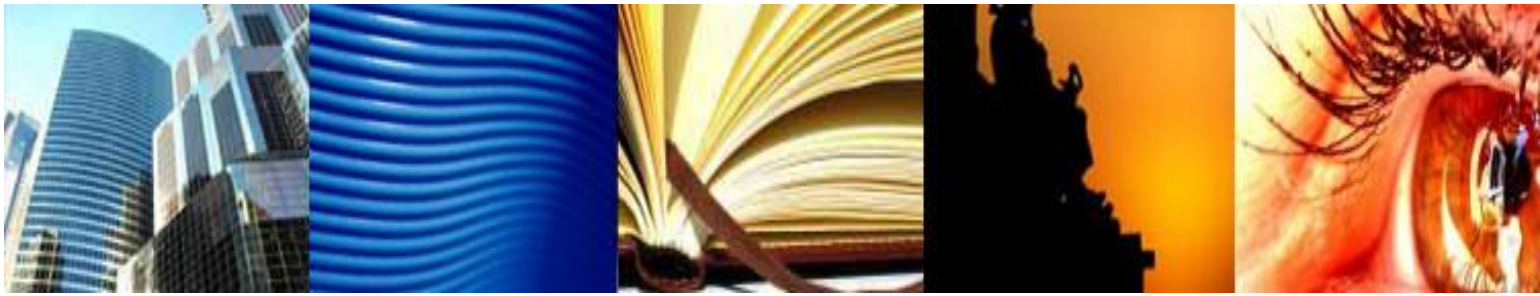
Net.Sync all-in-one



Net.Sync synchronization appliance that monitors timing quality

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the Path to Excellence

Net.Sync **all-in-one** appliance

Includes three sets of functionalities:

1. **PTP Master & Slave**: configurable as a PTP clock
2. **Time SLA assurance**: freq. and phase (wander) measurements
3. **Network testing**: advanced testing features at Ethernet/IP layer

Front pannel (1U)

- User interface
  - Display: OLED 256 x 64 pixels
  - LEDs: Power, System, Alarm, Clock
  - Keypad: Power, Up, Down, Left, Right, Page Up, Page Down, Esc
- Interfaces
  - Console: RJ45,
  - USB: upgrades, configuration, results, user files

Back pannel (1U)

- **Inputs**
  - Built-in GNSS receiver over SMA-F
  - Built-in quartz crystal OCXO
  - 1xPPS and 1xToD with NMEA format over RJ45 and BNC connectors
  - PTP and SyncE over 2xPort GbE
  - E1/T1, 1544 / 2048 kbit/s, 1544 / 2048 / 10 MHz over RJ45 and BNC
- **Outputs**
  - PTP and SyncE over 2xRJ45 and 2xSFP
  - E1, 2048 kbit/s, 2048 kHz over RJ45 and 2xBNC
  - T1, 1544 kbit/s, 1544 kHz over RJ45 and 2xBNC
  - 1 x PPS over RJ45

