

# AIOT-X1000

## Reliability Prediction Report (MTBF)

Summary	Failure Rate: 4930.770637 ppm MTBF: 202,808 Hours
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Issue date	Approval	Test Engineer
2015/01/30	KJ Wang	Jack Huang

# Reliability Prediction (MTBF)

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**I . Model Name:** AIOT-X1000

**II . Prediction Date:** Jan. 30, 2015

**III . Prediction Site:** AAEON Q.E. Dept.

**IV . Predicted by:** Jack Huang

**V . Equipment:** Windchill Quality Solutions 10.1

## VI. Simulation Environment:

- Temperature: 30 degrees C
- Standard: Telcordia (Bellcore) Standard

## VII. Term and Definition:

- Unit : An assembly of device.
- Duty Cycle : Used to specify the percentage of time that the element is in an on state, and it is equal to the percentage of total time the item is in the active environment.
- Quantity : The quantity of the selected item.
- Failure Rate : Used to specify that the failure rate is to be calculated based the selected Calculation models. The Failure rate multiplier is 1000000000.
- MTBF : MTBF is always specified in hours.

**VIII. Prediction Result:**

AIOT-X1000(9697AIOT07-D):

- Failure Rate: 4930.770637 ppm
- MTBF: 202.808 Hours

**AAEON Reliability Prediction  
Summary**

**File Name:** AIOT-X1000.rfp  
**Duty Cycle:** 100  
**Calculation Model:** Telcordia Issue 2  
**Method:** Method I Case 3

**Failure Rate:** 4930.770637  
**MTBF (hrs):** 202,808  
**Temperature:** 30  
**Environment:** GF, GU - Ground Fixed, Uncontrolled

Assembly Name	Part Number	Ref Des	Quantity	Failure Rate	MTBF
AIOT-X1000 B	9697AIOT07-D		1	4930.770637	202,808

**File Name:** AIOT-X1000.rfp  
**Assembly:** 9697AIOT07-D  
**Ref Des:**  
**Description:**

**Failure Rate:** 4930.770637  
**MTBF (hrs):** 202,808  
**Temperature:** 30  
**Environment:** GF, GU - Ground Fixed, Uncontrolled

Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
1050501054	Resistor	R146,R223,R40		2.547039	3	107020754.986850
1050501064	Resistor	R35		2.547039	1	282340674.079668
1050501234	Resistor	R224		2.547039	1	282340674.079668
1050502224	Resistor	R170,R178,R191, R202,R23,R36		2.547039	6	56573956.677649
1050503404	Resistor	R2		2.547039	1	282340674.079668
1050503624	Resistor	R91		2.547039	1	282340674.079668
1050504724	Resistor	R132,R133,R173, R180,R183,R194, R198,R203,R260, R308,R309		2.547039	11	32049696.385471
1050507524	Resistor	R10,R11,R50		2.547039	3	107020754.986850
1050507530	Resistor	R321,R323,R324		2.547039	3	107020754.986850
1050508224	Resistor	R255,R257,R258, R266,R267,R276, R277		2.547039	7	48991237.965885
1050510034	Resistor	R211,R218,R219, R220,R221,R222		2.547039	6	56573956.677649
1050515834	Resistor	R99		2.547039	1	282340674.079668
1050519114	Resistor	R359		2.547039	1	282340674.079668
1050522104	Resistor	R177,R185,R197, R206,R254		2.547039	5	67008142.102588
1050522124	Resistor	R325		2.547039	1	282340674.079668
1050524004	Resistor	R130,R131,R94		2.547039	3	107020754.986850
1050524924	Resistor	R332,R334		2.547039	2	154078778.388085
1050527404	Resistor	R3		2.547039	1	282340674.079668
1050530164	Resistor	R125,R126		2.547039	2	154078778.388085
1050532464	Resistor	R4		2.547039	1	282340674.079668

