

RADIATION TEST REPORT

PRODUCT:	PM156-190L
MASK:	
FILE:	
DATE CODE:	
GAMMA:	0, 20K,40K,100K,150k,200k and 48 Hour Anneal
GAMMA SOURCE:	Co60
DOSE RATE:	100 rad/sec
FACILITIES:	National Semiconductor Santa Clara, Ca.
TESTED:	5/10/1996

20Krad*	Time	Date	*Radiation	20K Test	Time	Date	
Start	8:38	5/10/1996	Biased +25C	Start	8:44	5/10/1996	
Stop	8:42	5/10/1996		Stop	8:46	5/10/1996	
40Krad				40K Test			
Start	8:50	5/10/1996		Start	8:55	5/10/1996	
Stop	8:54	5/10/1996		Stop	8:58	5/10/1996	
100Krad				100K Test			
Start	8:59	5/10/1996		Start	9:11	5/10/1996	
Stop	9:10	5/10/1996		Stop	9:20	5/10/1996	
150Krad				150K Test			
Start	9:22	5/10/1996		Start	9:31	5/10/1996	
Stop	9:30	5/10/1996		Stop	9:33	5/10/1996	
200Krad				200K Test			
Start	9:35	5/10/1996		Start	9:44	5/10/1996	
Stop	9:43	5/10/1996		Stop	9:47	5/10/1996	
48Hr. Anneal				*Biased	48Hr. Test		
Start	11:20	5/10/1996		Anneal	Start	11:34	5/12/1996
Stop	11:25	5/12/1996		+25c	Stop	11:39	5/12/1996

Serial Number 23 was used as the control unit.

Devices were kept under bias both during irradiation and anneal.

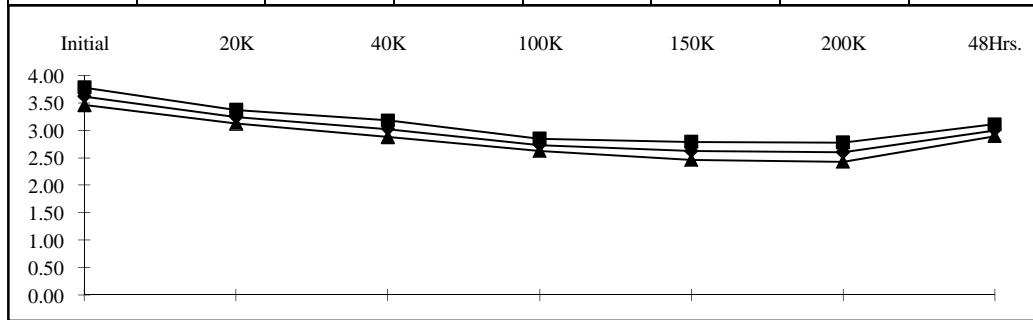
*Note: The 20K dosage time exceeded the calculated 3.333 min by 0.387 min
actual dosage is 22K.



Test#1 +ISY mA

Device	Initial	20K	40K	100K	150K	200K	48Hrs.
23	3.68	3.73	3.70	3.71	3.69	3.70	3.64
24	3.66	3.30	3.11	2.79	2.70	2.69	3.03
25	3.59	3.24	3.03	2.74	2.64	2.62	3.00
26	3.55	3.20	3.01	2.71	2.59	2.59	2.95
27	3.61	3.21	2.97	2.70	2.55	2.53	3.00
28	3.69	3.28	3.04	2.75	2.65	2.60	3.05