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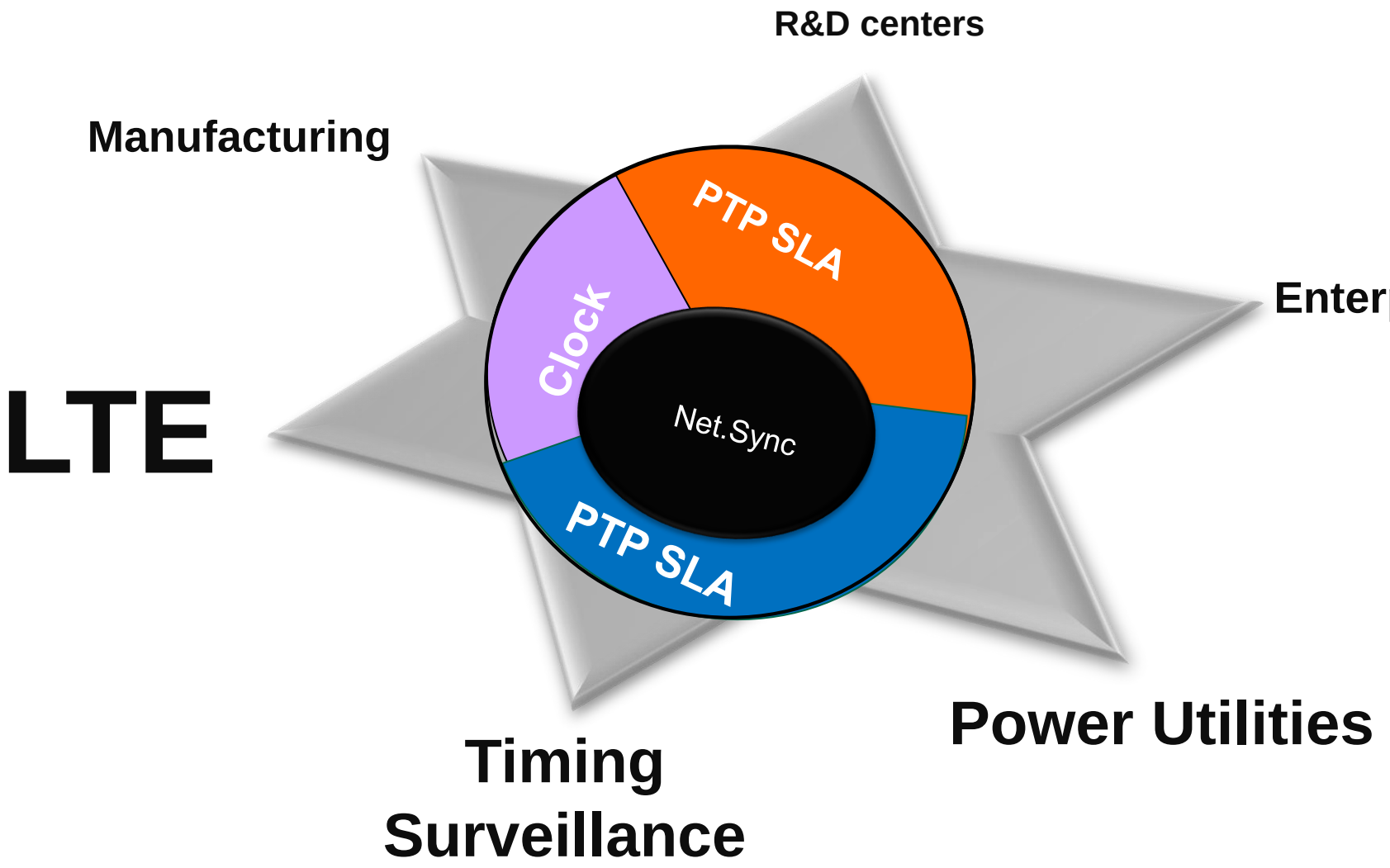
Heavy duty **PTP Synchonization** tool



