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NOVUS10/1GE32S

Ixia Novus 10GE/1GE/100M 32-Port SFP+

32-Port SFP+ 10/1 Gigabit Ethernet Load Module · L2-3

Serial Number 538922

Part number 944-1141

Line Card Validation Report

Tested to ZC-TP-860-1410-07 rev B · issued 2026-11-14

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-538922** Test procedure: **ZC-TP-860-1410-07 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: 2026-11-14

This report certifies the health-validation testing performed on the Ixia Novus 10GE/1GE 32-Port SFP+, a 32-port SFP+ 10 Gigabit / 1 Gigabit / 100 Mbps 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, 32 ports in all (a 2 h 18 min 10GE soak; line-rate runs without soak: 1GE 26 min 43 s, 100M 13 min 54 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-860-1410-07 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 SFP+ digital diagnostics (temperature, bias, optical power). 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-538922 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	2026-11-14	ZC-TP-860-1410-07 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-860-1410-07 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 10GE test set; the 1GE and 100M test sets are functional tests of at least 10 min 00 s at line rate, judged on link, line speed, frame delivery, zero errors, temperature and stability, with the frame rate and the error-ratio bound stated and not judged	**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: 10GE: zero errors over at least 8.27e+13 bits per port gives BER ≤ 3.6e-14 at 95% confidence, 28× tighter than the IEEE 802.3 cl.49/52 objective of 1e-12; 1GE: zero errors over at least 1.60e+12 bits per port gives BER ≤ 1.9e-12 at 95% confidence (functional test set, stated and not judged); 100M: zero errors over at least 8.35e+10 bits per port gives BER ≤ 3.6e-11 at 95% confidence (functional test set, stated and not judged) (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	NOVUS10/1GE32S, 32 active of 32 enumerated ports, SN 538922 (label); EEPROM 538922; boot record SN 538922	**PASS**

The NOVUS10/1GE32S is a 3-speed Ethernet load module (10GE, 1GE and 100M) that occupies one chassis slot and carries 32 SFP+ ports. It is ordered as part 944-1141 with Layer 2-3 support under IxExplorer, IxNetwork and the Tcl API. The module has one multicore processor with 2GB of CPU memory per port pair; in normal mode up to 16 users share the module, each owning two ports at a time. (Keysight data sheet 3120-1167.EN, Novus 32-Port 10/1 3-Speed Ethernet Load Module (published August 1, 2022), Specifications, p.3; Application support, p.5; Ordering Information, p.6)

The module is installed in an XGS12 or XGS2 chassis. Port speed is selected per port in the Port Properties General tab (10G Full Duplex, Gigabit Full Duplex, 100 Mbps Full Duplex) with the PHY mode set to SFP+/SFP Fiber (the default) or SGMII; the card Operation Mode tab selects Normal (Non-Aggregation) Mode or Aggregation Mode for the whole module. 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. (IxExplorer User Guide, Release 9.24 (doc version 202207211825), Chapter 17 Card Properties, Novus 10GE/1GE/100M Module, printed pp.982-983; Chapter 30 Port Properties NOVUS10/1GE32S Load Modules, printed pp.1507-1509; Keysight data sheet 3120-1167.EN, Novus 32-Port 10/1 3-Speed Ethernet Load Module (published August 1, 2022), Transmit and Receive Feature Specifications, p.4)

Stated performance specifications

Parameter	Specification
Model / part number	NOVUS10/1GE32S, 944-1141
Type	10GE/1GE/100M 3-speed Ethernet load module, L2-3 support. Application support: IxExplorer, IxNetwork, Tcl API.
Slots / ports	1 slot with 32x10GE/1GE SFP+ ports; physical interfaces: 32 ports of SFP+
Supported port speeds and media	10GE: SFP+ 10GE passive copper Direct Attach Cable (DAC) media, and 10GE/1GE-capable fiber media. 1GE: 10GE/1GE-capable fiber media. 100M: SFP 100M-capable fiber media.
Port speed and PHY mode selection	Per port in the Port Properties General tab: 10G Full Duplex, Gigabit Full Duplex, 100 Mbps Full Duplex. PHY modes: SFP+/SFP Fiber (default) and SGMII. Enable Auto-negotiation and Restart Auto Negotiation are available for Copper, SGMII and 1G Fiber modes. Link modes: Normal, Internal Loopback (Tx to Rx), Line Loopback (Rx to Tx), Simulate Cable Disconnect.
Transceivers and cables	988-0011 SFP+ 10GBASE-SR/SW and 1000BASE-SX dual-rate, 850 nm; 988-0012 SFP+ 10GBASE-LR/LW and 1000BASE-LX dual-rate, 1310 nm, 10 km (both listed as compatible with all 10/1 Gigabit Ethernet Novus load modules). SFP-LX 1GE 1310 nm and SFP-SX 1GE 850 nm. SFP-FX-100M-XCVR 100BASE-FX SGMII, multimode, 1310 nm, 2 km, 100M speed mode only (names 944-1141). TAA: SFP-PLUS-LR-XCVR-T (948-0057), SFP-PLUS-SR-XCVR-T (948-0048), SFP-LX-I-XCVR-T (995-0060), SFP-SX-I-XCVR-T (995-0061) (each names 944-1141). Also listed under Cables and transceivers: 948-0013 SR, 948-0014 LR, 948-0015 LRM SFP+ transceivers and 948-0016 passive copper DAC, 3 m; their printed compatibility text names earlier load module families, not the Novus.
Supported chassis	XGS2-SD (940-0010), XGS12-SD (940-0011), XGS2-SDL (940-0013), XGS12-SDL (940-0015), XGS2-HSL (940-0014), XGS12-HSL (940-0016)
Max ports per chassis	XGS12-SD, XGS12-SDL, XGS12-HSL (12 load modules): 384 ports of 10/1/100M 3-speed. XGS2-SD, XGS2-SDL, XGS2-HSL (2 load modules): 64 ports of 10/1/100M 3-speed.
Operation modes / number of users	Normal (non-aggregation) mode: up to 16 users per load module, each user owns 2 ports at one time. Aggregation mode: up to 8 users per load module. The mode is selected in the card Operation Mode tab.
CPU and memory	Multicore processor with 2GB of CPU memory per port pair
Port aggregation	Set across the entire load module. Assigns the CPU and memory resources of 4 ports to 1 port; 8 physical ports are available in aggregation mode. The data sheet states up to 970 Mbps of L4-7 stateful traffic across the load module via IxNetwork AppLibrary in this mode.
Max streams per port	512; 256 in Data Center Ethernet. Both the Packet Streams and the Advanced Stream Scheduler transmit modes allow 512 streams (256 in DCM mode).

Parameter	Specification
Frame size	Transmit minimum: 10GE 49 bytes at full line rate without UDF, 60 bytes at full line rate with UDF; 1GE and 100M 49 bytes at full line rate. Maximum 16,384 bytes (9,216 bytes in Data Center Ethernet). Receive minimum: 64 bytes at full line rate into the capture buffer, 49 bytes at less than full line rate.
Latency measurement resolution	2.5 nanoseconds (Port Properties, Transmit Modes tab, High TimeStamp Resolution: 2.5 ns timestamp on selected modes)
Transmit line clock adjustment	+/- 100 ppm across all ports on the load module
Trackable receive flows per port	512k with Tx/Rx Sync and sequence checking
Hardware capture buffer	512 MB per port
Link fault signaling and flow control	10GE: reports no fault, remote fault and local fault port statistics; the transmit port can be set to ignore link faults from the remote link partner. Flow control: IEEE 802.3x, and IEEE 802.1Qbb Priority-based Flow Control in Data Center mode (8 line-rate-capable queues up to 2,500-byte frames, 1 queue up to 9,216-byte frames).
Dimensions / weight	16.4 in (L) x 1.3 in (W) x 12.0 in (H), 417 x 33 x 305 mm; module only 11.4 lb (5.15 kg); shipping 18.2 lb (8.26 kg)
Operating temperature / humidity	Ambient air. 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, operating and storage

Specification rows are from the local Keysight data sheet 3120-1167.EN of the module (August 1, 2022) and the IxExplorer User Guide Release 9.24, each row cited with the printed page; the Ixia Platform Reference Guide Release 8.20 EA (December 2016) does not list this module. Definition ZC-FD-novus10ge32s rev 2, approved 2026-11-14.

Module Family: Novus 10GE/1GE/100M

The Novus 10/1 3-speed family is the 10GE/1GE/100M load module line of the XGS chassis. The Platform Reference Guide Release 8.20 EA part numbers table gives the three Dual-PHY (SFP+ and RJ45) members with L2-7 support; the 32-port SFP+ member and the two NP members are not in that table and are taken from the Keysight data sheet and the Product Compatibility Matrix. The data sheet groups 944-1141, 944-1142, 944-1143 and 944-1146 as Novus 10/1 3 Speed.

