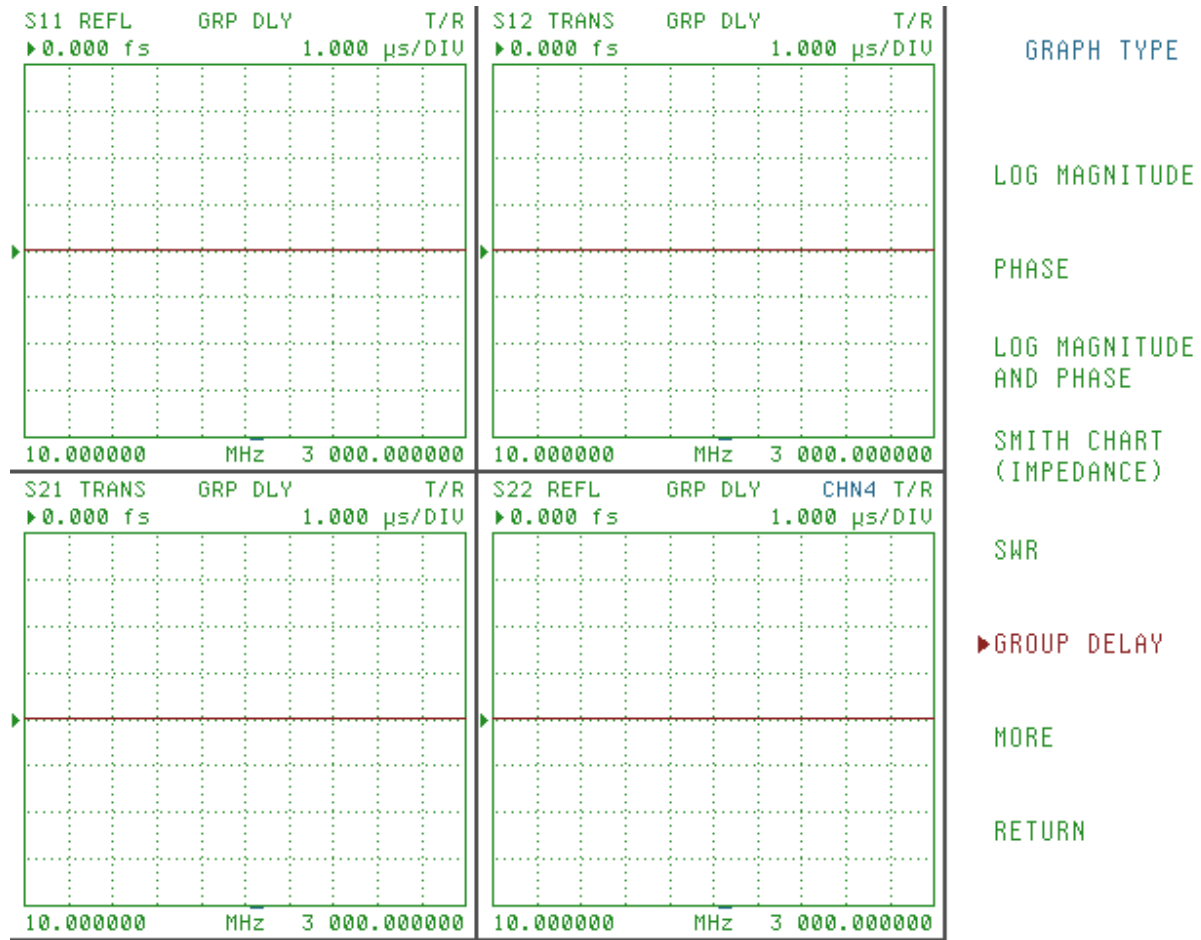
SWR

GROUP DELAY

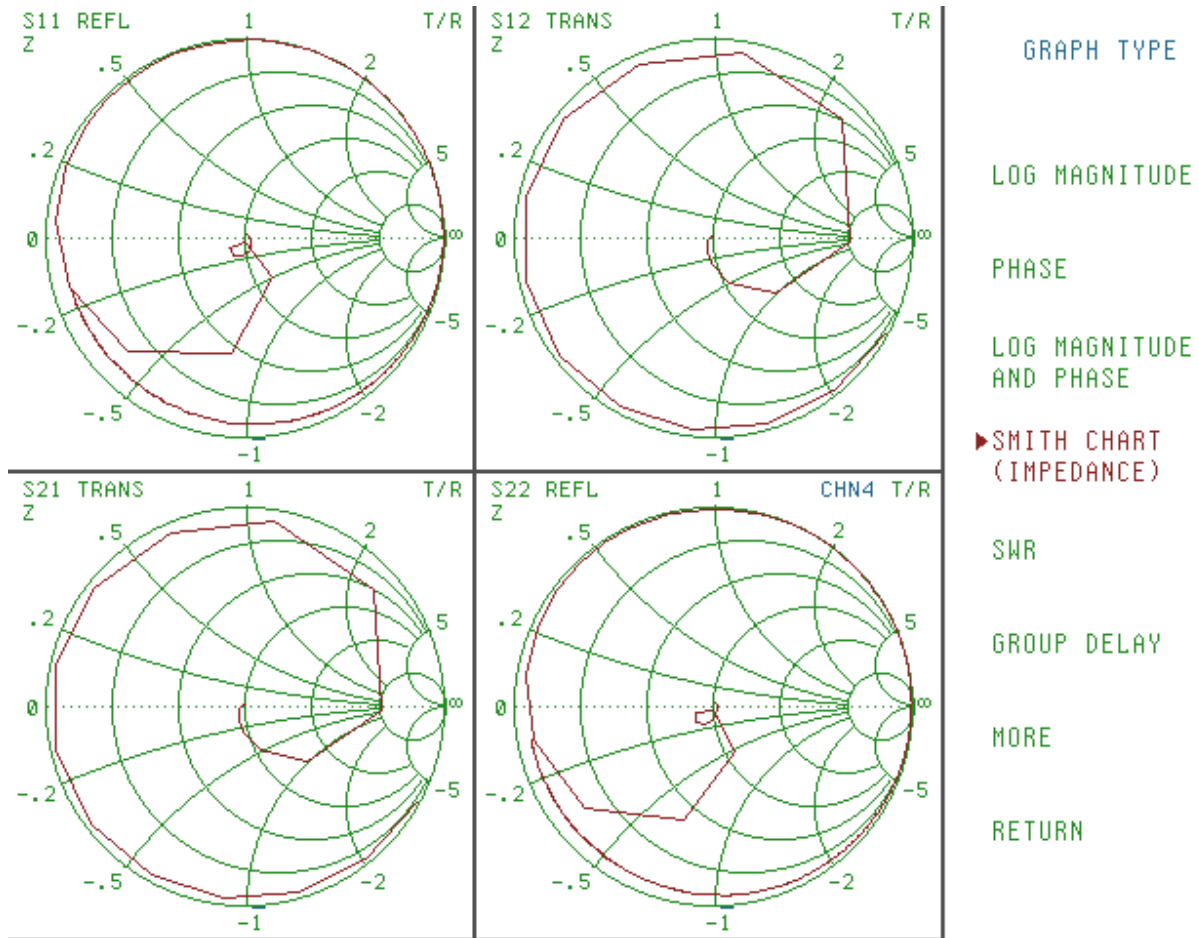
MORE

RETURN

Group Delay



Impedance



Compared to the simulation results, the impedance from the extra solder may have added extra impedance to the circuit, increasing the frequency of the low pass filter. The cutoff here is about 15MHz but was supposed to be 12MHz ; this must be due to the added impedance at the base of the capacitor.

Appendix

Log Magnitude

PNT #	FREQ GHz	MAGNITUDE dB	GROUP SECONDS	DELAY dB	MAGNITUDE dB	MAGNITUDE
1	0.01	-34.716	8.27E-09	-0.113	-34.015	
2	0.017475	-32.774	8.27E-09	-0.161	-31.569	

3	0.02495	-32.023	8.27E-09	-0.197	-30.007
4	0.032425	-30.957	8.43E-09	-0.24	-28.802
5	0.0399	-28.655	8.62E-09	-0.268	-27.184
6	0.047375	-25.527	8.89E-09	-0.314	-24.821
7	0.05485	-22.363	9.25E-09	-0.357	-22.157
8	0.062325	-19.852	9.73E-09	-0.429	-19.838
9	0.0698	-18.672	1.05E-08	-0.499	-18.679
10	0.077275	-20.368	1.18E-08	-0.572	-20.36
11	0.08475	-31.622	1.34E-08	-0.658	-29.363
12	0.092225	-11.873	1.44E-08	-1.204	-11.772
13	0.0997	-4.569	1.41E-08	-3.339	-4.533
14	0.107175	-1.757	1.24E-08	-7.447	-1.735
15	0.11465	-0.846	9.76E-09	-12.301	-0.831
16	0.122125	-0.53	7.31E-09	-17.026	-0.531
17	0.1296	-0.408	5.65E-09	-21.435	-0.404
18	0.137075	-0.335	4.57E-09	-25.506	-0.338
19	0.14455	-0.297	3.79E-09	-29.325	-0.3
20	0.152025	-0.266	3.26E-09	-32.901	-0.269
21	0.1595	-0.244	2.83E-09	-36.279	-0.252
22	0.166975	-0.218	2.48E-09	-39.39	-0.236
23	0.17445	-0.202	2.24E-09	-42.395	-0.225
24	0.181925	-0.185	2.00E-09	-45.211	-0.216
25	0.1894	-0.178	1.76E-09	-47.905	-0.21
26	0.196875	-0.155	1.64E-09	-50.494	-0.189
27	0.20435	-0.158	1.54E-09	-52.865	-0.185
28	0.211825	-0.147	1.44E-09	-55.144	-0.174
29	0.2193	-0.142	1.29E-09	-57.377	-0.163
30	0.226775	-0.135	1.32E-09	-59.404	-0.152
31	0.23425	-0.125	1.36E-09	-61.323	-0.148
32	0.241725	-0.122	1.31E-09	-63.169	-0.141
33	0.2492	-0.117	1.69E-09	-64.999	-0.134
34	0.256675	-0.111	1.67E-09	-66.571	-0.131
35	0.26415	-0.103	2.80E-09	-68.1	-0.126
36	0.271625	-0.104	3.61E-09	-69.711	-0.125
37	0.2791	-0.101	6.34E-10	-72.031	-0.119

38	0.286575	-0.097	-4.19E-09	-77.188	-0.113
39	0.29405	-0.083	-7.76E-09	-85.068	-0.101
40	0.301525	-0.089	-7.92E-09	-83.725	-0.1
41	0.309	-0.082	-5.04E-09	-79.759	-0.097
42	0.316475	-0.081	7.23E-10	-77.143	-0.101
43	0.32395	-0.081	5.24E-09	-76.077	-0.099
44	0.331425	-0.078	5.58E-09	-74.223	-0.105
45	0.3389	-0.073	5.65E-09	-73.21	-0.101
46	0.346375	-0.075	4.97E-09	-75.808	-0.103
47	0.35385	-0.071	3.30E-09	-77.853	-0.1
48	0.361325	-0.078	2.63E-09	-77.379	-0.095
49	0.3688	-0.064	3.09E-09	-78.208	-0.088
50	0.376275	-0.069	4.39E-09	-77.92	-0.09
51	0.38375	-0.067	6.15E-09	-77.777	-0.087
52	0.391225	-0.064	8.77E-09	-77.578	-0.089
53	0.3987	-0.059	8.75E-09	-76.776	-0.082
54	0.406175	-0.062	7.87E-09	-77.934	-0.087
55	0.41365	-0.068	8.36E-09	-82.703	-0.082
56	0.421125	-0.073	1.30E-08	-85.759	-0.088
57	0.4286	-0.075	2.33E-08	-90.588	-0.089
58	0.436075	-0.072	2.22E-08	-112.443	-0.079
59	0.44355	-0.074	2.05E-08	-90.285	-0.081
60	0.451025	-0.072	1.34E-08	-88.363	-0.08
61	0.4585	-0.064	2.43E-09	-86.078	-0.079
62	0.465975	-0.06	2.70E-09	-86.643	-0.079
63	0.47345	-0.064	1.90E-09	-81.685	-0.08
64	0.480925	-0.065	2.34E-09	-80.718	-0.081
65	0.4884	-0.061	1.81E-09	-80.678	-0.082
66	0.495875	-0.067	2.56E-09	-80.07	-0.084
67	0.50335	-0.066	2.30E-09	-80.287	-0.081
68	0.510825	-0.072	2.80E-09	-80.189	-0.081
69	0.5183	-0.071	2.90E-09	-78.776	-0.083
70	0.525775	-0.076	3.04E-09	-79.152	-0.084
71	0.53325	-0.072	3.62E-09	-79.912	-0.079
72	0.540725	-0.066	-9.78E-10	-80.733	-0.081