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Ether**10**.Genius markets

Power

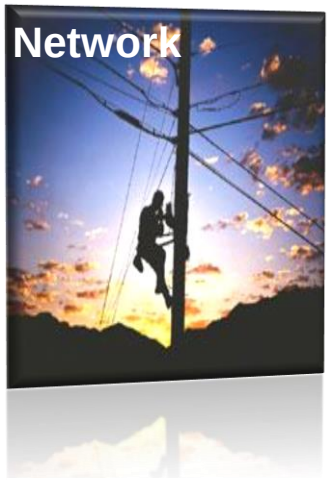
PTP Certification

Network Characterization

Synch Network Characterization

Measurement

Synchronization



PTP clocks

- Power Utilities
- Operators
- Installers
- Defense
- Enterprise
- Airports

PTP, SyncE

10GbE

backbone

Troubleshooting

PTP master/slave

Surveillance

Slave clock

Set up

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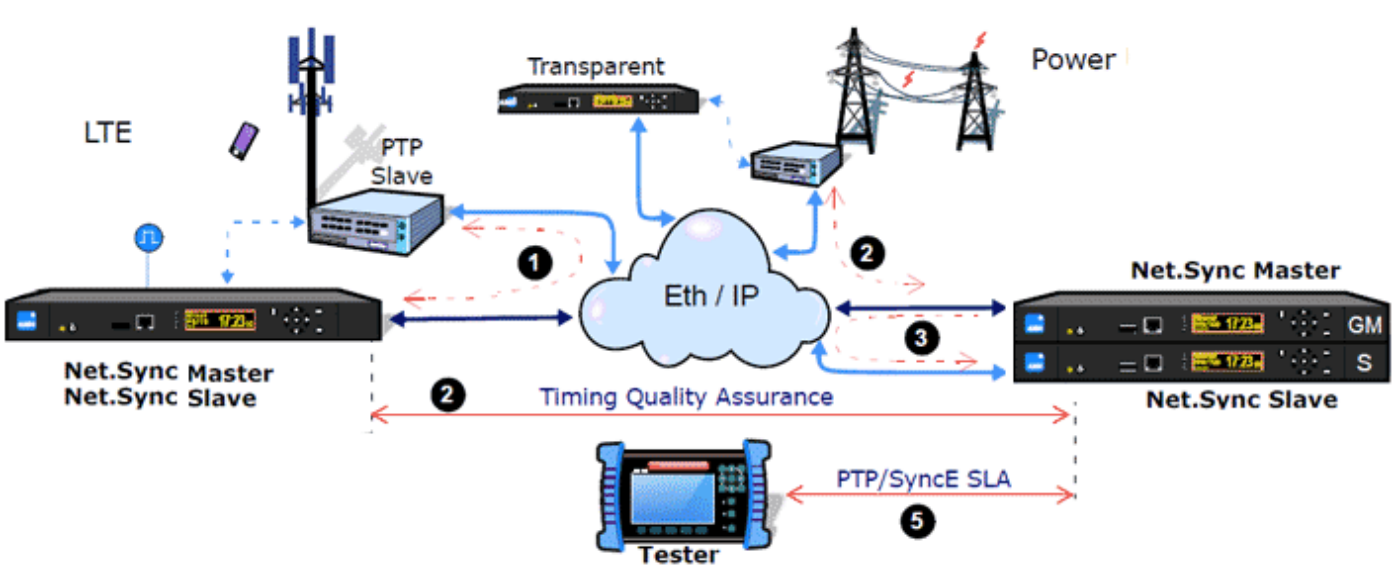
Syntonize accurately



- Installers and Telecom Operators of LTE
- Synchronize while measure the clock quality
- Migration from GPS or TDM to PTP
- PTP surveillance in Power Utility networks

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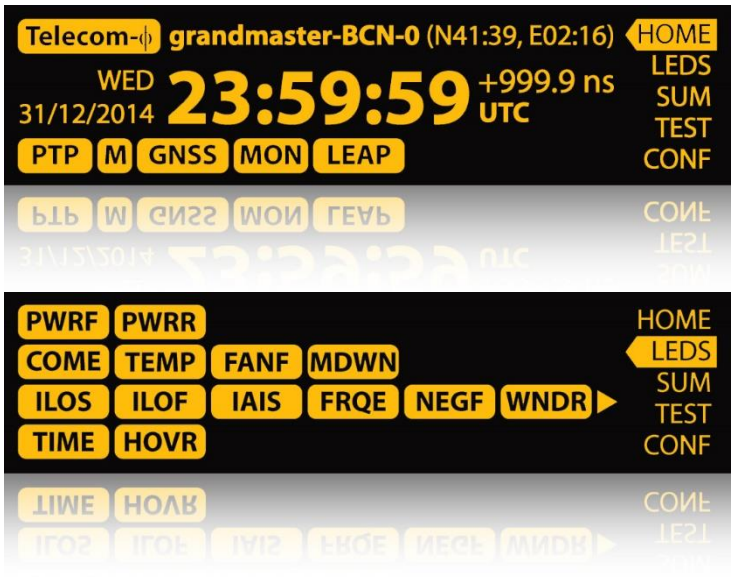
Rack interface



