DELTA ELECTRONICS, INC.

DC FAN LIFE EXPERIMENT REPORT

Available for these models with lower speed and same physical structure. All model may be followed byRxx orFxx series suffixes. This test report applies to AUB 80x80x25.4**mm** series as the right table	AUB0812H-EYHT				
Representative Test P/N : AUB0812H-EAGD					
Equipment: 1.Oven: E24-F0028					

◎ **L_{10} Expectancy: 50,000 hours minimum @ fan rated voltage and the temperature of 90℃**

According to the equation for **Weibull distribution**, **MTTF ≒ 7×L10 = 350,000 hours**

And we rely on a zero failure Weibull test strategy and accelerated testing technique, to determine the total test time **(t)** for verifying the above life estimation by the equations,

$$t = 1.036 \times MTTF \times [(B_{r;c}) \div n]^{0.91} \div A_F \text{, and } A_F = 2^{(Ts-Tu)/10}$$

where, $(B_{r;c})$ is Poisson distribution factor with the failure number of r equal to 0 and the decimal confidence level of c equal to 0.90(90%).

Stress/Elevated Temperature Ts (℃) (Actual Test Temperature)	Unstress Temperature Tu (℃)	Acceleration Factor A_F	Quantity of Test Devices n (pcs)	Poisson Distribution Factor $B_{r;c}$	Required test time with zero failure t (hours)	Actual test time with zero failure t (hours)	Verified MTTF 90 ℃ (hours)	Verified L_{10} 90 ℃ (hours)
90	**90**	**1.00**	**56**	**2.303**	**19,873**	**1,360.0**	**23,952**	**3,422**

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2015/2/25 10:00 AM	2017/6/15 4:32 AM	☑ In process	☐ In process (exceed requested)	☐ Termination	**1360.0**

Herewith , we could assume as right on the basis of above test result. Besides, if the actual test time exceed the required, it comes out that those fans' L_{10} expectancy and MTTF are greater than the warrant. (**MTTF :** means Mean Time To Failures, it should be used in a non-repairable system setting. Now we show the MTTF in our life report, that's because we will not repair the failed fans during life experiment. **MTBF**: means Mean Time Between failures, it should be used in a repairable system setting.

Temperature for MTTF Estimation (℃)	Acceleration Factor A_F	Estimated MTTF (hours)	Estimated L_{10} (hours)
25	**90.51**	**2,167,893**	**309,699**
30	**64.00**	**1,532,931**	**218,990**
40	**32.00**	**766,466**	**109,495**
50	**16.00**	**383,233**	**54,748**
60	**8.00**	**191,616**	**27,374**
70	**4.00**	**95,808**	**13,687**
80	**2.00**	**47,904**	**6,843**
90	**1.00**	**23,952**	**3,422**

Fan permission criteria for the measurement after test :
1. Speed can not drop of ≧ 15% below the original measured rpm.
2. Current cannot increase > 15% of original measure current.
3. Noise cannot >3dB over the original measure noise.

Test Result	☑ **Accept** ☐ **Reject**

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG15FNL071	**305.50**	**2015/9/9**	**Loly.Wang**	**Tim.Yi**

BGN（dBA）: 16.0 Temp（℃）：24.2

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DC FAN FUNCTION TEST RECORD
FOR LIFE EXPERIMENT

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Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
19,873	2015/2/25 10:00 AM	2017/6/15 4:32 AM	56	0	**1360.0**

Representative Test P/N : AUB0812H-EAGD	Current Test Status	☑ In process	☐ In process (exceed requested)	☐ Termination
Equipment: 1.Oven: E24-F0028				