Model	Part number	Description
NOVUS10/1GE32S (this unit)	944-1141	32-port SFP+ 10GE/1GE/100M load module, 1 slot, L2-3 support
NOVUS10/1GE16DP	944-1142	16-port Dual-PHY SFP+ / 10GBASE-T RJ45 10G/1G/100M load module, 1 slot, L2-7 support
NOVUS10/1GE8DP	944-1143	8-port Dual-PHY SFP+ / 10GBASE-T RJ45 10G/1G/100M load module, 1 slot, L2-7 support; 8-port enablement on the 16-port 944-1142, field-upgradable by software to the full 16-port NOVUS10/1GE16DP
NOVUS1GE16DP	944-1146	16-port Dual-PHY SFP+ / 1000BASE-T RJ45 1G/100M load module, 1 slot, L2-7 support; the 944-1142 16-port load module enabled for 1GE/100Mbps operation only on all 16 ports
NOVUS-NP10/1GE16DP	944-1162	16-port SFP+ / 10GBASE-T Dual-PHY 10GE/1GE/100M NP load module
NOVUS-NP10/1GE8DP	944-1163	8-port enablement on the 16-port SFP+ / 10GBASE-T Dual-PHY 10GE/1GE/100M NP load module

Platform Reference Guide v8.20 EA ch.34, Keysight data sheet 3120-1167.EN and the Keysight Product Compatibility Matrix, 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 10GE test set; the 1GE and 100M test sets are functional tests of at least 10 min 00 s at line rate, judged on link, line speed, frame delivery, zero errors, temperature and stability, with the frame rate and the error-ratio bound stated and not judged	10GE: interval 5.9 s, window 2 h 18 min of 2 h 00 min module soak time, counters zeroed yes (counters cleared 11:16:19; window judged from 11:44:32, 28 min 13 s later: One capture recorded all three test sets of this unit. The logger started at 11:16:06 with no traffic on the card; line-rate traffic at 10GE was started and the statistics were cleared at 11:44:29; every error counter read zero at the window start); 1GE: interval 5.9 s, window 26 min 43 s of 10 min 00 s minimum window (functional test set), counters zeroed yes (counters cleared 11:16:19; window judged from 14:04:17, 2 h 48 min later: One capture recorded all three test sets of this unit. The operator set every port to 1000 Mbps in IxExplorer, cleared the statistics and started traffic at 14:04; every error counter read zero at the window start); 100M: interval 6.0 s, window 13 min 54 s of 10 min 00 s minimum window (functional test set), counters zeroed yes (counters cleared 11:16:19; window judged from 14:33:57, 3 h 18 min later: One capture recorded all three test sets of this unit. The operator set every port to 100 Mbps, SGMII, internal loopback in IxExplorer, cleared the statistics at 14:33:20 and started traffic; the window starts after the last link-state record of that setup, logged by IxServer at 14:33:52; every error counter read zero at the window start); 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	10GE: max 46 °C, no over-temperature alarm; change over the window +0.0 °C (indication only); 1GE: max 48 °C, no over-temperature alarm; change over the window +0.0 °C (indication only); 100M: max 48 °C, no over-temperature alarm	**PASS**

Slot	Serial	Assembly	Rev	HW	FPGA	Ports
4	538922	850-1410-05-02	D	1	1074397818	32

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: 10GBASE-SR, SFP+ optical transceivers over multimode fiber (ports 1-32) 2026-11-14 11:44:32 to 14:02:22 local (2 h 18 min), 1,393 samples, longest gap 6 s (counters cleared 11:16:19; window judged from 11:44:32, 28 min 13 s later: One capture recorded all three test sets of this unit. The logger started at 11:16:06 with no traffic on the card; line-rate traffic at 10GE was started and the statistics were cleared at 11:44:29; every error counter read zero at the window start); 1000BASE-X, SFP+ optical transceivers over multimode fiber (ports 1-32) 2026-11-14 14:04:17 to 14:31:00 local (26 min 43 s), 271 samples, longest gap 6 s (counters cleared 11:16:19; window judged from 14:04:17, 2 h 48 min later: One capture recorded all three test sets of this unit. The operator set every port to 1000 Mbps in IxExplorer, cleared the statistics and started traffic at 14:04; every error counter read zero at the window start); Internal loopback (Tx to Rx) at 100 Mbps in SGMII PHY mode: each port's transmitter looped to its own receiver inside the card; transceivers and fiber are not in the signal path (ports 1-32) 2026-11-14 14:33:57 to 14:47:51 local (13 min 54 s), 141 samples, longest gap 6 s (counters cleared 11:16:19; window judged from 14:33:57, 3 h 18 min later: One capture recorded all three test sets of this unit. The operator set every port to 100 Mbps, SGMII, internal loopback in IxExplorer, cleared the statistics at 14:33:20 and started traffic; the window starts after the last link-state record of that setup, logged by IxServer at 14:33:52; every error counter read zero at the window start). All error counters verified zero at the start of each window.

Thermal profile (limit 80 °C, AC-9)

Sensor	10GE min / max / mean	1GE min / max / mean	100M min / max / mean
Central (card)	44 / 46 / 45.3 °C	47 / 48 / 47.0 °C	47 / 48 / 47.3 °C

Installed transceivers

Port	Vendor / Part	Serial	Port	Vendor / Part	Serial
1	AVAGO AFBR-709SMZ	AD1510303UJ	17	AVAGO AFBR-709DMZ	AA1749308GS
2	AVAGO AFBR-709DMZ	AA173830S2Y	18	AVAGO AFBR-709DMZ	AA173730LN8
3	AVAGO AFBR-709DMZ	AA1749308HC	19	AVAGO AFBR-709SMZ	AD1841307LT
4	AVAGO AFBR-709SMZ	AD1838302AU	20	AVAGO AFBR-709SMZ	AD1838303NC
5	AVAGO AFBR-709SMZ	AD1841307RJ	21	AVAGO AFBR-709SMZ	AD1838303PK
6	AVAGO AFBR-709SMZ	AD1838302BR	22	AVAGO AFBR-709SMZ	AD151030413
7	AVAGO AFBR-709SMZ	AD163930JX3	23	AVAGO AFBR-709SMZ	AD1838302DJ
8	AVAGO AFBR-709SMZ	AD1838302BC	24	AVAGO AFBR-709DMZ	AA1749308G7
9	AVAGO AFBR-709SMZ	AD1510303U1	25	AVAGO AFBR-709SMZ	AD1838303NV
10	AVAGO AFBR-709SMZ	AD1838302AV	26	AVAGO AFBR-709DMZ	AA1749308HN
11	AVAGO AFBR-709DMZ	AA1720307PS	27	AVAGO AFBR-709SMZ	AD1838303N9
12	AVAGO AFBR-709DMZ	AA1648307T9	28	AVAGO AFBR-709SMZ	AD1844306N7
13	AVAGO AFBR-709DMZ	AD1431301PY	29	AVAGO AFBR-709SMZ	AD1510303UP
14	AVAGO AFBR-709SMZ	AD1510303U9	30	AVAGO AFBR-709DMZ	AA1746306T4
15	AVAGO AFBR-709DMZ	AA1720304MK	31	AVAGO AFBR-709DMZ	AA1749301ZJ
16	AVAGO AFBR-709DMZ	AA174930189	32	AVAGO AFBR-709DMZ	AA1749301YV

32 of 32 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	10GE: 44,576 of 44,576 port-samples up, 0 link-down transitions; 1GE: 8,672 of 8,672 port-samples up, 0 link-down transitions; 100M: 4,512 of 4,512 port-samples up (internal loopback), 0 link-down transitions	**PASS**
AC-5 Line rate: negotiated speed equals the nominal port speed in every sample	10GE: 10,000 Mbps in 44,576 of 44,576 port-samples; 1GE: 1,000 Mbps in 8,672 of 8,672 port-samples; 100M: 100 Mbps in 4,512 of 4,512 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	10GE: -4 to +2 ppm vs 14,880,952 fps (least-squares over all samples, 95% uncertainty ±3.7 ppm); 1GE: -4 to +41 ppm vs 1,488,095 fps (least-squares over all samples, 95% uncertainty ±42.4 ppm); functional test set, stated and not judged; 100M: -53 to +109 ppm vs 148,810 fps (least-squares over all samples, 95% uncertainty ±114.8 ppm); functional test set, stated and not judged	**PASS**

Each test was evaluated across the ports of each test set for every sample of each monitoring window (10GE 1,393, 1GE 271, 100M 141); a test passes only if the criterion held continuously on every port.