- Basic **Configuration** (i.e. IP address, Operation Mode, etc.)
- **Events** such as Errors and Alarms on LEDs and Screen
- Time **Reference** selection
- USB port for **upgrades** and **configuration** loading
- General **information** regarding timing

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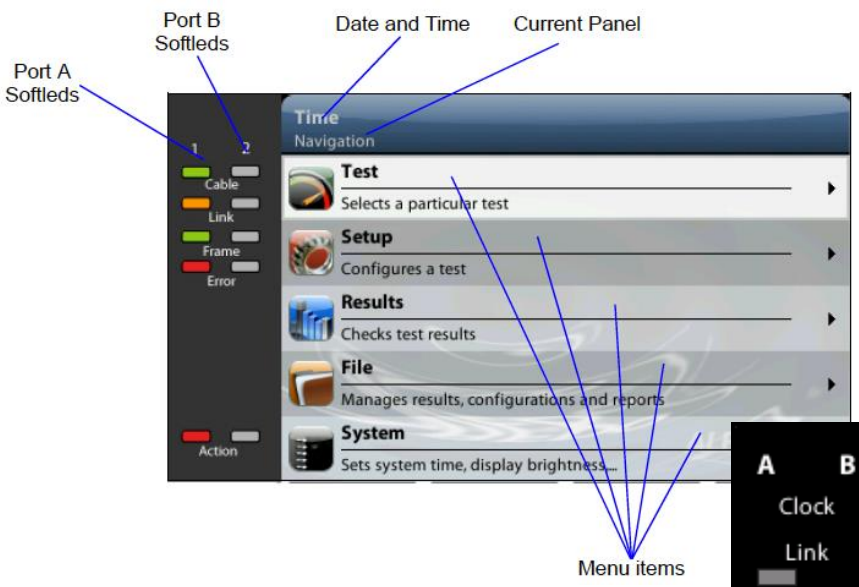
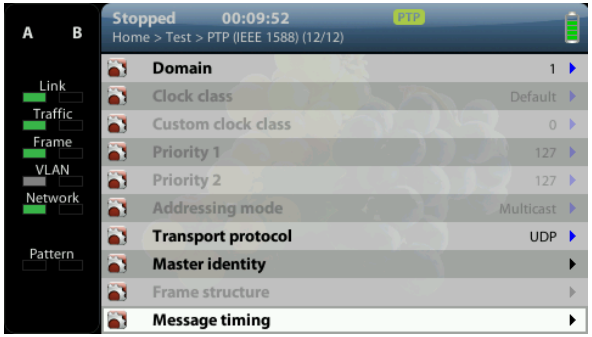
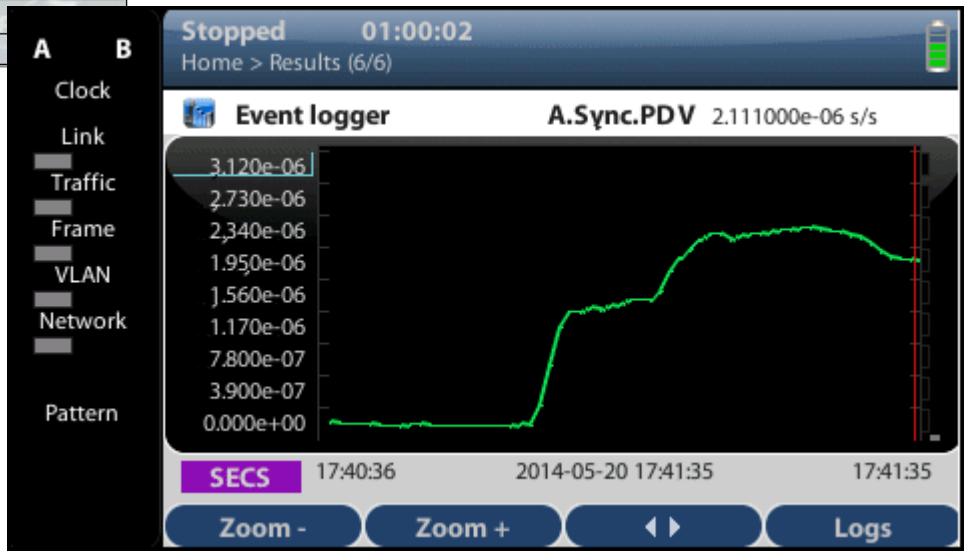
Net.Sync – Remote **GUI**

