Monitoring Solution for Mobile Networks

K15

Portable all-in-one Protocol Analyzer for Mobile and Converged Telecom.

- Very high port and channel density in a portable platform
- Enables system verification with deep and precise protocol decoding and filtering
- Speeds-up live network troubleshooting with automatic correlation of calls and procedures across multiple network interfaces
- Support of all manufacturer-proprietary implementation for GSM, GPRS, EDGE, UMTS
- Constant, timely update of protocols and protocol versions

Leading Solution for Mobile Network Troubleshooting

The K15 is a dedicated monitoring solution for mobile network testing, based on a high-performance transportable platform equipped with real-time powerful troubleshooting applications and designed to handle the complexity of mobile telecommunication protocols in labs, test plants and live network environments.

Features & Benefits

- Multi Interface Call Trace: Correlates All Related Messages on combinations of network interfaces of SS7, GSM, GPRS, EDGE, UMTS, cdmaONE and cdma2000 Networks, for Identification of Problems from the Symptom to the Root Cause
- UMTS Iub and GPRS Gb Deciphering: for all Messages in Real Time to enable Full Access to the Content of all Frames.
- H324.M KPI and Video Quality Analysis: Enables Video Telephony Troubleshooting and Quality of Service Analysis
- Application Layer Analysis: Service Level Troubleshooting and Usage Pattern Analysis of key GERAN Services such as Voice, WAP, SMS, POP3, FTP, SMTP & HTTP
- Auto-configuration Ensures Fast and Easy Setup of Measurements and Allows Troubleshooting to Begin Within Minutes
- Availability of E1/DS1/J1, STM-1/OC-3c, 10/100/1000 Mb/s Ethernet Monitoring Cards Along with Fixed Network, SS7, GSM, GPRS, EDGE, UMTS, cdmaONE and cdma2000 Protocol Decoding
- Multi-User Capabilities allow sharing K15 units among concurrent users
- NTP and GPS Synchronization Along with File Merge for Distributed Multi-site Monitoring
- Hardware Filters for STM-1/OC-3 Based UTRAN Interfaces Allow Network Analysis Under Load

Tektronix® Communications

Platform

The Compact-PCI compliant platform houses a PC running Windows XP Embedded operating system and up to five Application Boards in a small, easily transportable box. A complete operator interface is provided on the front panel, including a 15" XGA color display and attachable keyboard with touch pad. Four USB 2.0 interfaces and an sound-card with standard IN/OUT connectors are available. Powerful Internal Mass Storage capabilities are provided by means of a high performance disk subsystem with a capacity >500 GB in total. K15 units can be time-synchronized via GPS or via NTP.

An Intelligent Platform Management subsystem provides flexible management of platform ID, temperatures, fans and other system values, allowing also low acoustic noise in low-powerconsumption applications.

K15 Unit

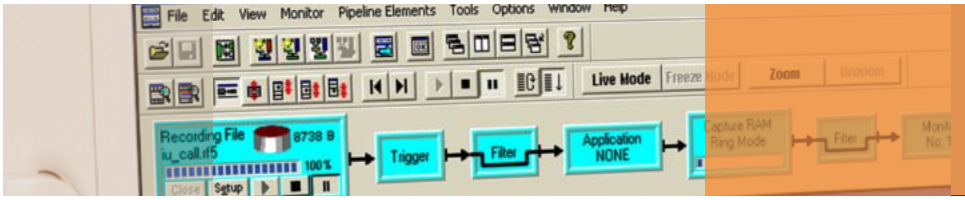
Auto-configuration

The Auto-configuration application shortens and simplifies the setup of measurements allowing troubleshooting activities to begin within only minutes. Using powerful detection algorithms, the Auto-configuration application independently determines the network configuration on the GPRS/EDGE A-bis interface and configures the K15 according.

Automatic real-time deciphering of the UMTS Iub interface and of the GPRS Gb interface

The UMTS Iub Deciphering application deciphers all protocol messages in real time. All the necessary parameters needed for deciphering are collected automatically by the instrument by monitoring the Iu interface.

The GPRS Gb Deciphering application is also totally transparent to the user and collects the parameters needed for deciphering from the Gr interface.



