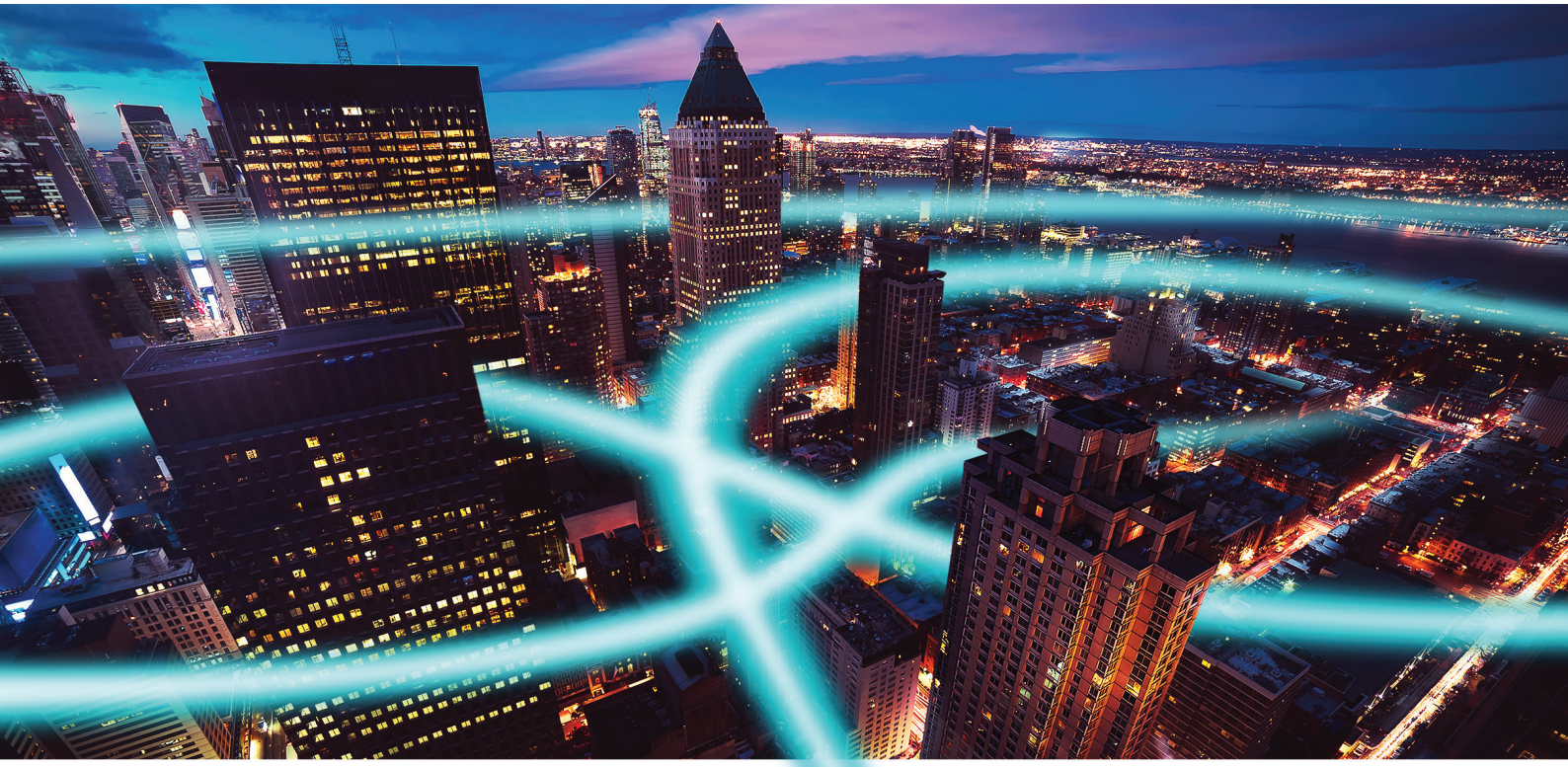
Calnex Paragon-neo

Calnex
Insight and Innovation

Solve the timing challenges of 5G



Supporting your changing environment

As the world prepares for 5G, the levels of synchronization accuracy and speed of data transfer required are increasing exponentially. In response, the ITU-T is enhancing the G.827x series of standards to cover next-generation accuracy requirements – to ensure that Ethernet systems are robust against varying transmission delays and other effects that can significantly disrupt the precise transfer of timing.

The Paragon-neo is the latest platform from Calnex, providing PTP and SyncE testing of speeds up to 100GbE. It's designed to meet the stringent test requirements of NEMs who are developing, verifying and manufacturing devices against enhanced timing standards such as for ITU-T G.8273.2 Class-C/D Boundary Clocks. And for those designing and deploying 5G networks and systems.

