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Quartz Crystal Microbalance Data

S. H. Baxamusa

December 6, 2011

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Mail Station: L-470
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December 5, 2011

TO: Inficon

FROM: Salmaan H. Baxamusa

SUBJECT: Troubleshoot Quartz Crystal Microbalance Measurements Data

We are using a Qpod quartz crystal microbalance (manufactured by Inficon) for use as a low-volume non-volatile residue analysis tool. Inficon has agreed to help troubleshoot some of our measurements and are requesting to view some sample data, which are attached.

The basic principle of an NVR analysis is to evaporate a known volume of solvent, and weigh the remaining residue to determine the purity of the solvent. A typical NVR analysis uses 60 g of solvent and can measure residue with an accuracy of ± 0.01 mg. The detection limit is thus $(0.01 \text{ mg}) / (60 \text{ g}) = 0.17 \text{ ppm}$.

We are attempting to use a quartz crystal microbalance (QCM) to make a similar measurement. The attached data show the response of the QCM as a 5-20 mg drop of solvent evaporates on its surface. The change in mass registered by the QCM after the drop evaporates is the residue that deposits on the crystal.

On some measurements, the change in mass is less than zero, which is unphysical since the drop will leave behind ≥ 0 mass of residue. The vendor, Inficon, has agreed to look at these data as a means to help troubleshoot the cause.

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

For questions, please contact:

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LLNL-TR-518791

Start Log		Run: 9	Date: 11/4/1981 Time: 13:35:12		
Time	Time (min)	MassRate	Mass	Frequency	dF
0.52	0.008666667	0.11	0	5993760	0
2.62	0.043666667	1	0.002	5993759.84	-0.16
4.71	0.0785	0.22	0.003	5993759.81	-0.19
6.76	0.112666667	-0.44	0.002	5993759.88	-0.12
8.8	0.146666667	0.22	0.002	5993759.84	-0.16
10.84	0.180666667	0.22	0.003	5993759.81	-0.19
12.89	0.214833333	0.22	0.003	5993759.77	-0.23
14.94	0.249	-0.44	0.002	5993759.84	-0.16
16.97	0.282833333	0.22	0.003	5993759.81	-0.19
19.01	0.316833333	0.44	0.004	5993759.73	-0.27
21.05	0.350833333	0.55	0.005	5993759.64	-0.36
23.09	0.384833333	0.22	0.005	5993759.61	-0.39
25.13	0.418833333	-0.67	0.004	5993759.72	-0.28
27.17	0.452833333	-0.22	0.003	5993759.75	-0.25
29.21	0.486833333	-0.55	0.002	5993759.84	-0.16
31.25	0.520833333	0.55	0.003	5993759.75	-0.25
33.3	0.555	0.33	0.004	5993759.7	-0.3
35.33	0.588833333	-0.78	0.002	5993759.82	-0.18
37.36	0.622666667	-0.22	0.002	5993759.86	-0.14
39.39	0.6565	0	0.002	5993759.86	-0.14
41.43	0.6905	-0.22	0.002	5993759.9	-0.1
43.46	0.724333333	-0.89	0	5993760.04	0.04
45.5	0.758333333	-0.33	-0.001	5993760.09	0.09
47.54	0.792333333	-0.33	-0.002	5993760.15	0.15
49.57	0.826166667	0.11	-0.001	5993760.13	0.13
51.61	0.860166667	0.67	0	5993760.02	0.02
53.64	0.894	-0.55	-0.001	5993760.11	0.11
55.68	0.928	-0.11	-0.001	5993760.13	0.13
57.71	0.961833333	1.11	0.001	5993759.95	-0.05
59.75	0.995833333	-0.44	0	5993760.02	0.02
61.78	1.029666667	-1	-0.002	5993760.19	0.19
63.81	1.0635	-0.11	-0.002	5993760.2	0.2
65.86	1.097666667	0.33	-0.002	5993760.15	0.15
67.89	1.1315	-0.22	-0.002	5993760.19	0.19
69.94	1.165666667	1	0	5993760.02	0.02
72.01	1.200166667	1	0.002	5993759.86	-0.14
74.07	1.2345	-0.67	0.001	5993759.97	-0.03
76.12	1.268666667	-0.78	-0.001	5993760.09	0.09
78.14	1.302333333	0.22	0	5993760.06	0.06
80.18	1.336333333	0.89	0.001	5993759.91	-0.09
82.21	1.370166667	0.44	0.002	5993759.84	-0.16
84.24	1.404	0.55	0.003	5993759.75	-0.25
86.27	1.437833333	-1.22	0.001	5993759.95	-0.05
88.32	1.472	-0.78	-0.001	5993760.08	0.08
90.36	1.506	0	-0.001	5993760.08	0.08
92.39	1.539833333	0.55	0	5993759.99	-0.01
94.43	1.573833333	0.67	0.002	5993759.88	-0.12
96.47	1.607833333	0	0.002	5993759.88	-0.12
98.5	1.641666667	-0.22	0.001	5993759.91	-0.09
100.54	1.675666667	0.11	0.002	5993759.9	-0.1
102.57	1.7095	0.33	0.002	5993759.84	-0.16
104.61	1.7435	1.44	0.005	5993759.61	-0.39
106.67	1.777833333	-1.22	0.003	5993759.81	-0.19

108.7	1.811666667	-0.33	0.002	5993759.86	-0.14
110.75	1.845833333	0	0.002	5993759.86	-0.14
112.79	1.879833333	0	0.002	5993759.86	-0.14
114.84	1.914	-0.11	0.002	5993759.88	-0.12
116.89	1.948166667	0.78	0.003	5993759.75	-0.25
118.92	1.982	-0.33	0.003	5993759.81	-0.19
120.98	2.016333333	0.11	0.003	5993759.79	-0.21
123.03	2.0505	0.55	0.004	5993759.7	-0.3
125.06	2.084333333	1.11	0.006	5993759.52	-0.48
127.1	2.118333333	0.11	0.006	5993759.5	-0.5
129.14	2.152333333	0.44	0.007	5993759.43	-0.57
131.18	2.186333333	1.33	0.01	5993759.21	-0.79
133.22	2.220333333	-1.33	0.007	5993759.43	-0.57
135.25	2.254166667	0.33	0.008	5993759.37	-0.63
137.29	2.288166667	-0.67	0.007	5993759.48	-0.52
139.34	2.322333333	-0.55	0.006	5993759.57	-0.43
141.41	2.356833333	0.78	0.007	5993759.45	-0.55
143.46	2.391	0.11	0.007	5993759.43	-0.57
145.51	2.425166667	0.89	0.009	5993759.28	-0.72
147.54	2.459	6.99	0.023	5993758.15	-1.85
149.57	2.492833333	11.54	0.046	5993756.27	-3.73
151.64	2.527333333	-2.44	0.041	5993756.67	-3.33
153.69	2.5615	-13.87	0.014	5993758.92	-1.08
155.72	2.595333333	-2.33	0.009	5993759.3	-0.7
157.77	2.6295	27.96	0.065	5993754.75	-5.25
159.8	2.663333333	7840.12	15.745	5992479.65	-1280.35
161.85	2.6975	10353.69	36.452	5990796.58	-2963.42
163.89	2.7315	-287	35.878	5990843.22	-2916.78
165.93	2.7655	-2349.04	31.18	5991225	-2535
167.98	2.799666667	3386.66	37.954	5990674.6	-3085.4
170.02	2.833666667	-2957.33	32.039	5991155.22	-2604.78
172.06	2.867666667	-13838.64	4.362	5993405.28	-354.72
174.1	2.901666667	15462.8	35.287	5990891.25	-2868.75
176.14	2.935666667	-77.33	35.133	5990903.82	-2856.18
178.2	2.97	-749.73	33.633	5991025.67	-2734.33
180.26	3.004333333	-149.21	33.335	5991049.92	-2710.08
182.29	3.038166667	-19714.24	-6.094	5994255.7	495.7
184.34	3.072333333	21335.3	36.577	5990786.47	-2973.53
186.38	3.106333333	-879.09	34.819	5990929.33	-2830.67
188.42	3.140333333	190.82	35.2	5990898.32	-2861.68
190.46	3.174333333	-71645.33	-108.09	6002564.61	8804.61
192.51	3.2085	72346.47	36.603	5990784.38	-2975.62
194.56	3.242666667	-2518	31.567	5991193.61	-2566.39
196.6	3.276666667	1211.69	33.99	5990996.68	-2763.32
198.64	3.310666667	-443.65	33.103	5991068.78	-2691.22
200.67	3.3445	-1681.63	29.739	5991342.1	-2417.9
202.71	3.3785	-22006.6	-14.274	5994921.22	1161.22
204.75	3.4125	24752.25	35.231	5990895.85	-2864.15
206.8	3.446666667	-409.92	34.411	5990962.47	-2797.53
208.85	3.480833333	-2470.52	29.47	5991364.01	-2395.99
210.97	3.516166667	1899.85	33.27	5991055.22	-2704.78
213.04	3.550666667	168.3	33.606	5991027.87	-2732.13
215.07	3.5845	-397.16	32.812	5991092.42	-2667.58
217.12	3.618666667	-1190.39	30.431	5991285.89	-2474.11
219.16	3.652666667	1120.27	32.672	5991103.81	-2656.19

