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NOVUS100GE8Q28+FAN+10G+25G+40G

Ixia Novus QSFP28 100GE 8-Port with 10/25/40GE

8-Port QSFP28 100 Gigabit Ethernet Load Module · L2-3

Serial Number 541694

Part number 944-1140

Line Card Validation Report

Tested to ZC-TP-860-1417-10 rev B · issued 2026-11-13

OVERALL RESULT: PASS

Prepared for	Order reference
Stock inventory Zombie Components LLC	Invoice No: **n/a** Order No: **STOCK** Customer PO: **n/a** Document: **ZC-TR-STOCK-541694** Test procedure: **ZC-TP-860-1417-10 rev B** Service: **Test to stock** Chassis: Ixia XGS12 Chassis S/N: XGS12-J0701117 IxOS version: **9.24.3100.10** (chassis IxServer; version-matched client) Report date: 2026-11-13

This report certifies the health-validation testing performed on the Ixia Novus QSFP28 100GE 8-Port with 10/25/40GE, an 8-port QSFP28 100 Gigabit Ethernet load module identified herein. The module was exercised with live 64-byte traffic at full line rate on the ports of each test set, 40 ports in all (a 2 h 00 min 100GE soak; line-rate runs without soak: 40GE 1 h 01 min, 25GE 1 h 01 min, 10GE 25 min 30 s), each from a reset counter baseline, while identity, link state, line speed, every L1/L2 error and fault counter, and module temperatures were sampled continuously and assessed against the acceptance criteria. The complete per-port measurements and time-series charts follow.

Acceptance criteria. Each criterion is benchmarked to IEEE 802.3 or RFC 1242/2544 and set tighter. test procedure ZC-TP-860-1417-10 rev B, ten criteria, applied where the OEM gives no pass or fail limit, set out in full on the next page; each section states the criteria it verifies. **10 of 10 met.**

Methodology. All monitoring was performed read-only against a version-matched IxOS 9.24.3100.10 client; every error counter was verified zero at the start of each window and the module's traffic ran undisturbed. Verdicts reflect sustained behaviour, not single samples. **Limitations.** The IxOS Tcl API exposes one temperature per port on this family (central); it does not expose fan speed, supply voltages or optical digital diagnostics. The chassis is a native IxOS (Linux) XGS12: the IxServer session log is taken from the chassis web console and read on the chassis clock.

Test Report Release Note

Issues of ZC-TR-STOCK-541694 from the report register. Issue 1 is the first release of this test record; each later issue re-issues the same test record without retesting, with the change stated. This copy is issue 1.

Issue	Date	Procedure	Change
1	2026-11-13	ZC-TP-860-1417-10 rev B	First release

Acceptance Criteria

Each criterion is benchmarked to IEEE 802.3 or RFC 1242/2544 and set tighter. Where the OEM gives no pass or fail limit for a load module, Zombie Components applies the acceptance criteria of its test procedure ZC-TP-860-1417-10 rev B to the module. The rule behind every limit: a module passed here must behave as a transparent instrument, adding no measurable error, loss or rate deviation to the production data its user collects. Where the industry sets no number (boot record, event log), nothing is tolerated. Each measurement section of this report opens with the criteria it verifies, the value measured and the result, and the Acceptance Criteria Summary before the sign-off lists all ten.

ID	Criterion and limit	Benchmark and basis
AC-1	Identity: enumerated model, port count and serial agree with the order, the unit label and the boot record	**Order, unit label, IxServer boot record.** The report certifies one physical unit. Identity must agree across all three sources, so the document stays valid after the card leaves the chassis.
AC-2	Boot: zero FAIL records in the as-tested IxServer boot record; card reaches Board Ready	**IxServer power-on sequence; no industry limit.** Zero FAIL records tolerated. A module that fails its own start-up checks is not accepted, however it performs afterward.
AC-3	Test conditions: IxOS client version-matched to the chassis; counters zeroed at window start; sampling interval 10 s or less; capture window at least the module soak time, the longest AC-8 window among the PHYs the module supports and never less than 2 h, applied to the 100GE test set; every other test set runs at least the AC-8 window of its own PHY at its own line rate	**Metrology practice: controlled, documented conditions.** A version-mismatched client returns empty or invalid data, and counters are zeroed so only this window is judged. The window is calculated, not chosen: it is the time at line rate needed to demonstrate AC-8 on the most demanding PHY the module supports, and never less than 2 h: the bit count proves the error ratio, but a short window does not bring the module to thermal equilibrium for AC-9. Where the test sets of a module differ in load, the soak is run on the set of highest load, and each other set runs the window that proves AC-8 for its own PHY.
AC-4	Link: up on every port in every sample; zero link-down transitions	**IEEE 802.3 link status.** Industry practice only requires that the link comes up. We require zero drops for the whole window, because one flap in service resets sessions and corrupts the measurement in progress.
AC-5	Line rate: negotiated speed equals the nominal port speed in every sample	**IEEE 802.3 PHY line rate.** Nominal speed in every sample, with no downshift or renegotiation at any point.
AC-6	Throughput: every port within ±100 ppm of the theoretical line-rate frame rate for the frame size under test, measured over the whole window (IEEE 802.3 clock tolerance); the measurement uncertainty is stated	**IEEE 802.3 ±100 ppm clock tolerance; RFC 2544 §26.1.** Tested at the minimum 64-byte frame, the highest frame rate and hardest case, on all ports at once. The measured rate must sit inside the tolerance of a compliant link.
AC-7	Frame delivery: zero frame loss on every port (RFC 2544 throughput definition). Tx and Rx totals agree within 10 frames, the frames in flight at the read instant	**RFC 1242 §3.17 / RFC 2544 §26.1: throughput is the highest rate with zero loss.** Zero loss at full line rate on every port simultaneously. The only allowance is frames in flight when the counters are read.
AC-8	Errors: zero increase on every frame-integrity, data-path, line-coding, fault, drop and flow-control counter. The demonstrated bit-error-ratio bound per port (95% confidence, zero errors) is at least 5× tighter than the IEEE 802.3 objective for the PHY. On copper, FCS errors are attributed to cabling and excluded. Codewords corrected by forward error correction are stated and are not errors; an uncorrectable codeword is an error	**IEEE 802.3 BER objective: 10^{-12} (1000BASE-X, 10G/40G/100G), 10^{-10} (1000BASE-T).** Zero errors, over enough bits to prove BER ≤ objective/5 at 95% confidence (3/N bits). A test instrument must be well inside the limit its users test against; 5:1 exceeds the 4:1 minimum test-uncertainty ratio of metrology practice (ANSI/NCSL Z540.3). A module we pass contributes at most one fifth of the objective, which can only matter for a device already within 20% of its limit.
AC-9	Thermal: no over-temperature alarm or shutdown during the window; every exposed sensor below 80 °C. Temperature change over the window is an indication only, not a pass or fail limit	**Ixia Platform Reference Guide: a card shuts itself down above its temperature threshold.** A shutdown interrupts a user's test, so that is what is judged; 80 °C is taken as the start of a runaway toward it. Temperature change depends on the room and the chassis as much as the card, so it is an indication only.
AC-10	Stability: zero card hardware events logged by IxServer during the capture window. Records for ports that are inactive in the mode under test are not counted	**IxServer event log; no industry limit.** Any reset, re-initialisation or hardware event during a run would corrupt a customer's test in service, so none is tolerated during the window.

Standard and overrides. These criteria are the Zombie Components standard and are applied to every module we test. Because the modules are used equipment, sold with warranty terms that vary by unit, the President of Zombie Components may accept a specific unit against a relaxed limit when its application and warranty justify it. Any such override is stated in the report: the criterion, the standard limit, the limit applied, the reason, who authorized it and when. An overridden criterion is shown as OVERRIDE, never as PASS. **No override was applied to this unit.**

Demonstrated error bound for this unit: 100GE: zero errors over at least 7.22e+14 bits per port gives BER ≤ 4.2e-15 at 95% confidence, 241× tighter than the IEEE 802.3 cl.82/86 objective of 1e-12; 40GE: zero errors over at least 1.46e+14 bits per port gives BER ≤ 2.0e-14 at 95% confidence, 49× tighter than the IEEE 802.3 cl.82/86 objective of 1e-12; 25GE: zero errors over at least 9.15e+13 bits per port gives BER ≤ 3.3e-14 at 95% confidence, 31× tighter than the IEEE 802.3 cl.107/110 objective of 1e-12; 10GE: zero errors over at least 1.53e+13 bits per port gives BER ≤ 2.0e-13 at 95% confidence, 5× tighter than the IEEE 802.3 cl.49/52 objective of 1e-12 (the criterion requires 5×).

Module Specifications & Intended Use

Acceptance criteria	Measured	Result: PASS
AC-1 Identity: enumerated model, port count and serial agree with the order, the unit label and the boot record	NOVUS100GE8Q28+FAN+10G+25G+40G, 40 active of 40 enumerated ports, SN 541694 (label); EEPROM 541694; boot record SN 541694	**PASS**

The NOVUS100GE8Q28+FAN is a 100 Gigabit Ethernet load module that occupies one chassis slot and carries eight native QSFP28 ports. With the matching speed option installed, each 100GE port can be reconfigured as 1x40GE, 4x25GE or 4x10GE (and 2x50GE with the 50GE option), giving up to 8 ports of 40GE or 32 ports of 25GE or 10GE per module. It provides Layer 2-3 support under IxExplorer, IxNetwork and the Tcl API. (Ixia Platform Reference Guide, Release 8.20 EA (Dec 2016), Chapter 32 IXIA Novus QSFP28 Load Modules, printed pp.541-542; Keysight data sheet 3120-1109.EN, Novus QSFP28 High-Density 100/50/40/25/10GE Load Module Family (published March 27, 2026), pp.2-4)

The module is installed in an XGS12 or XGS2 chassis; port speed is selected per Resource Group in the card Operation Mode tab (1x100GE, 4x25GE, 2x50GE, 1x40GE, 4x10GE). The transmit engine generates wire-speed packets with timestamps, sequence numbers, data integrity signature and packet group signatures. The receive engine performs wire-speed packet filtering and capturing and measures real-time latency and inter-arrival time for each packet group, with data integrity, sequence and advanced sequence checking. (Ixia Platform Reference Guide, Release 8.20 EA (Dec 2016), Chapter 32 IXIA Novus QSFP28 Load Modules, Specifications table, printed pp.547-548; IxExplorer User Guide, Release 9.24 (doc version 202207211825), Chapter 17 Card Properties, Novus Operation Mode, printed p.981)

