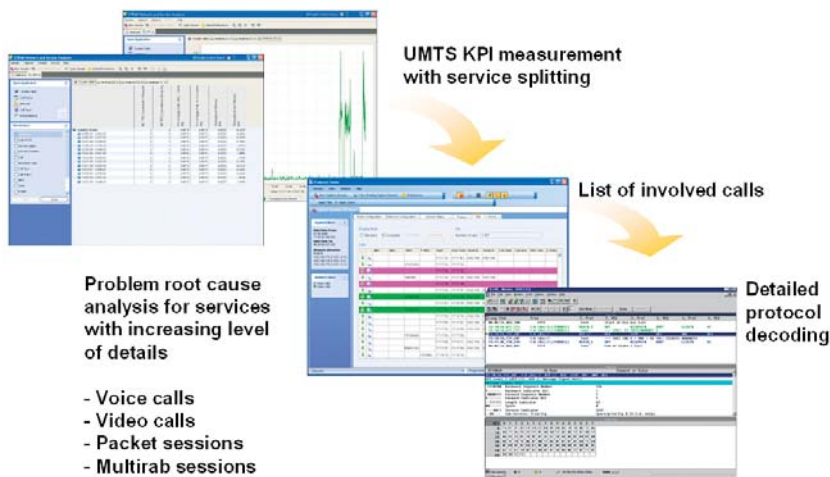


UTRAN Network and Service Analyzer

► Troubleshooting and Optimization Solution for 3G Networks and Service



► Troubleshooting from the symptom down to the root cause.

The UTRAN Network and Service Analyzer is a suite of software applications for troubleshooting and optimization of 3G networks and services. It is designed to support the K18 and K15 platforms. The UTRAN Network and Service Analyzer enables 3G Mobile Network Operators and Equipment Manufacturers to identify the root cause of poor quality of 3G services by mapping 3G service problems into the underlying UTRAN network problems.

Breakthrough Solution for Troubleshooting and Optimization of 3G Mobile Networks and Services

The UTRAN Network and Service Analyzer is a suite of real-time and offline software applications for troubleshooting and optimization of 3G networks and services supporting the K18 and K15 platforms and running on a Windows XP-based PC.

The K18/K15 platform performs real-time capture under heavy load from UTRAN STM-1/OC-3 or GbE interfaces, hardware filtering (e.g., control plane/user plane, VPI/VCI) and first-level hardware processing. The PC performs application measurements and acts as a data archive server. Communication between the K18/K15 platform and the PC is achieved via 100Base-T Fast Ethernet standard infrastructure.

► Features & Benefits

Automatic UTRAN Topology Discovery – Provides a Graphical Map of the Network Reducing the Overhead Time Needed to Understand the Configuration of the Environment Under Test.

Automatic UTRAN Instrument Configuration – Provides Automatic Configuration of All Necessary Parameters to Monitor the UTRAN, Reducing the Overhead Time to Set-up Test Equipment to a Few Minutes

UTRAN Multi-interface Call Trace – For Tracing Subscribers' Calls/Sessions as They Travel Across the Network, Including Both Control Plane and User Plane Analysis, Enabling Fast and Easy Identification of Network Problems and 3G Service Quality Degradation from the Symptom Down to the Root Cause

UTRAN Key Performance Indicators – For UTRAN and 3G Mobile Services Performance Evaluation to Improve Customer-perceived Quality of Service and Reduce Customer Churn

Cell Overlapping Matrix – Calculates Detailed Interference Measurements and Cell Neighbor Relation, Reducing the Need for Expensive Drive Test Campaign by Using Passive lub Monitoring Equipment

Multi-user Operation – Increases Work Productivity by Reducing Waiting Time to Access Test and Measurement Equipment

Hardware Filters – Filters Out Unnecessary Data While Monitoring UTRAN Interfaces to Increase the Measurement Device Performance