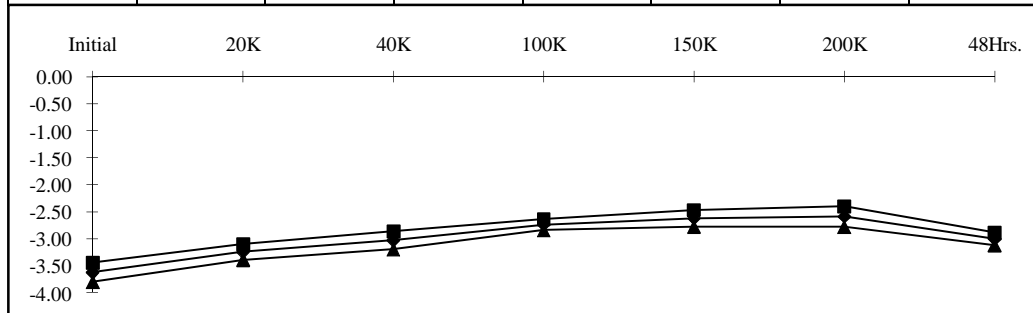
Min	3.55	3.20	2.97	2.70	2.55	2.53	2.95
Max	3.69	3.30	3.11	2.79	2.70	2.69	3.05
Stddev	0.05	0.04	0.05	0.04	0.06	0.06	0.04
Mean	3.62	3.25	3.03	2.74	2.63	2.60	3.01
M+3S	3.78	3.37	3.18	2.85	2.79	2.78	3.11
M-3S	3.46	3.12	2.88	2.62	2.46	2.43	2.90



Test#2 -ISY mA

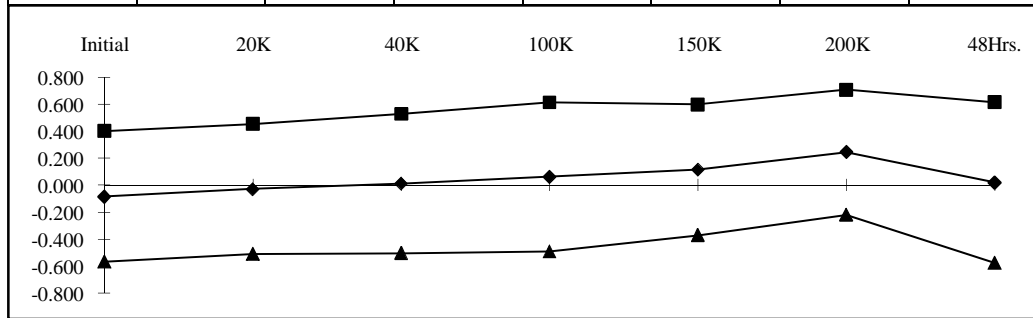
Device	Initial	20K	40K	100K	150K	200K	48Hrs.
23	-3.69	-3.70	-3.68	-3.72	-3.72	-3.68	-3.65
24	-3.67	-3.30	-3.12	-2.78	-2.70	-2.68	-3.04
25	-3.60	-3.24	-3.01	-2.73	-2.62	-2.61	-2.99
26	-3.55	-3.20	-3.00	-2.70	-2.59	-2.58	-2.95
27	-3.60	-3.20	-2.98	-2.74	-2.57	-2.50	-2.98
28	-3.70	-3.30	-3.05	-2.77	-2.63	-2.59	-3.05

Min	-3.70	-3.30	-3.12	-2.78	-2.70	-2.68	-3.05
Max	-3.55	-3.20	-2.98	-2.70	-2.57	-2.50	-2.95
Stddev	0.06	0.05	0.06	0.03	0.05	0.06	0.04
Mean	-3.62	-3.25	-3.03	-2.74	-2.62	-2.59	-3.00
M+3S	-3.45	-3.10	-2.86	-2.64	-2.46	-2.40	-2.88
M-3S	-3.80	-3.39	-3.20	-2.84	-2.78	-2.78	-3.12