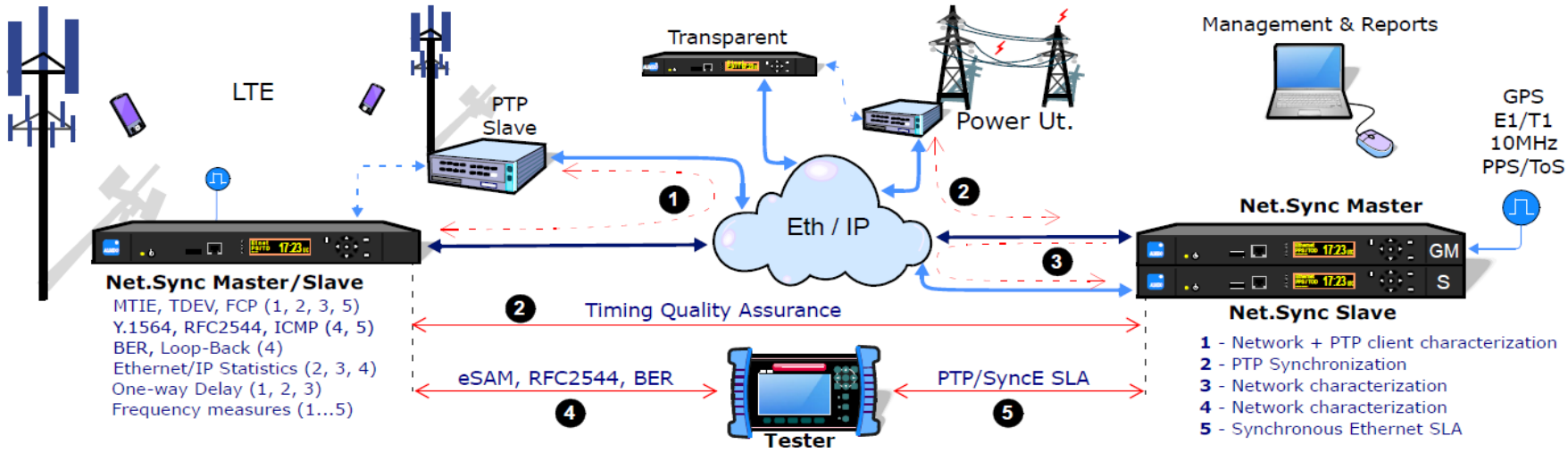






- Based on VNC

The value of **Innovation**



1. **Network and PTP client**. Characterization of network delay and delay variation measurements, timing accuracy at slave site.
2. **PTP Synchronization**. Multiple time references inc. GPS, BITS, SyncE for perfect master-slave packet stream generation.
3. **PTP Network**. Characterization by means of timing accuracy measurements and packet statistics.
4. **Transport layer**. Qualification and troubleshooting (performance and quality test suites.
5. **Synchronization SLA**. Permanent monitorization in terms of frequency and phase impairments control.