Stated performance specifications

Parameter	Specification
Model / part number	NOVUS100GE8Q28+FAN, 944-1140 (the v8.20 guide also lists 944-1144 as 100GbE only; 944-4004-T is the TAA version; 944-1165 is the 4-port enablement NOVUS100GE4Q28+FAN)
Type	100 Gigabit Ethernet full-featured load module, L2-3 support
Slots / ports	1 slot; 8x100GE native QSFP28 ports; 8x40GE and 32x10GE with the 40/10GE speed option; 32x25GE with the 25GE speed option; 16x50GE with the 50GE speed option
Physical interface	Native QSFP28
IEEE interface standards	IEEE 802.3 100GBASE-R, 802.3bj, 802.3bm, P802.3by (v8.20 guide); the data sheet adds 802.3ba and 802.3ae; 25G/50G Consortium specification v1.6 (v1.5 in the v8.20 guide)
Speed options and fan-out	25GE: 905-1007 factory installed, 905-1008 field upgrade (up to 4x25GE per port). 40GE and 10GE: 905-1025 factory installed, 905-1026 field upgrade (1x40GE or 4x10GE per port). 50GE: 905-1011 / 905-1012 (2x50GE per port). Ports default to 100GE. IxExplorer port speed modes per Resource Group: 1x100GE, 4x25GE, 2x50GE, 1x40GE, 4x10GE Normal Mode.
Transceiver support	QSFP28 100GBASE-SR4 (also 4x25GBASE-SR), 100GBASE-LR4, 100GE PSM4, 100GE CWDM4; QSFP+ 40GBASE-PLR4; Active Optical Cable
Passive copper DAC support	100GBASE-CR4 passive copper DAC up to 5 m (requires RS-FEC enabled); 25GBASE-CR passive DAC point-to-point and QSFP28-to-4xSFP28 fan-out up to 5 m (requires Clause 74 BASE-R FEC; data sheet: or RS-FEC Clause 91); 40GE over passive copper DAC. Ixia cable 942-0088: QSFP28 passive copper DAC, point-to-point, 3 m.
Max ports per chassis	XGS12 (12 modules): 96 ports 100GE, 96 ports 40GE, 384 ports 25GE, 384 ports 10GE. XGS2 (2 modules): 16 ports 100GE, 64 ports 25GE, 64 ports 10GE. The data sheet prints 32 ports of 40GE for XGS2; 2 modules x 8 ports = 16, so that printed value is reported as is and flagged.
Max streams per port	v8.20 guide: 100GbE 32, 25GbE 16. Current data sheet: normal mode 100GE 64, 40GE 64, 25GE 16, 10GE 16; high stream mode 100GE 128, 40GE 128, 25GE 64, 10GE 64.
Frame size	Maximum 14,000 bytes (9,216 bytes in Data Center Ethernet). Minimum 60 bytes at full line rate, 49 bytes at less than full line rate (the v8.20 guide transmit row prints '6 bytes at full line rate').
Latency measurement resolution	2.5 nanoseconds
Transmit line clock adjustment	-100 ppm to +100 ppm across all ports on the load module
Trackable receive flows per port	100GE and 40GE: 32K limited statistics mode, 4K full statistics mode. 25GE and 10GE: 8K limited, 2K full.
Hardware capture buffer	Two hardware capture buffers per card, assignable to a port or Resource Group. v8.20 guide: two 512MB buffers. Current data sheet: 2 GB per port for 1x100GE and 1x40GE, 1 GB per Resource Group for 4x25GE and 4x10GE (a second, unlabeled column of the same table states 1 MB). Extended capture on all 8 ports is supported only in XGS12-SD/SDL/HSL chassis; slots 1, 2, 11 and 12 then become inactive.

Parameter	Specification
FEC, auto-negotiation, link training	100GE: RS-FEC Clause 91, auto-negotiation Clause 73 for copper DAC, link training; RS-FEC corrected and uncorrected codeword counts. 25GE: FC-FEC Clause 74 and RS-FEC Clause 108, AN Clause 73, link training. 40GE: AN Clause 73 and link training for passive copper DAC. Auto-negotiation is not available at 10GE. The v8.20 guide states that at that release the 4x25GE option did not support FEC or auto-negotiation.
CPU and memory	Multicore processor with 2GB of CPU memory per port
Dimensions / weight	17.3 in (L) x 1.3 in (W) x 12.0 in (H), 440 x 33 x 305 mm; module only 11.8 lb (5.35 kg); shipping 18.6 lb (8.44 kg)
Operating temperature / humidity	Operating 41 F to 95 F (5 C to 35 C); storage 41 F to 122 F (5 C to 50 C); humidity 0% to 85% non-condensing

Specification rows are from the local Ixia Platform Reference Guide Release 8.20 EA (December 2016), the IxExplorer User Guide Release 9.24 and the Keysight data sheet of the family, each row cited with the printed page. Definition ZC-FD-novus100ge8q28o rev 1, approved 2026-11-12.

Module Family: Novus QSFP28 100GE

The Novus QSFP28 family is the 8-port native QSFP28 100GE load module of the XGS chassis line. One hardware part carries the speed options as licences on the card: 25GE, and 40GE with 10GE. IxOS names the card by the options it finds.

Model	Part number	Description
NOVUS100GE8Q28+FAN	944-1140	8-port QSFP28 100GE load module, 1 slot, 100GE native; 25GE by option
NOVUS100GE8Q28+FAN +10G+25G+40G (this unit)	944-1140	Same 944-1140 hardware with the 25GE and 40/10GE fan-out speed options installed. The IxOS card-type string itself is not printed in any source read; the options and their part numbers are.

Platform Reference Guide v8.20 EA ch.32 and Keysight data sheet 3120-1109.EN, as cited per member.

Device Under Test

Acceptance criteria	Measured	Result: PASS
AC-3 Test conditions: IxOS client version-matched to the chassis; counters zeroed at window start; sampling interval 10 s or less; capture window at least the module soak time, the longest AC-8 window among the PHYs the module supports and never less than 2 h, applied to the 100GE test set; every other test set runs at least the AC-8 window of its own PHY at its own line rate	100GE: interval 5.5 s, window 2 h 00 min of 2 h 00 min module soak time, counters zeroed yes; 40GE: interval 5.5 s, window 1 h 01 min of 20 min 00 s minimum window (no soak on this test set), counters zeroed yes; 25GE: interval 6.0 s, window 1 h 01 min of 20 min 00 s minimum window (no soak on this test set), counters zeroed yes; 10GE: interval 6.0 s, window 25 min 30 s of 25 min 00 s minimum window (no soak on this test set), counters zeroed yes; IxServer 9.24.3100.10, matched client (full card identity returned)	**PASS**
AC-9 Thermal: no over-temperature alarm or shutdown during the window; every exposed sensor below 80 °C. Temperature change over the window is an indication only, not a pass or fail limit	100GE: max 48 °C, no over-temperature alarm; change over the window +0.0 °C (indication only); 40GE: max 43 °C, no over-temperature alarm; change over the window +0.0 °C (indication only); 25GE: max 44 °C, no over-temperature alarm; change over the window +0.0 °C (indication only); 10GE: max 48 °C, no over-temperature alarm; change over the window +0.0 °C (indication only)	**PASS**

Slot	Serial	Assembly	Rev	HW	FPGA	Ports
2	541694	850-1410-06-01	A	1	1074397818	40

Serial number read from the unit's physical identification label and cross-referenced against the card's boot-record identity in the IxServer chassis log. Capture: 100GBASE-CR4, QSFP28 passive copper direct-attach cable (ports 1-8) 2026-11-12 06:50:36 to 08:50:56 local (2 h 00 min), 1,302 samples, longest gap 6 s; 40GBASE-CR4, QSFP+ passive copper direct-attach cable (ports 1-8) 2026-11-12 21:45:15 to 22:46:16 local (1 h 01 min), 661 samples, longest gap 6 s; 25GBASE-CR, QSFP28 to 4 x SFP28 passive copper direct-attach cable fan-out (ports 9-40) 2026-11-12 22:50:25 to 23:51:26 local (1 h 01 min), 615 samples, longest gap 6 s; 10GBASE-R, QSFP+ to 4 x SFP+ passive copper direct-attach cable fan-out (ports 9-40) 2026-11-12 09:48:39 to 10:14:09 local (25 min 30 s), 258 samples, longest gap 6 s. All error counters verified zero at the start of each window.

Thermal profile (limit 80 °C, AC-9)

Sensor	100GE min / max / mean	40GE min / max / mean	25GE min / max / mean	10GE min / max / mean
Central (card)	45 / 48 / 46.0 °C	36 / 43 / 40.9 °C	39 / 44 / 42.1 °C	41 / 48 / 47.1 °C

Installed transceivers

Port	Vendor / Part	Serial	Port	Vendor / Part	Serial
1	Molex Inc. 1002971301	606220488	21	Molex Inc. 1002971101	525220186
2	Molex Inc. 1002971301	606220488	22	not identified	-
3	Molex Inc. 1002971101	525220186	23	not identified	-
4	Molex Inc. 1002971101	525220186	24	not identified	-
5	Molex Inc. 1002971301	606220531	25	Molex Inc. 1002971301	606220531
6	Molex Inc. 1002971301	606220531	26	not identified	-
7	Molex Inc. 1002971301	601320398	27	not identified	-
8	Molex Inc. 1002971301	601320398	28	not identified	-
9	Molex Inc. 1002971301	606220488	29	Molex Inc. 1002971301	606220531
10	not identified	-	30	not identified	-
11	not identified	-	31	not identified	-
12	not identified	-	32	not identified	-
13	Molex Inc. 1002971301	606220488	33	Molex Inc. 1002971301	601320398
14	not identified	-	34	not identified	-
15	not identified	-	35	not identified	-
16	not identified	-	36	not identified	-
17	Molex Inc. 1002971101	525220186	37	Molex Inc. 1002971301	601320398
18	not identified	-	38	not identified	-
19	not identified	-	39	not identified	-
20	not identified	-	40	not identified	-

16 of 40 ports identified in the as-tested boot record. Identity only; optic digital diagnostics were not collected.

Port Bring-Up & Aggregate Conformance Checklist

Acceptance criteria	Measured	Result: PASS
AC-4 Link: up on every port in every sample; zero link-down transitions	100GE: 10,416 of 10,416 port-samples up, 0 link-down transitions; 40GE: 5,288 of 5,288 port-samples up, 0 link-down transitions; 25GE: 19,680 of 19,680 port-samples up, 0 link-down transitions; 10GE: 8,256 of 8,256 port-samples up, 0 link-down transitions	PASS
AC-5 Line rate: negotiated speed equals the nominal port speed in every sample	100GE: 100,000 Mbps in 10,416 of 10,416 port-samples; 40GE: 40,000 Mbps in 5,288 of 5,288 port-samples; 25GE: 25,000 Mbps in 19,680 of 19,680 port-samples; 10GE: 10,000 Mbps in 8,256 of 8,256 port-samples	PASS
AC-6 Throughput: every port within ±100 ppm of the theoretical line-rate frame rate for the frame size under test, measured over the whole window (IEEE 802.3 clock tolerance); the measurement uncertainty is stated	100GE: -37 to -31 ppm vs 148,809,524 fps (least-squares over all samples, 95% uncertainty ±4.0 ppm); 40GE: -7 to +5 ppm vs 59,523,810 fps (least-squares over all samples, 95% uncertainty ±11.0 ppm); 25GE: -13 to +3 ppm vs 37,202,381 fps (least-squares over all samples, 95% uncertainty ±11.9 ppm); 10GE: -41 to +3 ppm vs 14,880,952 fps (least-squares over all samples, 95% uncertainty ±42.4 ppm)	PASS

Each test was evaluated across the ports of each test set for every sample of each monitoring window (100GE 1,302, 40GE 661, 25GE 615, 10GE 258); a test passes only if the criterion held continuously on every port.

#	Aggregate Port Test	Pass Criterion	100GE	40GE	25GE	10GE
1	Link establishment	Link up on every port of the test set, every sample	PASS	PASS	PASS	PASS
2	Line rate	Line speed = nominal port speed, every sample	PASS	PASS	PASS	PASS
3	Link stability (no flaps)	Zero link-down transitions over window	PASS	PASS	PASS	PASS
4	Frame integrity	FCS / alignment / undersize / oversize / fragments / dribble / symbol = 0	PASS	PASS	PASS	PASS
5	Data-path verification	Sequence errors = 0 and data-integrity errors = 0	PASS	PASS	PASS	PASS
6	Frame delivery	Dropped frames = 0, ingress and egress	PASS	PASS	PASS	PASS
7	Line coding	Code / disparity / invalid-EOF / error-character counters = 0	PASS	PASS	PASS	PASS
8	Fault signaling	Local / remote fault, link-fault state, PCS counters = 0	PASS	PASS	PASS	PASS
9	Flow control	Zero pause frames received	PASS	PASS	PASS	PASS
10	Line-rate throughput	Every port within ±100 ppm of the line-rate frame rate, least-squares over the window (AC-6)	PASS	PASS	PASS	PASS
11	Counter coherence	framesSent monotonic on every port (no resets)	PASS	PASS	PASS	PASS
12	Thermal	All sensors < 80 °C for the entire window	PASS	PASS	PASS	PASS

Measured per-port frame rate: 100GE: 148,802,528–148,802,528 fps against the 148,809,524 fps ceiling for 64-byte frames; 40GE: 59,523,397–59,524,107 fps (least-squares) against the 59,523,810 fps ceiling for 64-byte frames; 25GE: 37,201,893–37,202,480 fps (least-squares) against the 37,202,381 fps ceiling for 64-byte frames; 10GE: 14,880,346–14,880,991 fps (least-squares) against the 14,880,952 fps ceiling for 64-byte frames.