#	Aggregate Port Test	Pass Criterion	10GE	1GE	100M
1	Link establishment	Link up on every port of the test set, every sample	**PASS**	**PASS**	**PASS**
2	Line rate	Line speed = nominal port speed, every sample	**PASS**	**PASS**	**PASS**
3	Link stability (no flaps)	Zero link-down transitions over window	**PASS**	**PASS**	**PASS**
4	Frame integrity	FCS / alignment / undersize / oversize / fragments / dribble / symbol = 0	**PASS**	**PASS**	**PASS**

#	Aggregate Port Test	Pass Criterion	10GE	1GE	100M
5	Data-path verification	Sequence errors = 0 and data-integrity errors = 0	**PASS**	**PASS**	**PASS**
6	Frame delivery	Dropped frames = 0, ingress and egress	**PASS**	**PASS**	**PASS**
7	Line coding	Code / disparity / invalid-EOF / error-character counters = 0	**PASS**	**PASS**	**PASS**
8	Fault signaling	Local / remote fault, link-fault state, PCS counters = 0	**PASS**	**REVIEW**	**REVIEW**
9	Flow control	Zero pause frames received	**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**	**REVIEW**
11	Counter coherence	framesSent monotonic on every port (no resets)	**PASS**	**PASS**	**PASS**
12	Thermal	All sensors < 80 °C for the entire window	**PASS**	**PASS**	**PASS**

Measured per-port frame rate: 10GE: 14,880,527–14,881,428 fps against the 14,880,952 fps ceiling for 64-byte frames; 1GE: 1,488,089–1,488,157 fps (least-squares) against the 1,488,095 fps ceiling for 64-byte frames; 100M: 148,802–148,826 fps (least-squares) against the 148,810 fps ceiling for 64-byte frames.

IxServer Event Log: Card 4 Summary (S/N 538922)

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	10GE: 0 card hardware events; 1GE: 0 card hardware events; 100M: 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 4 (serial 538922) plus chassis-level records.

Log summary by category. Every record for card 4 from the as-tested boot record onward (79,233 records) and the chassis-level records of the same session (17,411), 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	5	11:02:52 to 11:04:34	**ok**	Native Board, Serial Number 538922, BOM Assembly Number 860-1410-07 Rev P, PCBA Date Code P65000536, Assembly Number 850-1410-05-02 Revision D LM type NOVUS10/1GE32S. 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 P65000378 Assembly Number 850-1398-04-03 Revision E LM Serial Number 538922 MFG Date Code P65000536 Assembly Number 850-1410-05-02 Revision D
Firmware and FPGA	101	11:02:55 to 11:04:05	**ok**	1 distinct FPGA version line: FPGA versions: TX 1.12 (0x7002_000c) RX 1.12 (0x7002_000c) 16 main images booted, 16 firmware starts
Processor boot	2	11:03:49 to 11:04:34	**ok**	1 local processor booted (port group leads 1); Board Ready logged
Optics (transceivers)	32	11:04:32 to 11:10:20	**ok**	AVAGO AFBR-709DMZ: 14 ports (2, 3, 11, 12, 13, 15, 16, 17, 18, 24, 26, 30, 31, 32) AVAGO AFBR-709SMZ: 18 ports (1, 4, 5, 6, 7, 8, 9, 10, 14, 19, 20, 21, 22, 23, 25, 27, 28, 29)
Port configuration and traffic control	1784	11:03:36 to 14:47:58	**ok**	160 port configuration writes, 320 PFC control writes, 1304 other control records (activation, transmit, ownership)
Client sessions	68894	11:04:34 to 14:48:21	**ok**	253 client connections (chassis-level records) from 127.0.0.1, 192.168.2.13; 11 disconnects; 68894 card reads and keep-alives

Category	Records	Span (workstation time)	Result	Summary
Faults and warnings	0	-	**ok**	none
Other card records	8415	11:02:45 to 14:48:01	**ok**	8415 boot and bring-up detail records (register values, link training, 1050 link state changes before the capture window); none FAIL-tagged or Warning-tagged
Chassis context	17411	11:02:53 to 14:49:18	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)
11-14-2026 08:27:32	-	-	**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.
11-14-2026 11:02:45	4	-	**ok**	Hot insertion: complete boot record of the unit as tested	Native Board, Serial Number 538922, BOM Assembly Number 860-1410-07 Rev P, PCBA Date Code P65000536, Assembly Number 850-1410-05-02 Revision D; LM type NOVUS10/1GE32S. 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.
11-14-2026 11:02:45	4	1-32	**ok**	Transceiver enumeration	32 of 32 transceivers identified with vendor, part and serial.
11-14-2026 11:11:45	-	-	**ok**	Client sessions	11 client connections: IxExplorer (traffic control) and read-only Tcl connections (discovery, port info, statistics logging), all from the test workstation.
11-14-2026 14:33:20	4	1-32	**ok**	Statistics baselines	10 statistics-clear events; counters zeroed at the start of each capture window without stopping traffic.
11:44–14:02	4	1-32	**ok**	10GBASE-SR, SFP+ optical transceivers over multimode fiber soak (2 h 18 min)	0 card hardware events during the capture window (read-only statistics queries excluded). The card ran undisturbed at line rate.
14:04–14:31	4	1-32	**ok**	1000BASE-X, SFP+ optical transceivers over multimode fiber run (26 min 43 s)	0 card hardware events during the capture window (read-only statistics queries excluded). The card ran undisturbed at line rate.
14:33–14:47	4	1-32	**ok**	Internal loopback (Tx to Rx) at 100 Mbps in SGMII PHY mode: each port's transmitter looped to its own receiver inside the card; transceivers and fiber are not in the signal path run (13 min 54 s)	0 card hardware events during the capture window (read-only statistics queries excluded). The card ran undisturbed at line rate.
11-14-2026 14:52:20	-	-	**ok**	Session log accounting	Chassis log downloaded from the chassis web console. Scope: the as-tested insertion of card 4 through the end of the retrieved log, 96,875 event lines, all represented above. 0 FAIL-tagged records for card 4 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	10GE: max |Tx−Rx| 1 frames per port; 1GE: max |Tx−Rx| 1 frames per port; 100M: max |Tx−Rx| 0 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	10GE: 0 errors / 29 counters; BER ≤ 3.6e-14 (target 2e-13, IEEE 802.3 cl.49/52); 1GE: 0 errors / 29 counters; BER ≤ 1.9e-12 (functional test set, bound stated and not judged); 100M: 0 errors / 29 counters; BER ≤ 3.6e-11 (functional test set, bound stated and not judged)	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	10GE (ports 1-32)	1GE (ports 1-32)	100M (ports 1-32)
Port & link state (3 fields)			
link	1 (all ports, all 1,393 samples)	1 (all ports, all 271 samples)	1 (all ports, all 141 samples)
lineSpeed	10000 (all ports, all 1,393 samples)	1000 (all ports, all 271 samples)	100 (all ports, all 141 samples)
linkFaultState	0 (all ports, all 1,393 samples)	min 1 / max 2	min 1 / max 2
Traffic: transmit (4 fields)			
framesSent	+123,068,985,159–123,076,435,962 per port · total 3,938,319,270,195	+2,384,569,085–2,385,313,842 per port · total 76,315,909,421	+124,201,290–124,275,792 per port · total 3,975,486,017
scheduledFramesSent	+123,068,985,159–123,076,435,962 per port · total 3,938,319,270,195	+2,384,569,085–2,385,313,842 per port · total 76,315,909,421	+124,201,290–124,275,792 per port · total 3,975,486,017
bytesSent	+7,876,415,050,120–7,876,891,901,512 per port · total 252,052,433,291,452	+152,612,421,412–152,660,085,848 per port · total 4,884,218,201,624	+7,948,882,564–7,953,650,708 per port · total 254,431,105,656
bitsSent	+62,819,831,321,216–63,015,133,874,560 per port · total 2,016,224,162,440,736	+1,220,899,371,296–1,221,280,686,784 per port · total 39,073,745,612,992	+63,591,060,512–63,629,205,664 per port · total 2,035,448,845,248
Traffic: receive (3 fields)			
framesReceived	+123,068,985,158–123,076,435,961 per port · total 3,938,319,270,181	+2,384,569,085–2,385,313,842 per port · total 76,315,909,418	+124,201,290–124,275,792 per port · total 3,975,486,017
bytesReceived	+7,876,415,050,140–7,876,891,901,528 per port · total 252,052,433,291,832	+152,612,421,412–152,660,085,852 per port · total 4,884,218,201,748	+7,948,882,564–7,953,650,708 per port · total 254,431,105,676
bitsReceived	+62,819,831,325,280–63,015,133,874,656 per port · total 2,016,224,162,447,712	+1,220,899,371,296–1,221,280,686,816 per port · total 39,073,745,613,984	+63,591,060,512–63,629,205,664 per port · total 2,035,448,845,408
Frame integrity (8 fields)			
fcsErrors	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
alignmentErrors	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
oversize	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
undersize	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
fragments	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
dribbleErrors	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
symbolErrors	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
symbolErrorFrames	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
Data-path verification (2 fields)			
sequenceErrors	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
dataIntegrityErrors	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
Media access (1 field)			
collisions	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
Frame delivery (drops) (2 fields)			
droppedFrames	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
egressDroppedFrames	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
Line coding (5 fields)			
codeError	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
codingErrorFramesReceived	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
eErrorCharacterFramesReceived	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)

