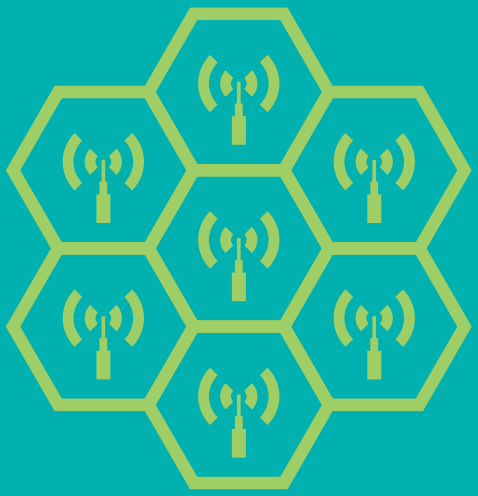
Triton

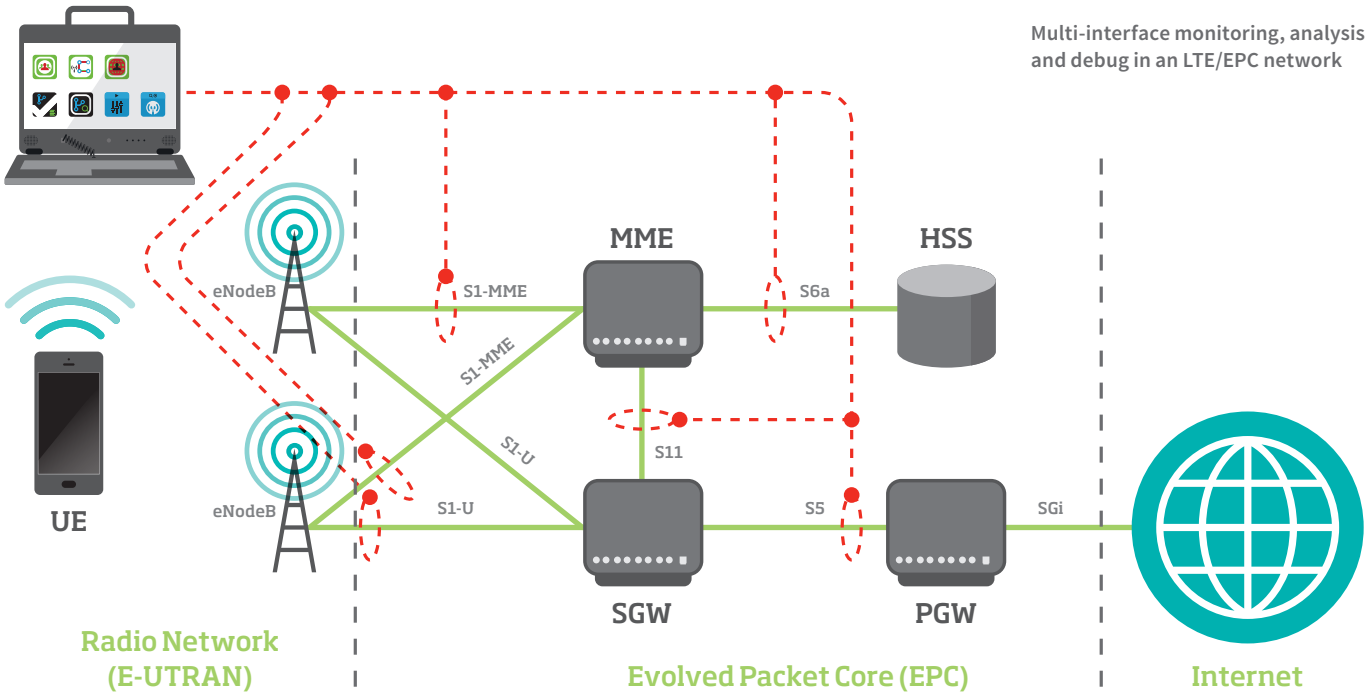
Multi-purpose LTE wireless core networking testing tool



Anite

Triton

As the only multi-purpose LTE wireless core networking testing solution available on the market today, Triton enables users to quickly and efficiently diagnose core network issues and validate detailed network performance. Mobile operators and network equipment manufacturers use Triton for network signalling and data performance verification, benefiting from its superior graphical interface, ease of use and portability.



