

Prior to Assembly			
Test No.	Instruction	Test description	Requirements fulfilled
1	Component verification and visual inspection	Confirm all electrical, optical and mechanical components match the bill of materials, check to see if free from physical damage and do small functionality tests.	R001, R011, R012, R018
2	Photodiode sensitivity characterisation	Validate photodiode response and sensitivity to ensure adequate detection over a 2m range once assembled.	R010, R011
3	Software Compliance Audit	Confirm all firmware and software used are open-source and appropriately documented prior to flashing.	R005
During Assembly			
Test No.	Instruction	Test description	Requirements fulfilled
4	Power Supply Integration Test	Verify correct voltage levels and isolation for the standalone power supply before connecting optical components.	R007
5	PCB Continuity and Signal Integrity Test	Check PCB traces, solder joints, and interconnections to ensure signal integrity between MCU, laser, and photodiode circuits.	R008, R012
6	Partial System Functional Test	Validate subsystem operation (laser modulation, UART link and communication state machine) before enclosure finalisation	R001, R002, R019
After Assembly			
Test No.	Instruction	Test description	Requirements fulfilled
7	USB communication and transparency Test	Connect modules between a PC and peripheral to confirm 1.5 Mbps USB	R004, R015, R017

		low-speed operation and transparent device behaviour	
8	Laser Power Classification Test	Measure each laser diode's optical output to verify compliance with Class 1M limits prior to installation.	R002, R006
9	Error Correction Performance Test	Introduce optical noise and verify correct Hamming (7,4) encoding and decoding	R019
10	Latency Test	Measure end-to-end latency between peripheral input and host response to confirm < 10 ms performance	R013, R017
11	Reflection Immunity and stability Test	Expose system to reflective surface and ambient light to verify no false triggering or signal interference occurs.	R014
12	Operational Duration and Thermal Compliance Test	Operate system continuously for extended period with module distance < 2m while monitoring temperature stability.	R016, R018, R020