221.21	3.686833333	2186.07	37.044	5990748.54	-3011.46
223.24	3.720666667	-165.52	36.713	5990775.43	-2984.57
225.29	3.754833333	-2218.69	32.275	5991136.02	-2623.98
227.36	3.789333333	3598.34	39.472	5990551.24	-3208.76
229.4	3.823333333	-1747.86	35.976	5990835.27	-2924.73
231.43	3.857166667	992.25	37.961	5990674.02	-3085.98
233.48	3.891333333	-8509.53	20.942	5992057.19	-1702.81
235.53	3.9255	-6215.41	8.511	5993067.86	-692.14
237.56	3.959333333	-3354.05	1.803	5993613.4	-146.6
239.61	3.9935	-543.38	0.716	5993701.79	-58.21
241.66	4.027666667	-166.19	0.384	5993728.82	-31.18
243.7	4.061666667	-55.8	0.272	5993737.9	-22.1
245.73	4.0955	-20.19	0.232	5993741.18	-18.82
247.77	4.1295	-7.54	0.217	5993742.41	-17.59
249.8	4.163333333	-3.88	0.209	5993743.04	-16.96
251.83	4.197166667	-2.33	0.204	5993743.42	-16.58
253.86	4.231	-4.1	0.196	5993744.09	-15.91
255.91	4.265166667	2.22	0.2	5993743.73	-16.27
257.94	4.299	-4.33	0.192	5993744.43	-15.57
259.98	4.333	0.67	0.193	5993744.32	-15.68
262.03	4.367166667	-0.22	0.193	5993744.36	-15.64
264.07	4.401166667	-2.22	0.188	5993744.72	-15.28
266.1	4.435	-1.66	0.185	5993744.99	-15.01
268.14	4.469	-3.99	0.177	5993745.64	-14.36
270.2	4.503333333	-1.89	0.173	5993745.95	-14.05
272.24	4.537333333	-1.55	0.17	5993746.2	-13.8
274.29	4.5715	-1.33	0.167	5993746.42	-13.58
276.32	4.605333333	-1.55	0.164	5993746.67	-13.33
278.38	4.639666667	-2	0.16	5993746.99	-13.01
280.46	4.674333333	-0.78	0.159	5993747.12	-12.88
282.54	4.709	-0.78	0.157	5993747.25	-12.75
284.58	4.743	-1.66	0.154	5993747.52	-12.48
286.61	4.776833333	-1	0.152	5993747.68	-12.32
288.64	4.810666667	-1	0.15	5993747.84	-12.16
290.68	4.844666667	-0.22	0.149	5993747.88	-12.12
292.71	4.8785	-0.78	0.148	5993748	-12
294.74	4.912333333	-1	0.146	5993748.17	-11.83
296.79	4.9465	-1.11	0.144	5993748.35	-11.65
298.83	4.9805	-0.67	0.142	5993748.45	-11.55
300.89	5.014833333	-0.55	0.141	5993748.54	-11.46
302.93	5.048833333	-0.44	0.14	5993748.62	-11.38
304.98	5.083	-0.44	0.139	5993748.69	-11.31
307.02	5.117	-0.55	0.138	5993748.78	-11.22
309.06	5.151	-0.44	0.137	5993748.85	-11.15
311.11	5.185166667	-0.22	0.137	5993748.89	-11.11
313.14	5.219	-0.11	0.137	5993748.91	-11.09
315.18	5.253	-0.44	0.136	5993748.98	-11.02
317.21	5.286833333	-0.44	0.135	5993749.05	-10.95
319.25	5.320833333	-0.33	0.134	5993749.1	-10.9
321.28	5.354666667	-0.33	0.134	5993749.16	-10.84
323.34	5.389	-1	0.132	5993749.32	-10.68
325.38	5.423	0	0.132	5993749.32	-10.68
327.42	5.457	-0.44	0.131	5993749.39	-10.61
329.46	5.491	-2.66	0.125	5993749.83	-10.17
331.52	5.525333333	-1	0.123	5993749.99	-10.01

333.55	5.559166667	1	0.125	5993749.83	-10.17
335.58	5.593	-0.11	0.125	5993749.84	-10.16
337.61	5.626833333	-0.22	0.125	5993749.88	-10.12
339.65	5.660833333	-1.22	0.122	5993750.08	-9.92
341.68	5.694666667	-1.22	0.12	5993750.28	-9.72
343.71	5.7285	-1.22	0.117	5993750.48	-9.52
345.75	5.7625	1.55	0.12	5993750.22	-9.78
347.82	5.797	-0.55	0.119	5993750.31	-9.69
349.94	5.832333333	0.78	0.121	5993750.19	-9.81
352	5.866666667	0.44	0.122	5993750.12	-9.88
354.04	5.900666667	-1.11	0.12	5993750.3	-9.7
356.08	5.934666667	0.89	0.121	5993750.15	-9.85
358.14	5.969	1.22	0.124	5993749.95	-10.05
360.2	6.003333333	-0.78	0.122	5993750.08	-9.92
362.24	6.037333333	-2.11	0.118	5993750.42	-9.58
364.29	6.0715	-0.33	0.117	5993750.48	-9.52
366.32	6.105333333	0.33	0.118	5993750.42	-9.58
368.36	6.139333333	-2.11	0.114	5993750.76	-9.24
370.39	6.173166667	-0.11	0.114	5993750.78	-9.22
372.43	6.207166667	-0.33	0.113	5993750.84	-9.16
374.48	6.241333333	0.89	0.115	5993750.69	-9.31
376.51	6.275166667	0.22	0.115	5993750.66	-9.34
378.54	6.309	-0.55	0.114	5993750.75	-9.25
380.58	6.343	0.44	0.115	5993750.67	-9.33
382.61	6.376833333	0	0.115	5993750.67	-9.33
384.64	6.410666667	0	0.115	5993750.67	-9.33
386.69	6.444833333	-0.67	0.114	5993750.78	-9.22
388.73	6.478833333	0.44	0.114	5993750.71	-9.29
390.8	6.513333333	-1.44	0.112	5993750.95	-9.05
392.86	6.547666667	-0.55	0.11	5993751.04	-8.96
395.19	6.5865	0.67	0.112	5993750.93	-9.07
397.4	6.623333333	0.33	0.112	5993750.87	-9.13
399.61	6.660166667	0.44	0.113	5993750.8	-9.2
401.74	6.695666667	0	0.113	5993750.8	-9.2
404	6.733333333	0	0.113	5993750.8	-9.2
406.11	6.7685	-0.78	0.112	5993750.93	-9.07
408.26	6.804333333	-0.22	0.111	5993750.96	-9.04
410.38	6.839666667	-0.11	0.111	5993750.98	-9.02
412.62	6.877	0	0.111	5993750.98	-9.02
414.82	6.913666667	0	0.111	5993750.98	-9.02
417.06	6.951	0.11	0.111	5993750.96	-9.04
419.21	6.986833333	-0.22	0.111	5993751	-9
421.32	7.022	-0.22	0.11	5993751.04	-8.96
423.48	7.058	-0.22	0.11	5993751.07	-8.93
425.51	7.091833333	0	0.11	5993751.07	-8.93
427.54	7.125666667	0.22	0.11	5993751.04	-8.96
429.6	7.16	-0.67	0.109	5993751.14	-8.86
431.64	7.194	-0.67	0.108	5993751.25	-8.75
433.68	7.228	0	0.108	5993751.25	-8.75
435.73	7.262166667	0	0.108	5993751.25	-8.75
437.76	7.296	0	0.108	5993751.25	-8.75
439.79	7.329833333	-0.44	0.107	5993751.32	-8.68
441.82	7.363666667	0.11	0.107	5993751.31	-8.69
443.86	7.397666667	-0.67	0.106	5993751.41	-8.59
445.9	7.431666667	0	0.106	5993751.41	-8.59

