

# uCOM-BT

## Reliability Prediction Report (MTBF)

Summary	Failure Rate: 10341.257053 ppm MTBF: 96,700 Hours
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Issue date

2015/07/08

Approval

KJ Wang

Test Engineer

Max Chang

# Reliability Prediction (MTBF)

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**I . Model Name:** uCOM-BT

**II . Prediction Date:** July, 08, 2015

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

**IV . Predicted by:** Max Chang

**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:**

uCOM-BT (9697UCBT0C-D):

- Failure Rate: 10341.257053 ppm
- MTBF: 96,700 Hours

**AAEON Reliability Prediction  
Summary**

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

**Failure Rate:** 10341.257053  
**MTBF (hrs):** 96,700  
**Temperature:** 30  
**Environment:** GF, GU - Ground Fixed, Uncontrolled

Assembly Name	Part Number	Ref Des	Quantity	Failure Rate	MTBF
uCOM-BT	9697UCBT0C-D		1	10341.257053	96,700

**File Name:** uCOM-BT.rfp  
**Assembly:** 9697UCBT0C-D  
**Ref Des:**  
**Description:**

**Failure Rate:** 10341.257053  
**MTBF (hrs):** 96,700  
**Temperature:** 30  
**Environment:** GF, GU - Ground Fixed, Uncontrolled

Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
1050500334	Resistor	R388		2.547039	1	282340674.079668
1050501224	Resistor	R320		2.547039	1	282340674.079668
1050501634	Resistor	R237,R327		2.547039	2	154078778.388085
1050502004	Resistor	R316,R88		2.547039	2	154078778.388085
1050502204	Resistor	R150,R31,R33,R35,R38,R57,R58,R59,R60,R75		2.547039	10	35079934.879747
1050502224	Resistor	R384		2.547039	1	282340674.079668
1050502724	Resistor	R338		2.547039	1	282340674.079668
1050503604	Resistor	R177		2.547039	1	282340674.079668
1050504724	Resistor	R1,R2		2.547039	2	154078778.388085
1050505134	Resistor	R236		2.547039	1	282340674.079668
1050508224	Resistor	R330,R336		2.547039	2	154078778.388085
1050510034	Resistor	R20,R21,R210,R222,R235,R7,R73,R8		2.547039	8	43225424.698300
1050512414	Resistor	R118,R135		2.547039	2	154078778.388085
1050516204	Resistor	R6		2.547039	1	282340674.079668
1050516964	Resistor	R315,R90		2.547039	2	154078778.388085
1050520034	Resistor	R139,R286		2.547039	2	154078778.388085
1050523264	Resistor	R4		2.547039	1	282340674.079668
1050524004	Resistor	R175,R176,R208,R211		2.547039	4	82309758.689546
1050529464	Resistor	R5		2.547039	1	282340674.079668
1050530164	Resistor	R202,R203		2.547039	2	154078778.388085
1050540204	Resistor	R12,R26,R29		2.547039	3	107020754.986850
1050540214	Resistor	R53		2.547039	1	282340674.079668
1050545364	Resistor	R126,R134		2.547039	2	154078778.388085
1050547004	Resistor	R398		2.547039	1	282340674.079668
1050547564	Resistor	R54		2.547039	1	282340674.079668
1050560424	Resistor	R156		2.547039	1	282340674.079668
1050568124	Resistor	R157		2.547039	1	282340674.079668
1050573264	Resistor	R310,R312,R314,R83		2.547039	4	82309758.689546
1050580614	Resistor	R191		2.547039	1	282340674.079668
1050756004	Resistor	R128,R171		2.547039	2	154078778.388085
105A500139	Resistor	R131,R132,R133,R302,R319		2.547039	5	67008142.102588
105A500173	Resistor	R146,R148,R151,R152,R153,R243,R294		2.547039	7	48991237.965885
105A501039	Resistor	R374,R375		2.547039	2	154078778.388085
105A501139	Resistor	R326		2.547039	1	282340674.079668