Multi-purpose tool on a single platform

Unique in the market, Triton is a single tool which supports multiple applications including SRP (Survey Record Play), network discovery, roaming analysis, cell visualisation and device tracking. It also enables mobile operators to verify the interoperability of multi-vendor components. Significant cost-savings can be made as only one tool is required for a wide range of testing requirements. Its versatile nature makes it suitable for both R&D environments and tactical field testing situations.

4x10 GbE data capture capacity for more accurate analysis

Triton addresses the exponential growth in data traffic and signalling in LTE networks by offering a greater data capture capacity (4x10 GbE) than any other solution available on the market. This enables a more comprehensive analysis. Its hardware filtering capability enables the user to auto-detect and filter traffic in real-time, extracting only the data of interest for capture and storage. Hardware-based traffic filtering reduces the record data rate by discarding user specified nonessential traffic, ensuring that all of the required data is captured.

Simple to use applications with touch-screen functionality

As LTE networks grow in complexity, mobile operators will increasingly rely on more rigorous testing to verify expected performance in the core network. Triton is preloaded with a suite of application packages that the user simply launches from a home screen. With an intuitive touch screen enabled graphical interface, integrated help guides and minimal configuration, Triton simplifies and accelerates execution better than any other core network testing solution.

A highly portable tool, Triton enables users to easily bring a comprehensive range of capabilities to any location for rapid and accurate issue resolution. Triton doesn't require any prior knowledge of network topology and offers automatic survey capability. Network traffic is surveyed, identified, filtered, recorded and analysed in real-time, and can be instantly played out to re-create the original traffic conditions. This means test equipment for R&D, interoperability and live production network use can be substantially optimised.

Compatible with popular open-source tools

Ease of use and cost-efficiency is further improved as Triton offers open-source compatibility with industry standard tools (e.g. Wireshark™) to validate the performance of products in both R&D and production phases, thereby maximising the usage of preferred tools and minimising training.

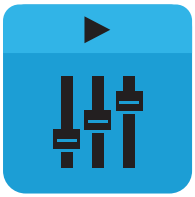
Key use cases

Triton is a multi-purpose tool that can be used to diagnose a problem at any location, in an R&D environment, test network or live field network, and then re-used if required at a different site. Triton has been designed by engineers who understand how valuable and timesaving a flexible, multi-purpose test tool with a simplified, intuitive user interface can be when installing, debugging and testing networks. Key use cases include:

- Filter, record and analyse traffic from 4x10GbE
  - Playback traffic recorded from a live network in an R&D environment
  - Offline analysis of recorded traffic and export to pcap compatible tools
- Tactical field testing and analysis of LTE traffic
- R&D and test network evaluation
  - LTE control plane (Diameter) troubleshooting, multi-vendor interoperability
  - Compare EPC node performance
  - KPI monitoring – real-time monitoring of network performance and generation of alerts
  - LTE roaming analysis and validation
  - Verify interoperability of multi-vendor components
- Telecom site survey prior to equipment installation
  - Network topology mapping and validation
- IP throughput and routing validation
- Layer 1 connectivity and integrity check

Applications accessible from the home screen

Subscriber Tracker



Playback

LTE Network Monitor

L2-4 Network Validation

LTE Roaming Analysis

L1 PRBS Tester

Survey and Record

Applications at a glance

Triton includes multiple applications that the user launches from a home screen. Each application enables traffic analysis or playback or both, to assist with test and validation of either a live or R&D LTE/EPC network.