73	0.5482	-0.069	-3.11E-09	-84.785	-0.088
74	0.555675	-0.069	-5.62E-09	-89.779	-0.083
75	0.56315	-0.069	-5.74E-09	-88.111	-0.086
76	0.570625	-0.072	-8.41E-10	-85.357	-0.085
77	0.5781	-0.072	-5.51E-10	-84.261	-0.09
78	0.585575	-0.079	9.98E-10	-82.865	-0.09
79	0.59305	-0.079	1.05E-09	-82.424	-0.087
80	0.600525	-0.079	-3.16E-10	-82.158	-0.089
81	0.608	-0.086	1.13E-09	-81.642	-0.086
82	0.615475	-0.088	4.03E-10	-80.786	-0.086
83	0.62295	-0.095	6.22E-10	-82.185	-0.095
84	0.630425	-0.096	-1.17E-09	-82.848	-0.09
85	0.6379	-0.094	-5.74E-10	-81.542	-0.093
86	0.645375	-0.094	-3.17E-10	-82.32	-0.096
87	0.65285	-0.094	-8.00E-10	-80.475	-0.091
88	0.660325	-0.088	-1.50E-10	-81.503	-0.096
89	0.6678	-0.091	1.91E-10	-80.705	-0.102
90	0.675275	-0.093	6.33E-10	-81.091	-0.101
91	0.68275	-0.094	4.58E-10	-81.441	-0.101
92	0.690225	-0.099	1.37E-09	-81.885	-0.108
93	0.6977	-0.099	-1.45E-10	-83.069	-0.107
94	0.705175	-0.111	-7.40E-10	-81.714	-0.098
95	0.71265	-0.107	-9.74E-10	-82.426	-0.11
96	0.720125	-0.112	-1.63E-09	-81.08	-0.105
97	0.7276	-0.113	-7.00E-10	-80.306	-0.11
98	0.735075	-0.116	-2.42E-10	-80.854	-0.113
99	0.74255	-0.111	3.25E-10	-81.574	-0.115
100	0.750025	-0.116	6.57E-10	-81.418	-0.116
101	0.7575	-0.115	2.00E-10	-80.106	-0.114
102	0.764975	-0.113	9.59E-10	-81.374	-0.119
103	0.77245	-0.119	-2.43E-10	-80.412	-0.119
104	0.779925	-0.121	5.40E-11	-79.935	-0.12
105	0.7874	-0.128	1.11E-09	-81.222	-0.122
106	0.794875	-0.135	-1.68E-09	-81.284	-0.124
107	0.80235	-0.144	1.16E-09	-82.309	-0.126

108	0.809825	-0.143	-2.45E-10	-83.848	-0.135
109	0.8173	-0.145	-8.27E-10	-82.388	-0.135
110	0.824775	-0.148	1.53E-09	-83.518	-0.136
111	0.83225	-0.152	-4.59E-10	-83.587	-0.142
112	0.839725	-0.151	3.36E-10	-81.909	-0.14
113	0.8472	-0.151	1.18E-09	-81.166	-0.136
114	0.854675	-0.155	8.00E-10	-81.367	-0.145
115	0.86215	-0.156	1.50E-10	-81.025	-0.143
116	0.869625	-0.152	1.57E-10	-80.785	-0.142
117	0.8771	-0.158	-2.09E-10	-82.385	-0.146
118	0.884575	-0.157	-4.16E-11	-80.717	-0.157
119	0.89205	-0.156	1.21E-09	-81.926	-0.156
120	0.899525	-0.161	1.68E-09	-80.929	-0.157
121	0.907	-0.167	1.05E-09	-81.424	-0.157
122	0.914475	-0.169	1.50E-09	-81.241	-0.16
123	0.92195	-0.177	4.55E-10	-80.599	-0.154
124	0.929425	-0.187	1.62E-10	-81.01	-0.155
125	0.9369	-0.194	2.70E-10	-81.065	-0.157
126	0.944375	-0.196	1.28E-10	-82.119	-0.153
127	0.95185	-0.194	1.42E-11	-80.458	-0.157
128	0.959325	-0.2	3.34E-10	-81.555	-0.17
129	0.9668	-0.19	1.01E-09	-80.885	-0.171
130	0.974275	-0.195	1.14E-10	-80.928	-0.179
131	0.98175	-0.195	-1.78E-10	-80.348	-0.185
132	0.989225	-0.195	7.97E-11	-80.443	-0.183
133	0.9967	-0.204	-7.31E-10	-81.165	-0.181
134	1.004175	-0.21	5.05E-10	-79.214	-0.185
135	1.01165	-0.222	5.67E-10	-80.156	-0.178
136	1.019125	-0.222	2.30E-10	-79.8	-0.187
137	1.0266	-0.226	2.85E-10	-80.306	-0.189
138	1.034075	-0.225	2.12E-10	-80.284	-0.191
139	1.04155	-0.228	4.27E-10	-79.368	-0.194
140	1.049025	-0.224	-6.05E-11	-79.855	-0.2
141	1.0565	-0.224	1.45E-09	-80.077	-0.199
142	1.063975	-0.218	-2.23E-11	-80.018	-0.203

143	1.07145	-0.226	7.14E-11	-79.675	-0.204
144	1.078925	-0.226	1.18E-10	-79.442	-0.205
145	1.0864	-0.239	-6.59E-10	-80.344	-0.21
146	1.093875	-0.24	3.07E-10	-79.937	-0.212
147	1.10135	-0.252	5.03E-10	-80.39	-0.223
148	1.108825	-0.259	8.60E-10	-79.508	-0.228
149	1.1163	-0.26	6.74E-10	-79.76	-0.229
150	1.123775	-0.263	4.42E-10	-79.893	-0.234
151	1.13125	-0.268	7.91E-10	-79.498	-0.234
152	1.138725	-0.273	8.79E-10	-79.156	-0.227
153	1.1462	-0.273	8.40E-10	-78.299	-0.226
154	1.153675	-0.281	6.28E-10	-78.468	-0.221
155	1.16115	-0.283	5.09E-10	-78.574	-0.227
156	1.168625	-0.288	3.73E-10	-78.796	-0.231
157	1.1761	-0.289	1.21E-11	-79.138	-0.239
158	1.183575	-0.291	8.13E-10	-78.338	-0.242
159	1.19105	-0.296	4.61E-10	-78.836	-0.247
160	1.198525	-0.294	1.09E-10	-78.785	-0.255
161	1.206	-0.298	1.07E-09	-78.94	-0.259
162	1.213475	-0.296	6.12E-10	-78.771	-0.253
163	1.22095	-0.297	1.01E-09	-77.965	-0.258
164	1.228425	-0.3	1.15E-09	-79.121	-0.256
165	1.2359	-0.304	1.44E-10	-78.941	-0.262
166	1.243375	-0.313	-3.96E-11	-78.334	-0.261
167	1.25085	-0.318	-1.21E-10	-78.687	-0.263
168	1.258325	-0.32	1.42E-10	-78.145	-0.272
169	1.2658	-0.323	1.78E-10	-79.003	-0.278
170	1.273275	-0.323	4.01E-10	-78.709	-0.277
171	1.28075	-0.321	3.55E-10	-78.259	-0.279
172	1.288225	-0.32	1.93E-10	-77.697	-0.281
173	1.2957	-0.325	1.98E-10	-77.594	-0.281
174	1.303175	-0.329	2.47E-10	-77.609	-0.278
175	1.31065	-0.337	5.90E-10	-77.299	-0.28
176	1.318125	-0.353	6.28E-10	-76.948	-0.281
177	1.3256	-0.358	3.36E-10	-77.482	-0.291

178	1.333075	-0.364	1.13E-09	-76.549	-0.289
179	1.34055	-0.371	-2.43E-10	-76.609	-0.291
180	1.348025	-0.371	8.95E-11	-76.918	-0.303
181	1.3555	-0.369	6.52E-10	-76.122	-0.308
182	1.362975	-0.374	9.71E-11	-75.936	-0.303
183	1.37045	-0.372	1.02E-09	-76.08	-0.308
184	1.377925	-0.37	6.61E-10	-75.558	-0.309
185	1.3854	-0.377	3.19E-10	-75.93	-0.317
186	1.392875	-0.385	1.34E-10	-75.284	-0.326
187	1.40035	-0.394	9.04E-11	-75.287	-0.336
188	1.407825	-0.398	4.65E-10	-74.62	-0.339
189	1.4153	-0.402	8.85E-10	-73.855	-0.341
190	1.422775	-0.403	1.16E-09	-73.659	-0.345
191	1.43025	-0.41	1.47E-09	-73.001	-0.335
192	1.437725	-0.404	1.57E-09	-73.018	-0.34
193	1.4452	-0.412	1.44E-09	-73.312	-0.342
194	1.452675	-0.409	6.91E-10	-72.737	-0.345
195	1.46015	-0.415	8.13E-10	-72.555	-0.342
196	1.467625	-0.422	3.53E-10	-72.581	-0.349
197	1.4751	-0.427	4.87E-10	-72.845	-0.353
198	1.482575	-0.427	5.55E-10	-72.566	-0.361
199	1.49005	-0.43	1.22E-10	-72.888	-0.362
200	1.497525	-0.437	6.42E-11	-72.691	-0.368
201	1.505	-0.44	-3.29E-10	-72.744	-0.37
202	1.512475	-0.451	-3.20E-10	-72.238	-0.377
203	1.51995	-0.465	-5.11E-10	-72.602	-0.377
204	1.527425	-0.467	-3.58E-11	-72.042	-0.383
205	1.5349	-0.472	7.95E-11	-71.224	-0.385
206	1.542375	-0.481	3.25E-10	-71.243	-0.391
207	1.54985	-0.49	9.76E-10	-70.721	-0.392
208	1.557325	-0.488	6.77E-10	-69.997	-0.397
209	1.5648	-0.486	1.09E-09	-69.961	-0.396
210	1.572275	-0.485	1.47E-09	-69.63	-0.391
211	1.57975	-0.485	1.26E-09	-69.187	-0.391
212	1.587225	-0.485	1.45E-09	-69.21	-0.397

213	1.5947	-0.487	1.16E-09	-69.52	-0.403
214	1.602175	-0.486	4.95E-10	-69.876	-0.403
215	1.60965	-0.49	5.41E-10	-70.409	-0.413
216	1.617125	-0.491	-1.96E-10	-70.635	-0.425
217	1.6246	-0.5	-2.06E-10	-70.721	-0.43
218	1.632075	-0.513	6.16E-12	-70.554	-0.439
219	1.63955	-0.516	-4.72E-10	-70.405	-0.445
220	1.647025	-0.528	-2.76E-10	-70.528	-0.442
221	1.6545	-0.523	-2.56E-10	-70.526	-0.434
222	1.661975	-0.521	-3.65E-10	-70.142	-0.446
223	1.66945	-0.53	-2.59E-10	-69.907	-0.444
224	1.676925	-0.533	3.63E-10	-69.457	-0.443
225	1.6844	-0.538	3.68E-10	-69.165	-0.45
226	1.691875	-0.539	7.29E-10	-69.386	-0.453
227	1.69935	-0.553	9.67E-10	-68.978	-0.455
228	1.706825	-0.564	8.33E-10	-68.631	-0.458
229	1.7143	-0.566	8.35E-10	-68.741	-0.461
230	1.721775	-0.573	4.42E-10	-68.452	-0.463
231	1.72925	-0.587	5.04E-10	-68.695	-0.462
232	1.736725	-0.585	2.95E-10	-68.86	-0.467
233	1.7442	-0.589	1.42E-10	-68.962	-0.468
234	1.751675	-0.588	2.26E-11	-69.1	-0.472
235	1.75915	-0.586	-2.78E-10	-69.043	-0.476
236	1.766625	-0.583	-4.40E-10	-68.977	-0.478
237	1.7741	-0.582	-6.95E-10	-69.372	-0.479
238	1.781575	-0.581	-5.83E-10	-68.813	-0.491
239	1.78905	-0.575	-3.46E-10	-68.418	-0.5
240	1.796525	-0.576	1.65E-10	-68.167	-0.494
241	1.804	-0.575	8.27E-10	-67.338	-0.495
242	1.811475	-0.577	1.30E-09	-66.768	-0.511
243	1.81895	-0.588	1.20E-09	-66.213	-0.507
244	1.826425	-0.602	1.41E-09	-65.995	-0.523
245	1.8339	-0.615	1.23E-09	-66.02	-0.527
246	1.841375	-0.624	1.21E-09	-65.659	-0.523
247	1.84885	-0.63	1.24E-09	-65.787	-0.522