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1050535764	Resistor	R100,R101,R102, R103,R104,R105, R106,R107,R108, R109,R110,R111, R112,R113,R114, R115,R116,R117, R118,R119,R120, R121,R122,R123, R124		2.547039	25	14603612.751152
1050540224	Resistor	R97		2.547039	1	282340674.079668
1050547004	Resistor	R261,R262,R269, R270		2.547039	4	82309758.689546
1050548714	Resistor	R175,R196		2.547039	2	154078778.388085
1050549924	Resistor	R342,R343		2.547039	2	154078778.388085
1050549964	Resistor	R182,R184,R186, R188,R204,R205, R207,R208,R43,R44, R45,R47		2.547039	12	29507083.749401
1050580614	Resistor	R68		2.547039	1	282340674.079668
1059501261	Resistor	R344		2.547039	1	282340674.079668
1059510031	Resistor	R352		2.547039	1	282340674.079668
1059700001	Resistor	R310,R311,R345, R350		2.547039	4	82309758.689546
1059702261	Resistor	R355		2.547039	1	282340674.079668
105A500139	Resistor	R18,R19,R20,R259, R263,R268,R271,R7, R8,R92		2.547039	10	35079934.879747
105A501033	Resistor	R318		2.547039	1	282340674.079668

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105A501039	Resistor	R127,R128,R129, R138,R139,R140, R141,R142,R143, R144,R150,R151, R152,R153,R154, R155,R156,R157, R158,R159,R160, R161,R162,R163, R164,R165,R166, R167,R212,R213,R22, R225,R235,R239, R242,R317,R320, R328,R329,R333, R335,R340,R42,R48, R51,R56,R58,R60, R61,R62		2.547039	60	6239906.126519
105A501133	Resistor	R316		2.547039	1	282340674.079668
105A501529	Resistor	R169,R172,R174, R190,R193,R195		2.547039	6	56573956.677649
105A501539	Resistor	R319		2.547039	1	282340674.079668
105A502003	Resistor	R906,R912,R918		2.547039	3	107020754.986850
105A503309	Resistor	R867,R868,R869, R870		2.547039	4	82309758.689546
105A510223	Resistor	R358		2.547039	1	282340674.079668
105A511823	Resistor	R315		2.547039	1	282340674.079668
105A522669	Resistor	R71		2.547039	1	282340674.079668
105A533003	Resistor	R356,R366		2.547039	2	154078778.388085

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105A533269	Resistor	R134,R135,R136, R137,R145,R149, R176,R179,R181, R199,R200,R201,R24, R247,R248,R249, R251,R252,R253,R26, R27,R28,R294,R295, R31,R32,R33,R34, R39,R49,R53,R54, R55,R72,R73,R74, R75,R77,R79,R80, R81,R82,R85,R86		2.547039	44	8443240.413160
105A549923	Resistor	R347		2.547039	1	282340674.079668
105A575003	Resistor	R349		2.547039	1	282340674.079668
105A593123	Resistor	R357		2.547039	1	282340674.079668
105A700003	Resistor	R14,R15,R16,R17, R209,R226,R227, R229,R230,R231, R288,R289,R290, R291,R296,R297, R299,R300,R322, R337,R360		2.547039	21	17274945.076062
105A700009	Resistor	R1,R237,R241,R293, R843		2.547039	5	67008142.102588
105A700203	Resistor	R346		2.547039	1	282340674.079668
105A703363	Resistor	R314		2.547039	1	282340674.079668



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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
1121501690	Capacitor	C105,C106,C107, C108,C109,C11,C111, C113,C114,C115, C117,C118,C12,C121, C13,C131,C132,C134, C136,C137,C138, C139,C14,C140,C141, C147,C149,C150, C152,C154,C155, C156,C157,C158, C159,C164,C167,C17, C173,C178,C188, C189,C190,C191, C192,C193,C198, C199,C2,C20		1.128806	118	7338727.814962
1124410190	Capacitor	C208,C210,C211, C212,C213,C214, C215,C216,C221, C223,C224,C225, C243,C244		1.128806	14	59316298.011235
1124410250	Capacitor	C304		1.128806	1	704977644.692287
1124418090	Capacitor	C15,C16,C174,C175		1.128806	4	196873384.410843
1124547290	Capacitor	C306,C67		1.128806	2	375289731.076049
1124568280	Capacitor	C122,C123,C124, C125,C126,C127, C128,C129		1.128806	8	101746760.035398
1129622690	Capacitor	C27,C28,C29,C30		1.128806	4	196873384.410843
1129715090	Capacitor	C18,C19		1.128806	2	375289731.076049
1169656132	Capacitor	EC10,EC11,EC12,EC9		4.744484	4	45505862.704531