IxServer Event Log: Card 2 Summary (S/N 541694)

Acceptance criteria	Measured	Result: PASS
AC-2 Boot: zero FAIL records in the as-tested IxServer boot record; card reaches Board Ready	0 FAIL records; 0 BIST/memory-test records; Board Ready logged	**PASS**
AC-10 Stability: zero card hardware events logged by IxServer during the capture window. Records for ports that are inactive in the mode under test are not counted	100GE: 0 card hardware events; 40GE: 0 card hardware events; 25GE: 0 card hardware events; 10GE: 0 card hardware events	**PASS**

Summary of the IxServer chassis log in the IxServer Task-window schema (**Date/Time · Card · Port · Result · Event**, per the Ixia IxServer User Guide), retrieved read-only and scoped to Card 2 (serial 541694) plus chassis-level records.

Log summary by category. Every record for card 2 from the as-tested boot record onward (99,953 records) and the chassis-level records of the same session (105,664), grouped by what the chassis was doing; counts, time span and the values that matter for each group.

Category	Records	Span (workstation time)	Result	Summary
Identity and assembly	10	01:35:05 to 21:40:44	ok	Native Board, Serial Number 541694, BOM Assembly Number 860-1417-10 Rev D, PCBA Date Code P73600290, Assembly Number 850-1410-06-01 Revision A LM type NOVUS100GE8Q28+FAN. Maximum current draw: 0.00 Amps at 3.3V, 0.00 Amps at 5V, 41.02 Amps at 12V. (492 Watts) Port Card MFG Date Code P73600320 Assembly Number 850-1417-08-02 Revision B LM Serial Number 541694 MFG Date Code P73600290 Assembly Number 850-1410-06-01 Revision A
Firmware and FPGA	638	01:35:08 to 22:49:07	ok	3 distinct FPGA version lines: FPGA versions: TX 1.26 (0x400a_001a) RX 1.26 (0x400a_001a); FPGA versions: TX 1.693 (0x400a_02b5) RX 1.693 (0x400a_02b5) 47 main images booted, 47 firmware starts
Processor boot	4	01:35:58 to 21:40:44	ok	1 local processor booted (port group leads 1); Board Ready logged
Optics (transceivers)	290	01:50:44 to 22:48:50	ok	Molex Inc. 1002971301: 12 ports (1, 2, 5, 6, 7, 8, 9, 13, 25, 29, 33, 37) Molex 1002971301: 2 ports (3, 4) Mellanox MCP7F00-A003: 3 ports (1, 9, 17) FCI Electronics 10130795-4030LF: 2 ports (2, 13) FCI Electronics 10130795-4050LF: 1 port (21) Molex Inc. 1002971101: 8 ports (1, 2, 3, 4, 9, 13, 17, 21) Molex Inc. 112-00176: 2 ports (1, 2)
Port configuration and traffic control	3516	01:35:49 to 22:49:57	ok	386 port configuration writes, 803 PFC control writes, 2327 other control records (activation, transmit, ownership)
Client sessions	70822	01:36:15 to 23:51:26	ok	1464 client connections (chassis-level records) from 127.0.0.1, 192.168.2.13; 88 disconnects; 70822 card reads and keep-alives
Faults and warnings	134	01:37:09 to 22:47:11	Warning	01:37:09 port 17 Warning PcpuTx: Unable to post MSG_TYPE_INTRINSIC_PARM: isCpuReady = false 01:37:09 port 17 Warning PcpuTx: Unable to post MSG_TYPE_INTRINSIC_PARM: isCpuReady = false 01:37:09 port 18 Warning PcpuTx: Unable to post MSG_TYPE_INTRINSIC_PARM: isCpuReady = false 01:37:09 port 19 Warning PcpuTx: Unable to post MSG_TYPE_INTRINSIC_PARM: isCpuReady = false 01:37:09 port 20 Warning PcpuTx: Unable to post MSG_TYPE_INTRINSIC_PARM: isCpuReady = false 01:42:07 port 17 Warning PcpuTx: Unable to post MSG_TYPE_INTRINSIC_PARM: isCpuReady = false 01:42:07 port 17 Warning PcpuTx: Unable to post MSG_TYPE_INTRINSIC_PARM: isCpuReady = false 01:42:07 port 18 Warning PcpuTx: Unable to post MSG_TYPE_INTRINSIC_PARM: isCpuReady = false
Other card records	24539	01:34:59 to 23:02:07	ok	24539 boot and bring-up detail records (register values, link training, 1041 link state changes before the capture window); none FAIL-tagged or Warning-tagged

Category	Records	Span (workstation time)	Result	Summary
Chassis context	105664	01:35:07 to 23:52:53	ok	------- Server Session Begin ------- IxOS 9.24.3100.10 Patch1 OS Name: Linux, Build Number: 0, Service Pack: 3.10.0-1160.42.2.el7.x86_64 Processor Type: 64bit, Number Of Processor Cores: 32 Backplane ID: 1306 Top Panel Assembly Part Number 840-0123-04 Revision D Top Panel Assembly Serial Number Top Panel Sub-Assembly Part Number 860-1342-01 Revision D Processor Card Assembly Part Number 942-0102-02 Revision N Processor Card Assembly Serial Number 721630 Processor Card Sub-Assembly Part Number 860-1331-10 Revision K Power Module Assembly Part Number 942-0032-08 Revision B Power Module Assembly Serial Number 721826 Power Module Sub-Assembly Part Number 870-0103-01 Revision C

Event timeline (aggregate).

Date / Time	Card	Port	Result	Event	Observations (aggregate)
11-12-2026 00:27:33	-	-	**ok**	IxServer start: chassis boot	IxServer 9.24.3100.10, chassis Ixia XGS12 S/N XGS12-J0701117. Chassis-side timestamps are mapped to workstation time by the clock offset measured between the workstation and the chassis.
11-12-2026 01:34:59	2	-	**ok**	Hot insertion: complete boot record of the unit as tested	Native Board, Serial Number 541694, BOM Assembly Number 860-1417-10 Rev D, PCBA Date Code P73600290, Assembly Number 850-1410-06-01 Revision A; LM type NOVUS100GE8Q28+FAN. Maximum current draw: 0.00 Amps at 3.3V, 0.00 Amps at 5V, 41.02 Amps at 12V. (492 Watts). 0 BIST / memory-test records, Board Ready logged. Complete, error-free enumeration: **zero FAIL records** in the boot sequence.
11-12-2026 01:34:59	2	1-40	**ok**	Transceiver enumeration	16 of 40 transceivers identified with vendor, part and serial.
11-12-2026 02:19:01	-	-	**ok**	Client sessions	90 client connections: IxExplorer (traffic control) and read-only Tcl connections (discovery, port info, statistics logging), all from the test workstation.
11-12-2026 22:50:23	2	1-40	**ok**	Statistics baselines	108 statistics-clear events; counters zeroed at the start of each capture window without stopping traffic.
06:50–08:50	2	1-8	**ok**	100GBASE-CR4, QSFP28 passive copper direct-attach cable soak (2 h 00 min)	0 card hardware events during the capture window (read-only statistics queries excluded). The card ran undisturbed at line rate.
21:45–22:46	2	1-8	**ok**	40GBASE-CR4, QSFP+ passive copper direct-attach cable run (1 h 01 min)	0 card hardware events during the capture window (read-only statistics queries excluded). The card ran undisturbed at line rate.
22:50–23:51	2	9-40	**ok**	25GBASE-CR, QSFP28 to 4 x SFP28 passive copper direct-attach cable fan-out run (1 h 01 min)	0 card hardware events during the capture window (read-only statistics queries excluded). The card ran undisturbed at line rate.
09:48–10:14	2	9-40	**ok**	10GBASE-R, QSFP+ to 4 x SFP+ passive copper direct-attach cable fan-out run (25 min 30 s)	0 card hardware events during the capture window (read-only statistics queries excluded). The card ran undisturbed at line rate.
11-12-2026 23:56:45	-	-	**ok**	Session log accounting	Chassis log downloaded from the chassis web console. Scope: the as-tested insertion of card 2 through the end of the retrieved log, 309,408 event lines, all represented above. 0 FAIL-tagged records for card 2 in scope.

Statistics Log: Full Field Aggregate (every test set)

Acceptance criteria	Measured	Result: PASS
AC-7 Frame delivery: zero frame loss on every port (RFC 2544 throughput definition). Tx and Rx totals agree within 10 frames, the frames in flight at the read instant	100GE: max |Tx−Rx| 1 frames per port; 40GE: max |Tx−Rx| 1 frames per port; 25GE: max |Tx−Rx| 1 frames per port; 10GE: max |Tx−Rx| 1 frames per port	PASS
AC-8 Errors: zero increase on every frame-integrity, data-path, line-coding, fault, drop and flow-control counter. The demonstrated bit-error-ratio bound per port (95% confidence, zero errors) is at least 5× tighter than the IEEE 802.3 objective for the PHY. On copper, FCS errors are attributed to cabling and excluded. Codewords corrected by forward error correction are stated and are not errors; an uncorrectable codeword is an error	100GE: 0 errors / 29 counters; BER ≤ 4.2e-15 (target 2e-13, IEEE 802.3 cl.82/86); 40GE: 0 errors / 29 counters; BER ≤ 2.0e-14 (target 2e-13, IEEE 802.3 cl.82/86); 25GE: 0 errors / 29 counters; BER ≤ 3.3e-14 (target 2e-13, IEEE 802.3 cl.107/110); 1 corrected by FEC, none uncorrectable; 10GE: 0 errors / 29 counters; BER ≤ 2.0e-13 (target 2e-13, IEEE 802.3 cl.49/52)	PASS

Every one of the 48 logged fields with its measured value per medium, including every error counter that stayed at zero. Counters show the per-port increase over the window, state fields the value held across all samples, temperatures the range across ports.

Field	100GE (ports 1-8)	40GE (ports 1-8)	25GE (ports 9-40)	10GE (ports 9-40)
Port & link state (3 fields)				
link	1 (all ports, all 1,302 samples)	1 (all ports, all 661 samples)	1 (all ports, all 615 samples)	1 (all ports, all 258 samples)
lineSpeed	100000 (all ports, all 1,302 samples)	40000 (all ports, all 661 samples)	25000 (all ports, all 615 samples)	10000 (all ports, all 258 samples)
linkFaultState	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
Traffic: transmit (4 fields)				
framesSent	+1,074,243,986,678–1,074,243,986,679 per port · total 8,593,951,893,429	+217,880,920,623–217,880,920,624 per port · total 1,743,047,364,991	+136,165,564,043–136,184,191,850 per port · total 4,357,838,100,802	+22,771,501,161–22,778,947,168 per port · total 728,874,097,103
scheduledFramesSent	+1,074,243,986,678–1,074,243,986,679 per port · total 8,593,951,893,429	+217,880,920,623–217,880,920,624 per port · total 1,743,047,364,991	+136,165,564,043–136,184,191,850 per port · total 4,357,838,100,802	+22,771,501,161–22,778,947,168 per port · total 728,874,097,103
bytesSent	+68,751,615,147,408–68,751,615,147,456 per port · total 550,012,921,179,440	+13,944,378,919,904–13,944,378,919,936 per port · total 111,555,031,359,376	+8,714,596,098,752–8,715,788,278,400 per port · total 278,901,638,451,776	+1,457,376,074,272–1,457,852,618,720 per port · total 46,647,942,214,048
bitsSent	+550,012,921,179,264–550,012,921,179,648 per port · total 4,400,103,369,435,520	+111,555,031,359,232–111,555,031,359,488 per port · total 892,440,250,875,008	+69,716,768,790,016–69,726,306,227,200 per port · total 2,231,213,107,614,208	+11,659,008,594,176–11,662,820,949,760 per port · total 373,183,537,712,384
Traffic: receive (3 fields)				
framesReceived	+1,074,243,986,678–1,074,243,986,679 per port · total 8,593,951,893,426	+217,880,920,623–217,880,920,624 per port · total 1,743,047,364,990	+136,165,564,043–136,184,191,850 per port · total 4,357,838,100,818	+22,771,501,161–22,778,947,168 per port · total 728,874,097,100
bytesReceived	+68,751,615,147,408–68,751,615,147,456 per port · total 550,012,921,179,408	+13,944,378,919,904–13,944,378,919,936 per port · total 111,555,031,359,408	+8,714,596,098,760–8,715,788,278,392 per port · total 278,901,638,452,016	+1,457,376,074,280–1,457,852,618,720 per port · total 46,647,942,214,368
bitsReceived	+550,012,921,179,264–550,012,921,179,648 per port · total 4,400,103,369,435,264	+111,555,031,359,232–111,555,031,359,488 per port · total 892,440,250,875,264	+69,716,768,790,080–69,726,306,227,136 per port · total 2,231,213,107,616,128	+11,659,008,594,240–11,662,820,949,760 per port · total 373,183,537,714,944
Frame integrity (8 fields)				
fcsErrors	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
alignmentErrors	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
oversize	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
undersize	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
fragments	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)