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**Temperature:** 30  
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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
105A502403	Resistor	R452,R453		2.547039	2	154078778.388085
105A505109	Resistor	R66,R67,R68 ,R69, R70		2.547039	5	67008142.102588
105A510009	Resistor	R306,R308,R 325, R328,R339,R 376, R377,R385,R 386, R387,R410		2.547039	11	32049696.385471
105A515009	Resistor	R24		2.547039	1	282340674.079668
105A549919	Resistor	R263		2.547039	1	282340674.079668
105A549969	Resistor	R101,R143,R 41,R42, R43		2.547039	5	67008142.102588
105A556003	Resistor	R301		2.547039	1	282340674.079668
105A561909	Resistor	R299,R318,R 699, R700,R701,R 702, R703,R704,R 705, R706		2.547039	10	35079934.879747
105A700003	Resistor	R304,R305,R 322, R323,R324		2.547039	5	67008142.102588
105A700009	Resistor	R130,R144,R 145, R149,R154,R 192, R227,R229,R 247, R252,R262,R 276, R289,R295,R 3,R303, R317,R342,R 344, R351,R353,R 39,R392, R397,R425,R 427, R436,R437,R 55,R56, R72		2.547039	31	11861900.957214
105A700109	Resistor	R296,R297,R 298		2.547039	3	107020754.986850
105A700139	Resistor	R111,R246		2.547039	2	154078778.388085

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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
105A701039	Resistor	R10,R100,R105,R114,R206,R219,R230,R232,R233,R248,R249,R260,R27,R274,R281,R287,R288,R291,R292,R293,R329,R332,R333,R334,R335,R337,R340,R346,R347,R348,R349,R350,R352,R355,R356,R357,R359,R360,R361,R362,R363,R364,R365,R366,R367,R368,R369,R370,R3		2.547039	66	5684918.384720
105A701059	Resistor	R380,R381,R389,R391,R52		2.547039	5	67008142.102588
105A701069	Resistor	R77		2.547039	1	282340674.079668
105A702039	Resistor	R110,R116,R78		2.547039	3	107020754.986850
105A702229	Resistor	R117,R120,R121,R124,R140,R142,R217,R218,R22,R23,R284,R285,R300,R321,R341,R343,R37,R404,R405		2.547039	19	19019185.781770
105A703309	Resistor	R138,R141,R195, R199		2.547039	4	82309758.689546
105A703329	Resistor	R253,R254,R256		2.547039	3	107020754.986850

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105A704729	Resistor	R196,R198,R244, R271,R272,R273, R311,R313,R331, R395,R396,R74,R85		2.547039	13	27342571.921361
105A708229	Resistor	R129,R51		2.547039	2	154078778.388085
105A710003	Resistor	R450		2.547039	1	282340674.079668
105A710039	Resistor	R393,R428		2.547039	2	154078778.388085
105A718003	Resistor	R451		2.547039	1	282340674.079668
105A720009	Resistor	R71		2.547039	1	282340674.079668
105A733009	Resistor	R423,R424,R430, R431,R432,R433, R438,R439		2.547039	8	43225424.698300
105B700009	Resistor	R113,R160,R161, R178,R185,R193, R194,R205,R209, R223,R265,R266, R267,R268,R720,R99		2.547039	16	22425139.809646
105B700139	Resistor	R716,R718		2.547039	2	154078778.388085
105B701039	Resistor	R102,R106,R107, R108,R162,R179, R180,R186,R214, R215,R224,R225,R28, R417,R440,R442, R443,R444,R717, R719		2.547039	20	18104712.511396
105B702205	Resistor	R181,R270		2.547039	2	154078778.388085
105B702225	Resistor	R558,R559,R565, R566,R76		2.547039	5	67008142.102588
105B703309	Resistor	R109,R112,R115, R159		2.547039	4	82309758.689546
105B704725	Resistor	R207		2.547039	1	282340674.079668
106B501034	Resistor	RT2,RT3		2.547039	2	154078778.388085
106BA01033	Resistor	RT1		2.547039	1	282340674.079668



