

Integra Optics Transceiver Testing

Testing Engineer: Donnel Davis Date: 7 / 23 / 2020
Transceiver Part Number: 1E5B73A11
Transceiver Description: QSFP28, 1310nm, LR4 Em1 Dual Rates SMF 10km, 100/1126DDM

Tested @ Single Rate

Physical Characteristics Testing

1.	Physical Resilience		
1.1.	Mechanical Shock Test	Use a Checkmark	Write Value
1.1.1.	5 times/axis, 4900 m/s ² (500G), 1.0ms	PASS ☒ FAIL ☐	NA
1.2.	Vibration		
1.2.1.	20 to 2000 Hz, 196 m/s ² (20G), 4 min/cyc, 4 cyc/axis	PASS ☒ FAIL ☐	NA
1.3.	Thermal Shock - Ta = -40 to +85°C		
1.3.1.	Primary 100cyc	PASS ☒ FAIL ☐	NA
1.3.2.	Extended 500cyc	PASS ☒ VALUE ☐	
2.	Environmental Resilience		
2.1.	Hight Temperature Storage		
2.1.1.	Ta = +85°C, 2000h	PASS ☒ FAIL ☐	NA
2.2.	Temperature Cycling - Ta = -40 to +85°C		
2.2.1.	Primary 100cyc	PASS ☒ FAIL ☐	NA
2.2.2.	Extended 500cyc	PASS ☒ VALUE ☐	
2.3.	Low Temperature Storage		
2.3.1.	Ta = -40°C, 72h	PASS ☒ FAIL ☐	NA
2.4.	Damp Heat [Non-Operational]		
2.4.1.	Ta = +85°C, 85% RH, 1000h	PASS ☒ FAIL ☐	NA
2.5.	Hight Temp Operational Life (HTOL)		
2.5.1.	Tc = +75°C, operating, 2000h	PASS ☒ FAIL ☐	NA
2.6.	Damp Heat (operational)		
2.6.1.	Tc = +75°C, 85% RH, operating, 1000h	PASS ☒ FAIL ☐	NA
2.7.	Cyclic Moisture Resistance		
2.7.1.	20 cycles, 24 h/cycles, 80-100% RH, -10/+25/+65°C	PASS ☒ FAIL ☐	NA
2.8.	ESD Threshold (HBM)		
2.8.1.	High speed pins +/-500V	PASS ☒ FAIL ☐	NA
2.8.2.	Other pins +/-2000V	PASS ☒ FAIL ☐	NA

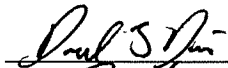
3.	Module and Link Level Testing		
3.1.	24-hour traffic stability test		
3.1.1.		PASS ☒ FAIL ☐	NA
3.2.	Link restoration on hard/soft reboot		
3.2.1	Link recovery per expectation required to pass	PASS ☒ FAIL ☐	NA
3.3.	Link Restoration on fiber pull Tx, Rx, Recovery from a Tx and Rx interruption is required to pass		
3.3.1.	Tx interruption recovery	PASS ☒ FAIL ☐	NA
3.3.2.	Rx interruption recovery	PASS ☒ FAIL ☐	NA
3.4.	MSA compliant EEPROM memory map		
3.4.1.	Expected write/read of EEPROM is required to pass	PASS ☒ FAIL ☐	NA
3.5.	Digital Diagnostics Monitoring (DDM) validation		
3.5.1.	A proper programing board and reference platform reading of DDM values are required to pass	PASS ☐ FAIL ☐	NA
3.6.	Transmitter optical power		
3.6.1.	Transmit power congruent with specification data is required to pass Note: For multi-lane transceivers, multiple values may be listed	PASS ☒ FAIL ☐	Expected Max Values <u>4.5</u>
	Testing Notes:		Expected Min Values <u>-4.3</u> Observed Values Lane1: <u>0.45</u> Lane2: <u>1.81</u> Lane3: <u>1.98</u> Lane4: <u>1.93</u>
3.7.	Transmitter wavelength		
3.7.1.	Transmitter power predominantly on the specified wavelength is required to pass	PASS ☒ FAIL ☐	NA
3.8.	Receiver sensitivity and BER testing		
3.8.1	The minimum receive value must be validated 3 times with successful recovery in to pass Note: For multi-lane transceivers the value is pulled from the first lane to experience errors	PASS ☒ FAIL ☐	Expected minimum Rx: <u>-8.6</u>
	Testing Notes		Trial1, minimum Rx: <u>-13.7</u>
			Trial2, minimum Rx: <u>-13.6</u>
			Trial3, minimum Rx: <u>-13.7</u>

3.9.	Loop length dispersion testing		
3.9.1.	<i>Error free traffic must exceed classification distance rating, triple verified, to pass. Values should adhere to minimum receive accounting for the transmitter dispersion penalty (TDP)</i> <i>Note: For multi-lane transceivers the value is pulled from the first lane to experience errors</i>	PASS ☒ FAIL ☐	Launch distance used(km): <u>10</u>
			Trial1, minimum Rx: <u>-14.08</u>
	Testing Notes		Trial2, minimum Rx: <u>-13.98</u>
			Trial3, minimum Rx: <u>-14.05</u>
3.10.	Receiver overload testing		
3.10.1.	<i>Observed maximum receive values must, triple verified, correlate to specification values to pass</i> <i>Note: For multi-lane transceivers the value is pulled from the first lane to experience errors</i>	PASS ☒ FAIL ☐	Expected maximum Rx: <u>3.0</u>
			Trial 1 observed overload level: _____
	Testing Notes Overload did not occur when run back to back.		Trial 2 observed overload level: _____
			Trial 3 observed overload level: _____
3.11.	Laser eye performance testing		
3.11.1.	Eye diagram minimum definition and coherence at DUT specified distance must be observed to pass	PASS ☒ FAIL ☐	NA
3.12.	Electrical eye performance testing		
3.12.1.	Eye diagram minimum definition and coherence at DUT specified distance must be observed to pass	PASS ☒ FAIL ☐	NA
3.13.	Spectral testing		
3.13.1.	Spectral distribution must result in a properly narrow peak to pass	PASS ☒ FAIL ☐	NA
4.0.	Additional notes		

Notes:

The above testing was conducted in a controlled and uniform fashion and all values observed constitute validation of the device under test.

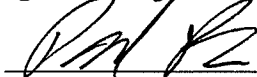
Presiding Engineer Signature:



Date:

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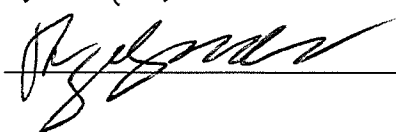
Reviewing Engineer Signature:



Date:

7/23/2020

Engineer Manager Signature:



Date:

7/23/2020