

AIOT-QM

Reliability Prediction Report (MTBF)

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|---------|--|
| Summary | Failure Rate: 5303.129017 ppm MTBF: 188,568 Hours |
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Issue date

Approval

Test Engineer

2015/10/30

KJ Wang

Jack Huang

Reliability Prediction (MTBF)

I . Model Name: AIOT-QM

II . Prediction Date: Oct. 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(9697AIOT0A-D):

- Failure Rate: 5303.129017 ppm

- MTBF: 188.568 Hours

**AAEON Reliability Prediction
Summary**

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

Failure Rate: 5303.129017
MTBF (hrs): 188,568
Temperature: 30
Environment: GF, GU - Ground Fixed, Uncontrolled

| Assembly Name | Part Number | Ref Des | Quantity | Failure Rate | MTBF |
|---------------|--------------|---------|----------|--------------|---------|
| AIOT-QM | 9697AIOT0A-D | | 1 | 5303.129017 | 188,568 |

File Name: AIOT-QM.rfp
Assembly: 9697AIOT0A-D
Ref Des:
Description:

Failure Rate: 5303.129017
MTBF (hrs): 188,568
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,R336,R36 | | 2.547039 | 7 | 48991237.965885 |
| 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 |

File Name: AIOT-QM.rfp
Assembly: 9697AIOT0A-D
Ref Des:
Description:

Failure Rate: 5303.129017
MTBF (hrs): 188,568
Temperature: 30
Environment: GF, GU - Ground Fixed, Uncontrolled

| Part Number | Category | Ref Des | Tem.Rise | Unit Failure Rate | Quantity | MTBF,Unit |
|-------------|----------|---|----------|-------------------|----------|------------------|
| 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 |

File Name: AIOT-QM.rfp
Assembly: 9697AIOT0A-D
Ref Des:
Description:

Failure Rate: 5303.129017
MTBF (hrs): 188,568
Temperature: 30
Environment: GF, GU - Ground Fixed, Uncontrolled

| Part Number | Category | Ref Des | Tem.Rise | Unit Failure Rate | Quantity | MTBF,Unit |
|-------------|----------|--|----------|-------------------|----------|------------------|
| 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 |
| 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 |
| 105A517413 | Resistor | R349 | | 2.547039 | 1 | 282340674.079668 |
| 105A522669 | Resistor | R71 | | 2.547039 | 1 | 282340674.079668 |
| 105A533003 | Resistor | R356,R366 | | 2.547039 | 2 | 154078778.388085 |

File Name: AIOT-QM.rfp
Assembly: 9697AIOT0A-D
Ref Des:
Description:

Failure Rate: 5303.129017
MTBF (hrs): 188,568
Temperature: 30
Environment: GF, GU - Ground Fixed, Uncontrolled

| Part Number | Category | Ref Des | Tem.Rise | Unit Failure Rate | Quantity | MTBF,Unit |
|-------------|----------|---|----------|-------------------|----------|------------------|
| 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 |
| 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 |

File Name: AIOT-QM.rfp
Assembly: 9697AIOT0A-D
Ref Des:
Description:

Failure Rate: 5303.129017
MTBF (hrs): 188,568
Temperature: 30
Environment: GF, GU - Ground Fixed, Uncontrolled

| 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 | 119 | 7277746.940915 |
| 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 | EC11,EC12,EC9 | | 4.744484 | 3 | 59399119.141203 |

File Name: AIOT-QM.rfp
Assembly: 9697AIOT0A-D
Ref Des:
Description:

Failure Rate: 5303.129017
MTBF (hrs): 188,568
Temperature: 30
Environment: GF, GU - Ground Fixed, Uncontrolled

| Part Number | Category | Ref Des | Tem.Rise | Unit Failure Rate | Quantity | MTBF,Unit |
|-------------|-----------|--|----------|-------------------|----------|------------------|
| 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 |
| 11A4227030 | 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,C300 | | 1.128806 | 2 | 375289731.076049 |
| 11C4501650 | Capacitor | C289,C290,C297 | | 1.128806 | 3 | 257514172.353070 |
| 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 |

File Name: AIOT-QM.rfp
Assembly: 9697AIOT0A-D
Ref Des:
Description:

Failure Rate: 5303.129017
MTBF (hrs): 188,568
Temperature: 30
Environment: GF, GU - Ground Fixed, Uncontrolled

| 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 |
| 1214970000 | Inductor | L6 | | 4.944252 | 1 | 154760964.143460 |
| 12310025A1 | Miscellaneous | Y1 | | 19.200000 | 1 | 23844262.770939 |
| 1214309006 | Inductor | L3 | 19.8 | 7.032157 | 1 | 108811158.986352 |
| 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 |

File Name: AIOT-QM.rfp
Assembly: 9697AIOT0A-D
Ref Des:
Description:

Failure Rate: 5303.129017
MTBF (hrs): 188,568
Temperature: 30
Environment: GF, GU - Ground Fixed, Uncontrolled

| 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 |
| 1440X10000 | 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 |

File Name: AIOT-QM.rfp
Assembly: 9697AIOT0A-D
Ref Des:
Description:

Failure Rate: 5303.129017
MTBF (hrs): 188,568
Temperature: 30
Environment: GF, GU - Ground Fixed, Uncontrolled

| 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 |
| 175011301A | Miscellaneous | | | 306.000000 | 1 | 1681683.006787 |
| 1752002200 | Miscellaneous | FS3 | | 2.400000 | 1 | 254626042.602335 |