Field	100GE (ports 1-8)	40GE (ports 1-8)	25GE (ports 9-40)	10GE (ports 9-40)
dribbleErrors	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
symbolErrors	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
symbolErrorFrames	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
Data-path verification (2 fields)				
sequenceErrors	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
dataIntegrityErrors	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
Media access (1 field)				
collisions	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
Frame delivery (drops) (2 fields)				
droppedFrames	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
egressDroppedFrames	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
Line coding (5 fields)				
codeError	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
codingErrorFramesReceived	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
eErrorCharacterFramesReceived	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
invalidEOFCount	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
disparityErrors	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
Flow control & VLAN (2 fields)				
flowControlFrames	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
vlanTaggedFramesRx	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
Capture comparators (2 fields)				
captureTrigger	+1,074,243,986,678–1,074,243,986,679 per port · total 8,593,951,893,430	+217,880,920,623–217,880,920,624 per port · total 1,743,047,364,990	+136,165,564,043–136,184,191,850 per port · total 4,357,838,100,821	+22,771,501,161–22,778,947,168 per port · total 728,874,097,105
captureFilter	+1,074,243,986,678–1,074,243,986,679 per port · total 8,593,951,893,430	+217,880,920,623–217,880,920,624 per port · total 1,743,047,364,990	+136,165,564,043–136,184,191,850 per port · total 4,357,838,100,821	+22,771,501,161–22,778,947,168 per port · total 728,874,097,105
Timing (1 field)				
transmitDuration	raw duration register, advancing every sample	raw duration register, advancing every sample	raw duration register, advancing every sample	raw duration register, advancing every sample
Fault signaling (sampled at every speed) (7 fields)				
localFaults	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
remoteFaults	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
pcsSyncErrorsReceived	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
pcsIllegalCodesReceived	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
pcsLocalFaultsReceived	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
pcsRemoteFaultsReceived	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
pcsIllegalIdleReceived	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
FEC (not used at this line rate; sampled regardless) (4 fields)				
fecCorrectedBitsCount	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
fecUncorrectableSubrowCount	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)
rsFecCorrectedCodewordCount	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	min 0 / max 1	0 (all ports, all 258 samples)
rsfecUncorrectedCodewordCount	0 (all ports, all 1,302 samples)	0 (all ports, all 661 samples)	0 (all ports, all 615 samples)	0 (all ports, all 258 samples)

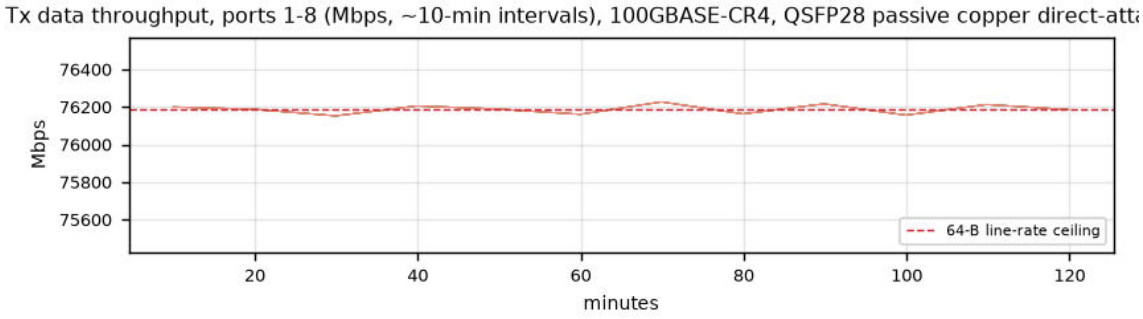
Field	100GE (ports 1-8)	40GE (ports 1-8)	25GE (ports 9-40)	10GE (ports 9-40)
Thermal sensors (3 fields)				
centralTemperature	45–48 °C across ports	36–43 °C across ports	39–44 °C across ports	41–48 °C across ports
portTemperature	reads 0 on every sample (sensor not exposed)	reads 0 on every sample (sensor not exposed)	reads 0 on every sample (sensor not exposed)	reads 0 on every sample (sensor not exposed)
trafficFpga1Temperature	reads 0 on every sample (sensor not exposed)	reads 0 on every sample (sensor not exposed)	reads 0 on every sample (sensor not exposed)	reads 0 on every sample (sensor not exposed)
Other (1 field)				
tRead	min 1794495036.93 / max 1794502256.309	min 1794548715.742 / max 1794552376.452	min 1794552625.517 / max 1794556286.646	min 1794505719.32 / max 1794507250.479

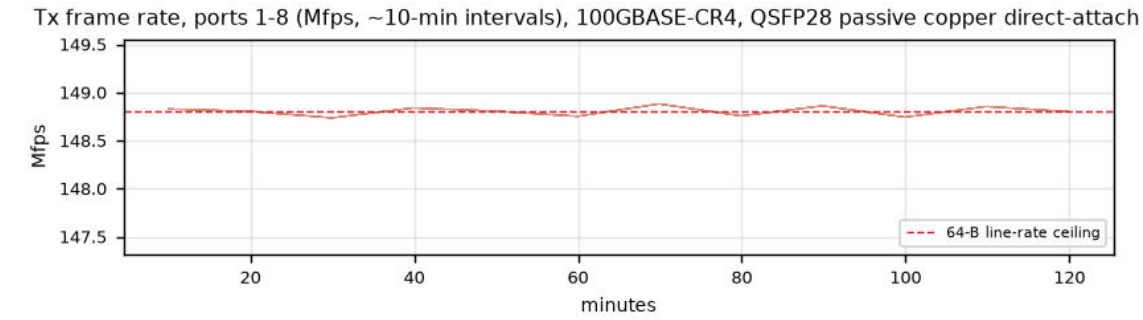
Zeros are measured values, sampled for the full window on every port.

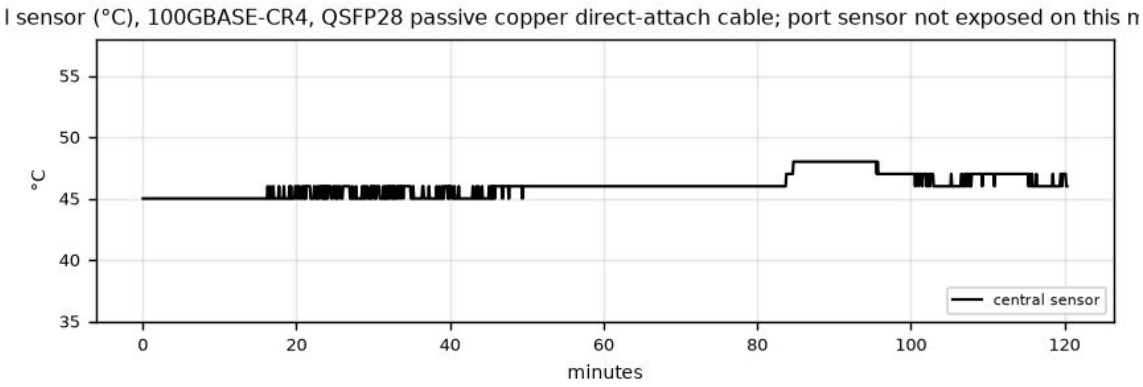
Statistics Log: Time-Series Graphs (100GBASE-CR4, QSFP28 passive copper direct-attach cable)

Acceptance criteria	Measured	Result: PASS
AC-6 Throughput: every port within ±100 ppm of the theoretical line-rate frame rate for the frame size under test, measured over the whole window (IEEE 802.3 clock tolerance); the measurement uncertainty is stated	100GE: -37 to -31 ppm vs 148,809,524 fps (least-squares over all samples, 95% uncertainty ±4.0 ppm)	**PASS**
AC-9 Thermal: no over-temperature alarm or shutdown during the window; every exposed sensor below 80 °C. Temperature change over the window is an indication only, not a pass or fail limit	100GE: max 48 °C, no over-temperature alarm; change over the window +0.0 °C (indication only)	**PASS**

Data throughput holds at ≈76,190 Mbps per port and the frame rate at the 148,809,524 fps ceiling for 64-byte frames (dashed line). Rates are exact counter deltas over ~10-minute intervals; 1-second timestamp resolution gives up to ±0.3% per interval, the scatter about the ceiling. Window totals are exact.



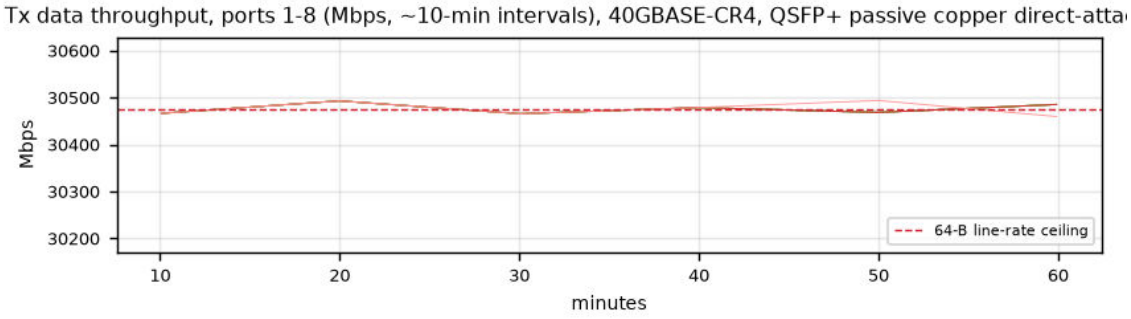


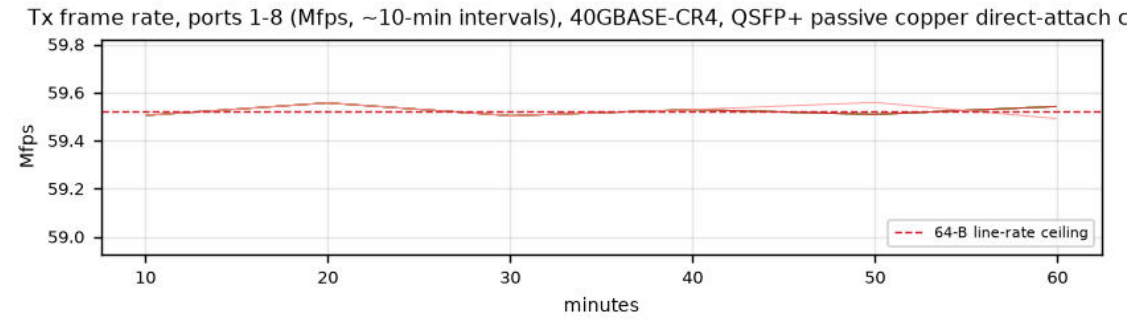


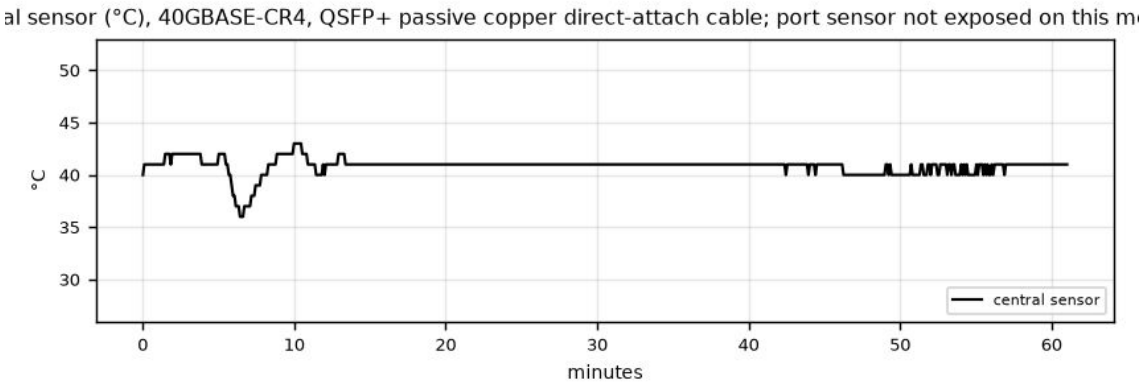
Statistics Log: Time-Series Graphs (40GBASE-CR4, QSFP+ passive copper direct-attach cable)

Acceptance criteria	Measured	Result: PASS
AC-6 Throughput: every port within ±100 ppm of the theoretical line-rate frame rate for the frame size under test, measured over the whole window (IEEE 802.3 clock tolerance); the measurement uncertainty is stated	40GE: -7 to +5 ppm vs 59,523,810 fps (least-squares over all samples, 95% uncertainty ±11.0 ppm)	**PASS**
AC-9 Thermal: no over-temperature alarm or shutdown during the window; every exposed sensor below 80 °C. Temperature change over the window is an indication only, not a pass or fail limit	40GE: max 43 °C, no over-temperature alarm; change over the window +0.0 °C (indication only)	**PASS**

Data throughput holds at ≈30,476 Mbps per port and the frame rate at the 59,523,810 fps ceiling for 64-byte frames (dashed line). Rates are exact counter deltas over ~10-minute intervals; 1-second timestamp resolution gives up to ±0.3% per interval, the scatter about the ceiling. Window totals are exact.