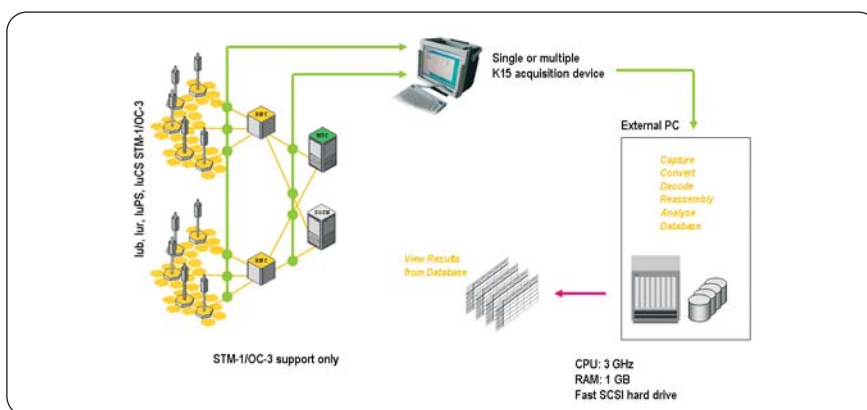
NSA Supports W-CDMA (FDD)- and TD-SCDMA (TDD)-based Implementations Based on STM-1 or Gigabit Ethernet (UTRAN-IP) Environments

► Applications

The UTRAN Network and Service Analyzer Suite Is for UMTS Mobile Network Operators' Operation and for Maintenance Technicians to Perform Effective Troubleshooting of Live or Trial Networks Under Significant Traffic Load Conditions Within Affordable Time and Cost Limits

For UMTS Mobile Network Operators' UTRAN Optimization Technicians to Maintain Proper UTRAN Optimization to Guarantee High Quality of Service

For UMTS Equipment Manufacturers' Test Engineers to Perform Efficient Troubleshooting During Load, Stress, Duration and Acceptance Tests of Network Elements in Labs or Trial Networks

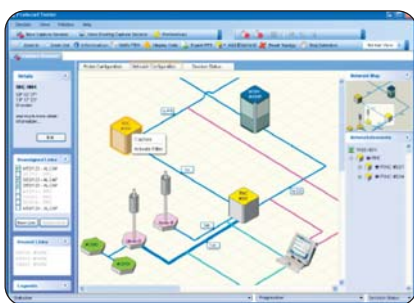


UTRAN Network and Service Analyzer

► Troubleshooting and Optimization Solution for 3G Networks and Services

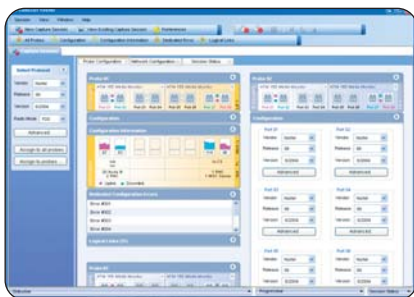
Automatic UTRAN Topology Discovery

A real-time expert software application provides a graphical map of the network topology being monitored by the instrument. Network elements (e.g., cell, NodeB, RNC, SGSN, MSC), logical interfaces (e.g., Iub, Iur, Iu-PS, Iu-CS) and logical links (e.g., control plane channels, user plane channels), are displayed in a graphical environment that represents the starting point for an analysis session.



Automatic UTRAN Instrument Configuration

An expert software application provides automatic configuration of all the necessary parameters to monitor the UTRAN Iub, Iur, Iu-PS, Iu-CS interfaces just by listening to live or simulated traffic, reducing the overhead time to set up test equipment to a few minutes. Both control plane and user plane channels are automatically detected and configured, enabling the user to focus on measurement activities rather than spend time on instrument configuration.