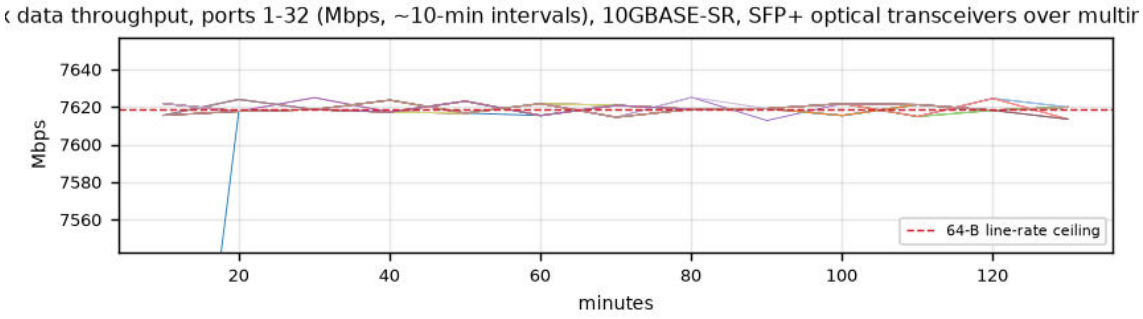
Field	10GE (ports 1-32)	1GE (ports 1-32)	100M (ports 1-32)
invalidEOFCount	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
disparityErrors	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
Flow control & VLAN (2 fields)			
flowControlFrames	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
vlanTaggedFramesRx	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
Capture comparators (2 fields)			
captureTrigger	+123,068,985,158–123,076,435,961 per port · total 3,938,319,270,181	+2,384,569,085–2,385,313,842 per port · total 76,315,909,421	+124,201,291–124,275,793 per port · total 3,975,486,042
captureFilter	+123,068,985,158–123,076,435,961 per port · total 3,938,319,270,181	+2,384,569,085–2,385,313,842 per port · total 76,315,909,421	+124,201,291–124,275,793 per port · total 3,975,486,042
Timing (1 field)			
transmitDuration	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 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
remoteFaults	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
pcsSyncErrorsReceived	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
pcsIllegalCodesReceived	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
pcsLocalFaultsReceived	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
pcsRemoteFaultsReceived	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
pcsIllegalIdleReceived	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
FEC (not used at this line rate; sampled regardless) (4 fields)			
fecCorrectedBitsCount	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
fecUncorrectableSubrowCount	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
rsFecCorrectedCodewordCount	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
rsfecUncorrectedCodewordCount	0 (all ports, all 1,393 samples)	0 (all ports, all 271 samples)	0 (all ports, all 141 samples)
Thermal sensors (3 fields)			
centralTemperature	44–46 °C across ports	47–48 °C across ports	47–48 °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)
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)
Other (1 field)			
tRead	min 1794685472.263 / max 1794693743.232	min 1794693857.767 / max 1794695460.899	min 1794695637.164 / max 1794696472.56

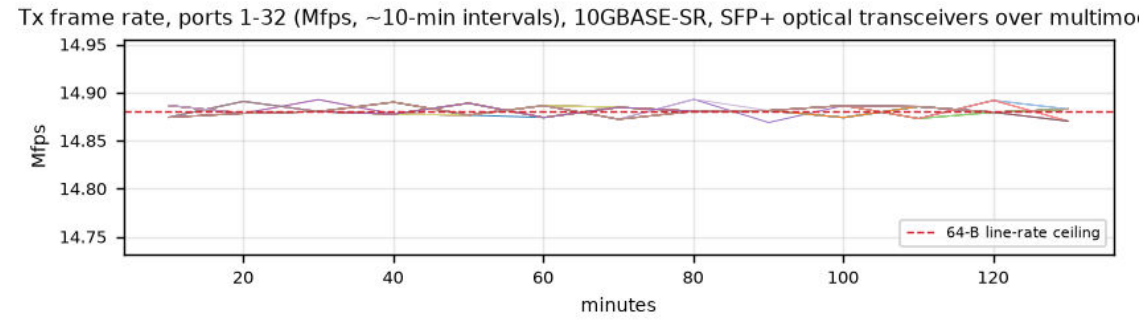
Zeros are measured values, sampled for the full window on every port.

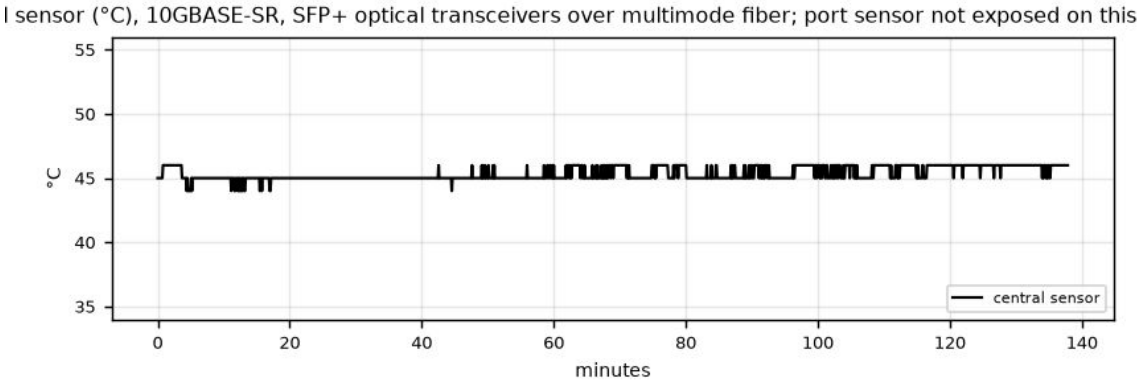
Statistics Log: Time-Series Graphs (10GBASE-SR, SFP+ optical transceivers over multimode fiber)

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: -4 to +2 ppm vs 14,880,952 fps (least-squares over all samples, 95% uncertainty ±3.7 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 46 °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 ~10-minute intervals; 1-second timestamp resolution gives up to ±0.3% per interval, the scatter about the ceiling. Window totals are exact.



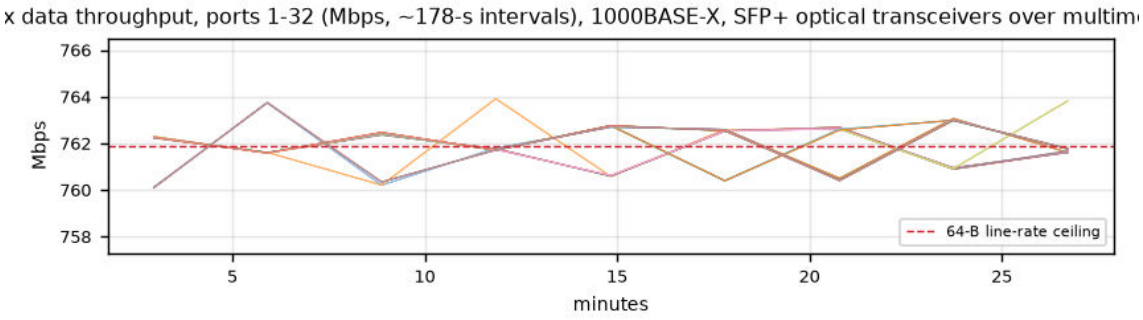


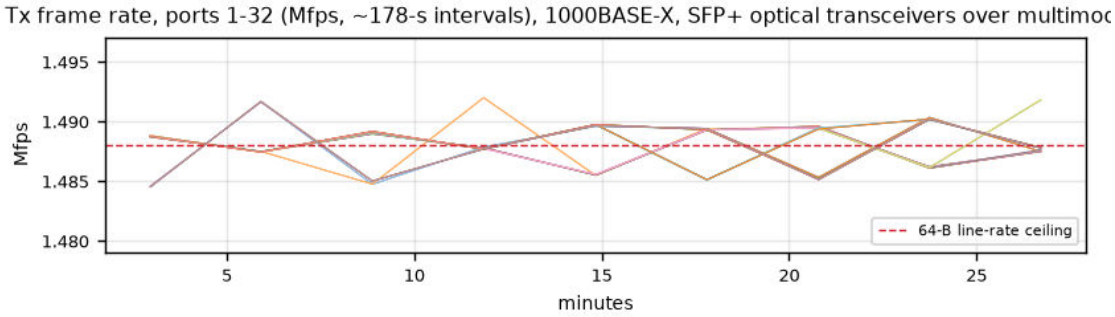


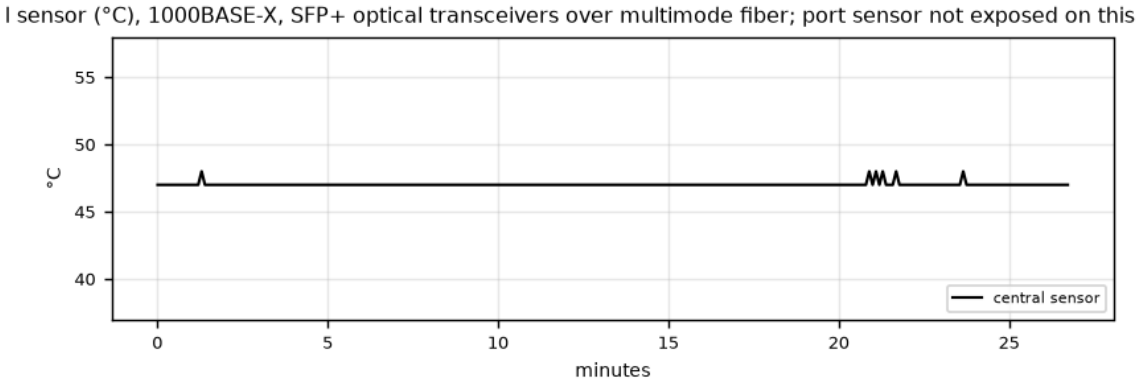
Statistics Log: Time-Series Graphs (1000BASE-X, SFP+ optical transceivers over multimode fiber)