447.93	7.4655	0.22	0.106	5993751.38	-8.62
449.97	7.4995	0	0.106	5993751.38	-8.62
452.02	7.533666667	0	0.106	5993751.38	-8.62
454.06	7.567666667	-0.22	0.106	5993751.41	-8.59
456.1	7.601666667	-0.11	0.106	5993751.43	-8.57
458.13	7.6355	0.55	0.107	5993751.34	-8.66
460.16	7.669333333	-0.11	0.107	5993751.36	-8.64
462.2	7.703333333	-0.44	0.106	5993751.43	-8.57
464.24	7.737333333	-0.11	0.105	5993751.45	-8.55
466.28	7.771333333	0	0.105	5993751.45	-8.55
468.32	7.805333333	0.44	0.106	5993751.38	-8.62
470.38	7.839666667	-0.78	0.105	5993751.5	-8.5
472.41	7.8735	0	0.105	5993751.5	-8.5
474.47	7.907833333	-0.33	0.104	5993751.56	-8.44
476.52	7.942	0.22	0.105	5993751.52	-8.48
478.55	7.975833333	0	0.105	5993751.52	-8.48
480.61	8.010166667	0	0.105	5993751.52	-8.48
482.65	8.044166667	-0.22	0.104	5993751.56	-8.44
484.7	8.078333333	0.44	0.105	5993751.49	-8.51
486.75	8.1125	0.33	0.106	5993751.43	-8.57
488.84	8.147333333	0.33	0.106	5993751.38	-8.62
490.89	8.1815	-0.33	0.106	5993751.43	-8.57
492.93	8.2155	-0.67	0.104	5993751.54	-8.46
494.96	8.249333333	0.44	0.105	5993751.47	-8.53
497	8.283333333	-0.44	0.104	5993751.54	-8.46
499.04	8.317333333	-0.67	0.103	5993751.65	-8.35
501.07	8.351166667	0.33	0.104	5993751.59	-8.41
503.1	8.385	0.33	0.104	5993751.54	-8.46
505.14	8.419	0.22	0.105	5993751.5	-8.5
507.19	8.453166667	0	0.105	5993751.5	-8.5
509.22	8.487	0	0.105	5993751.5	-8.5
511.27	8.521166667	-0.22	0.104	5993751.54	-8.46
513.31	8.555166667	-0.11	0.104	5993751.56	-8.44
515.34	8.589	-0.44	0.103	5993751.63	-8.37
517.43	8.623833333	0	0.103	5993751.63	-8.37
519.48	8.658	0.22	0.104	5993751.59	-8.41
521.54	8.692333333	0.11	0.104	5993751.58	-8.42
523.59	8.7265	0.44	0.105	5993751.5	-8.5
525.64	8.760666667	-0.22	0.104	5993751.54	-8.46
527.69	8.794833333	0	0.104	5993751.54	-8.46
529.75	8.829166667	-0.78	0.103	5993751.67	-8.33
531.79	8.863166667	0.22	0.103	5993751.63	-8.37
533.83	8.897166667	-0.44	0.102	5993751.7	-8.3
535.86	8.931	0	0.102	5993751.7	-8.3
537.89	8.964833333	-0.89	0.101	5993751.85	-8.15
539.94	8.999	-1	0.099	5993752.01	-7.99
541.99	9.033166667	0.44	0.099	5993751.94	-8.06
544.02	9.067	0.44	0.1	5993751.87	-8.13
546.05	9.100833333	0.33	0.101	5993751.81	-8.19
548.09	9.134833333	-0.11	0.101	5993751.83	-8.17
550.13	9.168833333	0.22	0.101	5993751.79	-8.21
552.18	9.203	0.55	0.102	5993751.7	-8.3
554.22	9.237	0.33	0.103	5993751.65	-8.35
556.29	9.2715	-0.67	0.102	5993751.76	-8.24
558.37	9.306166667	-0.11	0.101	5993751.78	-8.22

560.41	9.340166667	0.11	0.102	5993751.76	-8.24
562.45	9.374166667	-0.67	0.1	5993751.87	-8.13
564.5	9.408333333	-0.55	0.099	5993751.96	-8.04
566.54	9.442333333	0	0.099	5993751.96	-8.04
568.58	9.476333333	0.22	0.1	5993751.92	-8.08
570.63	9.5105	0	0.1	5993751.92	-8.08
572.67	9.5445	-0.22	0.099	5993751.96	-8.04
574.73	9.578833333	0.44	0.1	5993751.88	-8.12
576.77	9.612833333	0.78	0.102	5993751.76	-8.24
578.81	9.646833333	0.11	0.102	5993751.74	-8.26
580.84	9.680666667	0	0.102	5993751.74	-8.26
582.89	9.714833333	-0.44	0.101	5993751.81	-8.19
584.93	9.748833333	-0.33	0.1	5993751.87	-8.13
586.97	9.782833333	-0.55	0.099	5993751.96	-8.04
589.03	9.817166667	-0.89	0.097	5993752.1	-7.9
591.07	9.851166667	0.33	0.098	5993752.05	-7.95
593.1	9.885	-0.44	0.097	5993752.12	-7.88
595.14	9.919	0	0.097	5993752.12	-7.88
597.17	9.952833333	0.22	0.098	5993752.08	-7.92
599.21	9.986833333	0.44	0.099	5993752.01	-7.99
601.29	10.0215	0.67	0.1	5993751.9	-8.1
603.33	10.0555	-0.22	0.099	5993751.94	-8.06
605.36	10.08933333	-0.22	0.099	5993751.97	-8.03
607.39	10.12316667	0.11	0.099	5993751.96	-8.04
609.44	10.15733333	-0.67	0.098	5993752.06	-7.94
611.47	10.19116667	-0.11	0.098	5993752.08	-7.92
613.5	10.225	-0.22	0.097	5993752.12	-7.88
615.55	10.25916667	1	0.099	5993751.96	-8.04
617.59	10.29316667	-0.44	0.098	5993752.03	-7.97
619.63	10.32716667	-1.66	0.095	5993752.3	-7.7
621.66	10.361	1.11	0.097	5993752.12	-7.88
623.7	10.395	-0.44	0.096	5993752.19	-7.81
625.77	10.4295	0.78	0.098	5993752.06	-7.94
627.85	10.46416667	0.78	0.099	5993751.94	-8.06
629.93	10.49883333	0.11	0.1	5993751.92	-8.08
631.98	10.533	-0.33	0.099	5993751.97	-8.03
634.01	10.56683333	-0.22	0.099	5993752.01	-7.99
636.05	10.60083333	-0.22	0.098	5993752.05	-7.95
638.1	10.635	0.11	0.098	5993752.03	-7.97
640.13	10.66883333	0.44	0.099	5993751.96	-8.04
642.16	10.70266667	0.22	0.1	5993751.92	-8.08
644.2	10.73666667	-0.44	0.099	5993751.99	-8.01
646.23	10.7705	0.55	0.1	5993751.9	-8.1
648.27	10.8045	0.11	0.1	5993751.88	-8.12
650.32	10.83866667	-0.55	0.099	5993751.97	-8.03
652.37	10.87283333	-0.55	0.098	5993752.06	-7.94
654.41	10.90683333	-1	0.096	5993752.23	-7.77
656.45	10.94083333	0.55	0.097	5993752.14	-7.86
658.49	10.97483333	-0.33	0.096	5993752.19	-7.81
660.55	11.00916667	-0.11	0.096	5993752.21	-7.79
662.6	11.04333333	0.33	0.097	5993752.15	-7.85
664.64	11.07733333	-0.22	0.096	5993752.19	-7.81
666.69	11.1115	-0.55	0.095	5993752.28	-7.72
668.73	11.1455	0.11	0.095	5993752.26	-7.74
670.77	11.1795	0.44	0.096	5993752.19	-7.81