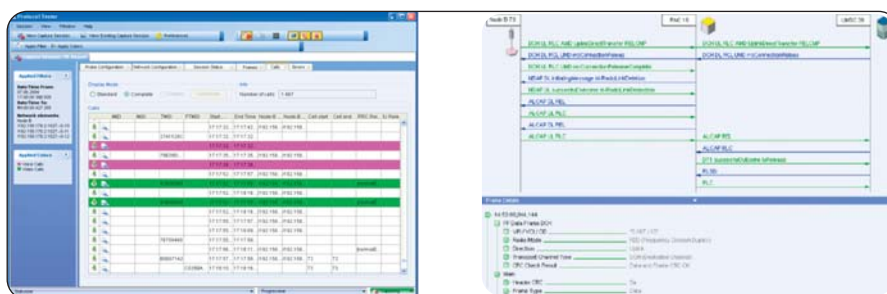


UTRAN Multi-interface Call Trace

A software application for UTRAN Iub, Iu-PS and Iu-CS interfaces allows users to trace subscribers' calls both in real time and offline as they travel across the network over multiple interfaces, over several network elements, including both control plane and user plane analysis, enabling fast and easy identification of network problems and 3G service quality degradation from the symptom down to the root cause.

The GUI allows drill-down troubleshooting from the problem symptom to the root cause with just a mouse-click and features three windows: the "call overview window," the "message sequence chart" and the "detailed monitored window."

In the "overview window," each line represents a call with its most important attributes. The call detail record (CDR) contains summary information about the call (e.g., start and stop time, call status, call type (voice, video or data), NBAP, RRC, NAS, RNSAP release cause, IMSI, TMSI, P-TMSI, IMEI, MSISDN, Calling Party Number and Called Party Number, Cell ID, NodeB ID, RNC ID, S-RNC ID, D-RNC ID, SGSN ID, MSC ID).



Different color codes can be attributed to calls depending on the content of the fields in the CDR, enabling the user to highlight specific call characteristics under analysis (e.g., all video calls can be highlighted in red). Filtering can be applied to the content of the fields in the CDR, enabling the user to focus on a specific subset of calls (e.g., all calls placed by a specific subscriber can be isolated). The frames can be exported to standard office applications to create reports about network problems. The user plane of each call can also be exported to allow a subsequent offline analysis of voice/video quality.

The "arrow diagram" graphically shows the message flow (arrows) of the call and the involved network elements (vertical lines) in a very intuitive way. A deep protocol knowledge is not required.

For in-depth troubleshooting of the problem's root cause, all details about the protocol messages and their parameters are shown in the "detailed monitor window."

UTRAN Key Performance Indicators

A software application for UTRAN Iub, Iur, Iu-CS and Iu-PS interfaces provides a comprehensive set of UTRAN and 3G Services Key Performance Indicators (KPI), allowing domain area identification of service problems, mapping of service problems into network problems and time reduction for network optimization and troubleshooting activities.

The application enables users to correlate radio measurements (e.g., BER, BLER, SIR, Transmitted Code Power and Received Total Wideband Power), with control plane KPI (e.g., RRC/GMM/MM/SM/CC procedure success/failure rate with distribution per cause), and user plane KPI (e.g., throughput), to understand the influence of the radio link quality and of the handovers on the network behavior.

The application enables users to look at the same set of KPI from different perspectives by enabling KPI calculation

and analysis per service (e.g., voice, video, packet), per network element (e.g., cell, NodeB, RNC, SGSN), per subscriber (e.g., IMSI), and per handset type (e.g., IMEI).

The GUI supports drill-down troubleshooting from the problem symptom down to the root cause with just a mouse-click. Color codes can be set in case measurements exceed predefined thresholds, and it is possible to navigate from any KPI measurement to the detailed list of calls that contributed to the generation of that KPI and to the detailed decoding of each single call.

The application provides a graphical environment to define custom KPI in order to allow technicians to carry out ad hoc benchmarking activities.

The KPI measurements are stored within an open MYSQL database and can be accessed by third-party tools to allow easy integration of the solution within already existing measurement systems.