248	1.856325	-0.643	8.83E-10	-65.822	-0.53
249	1.8638	-0.638	7.51E-10	-65.937	-0.526
250	1.871275	-0.646	6.22E-10	-65.982	-0.521
251	1.87875	-0.655	6.38E-10	-66.029	-0.54
252	1.886225	-0.656	6.14E-10	-66.01	-0.534
253	1.8937	-0.654	4.74E-10	-65.827	-0.534
254	1.901175	-0.661	2.39E-10	-66.115	-0.541
255	1.90865	-0.664	1.31E-10	-65.957	-0.554
256	1.916125	-0.664	6.42E-11	-65.932	-0.553
257	1.9236	-0.676	1.61E-10	-65.604	-0.555
258	1.931075	-0.684	2.51E-10	-65.826	-0.567
259	1.93855	-0.676	4.58E-10	-65.602	-0.567
260	1.946025	-0.681	2.83E-10	-64.693	-0.562
261	1.9535	-0.683	5.08E-10	-64.796	-0.571
262	1.960975	-0.676	6.19E-10	-64.586	-0.57
263	1.96845	-0.67	6.06E-10	-64.185	-0.568
264	1.975925	-0.68	1.06E-09	-64.412	-0.569
265	1.9834	-0.68	1.14E-09	-63.967	-0.573
266	1.990875	-0.67	1.14E-09	-63.979	-0.565
267	1.99835	-0.668	1.28E-09	-63.826	-0.567
268	2.005825	-0.672	9.34E-10	-63.873	-0.577
269	2.0133	-0.675	9.40E-10	-63.756	-0.57
270	2.020775	-0.68	7.58E-10	-64.054	-0.575
271	2.02825	-0.695	1.08E-10	-63.92	-0.59
272	2.035725	-0.707	-4.76E-10	-64.059	-0.587
273	2.0432	-0.708	-6.80E-10	-64.719	-0.596
274	2.050675	-0.742	-8.64E-10	-64.461	-0.599
275	2.05815	-0.746	-6.26E-10	-64.245	-0.597
276	2.065625	-0.756	-2.25E-10	-64.055	-0.602
277	2.0731	-0.762	-2.91E-10	-63.504	-0.611
278	2.080575	-0.769	-2.44E-11	-62.861	-0.604
279	2.08805	-0.768	2.05E-10	-62.596	-0.604
280	2.095525	-0.761	6.45E-10	-61.648	-0.612
281	2.103	-0.752	9.02E-10	-61.296	-0.616
282	2.110475	-0.744	1.02E-09	-60.776	-0.621

283	2.11795	-0.733	1.11E-09	-60.341	-0.623
284	2.125425	-0.731	1.13E-09	-60.2	-0.624
285	2.1329	-0.728	1.15E-09	-59.866	-0.63
286	2.140375	-0.731	9.98E-10	-59.664	-0.629
287	2.14785	-0.741	7.44E-10	-59.659	-0.64
288	2.155325	-0.759	3.40E-10	-59.931	-0.651
289	2.1628	-0.768	1.14E-11	-59.932	-0.657
290	2.170275	-0.776	-1.29E-10	-60.063	-0.656
291	2.17775	-0.785	-2.57E-10	-59.889	-0.651
292	2.185225	-0.787	-3.69E-10	-59.893	-0.646
293	2.1927	-0.797	-4.30E-10	-59.94	-0.636
294	2.200175	-0.797	-4.58E-10	-59.627	-0.644
295	2.20765	-0.798	-3.12E-10	-59.121	-0.635
296	2.215125	-0.793	7.13E-11	-58.552	-0.63
297	2.2226	-0.786	3.02E-10	-58.05	-0.631
298	2.230075	-0.788	6.03E-10	-57.478	-0.63
299	2.23755	-0.779	8.28E-10	-57.014	-0.645
300	2.245025	-0.778	9.74E-10	-56.36	-0.645
301	2.2525	-0.788	1.05E-09	-56.046	-0.665
302	2.259975	-0.797	1.01E-09	-55.839	-0.665
303	2.26745	-0.802	8.04E-10	-55.814	-0.683
304	2.274925	-0.82	5.02E-10	-55.793	-0.683
305	2.2824	-0.831	2.51E-10	-55.798	-0.684
306	2.289875	-0.838	1.21E-11	-55.775	-0.691
307	2.29735	-0.844	-1.70E-10	-55.914	-0.686
308	2.304825	-0.846	-2.48E-10	-55.754	-0.684
309	2.3123	-0.843	-2.30E-10	-55.723	-0.686
310	2.319775	-0.837	-2.64E-10	-55.467	-0.681
311	2.32725	-0.837	-1.34E-10	-55.12	-0.683
312	2.334725	-0.826	1.63E-12	-54.734	-0.681
313	2.3422	-0.825	1.77E-10	-54.302	-0.682
314	2.349675	-0.819	4.48E-10	-53.794	-0.684
315	2.35715	-0.817	5.84E-10	-53.393	-0.69
316	2.364625	-0.818	7.05E-10	-53.113	-0.692
317	2.3721	-0.83	6.65E-10	-52.823	-0.693

318	2.379575	-0.833	6.91E-10	-52.396	-0.692
319	2.38705	-0.849	7.96E-10	-52.203	-0.692
320	2.394525	-0.86	7.66E-10	-51.826	-0.694
321	2.402	-0.882	8.69E-10	-51.628	-0.692
322	2.409475	-0.891	8.87E-10	-51.479	-0.695
323	2.41695	-0.892	8.35E-10	-51.403	-0.688
324	2.424425	-0.897	7.70E-10	-51.413	-0.684
325	2.4319	-0.902	6.10E-10	-51.498	-0.692
326	2.439375	-0.899	5.36E-10	-51.568	-0.682
327	2.44685	-0.903	3.91E-10	-51.612	-0.689
328	2.454325	-0.905	2.41E-10	-51.683	-0.691
329	2.4618	-0.893	1.59E-10	-51.612	-0.688
330	2.469275	-0.889	5.79E-11	-51.646	-0.704
331	2.47675	-0.889	5.77E-11	-51.517	-0.707
332	2.484225	-0.886	2.49E-10	-51.305	-0.713
333	2.4917	-0.887	2.78E-10	-51.227	-0.72
334	2.499175	-0.876	3.49E-10	-51.074	-0.727
335	2.50665	-0.874	4.56E-10	-50.992	-0.72
336	2.514125	-0.873	5.28E-10	-50.813	-0.72
337	2.5216	-0.866	7.34E-10	-50.65	-0.722
338	2.529075	-0.871	8.56E-10	-50.567	-0.719
339	2.53655	-0.866	8.26E-10	-50.606	-0.717
340	2.544025	-0.862	6.67E-10	-50.821	-0.718
341	2.5515	-0.862	4.52E-10	-51	-0.721
342	2.558975	-0.858	1.19E-10	-51.305	-0.726
343	2.56645	-0.865	-7.53E-11	-51.554	-0.737
344	2.573925	-0.887	-2.68E-10	-51.656	-0.742
345	2.5814	-0.878	-5.13E-10	-52.025	-0.734
346	2.588875	-0.885	-6.22E-10	-52.161	-0.736
347	2.59635	-0.892	-7.04E-10	-52.183	-0.734
348	2.603825	-0.893	-5.61E-10	-51.921	-0.725
349	2.6113	-0.896	-2.22E-10	-51.51	-0.723
350	2.618775	-0.905	2.64E-11	-51.081	-0.713
351	2.62625	-0.908	2.98E-10	-50.721	-0.711
352	2.633725	-0.912	3.56E-10	-50.5	-0.714

353	2.6412	-0.908	3.99E-10	-50.25	-0.718
354	2.648675	-0.92	4.99E-10	-50.076	-0.718
355	2.65615	-0.922	4.78E-10	-49.892	-0.733
356	2.663625	-0.925	4.99E-10	-49.81	-0.732
357	2.6711	-0.92	4.45E-10	-49.685	-0.742
358	2.678575	-0.922	4.27E-10	-49.549	-0.743
359	2.68605	-0.916	3.48E-10	-49.588	-0.747
360	2.693525	-0.923	2.83E-10	-49.473	-0.755
361	2.701	-0.924	2.55E-10	-49.388	-0.757
362	2.708475	-0.918	2.02E-10	-49.236	-0.751
363	2.71595	-0.914	2.61E-10	-49.127	-0.747
364	2.723425	-0.919	3.01E-10	-48.953	-0.752
365	2.7309	-0.918	3.89E-10	-48.887	-0.753
366	2.738375	-0.908	4.43E-10	-48.692	-0.754
367	2.74585	-0.912	4.83E-10	-48.555	-0.752
368	2.753325	-0.906	5.99E-10	-48.443	-0.753
369	2.7608	-0.907	5.60E-10	-48.286	-0.757
370	2.768275	-0.903	5.92E-10	-48.101	-0.758
371	2.77575	-0.907	5.24E-10	-47.957	-0.761
372	2.783225	-0.903	4.57E-10	-48.036	-0.755
373	2.7907	-0.911	3.71E-10	-48.008	-0.75
374	2.798175	-0.918	2.72E-10	-47.949	-0.752
375	2.80565	-0.916	2.43E-10	-48.04	-0.749
376	2.813125	-0.926	2.00E-10	-48.003	-0.74
377	2.8206	-0.928	2.81E-10	-47.91	-0.734
378	2.828075	-0.934	3.46E-10	-47.719	-0.729
379	2.83555	-0.934	4.56E-10	-47.539	-0.727
380	2.843025	-0.932	5.17E-10	-47.398	-0.722
381	2.8505	-0.929	5.51E-10	-47.341	-0.721
382	2.857975	-0.912	5.40E-10	-47.222	-0.724
383	2.86545	-0.92	4.72E-10	-47.194	-0.733
384	2.872925	-0.902	4.33E-10	-47.263	-0.739
385	2.8804	-0.899	3.22E-10	-47.27	-0.75
386	2.887875	-0.895	2.16E-10	-47.244	-0.755
387	2.89535	-0.888	2.12E-10	-47.281	-0.762

388	2.902825	-0.888	1.56E-10	-47.115	-0.77
389	2.9103	-0.889	1.86E-10	-46.952	-0.768
390	2.917775	-0.905	2.62E-10	-46.749	-0.766
391	2.92525	-0.918	3.21E-10	-46.578	-0.766
392	2.932725	-0.923	4.39E-10	-46.36	-0.756
393	2.9402	-0.933	6.16E-10	-46.202	-0.755
394	2.947675	-0.93	7.77E-10	-46.054	-0.747
395	2.95515	-0.928	8.33E-10	-45.9	-0.739
396	2.962625	-0.926	8.46E-10	-45.937	-0.735
397	2.9701	-0.914	6.90E-10	-46.106	-0.735
398	2.977575	-0.923	5.54E-10	-46.126	-0.731
399	2.98505	-0.892	4.65E-10	-46.206	-0.746
400	2.992525	-0.898	4.65E-10	-46.239	-0.741
401	3	-0.888	4.65E-10	-46.361	-0.737