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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
1121501690	Capacitor	C116,C117,C118, C119,C120,C121, C122,C123,C125, C126,C128,C129, C130,C131,C132, C133,C134,C135, C136,C137,C138, C139,C140,C141, C142,C143,C144, C145,C147,C148, C151,C154,C156, C340,C370,C371, C375		1.128806	37	22998172.632301
1121501691	Capacitor	C227,C230,C244, C245,C247,C250, C251,C253,C254, C258,C266,C268, C270,C272,C273		1.128806	15	55479656.844874
1124418090	Capacitor	C16,C17		1.128806	2	375289731.076049
1124427091	Capacitor	C10,C13,C210,C211		1.128806	4	196873384.410843
1124547290	Capacitor	C234,C236,C237		1.128806	3	257514172.353070
1129622690	Capacitor	C114,C115,C307,C33, C34		1.128806	5	159367490.199266
1129701791	Capacitor	C179,C212,C213, C214,C215,C52,C80		1.128806	7	115633865.771428
1129710390	Capacitor	C308		1.128806	1	704977644.692287
1189622154	Capacitor	TC2,TC3,TC4		1.128806	3	257514172.353070
1189622154	Capacitor	TC1	46.5	1.456241	1	546463703.157647
11C1539840	Capacitor	C209		1.128806	1	704977644.692287
11C4547190	Capacitor	C206,C207,C208		1.128806	3	257514172.353070

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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
11C9510490	Capacitor	C1,C105,C106,C11,C12,C14,C15,C164,C165,C167,C169,C170,C171,C172,C173,C174,C175,C176,C178,C18,C180,C181,C182,C183,C184,C185,C188,C189,C190,C191,C193,C194,C2,C204,C205,C216,C217,C219,C22,C220,C221,C224,C23,C238,C26,C264,C278,C282,C285,C286,C29		1.128806	84	10266401.768736
11E4433090	Capacitor	C315		1.128806	1	704977644.692287
11E4433690	Capacitor	C113		1.128806	1	704977644.692287
11E9501090	Capacitor	C306,C309,C311		1.128806	3	257514172.353070

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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
11E9501091	Capacitor	C100,C101,C102, C159,C187,C19, C20,C21,C27,C29 3,C341, C342,C35,C36, C37, C50,C51,C53 ,C54, C55,C56,C58 ,C59, C60,C61,C62 ,C63, C64,C65,C66 ,C67, C69,C70,C71 ,C72, C73,C74,C76 ,C77, C78,C79,C83 ,C84, C85,C87,C88 ,C89, C90,C91,C95 ,C96, C97,C98,C99		1.128806	54	15865848.114680
11E9510490	Capacitor	C112,C158,C160, C161,C162,C168, C197,C199,C202, C203,C312,C327, C328,C329,C330, C332,C333,C334, C335,C376,C377, C378,C379,C380, C381,C382,C383, C384		1.128806	28	30212160.975569
11E9622052	Capacitor	C240,C284,C288		1.128806	3	257514172.353070
11E9622080	Capacitor	C24,C25,C28 ,C29, C43,C44,C45 ,C92, C93,C94		1.128806	10	82101057.548118

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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
11E9647690	Capacitor	C326,C38,C39		1.128806	3	257514172.353070
11EA501050	Capacitor	C196,C200,C57		1.128806	3	257514172.353070
11EA510390	Capacitor	C386,C387,C388, C389		1.128806	4	196873384.410843
11EA610040	Capacitor	C103,C104,C177, C186,C192,C201, C225,C228,C232, C246,C252,C265, C271,C276,C277, C279,C280,C281, C283,C287,C289, C291,C294,C32,C325, C331,C40,C41,C42, C82		1.128806	30	28241202.507613
11EA647010	Capacitor	C226,C229,C231, C233,C235,C248, C249,C255,C256, C267,C269,C274, C275		1.128806	13	63728475.410842
11EB610050	Capacitor	C222,C223,C239, C241,C242,C243, C257,C259,C260, C261,C262,C263, C318,C343		1.128806	14	59316298.011235
1211103377	Inductor	L4	44.8	10.360328	1	73856464.249321
1211103377	Inductor	L7		4.944252	1	154760964.143460
1211106869	Inductor	L3	43.8	10.211932	1	74929712.981206
1211110073	Inductor	L5		4.944252	1	154760964.143460
1211110073	Inductor	L6	44.8	10.360328	1	73856464.249321
121113307A	Inductor	L1	39.3	9.560044	1	80039082.846575
121113307M	Inductor	L2	45.9	10.525049	1	72700581.367231
1212306030	Inductor	FB1,FB2,FB3,FB4, FB5,FB6		4.944252	6	30055900.223009
12310025A3	Miscellaneous	Y1,Y3		19.200000	2	8854051.752197