Cell Overlapping Matrix

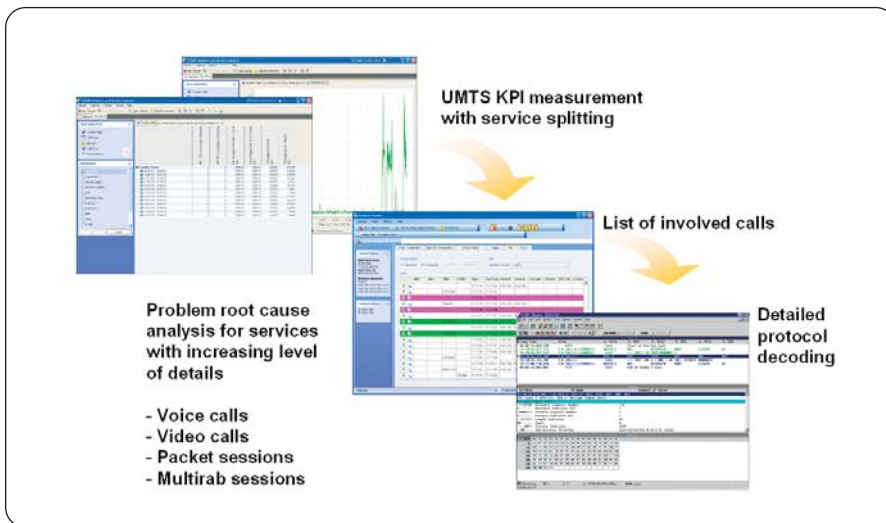
A software application generates the RNC Cell Overlapped Matrix by collecting radio interface measurements constantly flowing from the handsets (RRC measurement reports), enabling reduction of drive test activities and RNC reconfiguration tasks for UTRAN performance optimization.

The application calculates a matrix that shows the best neighbor cells for any given cell and can therefore be used for optimizing the scrambling code plan and the checklist-for-neighbors plan.

Cell ID	Cell 1	Cell 2	Cell 3	Cell 4	Cell 5	Cell 6	Cell 7	Cell 8	Cell 9	Cell 10	Cell 11	Cell 12	Cell 13	Cell 14	Cell 15	Cell 16	Cell 17	Cell 18	Cell 19	Cell 20
Cell 1	12.87%	0.31%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cell 2	23.87%	10.00%	12.00%	10.00%	0.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cell 3	21.57%	21.47%	13.00%	12.00%	0.11%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cell 4	20.00%	20.00%	20.00%	13.20%	13.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cell 5	20.00%	20.00%	20.00%	13.20%	13.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cell 6	20.00%	20.00%	20.00%	13.20%	13.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cell 7	20.00%	11.87%	10.00%	0.17%	7.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cell 8	21.57%	21.47%	13.00%	12.00%	0.11%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cell 9	10.41%	14.07%	11.70%	0.40%	7.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cell 10	12.00%	11.80%	0.94%	0.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cell 11	22.77%	22.00%	11.40%	11.40%	10.00%	2.40%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cell 12	17.73%	0.70%	0.00%	7.00%	7.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cell 13	22.20%	17.00%	12.00%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cell 14	17.24%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cell 15	17.24%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cell 16	12.00%	10.41%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cell 17	17.24%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cell 18	17.24%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cell 19	17.24%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cell 20	12.00%	10.41%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Multi-user Operation

Thanks to its distributed software architecture, the UTRAN Network and Service Analyzer enables offline multi-user operation. Several technicians can work in parallel and share the same information collected by the measurement device, increasing work productivity by reducing waiting time to access test and measurement equipment.



UTRAN Network and Service Analyzer

► Troubleshooting and Optimization Solution for 3G Networks and Services

► Characteristics

Recommended external PC

Processor – 3 GHz CPU.
Memory – 2 GB RAM.
Operating System – Windows XP.

K15 Interface/Measurement Application Boards

PCE-2 Board – Can mount up to 2 LIF.
STM-1/OC-3 LIF – Interfaces up to 2 STM-1/OC-3 bi-directional optical links.