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	1GE: -4 to +41 ppm vs 1,488,095 fps (least-squares over all samples, 95% uncertainty ±42.4 ppm); functional test set, stated and not judged	**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	1GE: max 48 °C, no over-temperature alarm; change over the window +0.0 °C (indication only)	**PASS**

Data throughput holds at ≈762 Mbps per port and the frame rate at the 1,488,095 fps ceiling for 64-byte frames (dashed line). Rates are exact counter deltas over ~178-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.



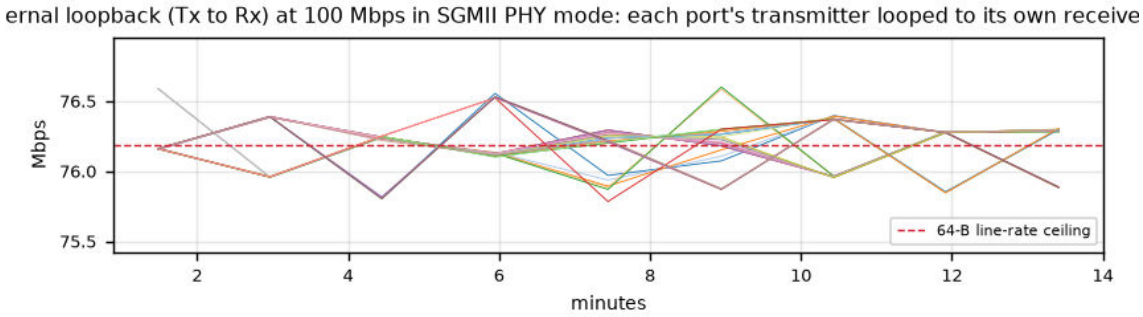


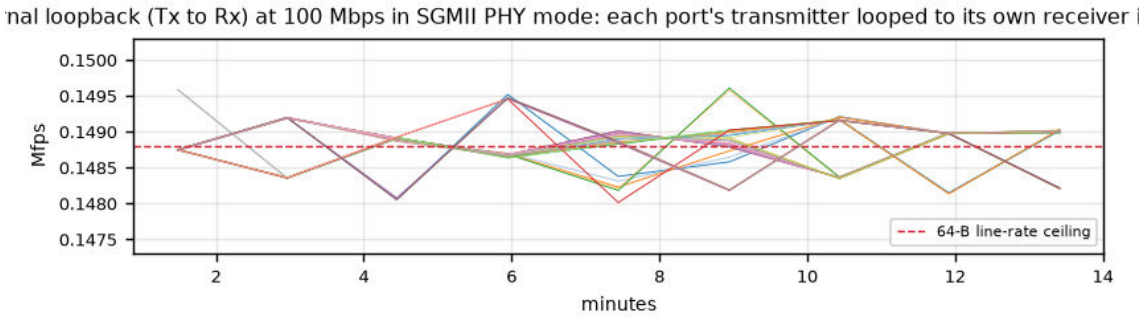


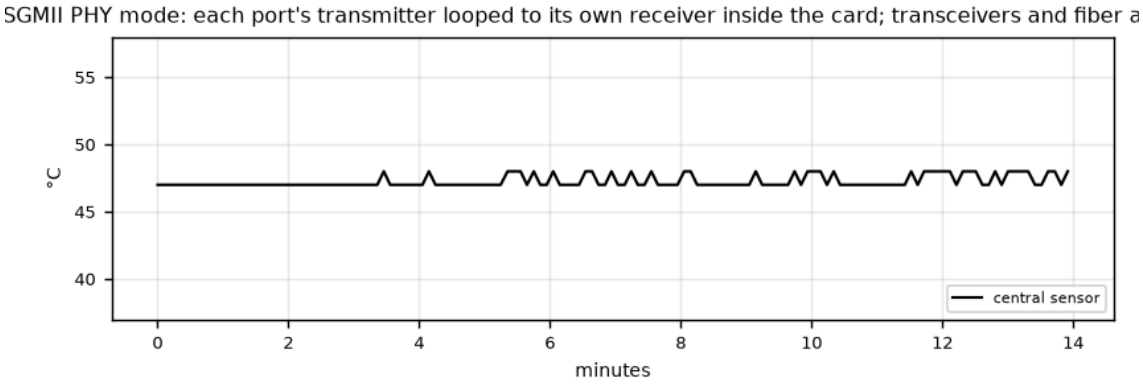
Statistics Log: Time-Series Graphs (Internal loopback (Tx to Rx) at 100 Mbps in SGMII PHY mode: each port's transmitter looped to its own receiver inside the card; transceivers and fiber are not in the signal path)

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	100M: -53 to +109 ppm vs 148,810 fps (least-squares over all samples, 95% uncertainty ±114.8 ppm); functional test set, stated and not judged	**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	100M: max 48 °C, no over-temperature alarm	**PASS**

Data throughput holds at ≈76 Mbps per port and the frame rate at the 148,810 fps ceiling for 64-byte frames (dashed line). Rates are exact counter deltas over ~89-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 ±0.5% per interval, the scatter about the ceiling. Window totals are exact.







Per-Module Detail

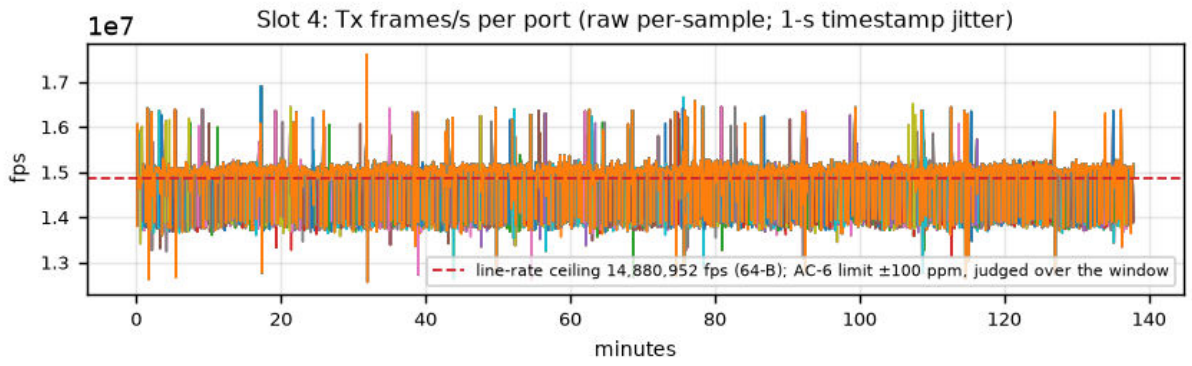
Slot 4: NOVUS10/1GE32S · S/N 538922 · 10GE