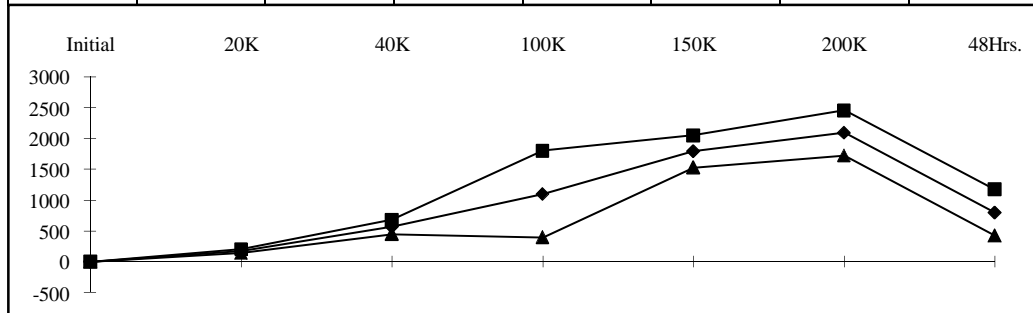
Test#3		VOS						mV
Device	Initial	20K	40K	100K	150K	200K	48Hrs.	
23	-0.071	-0.081	-0.079	-0.083	-0.076	-0.079	-0.088	
24	0.190	0.243	0.302	0.374	0.392	0.505	0.355	
25	-0.094	-0.073	-0.037	-0.042	0.022	0.130	-0.011	
26	-0.203	-0.118	-0.086	-0.044	0.015	0.140	-0.031	
27	-0.204	-0.168	-0.136	-0.063	0.021	0.185	-0.178	
28	-0.107	-0.027	0.021	0.085	0.123	0.265	-0.033	

Min	-0.204	-0.168	-0.136	-0.063	0.015	0.130	-0.178
Max	0.190	0.243	0.302	0.374	0.392	0.505	0.355
Stddev	0.161	0.161	0.172	0.184	0.161	0.155	0.199
Mean	-0.084	-0.029	0.013	0.062	0.115	0.245	0.020
M+3S	0.401	0.453	0.528	0.614	0.599	0.709	0.616
M-3S	-0.568	-0.510	-0.503	-0.490	-0.370	-0.219	-0.575



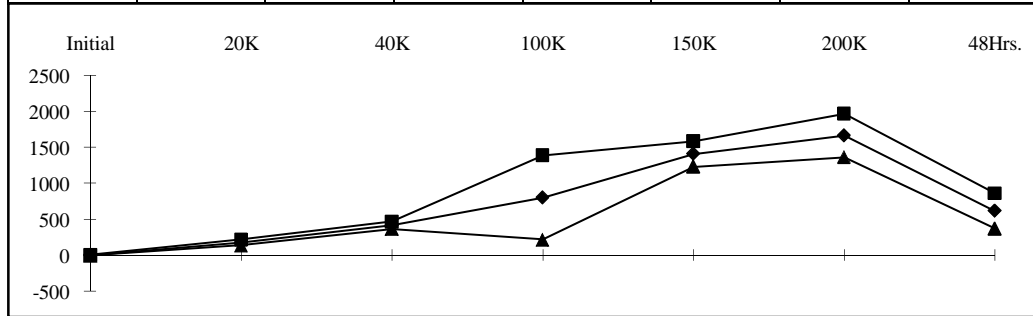
Test#4		+IB						pA
Device	Initial	20K	40K	100K	150K	200K	48Hrs.	
23	2	0	1	2	0	1	3	
24	3	179	575	1489	1737	1994	805	
25	2	163	546	1054	1745	2055	649	
26	1	162	513	1104	1749	1993	700	
27	2	185	586	868	1945	2285	923	
28	3	183	614	991	1788	2130	922	

Min	1	162	513	868	1737	1993	649
Max	3	185	614	1489	1945	2285	923
Stddev	1	11	39	234	87	122	125
Mean	2	174	567	1101	1793	2091	800
M+3S	5	208	683	1803	2055	2457	1176
M-3S	0	141	451	399	1531	1726	424