Phase

PNT #	FREQ GHz	PHASE Deg	PHASE Deg	PHASE Deg	PHASE Deg
1	0.01	24.267	-29.641	-29.688	18.225
2	0.017475	7.553	-51.433	-51.471	-5.515
3	0.02495	-5.694	-73.511	-73.545	-27.911
4	0.032425	-15.579	-95.866	-95.884	-48.057
5	0.0399	-26.987	-118.623	-118.632	-63.672
6	0.047375	-44.178	-142.134	-142.11	-77.501
7	0.05485	-66.745	-166.291	-166.272	-92.92
8	0.062325	-92.001	168.409	168.427	-111.389
9	0.0698	-118.415	141.869	141.851	-132.446
10	0.077275	-143.726	113.138	113.16	-152.74
11	0.08475	-77.868	80.774	80.734	-89.668
12	0.092225	-55.235	41.742	41.737	-65.078
13	0.0997	-96.563	-2.691	-2.631	-103.757

14	0.107175	-135.239	-42.007	-41.942	-140.932
15	0.11465	-163.938	-70.738	-70.751	-168.535
16	0.122125	175.013	-91.696	-91.63	171.32
17	0.1296	158.811	-107.75	-107.628	155.763
18	0.137075	145.704	-120.631	-120.591	143.192
19	0.14455	134.768	-131.221	-131.3	132.659
20	0.152025	125.419	-140.707	-140.495	123.587
21	0.1595	117.254	-148.257	-148.301	115.705
22	0.166975	110.016	-155.513	-155.626	108.694
23	0.17445	103.552	-161.918	-161.909	102.367
24	0.181925	97.705	-167.51	-167.559	96.577
25	0.1894	92.445	-172.375	-172.635	91.304
26	0.196875	87.521	-177.05	-177.129	86.536
27	0.20435	82.929	179.023	178.541	81.988
28	0.211825	78.746	174.678	174.965	77.837
29	0.2193	74.814	170.668	171.234	74.021
30	0.226775	71.227	167.897	168.261	70.465
31	0.23425	67.796	165.086	165.149	67.123
32	0.241725	64.619	160.575	160.353	63.972
33	0.2492	61.583	156.565	158.318	61.025
34	0.256675	58.777	152.646	152.53	58.245
35	0.26415	56.033	149.014	147.194	55.567
36	0.271625	53.412	141.499	138.627	52.994
37	0.2791	50.972	128.849	127.227	50.595
38	0.286575	48.604	112.417	117.967	48.322
39	0.29405	46.317	143.345	137.802	46.134
40	0.301525	44.067	-174.017	-174.218	43.992
41	0.309	42	-166.285	-154.493	42.002
42	0.316475	40.062	-159.246	-164.057	40.018
43	0.32395	38.187	-166.73	-159.642	38.195
44	0.331425	36.411	-175.328	-175.42	36.355
45	0.3389	34.661	157.059	154.859	34.564
46	0.346375	32.992	139.758	137.907	32.83
47	0.35385	31.403	128.779	126.782	31.126
48	0.361325	29.825	121.359	122.661	29.536

49	0.3688	28.261	110.522	120.087	27.91
50	0.376275	26.768	102.598	105.704	26.41
51	0.38375	25.347	97.815	101.419	24.945
52	0.391225	23.887	74.068	76.451	23.574
53	0.3987	22.455	53.681	52.346	22.175
54	0.406175	21.015	23.225	21.238	20.843
55	0.41365	19.663	0.285	0.27	19.556
56	0.421125	18.303	-24.892	-12.912	18.272
57	0.4286	17.042	-48.264	-40.579	17.015
58	0.436075	15.768	-94.006	-149.912	15.855
59	0.44355	14.57	145.083	117.58	14.605
60	0.451025	13.414	123.605	122.798	13.466
61	0.4585	12.269	108.756	103.509	12.312
62	0.465975	11.143	100.883	97.982	11.186
63	0.47345	10.101	91.168	94.372	10.065
64	0.480925	9.014	81.218	83.115	9.009
65	0.4884	7.975	76.127	77.263	7.913
66	0.495875	6.889	76.949	70.391	6.821
67	0.50335	5.872	60.384	71.21	5.769
68	0.510825	4.789	69.869	55.325	4.752
69	0.5183	3.759	54.9	54.263	3.694
70	0.525775	2.743	43.539	43.95	2.7
71	0.53325	1.793	37.71	42.094	1.752
72	0.540725	0.871	21.669	21.131	0.801
73	0.5482	-0.043	17.587	30.243	-0.169
74	0.555675	-0.933	34.522	27.356	-1.084
75	0.56315	-1.766	62.454	72.583	-2.018
76	0.570625	-2.65	82.699	84.764	-2.978
77	0.5781	-3.477	85.419	78.09	-3.815
78	0.585575	-4.303	76.487	71.889	-4.666
79	0.59305	-5.16	79.831	67.438	-5.546
80	0.600525	-6.069	74.317	62.645	-6.372
81	0.608	-6.946	66.897	68.982	-7.18
82	0.615475	-7.839	58.707	64.975	-8.073
83	0.62295	-8.735	66.797	63.215	-8.885

84	0.630425	-9.591	73.613	61.594	-9.677
85	0.6379	-10.449	69.019	63.824	-10.512
86	0.645375	-11.304	77.952	71.029	-11.309
87	0.65285	-12.138	69.818	69.723	-12.091
88	0.660325	-12.88	73.1	75.464	-12.976
89	0.6678	-13.674	75.919	69.816	-13.743
90	0.675275	-14.4	71.564	75.431	-14.547
91	0.68275	-15.087	70.144	63.436	-15.351
92	0.690225	-15.786	73.4	61.858	-16.168
93	0.6977	-16.545	76.468	63.682	-16.896
94	0.705175	-17.238	70.9	70.369	-17.667
95	0.71265	-17.982	74.007	66.452	-18.397
96	0.720125	-18.744	71.853	75.269	-19.142
97	0.7276	-19.468	72.221	71.117	-19.83
98	0.735075	-20.121	75.914	75.96	-20.554
99	0.74255	-20.815	77.202	74.099	-21.258
100	0.750025	-21.527	73.263	69.955	-21.967
101	0.7575	-22.171	63.388	72.128	-22.674
102	0.764975	-22.771	68.904	69.109	-23.396
103	0.77245	-23.462	71.164	72.659	-24.048
104	0.779925	-24.1	72.25	73.868	-24.742
105	0.7874	-24.726	70.221	67.759	-25.435
106	0.794875	-25.463	58.847	65.793	-26.1
107	0.80235	-26.233	63.65	68.131	-26.793
108	0.809825	-26.894	62.148	59.5	-27.496
109	0.8173	-27.645	76.975	66.128	-28.12
110	0.824775	-28.385	67.007	69.994	-28.819
111	0.83225	-29.1	69.83	71.076	-29.546
112	0.839725	-29.769	69.948	76.511	-30.237
113	0.8472	-30.482	80.903	73.041	-30.862
114	0.854675	-31.117	63.793	69.466	-31.522
115	0.86215	-31.703	74.359	69.246	-32.161
116	0.869625	-32.293	62.897	73.803	-32.766
117	0.8771	-32.885	65.618	66.475	-33.422
118	0.884575	-33.385	58.167	57.732	-34.059

119	0.89205	-33.918	51.599	58.004	-34.684
120	0.899525	-34.471	56.284	60.491	-35.339
121	0.907	-35.017	56.522	55.402	-36.002
122	0.914475	-35.533	50.774	48.303	-36.59
123	0.92195	-36.129	53.195	56.417	-37.221
124	0.929425	-36.776	52.197	54.602	-37.837
125	0.9369	-37.385	55.035	47.857	-38.425
126	0.944375	-38.03	43.679	46.988	-39
127	0.95185	-38.703	48.491	48.584	-39.604
128	0.959325	-39.351	47.782	52.753	-40.23
129	0.9668	-39.964	53.034	50.505	-40.808
130	0.974275	-40.626	49.727	45.274	-41.467
131	0.98175	-41.208	52.214	47.528	-42.136
132	0.989225	-41.774	39.72	46.194	-42.734
133	0.9967	-42.377	43.317	45.803	-43.362
134	1.004175	-42.979	44.481	47.258	-43.992
135	1.01165	-43.534	43.774	47.049	-44.535
136	1.019125	-44.11	40.985	37.826	-45.077
137	1.0266	-44.73	36.686	42.764	-45.697
138	1.034075	-45.339	46.434	39.999	-46.267
139	1.04155	-45.896	37.796	38.537	-46.826
140	1.049025	-46.479	35.553	38.615	-47.432
141	1.0565	-46.991	38.689	32.617	-48.039
142	1.063975	-47.487	35.68	35.653	-48.618
143	1.07145	-47.951	35.094	32.279	-49.194
144	1.078925	-48.451	37.607	29.11	-49.742
145	1.0864	-48.932	38.058	38.155	-50.32
146	1.093875	-49.397	35.365	32.964	-50.873
147	1.10135	-49.931	38.482	30.628	-51.488
148	1.108825	-50.467	30.828	28.054	-52.067
149	1.1163	-51.039	34.032	28.87	-52.637
150	1.123775	-51.556	29.359	25.849	-53.282
151	1.13125	-52.123	25.351	31.487	-53.861
152	1.138725	-52.668	27.756	30.395	-54.449
153	1.1462	-53.209	29.782	24.478	-54.985

154	1.153675	-53.806	23.975	20.94	-55.524
155	1.16115	-54.395	20.394	18.172	-56.063
156	1.168625	-54.954	16.958	18.37	-56.582
157	1.1761	-55.561	16.488	17.619	-57.118
158	1.183575	-56.174	15.972	14.496	-57.647
159	1.19105	-56.728	14.569	10.803	-58.206
160	1.198525	-57.286	14.006	10.306	-58.741
161	1.206	-57.828	10.654	13.213	-59.319
162	1.213475	-58.369	9.531	10.63	-59.861
163	1.22095	-58.844	11.7	8.848	-60.404
164	1.228425	-59.301	8.244	6.708	-60.919
165	1.2359	-59.796	11.048	10.612	-61.399
166	1.243375	-60.262	3.615	4.253	-61.909
167	1.25085	-60.708	4.478	7.629	-62.47
168	1.258325	-61.221	-1.022	4.564	-63.036
169	1.2658	-61.704	1.059	3.989	-63.632
170	1.273275	-62.147	5.663	-1.106	-64.256
171	1.28075	-62.629	4.509	-1.071	-64.819
172	1.288225	-63.123	4.442	2.333	-65.337
173	1.2957	-63.582	4.279	-0.636	-65.927
174	1.303175	-64.067	3.242	-6.084	-66.469
175	1.31065	-64.611	-0.797	-3.119	-66.966
176	1.318125	-65.138	-2.549	-4.955	-67.449
177	1.3256	-65.629	-4.484	-5.333	-67.952
178	1.333075	-66.155	-9.544	-7.004	-68.379
179	1.34055	-66.721	-8.959	-16.942	-68.848
180	1.348025	-67.169	-10.297	-6.104	-69.321
181	1.3555	-67.695	-10.618	-10.364	-69.775
182	1.362975	-68.189	-11.935	-10.153	-70.294
183	1.37045	-68.687	-11.317	-11.915	-70.832
184	1.377925	-69.146	-8.193	-13.228	-71.297
185	1.3854	-69.647	-10.953	-12.11	-71.848
186	1.392875	-70.131	-14.234	-12.855	-72.439
187	1.40035	-70.637	-14.842	-20.588	-73.025
188	1.407825	-71.185	-14.21	-16.536	-73.547