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1183668090	Capacitor	EC6,EC7		4.744484	2	86049450.747498
1189615154	Capacitor	EC1,EC2,EC3,EC4, EC5		4.744484	5	36944177.000623
11A2410240	Capacitor	C38,C39		4.744484	2	86049450.747498
11A4415080	Capacitor	C301		4.744484	1	159663026.715137
11A4901090	Capacitor	C84		4.744484	1	159663026.715137
11C1501080	Capacitor	C119,C179,C180, C183,C187,C234, C270		1.128806	7	115633865.771428
11C1510390	Capacitor	C102,C40,C41,C42, C52,C72,C74		1.128806	7	115633865.771428
11C2510480	Capacitor	C259,C260		1.128806	2	375289731.076049
11C4501050	Capacitor	C291		1.128806	1	704977644.692287
11C4501650	Capacitor	C289,C290,C297, C300		1.128806	4	196873384.410843
11C4547190	Capacitor	C142,C143,C144, C145,C160,C161, C162,C163,C181, C182,C184,C185, C186		1.128806	13	63728475.410842
11C4547290	Capacitor	C272,C273		1.128806	2	375289731.076049
11C4547690	Capacitor	C265		1.128806	1	704977644.692287
11C4547730	Capacitor	C296		1.128806	1	704977644.692287
11C4610090	Capacitor	C292,C293,C294, C295,C307,C308		1.128806	6	133979725.056342
11E1510050	Capacitor	C100,C101,C103, C104,C116,C120, C135,C153,C165, C166,C170,C197, C239,C253,C254, C257,C258,C302, C309		1.128806	19	44097696.883526
11E1547650	Capacitor	C298,C299		1.128806	2	375289731.076049

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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
11E9501091	Capacitor	C130,C133,C148, C151,C195,C196,C20, C21,C22,C236,C25, C252,C26,C271,C274, C275,C276,C277, C279,C280,C282, C283,C31,C313,C32, C33,C34,C43,C44, C47,C48,C49,C54, C55,C56,C57,C58, C59,C60,C61		1.128806	40	21305452.824644
11E9547630	Capacitor	C110,C112,C146		1.128806	3	257514172.353070
11E9622052	Capacitor	C10,C262,C263,C264, C266,C267,C269,C45, C46,C6		1.128806	10	82101057.548118
11EA610040	Capacitor	C53,C73,C98,C99		1.128806	4	196873384.410843
1211106868	Inductor	L11		4.944252	1	154760964.143460
1211133075	Inductor	L8,L9		4.944252	2	83201062.149749
12123C0007	Inductor	FB1,FB2,FB3,FB4,FB5,FB9		4.944252	6	30055900.223009
12123C0025	Inductor	FB10,FB6,FB7,FB8		4.944252	4	43912872.424775
1214309006	Inductor	L1,L2,L4,L5		4.944252	4	43912872.424775
1214309006	Inductor	L3	19.8	7.032157	1	108811158.986352
1214970000	Inductor	L6		4.944252	1	154760964.143460
12310025A1	Miscellaneous	Y1		19.200000	1	23844262.770939
1231324056	Miscellaneous	Y3		19.200000	1	23844262.770939
1231332726	Miscellaneous	Y2		19.200000	1	23844262.770939
1300054040	Semiconductor	D4,D5		7.793411	2	50578095.223398
1301005440	Semiconductor	D2		7.793411	1	92807310.010983
1301110040	Semiconductor	D15		7.793411	1	92807310.010983
1302012041	Semiconductor	D14		7.793411	1	92807310.010983
1304000043	Semiconductor	LED2		7.793411	1	92807310.010983
1304300140	Semiconductor	LED1		7.793411	1	92807310.010983
1305040241	Semiconductor	D8,D9		7.793411	2	50578095.223398
1305080040	Semiconductor	U53,U54,U55		7.793411	3	35106858.962001