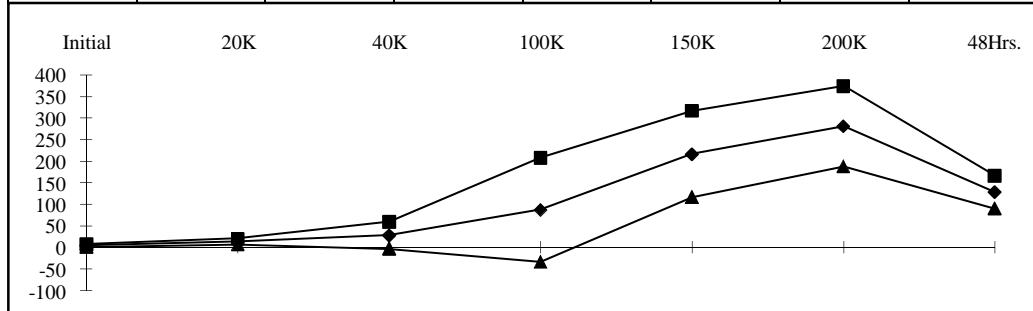
Test#5	-IB						pA
Device	Initial	20K	40K	100K	150K	200K	48Hrs.
23	2	3	3	2	4	0	3
24	2	180	432	1,118	1,410	1,553	616
25	3	164	400	767	1,362	1,649	514
26	2	162	397	760	1,356	1,597	562
27	0	191	430	579	1,505	1,810	704
28	0	190	422	789	1,412	1,713	691

Min	0	162	397	579	1356	1553	514
Max	3	191	432	1118	1505	1810	704
Stddev	1	14	17	195	60	101	82
Mean	1	177	416	803	1409	1664	617
M+3S	5	219	466	1389	1588	1967	862
M-3S	-3	136	366	216	1230	1362	372



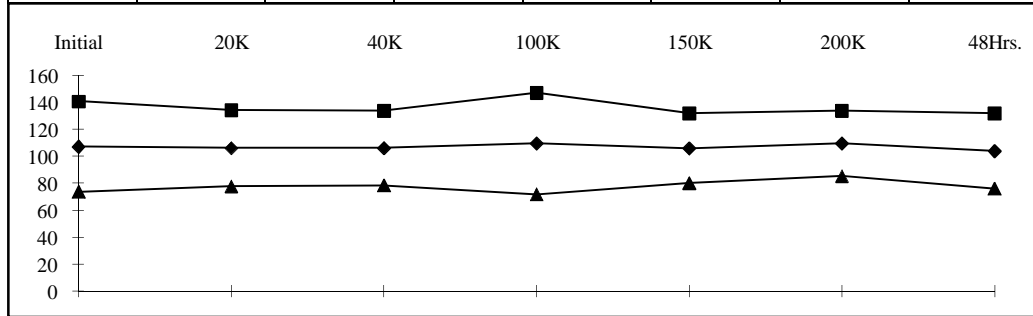
Test#6	IOS						pA
Device	Initial	20K	40K	100K	150K	200K	48Hrs.
23	5	5	5	5	5	4	7
24	6	17	38	146	257	307	139
25	6	15	36	89	229	307	111
26	5	15	34	96	232	296	124
27	4	12	15	36	174	242	127
28	4	12	20	71	192	254	143

Min	4	12	15	36	174	242	111
Max	6	17	38	146	257	307	143
Stddev	1	2	10	40	33	31	13
Mean	5	14	29	88	217	281	129
M+3S	8	21	60	208	317	374	167
M-3S	2	8	-3	-33	117	188	91



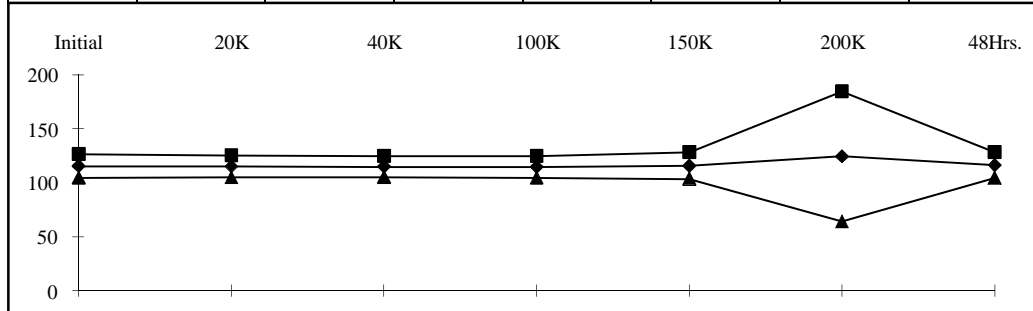
Test#8	CMRR						dB
Device	Initial	20K	40K	100K	150K	200K	48Hrs.
23	94	94	94	95	95	94	95
24	109	119	119	112	105	112	100
25	103	108	109	123	119	112	106
26	100	99	99	96	96	98	94
27	98	95	96	97	102	120	101
28	126	109	109	120	108	106	119