189	1.4153	-71.661	-18.96	-20.451	-74.136
190	1.422775	-72.163	-22.186	-21.034	-74.642
191	1.43025	-72.608	-22.956	-23.243	-75.191
192	1.437725	-73.154	-29.023	-29.821	-75.676
193	1.4452	-73.589	-26.622	-31.846	-76.141
194	1.452675	-73.984	-33.49	-33.723	-76.543
195	1.46015	-74.42	-35.841	-36.023	-76.999
196	1.467625	-74.844	-39.248	-38.868	-77.477
197	1.4751	-75.27	-39.028	-40.194	-77.901
198	1.482575	-75.715	-38.314	-41.765	-78.433
199	1.49005	-76.197	-39.001	-43.459	-79.02
200	1.497525	-76.651	-39.754	-42.341	-79.528
201	1.505	-77.12	-39.026	-40.193	-80.072
202	1.512475	-77.657	-36.7	-44.719	-80.648
203	1.51995	-78.141	-40.564	-38.04	-81.146
204	1.527425	-78.618	-36.422	-41.064	-81.637
205	1.5349	-79.117	-35.473	-37.844	-82.138
206	1.542375	-79.624	-36.751	-39.875	-82.632
207	1.54985	-80.121	-42.714	-41.854	-83.081
208	1.557325	-80.668	-42.412	-45.644	-83.568
209	1.5648	-81.197	-45.893	-47.189	-84.076
210	1.572275	-81.728	-49.831	-51.148	-84.531
211	1.57975	-82.197	-52.307	-54.224	-84.994
212	1.587225	-82.715	-56.573	-57.532	-85.542
213	1.5947	-83.172	-60.365	-61.967	-86.006
214	1.602175	-83.578	-63.515	-64.038	-86.481
215	1.60965	-84.075	-63.329	-65.326	-87.032
216	1.617125	-84.503	-63.678	-65.581	-87.469
217	1.6246	-84.913	-62.942	-64.41	-87.989
218	1.632075	-85.28	-64.755	-64.527	-88.496
219	1.63955	-85.664	-61.965	-62.862	-88.991
220	1.647025	-86.124	-62.567	-59.582	-89.438
221	1.6545	-86.46	-60.3	-60.383	-89.877
222	1.661975	-86.871	-57.823	-60.505	-90.419
223	1.66945	-87.299	-61.335	-60.799	-90.855

224	1.676925	-87.744	-60.873	-60.469	-91.325
225	1.6844	-88.163	-59.416	-62.905	-91.861
226	1.691875	-88.644	-61.131	-63.966	-92.331
227	1.69935	-89.104	-65.568	-64.109	-92.783
228	1.706825	-89.59	-68.548	-68.959	-93.281
229	1.7143	-90.168	-68.871	-72.085	-93.763
230	1.721775	-90.708	-71.816	-72.254	-94.194
231	1.72925	-91.29	-71.251	-73.167	-94.67
232	1.736725	-91.77	-74.252	-73.049	-95.066
233	1.7442	-92.329	-70.994	-73.123	-95.493
234	1.751675	-92.84	-72.621	-74.382	-95.915
235	1.75915	-93.244	-73.198	-73.925	-96.372
236	1.766625	-93.68	-72.587	-73.391	-96.769
237	1.7741	-94.149	-69.893	-69.544	-97.222
238	1.781575	-94.509	-69.424	-70.382	-97.771
239	1.78905	-94.851	-68.315	-68.788	-98.226
240	1.796525	-95.235	-67.391	-69.352	-98.764
241	1.804	-95.633	-68.803	-73.004	-99.287
242	1.811475	-96.022	-72.782	-73.835	-99.781
243	1.81895	-96.396	-74.825	-78.548	-100.335
244	1.826425	-96.779	-80.131	-78.58	-100.796
245	1.8339	-97.154	-82.516	-83.335	-101.295
246	1.841375	-97.542	-87.139	-88.489	-101.705
247	1.84885	-98.047	-89.814	-92.349	-102.205
248	1.856325	-98.474	-91.53	-91.098	-102.656
249	1.8638	-98.925	-94.148	-96.561	-103.027
250	1.871275	-99.459	-95.597	-95.921	-103.45
251	1.87875	-99.99	-96.817	-95.741	-103.895
252	1.886225	-100.467	-97.367	-98.732	-104.304
253	1.8937	-100.955	-99.551	-100.021	-104.728
254	1.901175	-101.463	-99.585	-101.367	-105.237
255	1.90865	-101.959	-100.492	-101.439	-105.729
256	1.916125	-102.509	-101.267	-103.26	-106.273
257	1.9236	-103.04	-103.729	-101.707	-106.759
258	1.931075	-103.549	-104.732	-104.368	-107.305

259	1.93855	-104.053	-105.722	-105.367	-107.736
260	1.946025	-104.545	-106.089	-106.452	-108.271
261	1.9535	-105.043	-109.138	-110.263	-108.698
262	1.960975	-105.355	-110.31	-111.043	-109.142
263	1.96845	-105.799	-110.945	-114.219	-109.6
264	1.975925	-106.131	-113.317	-115.097	-110.041
265	1.9834	-106.485	-115.727	-116.343	-110.449
266	1.990875	-106.805	-117.963	-119.727	-110.86
267	1.99835	-107.179	-121.171	-121.808	-111.344
268	2.005825	-107.506	-121.127	-121.84	-111.738
269	2.0133	-107.863	-126.013	-124.242	-112.187
270	2.020775	-108.214	-125.818	-125.646	-112.595
271	2.02825	-108.51	-127.057	-127.486	-113.012
272	2.035725	-108.879	-128.756	-126.352	-113.503
273	2.0432	-109.325	-122.981	-129.076	-113.959
274	2.050675	-109.793	-125.26	-126.419	-114.342
275	2.05815	-110.318	-123.491	-123.89	-114.861
276	2.065625	-110.926	-123.817	-125.499	-115.287
277	2.0731	-111.452	-124.939	-125.106	-115.695
278	2.080575	-112.057	-122.073	-123.931	-116.079
279	2.08805	-112.647	-123.235	-125.174	-116.493
280	2.095525	-113.265	-124.202	-125.127	-116.932
281	2.103	-113.749	-127.297	-128.317	-117.398
282	2.110475	-114.199	-128.872	-129.273	-117.823
283	2.11795	-114.635	-131.578	-132.227	-118.357
284	2.125425	-115.004	-134.094	-133.773	-118.794
285	2.1329	-115.343	-136.429	-136.506	-119.367
286	2.140375	-115.714	-140.714	-138.695	-119.868
287	2.14785	-116.055	-141.797	-141.531	-120.335
288	2.155325	-116.325	-143.092	-143.064	-120.901
289	2.1628	-116.673	-141.369	-142.941	-121.355
290	2.170275	-117.04	-142.569	-142.145	-121.767
291	2.17775	-117.441	-141.852	-141.624	-122.177
292	2.185225	-117.883	-139.406	-141.832	-122.58
293	2.1927	-118.36	-138.977	-140.296	-122.994

294	2.200175	-118.898	-137.185	-138.745	-123.427
295	2.20765	-119.384	-136.895	-138.466	-123.832
296	2.215125	-119.869	-137.145	-138.649	-124.217
297	2.2226	-120.339	-139.336	-140.054	-124.593
298	2.230075	-120.802	-142.216	-141.647	-125.029
299	2.23755	-121.265	-144.482	-143.288	-125.419
300	2.245025	-121.696	-146.198	-146.059	-125.848
301	2.2525	-122.08	-148.734	-147.948	-126.356
302	2.259975	-122.348	-150.891	-150.983	-126.75
303	2.26745	-122.684	-152.876	-153.919	-127.153
304	2.274925	-123.061	-154.46	-154.061	-127.58
305	2.2824	-123.485	-153.606	-154.823	-128.056
306	2.289875	-123.891	-153.557	-155.284	-128.515
307	2.29735	-124.443	-153.44	-155.428	-129.045
308	2.304825	-124.983	-153.396	-155.009	-129.469
309	2.3123	-125.566	-152.987	-154.543	-129.96
310	2.319775	-126.132	-153.01	-153.447	-130.43
311	2.32725	-126.672	-153.212	-153.764	-130.943
312	2.334725	-127.166	-152.435	-154.304	-131.337
313	2.3422	-127.635	-153.069	-154.687	-131.832
314	2.349675	-128	-154.485	-155.366	-132.274
315	2.35715	-128.287	-156.538	-156.968	-132.655
316	2.364625	-128.514	-158.057	-159.123	-133.006
317	2.3721	-128.787	-160.029	-159.989	-133.381
318	2.379575	-129.035	-161.76	-161.573	-133.788
319	2.38705	-129.289	-163.797	-163.409	-134.181
320	2.394525	-129.639	-166.184	-165.129	-134.548
321	2.402	-130.038	-167.574	-167.329	-134.971
322	2.409475	-130.521	-169.353	-169.385	-135.388
323	2.41695	-131.083	-171.564	-171.611	-135.842
324	2.424425	-131.703	-173.22	-173.81	-136.384
325	2.4319	-132.345	-175.287	-175.348	-136.866
326	2.439375	-133.021	-176.254	-176.306	-137.354
327	2.44685	-133.59	-177.257	-176.543	-137.813
328	2.454325	-134.137	-177.944	-176.729	-138.274

329	2.4618	-134.569	-178.262	-178.388	-138.649
330	2.469275	-135.022	-179.336	-178.584	-139.052
331	2.47675	-135.415	-179.325	-179.291	-139.505
332	2.484225	-135.774	179.909	179.987	-139.775
333	2.4917	-136.076	179.265	178.935	-140.145
334	2.499175	-136.392	177.271	176.693	-140.456
335	2.50665	-136.713	175.732	174.87	-140.821
336	2.514125	-137.032	174.733	174.343	-141.186
337	2.5216	-137.405	172.611	171.834	-141.669
338	2.529075	-137.865	170.575	169.499	-142.125
339	2.53655	-138.302	167.971	167.134	-142.602
340	2.544025	-138.759	165.463	164.934	-143.1
341	2.5515	-139.136	164.071	163.695	-143.576
342	2.558975	-139.476	163.712	163.509	-144.038
343	2.56645	-139.961	164.434	164.323	-144.566
344	2.573925	-140.277	164.391	164.794	-145.021
345	2.5814	-140.65	165.916	166.205	-145.399
346	2.588875	-140.917	169.013	167.646	-145.889
347	2.59635	-141.297	170.808	170.494	-146.336
348	2.603825	-141.652	172.42	171.55	-146.657
349	2.6113	-142.052	173.927	173.475	-147.038
350	2.618775	-142.492	173.209	173.014	-147.469
351	2.62625	-143.104	172.217	171.93	-147.906
352	2.633725	-143.586	170.912	170.405	-148.297
353	2.6412	-144.126	169.769	169.958	-148.706
354	2.648675	-144.666	168.576	168.227	-149.096
355	2.65615	-145.251	167.729	167.42	-149.518
356	2.663625	-145.725	166.125	166.078	-149.851
357	2.6711	-146.159	164.971	165.207	-150.291
358	2.678575	-146.566	164.122	164.285	-150.646
359	2.68605	-146.96	163.814	163.749	-150.924
360	2.693525	-147.329	163.525	163.494	-151.239
361	2.701	-147.701	163.213	163.412	-151.52
362	2.708475	-148.059	163.279	163.668	-151.894
363	2.71595	-148.461	162.478	162.447	-152.346

364	2.723425	-148.954	161.77	161.919	-152.743
365	2.7309	-149.41	161.059	161.264	-153.227
366	2.738375	-149.85	159.667	159.939	-153.733
367	2.74585	-150.257	157.306	157.629	-154.206
368	2.753325	-150.698	154.643	156.116	-154.752
369	2.7608	-151.092	152.562	153.731	-155.314
370	2.768275	-151.375	150.355	151.547	-155.862
371	2.77575	-151.707	147.802	149.144	-156.335
372	2.783225	-152.019	146.576	147.272	-156.781
373	2.7907	-152.294	145.48	146.067	-157.162
374	2.798175	-152.529	144.989	145.402	-157.582
375	2.80565	-152.919	145.348	145.013	-157.964
376	2.813125	-153.369	145.105	144.93	-158.324
377	2.8206	-153.901	145.536	145.203	-158.66
378	2.828075	-154.423	144.811	144.666	-158.959
379	2.83555	-154.992	143.921	143.939	-159.283
380	2.843025	-155.586	142.772	142.901	-159.617
381	2.8505	-156.201	141.534	141.972	-159.953
382	2.857975	-156.748	140.349	140.552	-160.331
383	2.86545	-157.126	138.664	139.093	-160.72
384	2.872925	-157.58	137.5	137.576	-161.112
385	2.8804	-157.777	136.489	136.407	-161.473
386	2.887875	-158.056	135.442	135.579	-161.925
387	2.89535	-158.285	134.469	135.015	-162.365
388	2.902825	-158.536	134.074	134.656	-162.864
389	2.9103	-158.708	133.578	134.01	-163.298
390	2.917775	-159.028	132.398	133.083	-163.766
391	2.92525	-159.363	131.842	131.395	-164.3
392	2.932725	-159.794	130.742	130.23	-164.789
393	2.9402	-160.32	129.208	128.284	-165.295
394	2.947675	-160.881	127.316	126.529	-165.81
395	2.95515	-161.493	124.824	124.108	-166.289
396	2.962625	-162.051	122.41	122.026	-166.742
397	2.9701	-162.565	120.882	120.961	-167.111
398	2.977575	-162.968	119.473	119.881	-167.472