672.83	11.21383333	-0.67	0.095	5993752.3	-7.7
674.87	11.24783333	-0.44	0.094	5993752.37	-7.63
676.92	11.282	-0.11	0.094	5993752.39	-7.61
679	11.31666667	0	0.094	5993752.39	-7.61
681.05	11.35083333	0.11	0.094	5993752.37	-7.63
683.09	11.38483333	0.22	0.095	5993752.33	-7.67
685.14	11.419	0.89	0.096	5993752.19	-7.81
687.18	11.453	0.22	0.097	5993752.15	-7.85
689.21	11.48683333	0.44	0.098	5993752.08	-7.92
691.27	11.52116667	0.33	0.098	5993752.03	-7.97
693.31	11.55516667	-0.55	0.097	5993752.12	-7.88
695.38	11.58966667	0.11	0.097	5993752.1	-7.9
697.46	11.62433333	-0.55	0.096	5993752.19	-7.81
699.54	11.659	-0.33	0.096	5993752.24	-7.76
701.59	11.69316667	0.89	0.097	5993752.1	-7.9
703.62	11.727	0	0.097	5993752.1	-7.9
705.66	11.761	-1	0.095	5993752.26	-7.74
707.7	11.795	-0.89	0.094	5993752.41	-7.59
709.74	11.829	-0.22	0.093	5993752.44	-7.56
711.79	11.86316667	1.11	0.095	5993752.26	-7.74
713.84	11.89733333	0.44	0.096	5993752.19	-7.81
715.89	11.9315	0.22	0.097	5993752.15	-7.85
717.93	11.9655	0.33	0.097	5993752.1	-7.9
719.96	11.99933333	0	0.097	5993752.1	-7.9
722.02	12.03366667	0.22	0.098	5993752.06	-7.94
724.05	12.0675	0	0.098	5993752.06	-7.94
726.11	12.10183333	0	0.098	5993752.06	-7.94
728.14	12.13566667	0.33	0.099	5993752.01	-7.99
730.17	12.1695	-0.22	0.098	5993752.05	-7.95
732.2	12.20333333	0.33	0.099	5993751.99	-8.01
734.25	12.2375	-0.11	0.099	5993752.01	-7.99
736.29	12.2715	-0.44	0.098	5993752.08	-7.92
738.33	12.3055	-1.22	0.095	5993752.28	-7.72
740.36	12.33933333	-0.44	0.094	5993752.35	-7.65
742.42	12.37366667	0.89	0.096	5993752.21	-7.79
744.45	12.4075	-0.11	0.096	5993752.23	-7.77
746.49	12.4415	-0.33	0.095	5993752.28	-7.72
748.55	12.47583333	-0.11	0.095	5993752.3	-7.7
750.6	12.51	0	0.095	5993752.3	-7.7
752.65	12.54416667	0.67	0.096	5993752.19	-7.81
754.7	12.57833333	1.11	0.099	5993752.01	-7.99
756.73	12.61216667	0.22	0.099	5993751.97	-8.03
758.77	12.64616667	0	0.099	5993751.97	-8.03
760.82	12.68033333	-0.55	0.098	5993752.06	-7.94
762.86	12.71433333	-0.44	0.097	5993752.14	-7.86
764.93	12.74883333	-0.44	0.096	5993752.21	-7.79
767.01	12.7835	0.11	0.096	5993752.19	-7.81
769.07	12.81783333	0.89	0.098	5993752.05	-7.95
771.12	12.852	-0.44	0.097	5993752.12	-7.88
773.17	12.88616667	-0.11	0.097	5993752.14	-7.86
775.2	12.92	0	0.097	5993752.14	-7.86
777.25	12.95416667	0	0.097	5993752.14	-7.86
779.28	12.988	0.22	0.097	5993752.1	-7.9
781.33	13.02216667	-0.89	0.096	5993752.24	-7.76
783.38	13.05633333	-0.55	0.095	5993752.33	-7.67

785.41	13.09016667	0	0.095	5993752.33	-7.67
787.46	13.12433333	0	0.095	5993752.33	-7.67
789.5	13.15833333	-0.33	0.094	5993752.39	-7.61
791.55	13.1925	0.89	0.096	5993752.24	-7.76
793.59	13.2265	0.44	0.097	5993752.17	-7.83
795.63	13.2605	0.11	0.097	5993752.15	-7.85
797.66	13.29433333	-1.55	0.094	5993752.41	-7.59
799.7	13.32833333	-0.44	0.093	5993752.48	-7.52
801.75	13.3625	0.22	0.093	5993752.44	-7.56
803.8	13.39666667	0.11	0.093	5993752.43	-7.57
805.83	13.4305	0.67	0.095	5993752.32	-7.68
807.88	13.46466667	-0.55	0.094	5993752.41	-7.59
809.93	13.49883333	-0.33	0.093	5993752.46	-7.54
811.99	13.53316667	0.55	0.094	5993752.37	-7.63
814.04	13.56733333	0.55	0.095	5993752.28	-7.72
816.08	13.60133333	0.11	0.095	5993752.26	-7.74
818.14	13.63566667	-0.22	0.095	5993752.3	-7.7
820.18	13.66966667	0.89	0.097	5993752.15	-7.85
822.23	13.70383333	0	0.097	5993752.15	-7.85
824.27	13.73783333	-0.44	0.096	5993752.23	-7.77
826.31	13.77183333	0.22	0.096	5993752.19	-7.81
828.38	13.80633333	0.11	0.097	5993752.17	-7.83
830.41	13.84016667	0.33	0.097	5993752.12	-7.88
832.46	13.87433333	-0.33	0.097	5993752.17	-7.83
834.56	13.90933333	-0.89	0.095	5993752.32	-7.68
836.67	13.9445	-1.33	0.092	5993752.53	-7.47
838.76	13.97933333	-0.11	0.092	5993752.55	-7.45
840.83	14.01383333	0.33	0.093	5993752.5	-7.5
842.86	14.04766667	0	0.093	5993752.5	-7.5
844.89	14.0815	1.22	0.095	5993752.3	-7.7
846.93	14.1155	0.44	0.096	5993752.23	-7.77
848.98	14.14966667	-0.67	0.095	5993752.33	-7.67
851.01	14.1835	0	0.095	5993752.33	-7.67
853.05	14.2175	-0.22	0.094	5993752.37	-7.63
855.12	14.252	-0.44	0.093	5993752.44	-7.56
857.17	14.28616667	-0.44	0.092	5993752.52	-7.48
859.21	14.32016667	0	0.092	5993752.52	-7.48
861.27	14.3545	1.11	0.095	5993752.33	-7.67
863.32	14.38866667	0.44	0.095	5993752.26	-7.74
865.39	14.42316667	0.11	0.096	5993752.24	-7.76
867.44	14.45733333	0.22	0.096	5993752.21	-7.79
869.48	14.49133333	0	0.096	5993752.21	-7.79
871.54	14.52566667	-0.11	0.096	5993752.23	-7.77
873.59	14.55983333	-0.33	0.095	5993752.28	-7.72
875.62	14.59366667	-0.11	0.095	5993752.3	-7.7
877.65	14.6275	0.33	0.096	5993752.24	-7.76
879.68	14.66133333	-0.55	0.095	5993752.33	-7.67
881.72	14.69533333	0.44	0.095	5993752.26	-7.74
883.77	14.7295	0.22	0.096	5993752.23	-7.77
885.81	14.7635	0.11	0.096	5993752.21	-7.79
887.85	14.7975	0.11	0.096	5993752.19	-7.81
889.89	14.8315	-0.11	0.096	5993752.21	-7.79
891.93	14.8655	-0.44	0.095	5993752.28	-7.72
893.96	14.89933333	0.22	0.096	5993752.24	-7.76
896.01	14.9335	-0.78	0.094	5993752.37	-7.63

898.05	14.9675	-0.55	0.093	5993752.46	-7.54
900.11	15.00183333	0.67	0.094	5993752.35	-7.65
902.16	15.036	-0.11	0.094	5993752.37	-7.63
904.23	15.0705	0.33	0.095	5993752.32	-7.68
906.35	15.10583333	-0.44	0.094	5993752.39	-7.61
908.39	15.13983333	-0.55	0.093	5993752.48	-7.52
910.44	15.174	0.22	0.093	5993752.44	-7.56
912.48	15.208	-1.44	0.09	5993752.68	-7.32
914.52	15.242	0.33	0.091	5993752.62	-7.38
916.58	15.27633333	0.11	0.091	5993752.61	-7.39
918.61	15.31016667	0.67	0.093	5993752.5	-7.5
920.66	15.34433333	0.11	0.093	5993752.48	-7.52
922.71	15.3785	-1.55	0.09	5993752.73	-7.27
924.75	15.4125	0.33	0.09	5993752.68	-7.32
926.79	15.4465	0.67	0.092	5993752.57	-7.43
928.86	15.481	0.44	0.093	5993752.5	-7.5
930.91	15.51516667	0	0.093	5993752.5	-7.5
932.98	15.54966667	-1.89	0.089	5993752.8	-7.2
935.18	15.58633333	0	0.089	5993752.8	-7.2
937.22	15.62033333	1	0.091	5993752.64	-7.36
939.25	15.65416667	0.67	0.092	5993752.53	-7.47
941.3	15.68833333	0.55	0.093	5993752.44	-7.56
943.34	15.72233333	-0.33	0.093	5993752.5	-7.5
945.37	15.75616667	-1.55	0.089	5993752.75	-7.25
947.4	15.79	-0.67	0.088	5993752.86	-7.14
949.45	15.82416667	0.89	0.09	5993752.71	-7.29
951.49	15.85816667	-1	0.088	5993752.88	-7.12
953.54	15.89233333	0.44	0.089	5993752.8	-7.2
955.59	15.9265	-0.22	0.088	5993752.84	-7.16
957.63	15.9605	-0.33	0.088	5993752.89	-7.11
959.68	15.99466667	0.55	0.089	5993752.8	-7.2
961.77	16.0295	1	0.091	5993752.64	-7.36
963.82	16.06366667	0.22	0.091	5993752.61	-7.39
965.87	16.09783333	0	0.091	5993752.61	-7.39
967.91	16.13183333	-1.33	0.089	5993752.82	-7.18
969.96	16.166	0.22	0.089	5993752.79	-7.21
972.03	16.2005	0.55	0.09	5993752.7	-7.3
974.12	16.23533333	0.78	0.092	5993752.57	-7.43
976.17	16.2695	0.89	0.093	5993752.43	-7.57
978.21	16.3035	0.78	0.095	5993752.3	-7.7
980.26	16.33766667	-0.78	0.093	5993752.43	-7.57
982.3	16.37166667	-1	0.091	5993752.59	-7.41
984.34	16.40566667	0.33	0.092	5993752.53	-7.47
986.38	16.43966667	0.44	0.093	5993752.46	-7.54
988.42	16.47366667	0.67	0.094	5993752.35	-7.65
990.48	16.508	-0.11	0.094	5993752.37	-7.63
992.54	16.54233333	0.11	0.094	5993752.35	-7.65
994.58	16.57633333	0.11	0.095	5993752.33	-7.67
996.61	16.61016667	0.11	0.095	5993752.32	-7.68
998.66	16.64433333	-0.11	0.095	5993752.33	-7.67
1000.71	16.6785	0	0.095	5993752.33	-7.67
1002.75	16.7125	-0.11	0.094	5993752.35	-7.65
1004.79	16.7465	0	0.094	5993752.35	-7.65
1006.86	16.781	-0.55	0.093	5993752.44	-7.56
1008.91	16.81516667	-1.22	0.091	5993752.64	-7.36