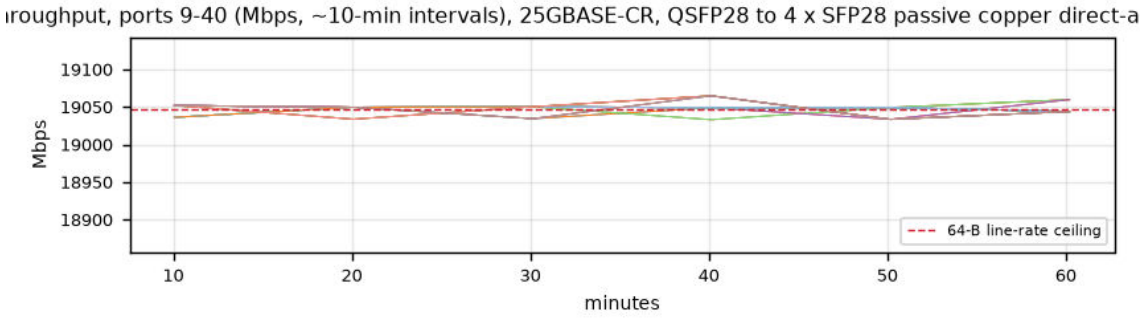


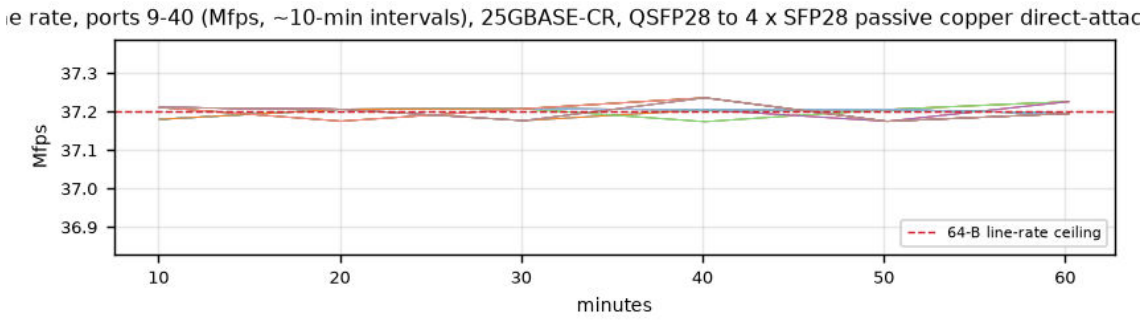


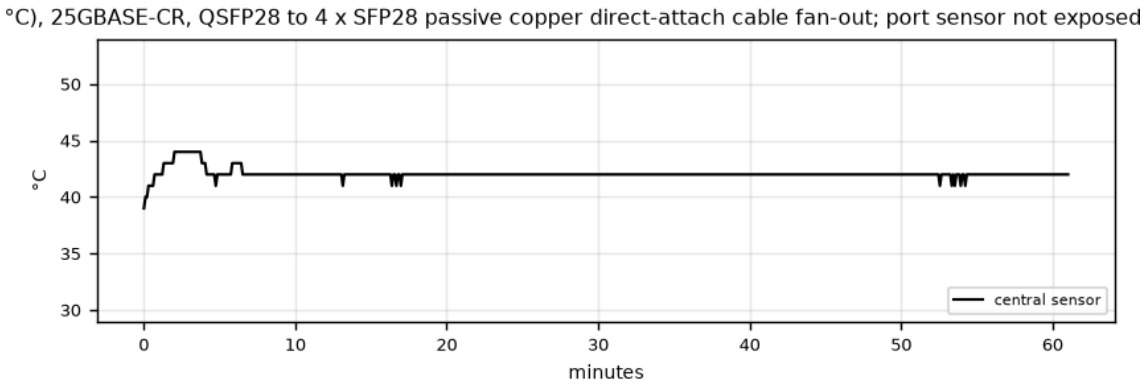
Statistics Log: Time-Series Graphs (25GBASE-CR, QSFP28 to 4 x SFP28 passive copper direct-attach cable fan-out)

Acceptance criteria	Measured	Result: PASS
AC-6 Throughput: every port within ±100 ppm of the theoretical line-rate frame rate for the frame size under test, measured over the whole window (IEEE 802.3 clock tolerance); the measurement uncertainty is stated	25GE: -13 to +3 ppm vs 37,202,381 fps (least-squares over all samples, 95% uncertainty ±11.9 ppm)	**PASS**
AC-9 Thermal: no over-temperature alarm or shutdown during the window; every exposed sensor below 80 °C. Temperature change over the window is an indication only, not a pass or fail limit	25GE: max 44 °C, no over-temperature alarm; change over the window +0.0 °C (indication only)	**PASS**

Data throughput holds at ≈19,048 Mbps per port and the frame rate at the 37,202,381 fps ceiling for 64-byte frames (dashed line). Rates are exact counter deltas over ~10-minute intervals; 1-second timestamp resolution gives up to ±0.3% per interval, the scatter about the ceiling. Window totals are exact.



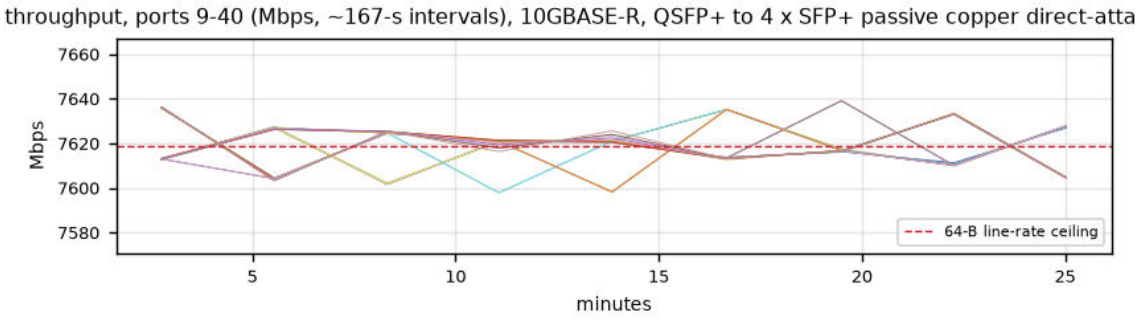


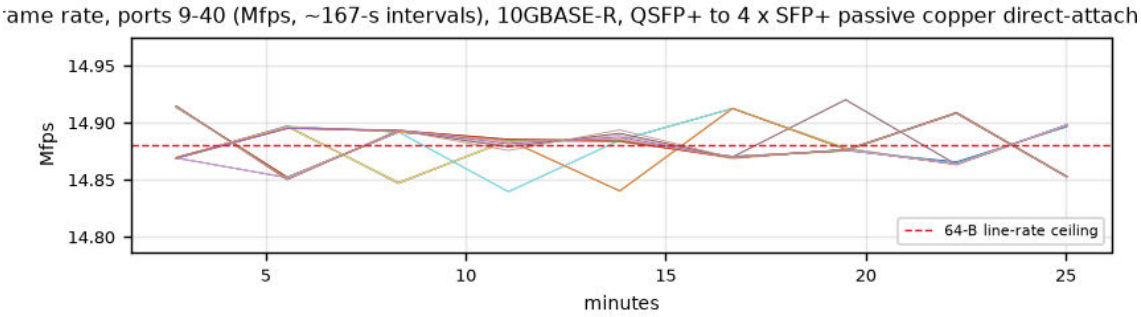


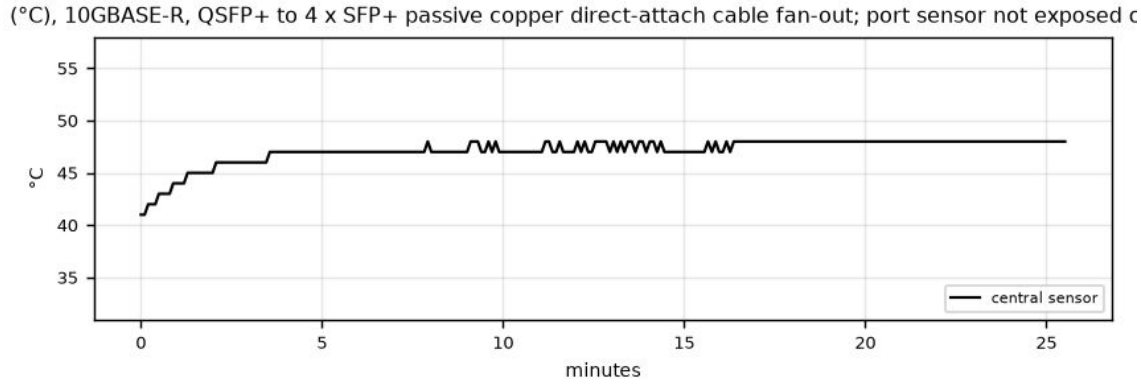
Statistics Log: Time-Series Graphs (10GBASE-R, QSFP+ to 4 x SFP+ passive copper direct-attach cable fan-out)

Acceptance criteria	Measured	Result: PASS
AC-6 Throughput: every port within ±100 ppm of the theoretical line-rate frame rate for the frame size under test, measured over the whole window (IEEE 802.3 clock tolerance); the measurement uncertainty is stated	10GE: -41 to +3 ppm vs 14,880,952 fps (least-squares over all samples, 95% uncertainty ±42.4 ppm)	**PASS**
AC-9 Thermal: no over-temperature alarm or shutdown during the window; every exposed sensor below 80 °C. Temperature change over the window is an indication only, not a pass or fail limit	10GE: max 48 °C, no over-temperature alarm; change over the window +0.0 °C (indication only)	**PASS**

Data throughput holds at ≈7,619 Mbps per port and the frame rate at the 14,880,952 fps ceiling for 64-byte frames (dashed line). Rates are exact counter deltas over ~167-second intervals, the window being too short for 10-minute ones; the read instant of a counter is known to about ±0.2 s, which gives up to ±0.3% per interval, the scatter about the ceiling. Window totals are exact.