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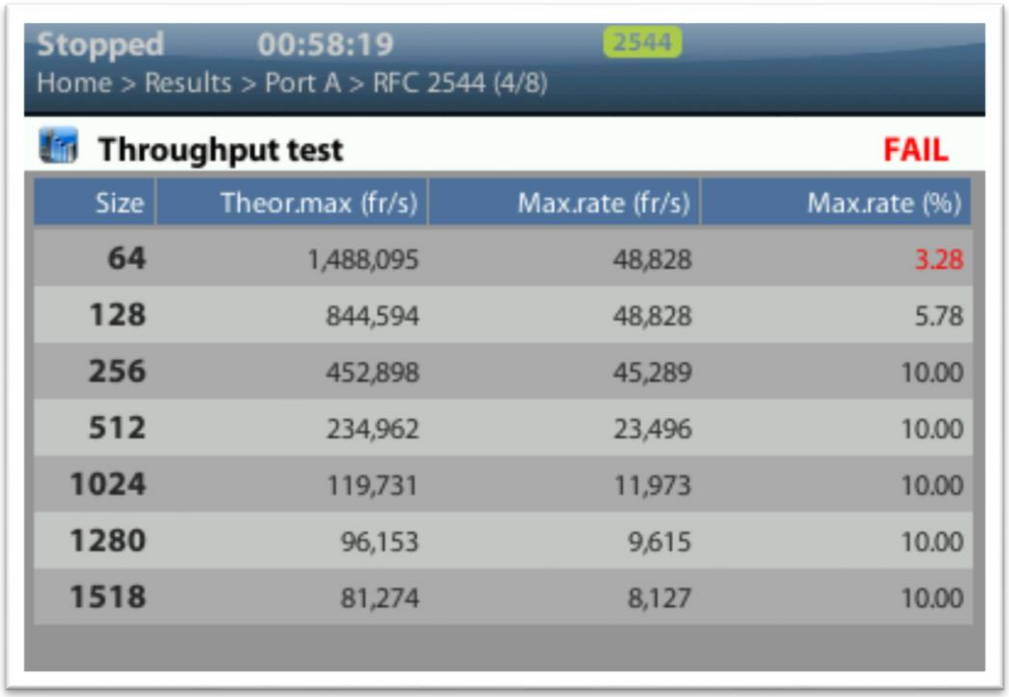
Transmission layer test

Compliant with latest standards for advanced services such as IPTV, VoIP or VoD:

- **Traffic Scan and Discovering**
  - Find selected flows
  - Monitor or execute test
  - No more difficult set up
- **Improved RFC 2544**
  - throughput,
  - frame-loss,
  - latency,
  - back-to-back
  - recovery time tests
- **ITU-T Y.1564**
  - Service Configuration
  - Service Conformance



Size	Theor.max (fr/s)	Max.rate (fr/s)	Max.rate (%)
64	1,488,095	48,828	3.28
128	844,594	48,828	5.78
256	452,898	45,289	10.00
512	234,962	23,496	10.00
1024	119,731	11,973	10.00
1280	96,153	9,615	10.00
1518	81,274	8,127	10.00

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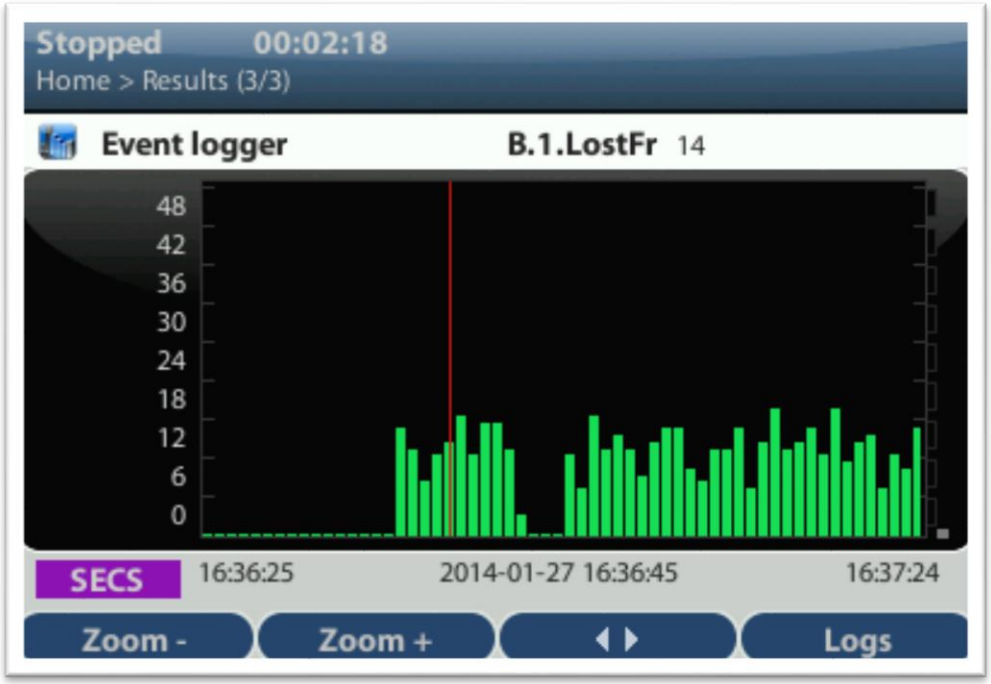
Synchronous Ethernet functionalities



