

Balancing Authority ACE Limit Proof-of-Concept Field Trial Project 2010-14

Eastern Interconnection Update Discussion

February 28, 2011

Starting at 2:30 PM EST

Bob Klueber – Midwest ISO

Balancing Authority Reliability-based Control Standard Drafting Team
(BARCSDT)

Balancing Authority ACE Limit Proof-of-Concept Field Trial

Eastern Interconnection Field Trial Participation

Participation reflects approximately 67% of the projected 2010 peak load for the Eastern Interconnection

Eastern Interconnection Balancing Authority Participants	2010 Frequency Bias	Region	Reliability Coordinator	Start Date
American Electric Power (CSWS)	-103.4	SPP	SPP	September 1, 2005
Associated Electric Cooperative, Inc. (AECI)	-45	SERC	TVA	April 1, 2010
Duke Energy Carolinas (DUK)	-196	SERC	VACS	April 1, 2009
East Kentucky Power Cooperative (EKPC)	-42.73	SERC	TVA	July 6, 2005
Entergy (EES)	-227.1	SERC	ICTE	July 6, 2005
EON-US (LGEE)	-74	SERC	TVA	April 1, 2008
Independent Electricity System Operator (IESO)	-245.8	NPCC	IESO	March 1, 2008
Manitoba Hydro (MHEB)	-43.3	MRO	MISO	July 6, 2005
Midwest Independent Transmission System Operator (MISO)	-1038.6	MRO, RFC, SERC	MISO	January 6, 2009
PJM Interconnection (PJM)	-1358	RFC	PJM	August 1, 2005
Santee Cooper (SC)	-61.52	SERC	VACS	March 1, 2006
Southern Company (SOCO)	-445	SERC	SOCO	October 15, 2005
Tennessee Valley Authority (TVA)	-317.6	SERC	TVA	October 1, 2005

Balancing Authority ACE Limit Proof-of-Concept Field Trial

The Balancing Authority ACE Limit (BAAL) shall not be exceeded for more than 30 consecutive clock-minutes*

	Longest exceedance of the Balancing Authority ACE Limit since starting operation under the Field Trial		January 2011 Performance under Field Trial	
	Max MinCtLow	Max MinCtHigh	Max MinCtLow	Max MinCtHigh
BA01	26	16	8	5
BA02	17	17	7	6
BA03	19	19	10	11
BA04	10	20	9	9
BA05	16	22	9	7
BA06	28	22	25	14
BA07	15	23	5	6
BA08	20	24	7	9
BA09	28	26	15	11
BA10	21	31	10	7
BA11	14	32	4	4
BA12	29	40	20	15
BA13	28	43	6	9

MinCtLow = Count of consecutive clock-minutes BAAL_{Low} was exceeded

MinCtHigh = Count of consecutive clock-minutes BAAL_{High} was exceeded

*BAAL being exceeded for more than 30 consecutive clock-minutes would be a violation under the proposed BAL-007 standard.

Frequency Statistics

Eastern Interconnection

Year	Month	Total Minutes FTL_Low at 59.98 Hz SF	Total Minutes FTL_Low at 60 Hz SF	Total FTL_Low Minutes	Percentage Low During TEC	FTL_Low Events	FTL_Low Max Duration	Total Minutes FTL_High at 60.02 Hz SF	Total Minutes FTL_High at 60 Hz SF	Total FTL_High Minutes	Percentage High During TEC	FTL_High Events	FTL_High Max Duration	Total FTL_Low and FTL_High Minutes at 60 Hz SF	Total FTL_Low and FTL_High Minutes
2005	7	28	30	58	48.28%	32	5	0	16	16	0.00%	11	3	46	74
2005	8	47	91	138	34.06%	56	10	0	35	35	0.00%	21	5	126	173
2005	9	32	39	71	45.07%	33	8	0	39	39	0.00%	21	7	78	110
2005	10	42	48	90	46.67%	43	11	0	33	33	0.00%	23	5	81	123
2005	11	65	43	108	60.19%	58	6	0	35	35	0.00%	22	7	78	143
2005	12	37	36	73	50.68%	41	7	0	27	27	0.00%	19	3	63	100
2006	1	42	33	75	56.00%	43	6	0	61	61	0.00%	27	5	94	136
2006	2	0	64	64	0.00%	39	6	2	43	45	4.44E-02	24	4	107	109
2006	3	28	51	79	35.44%	50	4	17	37	54	31.48%	33	8	88	133
2006	4	19	86	105	18.10%	58	5	0	76	76	0.00%	46	8	162	181
2006	5	52	67	119	43.70%	54	8	0	72	72	0.00%	39	5	139	191
2006	6	45	34	79	56.96%	41	5	0	59	59	0.00%	24	10	93	138
2006	7	31	40	71	43.66%	34	9	0	50	50	0.00%	29	4	90	121
2006	8	16	85	101	15.84%	49	5	0	58	58	0.00%	26	8	143	159
2006	9	19	60	79	24.05%	39	6	0	53	53	0.00%	33	4	113	132
2006	10	53	42	95	55.79%	51	6	0	54	54	0.00%	28	8	96	149
2006	11	56	35	91	61.54%	47	5	1	36	37	2.70%	22	3	71	128
2006	12	34	18	52	65.38%	34	4	0	54	54	0.00%	29	6	72	106
2007	1	59	29	88	67.05%	44	7	0	55	55	0.00%	31	7	84	143
2007	2	17	31	48	35.42%	33	3	0	39	39	0.00%	21	4	70	87
2007	3	75	83	158	47.47%	76	15	0	78	78	0.00%	38	8	161	236
2007	4	36	41	77	46.75%	45	5	0	58	58	0.00%	31	4	99	135
2007	5	70	46	116	60.34%	64	5	0	95	95	0.00%	49	7	141	211
2007	6	62	30	92	67.39%	47	6	0	51	51	0.00%	25	7	81	143
2007	7	47	20	67	70.15%	33	6	0	39	39	0.00%	20	4	59	106
2007	8	37	25	62	59.68%	31	6	1	55	56	1.79E-02	32	5	80	118
2007	9	20	75	95	21.05%	41	8	0	27	27	0.00%	16	5	102	122
2007	10	57	65	122	46.72%	73	5	1	56	57	1.75E-02	36	5	121	179
2007	11	74	21	95	77.89%	60	4	0	34	34	0.00%	24	5	55	129
2007	12	37	22	59	62.71%	38	6	0	61	61	0.00%	38	4	83	120
2008	1	0	75	75	0.00%	34	8	0	48	48	0.00%	24	4	123	123
2008	2	18	71	89	20.22%	46	8	0	51	51	0.00%	24	8	122	140
2008	3	37	65	102	36.27%	55	6	0	40	40	0.00%	34	2	105	142
2008	4	41	65	106	38.68%	60	5	0	59	59	0.00%	33	6	124	165
2008	5	67	39	106	63.21%	63	4	0	40	40	0.00%	20	5	79	146
2008	6	40	21	61	65.57%	34	5	0	35	35	0.00%	19	5	56	96
2008	7	42	17	59	71.19%	29	7	0	17	17	0.00%	12	3	34	76
2008	8	41	19	60	68.33%	35	5	0	29	29	0.00%	17	6	48	89
2008	9	25	44	69	36.23%	39	4	0	55	55	0.00%	21	11	99	124
2008	10	35	33	68	51.47%	38	5	0	27	27	0.00%	19	3	60	95
2008	11	13	9	22	59.09%	13	5	0	13	13	0.00%	9	4	22	35
2008	12	16	34	50	32.00%	35	4	0	11	11	0.00%	8	3	45	61
2009	1	2	26	28	7.14E-02	16	4	0	19	19	0.00%	9	3	45	47
2009	2	0	34	34	0.00%	18	4	0	18	18	0.00%	11	6	52	52
2009	3	0	41	41	0.00%	23	5	0	25	25	0.00%	11	9	66	66
2009	4	0	59	59	0.00%	37	5	0	27	27	0.00%	20	3	86	86
2009	5	8	35	43	18.60%	31	4	0	27	27	0.00%	15	8	62	70
2009	6	30	28	58	51.72%	28	5	0	25	25	0.00%	16	3	53	83
2009	7	14	22	36	38.89%	22	3	0	28	28	0.00%	16	6	50	64
2009	8	16	10	26	61.54%	20	2	0	13	13	0.00%	10	2	23	39
2009	9	11	22	33	33.33%	21	3	0	20	20	0.00%	14	4	42	53
2009	10	44	45	89	49.44%	44	6	0	18	18	0.00%	10	3	63	107
2009	11	30	19	49	61.22%	33	3	0	34	34	0.00%	21	4	53	83
2009	12	11	23	34	32.35%	20	5	0	22	22	0.00%	15	3	45	56
2010	1	36	26	62	58.06%	35	6	0	16	16	0.00%	9	3	42	78
2010	2	23	16	39	58.97%	24	3	0	26	26	0.00%	16	2	42	65
2010	3	38	71	109	34.86%	65	6	0	40	40	0.00%	22	6	111	149
2010	4	63	38	101	62.38%	65	5	0	54	54	0.00%	34	6	92	155
2010	5	72	30	102	70.59%	60	6	0	40	40	0.00%	29	4	70	142
2010	6	10	28	38	26.32%	27	2	0	10	10	0.00%	9	2	38	48
2010	7	8	19	27	29.63%	17	4	0	30	30	0.00%	13	5	49	57
2010	8	16	29	45	35.56%	24	4	0	17	17	0.00%	11	3	46	62
2010	9	0	56	56	0.00%	31	4	0	22	22	0.00%	11	4	78	78
2010	10	1	60	61	1.64E-02	40	5	0	19	19	0.00%	15	4	79	80
2010	11	0	59	59	0.00%	44	3	5	26	31	16.13%	20	3	85	90
2010	12	8	12	20	40.00%	18	2	3	30	33	9.09E-02	20	5	42	53
2011	1	5	30	35	14.29%	25	3	0	9	9	0.00%	6	4	39	44

This chart is a summary of frequency-related statistics gathered since the start of the Field Trial. Of particular interest is the drop in operation outside of the FTL bounds, trending lower in the latter part of 2008 with November 2008 having the least number of clock-minutes of operation outside the FTL bounds, followed by August 2009, over the dataset.