APPLICATION	ENABLES YOU TO	DETAILS
LTE Subscriber Tracker	Detect and analyse control plane traffic for one or more devices across all monitored interfaces.	Quickly identify and validate control plane traffic for a single subscriber through the EPC. Manual searching through log files is not necessary.
LTE Network Monitor	Auto-detect connected network nodes and interfaces. Analyse traffic by node or interface. Analyse tracking areas and cells. Set and monitor KPIs.	Rapidly see the overall health including throughput and failures of the EPC. No prior knowledge of the network configuration is required; the Triton learns the network configuration and topology from monitored traffic. Quickly compare the performance of similar EPC nodes and identify issues before they impact subscriber experience.
LTE Roaming Analysis	Verify roaming patterns against expected behaviour for revenue assurance and fraud detection. Analyse roaming traffic to map inbound and outbound roamers. Quickly filter and understand where roaming traffic is sourced, detect where roamers are being steered.	Map roamers on a world map and colour code countries based on volume enabling quick validation of actual against expected roamer behaviour. Country, network and time zone search allows deeper investigation of behaviour without the need to analyse complex log files.
LTE Telecom Survey and Record	Survey a passive monitoring point and display visible protocols and network elements.	The red/green traffic light system displays which protocols are visible on the connected monitoring point, confirming that the Triton is connected to the correct part of the network and that the network is correctly configured for required monitoring and analysis. When at a remote and unfamiliar field site, an engineer can quickly understand a network's configuration and complete the assigned analysis eliminating the need for debugging network connectivity.
Playback	Play out pre-recorded captured traffic files (pcap).	Enables recreation of a live network in the lab for regression testing, either for pre-interoperability or conformance testing. Traffic previously captured and optionally filtered on the Triton or obtained from imported pcap files is played out from multiple 10Gb ports.
Layer 2 to Layer 4	Check packet throughput and routing behaviour of network infrastructure.	The wizard format allows users to quickly model traffic to be injected into a network at defined rates and payloads.
Layer 1	Check optical cable integrity (loopback) or connect to remote Triton.	Allows an engineer to ensure that the optical cable connecting Triton to the test network or remote test system is functioning correctly, eliminating the need for debugging optical fibre connectivity and a separate layer 1 tester.

Applications - Technical specifications

Each Triton application includes the following key features and capabilities. Anite's maintenance service provides software updates and enhancements that may add to these capabilities as well as adding new applications. Please get in touch to discuss your specific requirements.

Subscriber Tracker application
– control plane messaging extracted for one MSISDN

Subscriber Tracker

Used for analysis and debug of control plane traffic (AAA, handover, location). Auto-configures by surveying network traffic then presents discovered topology as an annotated network diagram. User can search for, inspect and compare individual UE activity and present as message flow diagram.

- 3GPP Interfaces: S1-MME, S11, S6a
- Protocols: Diameter, S1-AP, NAS, GTP-C v2
- Available on 2 interfaces simultaneously S6a MME-HS decode according to 3GPP 129.272
- Provision of 16 MSISDN tracking identities
- Discover up to 16 MSISDN from captured data
- View activity of 16 subscribers simultaneously, display up to 500 transactions per subscriber
- Store and analyse up to 1-month of historical data
- Control plane signalling, typically 0.5% of each 10Gb/s monitoring channel

LTE Network Monitor

Provides an overall view of LTE/EPC network health by analysis of network performance, average transaction counts and failure rates.

- 3GPP Interfaces: S1-MME, S11, S6a
- Protocols: Diameter, S1-AP, NAS, GTP-C v2
- Available on 4 interfaces simultaneously
- Pre-loaded reports include:
  - S1-MME Average context setup, transaction counts, transaction failure vs success
  - S11 Create session performance, total transactions, transaction failure vs success
  - S6a Total transactions, transaction failure vs success
- Aggregated data store enables storage of multiples of years of data:

  - **Last minute:** 60-data points (per second)
  - **Last hour:** 60-data points (per minute)
  - **Last day:** 24-data points (per hour)
  - **Last month:** 31-data points (per day)
  - **Last year:** 12-data points (per month)
  - **Greater than 1 year:** Statistics for each year
- Statistics can be exported (i.e. every hour) to maintain granularity of information
- Total storage available 1.2TByte

Survey and Record

Used to quickly identify telecom control plane traffic present at a monitoring point (survey). User can select and filter individual protocols for recording to pcap files. These can be played back either into a live network or at a R&D lab for regression testing using the Playback application.

- 3GPP Interfaces: S1-MME, S5, S8, S11 AoIP, IuCS, IuPS, Diameter (S6a, S6d)
- Protocols: ISUP, MEGACO, GTP-Cv0, GTP-Cv1, GTP-Cv2, RTP, S1AP, SIP, Diameter
- Available on 2 interfaces simultaneously
- Survey identifies and maps up to 1024 network nodes
- Store and analyse control and user session content, up to 1.2TByte
- Maximum file size for replay 1.2TByte

Playback

Used to playback pcap traffic previously captured by Anite Triton or from a user provided file. Hardware timing control ensures accurate transmission and synchronisation between multiple ports to ensure traffic is recreated correctly.

