



Bullet III - Mean Time Between Failure (MTBF)

Overview

This reliability prediction for the Bullet III antennas was calculated by Chi-Square Distribution function.

The MTBF report is applicable to following product:

Part Number	Description
57860-20	Bullet III TNC 5V
57860-30	Bullet III F CONN. 5V LF
57861-20	Bullet III 3V LF

Calculation Steps

1. Acceleration factor calculated by Hallberg-Peck Model

$$AF = \left(\frac{RH_A}{RH_U}\right)^3 \times \exp\left[\frac{E_A}{K} \left(\frac{1}{T_U} - \frac{1}{T_A}\right)\right]$$

$E_A \rightarrow$ active energy 0.9ev $K \rightarrow$ Boltzmann constant 8.623×10^5 eV/K

And Martin Marietta Model

$$AF = \left(\frac{V_A}{V_U}\right)^3 \times 2^{\left(\frac{T_A - T_U}{10}\right)}$$

2. If no failure, MTBF calculated by Chi-Square Distribution Function

$$\frac{1}{MTBF} = \lambda = \frac{\chi^2(\alpha, df.)}{2 \times AF \times T} \quad (\alpha = 60\% \text{ confidence level})$$

3. If have failure, MTBF calculated by

$$MTBF = \frac{\sum_{i=1}^r t_i + (n - r) t_c}{r} \quad r \rightarrow \text{failure size} \quad t_i \rightarrow \text{every stop time} \quad t_c \rightarrow \text{finish time}$$

MTBF Result

The mean time between failures (MTBF) of the Bullet III antenna was calculated to be 308,612 hours

For questions or additional information, please contact your local Trimble sales representative.