Frequency Statistics

Eastern Interconnection

Year	Month	Total Minutes FTL_Low at 59.98 Hz SF	Total Minutes FTL_Low at 60 Hz SF	Year	Month	Total Minutes FTL_Low at 59.98 Hz SF	Total Minutes FTL_Low at 60 Hz SF	Total FTL_Low Minutes	Percentage Low During TEC	FTL_Low Events	FTL_Low Max Duration	FTL_High Max Duration	Total FTL_Low and FTL_High Minutes at 60 Hz SF	Total FTL_Low and FTL_High Minutes
2005	7	28	30									3	46	74
2005	8	47	91									5	126	173
2005	9	32	39									7	78	110
2005	10	42	46									5	81	123
2005	11	65	43									7	78	143
2005	12	37	36									3	63	100
2006	1	42	33	2008	1	0	75	75	0.00%	34	8	5	94	136
2006	2	0	64	2008	2	18	71	89	20.22%	46	8	4	107	109
2006	3	28	51	2008	3	37	65	102	36.27%	55	6	8	88	133
2006	4	19	86	2008	4	41	65	106	38.68%	60	5	8	162	181
2006	5	52	67	2008	5	67	39	106	63.21%	63	4	5	139	191
2006	6	45	34	2008	6	40	21	61	65.57%	34	5	10	93	138
2006	7	31	40	2008	7	42	17	59	71.19%	29	7	4	90	121
2006	8	16	86	2008	8	41	19	60	68.33%	35	5	8	143	159
2006	9	19	60	2008	9	25	44	69	36.23%	39	4	4	113	132
2006	10	53	42	2008	10	35	33	68	51.47%	38	5	8	96	149
2006	11	56	36	2008	11	13	9	22	59.09%	13	5	3	71	128
2006	12	34	16	2008	12	16	34	50	32.00%	35	4	6	72	106
2007	1	59	29	2009	1	2	26	28	7.14E-02	16	4	7	84	143
2007	2	17	31	2009	2	0	34	34	0.00%	18	4	4	70	87
2007	3	75	83	2009	3	0	41	41	0.00%	23	5	8	161	236
2007	4	36	41	2009	4	0	59	59	0.00%	37	5	4	99	135
2007	5	70	46	2009	5	8	35	43	18.60%	31	4	7	141	211
2007	6	62	30	2009	6	30	28	58	51.72%	28	5	7	81	143
2007	7	47	20	2009	7	14	22	36	38.89%	22	3	4	59	106
2007	8	37	26	2009	8	16	10	26	61.54%	20	2	5	80	118
2007	9	20	75	2009	9	11	22	33	33.33%	21	3	5	102	122
2007	10	57	65	2009	10	44	45	89	49.44%	44	6	5	121	179
2007	11	74	21	2009	11	30	19	49	61.22%	33	3	5	55	129
2007	12	37	22	2009	12	11	23	34	32.35%	20	5	4	83	120
2008	1	0	75	2010	1	36	26	62	58.06%	35	6	4	123	123
2008	2	18	71	2010	2	23	16	39	58.97%	24	3	8	122	140
2008	3	37	65	2010	3	38	71	109	34.86%	65	6	2	105	142
2008	4	41	65	2010	4	63	38	101	62.38%	65	5	6	124	165
2008	5	67	39	2010	5	72	30	102	70.59%	60	6	5	79	146
2008	6	40	21	2010	6	10	28	38	26.32%	27	2	5	56	96
2008	7	42	17	2010	7	8	19	27	29.63%	17	4	3	34	76
2008	8	41	19	2010	8	16	29	45	35.56%	24	4	6	48	89
2008	9	25	44	2010	9	0	56	56	0.00%	31	4	11	99	124
2008	10	35	33	2010	10	1	60	61	1.64E-02	40	5	3	60	95
2008	11	13	9	2010	11	0	59	59	0.00%	44	3	4	22	35
2008	12	16	34	2010	12	8	12	20	40.00%	18	2	3	45	61
2009	1	2	26	2011	1	5	30	35	14.29%	25	3	3	45	47
2009	2	0	34									6	52	52
2009	3	0	41									9	66	66
2009	4	0	59									3	86	86
2009	5	8	36									8	62	70
2009	6	30	26									3	53	83
2009	7	14	22									6	50	64
2009	8	16	10									2	23	39
2009	9	11	22									4	42	53
2009	10	44	45									3	63	107
2009	11	30	19									4	53	83
2009	12	11	23									3	45	56
2010	1	36	26									3	42	78
2010	2	23	16									2	42	65
2010	3	38	71									6	111	149
2010	4	63	36									6	92	155
2010	5	72	30									4	70	142
2010	6	10	26									2	38	48
2010	7	8	19									5	49	57
2010	8	16	29									3	46	62
2010	9	0	56									4	78	78
2010	10	1	60									4	79	80
2010	11	0	59									3	85	90
2010	12	8	12									5	42	53
2011	1	5	30									4	39	44

This chart is a summary of frequency-related statistics gathered since the start of the Field Trial. Of particular interest is the drop in operation outside of the FTL bounds, trending lower in the latter part of 2008 with November 2008 having the least number of clock-minutes of operation outside the FTL bounds, followed by August 2009, over the dataset.

Frequency Statistics

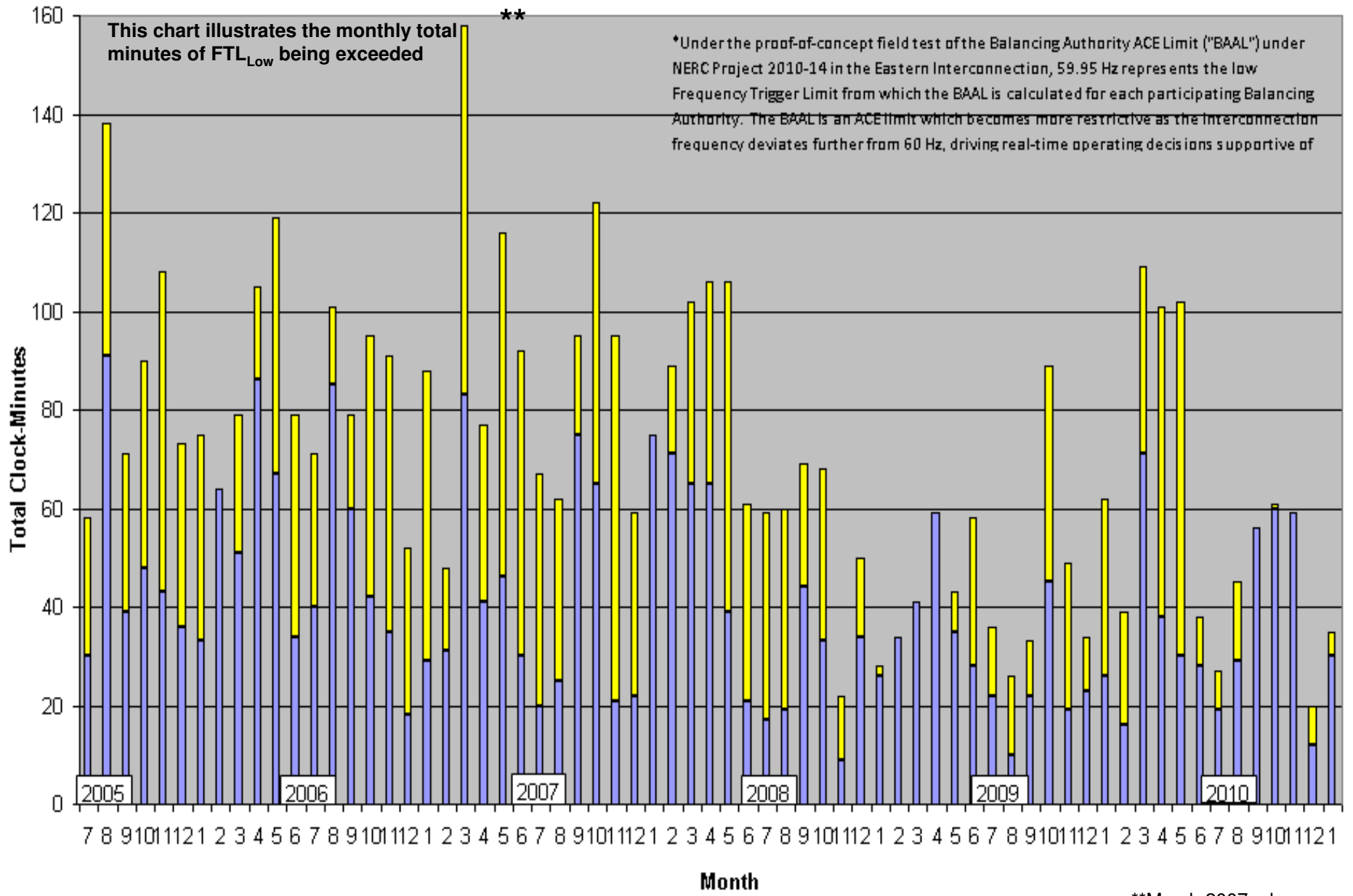
Eastern Interconnection

Year	Month	Total Minutes FTL_Low at 60 Hz SF	Total Minutes FTL_High at 60.02 Hz SF	Total Minutes FTL_High at 60 Hz SF	Total FTL_High Minutes	Percentage High During TEC	FTL_High Events	FTL_High Max Duration	Total FTL_Low and FTL_High Minutes at 60 Hz SF	Total FTL_Low and FTL_High Minutes	Low High at 60 Hz SF	Total FTL_Low and FTL_High Minutes
2005	7										46	74
2005	8										126	173
2005	9										78	110
2005	10										81	123
2005	11										78	143
2005	12										63	100
2006	1										94	136
2006	2	2008	1	0	48	48	0.00%	24	4	123	107	109
2006	3	2008	2	0	51	51	0.00%	24	8	122	88	133
2006	4	2008	3	0	40	40	0.00%	34	2	105	162	181
2006	5	2008	4	0	59	59	0.00%	33	6	124	139	191
2006	6	2008	5	0	40	40	0.00%	20	5	79	93	138
2006	7	2008	6	0	35	35	0.00%	19	5	56	90	121
2006	8	2008	7	0	17	17	0.00%	12	3	34	143	159
2006	9	2008	8	0	29	29	0.00%	17	6	48	113	132
2006	10	2008	9	0	55	55	0.00%	21	11	99	96	149
2006	11	2008	10	0	27	27	0.00%	19	3	60	71	128
2006	12	2008	11	0	13	13	0.00%	9	4	22	72	106
2007	1	2008	12	0	11	11	0.00%	8	3	45	84	143
2007	2	2009	1	0	19	19	0.00%	9	3	45	70	87
2007	3	2009	2	0	18	18	0.00%	11	6	52	161	236
2007	4	2009	3	0	25	25	0.00%	11	9	66	99	135
2007	5	2009	4	0	27	27	0.00%	20	3	86	141	211
2007	6	2009	5	0	25	25	0.00%	16	3	53	81	143
2007	7	2009	6	0	28	28	0.00%	16	6	50	59	106
2007	8	2009	7	0	13	13	0.00%	10	2	23	80	118
2007	9	2009	8	0	20	20	0.00%	14	4	42	102	122
2007	10	2009	9	0	18	18	0.00%	10	3	63	121	179
2007	11	2009	10	0	34	34	0.00%	21	4	53	55	129
2007	12	2009	11	0	22	22	0.00%	15	3	45	83	120
2008	1	2010	1	0	16	16	0.00%	9	3	42	123	123
2008	2	2010	2	0	26	26	0.00%	16	2	42	122	140
2008	3	2010	3	0	40	40	0.00%	22	6	111	105	142
2008	4	2010	4	0	54	54	0.00%	34	6	92	124	165
2008	5	2010	5	0	40	40	0.00%	29	4	70	79	146
2008	6	2010	6	0	10	10	0.00%	9	2	38	56	96
2008	7	2010	7	0	30	30	0.00%	13	5	49	34	76
2008	8	2010	8	0	17	17	0.00%	11	3	46	48	89
2008	9	2010	9	0	22	22	0.00%	11	4	78	99	124
2008	10	2010	10	5	26	31	16.13%	20	3	85	60	95
2008	11	2010	11	3	30	33	9.09%	20	5	42	22	35
2008	12	2010	12	0	9	9	0.00%	6	4	39	45	61
2009	1	2011	1	0	9	9	0.00%	6	4	39	45	47
2009	2										52	52
2009	3										66	66
2009	4										86	86
2009	5										62	70
2009	6										53	83
2009	7										50	64
2009	8										23	39
2009	9										42	53
2009	10										63	107
2009	11										53	83
2009	12										45	56
2010	1										42	78
2010	2										42	65
2010	3										42	65
2010	4										111	149
2010	5										92	155
2010	6										53	83
2010	7										45	56
2010	8										42	78
2010	9										46	62
2010	10										78	78
2010	11										49	57
2010	12										46	62
2011	1										78	78
											79	80
											85	90
											42	53
											39	44

This chart is a summary of frequency-related statistics gathered since the start of the Field Trial. Of particular interest is the drop in operation outside of the FTL bounds, trending lower in the latter part of 2008 with November 2008 having the least number of clock-minutes of operation outside the FTL bounds, followed by August 2009, over the dataset.