Min	98	95	96	96	96	98	94
Max	126	119	119	123	119	120	119
Stddev	11	9	9	13	9	8	9
Mean	107	106	106	109	106	110	104
M+3S	141	134	134	147	132	134	132
M-3S	74	78	78	72	80	85	76



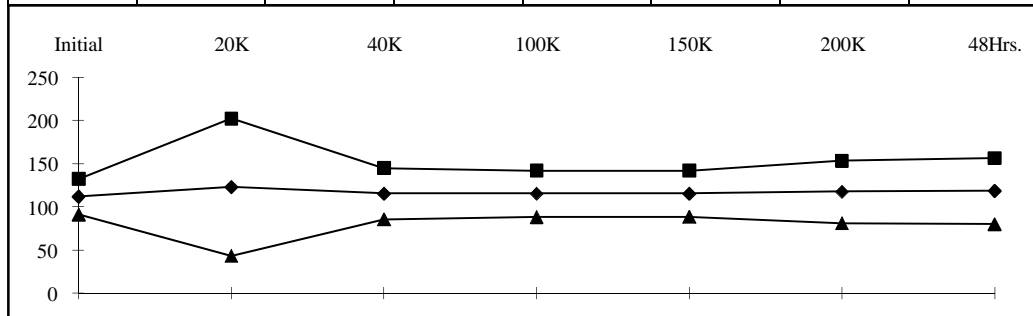
Test#9	-PSRR(-10V to -20V)						dB
Device	Initial	20K	40K	100K	150K	200K	48Hrs.
23	112	113	112	113	112	112	112
24	112	112	112	112	112	112	113
25	115	115	115	115	115	115	117
26	120	120	119	119	121	120	122
27	118	117	117	117	119	160	119
28	112	112	112	112	113	116	112

Min	112	112	112	112	112	112	112
Max	120	120	119	119	121	160	122
Stddev	4	3	3	3	4	20	4
Mean	115	115	115	115	116	124	117
M+3S	126	125	125	125	128	185	129
M-3S	105	105	105	105	104	64	104



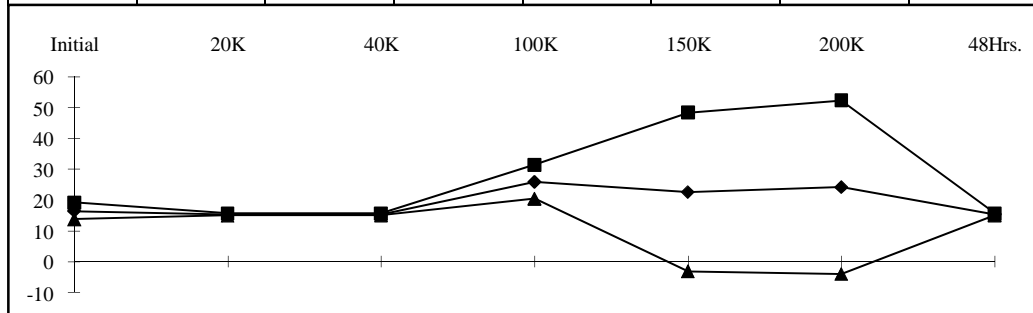
Test#9.1		+PSRR(+10V to +20V)					dB	
Device	Initial	20K	40K	100K	150K	200K	48Hrs.	
23	108	108	108	108	108	108	108	
24	115	119	123	119	117	127	134	
25	113	114	113	121	118	112	112	
26	102	103	103	102	102	104	104	
27	109	108	109	110	112	111	129	
28	120	169	127	124	127	133	112	