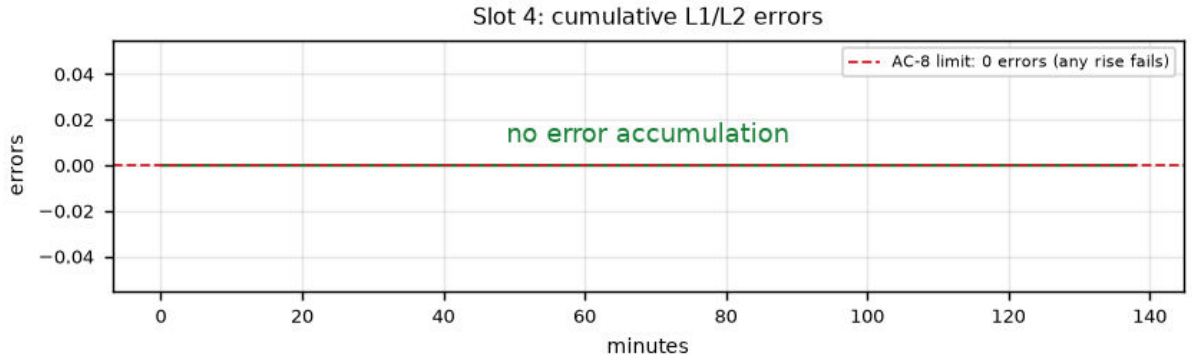
PASS

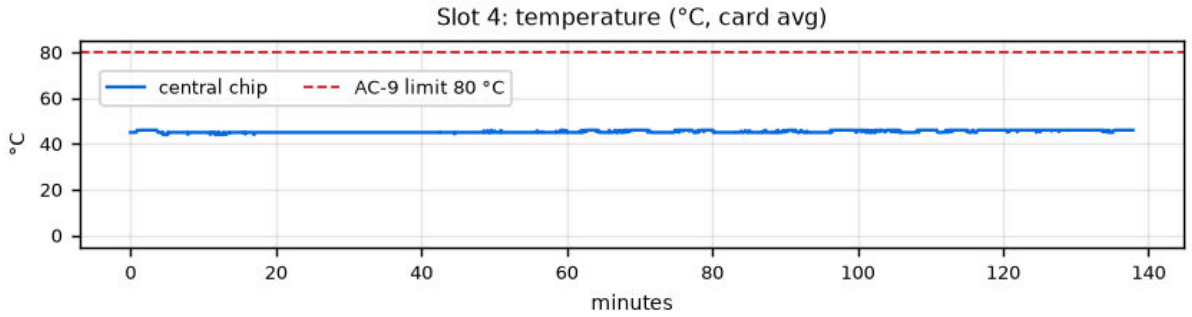
Per-port acceptance criteria	Measured	Result: PASS
AC-4 Link: up on every port in every sample; zero link-down transitions	32 of 32 ports up in 100% of samples with 0 transitions	PASS
AC-5 Line rate: negotiated speed equals the nominal port speed in every sample	32 of 32 ports at 10,000 Mbps	PASS
AC-7 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 46 °C	PASS

Port	Link	Speed	Tx frames	Rx frames	Loss	Avg fps	Throughput	Errors	Result
1	100%	10000	123,076,435,962	123,076,435,961	+1	14,881,428	7.6 Gbps	0	PASS
2	100%	10000	123,068,985,159	123,068,985,158	+1	14,880,527	7.6 Gbps	0	PASS
3	100%	10000	123,068,985,159	123,068,985,158	+1	14,880,527	7.6 Gbps	0	PASS
4	100%	10000	123,068,985,159	123,068,985,158	+1	14,880,527	7.6 Gbps	0	PASS
5	100%	10000	123,068,985,159	123,068,985,158	+1	14,880,527	7.6 Gbps	0	PASS
6	100%	10000	123,068,985,159	123,068,985,158	+1	14,880,527	7.6 Gbps	0	PASS
7	100%	10000	123,068,985,159	123,068,985,158	+1	14,880,527	7.6 Gbps	0	PASS
8	100%	10000	123,068,985,159	123,068,985,158	+1	14,880,527	7.6 Gbps	0	PASS
9	100%	10000	123,068,985,159	123,068,985,158	+1	14,880,527	7.6 Gbps	0	PASS
10	100%	10000	123,068,985,159	123,068,985,158	+1	14,880,527	7.6 Gbps	0	PASS
11	100%	10000	123,068,985,159	123,068,985,158	+1	14,880,527	7.6 Gbps	0	PASS
12	100%	10000	123,068,985,159	123,068,985,158	+1	14,880,527	7.6 Gbps	0	PASS
13	100%	10000	123,068,985,159	123,068,985,158	+1	14,880,527	7.6 Gbps	0	PASS
14	100%	10000	123,068,985,159	123,068,985,158	+1	14,880,527	7.6 Gbps	0	PASS
15	100%	10000	123,068,985,159	123,068,985,158	+1	14,880,527	7.6 Gbps	0	PASS
16	100%	10000	123,068,985,159	123,068,985,158	+1	14,880,527	7.6 Gbps	0	PASS
17	100%	10000	123,076,433,349	123,076,433,349	+0	14,881,428	7.6 Gbps	0	PASS
18	100%	10000	123,076,433,349	123,076,433,349	+0	14,881,428	7.6 Gbps	0	PASS
19	100%	10000	123,076,433,349	123,076,433,349	+0	14,881,428	7.6 Gbps	0	PASS
20	100%	10000	123,076,433,349	123,076,433,349	+0	14,881,428	7.6 Gbps	0	PASS
21	100%	10000	123,076,433,349	123,076,433,349	+0	14,881,428	7.6 Gbps	0	PASS
22	100%	10000	123,076,433,349	123,076,433,349	+0	14,881,428	7.6 Gbps	0	PASS
23	100%	10000	123,076,433,349	123,076,433,349	+0	14,881,428	7.6 Gbps	0	PASS
24	100%	10000	123,076,433,349	123,076,433,349	+0	14,881,428	7.6 Gbps	0	PASS
25	100%	10000	123,076,433,349	123,076,433,349	+0	14,881,428	7.6 Gbps	0	PASS
26	100%	10000	123,076,433,349	123,076,433,349	+0	14,881,428	7.6 Gbps	0	PASS
27	100%	10000	123,076,433,349	123,076,433,349	+0	14,881,428	7.6 Gbps	0	PASS
28	100%	10000	123,076,433,349	123,076,433,349	+0	14,881,428	7.6 Gbps	0	PASS
29	100%	10000	123,076,433,349	123,076,433,349	+0	14,881,428	7.6 Gbps	0	PASS
30	100%	10000	123,076,433,349	123,076,433,349	+0	14,881,428	7.6 Gbps	0	PASS
31	100%	10000	123,068,994,981	123,068,994,982	-1	14,880,529	7.6 Gbps	0	PASS
32	100%	10000	123,068,994,981	123,068,994,982	-1	14,880,529	7.6 Gbps	0	PASS

Thermal: central chip avg 45°C (max 46°C) · port chip not exposed · drift +0°C over run: stable, within normal range.







Transceivers (SFP+): 32 × LAN SFP+.

Per-Module Detail

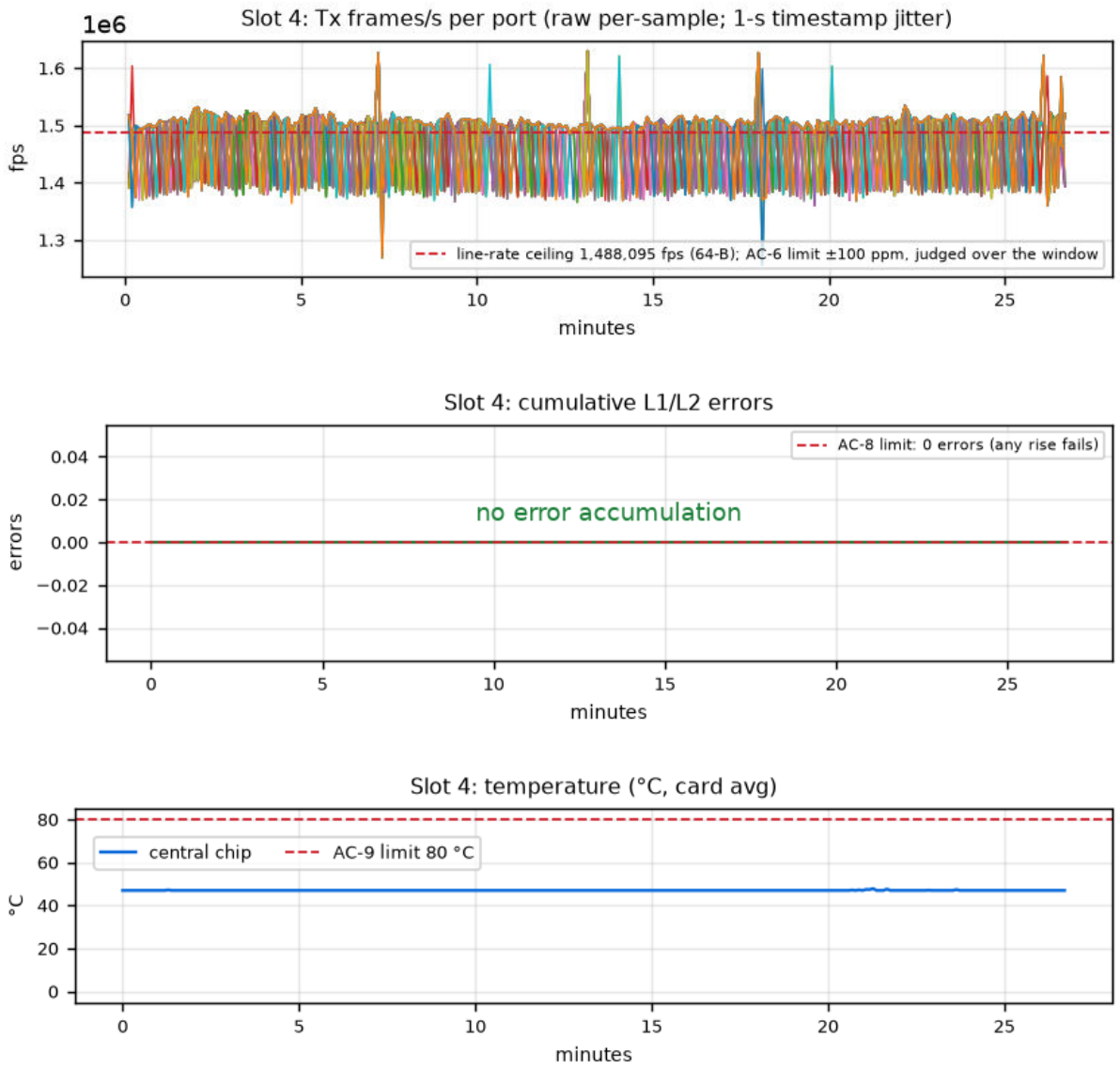
Slot 4: NOVUS10/1GE32S · S/N 538922 · 1GE