Total Clock-Minutes of Frequency below 59.95 Hz*

Eastern Interconnection

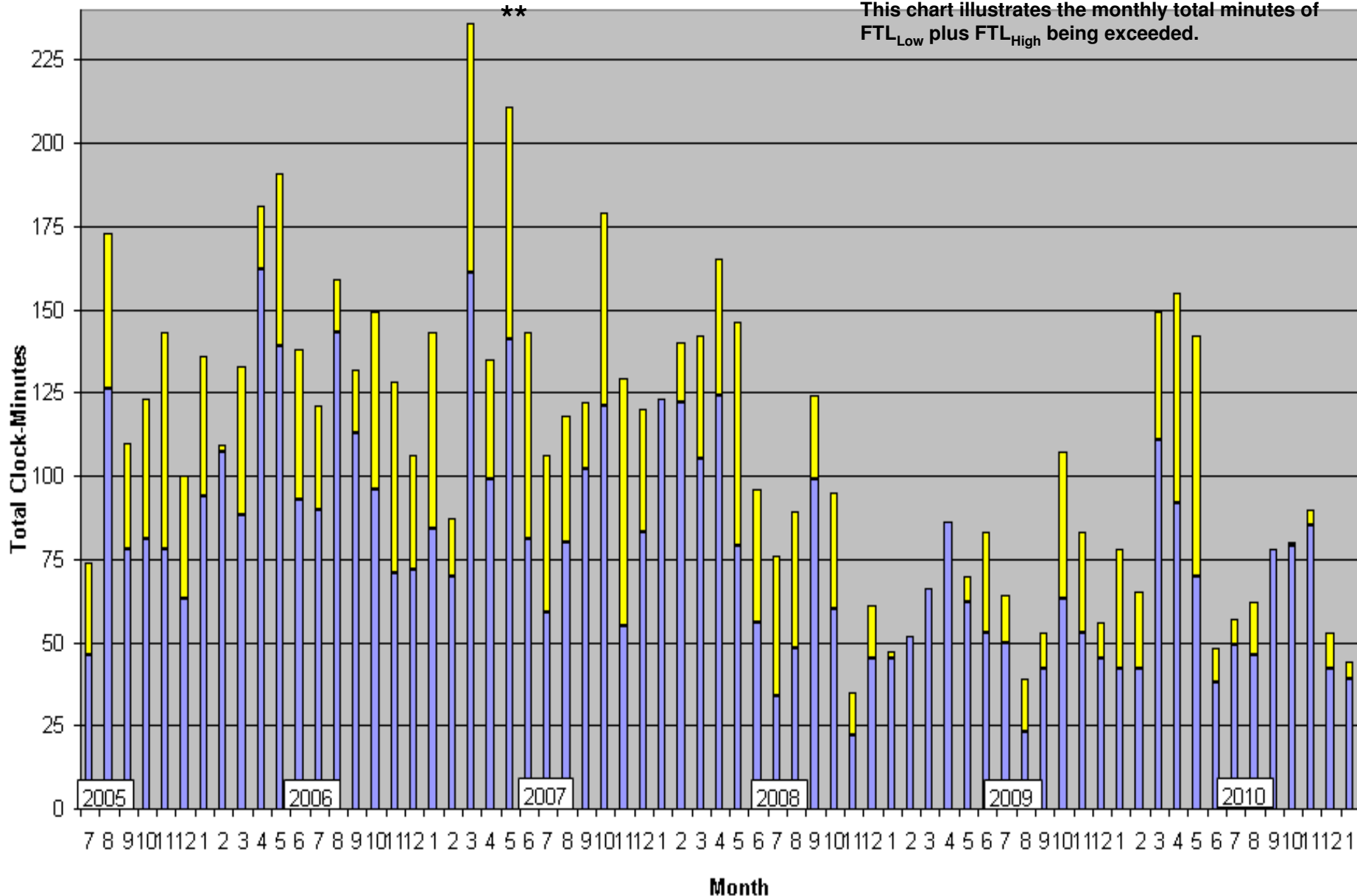


■ Total Minutes at 60 Hz ■ Addition Minutes During Time-Error Corrections

**March 2007- change to the new Daylight Saving Time.

Total Clock-Minutes less than 59.95 Hz or greater than 60.05 Hz Eastern Interconnection

This chart illustrates the monthly total minutes of FTL_{Low} plus FTL_{High} being exceeded.



■ Total Minutes at 60 Hz ■ Addition Minutes During Time-Error Corrections

**March 2007- change to the new Daylight Saving Time.

Date	Time	TimeZone	FreqError	ActualFreq	SchedFreq	MinCtLow	MinCtHigh	ACPS1
01/01/11	17:12	CST	-0.0159	59.9641	59.98	11	0	-2534.79
01/01/11	17:13	CST	-0.0126	59.9674	59.98	12	0	-2194.14
01/01/11	17:14	CST	-0.0077	59.9723	59.98	13	0	-1728.27
01/01/11	17:15	CST	-0.0095	59.9705	59.98	14	0	-1818.63
01/01/11	17:16	CST	-0.0001	59.9799	59.98	15	0	-1099.61
01/01/11	17:17	CST	-0.0157	59.9643	59.98	16	0	-2256.88
01/01/11	17:18	CST	-0.0177	59.9623	59.98	17	0	-2430.28
01/01/11	17:19	CST	0.007	59.987	59.98	18	0	-626.19
01/01/11	17:42	CST	-0.002	59.978	59.98	11	0	-2420.31
01/01/11	17:43	CST	-0.0044	59.9756	59.98	12	0	-2741.54
01/01/11	17:44	CST	0.0073	59.9873	59.98	13	0	-1321.71
01/01/11	17:45	CST	-0.0028	59.9772	59.98	14	0	-2722.18
01/01/11	17:46	CST	-0.0106	59.9694	59.98	15	0	-3721.17
01/01/11	17:47	CST	-0.0051	59.9749	59.98	16	0	-2938.75
01/01/11	17:48	CST	0.0067	59.9867	59.98	17	0	-1440.67
01/01/11	17:49	CST	0.0086	59.9886	59.98	18	0	-1230.37
01/01/11	17:50	CST	0.0089	59.9889	59.98	19	0	-1217.99
01/01/11	17:51	CST	0.0098	59.9898	59.98	20	0	-1080.72
01/01/11	17:52	CST	0.0101	59.9901	59.98	21	0	-1029.33
01/01/11	17:53	CST	0.004	59.984	59.98	22	0	-1819.63
01/01/11	17:54	CST	-0.004	59.976	59.98	23	0	-2958.10
01/01/11	17:55	CST	-0.0021	59.9779	59.98	24	0	-2586.63
01/01/11	17:56	CST	0.0059	59.9859	59.98	25	0	-1434.66
01/03/11	7:20	EST	-0.01016	59.98984	60	11	0	-651.04
01/03/11	7:21	EST	-0.02142333	59.97858	60	12	0	-1694.50
01/03/11	7:22	EST	-0.02746667	59.97253	60	13	0	-2183.12
01/03/11	7:23	EST	-0.03308333	59.96692	60	14	0	-3205.22
01/03/11	7:24	EST	-0.0299	59.9701	60	15	0	-3178.00
01/03/11	7:25	EST	-0.02542	59.97458	60	16	0	-2422.17
01/03/11	7:26	EST	-0.01837667	59.98162	60	17	0	-1712.62
01/03/11	7:27	EST	-0.01637	59.98363	60	18	0	-1451.86
01/03/11	7:28	EST	-0.02211667	59.97788	60	19	0	-1448.69
01/03/11	7:29	EST	-0.01578333	59.98422	60	20	0	-832.20
01/10/11	11:09	EST	-0.01385	59.98615	60	11	0	-1740.02
01/10/11	11:10	EST	-0.01396552	59.98603	60	12	0	-1751.24
01/10/11	11:11	EST	-0.007733333	59.99227	60	13	0	-878.69
01/10/11	11:12	EST	-0.01156207	59.98844	60	14	0	-1321.56
01/10/11	11:13	EST	-0.01158667	59.98841	60	15	0	-1222.83
01/10/11	11:14	EST	-0.0164	59.9836	60	16	0	-1686.28
01/21/11	17:34	EST	-0.04722414	59.95278	60	11	0	-3628.47
01/21/11	17:35	EST	-0.03787667	59.96212	60	12	0	-2683.17
01/21/11	17:36	EST	-0.03767667	59.96232	60	13	0	-2540.42
01/21/11	17:37	EST	-0.03706	59.96294	60	14	0	-2110.38
01/21/11	17:38	EST	-0.03153104	59.96847	60	15	0	-2132.54
01/21/11	17:39	EST	-0.02422667	59.97577	60	16	0	-1529.92
01/31/11	17:48	CST	-0.0102	59.9698	59.98	11	0	-1778.78
01/31/11	17:49	CST	-0.0178	59.9622	59.98	12	0	-2414.13
01/31/11	17:50	CST	-0.0271	59.9529	59.98	13	0	-3052.65
01/31/11	17:51	CST	-0.0178	59.9622	59.98	14	0	-2522.22
01/31/11	17:52	CST	-0.0209	59.9591	59.98	15	0	-2798.42
01/31/11	17:53	CST	-0.0006	59.9794	59.98	16	0	-1264.60
01/31/11	17:54	CST	-0.0045	59.9755	59.98	17	0	-1557.34
01/31/11	17:55	CST	-0.0077	59.9723	59.98	18	0	-1802.20
01/31/11	17:56	CST	-0.009	59.971	59.98	19	0	-1707.43

All durations of the BAAL being exceeded for more than 15 consecutive clock-minutes noted on left.

Periods of the FTL being exceeded for 3 consecutive clock minutes or more:

PrevailingTime	PTimeZone	FreqError	ActualFreq	SchedFreq
1/17/11 9:59	EST	-0.0607	59.9393	60
1/17/11 10:00	EST	-0.0586	59.9414	60
1/17/11 10:01	EST	-0.0514	59.9486	60
1/23/11 16:56	EST	0.0603	60.0603	60
1/23/11 16:57	EST	0.0669	60.0669	60
1/23/11 16:58	EST	0.0659	60.0659	60
1/23/11 16:59	EST	0.0563	60.0563	60

Date	Time	TimeZone	FreqError	ActualFreq	SchedFreq	MinCtLow	MinCtHigh	ACPS1
01/01/11	17:12	CST	-0.0159	59.9641	59.98	11	0	-2534.79
01/01/11	17:13	CST	-0.0126	59.9674	59.98	12	0	-2194.14
01/01/11	17:14	CST	-0.0077	59.9723	59.98	13	0	-1728.27
01/01/11	17:15	CST	-0.0095	59.9705	59.98	14	0	-1818.63
01/01/11	17:16	CST	0.0001	59.9799	59.98	15	0	-1099.61
01/01/11	17:17	CST						
01/01/11	17:18	CST						
01/01/11	17:19	CST						
01/01/11	17:42	CST						
01/01/11	17:43	CST						
01/01/11	17:44	CST						
01/01/11	17:45	CST						
01/01/11	17:46	CST						
01/01/11	17:47	CST						
01/01/11	17:48	CST						
01/01/11	17:49	CST						
01/01/11	17:50	CST						
01/01/11	17:51	CST						
01/01/11	17:52	CST						
01/01/11	17:53	CST						
01/01/11	17:54	CST						
01/01/11	17:55	CST						
01/01/11	17:56	CST						
01/03/11	7:20	EST						
01/03/11	7:21	EST						
01/03/11	7:22	EST						
01/03/11	7:23	EST						
01/03/11	7:24	EST						
01/03/11	7:25	EST						
01/03/11	7:26	EST						
01/03/11	7:27	EST						
01/03/11	7:28	EST						
01/03/11	7:29	EST						
01/10/11	11:09	EST						
01/10/11	11:10	EST						
01/10/11	11:11	EST						
01/10/11	11:12	EST						
01/10/11	11:13	EST						
01/10/11	11:14	EST						
01/21/11	17:34	EST						
01/21/11	17:35	EST						
01/21/11	17:36	EST						
01/21/11	17:37	EST						
01/21/11	17:38	EST						
01/21/11	17:39	EST						
01/31/11	17:48	CST						
01/31/11	17:49	CST						
01/31/11	17:50	CST						
01/31/11	17:51	CST	-0.0271	59.9629	59.98	13	0	-3052.65
01/31/11	17:52	CST	-0.0178	59.9622	59.98	14	0	-2522.22
01/31/11	17:53	CST	-0.0209	59.9591	59.98	15	0	-2798.42
01/31/11	17:54	CST	-0.0006	59.9794	59.98	16	0	-1264.60
01/31/11	17:55	CST	-0.0045	59.9755	59.98	17	0	-1557.34
01/31/11	17:56	CST	-0.0077	59.9723	59.98	18	0	-1802.20
01/31/11	17:56	CST	-0.009	59.971	59.98	19	0	-1707.43

All durations of the BAAL being

secutive

Dates in this presentation:

Clock-minute Frequency greater than the FTL_{High} on January 23, 2011, ending 16:59 EST: 4 consecutive clock-minutes.