399	2.98505	-163.26	118.477	119.053	-167.796
400	2.992525	-163.685	117.157	118.175	-168.033
401	3	-163.986	116.36	117.602	-168.263

Group Delay

PNT	FREQ	GROUP	DELAY	GROUP	DELAY	GROUP
DELAY		GROUP	DELAY			
#	GHz	SECONDS	SECONDS	SECONDS	SECONDS	
1	0.01000000	4.7713E-09	8.2619E-09	8.2630E-09	7.6511E-09	
2	0.01747500	4.7713E-09	8.2619E-09	8.2630E-09	7.6511E-09	
3	0.02495000	4.7713E-09	8.2619E-09	8.2630E-09	7.6511E-09	
4	0.03242500	4.8413E-09	8.4231E-09	8.4187E-09	6.7268E-09	
5	0.03990000	5.6772E-09	8.6163E-09	8.6153E-09	6.0158E-09	
6	0.04737500	7.1048E-09	8.8903E-09	8.8886E-09	5.8956E-09	
7	0.05485000	8.4883E-09	9.2422E-09	9.2394E-09	6.3956E-09	
8	0.06232500	9.2461E-09	9.7249E-09	9.7285E-09	6.9835E-09	
9	0.06980000	999.3195E-12	10.4935E-09	10.4945E-09	-283.1700E-12	
10	0.07727500	-3.4109E-09	11.7683E-09	11.7671E-09	-4.3117E-09	
11	0.08475000	-2.0280E-09	13.4305E-09	13.4249E-09	-2.6662E-09	
12	0.09222500	-790.1683E-12	14.4156E-09	14.4112E-09	-1.0997E-09	
13	0.09970000	8.0220E-09	14.0769E-09	14.0713E-09	7.3099E-09	
14	0.10717500	12.0509E-09	12.3987E-09	12.3943E-09	11.4906E-09	
15	0.11465000	9.7212E-09	9.7660E-09	9.7588E-09	9.3334E-09	
16	0.12212500	7.3494E-09	7.3059E-09	7.2957E-09	7.0509E-09	
17	0.12960000	5.6926E-09	5.6186E-09	5.6282E-09	5.4648E-09	
18	0.13707500	4.6080E-09	4.5505E-09	4.5176E-09	4.4265E-09	
19	0.14455000	3.8611E-09	3.7711E-09	3.8176E-09	3.7199E-09	
20	0.15202500	3.3141E-09	3.2680E-09	3.2633E-09	3.2046E-09	
21	0.15950000	2.9023E-09	2.8536E-09	2.8460E-09	2.8150E-09	
22	0.16697500	2.5779E-09	2.4983E-09	2.5363E-09	2.5159E-09	
23	0.17445000	2.3047E-09	2.2592E-09	2.2355E-09	2.2705E-09	
24	0.18192500	2.0905E-09	1.9842E-09	2.0171E-09	2.0603E-09	
25	0.18940000	1.9162E-09	1.7741E-09	1.7939E-09	1.8957E-09	
26	0.19687500	1.7585E-09	1.6575E-09	1.6595E-09	1.7406E-09	
27	0.20435000	1.6392E-09	1.5023E-09	1.4634E-09	1.6043E-09	
28	0.21182500	1.5134E-09	1.3257E-09	1.3317E-09	1.4912E-09	
29	0.21930000	1.4031E-09	1.3034E-09	1.2595E-09	1.3792E-09	
30	0.22677500	1.3133E-09	1.2149E-09	1.2022E-09	1.2847E-09	
31	0.23425000	1.2277E-09	1.2356E-09	1.2775E-09	1.2053E-09	
32	0.24172500	1.1559E-09	1.3161E-09	1.4765E-09	1.1322E-09	
33	0.24920000	1.0950E-09	1.5749E-09	1.6087E-09	1.0715E-09	

34	0.256675000	1.0434E-09	1.8991E-09	2.2801E-09	1.0181E-09
35	0.264150000	988.4702E-12	2.7397E-09	2.6380E-09	969.1340E-12
36	0.271625000	945.5913E-12	3.9053E-09	3.7337E-09	923.1709E-12
37	0.279100000	901.4721E-12	1.4833E-09	1.9388E-09	875.4096E-12
38	0.286575000	865.2488E-12	-4.4921E-09	-4.2542E-09	837.2729E-12
39	0.294050000	831.7940E-12	-7.1749E-09	-6.6821E-09	800.8550E-12
40	0.301525000	790.7643E-12	-8.3322E-09	-8.2030E-09	770.6202E-12
41	0.309000000	754.8773E-12	-6.1424E-09	-5.8840E-09	739.4119E-12
42	0.316475000	708.0335E-12	510.1970E-12	-4.3420E-12	710.6284E-12
43	0.323950000	679.0707E-12	4.3459E-09	4.3242E-09	687.2072E-12
44	0.331425000	657.6429E-12	6.0583E-09	5.8236E-09	666.6230E-12
45	0.338900000	629.4704E-12	6.2809E-09	5.6605E-09	653.9484E-12
46	0.346375000	612.3780E-12	5.5249E-09	5.2559E-09	635.2360E-12
47	0.353850000	596.4276E-12	4.2518E-09	3.4523E-09	618.1310E-12
48	0.361325000	580.2935E-12	2.3837E-09	2.5562E-09	599.2860E-12
49	0.368800000	564.1108E-12	2.9184E-09	2.7790E-09	576.1966E-12
50	0.376275000	552.3787E-12	3.7403E-09	4.1700E-09	550.6589E-12
51	0.383750000	535.3293E-12	5.6776E-09	5.8096E-09	532.2918E-12
52	0.391225000	531.2430E-12	8.1515E-09	8.5766E-09	516.0274E-12
53	0.398700000	527.6403E-12	8.9287E-09	8.7158E-09	498.7293E-12
54	0.406175000	519.3040E-12	8.6286E-09	9.0265E-09	493.1264E-12
55	0.413650000	506.3452E-12	8.9065E-09	7.2015E-09	479.8471E-12
56	0.421125000	489.6486E-12	6.8662E-09	5.6661E-09	461.3271E-12
57	0.428600000	472.4157E-12	-6.8618E-09	-7.2575E-09	461.8726E-12
58	0.436075000	454.8414E-12	-11.6041E-09	-12.8007E-09	443.3906E-12
59	0.443550000	443.5254E-12	-14.3095E-09	-12.8549E-09	434.1676E-12
60	0.451025000	428.3352E-12	-14.5938E-09	-13.7167E-09	433.8955E-12
61	0.458500000	416.5844E-12	-1.5347E-09	-383.2169E-12	420.0569E-12
62	0.465975000	407.5491E-12	3.1298E-09	3.2280E-09	416.1379E-12
63	0.473450000	398.9961E-12	2.8955E-09	3.0004E-09	411.0479E-12
64	0.480925000	396.2848E-12	2.5393E-09	3.4086E-09	404.6941E-12
65	0.488400000	391.6988E-12	1.9779E-09	1.6382E-09	397.6088E-12
66	0.495875000	392.2202E-12	892.3528E-12	2.1457E-09	395.8913E-12
67	0.503350000	390.4530E-12	1.8351E-09	2.4136E-09	394.3623E-12
68	0.510825000	385.3090E-12	2.0760E-09	1.3191E-09	384.6307E-12
69	0.518300000	376.6157E-12	3.0321E-09	2.8088E-09	373.8951E-12
70	0.525775000	362.8523E-12	3.8981E-09	3.0560E-09	366.2589E-12
71	0.533250000	354.5486E-12	3.2700E-09	2.7287E-09	354.0766E-12
72	0.540725000	340.8836E-12	1.0341E-09	-505.6597E-12	350.1875E-12
73	0.548200000	333.6456E-12	-2.7944E-09	-1.8308E-09	350.2517E-12
74	0.555675000	328.6759E-12	-4.9199E-09	-4.1276E-09	350.9071E-12
75	0.563150000	318.6118E-12	-5.6392E-09	-4.6090E-09	339.3824E-12
76	0.570625000	312.7154E-12	-2.9253E-09	-1.9328E-09	334.9183E-12
77	0.578100000	315.4733E-12	-288.0316E-12	-1.6269E-09	327.0286E-12

78	0.585575000	317.9623E-12	1.5490E-09	-155.9461E-12	315.6045E-12
79	0.593050000	322.5096E-12	2.2992E-09	1.8863E-09	315.5830E-12
80	0.600525000	327.8574E-12	983.1167E-12	866.1950E-12	315.0023E-12
81	0.608000000	331.5750E-12	270.1127E-12	937.3041E-12	309.6031E-12
82	0.615475000	326.3378E-12	107.3608E-12	1.2018E-09	307.0949E-12
83	0.622950000	325.3890E-12	-992.8927E-12	-1.9861E-09	307.4029E-12
84	0.630425000	320.6417E-12	-93.2021E-12	257.6735E-12	299.5967E-12
85	0.637900000	314.6643E-12	440.5451E-12	122.9790E-12	299.3051E-12
86	0.645375000	306.1360E-12	-110.4065E-12	-124.8707E-12	302.9006E-12
87	0.652850000	297.0018E-12	-131.0705E-12	1.1951E-09	299.4067E-12
88	0.660325000	289.2452E-12	-388.0990E-12	-653.5026E-15	298.4482E-12
89	0.667800000	274.9780E-12	-252.6482E-12	-941.9970E-12	299.7832E-12
90	0.675275000	269.4162E-12	53.9466E-12	-245.7914E-12	298.6658E-12
91	0.682750000	268.8426E-12	-372.3058E-12	-222.1356E-12	293.5847E-12
92	0.690225000	264.2533E-12	840.5036E-12	-577.7317E-12	289.8040E-12
93	0.697700000	267.2702E-12	-1.3395E-09	455.4488E-12	285.8543E-12
94	0.705175000	272.8994E-12	-579.7390E-12	-301.0655E-12	273.1597E-12
95	0.712650000	269.8239E-12	317.5845E-12	-237.2562E-12	271.4383E-12
96	0.720125000	266.0333E-12	-1.4084E-09	-351.4951E-12	272.3917E-12
97	0.727600000	264.0228E-12	562.1802E-12	-748.3575E-12	262.5944E-12
98	0.735075000	258.5251E-12	65.1972E-12	74.3738E-12	264.0528E-12
99	0.742550000	252.1949E-12	641.4298E-12	381.4953E-12	263.5237E-12
100	0.750025000	245.3980E-12	818.3454E-12	733.4716E-12	261.5380E-12
101	0.757500000	244.0779E-12	93.7663E-12	1.2366E-09	259.1586E-12
102	0.764975000	241.2445E-12	-209.5085E-12	178.5373E-12	260.9304E-12
103	0.772450000	238.9686E-12	-239.6228E-12	-427.7791E-12	256.6878E-12
104	0.779925000	250.6416E-12	56.1743E-12	-195.4044E-12	253.3389E-12
105	0.787400000	257.6824E-12	1.2544E-09	86.7046E-12	255.1100E-12
106	0.794875000	260.2634E-12	690.4113E-12	1.0334E-12	255.7864E-12
107	0.802350000	270.1707E-12	-223.0308E-12	157.3921E-12	250.4831E-12
108	0.809825000	271.9829E-12	984.5696E-12	665.1763E-12	251.1124E-12
109	0.817300000	267.8041E-12	-1.2273E-09	-464.3122E-12	257.2293E-12
110	0.824775000	265.0190E-12	-692.8658E-12	623.6888E-12	251.8554E-12
111	0.832250000	262.4160E-12	427.1738E-12	272.5644E-12	255.2628E-12
112	0.839725000	252.3365E-12	-403.9908E-12	1.1922E-12	250.9726E-12
113	0.847200000	239.5128E-12	836.7215E-12	137.0683E-12	240.2529E-12
114	0.854675000	232.9801E-12	1.8102E-09	249.0465E-12	234.2599E-12
115	0.862150000	222.6737E-12	-58.7167E-12	919.2463E-12	233.5118E-12
116	0.869625000	210.5834E-12	494.5951E-12	-253.7759E-12	234.3625E-12
117	0.877100000	204.7641E-12	1.2345E-09	1.3739E-09	233.2788E-12
118	0.884575000	203.4739E-12	-452.2681E-12	70.1725E-12	239.6990E-12
119	0.892050000	197.4506E-12	876.5709E-12	99.6021E-12	242.2776E-12
120	0.899525000	202.0074E-12	415.4150E-12	519.8659E-12	235.3619E-12
121	0.907000000	208.2189E-12	-298.3913E-12	89.6213E-12	238.7276E-12