1010.94	16.849	0.11	0.091	5993752.62	-7.38
1012.98	16.883	-0.44	0.09	5993752.7	-7.3
1015.04	16.91733333	-0.44	0.089	5993752.77	-7.23
1017.08	16.95133333	0.33	0.09	5993752.71	-7.29
1019.14	16.98566667	-0.44	0.089	5993752.79	-7.21
1021.2	17.02	0.89	0.091	5993752.64	-7.36
1023.25	17.05416667	-0.55	0.09	5993752.73	-7.27
1025.29	17.08816667	-0.22	0.089	5993752.77	-7.23
1027.33	17.12216667	-0.55	0.088	5993752.86	-7.14
1029.36	17.156	1.44	0.091	5993752.62	-7.38
1031.4	17.19	1	0.093	5993752.46	-7.54
1033.46	17.22433333	0.55	0.094	5993752.37	-7.63
1035.5	17.25833333	0.11	0.094	5993752.35	-7.65
1037.55	17.2925	0.11	0.095	5993752.33	-7.67
1039.59	17.3265	-0.22	0.094	5993752.37	-7.63
1041.66	17.361	0	0.094	5993752.37	-7.63
1043.75	17.39583333	0.33	0.095	5993752.32	-7.68
1045.81	17.43016667	-0.33	0.094	5993752.37	-7.63
1047.85	17.46416667	-1.55	0.091	5993752.62	-7.38
1049.88	17.498	-1.33	0.088	5993752.84	-7.16
1051.96	17.53266667	0	0.088	5993752.84	-7.16
1054.02	17.567	0.78	0.09	5993752.71	-7.29
1056.05	17.60083333	1	0.092	5993752.55	-7.45
1058.15	17.63583333	-0.22	0.091	5993752.59	-7.41
1060.2	17.67	0.67	0.093	5993752.48	-7.52
1062.25	17.70416667	-1.89	0.089	5993752.79	-7.21
1064.29	17.73816667	-0.33	0.088	5993752.84	-7.16
1066.32	17.772	0	0.088	5993752.84	-7.16
1068.37	17.80616667	0.89	0.09	5993752.7	-7.3
1070.41	17.84016667	0.44	0.091	5993752.62	-7.38
1072.46	17.87433333	-0.78	0.089	5993752.75	-7.25
1074.52	17.90866667	1	0.091	5993752.59	-7.41
1076.58	17.943	0	0.091	5993752.59	-7.41
1078.62	17.977	0.11	0.092	5993752.57	-7.43
1080.68	18.01133333	0.22	0.092	5993752.53	-7.47
1082.71	18.04516667	0.22	0.093	5993752.5	-7.5
1084.77	18.0795	-0.33	0.092	5993752.55	-7.45
1086.8	18.11333333	0.33	0.093	5993752.5	-7.5
1088.84	18.14733333	-0.55	0.091	5993752.59	-7.41
1090.89	18.1815	-0.33	0.091	5993752.64	-7.36
1092.92	18.21533333	0.78	0.092	5993752.52	-7.48
1094.96	18.24933333	0.22	0.093	5993752.48	-7.52
1097	18.28333333	-0.11	0.093	5993752.5	-7.5
1099.04	18.31733333	-0.44	0.092	5993752.57	-7.43
1101.09	18.3515	0.55	0.093	5993752.48	-7.52
1103.13	18.3855	0.22	0.093	5993752.44	-7.56
1105.17	18.4195	0.11	0.093	5993752.43	-7.57
1107.22	18.45366667	0.11	0.094	5993752.41	-7.59
1109.25	18.4875	-0.22	0.093	5993752.44	-7.56
1111.38	18.523	0.44	0.094	5993752.37	-7.63
1113.48	18.558	0	0.094	5993752.37	-7.63
1115.54	18.59233333	-0.22	0.094	5993752.41	-7.59
1117.6	18.62666667	-0.11	0.093	5993752.43	-7.57
1119.64	18.66066667	0	0.093	5993752.43	-7.57
1121.68	18.69466667	0	0.093	5993752.43	-7.57

1123.73	18.72883333	0.11	0.094	5993752.41	-7.59
1125.77	18.76283333	-0.55	0.093	5993752.5	-7.5
1127.81	18.79683333	-0.44	0.092	5993752.57	-7.43
1129.88	18.83133333	-0.78	0.09	5993752.7	-7.3
1131.93	18.8655	-0.11	0.09	5993752.71	-7.29
1133.98	18.89966667	0.67	0.091	5993752.61	-7.39
1136.02	18.93366667	-0.11	0.091	5993752.62	-7.38
1138.07	18.96783333	-0.33	0.09	5993752.68	-7.32
1140.14	19.00233333	-0.22	0.09	5993752.71	-7.29
1142.19	19.0365	0.55	0.091	5993752.62	-7.38
1144.23	19.0705	0.11	0.091	5993752.61	-7.39
1146.27	19.1045	0.22	0.092	5993752.57	-7.43
1148.31	19.1385	0.33	0.092	5993752.52	-7.48
1150.36	19.17266667	-1.44	0.089	5993752.75	-7.25
1152.4	19.20666667	-0.55	0.088	5993752.84	-7.16
1154.44	19.24066667	-0.11	0.088	5993752.86	-7.14
1156.48	19.27466667	-0.11	0.088	5993752.88	-7.12
1158.53	19.30883333	-0.11	0.088	5993752.89	-7.11
1160.57	19.34283333	0.67	0.089	5993752.79	-7.21
1162.61	19.37683333	1.11	0.091	5993752.61	-7.39
1164.65	19.41083333	0.55	0.092	5993752.52	-7.48
1166.7	19.445	0.33	0.093	5993752.46	-7.54
1168.74	19.479	-0.11	0.093	5993752.48	-7.52
1170.82	19.51366667	0.11	0.093	5993752.46	-7.54
1172.87	19.54783333	-0.11	0.093	5993752.48	-7.52
1174.91	19.58183333	-0.55	0.092	5993752.57	-7.43
1176.94	19.61566667	0.44	0.093	5993752.5	-7.5
1178.98	19.64966667	0.11	0.093	5993752.48	-7.52
1181.06	19.68433333	-0.33	0.092	5993752.53	-7.47
1183.15	19.71916667	0.44	0.093	5993752.46	-7.54
1185.21	19.7535	-1.11	0.091	5993752.64	-7.36
1187.26	19.78766667	-2.11	0.087	5993752.98	-7.02
1189.29	19.8215	1.11	0.089	5993752.8	-7.2
1191.32	19.85533333	1.66	0.092	5993752.53	-7.47
1193.39	19.88983333	0.67	0.093	5993752.43	-7.57
1195.42	19.92366667	-0.33	0.093	5993752.48	-7.52
1197.45	19.9575	0.22	0.093	5993752.44	-7.56
1199.48	19.99133333	0.11	0.093	5993752.43	-7.57
1201.6	20.02666667	0	0.093	5993752.43	-7.57
1203.64	20.06066667	-0.67	0.092	5993752.53	-7.47
1205.68	20.09466667	0	0.092	5993752.53	-7.47
1207.73	20.12883333	0.55	0.093	5993752.44	-7.56
1209.78	20.163	0	0.093	5993752.44	-7.56
1211.81	20.19683333	0.11	0.093	5993752.43	-7.57
1213.88	20.23133333	0	0.093	5993752.43	-7.57
1215.91	20.26516667	0.11	0.094	5993752.41	-7.59
1217.95	20.29916667	-0.11	0.093	5993752.43	-7.57
1219.99	20.33316667	-0.11	0.093	5993752.44	-7.56
1222.06	20.36766667	-0.22	0.093	5993752.48	-7.52
1224.1	20.40166667	0.33	0.093	5993752.43	-7.57
1226.13	20.4355	-0.11	0.093	5993752.44	-7.56
1228.16	20.46933333	-0.22	0.093	5993752.48	-7.52
1230.22	20.50366667	0.22	0.093	5993752.44	-7.56
1232.25	20.5375	-0.11	0.093	5993752.46	-7.54
1234.3	20.57166667	0.11	0.093	5993752.44	-7.56