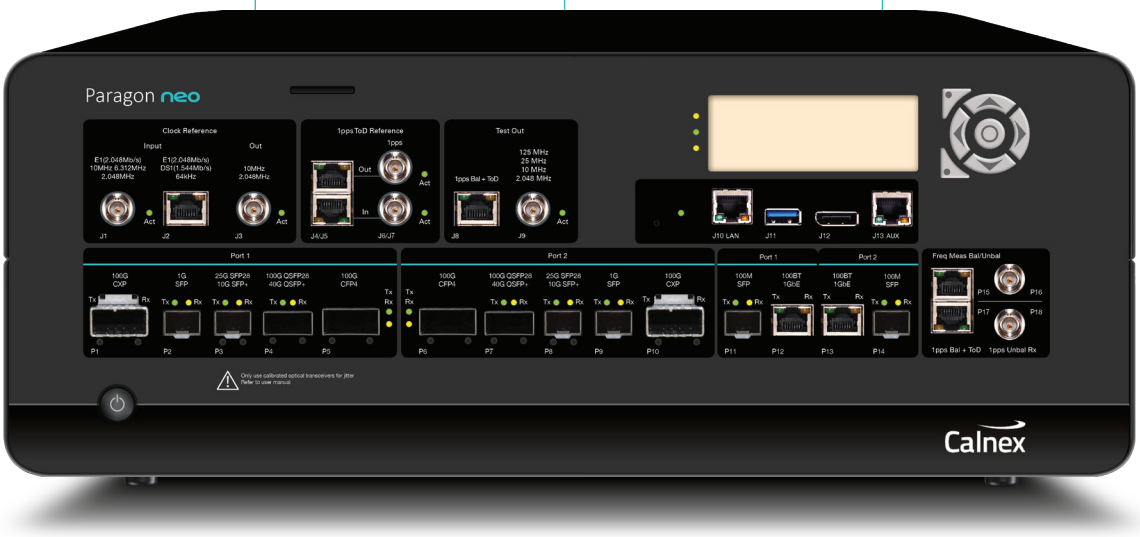
What's more, because high network efficiency and reduced data transmission costs are only possible with highly accurate timing, Paragon-neo offers hardware performance and software test methodologies allowing *sub-nanosecond accuracy* for the entire test system.

To meet the timing challenges of 5G deployments, Calnex is committed to providing the most advanced, precise and reliable test solutions to make sure your devices and systems deliver the high quality network services of the future. In a changing world, it's good to know that some things never change.

Analyse PTP conformance to standards-based or user-defined profiles, with automatic indication of pass/fail (and reason for non-compliance) and report generation.

Generate SyncE wander and jitter for ITU-T G.8262.1/G.8262 testing, simultaneously measure SyncE wander and PTP Time Error, and control ESMC message generation for testing to ITU-T G.8264.

Emulate PTP Master and Slave clocks to maximise accuracy and repeatability of PTP test, including specific test modes for various DUTs and automatic test selection for ITU-T standards conformance.

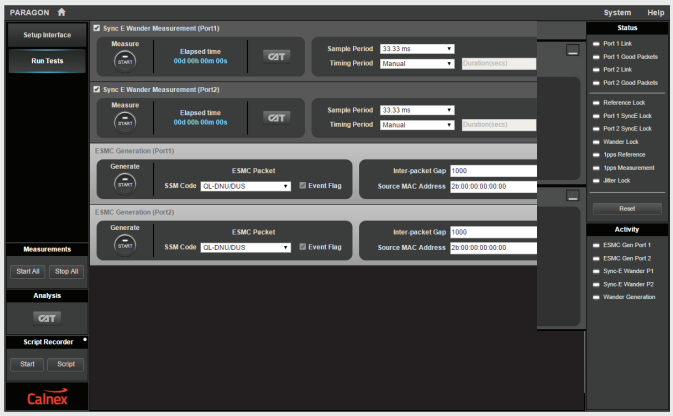


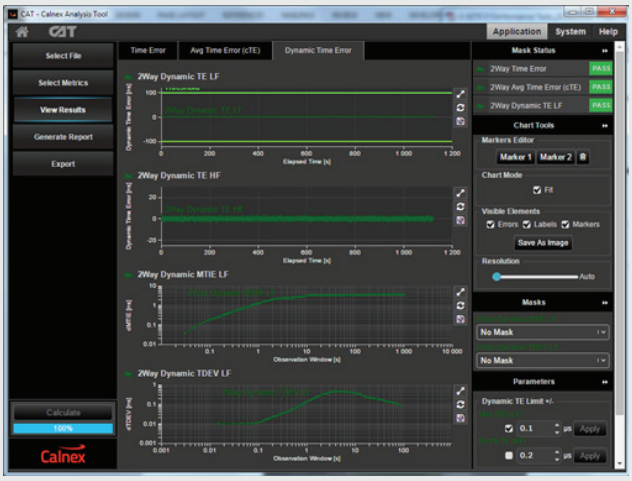
PTP Field Verifier (PFV)

- Analyze PTP protocol for conformance to standards or user-defined profiles.
- Automatic pass/fail indication – check captured PTP messages against a pre-defined set of rules, with clear pass/fail alerts.