- Replay at recorded rate
- Accurate hardware controlled timing of packet transmission
- Playback on multiple ports time sychronised
- Maximum file size for replay 1.2TByte

L1 PRBS

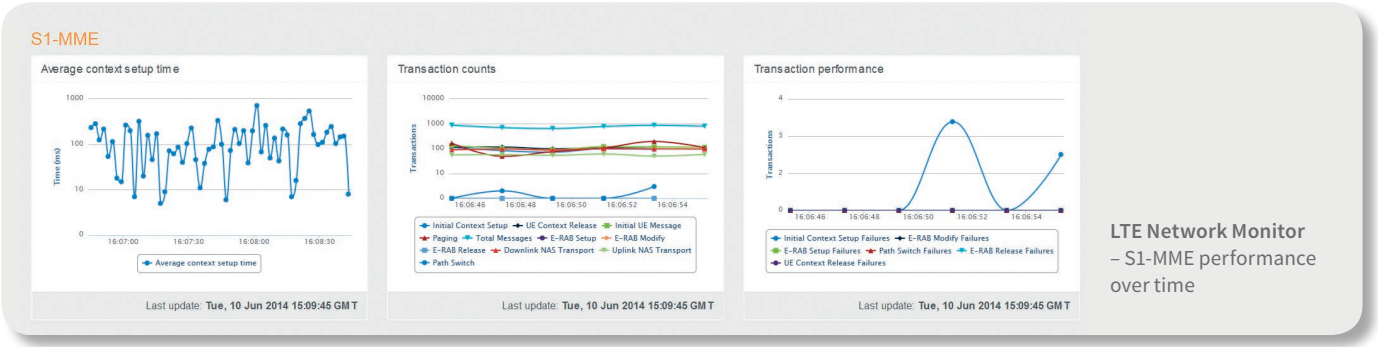
Validate layer 1 optical connectivity and integrity.

- Available on 4 interfaces simultaneously
- Raw 10Gb/s PRBS 9, 11, 15, 20, 23, 31
- Calculates error rates on receive

L2-4 Tester

Used for validating IP network routing configuration and throughput capability.

- Available on 2 ports looped back through the network under test
- OR 2 ports routed to a second Triton through the network under test
- Frame payload user configurable 30 to 1480 bytes
- Frame rate defined by payload and inter-frame gap



LTE Network Monitor
– S1-MME performance over time

Platform information

Triton is a hand portable test platform for LTE/EPC monitoring, analysis, record and playback. All units are provided with a wheeled case for light transport. A reinforced flight case (purchasable separately) is suitable for shipping units to international sites. A separate bench top adaptor is available to convert from 1Gb Ethernet (RJ45 style) to 10GbE (LC optical fibre) allowing Triton to connect to 1Gb Ethernet monitoring points.

Interfaces: 4 x 10GbE

- SFP+ optical transceiver 850nm (LC-connector)
- Hardware filtering on all four 10Gb/s interfaces
- 5ns timestamp accuracy

Integrated Capture Storage

- 1.2TB SSD for capture
- pcap format
- Typical 8Gb/s capture
- Separate storage for system and applications

Screen and Controls

- 17.9”, 16:9 wide touchscreen display
- Integrated 104 key keyboard/touchpad

Power Supply

- 600W 110-220 VAC 60Hz
- Mains cables included: UK, Central Europe, USA

Environmental

- 5 to 35°C (Operating)

Weight and Dimensions

- 17.5/12.35 Kg (packed/unpacked)
- 51 x 46.5 x 38 cm (packed)
- 43.2 x 36.5 x 19.5cm (unpacked)

Certification

- ETSI EN 300 386 v1.6.1(2012-04)
- EN 60950-1 First Edition 2006/A12: 2011

Bench Top Converter

- 3 x 1GbE RJ45 inputs
- 1 x 10GbE SFP+ optical transceiver 850nm (LC-connector)
- Power Supply 60W 110-220 VAC 60Hz
- Mains cables included: UK, Central Europe, USA
- Weight 2.8 lbs or 1.27 kg
- Dimensions 19.6 x 4.4 x 20.4cm