Clock-minute ACE less than the $BAAL_{Low}$ on January 1, 2011, ending 18:19 EST: 18 consecutive clock-minutes during time-error correction.

Clock-minute ACE less than the $BAAL_{Low}$ on January 1, 2011, ending 18:56 EST: 25 consecutive clock-minutes during time-error correction.

Clock-minute ACE less than the $BAAL_{Low}$ on January 3, 2011, ending 07:29 EST: 20 consecutive clock-minutes

Clock-minute ACE less than the $BAAL_{Low}$ on January 31, 2011, ending 18:56 EST: 19 consecutive clock-minutes during time-error correction.

Under the draft requirement, a proposed $BAAL_{Low}$ violation would occur when the ACE is lower than $BAAL_{Low}$ for more than 30 consecutive clock-minutes and a proposed $BAAL_{High}$ violation would occur when the ACE is greater than $BAAL_{High}$ for more than 30 consecutive clock-minutes.

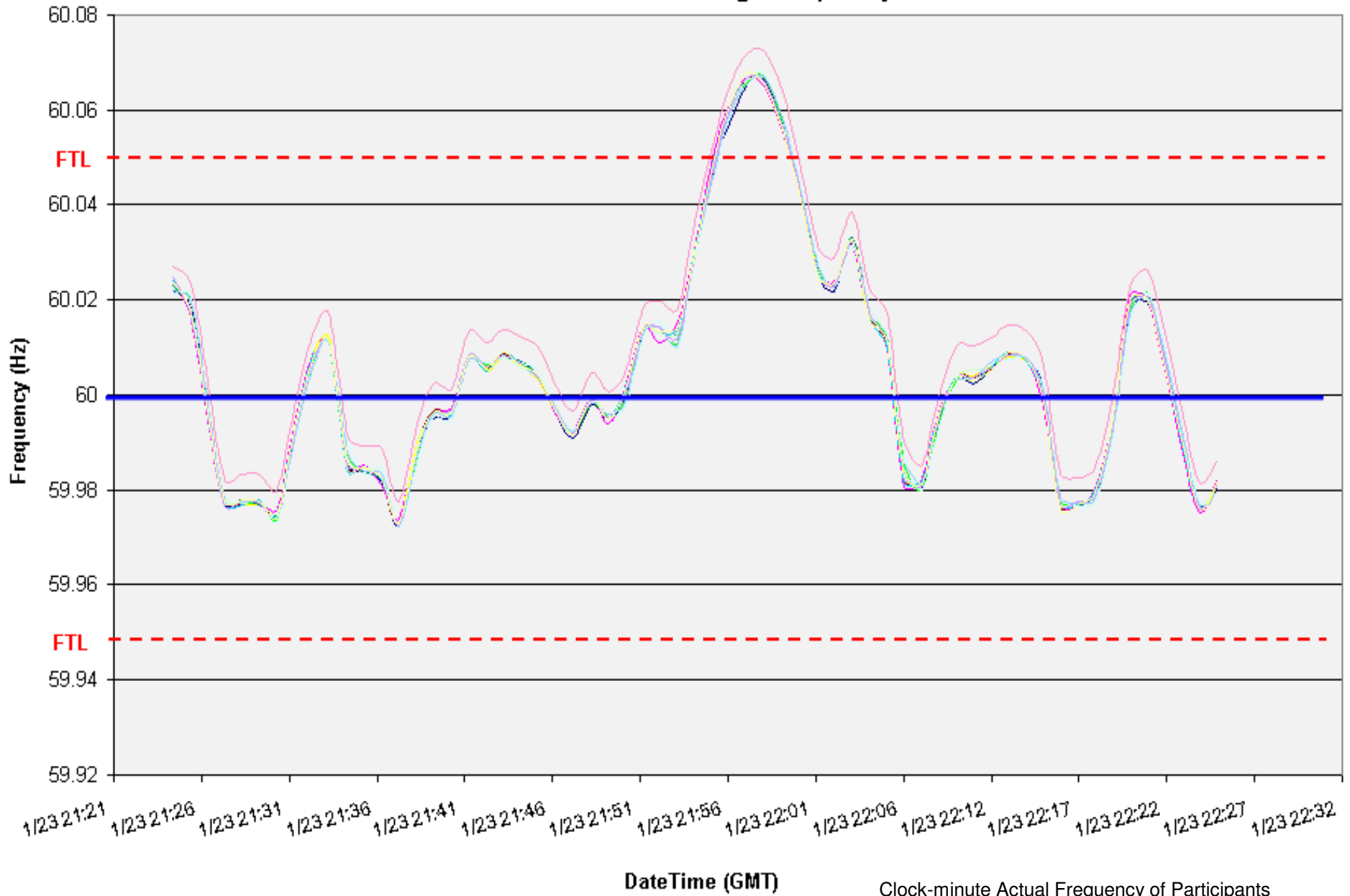
Under prior work on draft BAL-008, a proposed FTL_{Low} violation would occur when the Frequency is lower than FTL_{Low} for more than 30 consecutive clock-minutes and a proposed FTL_{High} violation would occur when the Frequency is greater than FTL_{High} for more than 30 consecutive clock-minutes.

ended for
more:

alFreq	SchedFreq
59.9393	60
59.9414	60
59.9486	60
60.0603	60
60.0669	60
60.0659	60
60.0563	60