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (M A) **300Max.**	Final Test Current Spec. (M A) **300Max.**	Deviation (%)	Initial Test Speed Spec. (RPM) **3510-4290**	Final Test Speed Spec. (RPM) **3510-4290**	Deviation (%)	Initial Test Noise Spec. (dB A) **41.5 Max**	Final Test Noise Spec. (dB A) **41.5 Max**	Deviation **3 dBMax.**
1	232	237	2.2	3895	3940	1.2	36.3	36.1	-0.2
2	235	240	2.1	3928	3921	-0.2	36.5	36.5	0.0
3	234	237	1.3	3885	3925	1.0	36.4	35.8	-0.6
4	239	230	-3.8	3997	4008	0.3	36.9	36.2	-0.7
5	240	238	-0.8	3892	3919	0.7	37.0	36.7	-0.3
6	239	230	-3.8	3856	3960	2.7	36.2	36.3	0.1
7	233	234	0.4	3959	3925	-0.9	36.5	35.9	-0.6
8	239	237	-0.8	3635	3960	8.9	36.7	36.2	-0.5
9	244	236	-3.3	3848	3939	2.4	36.9	36.5	-0.4
10	235	243	3.4	3808	3901	2.4	36.2	36.7	0.5
11	239	234	-2.1	3929	3967	1.0	36.4	35.8	-0.6
12	236	234	-0.8	3929	3910	-0.5	36.6	36.0	-0.6
13	237	233	-1.7	3873	3917	1.1	36.8	36.3	-0.5
14	235	241	2.6	3864	3956	2.4	37.0	36.5	-0.5
15	234	239	2.1	3894	3878	-0.4	36.3	36.7	0.4
16	235	234	-0.4	3895	3956	1.6	36.5	36.0	-0.5
17	236	239	1.3	3896	3917	0.5	36.7	36.2	-0.5
18	232	247	6.5	3978	3928	-1.3	36.9	36.4	-0.5
19	232	236	1.7	3911	3877	-0.9	36.2	35.9	-0.3
20	245	236	-3.7	3912	3927	0.4	36.4	36.6	0.2
21	238	242	1.7	3900	3942	1.1	36.6	36.1	-0.5
22	234	239	2.1	3864	3895	0.8	36.8	36.3	-0.5
23	227	232	2.2	4013	3877	-3.4	37.0	36.5	-0.5
24	233	238	2.1	3975	3977	0.1	36.4	36.4	0.0
25	240	233	-2.9	3888	3873	-0.4	36.6	36.7	0.1
26	228	243	6.6	3932	3930	-0.1	36.9	36.0	-0.9
27	233	239	2.6	3885	3928	1.1	36.3	36.2	-0.1
28	236	240	1.7	3924	3917	-0.2	37.0	36.4	-0.6
29	235	233	-0.9	3901	3881	-0.5	36.6	36.0	-0.6
30	233	236	1.3	3625	3892	7.4	36.8	36.4	-0.4
31	236	235	-0.4	3932	3913	-0.5	36.7	36.6	-0.1
32	233	239	2.6	3929	3929	0.0	36.2	35.8	-0.4

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG15FNL071	**305.50**	**2015/9/9**	**Loly.Wang**	**Tim.Yi**

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DC FAN FUNCTION TEST RECORD
FOR LIFE EXPERIMENT

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Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
19,873	2015/2/25 10:00 AM	2017/6/15 4:32 AM	56	0	**1360.0**

Representative Test P/N : AUB0812H-EAGD	Current Test Status	☑ In process	☐ In process (exceed requested)	☐ Termination
Equipment: 1.Oven: E24-F0028				

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (M A) **300 Max.**	Final Test Current Spec. (M A) **300 Max.**	Deviation (%)	Initial Test Speed Spec. (RPM) **3510-4290**	Final Test Speed Spec. (RPM) **3510-4290**	Deviation (%)	Initial Test Noise Spec. (dB A) **41.5 Max**	Final Test Noise Spec. (dB A) **41.5 Max**	Deviation **3 dBMax.**
33	234	232	-0.9	3928	3919	-0.2	36.3	36.1	-0.2
34	231	237	2.6	3928	3912	-0.4	36.6	36.3	-0.3
35	240	229	-4.6	3734	3891	4.2	36.8	36.0	-0.8
36	232	238	2.6	3910	3899	-0.3	37.0	36.4	-0.6
37	232	233	0.4	4012	3870	-3.5	36.3	35.9	-0.4
38	242	239	-1.2	3850	3903	1.4	36.5	36.6	0.1
39	233	235	0.9	3949	3902	-1.2	36.7	36.1	-0.6
40	235	248	5.5	3929	3986	1.5	36.9	36.2	-0.7
41	234	233	-0.4	3962	3941	-0.5	36.2	36.4	0.2
42	235	239	1.7	3888	3921	0.8	36.4	36.6	0.2
43	239	233	-2.5	3926	3921	-0.1	36.6	35.8	-0.8
44	237	239	0.8	3928	3908	-0.5	36.0	36.1	0.1
45	230	231	0.4	3928	3897	-0.8	37.0	36.3	-0.7
46	237	247	4.2	3912	3938	0.7	36.3	36.5	0.2
47	231	235	1.7	3920	3915	-0.1	36.5	36.7	0.2
48	233	236	1.3	3911	3898	-0.3	36.7	36.0	-0.7
49	235	238	1.3	3926	3870	-1.4	36.9	35.8	-1.1
50	236	243	3.0	3900	3925	0.6	36.3	36.2	-0.1
51	240	230	-4.2	3789	3883	2.5	36.5	35.9	-0.6
52	233	234	0.4	3878	3953	1.9	36.7	36.6	-0.1
53	235	231	-1.7	3845	3872	0.7	36.9	36.1	-0.8
54	237	244	3.0	3844	3936	2.4	36.5	36.3	-0.2
55	238	237	-0.4	3822	3928	2.8	36.0	36.5	0.5
56	239	241	0.8	3825	3909	2.2	36.8	36.6	-0.2
X-Bar	235.45	236.89	-	3892.79	3919.32	-	36.58	36.26	-
σ	3.58	4.42	-	73.05	30.37	-	0.27	0.28	-

QE File No.	Time-out for function test or others (hrs)	Issued Date	Reported By	Approved By
DG15FNL071	**305.50**	**2015/9/9**	**Loly.Wang**	**Tim.Yi**