Min	102	103	103	102	102	104	104
Max	120	169	127	124	127	133	134
Stddev	7	27	10	9	9	12	13
Mean	112	123	115	115	115	117	118
M+3S	132	202	145	142	142	153	157
M-3S	91	43	85	88	88	81	80



Test#10		+SR					V/uS	
Device	Initial	20K	40K	100K	150K	200K	48Hrs.	
23	17	17	17	17	17	17	17	
24	18	16	16	24	16	17	16	
25	17	15	16	25	17	18	15	
26	17	15	16	25	16	17	16	
27	16	15	15	28	32	35	15	
28	15	15	15	28	32	35	15	

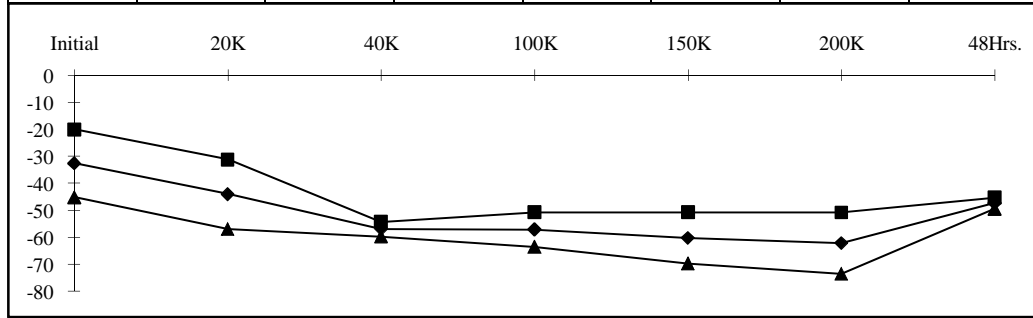
Min	15	15	15	24	16	17	15
Max	18	16	16	28	32	35	16
Stddev	1	0	0	2	9	9	0
Mean	16	15	15	26	23	24	15
M+3S	19	16	16	31	48	52	16
M-3S	14	15	15	20	-3	-4	15



Test#10 **-SR** **V/uS**

Device	Initial	20K	40K	100K	150K	200K	48Hrs.
23	-31	-31	-31	-31	-27	-27	-28
24	-31	-40	-56	-56	-56	-58	-46
25	-30	-45	-56	-56	-61	-60	-48
26	-31	-40	-57	-56	-58	-60	-48
27	-31	-44	-58	-58	-63	-66	-48
28	-40	-51	-58	-61	-63	-66	-48

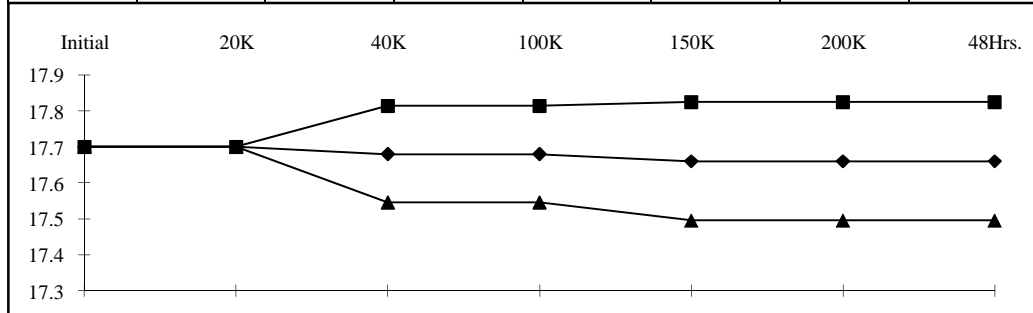
Min	-40	-51	-58	-61	-63	-66	-48
Max	-30	-40	-56	-56	-56	-58	-46
Stddev	4	4	1	2	3	4	1
Mean	-33	-44	-57	-57	-60	-62	-47
M+3S	-20	-31	-54	-51	-51	-51	-45
M-3S	-45	-57	-60	-64	-70	-74	-49