01/23/2011 ending 16:59 EST
4-minute duration above FTL_{High}

EI Clock-Minute Average Frequency

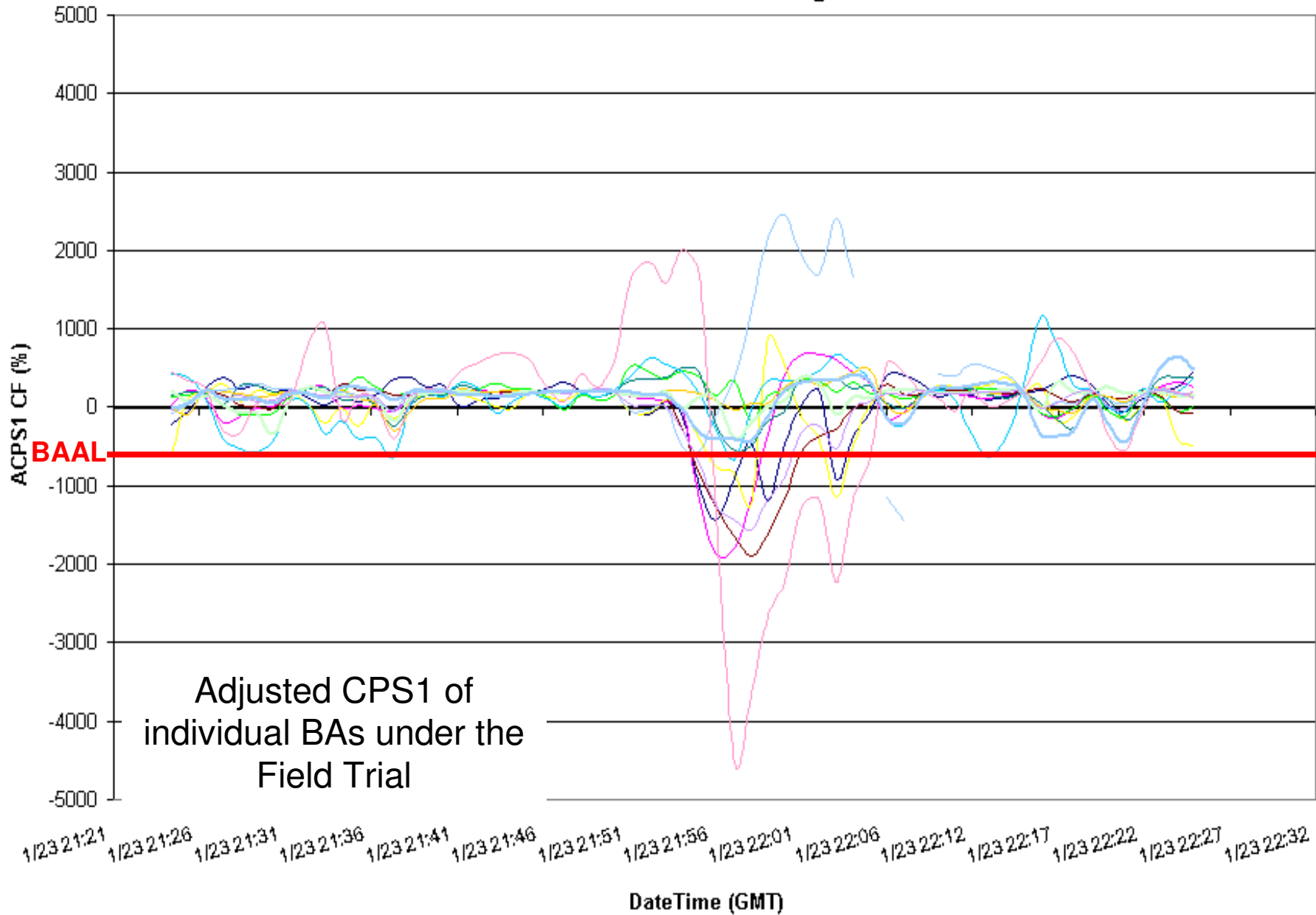


Clock-minute Actual Frequency of Participants

01/23/2011 ending 16:59 EST

4-minute duration above FTL_{High}

ACPS1 Clock-Minute Averages

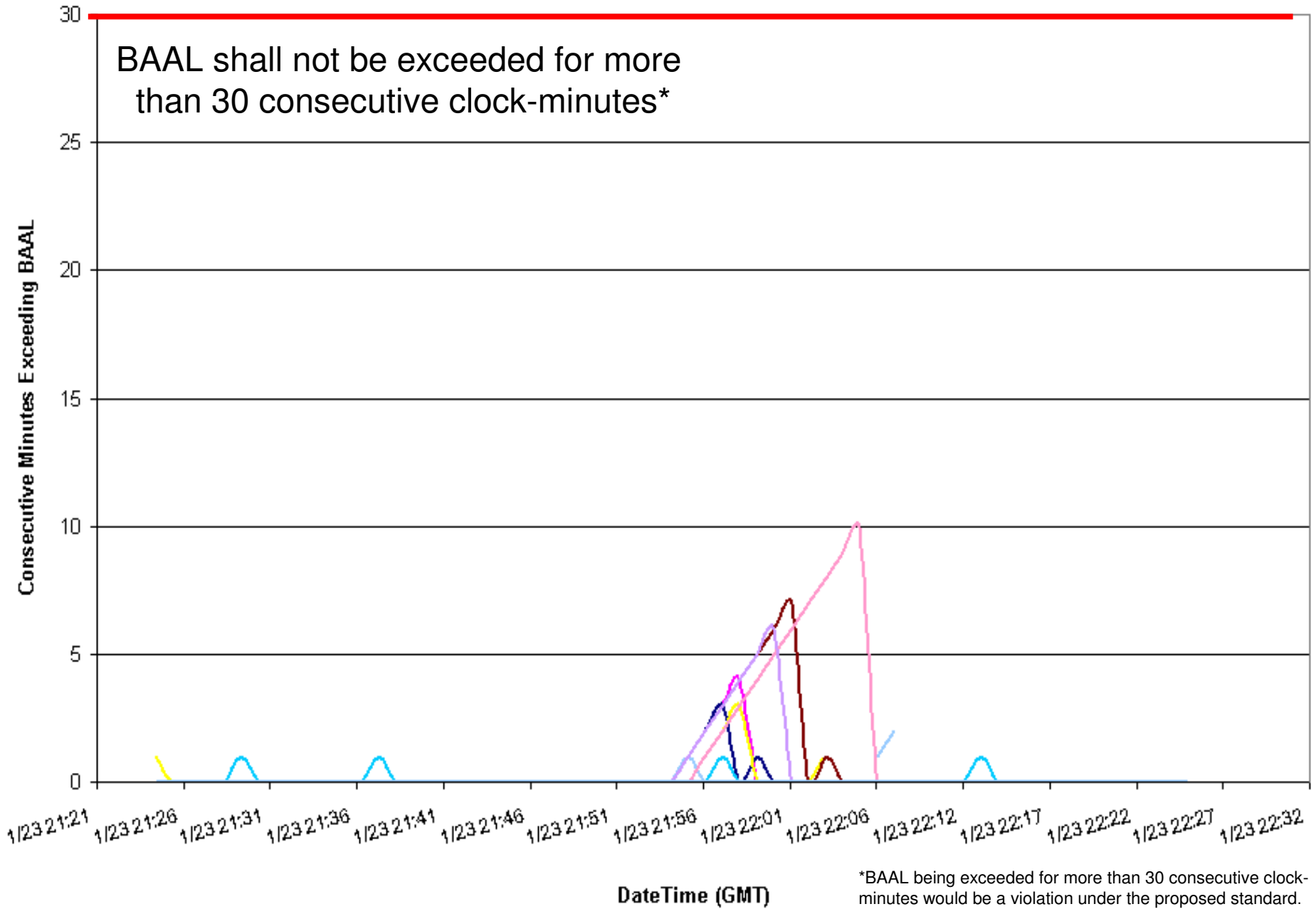


01/23/2011 ending 16:59 EST

4-minute duration above FTL_{High}

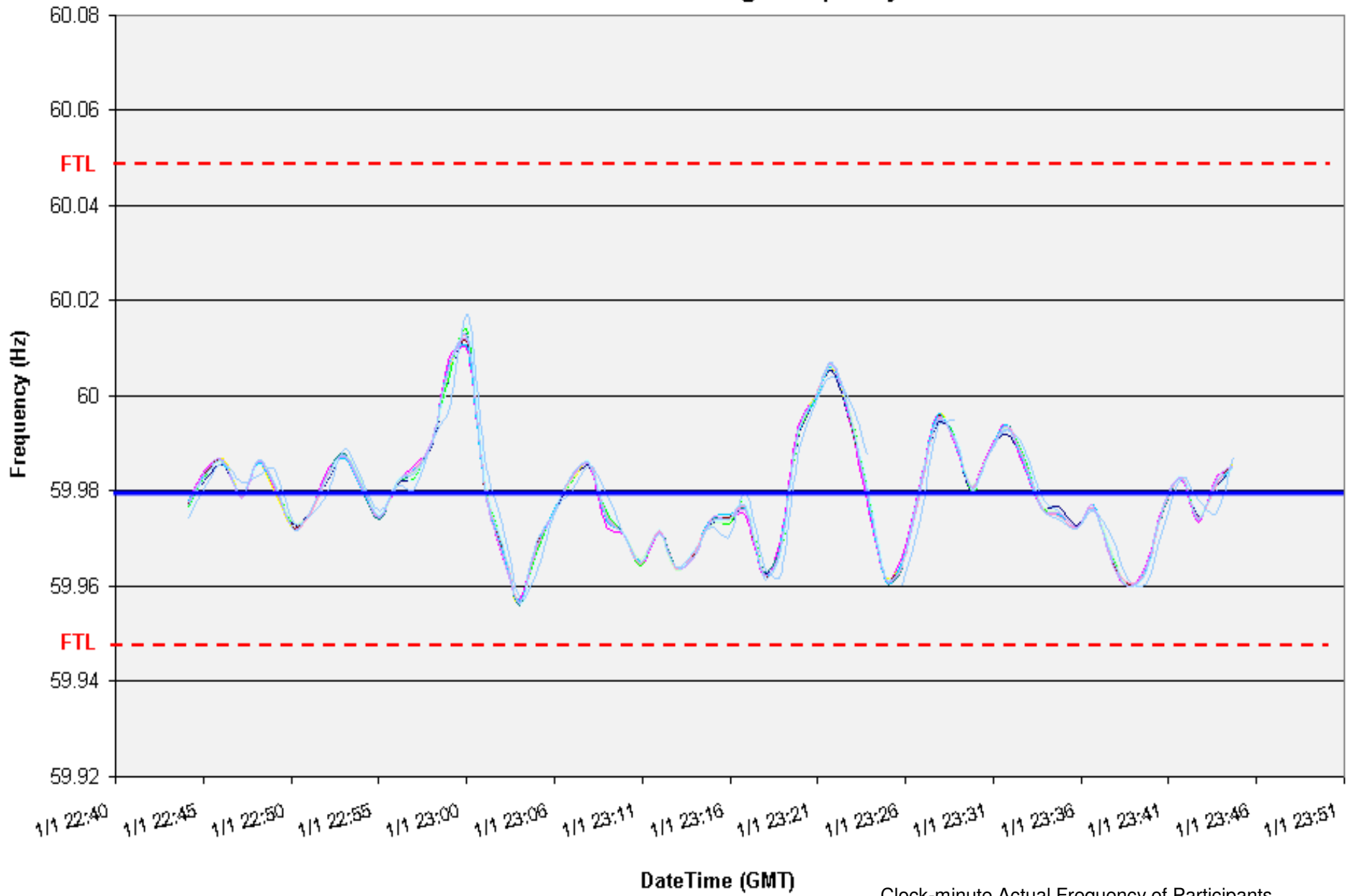
Consecutive Minutes Exceeding BAAL

BAAL Violation*



01/01/2011 ending 18:19 EST
18-minute duration below BAAL_{Low}

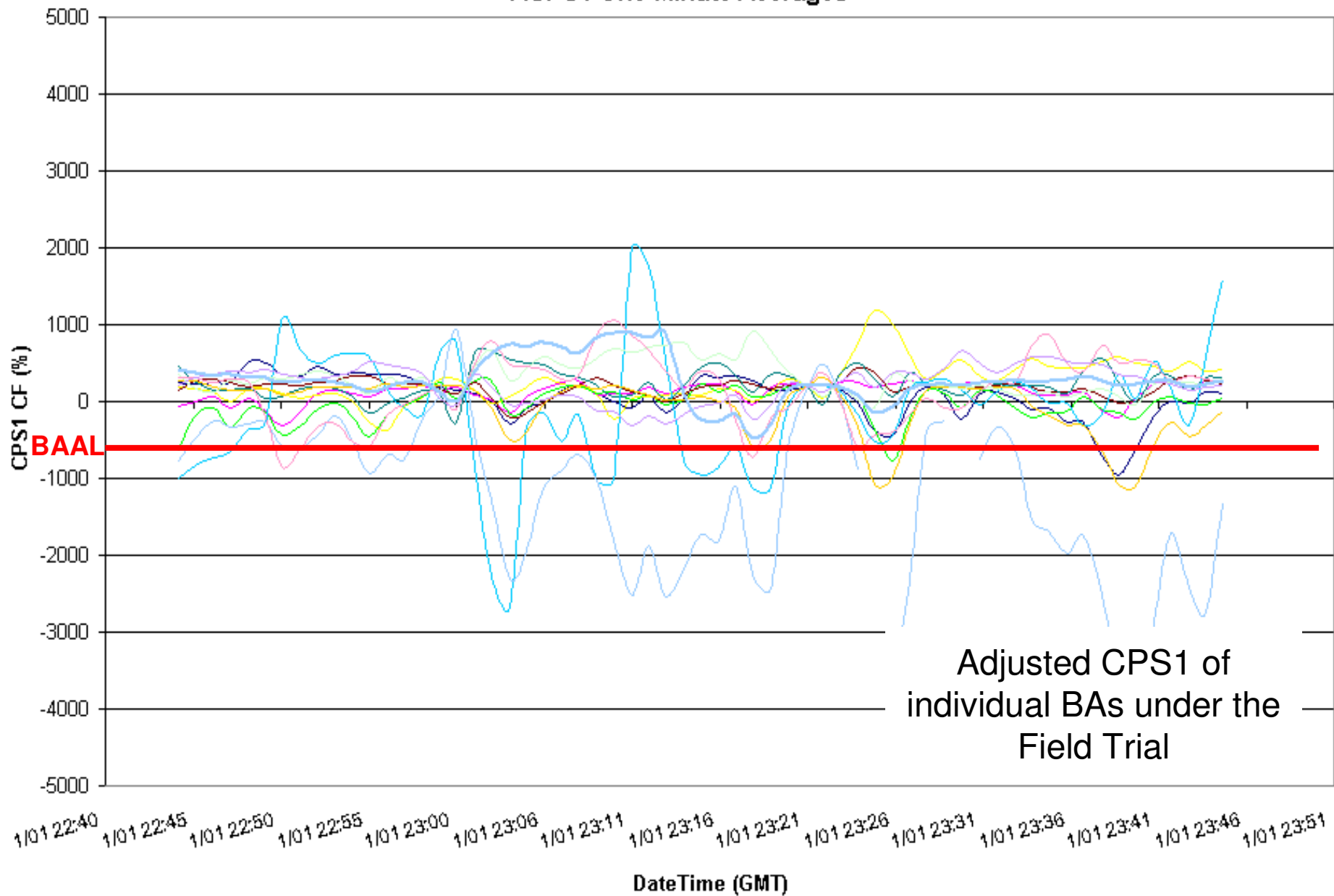
EI Clock-Minute Average Frequency



Clock-minute Actual Frequency of Participants

01/01/2011 ending 18:19 EST
18-minute duration below BAAL_{Low}

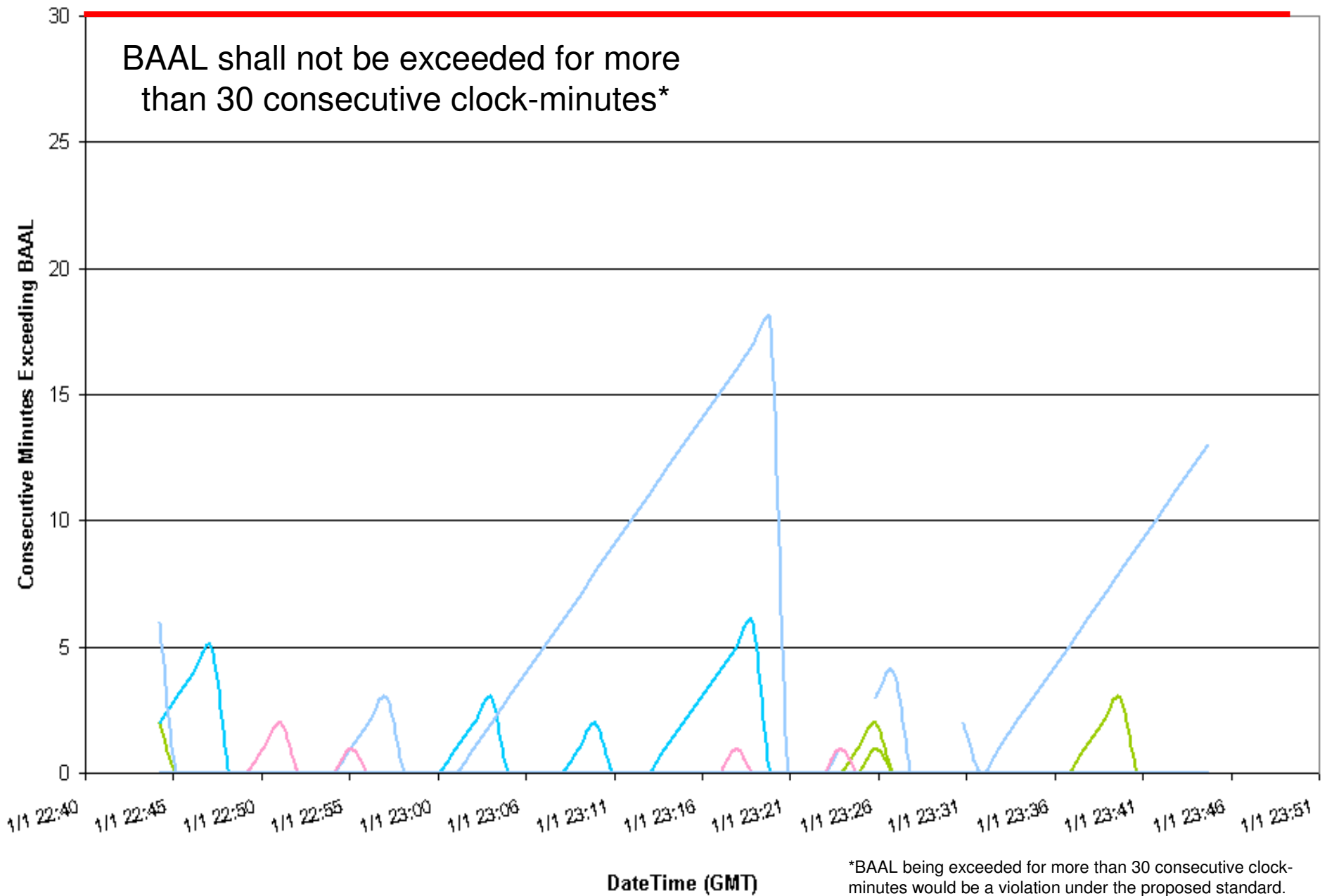
ACPS1 One-Minute Averages



01/01/2011 ending 18:19 EST
18-minute duration below BAAL_{Low}

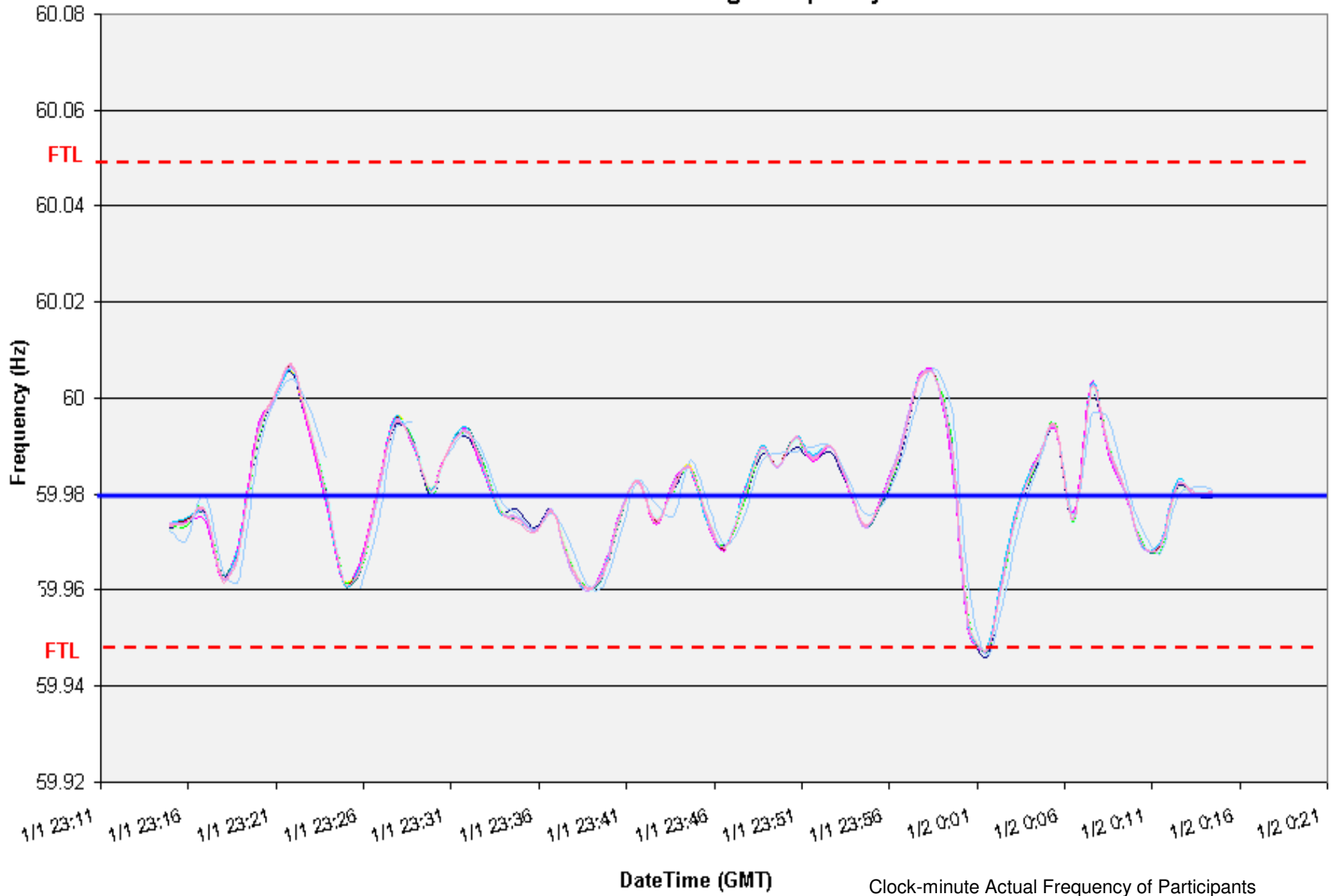