1236.34	20.60566667	-0.22	0.093	5993752.48	-7.52
1238.37	20.6395	0	0.093	5993752.48	-7.52
1240.41	20.6735	-0.55	0.092	5993752.57	-7.43
1242.46	20.70766667	0.11	0.092	5993752.55	-7.45
1244.49	20.7415	0.78	0.093	5993752.43	-7.57
1246.53	20.7755	0.22	0.094	5993752.39	-7.61
1248.57	20.8095	0	0.094	5993752.39	-7.61
1250.65	20.84416667	-0.22	0.093	5993752.43	-7.57
1252.73	20.87883333	0	0.093	5993752.43	-7.57
1254.79	20.91316667	0.11	0.094	5993752.41	-7.59
1256.85	20.9475	0.22	0.094	5993752.37	-7.63
1258.89	20.9815	-0.22	0.094	5993752.41	-7.59
1260.97	21.01616667	-0.11	0.093	5993752.43	-7.57
1263.01	21.05016667	-0.55	0.092	5993752.52	-7.48
1265.05	21.08416667	-0.67	0.091	5993752.62	-7.38
1267.1	21.11833333	0	0.091	5993752.62	-7.38
1269.14	21.15233333	0	0.091	5993752.62	-7.38
1271.21	21.18683333	0.22	0.091	5993752.59	-7.41
1273.24	21.22066667	0.11	0.092	5993752.57	-7.43
1275.29	21.25483333	-0.22	0.091	5993752.61	-7.39
1277.32	21.28866667	0.22	0.092	5993752.57	-7.43
1279.37	21.32283333	-0.22	0.091	5993752.61	-7.39
1281.42	21.357	-0.33	0.091	5993752.66	-7.34
1283.45	21.39083333	0.11	0.091	5993752.64	-7.36
1285.5	21.425	0.67	0.092	5993752.53	-7.47
1287.54	21.459	0.44	0.093	5993752.46	-7.54
1289.61	21.4935	0.33	0.094	5993752.41	-7.59
1291.74	21.529	-1.44	0.091	5993752.64	-7.36
1293.91	21.56516667	-2.11	0.087	5993752.98	-7.02
1296	21.6	0.89	0.088	5993752.84	-7.16
1298.21	21.63683333	0.11	0.089	5993752.82	-7.18
1300.39	21.67316667	1	0.091	5993752.66	-7.34
1302.61	21.71016667	-0.22	0.09	5993752.7	-7.3
1304.75	21.74583333	-1.33	0.087	5993752.91	-7.09
1306.83	21.7805	0	0.087	5993752.91	-7.09
1308.94	21.81566667	1	0.089	5993752.75	-7.25
1311.02	21.85033333	-0.11	0.089	5993752.77	-7.23
1313.24	21.88733333	0.33	0.09	5993752.71	-7.29
1315.45	21.92416667	0.55	0.091	5993752.62	-7.38
1317.71	21.96183333	0.78	0.093	5993752.5	-7.5
1319.85	21.9975	-2.11	0.088	5993752.84	-7.16
1322.03	22.03383333	0.78	0.09	5993752.71	-7.29
1324.09	22.06816667	-1.44	0.087	5993752.95	-7.05
1326.15	22.1025	-1.22	0.085	5993753.15	-6.85
1328.19	22.1365	2.44	0.089	5993752.75	-7.25
1330.24	22.17066667	1.11	0.092	5993752.57	-7.43
1332.3	22.205	0.55	0.093	5993752.48	-7.52
1334.34	22.239	-0.11	0.093	5993752.5	-7.5
1336.39	22.27316667	-0.22	0.092	5993752.53	-7.47
1338.43	22.30716667	-0.67	0.091	5993752.64	-7.36
1340.48	22.34133333	-0.89	0.089	5993752.79	-7.21
1342.53	22.3755	-0.22	0.089	5993752.82	-7.18
1344.58	22.40966667	-1.33	0.086	5993753.04	-6.96
1346.64	22.444	0.67	0.087	5993752.93	-7.07
1348.69	22.47816667	0.78	0.089	5993752.8	-7.2

1350.77	22.51283333	0.44	0.09	5993752.73	-7.27
1352.82	22.547	0.67	0.091	5993752.62	-7.38
1354.89	22.5815	1	0.093	5993752.46	-7.54
1356.94	22.61566667	-0.33	0.092	5993752.52	-7.48
1358.99	22.64983333	-0.11	0.092	5993752.53	-7.47
1361.06	22.68433333	-1.44	0.089	5993752.77	-7.23
1363.12	22.71866667	36.61	0.162	5993746.81	-13.19
1365.16	22.75266667	2826.31	5.815	5993287.09	-472.91
1367.21	22.78683333	14253.34	34.322	5990969.72	-2790.28
1369.27	22.82116667	1298.88	36.919	5990758.63	-3001.37
1371.32	22.85533333	-480.81	35.958	5990836.77	-2923.23
1373.36	22.88933333	-3403.19	29.151	5991389.89	-2370.11
1375.41	22.9235	3696.52	36.544	5990789.1	-2970.9
1377.45	22.9575	-23.96	36.497	5990792.99	-2967.01
1379.49	22.9915	-594.97	35.307	5990889.69	-2870.31
1381.57	23.02616667	58.35	35.423	5990880.2	-2879.8
1383.63	23.0605	38.83	35.501	5990873.89	-2886.11
1385.69	23.09483333	-9796.55	15.908	5992466.41	-1293.59
1387.75	23.12916667	-7300.62	1.307	5993653.75	-106.25
1389.85	23.16416667	-437.33	0.432	5993724.89	-35.11
1392.03	23.2005	-126.03	0.18	5993745.39	-14.61
1394.11	23.23516667	-43.04	0.094	5993752.39	-7.61
1396.16	23.26933333	-9.65	0.075	5993753.96	-6.04
1398.22	23.30366667	-6.21	0.062	5993754.97	-5.03
1400.27	23.33783333	-1.66	0.059	5993755.24	-4.76
1402.34	23.37233333	-3.55	0.052	5993755.82	-4.18
1404.38	23.40633333	-5.44	0.041	5993756.7	-3.3
1406.43	23.4405	-2.22	0.036	5993757.06	-2.94
1408.48	23.47466667	-0.55	0.035	5993757.15	-2.85
1410.56	23.50933333	-1.44	0.032	5993757.39	-2.61
1412.61	23.5435	-0.67	0.031	5993757.5	-2.5
1414.65	23.5775	-1	0.029	5993757.66	-2.34
1416.7	23.61166667	-2.55	0.024	5993758.07	-1.93
1418.74	23.64566667	-1.33	0.021	5993758.29	-1.71
1420.79	23.67983333	0.67	0.023	5993758.18	-1.82
1422.85	23.71416667	-0.89	0.021	5993758.33	-1.67
1424.9	23.74833333	0.33	0.022	5993758.27	-1.73
1426.97	23.78283333	-1	0.02	5993758.43	-1.57
1429.02	23.817	-1.55	0.016	5993758.69	-1.31
1431.06	23.851	-0.22	0.016	5993758.72	-1.28
1433.1	23.885	0.67	0.017	5993758.62	-1.38
1435.16	23.91933333	-2.11	0.013	5993758.96	-1.04
1437.21	23.9535	-0.67	0.012	5993759.07	-0.93
1439.26	23.98766667	0	0.012	5993759.07	-0.93
1441.35	24.0225	1.33	0.014	5993758.85	-1.15
1443.39	24.0565	1.11	0.017	5993758.67	-1.33
1445.46	24.091	-1.44	0.014	5993758.9	-1.1
1447.51	24.12516667	0.33	0.014	5993758.85	-1.15
1449.55	24.15916667	-1.11	0.012	5993759.03	-0.97
1451.61	24.1935	-0.22	0.012	5993759.07	-0.93
1453.66	24.22766667	0.67	0.013	5993758.96	-1.04
1455.71	24.26183333	-0.33	0.012	5993759.01	-0.99
1457.77	24.29616667	-0.67	0.011	5993759.12	-0.88
1459.89	24.3315	0.11	0.011	5993759.1	-0.9
1461.96	24.366	0.33	0.012	5993759.05	-0.95