Per-Module Detail

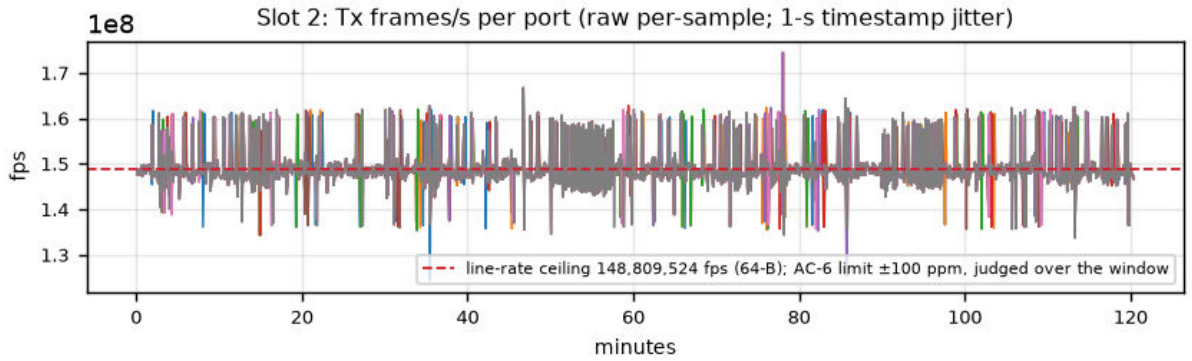
Slot 2: NOVUS100GE8Q28+FAN+10G+25G+40G · S/N 541694 · 100GE

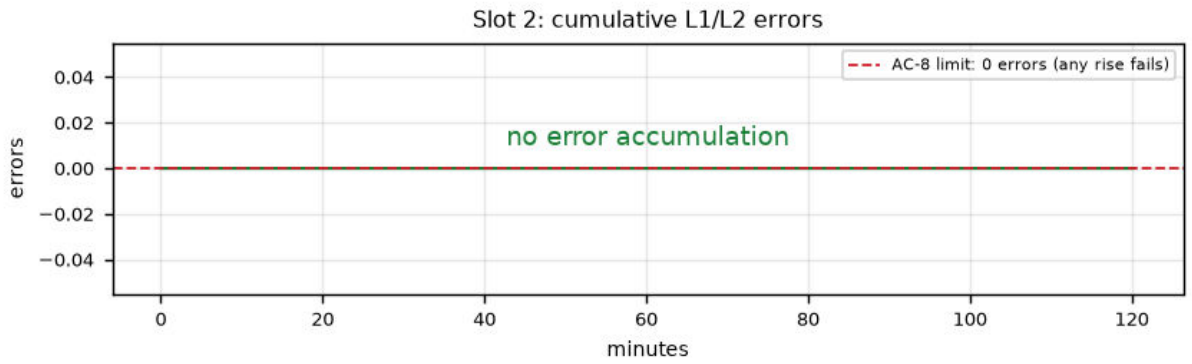
PASS

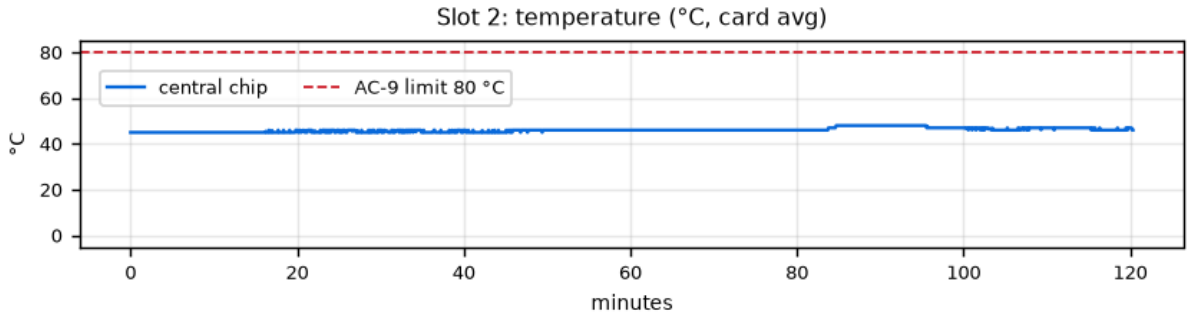
Per-port acceptance criteria	Measured	Result: PASS
AC-4 Link: up on every port in every sample; zero link-down transitions	8 of 8 ports up in 100% of samples with 0 transitions	PASS
AC-5 Line rate: negotiated speed equals the nominal port speed in every sample	8 of 8 ports at 100,000 Mbps	PASS
AC-7 Frame delivery: zero frame loss on every port (RFC 2544 throughput definition). Tx and Rx totals agree within 10 frames, the frames in flight at the read instant	max |Tx−Rx| 1 frames on any port	PASS
AC-8 Errors: zero increase on every frame-integrity, data-path, line-coding, fault, drop and flow-control counter.	0 counted errors, all ports	PASS
AC-9 Thermal: no over-temperature alarm or shutdown during the window; every exposed sensor below 80 °C	max 48 °C	PASS

Port	Link	Speed	Tx frames	Rx frames	Loss	Avg fps	Throughput	Errors	Result
1	100%	100000	1,074,243,986,679	1,074,243,986,678	+1	148,802,528	76.2 Gbps	0	PASS
2	100%	100000	1,074,243,986,679	1,074,243,986,678	+1	148,802,528	76.2 Gbps	0	PASS
3	100%	100000	1,074,243,986,679	1,074,243,986,679	+0	148,802,528	76.2 Gbps	0	PASS
4	100%	100000	1,074,243,986,679	1,074,243,986,678	+1	148,802,528	76.2 Gbps	0	PASS
5	100%	100000	1,074,243,986,678	1,074,243,986,678	+0	148,802,528	76.2 Gbps	0	PASS
6	100%	100000	1,074,243,986,678	1,074,243,986,678	+0	148,802,528	76.2 Gbps	0	PASS
7	100%	100000	1,074,243,986,678	1,074,243,986,679	-1	148,802,528	76.2 Gbps	0	PASS
8	100%	100000	1,074,243,986,679	1,074,243,986,678	+1	148,802,528	76.2 Gbps	0	PASS

Thermal: central chip avg 46°C (max 48°C) · port chip not exposed · drift +0°C over run: stable, within normal range.






Slot 2: temperature (°C, card avg)
central chip
AC-9 limit 80 °C
°C
minutes
0
20
40
60
80
100
120

Per-Module Detail

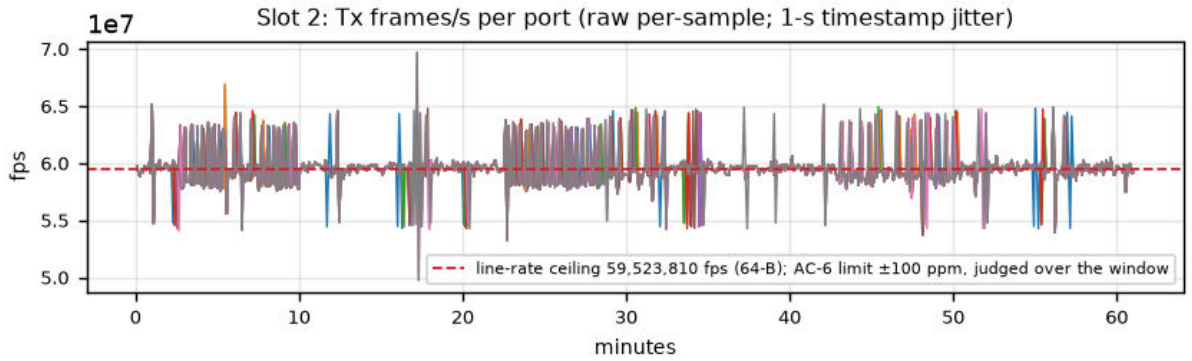
Slot 2: NOVUS100GE8Q28+FAN+10G+25G+40G · S/N 541694 · 40GE

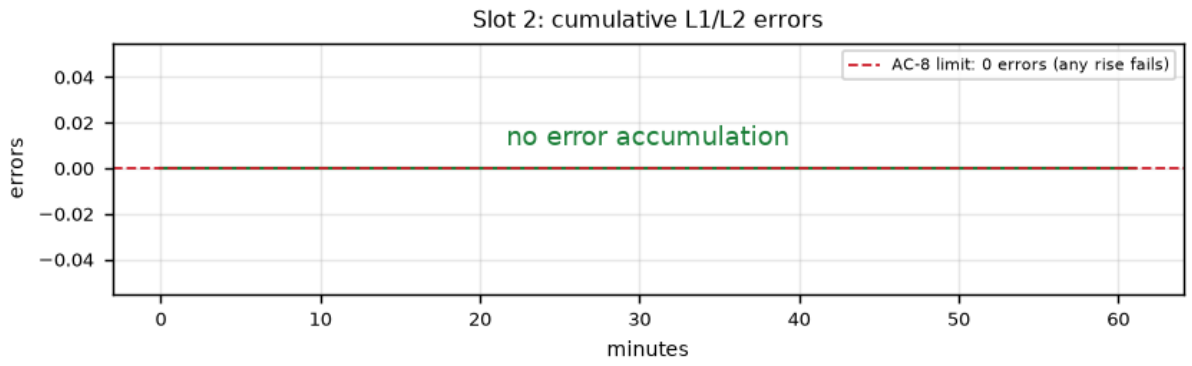
PASS

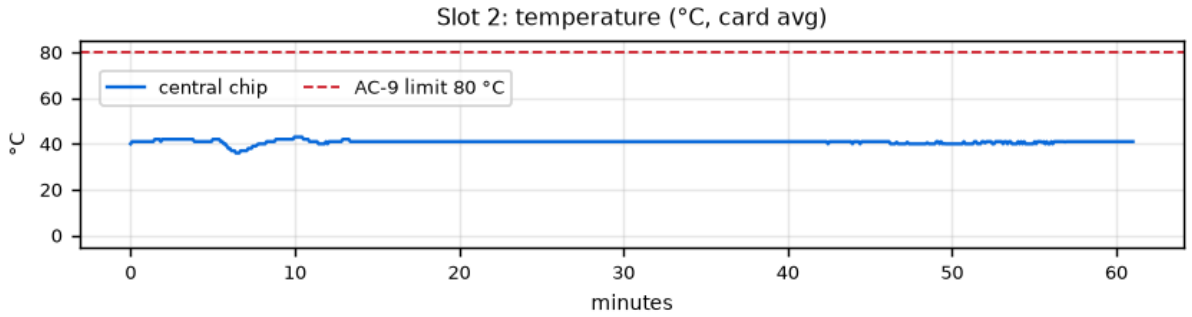
Per-port acceptance criteria	Measured	Result: PASS
AC-4 Link: up on every port in every sample; zero link-down transitions	8 of 8 ports up in 100% of samples with 0 transitions	PASS
AC-5 Line rate: negotiated speed equals the nominal port speed in every sample	8 of 8 ports at 40,000 Mbps	PASS
AC-7 Frame delivery: zero frame loss on every port (RFC 2544 throughput definition). Tx and Rx totals agree within 10 frames, the frames in flight at the read instant	max |Tx−Rx| 1 frames on any port	PASS
AC-8 Errors: zero increase on every frame-integrity, data-path, line-coding, fault, drop and flow-control counter.	0 counted errors, all ports	PASS
AC-9 Thermal: no over-temperature alarm or shutdown during the window; every exposed sensor below 80 °C	max 43 °C	PASS

Port	Link	Speed	Tx frames	Rx frames	Loss	Avg fps	Throughput	Errors	Result
1	100%	40000	217,880,920,624	217,880,920,623	+1	59,520,646	30.5 Gbps	0	PASS
2	100%	40000	217,880,920,624	217,880,920,624	+0	59,520,646	30.5 Gbps	0	PASS
3	100%	40000	217,880,920,623	217,880,920,624	-1	59,520,646	30.5 Gbps	0	PASS
4	100%	40000	217,880,920,624	217,880,920,624	+0	59,520,646	30.5 Gbps	0	PASS
5	100%	40000	217,880,920,624	217,880,920,624	+0	59,520,646	30.5 Gbps	0	PASS
6	100%	40000	217,880,920,624	217,880,920,624	+0	59,520,646	30.5 Gbps	0	PASS
7	100%	40000	217,880,920,624	217,880,920,623	+1	59,520,646	30.5 Gbps	0	PASS
8	100%	40000	217,880,920,624	217,880,920,624	+0	59,520,646	30.5 Gbps	0	PASS

Thermal: central chip avg 41°C (max 43°C) · port chip not exposed · drift +0°C over run: stable, within normal range.