Consecutive Minutes Exceeding BAAL

BAAL Violation*



01/01/2011 ending 18:56 EST
25-minute duration below BAAL_{Low}

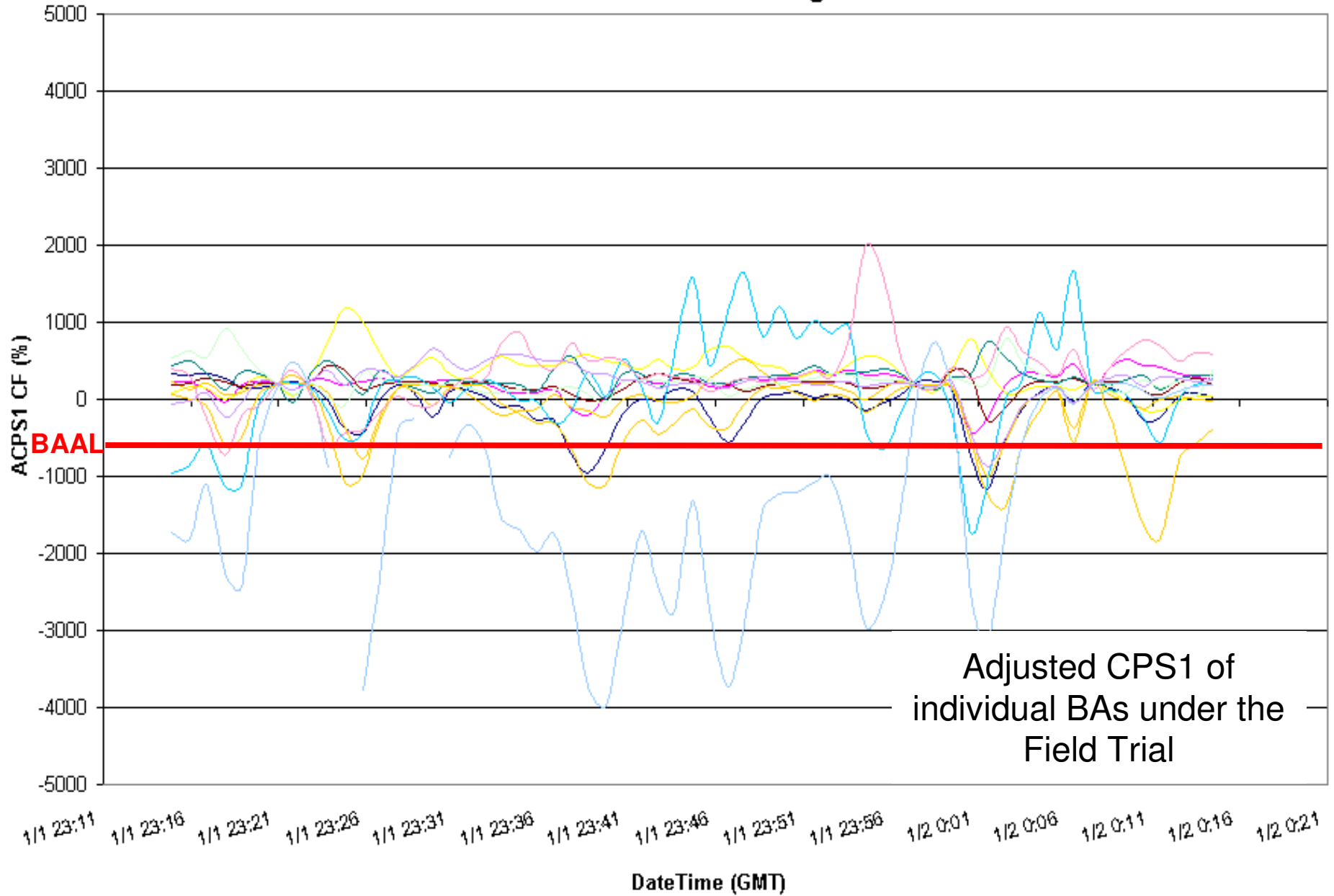
EI Clock-Minute Average Frequency



Clock-minute Actual Frequency of Participants

01/01/2011 ending 18:56 EST
25-minute duration below BAAL_{Low}

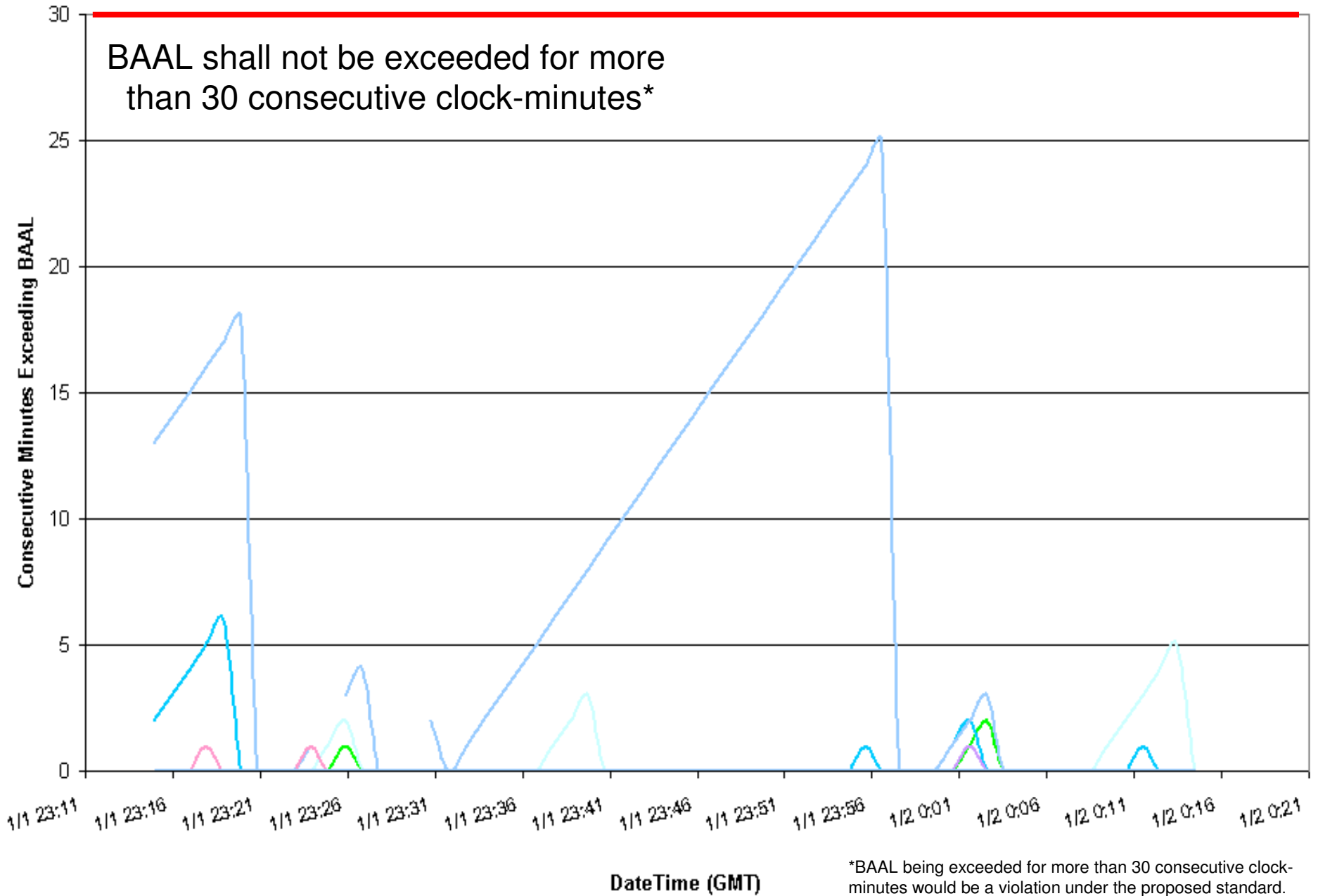
ACPS1 Clock-Minute Averages



01/01/2011 ending 18:56 EST
25-minute duration below BAAL_{Low}

Consecutive Minutes Exceeding BAAL

BAAL Violation*



01/03/2011 ending 07:29 EST
20-minute duration below BAAL_{Low}

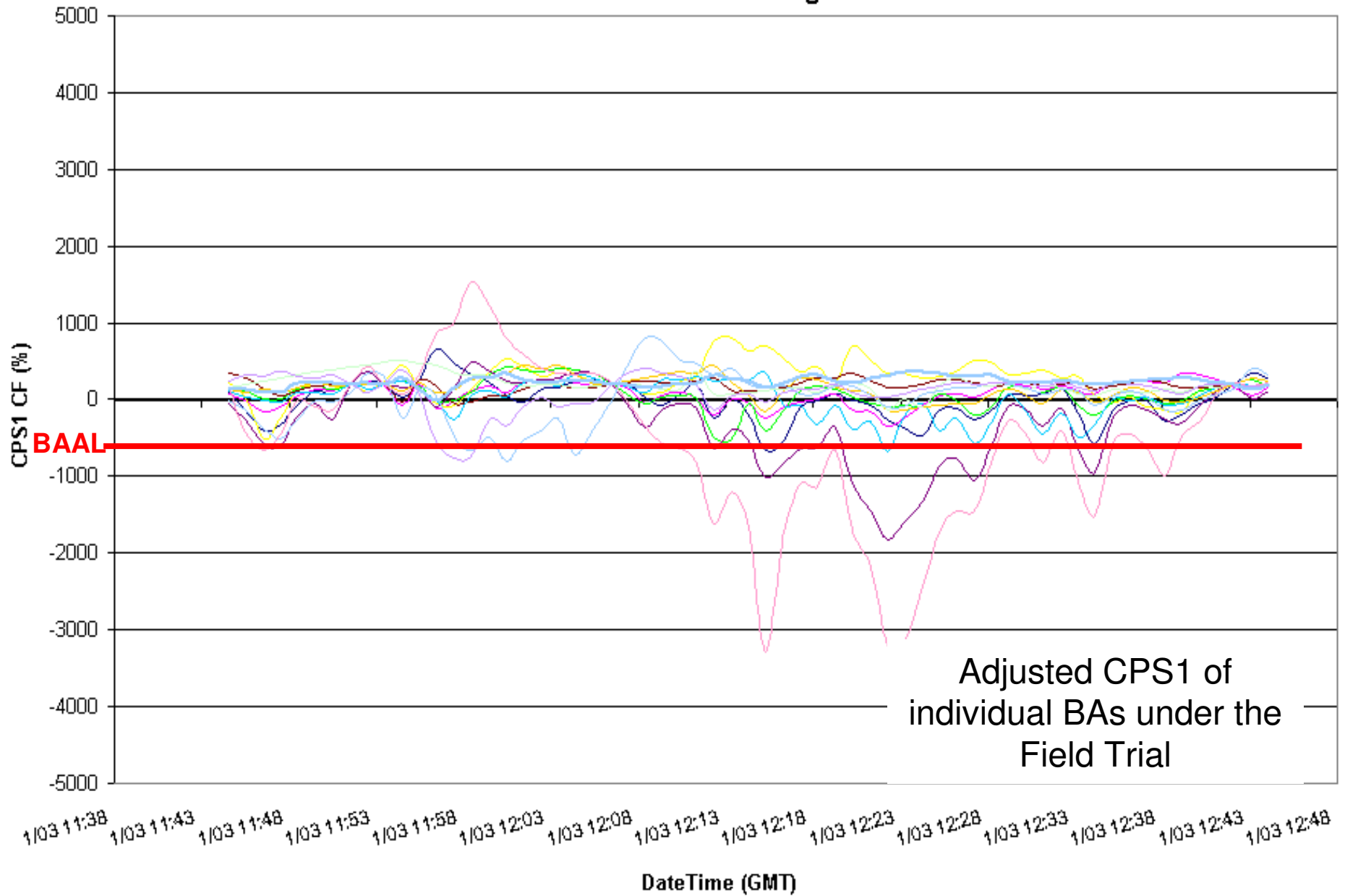
EI Clock-Minute Average Frequency



Clock-minute Actual Frequency of Participants

01/03/2011 ending 07:29 EST
20-minute duration below BAAL_{Low}

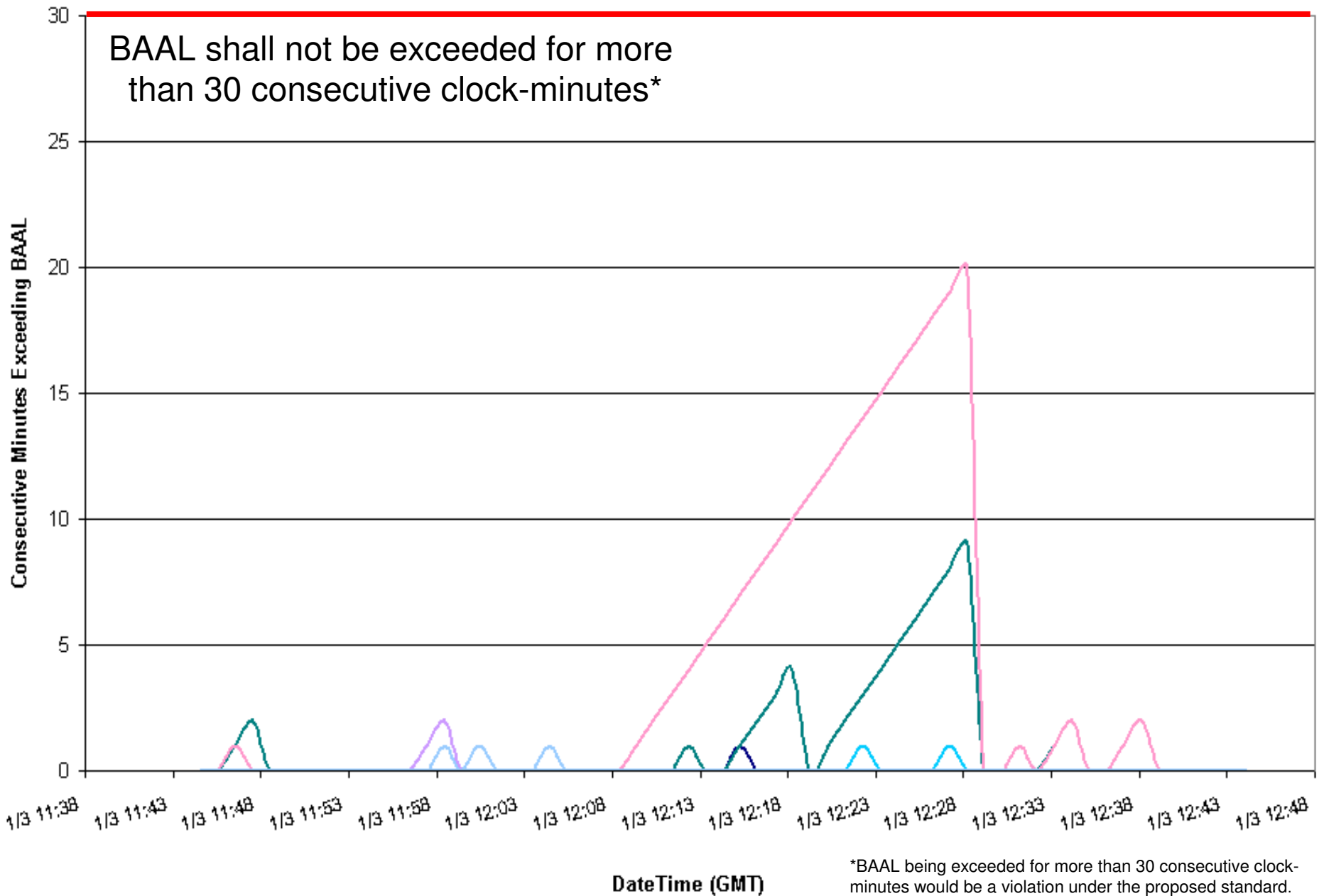
ACPS1 One-Minute Averages



01/03/2011 ending 07:29 EST
20-minute duration below BAAL_{Low}

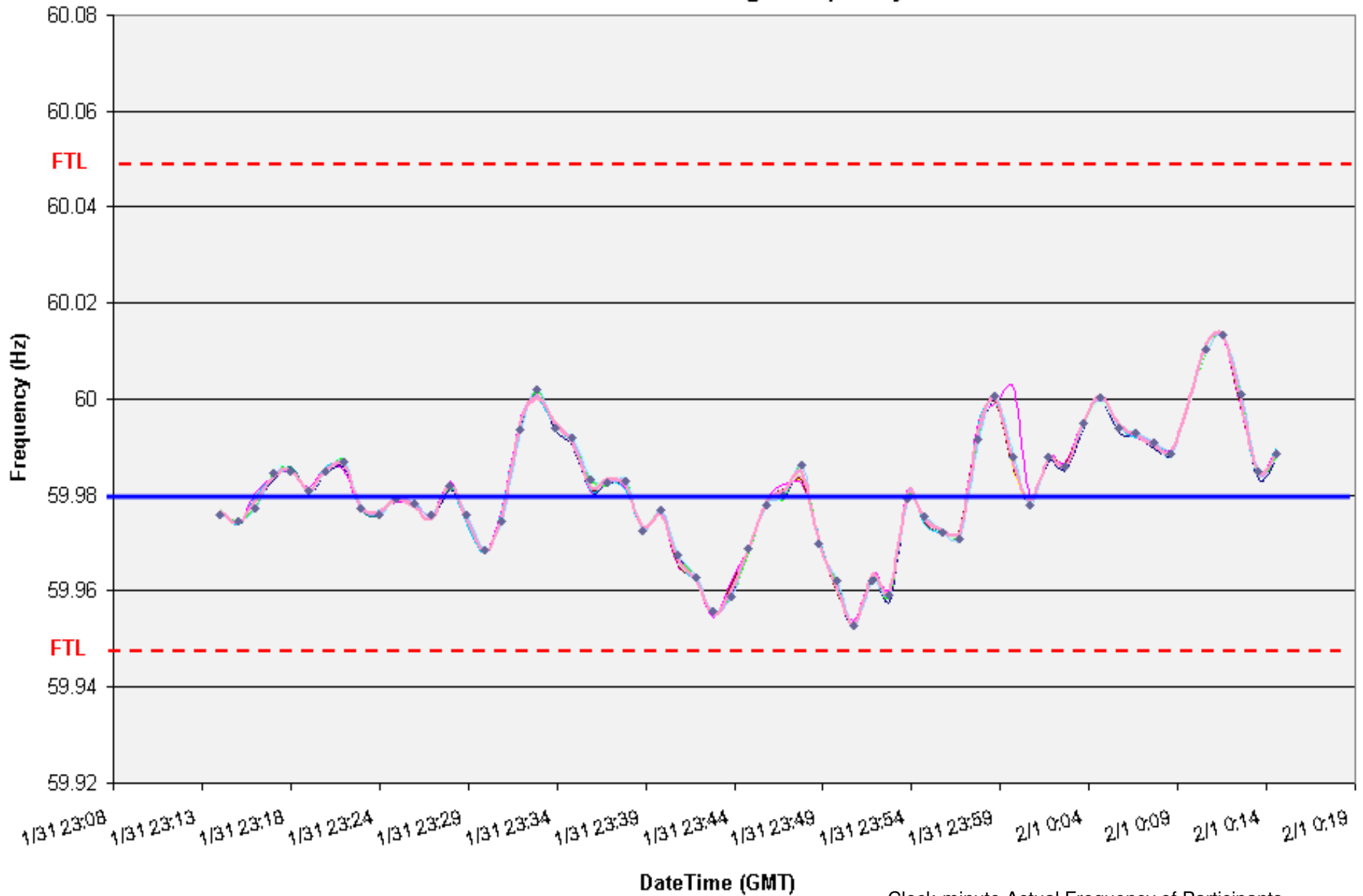