- SyncE Analysis: Line frequency, offset, drift
- Wander TIE / MTIE / TDEV (ITU-T O.172)
- Wander generation, QL in SSM decoding (G.781)
- Asymmetric Delay Analysis: Two-way delay measurement
- One-way delay measurement (Assisted by GNSS)

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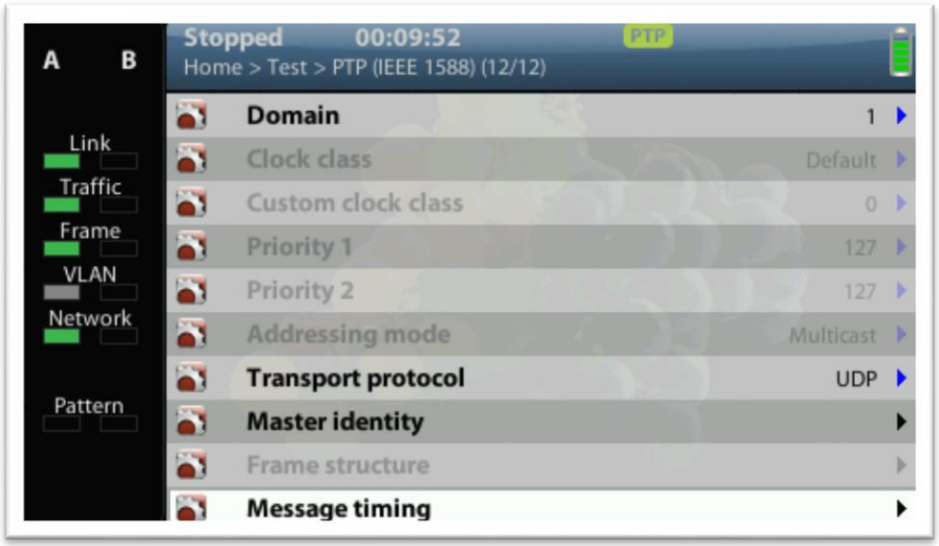
Precision Time Protocol (PTP-1588v2) support



- Generation / Decoding of PTP
- Master / Slave / Transparent
  - Protocol state, Port state, best master, identity,
  - BMC priorities, clock class, accuracy, clock variance, time source
- PTP Counts & statistics
  - Sync, Delay req, Delay resp, Peer delay req, Peer delay res,
  - Follow up, Peer delay res. follow up, Announce
- PTP Sync Floor Delay Population: FPC, FPR, FPP
- PTP wander Analysis / Generation: TIE, MTIE, TDEV

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Accuracy PTP / SyncE / E1

- Wander
  - Wander Measurement and Generation
  - TIE, MTIE, and TDEV
  - Wander results from 20 to 100 000s

- Timing accuracy
  - Locked to GPS: timestamp ± 100 ns
  - Holdover PPS to OCXO: <±1.5ms then 1h; Freq.<16 ppb 1month
  - Holdover PPS to Rubidium: <±1.5ms then 24h; Freq.<16 ppb 5year

Why Where Net.Sync ?

- Grand Master PTP clock
- GNSS Receiver and PRTC
- Synchronization from input ref. to timing output
- Service activation
- Synchronization roll-out
- Synchronization SLA monitoring and maintenance
- SyncE deployment

That's all

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