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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
1305DFN100	Semiconductor	D10,D11,D12 ,D13, D16,D17,D18 ,D20, D21,D22		7.793411	10	11489279.961809
1310700010	Semiconductor	D1		22.463360	1	31642600.748419
1311390612	Semiconductor	Q1,Q5,Q9		22.463360	3	12043329.789539
1315083330	Semiconductor	Q19,Q20		22.463360	2	17315095.066101
1315700216	Semiconductor	Q10,Q11,Q1 2,Q2,Q3, Q4,Q6,Q7,Q8		22.463360	9	4366472.106532
1315831310	Semiconductor	Q17,Q18		22.463360	2	17315095.066101
1315971500	Semiconductor	U13,U14,U15		22.463360	3	12043329.789539
14202514B0	Integrated Circuit	U11		43.803003	1	11739202.588727
1430021020	Integrated Circuit	U37		43.803003	1	11739202.588727
1430229200	Integrated Circuit	U33		43.803003	1	11739202.588727
1430229240	Integrated Circuit	U32,U34,U35		43.803003	3	4923240.069161
1430512001	Integrated Circuit	U6		43.803003	1	11739202.588727
1430748010	Integrated Circuit	U3	32.9	357.710952	1	1437507.926650
1439055100	Integrated Circuit	U2		43.803003	1	11739202.588727
1440838480	Integrated Circuit	U10,U9	27.6	262.346636	2	1141178.662792
1440X10001	Integrated Circuit	U1	29.3	70.752155	1	7267797.376706
1468008461	Integrated Circuit	U4,U5		43.803003	2	6834791.244197
1490080280	Integrated Circuit	U8		43.803003	1	11739202.588727
14909645T0	Integrated Circuit	U17		43.803003	1	11739202.588727
14S3112400	Integrated Circuit	U31		43.803003	1	11739202.588727
14S4322200	Integrated Circuit	U39		43.803003	1	11739202.588727
14S4331101	Integrated Circuit	U19	20.8	173.640998	1	2961353.225518
14S4348500	Integrated Circuit	U22,U24		43.803003	2	6834791.244197
14S4751100	Integrated Circuit	U16		43.803003	1	11739202.588727
14S5812502	Integrated Circuit	U20		26.018600	1	25551442.237972
14S5A01400	Integrated Circuit	U21		26.018600	1	25551442.237972
14S5A12506	Integrated Circuit	U23		26.018600	1	25551442.237972
14S6206403	Integrated Circuit	U7		11.063278	1	58231413.220643
1540510380	Resistor	RP2,RP3,RP4 ,RP5, RP6		9.971436	5	14126297.426094
1540700081	Resistor	RP1		9.971436	1	51606907.671214
160102US90	Connection	SW2		16.184835	1	35685591.360212
1652503209	Connection	CN16		16.184835	1	35685591.360212
1652812204	Connection	CN4,CN5		16.184835	2	20390152.380746
1653002101	Connection	CN36,J1		16.184835	2	20390152.380746
165300310G	Connection	JP1,JP2,JP3		16.184835	3	14515880.849373
165300420L	Connection	J2		16.184835	1	35685591.360212
165320520L	Connection	CN8		16.184835	1	35685591.360212
165320520T	Connection	CN3		16.184835	1	35685591.360212
165320520Y	Connection	CN1		16.184835	1	35685591.360212
165321020E	Connection	CN9		16.184835	1	35685591.360212

**Reliability Prediction  
Summary**

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**Assembly:** 9697AIOT07-D  
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**Description:**

**Failure Rate:** 4930.770637  
**MTBF (hrs):** 202,808  
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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
165321020F	Connection	CN10		16.184835	1	35685591.360212
1653300108	Connection	JP1(1-2)1, JP2(1-2)1, JP3(1-2)1		16.184835	3	14515880.849373
1654226303	Connection	CN20,CN21		16.184835	2	20390152.380746
165440910B	Connection	CN14		16.184835	1	35685591.360212
1654805303	Connection	CN6		16.184835	1	35685591.360212
1654808309	Connection	CN7		16.184835	1	35685591.360212
1654900839	Connection	CN35		16.184835	1	35685591.360212
1654908301	Connection	CN12		16.184835	1	35685591.360212
1655302020	Connection	CN18		16.184835	1	35685591.360212
1655304020	Connection	CN11		16.184835	1	35685591.360212
1655902024	Connection	CN17		16.184835	1	35685591.360212
1655902030	Connection	CN2		16.184835	1	35685591.360212
1655909031	Connection	CN15		16.184835	1	35685591.360212
1752002200	Miscellaneous	FS3		2.400000	1	254626042.602335