Consecutive Minutes Exceeding BAAL

BAAL Violation*



01/31/2011 ending 18:56 EST
19-minute duration below BAAL_{Low}

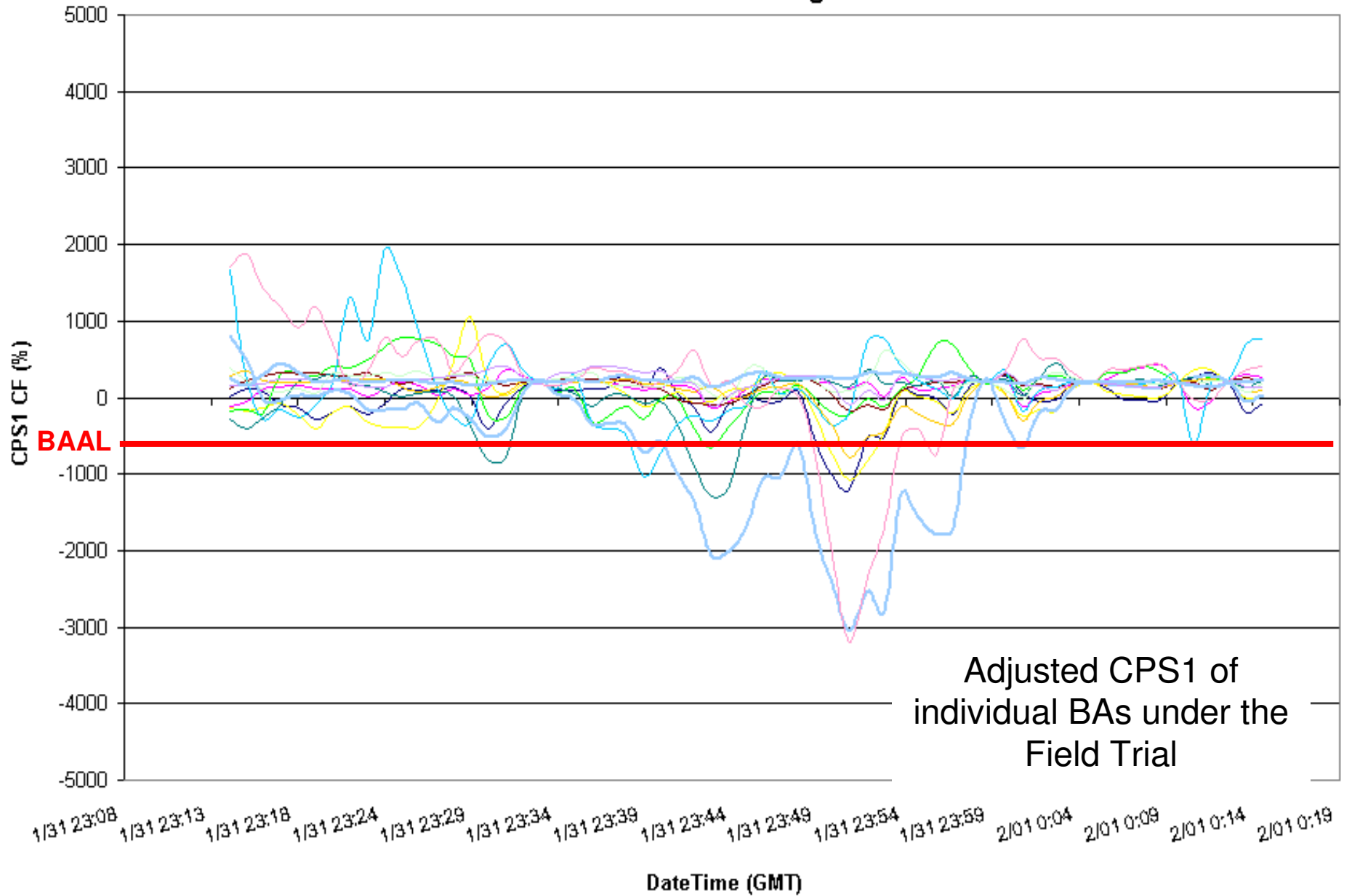
EI Clock-Minute Average Frequency



Clock-minute Actual Frequency of Participants

01/31/2011 ending 18:56 EST
19-minute duration below BAAL_{Low}

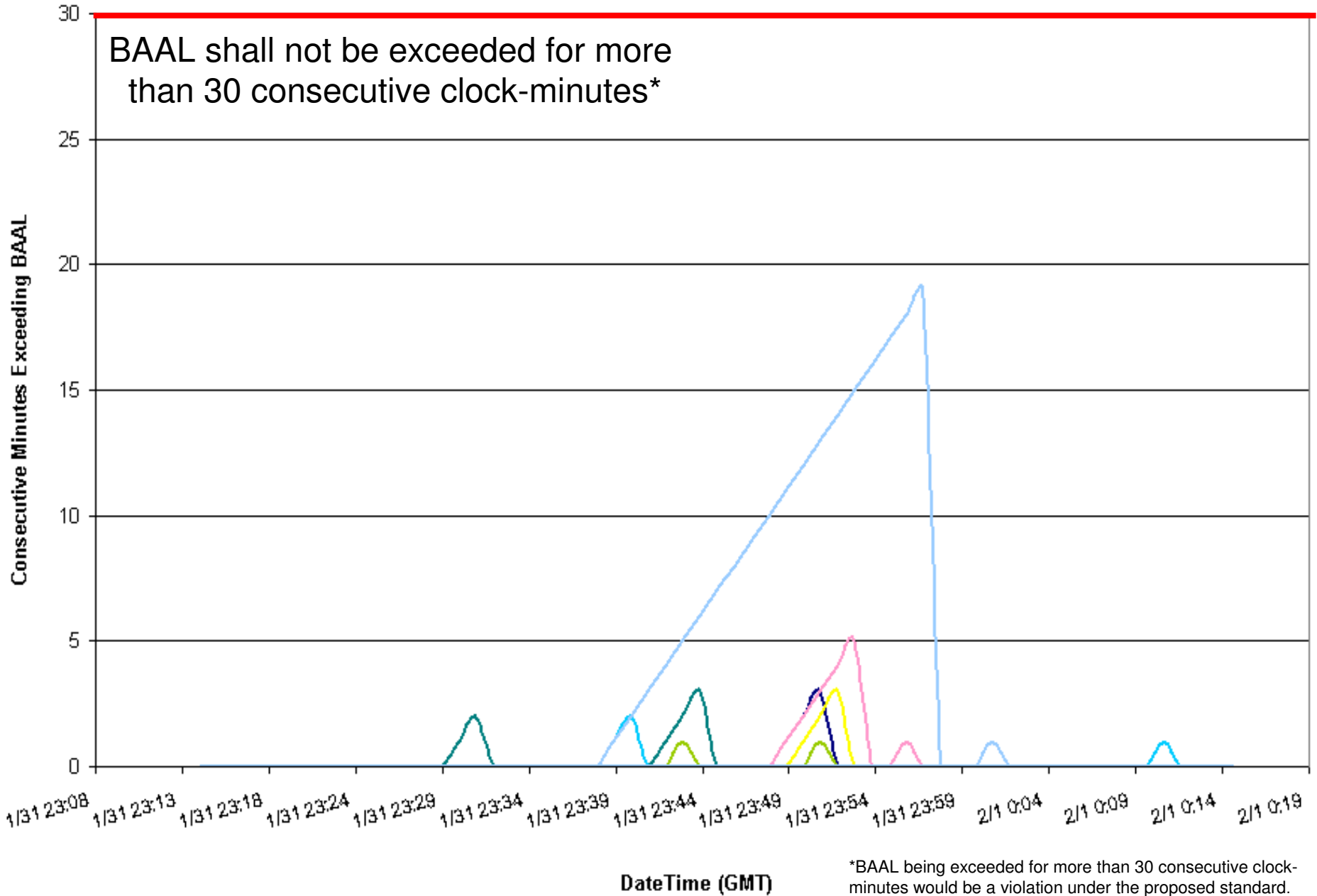
ACPS1 One-Minute Averages



01/31/2011 ending 18:56 EST
19-minute duration below BAAL_{Low}

Consecutive Minutes Exceeding BAAL

BAAL Violation*



Balancing Authority ACE Limit Proof-of-Concept Field Trial

Examples of circumstances when BAAL was exceeded and actions taken if appropriate

Clock-minute of ACE exceeding the BAAL (mm/dd/yy hh:mm)	Clock-minute of ACE returning within the BAAL (mm/dd/yy hh:mm)	TimeZone	Total duration of ACE exceeding the BAAL (minutes)	Event associated with a DCS-Reportable Event? (0=No, 1=Yes)	Event associated with a resource loss other than a DCS-Reportable Event? (0=No, 1=Yes)	Brief explanation of circumstances and notable actions taken if applicable
1/1/11 17:32	1/1/11 17:57	CST	0:25	0	0	Time error correction in effect. Low ACE due to low load forecast and wind falling out. Interchange scheduled in at the top of the hour. Started a peaker at 15:54, but stopped it at 15:58 before synchronization and after the exceedance ended.
1/3/11 7:10	1/3/11 7:30	EST	0:20	0	0	BAAL Low event. The load forecast was missed. The controller started several units to correct the situation.
1/25/11 1:18	1/25/11 1:32	EST	0:14	0	0	BAAL-low event. Time error correction was pulling frequency down. System Operator increased generation to return ACE within limits.
1/25/11 23:44	1/25/11 23:55	EST	0:11	0	0	Load curve decreasing, units at equipment points

Balancing Authority ACE Limit Proof-of-Concept Field Trial

Discussion

Bob Klueber

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