Slot 2: temperature (°C, card avg)
central chip
AC-9 limit 80 °C
°C
80
60
40
20
0
0
10
20
30
40
50
60
minutes

Per-Module Detail

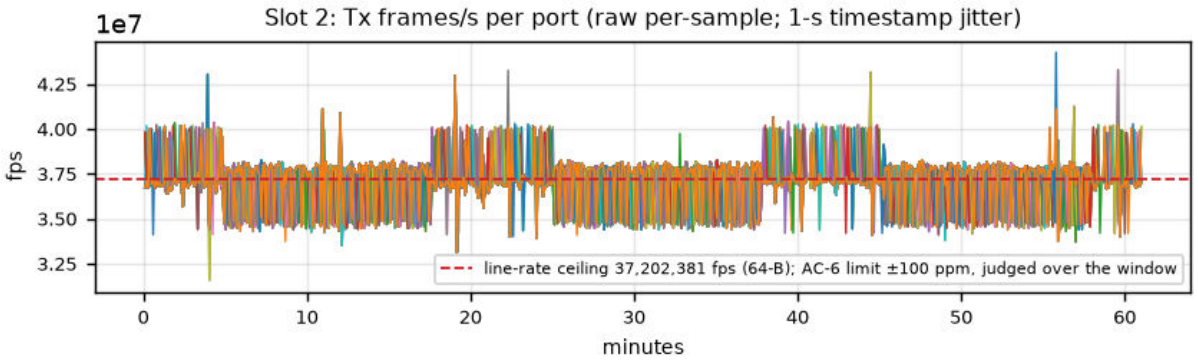
Slot 2: NOVUS100GE8Q28+FAN+10G+25G+40G · S/N 541694 · 25GE

PASS

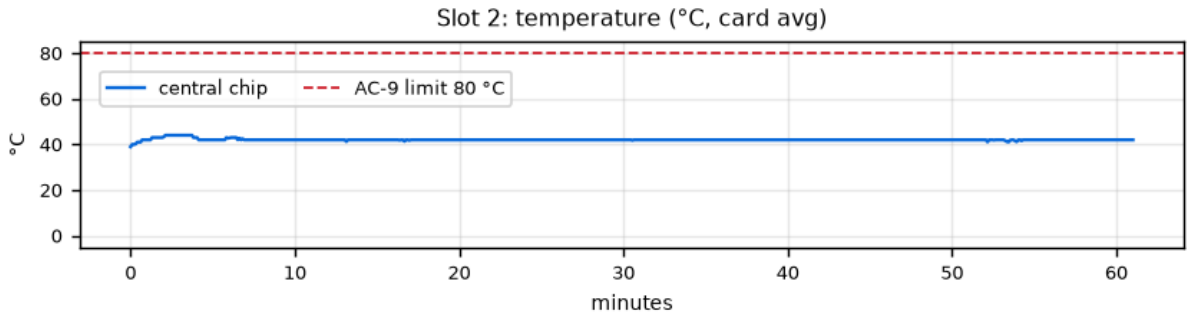
Per-port acceptance criteria	Measured	Result: PASS
AC-4 Link: up on every port in every sample; zero link-down transitions	32 of 32 ports up in 100% of samples with 0 transitions	PASS
AC-5 Line rate: negotiated speed equals the nominal port speed in every sample	32 of 32 ports at 25,000 Mbps	PASS
AC-7 Frame delivery: zero frame loss on every port (RFC 2544 throughput definition). Tx and Rx totals agree within 10 frames, the frames in flight at the read instant	max |Tx−Rx| 1 frames on any port	PASS
AC-8 Errors: zero increase on every frame-integrity, data-path, line-coding, fault, drop and flow-control counter.	0 counted errors, all ports	PASS
AC-9 Thermal: no over-temperature alarm or shutdown during the window; every exposed sensor below 80 °C	max 44 °C	PASS

Port	Link	Speed	Tx frames	Rx frames	Loss	Avg fps	Throughput	Errors	Result
9	100%	25000	136,184,180,781	136,184,180,782	-1	37,202,521	19.0 Gbps	0	PASS
10	100%	25000	136,184,180,781	136,184,180,781	+0	37,202,521	19.0 Gbps	0	PASS
11	100%	25000	136,184,180,781	136,184,180,782	-1	37,202,521	19.0 Gbps	0	PASS
12	100%	25000	136,184,180,781	136,184,180,782	-1	37,202,521	19.0 Gbps	0	PASS
13	100%	25000	136,184,180,781	136,184,180,781	+0	37,202,521	19.0 Gbps	0	PASS
14	100%	25000	136,184,180,781	136,184,180,781	+0	37,202,521	19.0 Gbps	0	PASS
15	100%	25000	136,184,180,781	136,184,180,781	+0	37,202,521	19.0 Gbps	0	PASS
16	100%	25000	136,184,180,781	136,184,180,781	+0	37,202,521	19.0 Gbps	0	PASS
17	100%	25000	136,184,180,781	136,184,180,781	+0	37,202,521	19.0 Gbps	0	PASS
18	100%	25000	136,184,180,781	136,184,180,781	+0	37,202,521	19.0 Gbps	0	PASS
19	100%	25000	136,184,180,781	136,184,180,781	+0	37,202,521	19.0 Gbps	0	PASS
20	100%	25000	136,184,180,781	136,184,180,781	+0	37,202,521	19.0 Gbps	0	PASS
21	100%	25000	136,184,180,781	136,184,180,782	-1	37,202,521	19.0 Gbps	0	PASS
22	100%	25000	136,184,180,781	136,184,180,782	-1	37,202,521	19.0 Gbps	0	PASS
23	100%	25000	136,165,564,043	136,165,564,043	+0	37,197,435	19.0 Gbps	0	PASS
24	100%	25000	136,165,564,043	136,165,564,043	+0	37,197,435	19.0 Gbps	0	PASS
25	100%	25000	136,165,564,043	136,165,564,043	+0	37,197,435	19.0 Gbps	0	PASS
26	100%	25000	136,184,191,849	136,184,191,850	-1	37,202,524	19.0 Gbps	0	PASS
27	100%	25000	136,184,191,849	136,184,191,850	-1	37,202,524	19.0 Gbps	0	PASS
28	100%	25000	136,184,191,849	136,184,191,850	-1	37,202,524	19.0 Gbps	0	PASS
29	100%	25000	136,184,191,849	136,184,191,850	-1	37,202,524	19.0 Gbps	0	PASS
30	100%	25000	136,184,191,849	136,184,191,850	-1	37,202,524	19.0 Gbps	0	PASS
31	100%	25000	136,184,191,849	136,184,191,850	-1	37,202,524	19.0 Gbps	0	PASS
32	100%	25000	136,184,191,849	136,184,191,850	-1	37,202,524	19.0 Gbps	0	PASS
33	100%	25000	136,184,191,850	136,184,191,850	+0	37,202,524	19.0 Gbps	0	PASS
34	100%	25000	136,184,191,850	136,184,191,850	+0	37,202,524	19.0 Gbps	0	PASS
35	100%	25000	136,184,191,850	136,184,191,850	+0	37,202,524	19.0 Gbps	0	PASS
36	100%	25000	136,184,191,850	136,184,191,850	+0	37,202,524	19.0 Gbps	0	PASS
37	100%	25000	136,184,191,849	136,184,191,850	-1	37,202,524	19.0 Gbps	0	PASS
38	100%	25000	136,184,191,849	136,184,191,850	-1	37,202,524	19.0 Gbps	0	PASS
39	100%	25000	136,184,191,849	136,184,191,850	-1	37,202,524	19.0 Gbps	0	PASS
40	100%	25000	136,184,191,849	136,184,191,850	-1	37,202,524	19.0 Gbps	0	PASS

Thermal: central chip avg 42°C (max 44°C) · port chip not exposed · drift +0°C over run: stable, within normal range.







Per-Module Detail

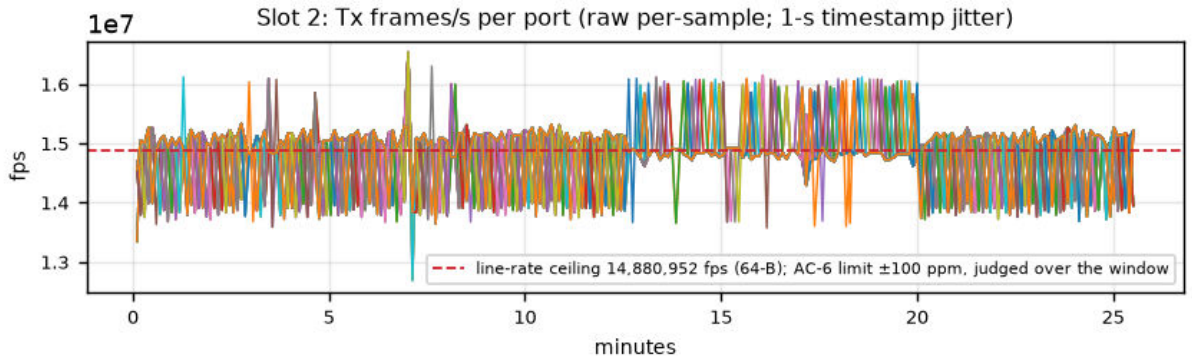
Slot 2: NOVUS100GE8Q28+FAN+10G+25G+40G · S/N 541694 · 10GE

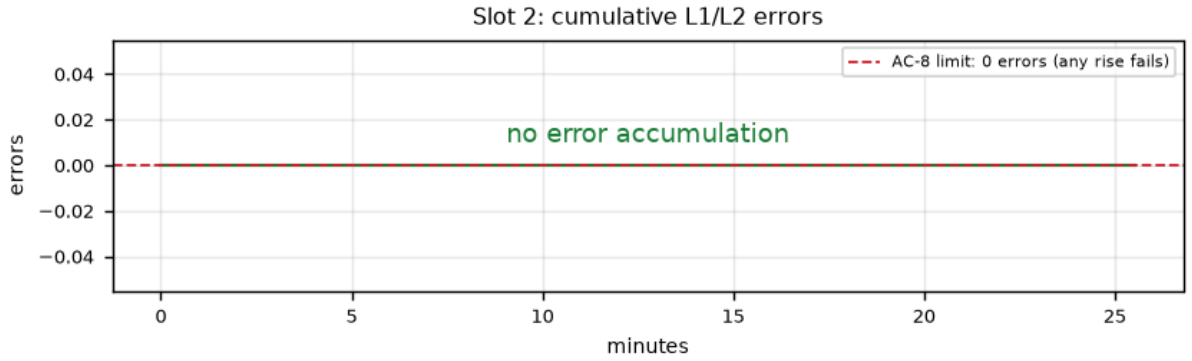
PASS

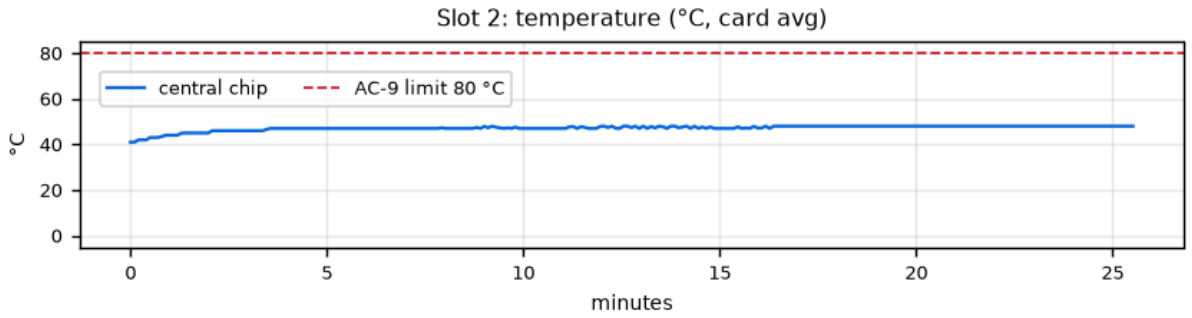
Per-port acceptance criteria	Measured	Result: PASS
AC-4 Link: up on every port in every sample; zero link-down transitions	32 of 32 ports up in 100% of samples with 0 transitions	PASS
AC-5 Line rate: negotiated speed equals the nominal port speed in every sample	32 of 32 ports at 10,000 Mbps	PASS
AC-7 Frame delivery: zero frame loss on every port (RFC 2544 throughput definition). Tx and Rx totals agree within 10 frames, the frames in flight at the read instant	max |Tx−Rx| 1 frames on any port	PASS
AC-8 Errors: zero increase on every frame-integrity, data-path, line-coding, fault, drop and flow-control counter.	0 counted errors, all ports	PASS
AC-9 Thermal: no over-temperature alarm or shutdown during the window; every exposed sensor below 80 °C	max 48 °C	PASS