Multi-interface and Multitechnology Call Trace

The Multi-interface Call Trace and Multi-technology Call Trace help trace calls/ sessions in real time and offline as they evolve over multiple interfaces.

Parameters such as the IMSI are used to identify the subscriber identity and to trigger the search. The call/session can even be traced if the identifying parameters change dynamically during the transactions (for example IMSI, P-TMSI), as well as if it spans over multiple interfaces (such as Iub – Iu-PS – Gr) and involves different network elements (like Node B, RNC, HLR).

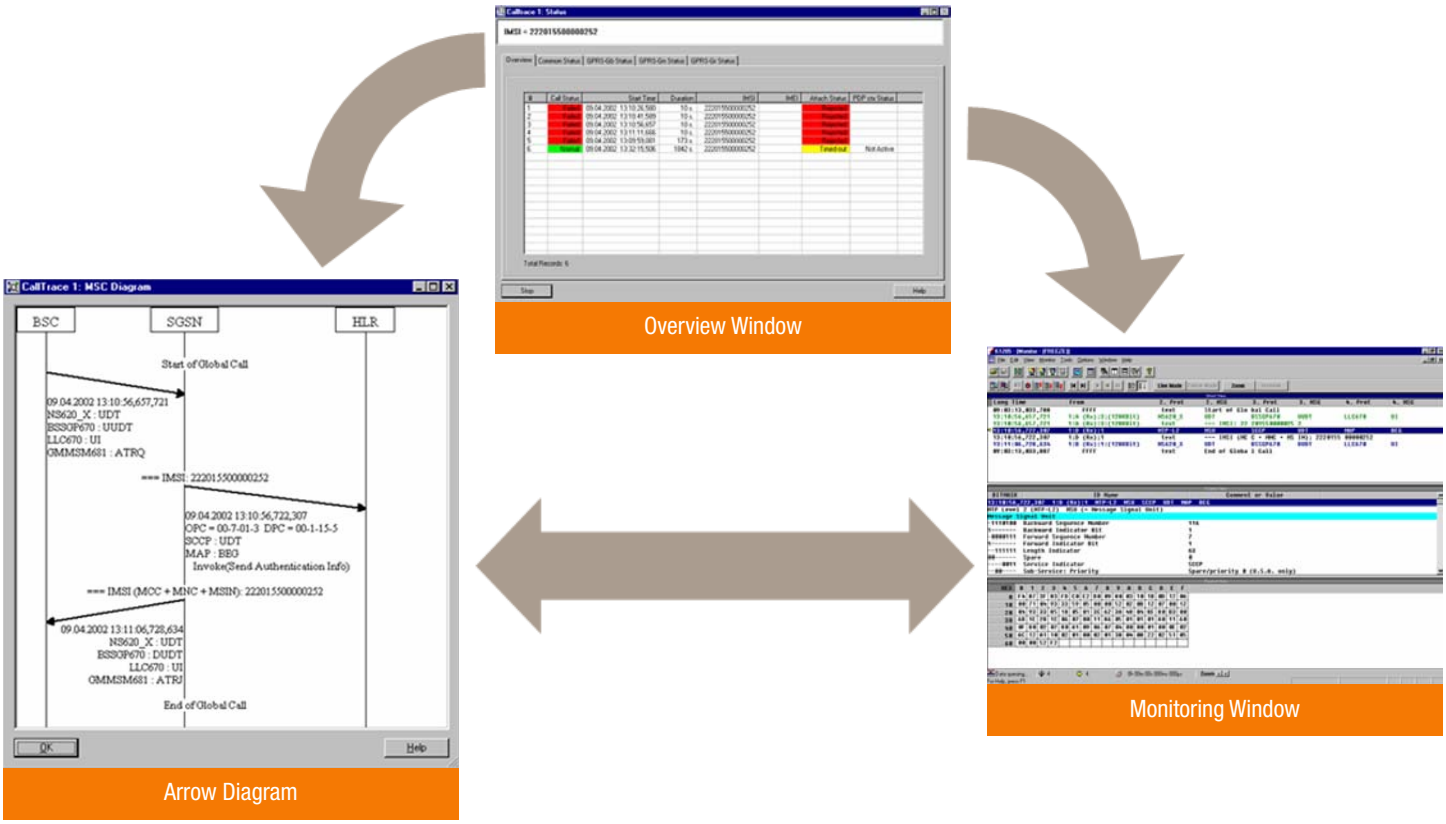
The GUI allows drill-down troubleshooting from the problem symptom to the root cause with a single mouse-click.

