Reliability Prediction
MTBF Report

Model name : <u>QSFPDD-DR4-400G</u>

1. Instrument:

Has carried out the theoretical reliability prediction for the QSFP-DD DR4 transceiver module in reference to the Telcordia SR-332 Reliability Prediction Procedure for Electronic Equipment. The prediction was based on the Unit Steady-State Failure Rate Using the Parts Count Method.

2. Failure Rate Models:

Unit Steady-State Failure Rate Using the Parts Count Method

The parts count steady-state failure rate prediction for a unit, λPC is computed as the sum of the device failure rate predictions for all devices in the unit, multiplied by the unit environmental factor:

$$\lambda_{PC} = \pi_E \sum_{i=1}^{n} N_i \lambda_{SSi}$$

where

N: number of different device types in the unit

N_i: quantity of ith device type

π_E: unit environmental factor

If no data from laboratory tests or field studies of this unit are available, then

$$\lambda_{SS} = \lambda_{PC}$$

3. Summary of Failure Rate Prediction for λ_{PC} and MTBF:

PART DESCRIPTION	QTY.	FAILURE_RATE @ 40℃
CAP, CERAMIC, NPO CC	258	25.80
RESISTOR, FIXED FILM RNR	82	14.76
FERRITE BEAD/INDUCTANCE	25	6.00
DIODE	7	10.71
MCU	1	0.34
Amplifier	4	8.76
DC-DC	6	138.02
Special IC	9	79.65
LD	2	32.00
EPIC	1	53.10
PCB	1	2.60
	TOTAL	371.74

Notes:

1. Failure Rate = 371.74 F.I.T.@+40º C with 90% Confidence Level

2. MTBF = (1 / FAILURE_RATE) x 109 HOURS = 109 / 371.74 = 2690052.187 HOURS

3. The unit of FAILURE_RATE is PER BILLION HOURS.

4. MTBF = 2690052.187 hours @+40º C with 90% Confidence Level