AFCT-5944xxxZ, AFCT-5943xxxZ, AFCT-5942xxxZ

Single Mode SFF Transceivers for SONET
OC-48/SDH STM-16 Multirate Operation

Qualification Report (2000hrs)

Summary

The AFCT-5944xxxZ, AFCT-5943xxxZ and AFCT-5942xxxZ transceivers have been qualified with reference to Telcordia Document GR-468-CORE under the supervision of Avago Technologies Quality and Reliability Department.

This report summarizes the qualification tests over a range of environmental and mechanical extremes that were carried out.

Introduction

The AFCT-5944xxxZ, AFCT-5943xxxZ and AFCT-5942xxxZ are high performance, effec¬tive modules for serial optical data communications applications that range from 125 Mb/s to 2.7 Gb/s. They are designed to provide SONET/SDH compliant links at 2488 Mb/s for both short and intermediate reach links.

The modules are designed for single mode fiber and operate at a nominal wavelength of 1300 nm. The transmitter section of the AFCT-594xLZ/ALZ/GZ/AGZ incorporates a 1300 nm Fabry Perot (FP) laser. The transmitter in the AFCT-594xTLZ/ATLZ/TGZ/ATGZ uses a Distributed Feedback (DFB) Laser.

Testing

In order to demonstrate mechanical integrity, ruggedness and endurance, AFCT-5944ALZ and AFCT-5944ATLZ modules were subjected to Accelerated Stress Tests as shown in Table 1. The devices were tested for all key parameters before and after each test leg. Receiver sensitivity and transmitter output power were used to confirm correct functionality of the module.

Most of the qualification legs, detailed in Table 1, are tested in-house. Where the facilities do not exist, the work was conducted externally.

Results

Table 1 summarizes the qualification test legs, test references, conditions, sample size and results.

Appendix A shows the details test results of receiver sensitivity and transmitter output power at qualification release point.

Conclusion

At the time of publication of this report, the AFCT-5944ALZ and AFCT-5944ATLZ qualification test legs have successfully passed the product qualification full release points as defined by Avago Technologies Quality and Reliability Department.

Table 1. AFCT-5944ALZ and AFCT-5944ATLZ Qualification Test Summary

Leg	Test	Reference	Stress Condition	Sample Size	Test Results (Fail/Pass) [2]
1a	Mechanical Shock [1]	MIL-STD-883 Method 2002B	1500g, 0.5ms, 5 shocks/axis, 6 axis	11 x AFCT-5944ALZ	0/11 Post Shock test
1b	Mechanical Vibration [1]	MIL-STD-883 Method 2007A	20g, 20-2000Hz, 4 min/cycle, 4 cycles/axis, 3 axis		0/11 Post Vibration
2.1	Temperature Cycling	MIL-STD-883 Method 1010	Ta = -40°C to +100°C, 15min dwell, 5min transfer 1000 cycles for release	11 x AFCT-5944ALZ	0/11 @ 1000 cycles
2.2	Temperature Cycling	MIL-STD-883 Method 1010	Ta = -40°C to +100°C, 15min dwell, 5min transfer 1000 cycles for release	11 x AFCT-5944ATLZ	0/11 @ 1000 cycles
3	Biased Cyclic Moisture Resistance	MIL-STD-883 Method 1004	Ta= -10°C to +65°C, biased Power on/off @ 30 min RH= 95%, (1 cycle per day) 20 cycles for release 40 cycles for info	11 x AFCT-5944ALZ	0/11 @ 40 cycles
4.1	High Temperature Operating Life (HTOL)	Section 5.18 (GR-468-CORE)	Ta = +85°C, rated power 1000hours for provisional release 2000 hours for full release,	25 x AFCT-5944ALZ	0/25 @ 2000 hours
4.2	High Temperature Operating Life (HTOL)	Section 5.18 (GR-468-CORE)	Ta = +85°C, rated power 1000hours for provisional release 2000 hours for full release,	25 x AFCT-5944ATLZ	0/25 @ 2000 hours
5.1	Unbiased Damp Heat	MIL-STD-402 Method 103	Ta = +85°C, RH = 85%, Unbiased, 1000hours for provisional release 2000hours for full release	11 x AFCT-5944ALZ	0/11 @ 2000 hours
5.2	Unbiased Damp Heat	MIL-STD-402 Method 103	Ta = +85°C, RH = 85%, Unbiased, 1000hours for provisional release 2000hours for full release	11 x AFCT-5944ATLZ	0/11 @ 2000 hours
6.1	Low Temperature Storage	GR-468-CORE	Ta = -40°C, 1000hours for provisional release 2000hours for full release	11 x AFCT-5944ALZ	0/11 @ 2000 hours
6.2	Low Temperature Storage	GR-468-CORE	Ta = -40°C, 1000hours for provisional release 2000hours for full release	11 x AFCT-5944ATLZ	0/11 @ 2000 hours
7	Thermal Shock (Air-Air)	MIL-STD-883 Method 1011	Ta = -40°C to 85°C 100 cycles for release	11 x AFCT-5944ALZ	0/11 @ 100 cycles
8a	ESD test - Contact Discharge [1]	IEC 61000-4-2	8000V 10 zaps on electrical faceplate on panel Live traffic	5 x AFCT-5944ALZ	0/5 @ 8000V
8b	ESD test - Air Discharge [1]	IEC 61000-4-2	15000V Live Traffic		0/5 @ 15000V
9a	HBM ESD [1]	MIL-STD-883 Method 3015	1000V, 2000V	6 x AFCT-5944ALZ	0/6 @ 2000V
9b	High Temperature Operating Life (HTOL) [1]	Section 5.18 (GR-468-CORE)	Ta = +85°C, rated power, post HBM ESD test 1000 hours, for info only		0/6 @ 1000hrs

Leg	Test	Reference	Stress Condition	Sample Size	Test Results (Fail/Pass) [2]
10a	Optical Cable Insertions	--	200 insertions for release 500 insertions for info	11 x AFCT-5944ALZ	0/11 @ 250 insertions 0/5 @ 500 insertions
10b	Solderability	JESD22-B102D	8hrs steam aging @+93°C, Solder dip @ 245°C, 5+/-0.5sec immersion	5 x AFCT-5944ALZ	0/5 Post Solderability
11	Transmission with applied load	GR-468-CORE	Axial pull, 0.5kg (release) and 1kg (for info only) 5s/load, 3 times	11 x AFCT-5944ALZ	0/11 Axial Pull @ 0.5kg & 1kg load
			Side Load, 0.25kg (release) and 0.5kg (for info only) 5s/load, 3 times/direction, 4 directions		0/11 Side Load @ 0.25kg & 0.5kg load (LOP delta <0.8dBm)

Notes:
1. Same set of samples are test in sequence for the Test legs that start with same digital numbers (e.g. 1a & 1b).
2. Note: "Pass" means that the parts were within datasheet limits after stressing; and at release point the delta for LOP <1.0dBm and CSEN <1.0dBm.

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