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 1,000 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%	1000	2,384,570,209	2,384,570,209	+0	1,487,910	761.8 Mbps	0	PASS
2	100%	1000	2,384,570,209	2,384,570,208	+1	1,487,910	761.8 Mbps	0	PASS
3	100%	1000	2,384,570,209	2,384,570,209	+0	1,487,910	761.8 Mbps	0	PASS
4	100%	1000	2,384,570,209	2,384,570,208	+1	1,487,910	761.8 Mbps	0	PASS
5	100%	1000	2,384,570,209	2,384,570,209	+0	1,487,910	761.8 Mbps	0	PASS
6	100%	1000	2,384,570,209	2,384,570,209	+0	1,487,910	761.8 Mbps	0	PASS
7	100%	1000	2,384,570,209	2,384,570,209	+0	1,487,910	761.8 Mbps	0	PASS
8	100%	1000	2,384,570,209	2,384,570,209	+0	1,487,910	761.8 Mbps	0	PASS
9	100%	1000	2,384,570,209	2,384,570,209	+0	1,487,910	761.8 Mbps	0	PASS
10	100%	1000	2,384,570,209	2,384,570,209	+0	1,487,910	761.8 Mbps	0	PASS
11	100%	1000	2,384,570,209	2,384,570,209	+0	1,487,910	761.8 Mbps	0	PASS
12	100%	1000	2,384,570,209	2,384,570,209	+0	1,487,910	761.8 Mbps	0	PASS
13	100%	1000	2,384,570,209	2,384,570,208	+1	1,487,910	761.8 Mbps	0	PASS
14	100%	1000	2,384,570,209	2,384,570,209	+0	1,487,910	761.8 Mbps	0	PASS
15	100%	1000	2,384,570,209	2,384,570,209	+0	1,487,910	761.8 Mbps	0	PASS
16	100%	1000	2,385,313,842	2,385,313,842	+0	1,488,374	762.0 Mbps	0	PASS
17	100%	1000	2,385,313,842	2,385,313,842	+0	1,488,374	762.0 Mbps	0	PASS
18	100%	1000	2,385,313,842	2,385,313,842	+0	1,488,374	762.0 Mbps	0	PASS
19	100%	1000	2,385,313,842	2,385,313,842	+0	1,488,374	762.0 Mbps	0	PASS
20	100%	1000	2,385,313,842	2,385,313,842	+0	1,488,374	762.0 Mbps	0	PASS
21	100%	1000	2,385,313,842	2,385,313,842	+0	1,488,374	762.0 Mbps	0	PASS
22	100%	1000	2,385,313,842	2,385,313,842	+0	1,488,374	762.0 Mbps	0	PASS
23	100%	1000	2,385,313,842	2,385,313,842	+0	1,488,374	762.0 Mbps	0	PASS
24	100%	1000	2,385,313,842	2,385,313,842	+0	1,488,374	762.0 Mbps	0	PASS
25	100%	1000	2,385,313,842	2,385,313,842	+0	1,488,374	762.0 Mbps	0	PASS
26	100%	1000	2,385,313,842	2,385,313,842	+0	1,488,374	762.0 Mbps	0	PASS
27	100%	1000	2,385,313,842	2,385,313,842	+0	1,488,374	762.0 Mbps	0	PASS
28	100%	1000	2,385,313,842	2,385,313,842	+0	1,488,374	762.0 Mbps	0	PASS
29	100%	1000	2,384,569,085	2,384,569,085	+0	1,487,909	761.8 Mbps	0	PASS
30	100%	1000	2,384,569,085	2,384,569,085	+0	1,487,909	761.8 Mbps	0	PASS
31	100%	1000	2,384,569,085	2,384,569,085	+0	1,487,909	761.8 Mbps	0	PASS
32	100%	1000	2,384,569,085	2,384,569,085	+0	1,487,909	761.8 Mbps	0	PASS

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



Transceivers (SFP+): 32 × LAN SFP+.

Per-Module Detail

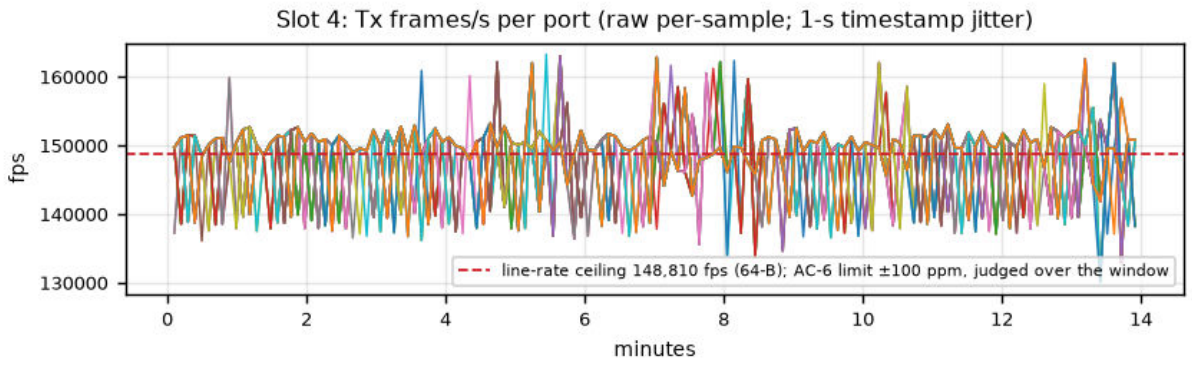
Slot 4: NOVUS10/1GE32S · S/N 538922 · 100M