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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
1231332726	Miscellaneous	Y2		19.200000	1	23844262.770939
1301005440	Semiconductor	D6	40.7	21.130566	1	34229347.167189
1301005440	Semiconductor	D8		7.793411	1	92807310.010983
1301005444	Semiconductor	D1,D2,D3		7.793411	3	35106858.962001
1301400642	Semiconductor	D7		7.793411	1	92807310.010983
1304000044	Optical Device	LED2		79.003355	1	6497172.749112
1304101340	Optical Device	LED1		79.003355	1	6497172.749112
13100EMX10	Semiconductor	Q61		22.463360	1	31642600.748419
1314880011	Semiconductor	U29	35.8	54.703706	1	12993619.408063
1315036640	Semiconductor	Q15	49.6	73.461356	1	9675823.753792
1315036640	Semiconductor	Q17		22.463360	1	31642600.748419
1315720010	Semiconductor	Q14	46.6	69.037265	1	10295876.132619
1315720010	Semiconductor	Q16		22.463360	1	31642600.748419
1315EM6K10	Semiconductor	Q1,Q13,Q18, Q19,Q2, Q20,Q22,Q3, Q30,Q32, Q33,Q34,Q3 5,Q36, Q41,Q42,Q5 2,Q55, Q56,Q57,Q5 9,Q60, Q62,Q9		22.463360	24	1717346.784324
1315EM6K10	Semiconductor	Q5	34.1	52.664525	1	13496734.943368
1430091100	Integrated Circuit	U33		43.803003	1	11739202.588727
1430959602	Integrated Circuit	U23	52.7	1049.762870	1	489836.651506
14401016A1	Integrated Circuit	U36	39.4	516.399678	1	995764.233909
1440210IT0	Integrated Circuit	U22	36.8	446.618300	1	1151346.304427
1440E38450	Integrated Circuit	U1	53.4	161.649400	1	3181034.577837
1468014680	Integrated Circuit	U7	33.6	372.391765	1	1380837.002917
1468014680	Integrated Circuit	U11,U12,U6		43.803003	3	4923240.069161
149TB01040	Integrated Circuit	U17,U2,U26, U3,U31		43.803003	5	3214211.402100
149TS01040	Integrated Circuit	U24	39.7	525.048397	1	979361.774052
14E0085281	Integrated Circuit	U28	42.2	602.314350	1	853727.507776
14S3010700	Integrated Circuit	U5	33	359.775925	1	1429257.196231
14S5A00821	Integrated Circuit	U34		26.018600	1	25551442.237972
14S5A12506	Integrated Circuit	U20		26.018600	1	25551442.237972
14S5A30601	Integrated Circuit	U25	41	564.042600	1	911655.128634
14S5A30601	Integrated Circuit	U4		43.803003	1	11739202.588727
14S6206403	Integrated Circuit	SPI1	41.4	576.551027	1	891876.529414
14S6216060	Integrated Circuit	U30		43.803003	1	11739202.588727
14S6308002	Integrated Circuit	U35		11.063278	1	58231413.220643
14S9346000	Integrated Circuit	U19		43.803003	1	11739202.588727
1540510380	Resistor	RP10,RP11,R P12,RP8, RP9		9.971436	5	14126297.426094

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Summary**

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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
1540736081	Resistor	RP1,RP2,RP3 ,RP4, RP5,RP6		9.971436	6	12090001.526571
160000403	Connection	SW1(1,2OFF)		16.184835	1	35685591.360212
1655802130	Miscellaneous	BAT1A		306.000000	1	1681683.006787