Port	Link	Speed	Tx frames	Rx frames	Loss	Avg fps	Throughput	Errors	Result
9	100%	10000	22,778,934,280	22,778,934,281	-1	14,879,848	7.6 Gbps	0	PASS
10	100%	10000	22,778,934,280	22,778,934,281	-1	14,879,848	7.6 Gbps	0	PASS
11	100%	10000	22,778,934,280	22,778,934,281	-1	14,879,848	7.6 Gbps	0	PASS
12	100%	10000	22,778,934,280	22,778,934,281	-1	14,879,848	7.6 Gbps	0	PASS
13	100%	10000	22,778,934,280	22,778,934,280	+0	14,879,848	7.6 Gbps	0	PASS
14	100%	10000	22,778,934,280	22,778,934,280	+0	14,879,848	7.6 Gbps	0	PASS
15	100%	10000	22,778,934,280	22,778,934,280	+0	14,879,848	7.6 Gbps	0	PASS
16	100%	10000	22,771,501,161	22,771,501,161	+0	14,874,992	7.6 Gbps	0	PASS
17	100%	10000	22,771,501,161	22,771,501,161	+0	14,874,992	7.6 Gbps	0	PASS
18	100%	10000	22,771,501,161	22,771,501,161	+0	14,874,992	7.6 Gbps	0	PASS
19	100%	10000	22,771,501,161	22,771,501,161	+0	14,874,992	7.6 Gbps	0	PASS
20	100%	10000	22,771,501,161	22,771,501,161	+0	14,874,992	7.6 Gbps	0	PASS
21	100%	10000	22,771,501,161	22,771,501,161	+0	14,874,992	7.6 Gbps	0	PASS
22	100%	10000	22,771,501,161	22,771,501,161	+0	14,874,992	7.6 Gbps	0	PASS
23	100%	10000	22,778,947,168	22,778,947,167	+1	14,879,856	7.6 Gbps	0	PASS
24	100%	10000	22,778,947,168	22,778,947,167	+1	14,879,856	7.6 Gbps	0	PASS
25	100%	10000	22,778,947,168	22,778,947,167	+1	14,879,856	7.6 Gbps	0	PASS
26	100%	10000	22,778,947,168	22,778,947,167	+1	14,879,856	7.6 Gbps	0	PASS
27	100%	10000	22,778,947,168	22,778,947,167	+1	14,879,856	7.6 Gbps	0	PASS
28	100%	10000	22,778,947,168	22,778,947,167	+1	14,879,856	7.6 Gbps	0	PASS
29	100%	10000	22,778,947,168	22,778,947,168	+0	14,879,856	7.6 Gbps	0	PASS
30	100%	10000	22,778,947,168	22,778,947,167	+1	14,879,856	7.6 Gbps	0	PASS
31	100%	10000	22,778,947,168	22,778,947,168	+0	14,879,856	7.6 Gbps	0	PASS
32	100%	10000	22,778,947,168	22,778,947,168	+0	14,879,856	7.6 Gbps	0	PASS
33	100%	10000	22,778,947,167	22,778,947,167	+0	14,879,856	7.6 Gbps	0	PASS
34	100%	10000	22,778,947,167	22,778,947,167	+0	14,879,856	7.6 Gbps	0	PASS
35	100%	10000	22,778,947,167	22,778,947,167	+0	14,879,856	7.6 Gbps	0	PASS
36	100%	10000	22,778,947,167	22,778,947,167	+0	14,879,856	7.6 Gbps	0	PASS
37	100%	10000	22,778,947,167	22,778,947,167	+0	14,879,856	7.6 Gbps	0	PASS
38	100%	10000	22,778,947,167	22,778,947,167	+0	14,879,856	7.6 Gbps	0	PASS
39	100%	10000	22,778,947,167	22,778,947,167	+0	14,879,856	7.6 Gbps	0	PASS
40	100%	10000	22,778,947,167	22,778,947,167	+0	14,879,856	7.6 Gbps	0	PASS

Thermal: central chip avg 47°C (max 48°C) · port chip not exposed · drift +0°C over run: stable, within normal range.









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Acceptance Criteria Summary

All ten acceptance criteria of ZC-TP-860-1417-10 rev B with the value measured on this unit and the result. The overall result is PASS only if every criterion is met: **10 of 10 met.**

Acceptance criteria (ZC-TP-860-1417-10 rev B)	Measured	Result: PASS
AC-1 Identity: enumerated model, port count and serial agree with the order, the unit label and the boot record	NOVUS100GE8Q28+FAN+10G+25G+40G, 40 active of 40 enumerated ports, SN 541694 (label); EEPROM 541694; boot record SN 541694	**PASS**
AC-2 Boot: zero FAIL records in the as-tested IxServer boot record; card reaches Board Ready	0 FAIL records; 0 BIST/memory-test records; Board Ready logged	**PASS**
AC-3 Test conditions: IxOS client version-matched to the chassis; counters zeroed at window start; sampling interval 10 s or less; capture window at least the module soak time, the longest AC-8 window among the PHYs the module supports and never less than 2 h, applied to the 100GE test set; every other test set runs at least the AC-8 window of its own PHY at its own line rate	100GE: interval 5.5 s, window 2 h 00 min of 2 h 00 min module soak time, counters zeroed yes; 40GE: interval 5.5 s, window 1 h 01 min of 20 min 00 s minimum window (no soak on this test set), counters zeroed yes; 25GE: interval 6.0 s, window 1 h 01 min of 20 min 00 s minimum window (no soak on this test set), counters zeroed yes; 10GE: interval 6.0 s, window 25 min 30 s of 25 min 00 s minimum window (no soak on this test set), counters zeroed yes; IxServer 9.24.3100.10, matched client (full card identity returned)	**PASS**
AC-4 Link: up on every port in every sample; zero link-down transitions	100GE: 10,416 of 10,416 port-samples up, 0 link-down transitions; 40GE: 5,288 of 5,288 port-samples up, 0 link-down transitions; 25GE: 19,680 of 19,680 port-samples up, 0 link-down transitions; 10GE: 8,256 of 8,256 port-samples up, 0 link-down transitions	**PASS**
AC-5 Line rate: negotiated speed equals the nominal port speed in every sample	100GE: 100,000 Mbps in 10,416 of 10,416 port-samples; 40GE: 40,000 Mbps in 5,288 of 5,288 port-samples; 25GE: 25,000 Mbps in 19,680 of 19,680 port-samples; 10GE: 10,000 Mbps in 8,256 of 8,256 port-samples	**PASS**
AC-6 Throughput: every port within ±100 ppm of the theoretical line-rate frame rate for the frame size under test, measured over the whole window (IEEE 802.3 clock tolerance); the measurement uncertainty is stated	100GE: -37 to -31 ppm vs 148,809,524 fps (least-squares over all samples, 95% uncertainty ±4.0 ppm); 40GE: -7 to +5 ppm vs 59,523,810 fps (least-squares over all samples, 95% uncertainty ±11.0 ppm); 25GE: -13 to +3 ppm vs 37,202,381 fps (least-squares over all samples, 95% uncertainty ±11.9 ppm); 10GE: -41 to +3 ppm vs 14,880,952 fps (least-squares over all samples, 95% uncertainty ±42.4 ppm)	**PASS**
AC-7 Frame delivery: zero frame loss on every port (RFC 2544 throughput definition). Tx and Rx totals agree within 10 frames, the frames in flight at the read instant	100GE: max |Tx–Rx| 1 frames per port; 40GE: max |Tx–Rx| 1 frames per port; 25GE: max |Tx–Rx| 1 frames per port; 10GE: max |Tx–Rx| 1 frames per port	**PASS**

Acceptance criteria (ZC-TP-860-1417-10 rev B)	Measured	Result: PASS
AC-8 Errors: zero increase on every frame-integrity, data-path, line-coding, fault, drop and flow-control counter. The demonstrated bit-error-ratio bound per port (95% confidence, zero errors) is at least 5× tighter than the IEEE 802.3 objective for the PHY. On copper, FCS errors are attributed to cabling and excluded. Codewords corrected by forward error correction are stated and are not errors; an uncorrectable codeword is an error	100GE: 0 errors / 29 counters; BER ≤ 4.2e-15 (target 2e-13, IEEE 802.3 cl.82/86); 40GE: 0 errors / 29 counters; BER ≤ 2.0e-14 (target 2e-13, IEEE 802.3 cl.82/86); 25GE: 0 errors / 29 counters; BER ≤ 3.3e-14 (target 2e-13, IEEE 802.3 cl.107/110); 1 corrected by FEC, none uncorrectable; 10GE: 0 errors / 29 counters; BER ≤ 2.0e-13 (target 2e-13, IEEE 802.3 cl.49/52)	**PASS**
AC-9 Thermal: no over-temperature alarm or shutdown during the window; every exposed sensor below 80 °C. Temperature change over the window is an indication only, not a pass or fail limit	100GE: max 48 °C, no over-temperature alarm; change over the window +0.0 °C (indication only); 40GE: max 43 °C, no over-temperature alarm; change over the window +0.0 °C (indication only); 25GE: max 44 °C, no over-temperature alarm; change over the window +0.0 °C (indication only); 10GE: max 48 °C, no over-temperature alarm; change over the window +0.0 °C (indication only)	**PASS**
AC-10 Stability: zero card hardware events logged by IxServer during the capture window. Records for ports that are inactive in the mode under test are not counted	100GE: 0 card hardware events; 40GE: 0 card hardware events; 25GE: 0 card hardware events; 10GE: 0 card hardware events	**PASS**

Demonstrated error bound for this unit: 100GE: zero errors over at least 7.22e+14 bits per port gives BER ≤ 4.2e-15 at 95% confidence, 241× tighter than the IEEE 802.3 cl.82/86 objective of 1e-12; 40GE: zero errors over at least 1.46e+14 bits per port gives BER ≤ 2.0e-14 at 95% confidence, 49× tighter than the IEEE 802.3 cl.82/86 objective of 1e-12; 25GE: zero errors over at least 9.15e+13 bits per port gives BER ≤ 3.3e-14 at 95% confidence, 31× tighter than the IEEE 802.3 cl.107/110 objective of 1e-12; 10GE: zero errors over at least 1.53e+13 bits per port gives BER ≤ 2.0e-13 at 95% confidence, 5× tighter than the IEEE 802.3 cl.49/52 objective of 1e-12 (the criterion requires 5×).



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Validation Sign-Off

Zombie Components LLC certifies that the health-validation testing described in this report was performed on the line-card module and chassis identified below, and that the recorded results are accurate and complete to the best of the tester's knowledge.

Document	ZC-TR-STOCK-541694 · issue 1, 2026-11-13
Tested to	ZC-TP-860-1417-10 rev B · assembly 860-1417-10
Customer	Stock inventory, Zombie Components LLC
Order / Invoice	STOCK / n/a
Service	Test to stock
Chassis	Ixia XGS12 · S/N XGS12-J0701117
IxOS version	IxOS 9.24.3100.10 (chassis IxServer; testing client version-matched)
Module tested	NOVUS100GE8Q28+FAN+10G+25G+40G · Ixia Novus QSFP28 100GE 8-Port with 10/25/40GE · S/N 541694 · 100GE + 40GE + 25GE + 10GE
100GE window	2026-11-12 06:50:36 to 08:50:56 local (2 h 00 min), 1,302 samples
40GE window	2026-11-12 21:45:15 to 22:46:16 local (1 h 01 min), 661 samples
25GE window	2026-11-12 22:50:25 to 23:51:26 local (1 h 01 min), 615 samples
10GE window	2026-11-12 09:48:39 to 10:14:09 local (25 min 30 s), 258 samples
Overall result	**PASS**

Tested by: Allen E. Hall

Title: President

Signature: 

Date: November 13, 2026