122	0.914475000	212.4255E-12	612.6225E-12	821.6430E-12	232.3811E-12
123	0.921950000	219.8767E-12	715.2759E-12	283.6829E-12	224.3917E-12
124	0.929425000	228.7181E-12	-45.5878E-12	643.7185E-12	223.7878E-12
125	0.936900000	236.2763E-12	170.4958E-12	458.2269E-12	222.6172E-12
126	0.944375000	238.1581E-12	5.0327E-12	521.6815E-12	220.7038E-12
127	0.951850000	239.8376E-12	-56.5719E-12	560.0386E-12	221.6143E-12
128	0.959325000	241.3033E-12	850.3220E-12	696.1202E-12	229.5357E-12
129	0.966800000	234.2038E-12	59.8536E-12	-83.2362E-12	233.6895E-12
130	0.974275000	228.4548E-12	288.6171E-12	-271.1253E-12	233.6279E-12
131	0.981750000	224.7018E-12	47.8797E-12	-36.7422E-12	237.4794E-12
132	0.989225000	219.5159E-12	-24.8175E-12	191.9497E-12	233.4096E-12
133	0.996700000	214.7869E-12	478.8590E-12	1.0344E-09	222.0410E-12
134	1.004175000	216.1353E-12	739.5076E-12	409.2085E-12	219.2894E-12
135	1.011650000	218.8886E-12	523.2702E-12	443.9008E-12	217.8637E-12
136	1.019125000	219.9625E-12	475.0822E-12	303.4297E-12	211.6604E-12
137	1.026600000	218.7646E-12	200.7362E-12	-724.5596E-12	214.4757E-12
138	1.034075000	218.4315E-12	368.6024E-12	190.7271E-12	217.6252E-12
139	1.041550000	211.3833E-12	367.7239E-12	886.1669E-12	216.3632E-12
140	1.049025000	199.8240E-12	-50.7599E-12	731.2715E-12	216.9983E-12
141	1.056500000	192.2595E-12	752.3041E-12	1.0747E-09	218.2422E-12
142	1.063975000	185.1811E-12	314.4893E-12	256.3630E-12	214.5870E-12
143	1.071450000	178.9895E-12	351.8839E-12	-1.0995E-09	210.8687E-12
144	1.078925000	177.2658E-12	246.8287E-12	-63.0531E-12	210.3102E-12
145	1.086400000	183.4570E-12	114.9286E-12	-749.5101E-12	213.6985E-12
146	1.093875000	187.0275E-12	60.8395E-12	674.4267E-12	216.1151E-12
147	1.101350000	195.8282E-12	409.8072E-12	855.3331E-12	217.9350E-12
148	1.108825000	204.6909E-12	755.3779E-12	-212.7842E-12	223.9239E-12
149	1.116300000	204.6282E-12	767.6096E-12	1.7076E-09	221.8489E-12
150	1.123775000	204.8876E-12	466.0795E-12	674.0160E-12	219.8157E-12
151	1.131250000	200.9375E-12	763.0236E-12	944.1797E-12	217.3807E-12
152	1.138725000	203.2549E-12	427.5262E-12	1.3723E-09	211.7607E-12
153	1.146200000	209.5174E-12	516.4058E-12	489.4789E-12	203.0121E-12
154	1.153675000	211.4772E-12	880.9029E-12	160.4124E-12	199.7545E-12
155	1.161150000	220.1563E-12	256.1870E-12	645.5423E-12	195.0135E-12
156	1.168625000	220.9817E-12	1.0726E-09	895.5330E-12	195.0124E-12
157	1.176100000	218.7320E-12	75.8465E-12	-110.3177E-12	197.9663E-12
158	1.183575000	214.2436E-12	392.6816E-12	518.1815E-12	204.3748E-12
159	1.191050000	209.9239E-12	875.2804E-12	389.5946E-12	210.9346E-12
160	1.198525000	204.9684E-12	24.9840E-12	376.9648E-12	207.9977E-12
161	1.206000000	195.5769E-12	764.1759E-12	1.0958E-09	206.0514E-12
162	1.213475000	189.5533E-12	603.8458E-12	944.4436E-12	200.5034E-12
163	1.220950000	180.9873E-12	-5.9832E-12	217.7954E-12	189.4598E-12
164	1.228425000	176.1576E-12	411.1880E-12	321.2836E-12	188.0496E-12
165	1.235900000	172.6030E-12	292.8511E-12	323.2606E-12	192.6089E-12

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167 1.250850000 179.5204E-12 245.3934E-12 526.3976E-12 205.7066E-12
168 1.258325000 174.1971E-12 468.1938E-12 649.9346E-12 216.0226E-12
169 1.265800000 178.3736E-12 884.3897E-12 419.2290E-12 215.6842E-12
170 1.273275000 178.0383E-12 -200.1848E-12 470.5462E-12 218.0703E-12
171 1.280750000 172.4155E-12 363.5870E-12 224.0496E-12 215.0388E-12
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173 1.295700000 184.1077E-12 273.4114E-12 367.5214E-12 199.2127E-12
174 1.303175000 183.9985E-12 90.5403E-12 598.7189E-12 194.7650E-12
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176 1.318125000 193.8386E-12 905.2689E-12 442.7336E-12 175.5094E-12
177 1.325600000 195.8821E-12 557.5970E-12 451.6353E-12 175.5087E-12
178 1.333075000 191.5918E-12 657.4070E-12 221.6534E-12 173.8629E-12
179 1.340550000 189.8517E-12 290.6177E-12 838.7053E-12 169.9808E-12
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188 1.407825000 186.4063E-12 829.0010E-12 593.4654E-12 206.8520E-12
189 1.415300000 183.8454E-12 697.4548E-12 918.6785E-12 198.0177E-12
190 1.422775000 181.8998E-12 359.5650E-12 871.2657E-12 197.6129E-12
191 1.430250000 179.5566E-12 887.8260E-12 1.0135E-09 187.1356E-12
192 1.437725000 169.4046E-12 793.6024E-12 1.4880E-09 174.0741E-12
193 1.445200000 166.3852E-12 984.8393E-12 779.7792E-12 168.8347E-12
194 1.452675000 156.4352E-12 1.5067E-09 1.3523E-09 165.0009E-12
195 1.460150000 154.9510E-12 1.0619E-09 1.1817E-09 161.6809E-12
196 1.467625000 161.2550E-12 599.7254E-12 499.4783E-12 173.4957E-12
197 1.475100000 165.0817E-12 584.3929E-12 814.8912E-12 188.1641E-12
198 1.482575000 170.4111E-12 428.2806E-12 286.8479E-12 190.9149E-12
199 1.490050000 171.9222E-12 153.1276E-12 299.4041E-12 201.0336E-12
200 1.497525000 178.4608E-12 113.3930E-12 202.7077E-12 207.4935E-12
201 1.505000000 180.6474E-12 269.9494E-12 -135.1407E-12 199.0426E-12
202 1.512475000 180.4234E-12 -239.8351E-12 -34.4691E-12 197.7256E-12
203 1.519950000 184.3607E-12 -607.4640E-12 -311.2285E-12 195.8211E-12
204 1.527425000 184.9781E-12 -21.4263E-12 -181.9310E-12 184.9228E-12
205 1.534900000 182.8390E-12 -415.5302E-12 96.6493E-12 175.5328E-12
206 1.542375000 190.1508E-12 267.5799E-12 120.3019E-12 178.9562E-12
207 1.549850000 194.2512E-12 778.5806E-12 588.3104E-12 174.0840E-12
208 1.557325000 193.9464E-12 769.9742E-12 565.2379E-12 175.9659E-12
209 1.564800000 194.8685E-12 1.2311E-09 1.0038E-09 181.7354E-12

210	1.572275000	191.5627E-12	1.1748E-09	1.2880E-09	182.1585E-12
211	1.579750000	183.2522E-12	1.5800E-09	1.2342E-09	179.9542E-12
212	1.587225000	174.1705E-12	1.2663E-09	1.5736E-09	182.4002E-12
213	1.594700000	171.7989E-12	1.2843E-09	1.2090E-09	183.1211E-12
214	1.602175000	165.8777E-12	851.4894E-12	847.1605E-12	178.2815E-12
215	1.609650000	161.5356E-12	91.0240E-12	154.0746E-12	185.3516E-12
216	1.617125000	157.4410E-12	77.9770E-12	115.8953E-12	185.3020E-12
217	1.624600000	152.2122E-12	-345.6770E-12	-127.2959E-12	189.8581E-12
218	1.632075000	150.9442E-12	155.9801E-12	-481.5006E-12	186.0207E-12
219	1.639550000	144.8437E-12	64.5841E-12	-199.7290E-12	183.0828E-12
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221	1.654500000	148.5244E-12	27.3188E-12	-229.4510E-12	171.6437E-12
222	1.661975000	150.5749E-12	-755.1336E-12	227.5454E-12	172.7834E-12
223	1.669450000	155.8838E-12	-182.9676E-12	58.7252E-12	176.1629E-12
224	1.676925000	164.5097E-12	115.4711E-12	75.4859E-12	178.3254E-12
225	1.684400000	166.6453E-12	139.8662E-12	418.7466E-12	175.4456E-12
226	1.691875000	171.0391E-12	804.2696E-12	303.7370E-12	183.5669E-12
227	1.699350000	184.3168E-12	701.4609E-12	837.1872E-12	177.1212E-12
228	1.706825000	194.1682E-12	875.1654E-12	829.2147E-12	173.0577E-12
229	1.714300000	199.7237E-12	732.0639E-12	653.9888E-12	178.0454E-12
230	1.721775000	200.7989E-12	538.0729E-12	685.3009E-12	164.0072E-12
231	1.729250000	201.9387E-12	540.6827E-12	423.0494E-12	161.5292E-12
232	1.736725000	196.6476E-12	261.4067E-12	167.7028E-12	159.6765E-12
233	1.744200000	182.9056E-12	413.2773E-12	-30.0122E-12	160.0160E-12
234	1.751675000	179.4942E-12	50.1439E-12	349.0101E-12	156.6974E-12
235	1.759150000	169.4960E-12	-232.8681E-12	-55.3868E-12	160.1407E-12
236	1.766625000	155.8597E-12	-275.1111E-12	-248.3926E-12	169.6839E-12
237	1.774100000	150.6890E-12	-783.0761E-12	-230.9182E-12	168.8560E-12
238	1.781575000	144.0449E-12	-633.9911E-12	-942.7292E-12	181.2010E-12
239	1.789050000	139.0826E-12	-290.9497E-12	-313.5636E-12	190.3075E-12
240	1.796525000	138.2583E-12	169.1367E-12	161.0203E-12	186.3957E-12
241	1.804000000	142.8506E-12	600.3853E-12	588.4167E-12	190.5010E-12
242	1.811475000	140.4747E-12	982.3299E-12	995.0611E-12	192.0405E-12
243	1.818950000	137.1271E-12	1.0775E-09	989.4114E-12	186.9039E-12
244	1.826425000	141.1601E-12	1.0431E-09	1.1757E-09	178.3297E-12
245	1.833900000	155.1466E-12	1.2664E-09	1.1969E-09	176.8547E-12
246	1.841375000	159.0875E-12	1.2277E-09	1.1509E-09	172.5119E-12
247	1.848850000	166.0931E-12	1.2236E-09	1.3310E-09	160.9948E-12
248	1.856325000	180.2809E-12	1.0044E-09	951.2751E-12	165.6388E-12
249	1.863800000	177.5344E-12	504.3148E-12	764.6647E-12	157.2957E-12
250	1.871275000	181.6595E-12	727.1556E-12	659.2983E-12	154.1713E-12
251	1.878750000	187.3901E-12	568.3389E-12	608.9794E-12	158.8025E-12
252	1.886225000	185.5132E-12	771.2989E-12	683.8451E-12	165.0193E-12
253	1.893700000	183.7469E-12	770.6234E-12	677.7219E-12	170.9391E-12