K18 Probe

STM-1/OC-3 –
 4 x STM-1 receiver ports – SC connector.
GbE –
 4 x RJ45 (electrical) or 4 x flexible SFP modules (RJ45 electrical, LC 1300 nm optical, SC 850 nm optical).

► Software Applications

UTRAN Protocol Decoding	lub, lur, lu-PS, lu-CS interfaces
UTRAN Multi Interface Call Trace	lub, lu-PS, lu-CS interfaces
UTRAN KPI	lub, lur, lu-PS, lu-CS interfaces
Cell Overlapping Matrix	lub interfaces

► Ordering Information

Ordering Code	Name	Description
NSA18SW-MON-U	UTRAN Monitoring Suite HW/SW bundle	lub, lur, luCS, luPS Protocol Monitoring, Automatic Configuration and Topology Discovery
NSA15SW-TRB-U NSA18SW-TRB-U	UTRAN Troubleshooting Suite HW/SW bundle	lub, lur, luCS, luPS Protocol Monitoring, Automatic Configuration, Topology Discovery and Call Trace
NSA15SW-PAS-U NSA18SW-PAS-U	UTRAN Performance Analysis Suite HW/SW bundle	lub, lur, luCS, luPS Protocol Monitoring, Automatic Configuration, Topology Discovery, Call Trace and KPI
NSA15SW-NK NSA18SW-NK	UTRAN Nokia NBAP SW	
NSA15SW-D-U NSA18SW-D-U	UTRAN lub deciphering	
NSA15SW-OFFUS NSA18SW-OFFUS	UTRAN additional offline SW for one user	
NSA15SW-IMA NSA18SW-IMA	IMA monitoring	
NSA18SW-EX-IPU	IP-UTRAN extension for the K18 GbE probe	
NSA15SW-NTT-U NSA18SW-NTT-U	NTT DoCoMo protocol support	

Software Subscriptions and Software Cross Upgrades between suites are available on request.

Contact Tektronix:

ASEAN / Australasia (65) 6356 3900

Austria +41 52 675 3777

Balkan, Israel, South Africa and other ISE Countries +41 52 675 3777

Belgium 07 81 60166

Brazil & South America 55 (11) 3741-8360

Canada 1 (800) 661-5625

Central East Europe, Ukraine and the Baltics +41 52 675 3777

Central Europe & Greece +41 52 675 3777

Denmark +45 80 88 1401

Finland +41 52 675 3777

France +33 (0) 1 69 86 81 81

Germany +49 (221) 94 77 400

Hong Kong (852) 2585-6688

India (91) 80-22275577

Italy +39 (02) 25086 1

Japan 81 (3) 6714-3010

Luxembourg +44 (0) 1344 392400

Mexico, Central America & Caribbean 52 (55) 5424700

Middle East, Asia and North Africa +41 52 675 3777

The Netherlands 090 02 021797

Norway 800 16098

People's Republic of China 86 (10) 6235 1230

Poland +41 52 675 3777

Portugal 80 08 12370

Republic of Korea 82 (2) 528-5299

Russia & CIS +7 (495) 7484900

South Africa +27 11 254 8360

Spain (+34) 901 988 054

Sweden 020 08 80371

Switzerland +41 52 675 3777

Taiwan 886 (2) 2722-9622

United Kingdom & Eire +44 (0) 1344 392400

USA 1 (800) 426-2200

For other areas contact Tektronix, Inc. at: 1 (503) 627-7111

Updated 12 May 2006

Our most up-to-date product information is available at:
www.tektronix.com

Product(s) are manufactured in ISO registered facilities.



Copyright © 2006, Tektronix. All rights reserved. Tektronix products are covered by U.S. and foreign patents, issued and pending. Information in this publication supersedes that in all previously published material. Specification and price change privileges reserved. TEKTRONIX and TEK are registered trademarks of Tektronix, Inc. All other trade names referenced are the service marks, trademarks or registered trademarks of their respective companies.

9/06 HB/WOW

2FW-18512-2

Tektronix
 Enabling Innovation