Conformance Test Application

- Start testing in seconds – just two clicks to configure crucial standards-defined test sequences.
- Automatically generates PTP and ESMC messages, Time Error and SyncE impairments, and applies filters, metrics and masks.

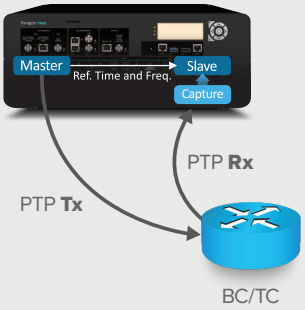




- Analyze the Time Error (TE) of, for example, Class-C/D T-Boundary Clocks or Class-B PRTC/Master Clocks.
- Apply standards-defined Time Error impairments.
- Combine with SyncE and ESMC for complex tests such as Phase Noise Response to SyncE Transient.

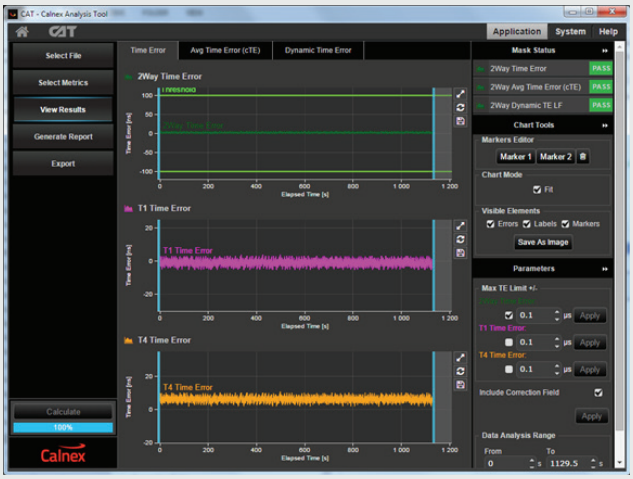
PTP Applications

Test hybrid devices simultaneously with PTP Time Error/ SyncE wander and measure output packet timing, recovered clocks and SyncE wander with unbeatable test accuracy and repeatability.



Application	Standard
Boundary Clock Testing	ITU-T G.8273.2
Transparent Clock Testing	ITU-T G.8273.2
Assisted Partial Timing Support Clock Testing	ITU-T G.8273.4
Master Clock Testing	ITU-T G.8272
Slave Clock Testing	ITU-T G.8273.2

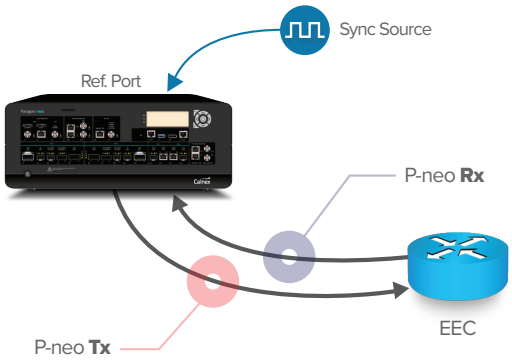
CAT



The Calnex Analysis Tool (CAT) provides powerful insight into network and device performance. All your measurement results are now in one place, and you can view multiple graphs simultaneously for easier correlation of your results. Plus, with enhanced graphics, it's easy to evaluate ITU-T metrics such as MTIE and TDEV against ITU-T masks.

SyncE Applications – ITU-T G.8262.1/G.8262 (Jitter and Wander)

The Paragon-neo supports full SyncE testing up to 100GbE to ITU-T G.8262.1/G.8262 including Wander Tolerance, Wander Transfer, Wander (Noise) generation, Pull-in, Hold-in and Pull-out ranges, Frequency Accuracy and Phase Transient, plus Jitter Tolerance and Jitter Generation.



Application	P-neo **Tx**	P-neo **Rx**
SyncE Jitter Generation	Jitter free	Measure Jitter
SyncE Jitter Tolerance	Apply Jitter	Check Test Packets
SyncE Wander (noise) Generation	Wander free	Measure Wander
SyncE Wander (noise) Tolerance	Apply Wander	Check ESMC
SyncE Wander (noise) Transfer	Apply Wander	Measure Wander
SyncE Short Term Phase Transient	Break line or set ESMC QL=DNU	SyncE TIE, MTIE

PTP Performance Summary

- Capture and decode PTP packets for analysis and Time Error testing.
- PTP Master/Slave emulation, plus the Paragon-neo's unique conformance test application, removes uncertainty and maximizes test repeatability – essential for validating new, high-accuracy 5G network devices.
- Automatic test of PTP profile compliance for simple and reliable verification against standards-based or user-defined profile configurations.

SyncE Performance Summary

- Prove SyncE wander performance to ITU-T G.8262.1/G.8262.
- Evaluate MTIE/TDEV pass/fail results to ITU-T G.8262.1/G.8262 masks.
- Check ESMC (SSM) messaging to ITU-T G.8264.
- Test SyncE jitter performance to ITU-T G.8262.1/G.8262.