1464	24.4	0.11	0.012	5993759.03	-0.97
1466.06	24.43433333	-0.67	0.011	5993759.14	-0.86
1468.12	24.46866667	-0.11	0.011	5993759.16	-0.84
1470.22	24.50366667	-0.55	0.01	5993759.25	-0.75
1472.29	24.53816667	-0.55	0.008	5993759.34	-0.66
1474.33	24.57216667	0.22	0.009	5993759.3	-0.7
1476.37	24.60616667	-0.33	0.008	5993759.36	-0.64
1478.43	24.6405	-0.44	0.007	5993759.43	-0.57
1480.5	24.675	-0.55	0.006	5993759.52	-0.48
1482.57	24.7095	-0.11	0.006	5993759.54	-0.46
1484.63	24.74383333	0	0.006	5993759.54	-0.46
1486.7	24.77833333	0.22	0.006	5993759.5	-0.5
1488.76	24.81266667	-0.11	0.006	5993759.52	-0.48
1490.8	24.84666667	-0.22	0.006	5993759.55	-0.45
1492.89	24.8815	-0.33	0.005	5993759.61	-0.39
1494.94	24.91566667	0.11	0.005	5993759.59	-0.41
1496.99	24.94983333	0.44	0.006	5993759.52	-0.48
1499.05	24.98416667	-0.89	0.004	5993759.66	-0.34
1501.14	25.019	-2.11	0	5993760	0
1503.18	25.053	-0.11	0	5993760.02	0.02
1505.25	25.0875	-1.33	-0.003	5993760.24	0.24
1507.32	25.122	1.44	0	5993760	0
1509.38	25.15633333	-0.55	-0.001	5993760.09	0.09
1511.42	25.19033333	-0.55	-0.002	5993760.19	0.19
1513.48	25.22466667	0.11	-0.002	5993760.17	0.17
1515.54	25.259	2.11	0.002	5993759.82	-0.18
1517.58	25.293	0.11	0.003	5993759.81	-0.19
1519.64	25.32733333	-0.11	0.002	5993759.82	-0.18
1521.69	25.3615	0.11	0.003	5993759.81	-0.19
1523.74	25.39566667	-2.44	-0.002	5993760.2	0.2
1525.79	25.42983333	0.67	-0.001	5993760.09	0.09
1527.89	25.46483333	-0.11	-0.001	5993760.11	0.11
1529.99	25.49983333	1.66	0.002	5993759.84	-0.16
1532.1	25.535	0.33	0.003	5993759.79	-0.21
1534.16	25.56933333	0.44	0.004	5993759.72	-0.28
1536.2	25.60333333	0.33	0.004	5993759.66	-0.34
1538.25	25.6375	0	0.004	5993759.66	-0.34
1540.3	25.67166667	0.11	0.005	5993759.64	-0.36
1542.36	25.706	-0.11	0.004	5993759.66	-0.34
1544.41	25.74016667	0	0.004	5993759.66	-0.34
1546.45	25.77416667	0	0.004	5993759.66	-0.34
1548.51	25.8085	-0.33	0.004	5993759.72	-0.28
1550.55	25.8425	-2.55	-0.001	5993760.13	0.13
1552.61	25.87683333	-0.33	-0.002	5993760.19	0.19
1554.66	25.911	1.11	0	5993760	0
1556.75	25.94583333	0	0	5993760	0
1558.81	25.98016667	-1.78	-0.003	5993760.29	0.29
1560.9	26.015	-0.11	-0.004	5993760.31	0.31
1562.96	26.04933333	0.67	-0.002	5993760.2	0.2
1565.01	26.0835	0.44	-0.001	5993760.13	0.13
1567.05	26.1175	-1	-0.003	5993760.29	0.29
1569.11	26.15183333	1	-0.001	5993760.13	0.13
1571.17	26.18616667	0	-0.001	5993760.13	0.13
1573.21	26.22016667	0.33	-0.001	5993760.08	0.08
1575.29	26.25483333	-0.11	-0.001	5993760.09	0.09

1577.34	26.289	-1.11	-0.003	5993760.28	0.28
1579.4	26.32333333	0.67	-0.002	5993760.17	0.17
1581.45	26.3575	0.11	-0.002	5993760.15	0.15
1583.5	26.39166667	0.44	-0.001	5993760.08	0.08
1585.55	26.42583333	0	-0.001	5993760.08	0.08
1587.6	26.46	-1.22	-0.003	5993760.28	0.28
1589.64	26.494	-2.55	-0.008	5993760.69	0.69
1591.74	26.529	-0.44	-0.009	5993760.76	0.76
1593.79	26.56316667	1.66	-0.006	5993760.49	0.49
1595.86	26.59766667	1.22	-0.003	5993760.29	0.29
1597.95	26.6325	-0.22	-0.004	5993760.33	0.33
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1610.41	26.84016667	-0.55	-0.003	5993760.28	0.28
1612.46	26.87433333	0.11	-0.003	5993760.26	0.26
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1647.44	27.45733333	0.33	0	5993759.99	-0.01
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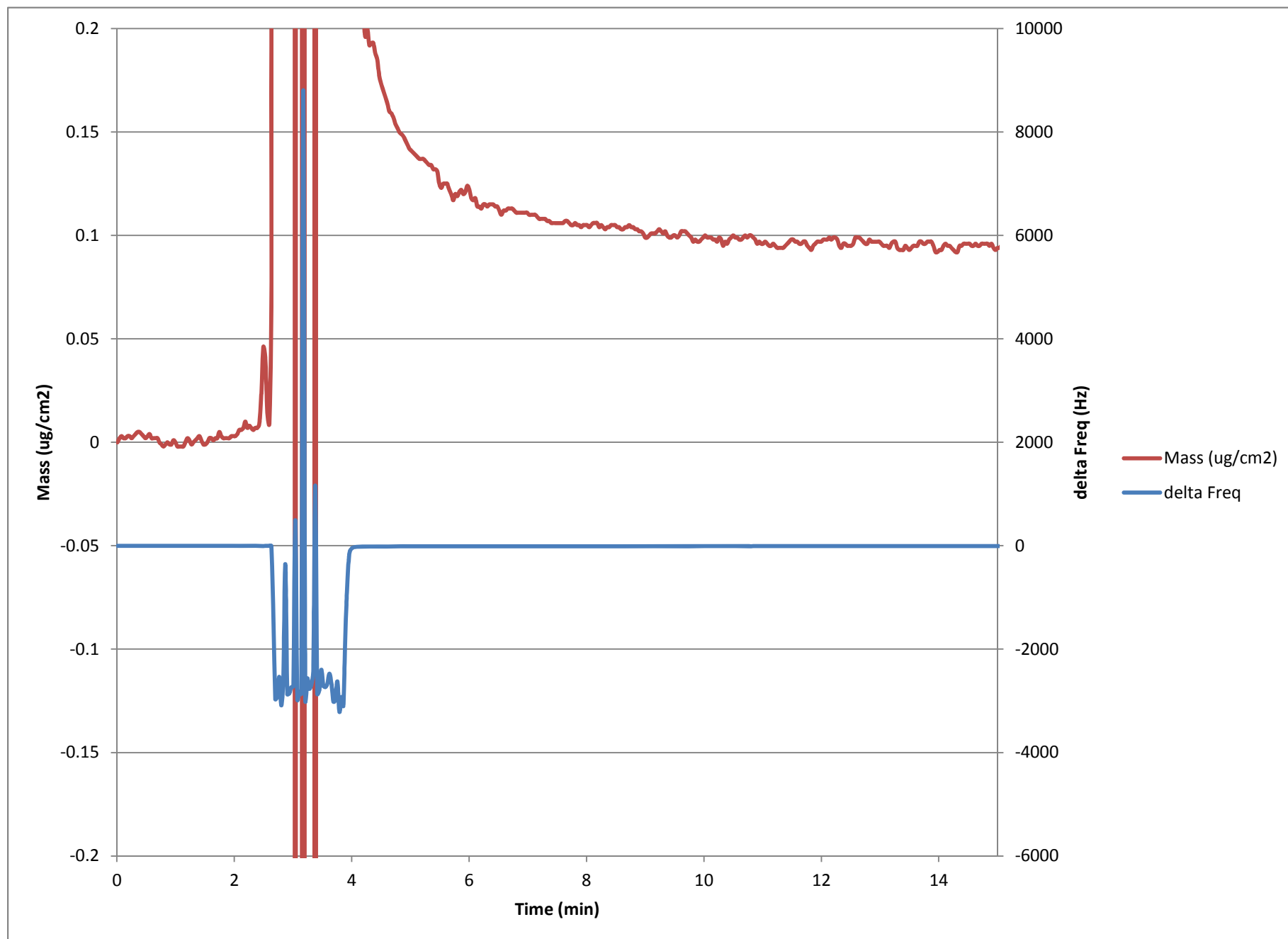
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1911.16	31.85266667	-0.33	0.103	5993751.61	-8.39
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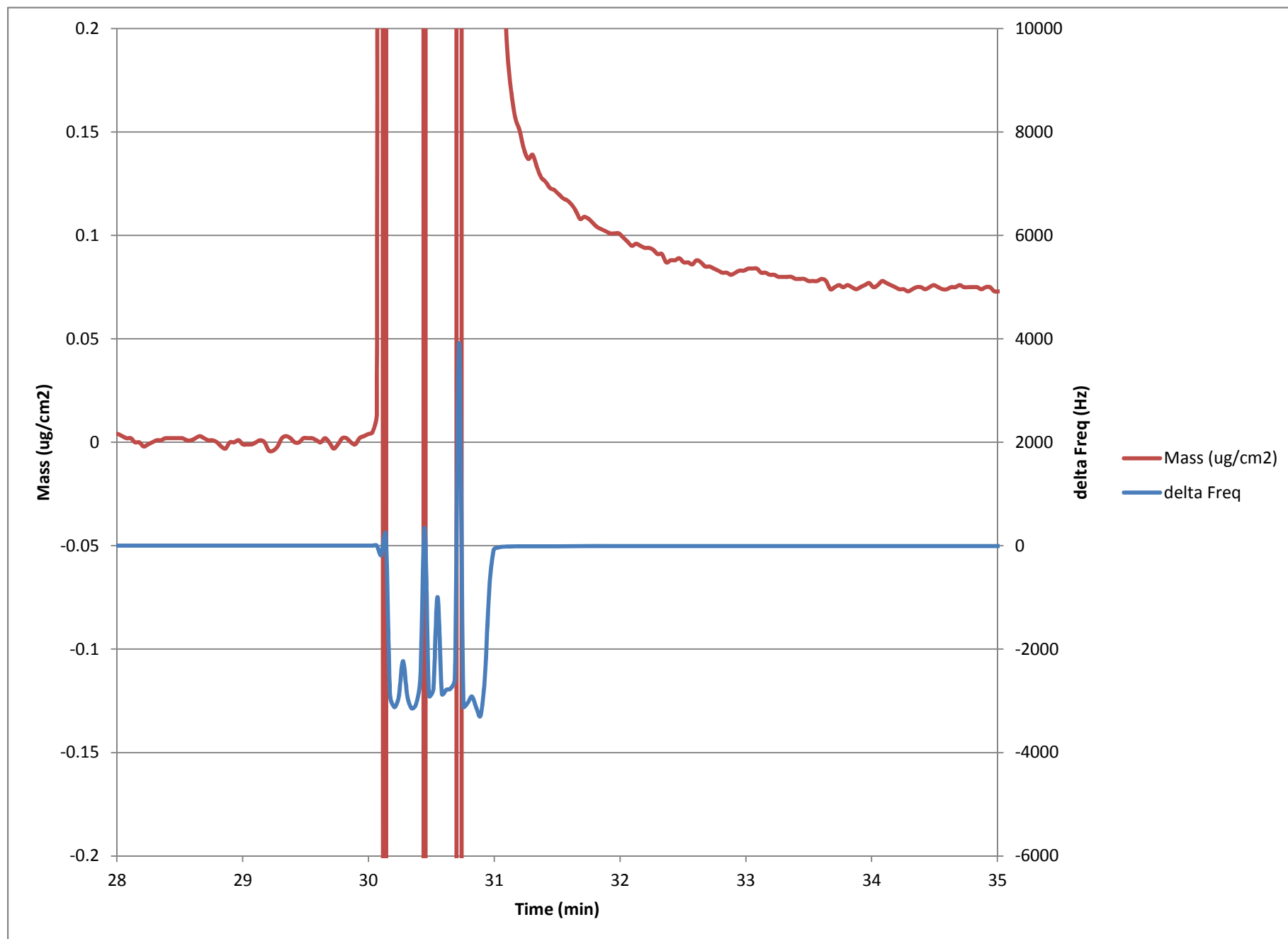
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1952.4	32.54	-0.11	0.087	5993752.95	-7.05
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1968.8	32.81333333	-0.89	0.082	5993753.38	-6.62
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2007.78	33.463	0	0.079	5993753.63	-6.37
2009.83	33.49716667	-0.44	0.078	5993753.71	-6.29
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2016.16	33.60266667	0.33	0.079	5993753.62	-6.38
2018.24	33.63733333	-0.55	0.078	5993753.71	-6.29
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2133.51	35.5585	0.22	0.071	5993754.23	-5.77
2135.55	35.5925	0	0.071	5993754.23	-5.77
2137.61	35.62683333	0.55	0.072	5993754.14	-5.86
2139.66	35.661	-0.44	0.071	5993754.21	-5.79
2141.71	35.69516667	0	0.071	5993754.21	-5.79