Reinforced Flight Case

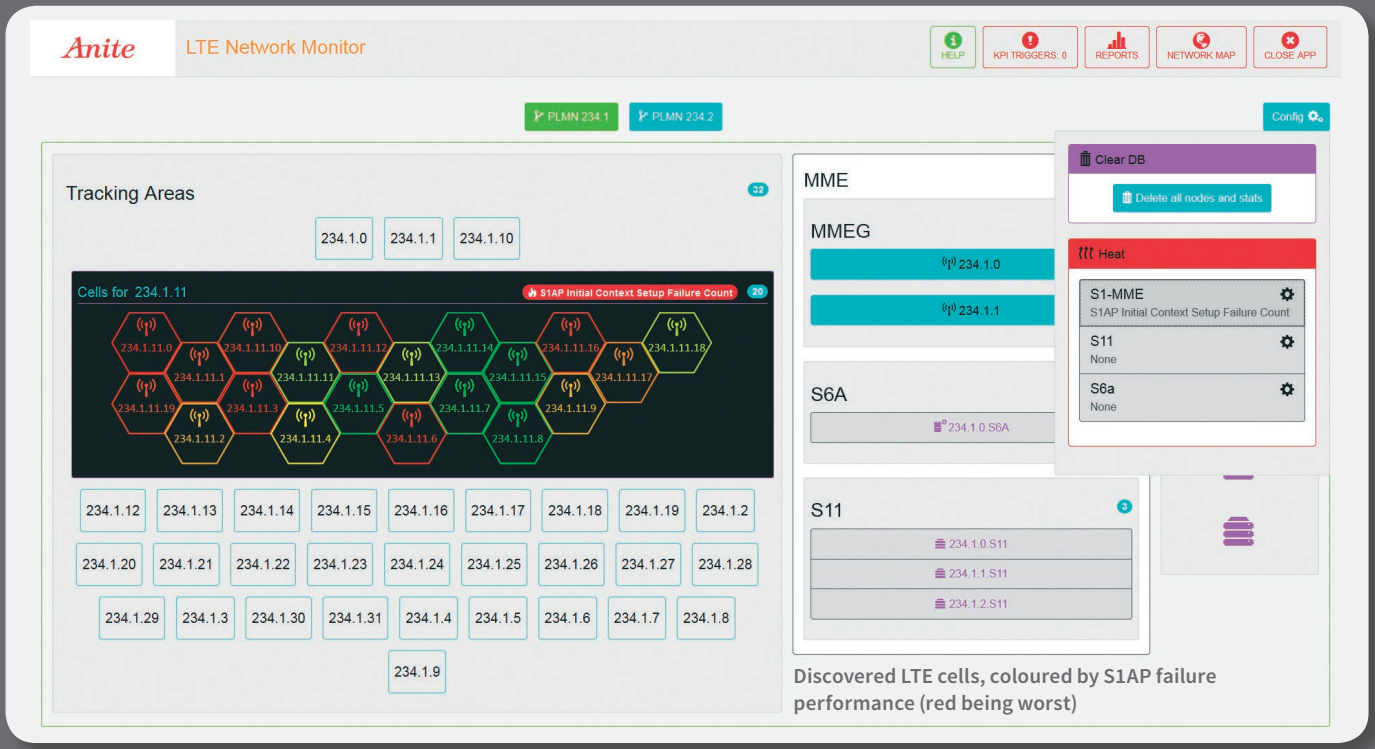
- Dimensions 52 x 52 x 48.9cm
- Weight empty 13.5Kg
- Pre-installed wheel plates with removable castors
- Built in tow handle Certification: IP67, STANAG 4280

Bench Top Convertor

Triton

Triton enables mobile operators and network equipment manufacturers to address growing Quality of Experience testing requirements in an increasingly complex LTE core network. A hand portable test tool for 4th Generation EPC networks (LTE core), Triton passively monitors the EPC interfaces by connecting through a 10GbE (or multiple) aggregated optical link. Triton includes 4 x 10GbE interfaces for line-rate capture and is ruggedized for all types of laboratory (R&D and interoperability) and field (live production network) use.

- Quickly diagnose subscriber experience issues in LTE networks
- Capture real network traffic from high data rate interfaces for lab simulation
- Independently analyse network performance and highlight poorly performing network entities
- Map network configuration with no prior knowledge



Discovered LTE cells, coloured by S1AP failure performance (red being worst)

Contact the team

talk +44 (0)1252 775 200
read anite.com
write wireless@anite.com

Anite