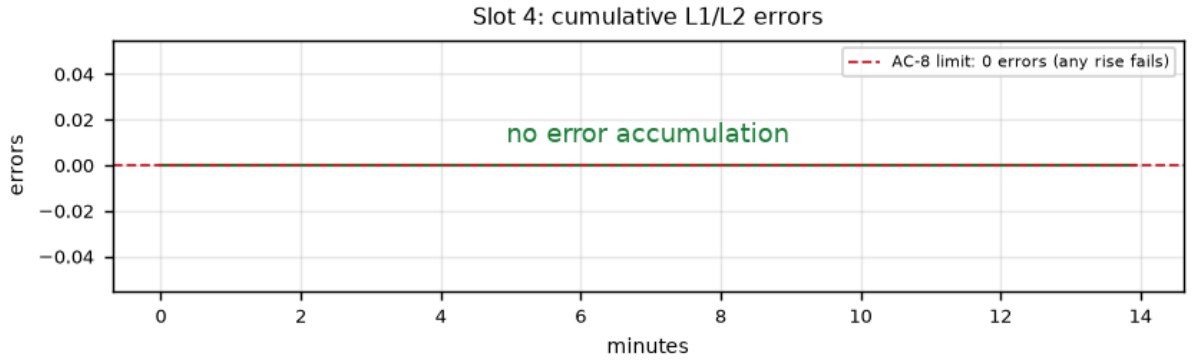
PASS

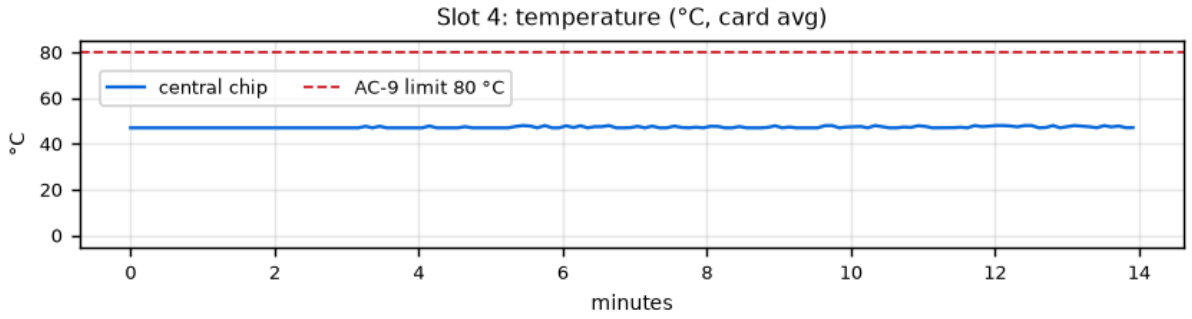
Per-port acceptance criteria	Measured	Result: PASS
AC-4 Link: up on every port in every sample; zero link-down transitions	32 of 32 ports up in 100% of samples with 0 transitions	PASS
AC-5 Line rate: negotiated speed equals the nominal port speed in every sample	32 of 32 ports at 100 Mbps	PASS
AC-7 Frame 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| 0 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%	100	124,201,290	124,201,290	+0	148,772	76.2 Mbps	0	PASS
2	100%	100	124,201,290	124,201,290	+0	148,772	76.2 Mbps	0	PASS
3	100%	100	124,201,290	124,201,290	+0	148,772	76.2 Mbps	0	PASS
4	100%	100	124,275,770	124,275,770	+0	148,861	76.2 Mbps	0	PASS
5	100%	100	124,275,770	124,275,770	+0	148,861	76.2 Mbps	0	PASS
6	100%	100	124,275,770	124,275,770	+0	148,861	76.2 Mbps	0	PASS
7	100%	100	124,275,770	124,275,770	+0	148,861	76.2 Mbps	0	PASS
8	100%	100	124,275,770	124,275,770	+0	148,861	76.2 Mbps	0	PASS
9	100%	100	124,275,770	124,275,770	+0	148,861	76.2 Mbps	0	PASS
10	100%	100	124,275,770	124,275,770	+0	148,861	76.2 Mbps	0	PASS
11	100%	100	124,275,770	124,275,770	+0	148,861	76.2 Mbps	0	PASS
12	100%	100	124,275,770	124,275,770	+0	148,861	76.2 Mbps	0	PASS
13	100%	100	124,275,770	124,275,770	+0	148,861	76.2 Mbps	0	PASS
14	100%	100	124,275,770	124,275,770	+0	148,861	76.2 Mbps	0	PASS
15	100%	100	124,275,770	124,275,770	+0	148,861	76.2 Mbps	0	PASS
16	100%	100	124,275,770	124,275,770	+0	148,861	76.2 Mbps	0	PASS
17	100%	100	124,201,423	124,201,423	+0	148,772	76.2 Mbps	0	PASS
18	100%	100	124,201,423	124,201,423	+0	148,772	76.2 Mbps	0	PASS
19	100%	100	124,201,423	124,201,423	+0	148,772	76.2 Mbps	0	PASS
20	100%	100	124,201,423	124,201,423	+0	148,772	76.2 Mbps	0	PASS
21	100%	100	124,201,423	124,201,423	+0	148,772	76.2 Mbps	0	PASS
22	100%	100	124,201,423	124,201,423	+0	148,772	76.2 Mbps	0	PASS
23	100%	100	124,201,423	124,201,423	+0	148,772	76.2 Mbps	0	PASS
24	100%	100	124,201,423	124,201,423	+0	148,772	76.2 Mbps	0	PASS
25	100%	100	124,201,423	124,201,423	+0	148,772	76.2 Mbps	0	PASS
26	100%	100	124,201,423	124,201,423	+0	148,772	76.2 Mbps	0	PASS
27	100%	100	124,201,423	124,201,423	+0	148,772	76.2 Mbps	0	PASS
28	100%	100	124,201,423	124,201,423	+0	148,772	76.2 Mbps	0	PASS
29	100%	100	124,201,423	124,201,423	+0	148,772	76.2 Mbps	0	PASS
30	100%	100	124,201,423	124,201,423	+0	148,772	76.2 Mbps	0	PASS
31	100%	100	124,201,423	124,201,423	+0	148,772	76.2 Mbps	0	PASS
32	100%	100	124,275,792	124,275,792	+0	148,861	76.2 Mbps	0	PASS

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







Transceivers (SFP+): 32 × LAN SFP+.



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Acceptance Criteria Summary

All ten acceptance criteria of ZC-TP-860-1410-07 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-860-1410-07 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	NOVUS10/1GE32S, 32 active of 32 enumerated ports, SN 538922 (label); EEPROM 538922; boot record SN 538922	**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 10GE test set; the 1GE and 100M test sets are functional tests of at least 10 min 00 s at line rate, judged on link, line speed, frame delivery, zero errors, temperature and stability, with the frame rate and the error-ratio bound stated and not judged	10GE: interval 5.9 s, window 2 h 18 min of 2 h 00 min module soak time, counters zeroed yes (counters cleared 11:16:19; window judged from 11:44:32, 28 min 13 s later: One capture recorded all three test sets of this unit. The logger started at 11:16:06 with no traffic on the card; line-rate traffic at 10GE was started and the statistics were cleared at 11:44:29; every error counter read zero at the window start); 1GE: interval 5.9 s, window 26 min 43 s of 10 min 00 s minimum window (functional test set), counters zeroed yes (counters cleared 11:16:19; window judged from 14:04:17, 2 h 48 min later: One capture recorded all three test sets of this unit. The operator set every port to 1000 Mbps in IxExplorer, cleared the statistics and started traffic at 14:04; every error counter read zero at the window start); 100M: interval 6.0 s, window 13 min 54 s of 10 min 00 s minimum window (functional test set), counters zeroed yes (counters cleared 11:16:19; window judged from 14:33:57, 3 h 18 min later: One capture recorded all three test sets of this unit. The operator set every port to 100 Mbps, SGMII, internal loopback in IxExplorer, cleared the statistics at 14:33:20 and started traffic; the window starts after the last link-state record of that setup, logged by IxServer at 14:33:52; every error counter read zero at the window start); 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	10GE: 44,576 of 44,576 port-samples up, 0 link-down transitions; 1GE: 8,672 of 8,672 port-samples up, 0 link-down transitions; 100M: 4,512 of 4,512 port-samples up (internal loopback), 0 link-down transitions	**PASS**
AC-5 Line rate: negotiated speed equals the nominal port speed in every sample	10GE: 10,000 Mbps in 44,576 of 44,576 port-samples; 1GE: 1,000 Mbps in 8,672 of 8,672 port-samples; 100M: 100 Mbps in 4,512 of 4,512 port-samples	**PASS**

Acceptance criteria (ZC-TP-860-1410-07 rev B)	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: -4 to +2 ppm vs 14,880,952 fps (least-squares over all samples, 95% uncertainty ±3.7 ppm); 1GE: -4 to +41 ppm vs 1,488,095 fps (least-squares over all samples, 95% uncertainty ±42.4 ppm); functional test set, stated and not judged; 100M: -53 to +109 ppm vs 148,810 fps (least-squares over all samples, 95% uncertainty ±114.8 ppm); functional test set, stated and not judged	**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	10GE: max |Tx−Rx| 1 frames per port; 1GE: max |Tx−Rx| 1 frames per port; 100M: max |Tx−Rx| 0 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	10GE: 0 errors / 29 counters; BER ≤ 3.6e-14 (target 2e-13, IEEE 802.3 cl.49/52); 1GE: 0 errors / 29 counters; BER ≤ 1.9e-12 (functional test set, bound stated and not judged); 100M: 0 errors / 29 counters; BER ≤ 3.6e-11 (functional test set, bound stated and not judged)	**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 46 °C, no over-temperature alarm; change over the window +0.0 °C (indication only); 1GE: max 48 °C, no over-temperature alarm; change over the window +0.0 °C (indication only); 100M: max 48 °C, no over-temperature alarm	**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	10GE: 0 card hardware events; 1GE: 0 card hardware events; 100M: 0 card hardware events	**PASS**

Demonstrated error bound for this unit: 10GE: zero errors over at least 8.27e+13 bits per port gives BER ≤ 3.6e-14 at 95% confidence, 28× tighter than the IEEE 802.3 cl.49/52 objective of 1e-12; 1GE: zero errors over at least 1.60e+12 bits per port gives BER ≤ 1.9e-12 at 95% confidence (functional test set, stated and not judged); 100M: zero errors over at least 8.35e+10 bits per port gives BER ≤ 3.6e-11 at 95% confidence (functional test set, stated and not judged) (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-538922 · issue 1, 2026-11-14
Tested to	ZC-TP-860-1410-07 rev B · assembly 860-1410-07
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	NOVUS10/1GE32S · Ixia Novus 10GE/1GE/100M 32-Port SFP+ · S/N 538922 · 10GE + 1GE + 100M
10GE window	2026-11-14 11:44:32 to 14:02:22 local (2 h 18 min), 1,393 samples
1GE window	2026-11-14 14:04:17 to 14:31:00 local (26 min 43 s), 271 samples
100M window	2026-11-14 14:33:57 to 14:47:51 local (13 min 54 s), 141 samples
Overall result	**PASS**

Tested by: Allen E. Hall

Title: President

Signature: 

Date: November 14, 2026