Test#12 **+VO RL=2K** **V**

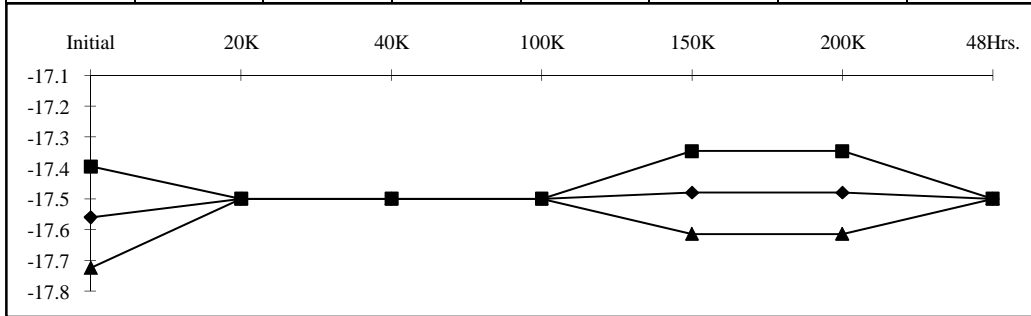
Device	Initial	20K	40K	100K	150K	200K	48Hrs.
23	17.7	17.7	17.7	17.7	17.7	17.7	17.7
24	17.7	17.7	17.7	17.6	17.7	17.7	17.7
25	17.7	17.7	17.7	17.7	17.7	17.7	17.7
26	17.7	17.7	17.7	17.7	17.7	17.7	17.7
27	17.7	17.7	17.6	17.7	17.6	17.6	17.6
28	17.7	17.7	17.7	17.7	17.6	17.6	17.6

Min	17.7	17.7	17.6	17.6	17.6	17.6	17.6
Max	17.7	17.7	17.7	17.7	17.7	17.7	17.7
Stddev	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Mean	17.7	17.7	17.7	17.7	17.7	17.7	17.7
M+3S	17.7	17.7	17.8	17.8	17.8	17.8	17.8
M-3S	17.7	17.7	17.5	17.5	17.5	17.5	17.5



Device	Initial	20K	40K	100K	150K	200K	48Hrs.
23	-17.6	-17.6	-17.6	-17.6	-17.6	-17.6	-17.6
24	-17.6	-17.5	-17.5	-17.5	-17.5	-17.5	-17.5
25	-17.6	-17.5	-17.5	-17.5	-17.5	-17.5	-17.5
26	-17.6	-17.5	-17.5	-17.5	-17.5	-17.5	-17.5
27	-17.5	-17.5	-17.5	-17.5	-17.4	-17.4	-17.5
28	-17.5	-17.5	-17.5	-17.5	-17.5	-17.5	-17.5

Min	-17.6	-17.5	-17.5	-17.5	-17.5	-17.5	-17.5
Max	-17.5	-17.5	-17.5	-17.5	-17.4	-17.4	-17.5
Stddev	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Mean	-17.6	-17.5	-17.5	-17.5	-17.5	-17.5	-17.5
M+3S	-17.4	-17.5	-17.5	-17.5	-17.3	-17.3	-17.5
M-3S	-17.7	-17.5	-17.5	-17.5	-17.6	-17.6	-17.5



Device	Initial	20K	40K	100K	150K	200K	48Hrs.
23	314	338	318	322	328	332	310
24	282	253	247	232	221	226	240
25	262	259	232	225	210	213	231
26	311	287	285	236	243	238	269
27	289	260	255	234	220	212	244
28	310	284	275	244	227	211	249

Min	262	253	232	225	210	211	231
Max	311	287	285	244	243	238	269
Stddev	21	16	21	7	12	12	14
Mean	291	268	259	234	224	220	247
M+3S	352	316	322	254	261	255	289
M-3S	229	221	195	214	187	185	204