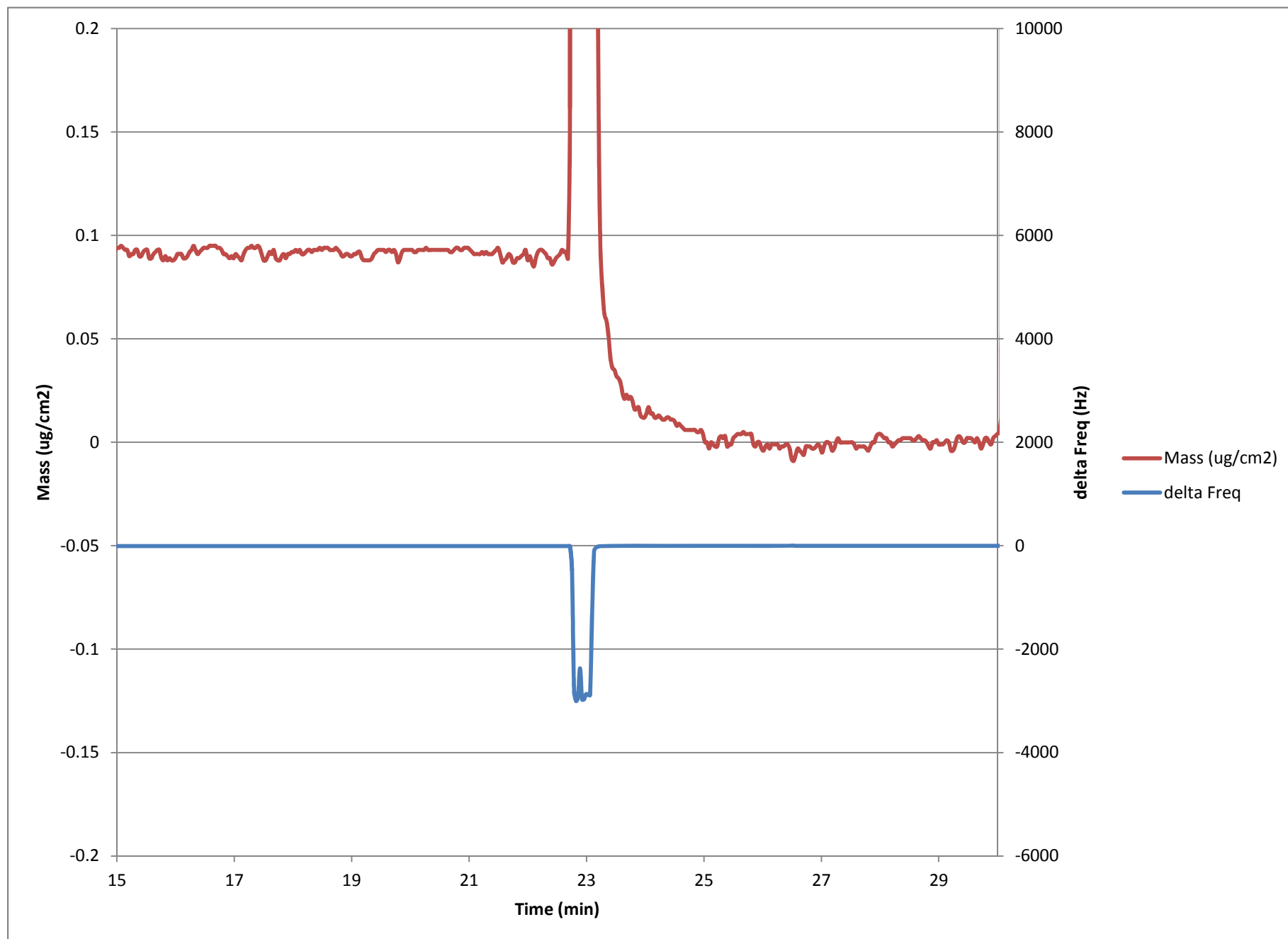
2143.76	35.72933333	-0.22	0.071	5993754.25	-5.75
2145.8	35.76333333	-0.11	0.071	5993754.27	-5.73
2147.86	35.79766667	-0.11	0.071	5993754.28	-5.72
Stop Log	#VALUE!	Run: 9	l/1981 Time: 14:11:00		



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