254	1.901175000	192.0086E-12	589.6656E-12	515.9828E-12	181.6092E-12
255	1.908650000	197.8546E-12	400.1187E-12	268.9929E-12	186.8975E-12
256	1.916125000	189.4286E-12	152.6815E-12	421.7948E-12	191.5925E-12
257	1.923600000	191.6031E-12	336.0988E-12	246.2167E-12	183.8781E-12
258	1.931075000	191.5762E-12	130.1547E-12	372.7134E-12	186.2986E-12
259	1.938550000	181.5121E-12	489.2119E-12	292.7599E-12	180.9862E-12
260	1.946025000	173.2682E-12	448.2836E-12	-41.4159E-12	167.3824E-12
261	1.953500000	160.8665E-12	323.3045E-12	412.1482E-12	179.9705E-12
262	1.960975000	143.5657E-12	336.7459E-12	678.0911E-12	166.2377E-12
263	1.968450000	136.5856E-12	343.8217E-12	761.2299E-12	159.6460E-12
264	1.975925000	133.7823E-12	696.4594E-12	903.0817E-12	163.8590E-12
265	1.983400000	134.1431E-12	1.0811E-09	794.6570E-12	158.1816E-12
266	1.990875000	126.3882E-12	1.0143E-09	660.7606E-12	156.2764E-12
267	1.998350000	123.9288E-12	1.0430E-09	617.4111E-12	163.9604E-12
268	2.005825000	128.5125E-12	884.9630E-12	735.5859E-12	160.4597E-12
269	2.013300000	120.3040E-12	845.9825E-12	723.6329E-12	154.7327E-12
270	2.020775000	124.9466E-12	909.3482E-12	584.5708E-12	159.9168E-12
271	2.028250000	134.2437E-12	571.2860E-12	675.8833E-12	159.3731E-12
272	2.035725000	145.0343E-12	3.9720E-12	345.5080E-12	160.1783E-12
273	2.043200000	168.0543E-12	-291.2368E-12	-152.5560E-12	173.9784E-12
274	2.050675000	193.1518E-12	-436.5426E-12	-277.2205E-12	171.3282E-12
275	2.058150000	203.1946E-12	-647.5261E-12	-523.0289E-12	162.4464E-12
276	2.065625000	209.9062E-12	-529.4384E-12	-596.2935E-12	159.4071E-12
277	2.073100000	217.5632E-12	-673.6995E-12	-473.5540E-12	149.1326E-12
278	2.080575000	218.4166E-12	-400.1746E-12	-235.1964E-12	152.0740E-12
279	2.088050000	210.5327E-12	-37.2702E-12	-105.4265E-12	161.3095E-12
280	2.095525000	200.1065E-12	496.6464E-12	351.2782E-12	169.0211E-12
281	2.103000000	181.5419E-12	760.7238E-12	766.8881E-12	172.6239E-12
282	2.110475000	157.7323E-12	976.7198E-12	815.5145E-12	172.9648E-12
283	2.117950000	147.8844E-12	1.1516E-09	1.0756E-09	184.2211E-12
284	2.125425000	139.0295E-12	1.2028E-09	1.1851E-09	187.0676E-12
285	2.132900000	130.8295E-12	1.3521E-09	1.0401E-09	186.5247E-12
286	2.140375000	127.1615E-12	1.1013E-09	1.1481E-09	189.4498E-12
287	2.147850000	121.9335E-12	896.2611E-12	779.5804E-12	177.4855E-12
288	2.155325000	123.9734E-12	540.1305E-12	478.2434E-12	173.0931E-12
289	2.162800000	128.5734E-12	140.7568E-12	264.6132E-12	166.0393E-12
290	2.170275000	143.4566E-12	-228.7557E-12	-64.8555E-12	162.0509E-12
291	2.177750000	160.5086E-12	-422.6787E-12	-160.0415E-12	159.4100E-12
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293	2.192700000	181.0719E-12	-583.9719E-12	-524.6577E-12	152.5135E-12
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296	2.215125000	176.5180E-12	69.7348E-12	68.2747E-12	150.5430E-12
297	2.222600000	172.7550E-12	523.9092E-12	269.4117E-12	156.4480E-12

298	2.230075000	167.6759E-12	760.9804E-12	500.7998E-12	154.8574E-12	
299	2.237550000	160.6454E-12	818.2915E-12	752.7967E-12	163.6017E-12	
300	2.245025000	147.3478E-12	841.5398E-12	941.3627E-12	161.2096E-12	
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307	2.297350000	195.0868E-12	-50.3013E-12	1.2475E-12	172.8663E-12	
308	2.304825000	207.0774E-12	-157.5607E-12	-176.3209E-12		178.0220E-12
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313	2.342200000	152.2144E-12	214.1887E-12	138.9168E-12	166.8586E-12	
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316	2.364625000	95.9026E-12	657.9580E-12	575.6833E-12	141.4954E-12	
317	2.372100000	90.7178E-12	774.2049E-12	734.8573E-12	140.9482E-12	
318	2.379575000	105.1827E-12	764.9921E-12	693.9701E-12	143.7805E-12	
319	2.387050000	114.9909E-12	755.1003E-12	732.4091E-12	142.7159E-12	
320	2.394525000	136.6983E-12	847.1619E-12	802.8712E-12	145.3242E-12	
321	2.402000000	165.1207E-12	744.7137E-12	750.8206E-12	153.1379E-12	
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323	2.416950000	213.7946E-12	650.2478E-12	745.9541E-12	173.0208E-12	
324	2.424425000	235.5586E-12	582.7669E-12	603.8307E-12	181.8991E-12	
325	2.431900000	234.7308E-12	548.5268E-12	554.2807E-12	182.7100E-12	
326	2.439375000	225.3492E-12	532.7931E-12	390.6585E-12	175.2833E-12	
327	2.446850000	207.6905E-12	505.4510E-12	433.2623E-12	165.8110E-12	
328	2.454325000	184.8647E-12	412.5132E-12	378.2858E-12	151.6835E-12	
329	2.461800000	167.4398E-12	231.4888E-12	295.9771E-12	153.7376E-12	
330	2.469275000	147.1543E-12	178.7223E-12	267.9998E-12	146.9403E-12	
331	2.476750000	137.6438E-12	154.2422E-12	202.6779E-12	137.1632E-12	
332	2.484225000	127.5507E-12	257.4814E-12	352.5753E-12	136.1624E-12	
333	2.491700000	120.5152E-12	406.6473E-12	446.3706E-12	124.8941E-12	
334	2.499175000	121.3318E-12	402.6667E-12	521.3717E-12	125.5023E-12	
335	2.506650000	126.5981E-12	526.3106E-12	607.1124E-12	140.2351E-12	
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339	2.536550000	159.2987E-12	836.1204E-12	846.2121E-12	179.0356E-12	
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346	2.588875000	123.4964E-12	-729.6108E-12	-695.7506E-12	157.7053E-12
347	2.596350000	131.5071E-12	-734.9551E-12	-738.4182E-12	144.7997E-12
348	2.603825000	144.8578E-12	-548.4786E-12	-597.2744E-12	143.3779E-12
349	2.611300000	162.9163E-12	-289.8178E-12	-275.4435E-12	146.1351E-12
350	2.618775000	179.2794E-12	86.0639E-12	12.5626E-12	152.5638E-12
351	2.626250000	190.7065E-12	286.0073E-12	325.5917E-12	155.3096E-12
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353	2.641200000	198.5088E-12	486.3165E-12	452.4577E-12	156.6989E-12
354	2.648675000	198.4975E-12	491.7203E-12	469.8726E-12	148.5733E-12
355	2.656150000	191.2282E-12	483.0178E-12	457.5000E-12	149.8250E-12
356	2.663625000	176.6980E-12	454.0468E-12	425.6230E-12	142.9370E-12
357	2.671100000	160.9927E-12	483.6274E-12	421.6991E-12	128.6110E-12
358	2.678575000	143.8471E-12	336.3525E-12	271.4658E-12	126.9071E-12
359	2.686050000	140.2975E-12	264.1384E-12	208.1314E-12	115.5806E-12
360	2.693525000	138.5922E-12	133.3089E-12	87.9691E-12	118.3974E-12
361	2.701000000	142.4919E-12	87.8557E-12	135.1347E-12	128.8279E-12
362	2.708475000	152.9933E-12	132.0217E-12	186.5006E-12	140.5470E-12
363	2.715950000	155.3593E-12	216.3916E-12	294.8232E-12	158.1547E-12
364	2.723425000	160.4710E-12	355.1482E-12	448.8911E-12	166.7509E-12
365	2.730900000	166.7112E-12	525.7449E-12	481.9121E-12	177.2665E-12
366	2.738375000	161.8503E-12	666.7257E-12	608.3783E-12	181.4427E-12
367	2.745850000	158.1150E-12	774.3283E-12	630.3295E-12	190.0870E-12
368	2.753325000	146.8155E-12	828.7802E-12	680.6066E-12	198.9738E-12
369	2.760800000	136.9634E-12	763.7773E-12	726.4752E-12	193.9840E-12
370	2.768275000	117.2860E-12	736.6916E-12	729.7129E-12	192.0192E-12
371	2.775750000	109.1916E-12	603.2282E-12	717.7244E-12	177.7881E-12
372	2.783225000	106.7109E-12	480.4803E-12	581.8980E-12	160.6993E-12
373	2.790700000	108.4587E-12	326.5883E-12	411.4529E-12	153.1705E-12
374	2.798175000	132.9786E-12	131.8927E-12	241.0220E-12	140.6278E-12
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376	2.813125000	178.5706E-12	46.4483E-12	50.3622E-12	124.1797E-12
377	2.820600000	192.3353E-12	98.2210E-12	113.2473E-12	120.3806E-12
378	2.828075000	204.5463E-12	226.6477E-12	194.1626E-12	118.9857E-12
379	2.835550000	218.1395E-12	372.0187E-12	315.9522E-12	122.0944E-12
380	2.843025000	214.0625E-12	483.4459E-12	449.2072E-12	133.7667E-12
381	2.850500000	198.0935E-12	553.3282E-12	516.0303E-12	138.8658E-12
382	2.857975000	182.9765E-12	551.1819E-12	573.4861E-12	146.4980E-12
383	2.865450000	149.8761E-12	566.6747E-12	541.0590E-12	142.5387E-12
384	2.872925000	122.9974E-12	506.4985E-12	465.2074E-12	149.8902E-12
385	2.880400000	103.2123E-12	383.2615E-12	346.9036E-12	152.8019E-12

386	2.887875000	84.9865E-12	270.2878E-12	226.3798E-12	156.5911E-12
387	2.895350000	86.8620E-12	239.7646E-12	246.3251E-12	165.2312E-12
388	2.902825000	85.5720E-12	182.3868E-12	212.7569E-12	164.9718E-12
389	2.910300000	105.2451E-12	204.4513E-12	273.8218E-12	172.7047E-12
390	2.917775000	123.8409E-12	282.6065E-12	380.1216E-12	172.8210E-12
391	2.925250000	146.5022E-12	252.1145E-12	403.3613E-12	182.0168E-12
392	2.932725000	174.3335E-12	382.4152E-12	487.5065E-12	185.1454E-12
393	2.940200000	199.3509E-12	511.7194E-12	580.0466E-12	181.7942E-12
394	2.947675000	207.0824E-12	635.8155E-12	627.9224E-12	185.7762E-12
395	2.955150000	205.2834E-12	710.6111E-12	614.0025E-12	176.6583E-12
396	2.962625000	194.1300E-12	690.4659E-12	595.4521E-12	155.4854E-12
397	2.970100000	169.1650E-12	568.7202E-12	468.3757E-12	136.2858E-12
398	2.977575000	156.1687E-12	522.0642E-12	374.6044E-12	118.0458E-12
399	2.985050000	131.3370E-12	437.6823E-12	357.2299E-12	112.2933E-12
400	2.992525000	131.3370E-12	437.6823E-12	357.2299E-12	112.2933E-12
401	3.000000000	131.3370E-12	437.6823E-12	357.2299E-12	112.2933E-12