The Overview Window lists detected calls/sessions and highlights their status at a glance (normal, failed) for quick identification of problems. This allows easy filtering out of calls that are not of interest for the particular test being performed (normal calls).

The Arrow Diagram graphically shows the message flow (arrows) of the call/session and the involved network elements (vertical lines) in a highly intuitive way. Deep protocol knowledge is no longer required to perform expert-level troubleshooting.

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. Supported interfaces are:

- SS7/GSM (A, ISUP, MAP, CAP; ISUP, INAP)
- GPRS/EDGE (Abis, A, Gb, Gr, Gn/Gp)
- UMTS (Iub, Iu-PS, Iu-CS)
- cdmaONE/cdma2000 (A1, A10/A11; A1, IS-41, ISUP)



H.324M Video Telephony QoS Analysis

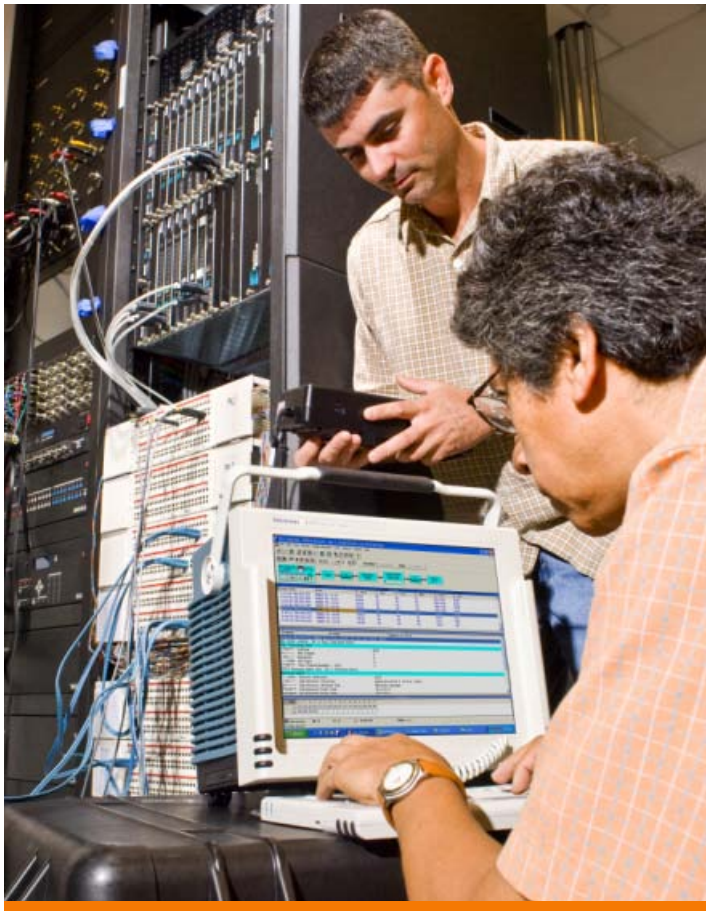
By tracking H.324M video calls on the Iu-CS or CORE interfaces, the H.324M Video Telephony QoS Analysis application enables users to:

- Calculate H.324M key performance indicators (KPI) to speed-up troubleshooting activities
- Extract the H.324M video/audio stream to assess its quality
- Look and listen to video calls to assess the customer perceived quality of service
- Extract the video stream in .3gp format for subsequent in-depth off-line video quality analysis with the Tektronix MTS4EA Software Suite

GERAN ApplicationLayer Analysis

By monitoring both control and user plane details on the GERAN interfaces, the Application Layer Analysis provides provides K15 users with an insight into how end users use and experience common GERAN applications. With a dashboard overview highlighting areas requiring further investigation, the **GERAN Application Layer Analysis** application enables users to:

- Quickly identify under-performing or rarely used services and applications
- Easily identify the cells and services that result in low QoE due to dropped calls, low throughput, slow RTT, etc.
- Determine capacity requirements needed to support the services and applications used by end-customers
- Direct access to the individual sessions allowing fast and focused troubleshooting of issues which require further investigation



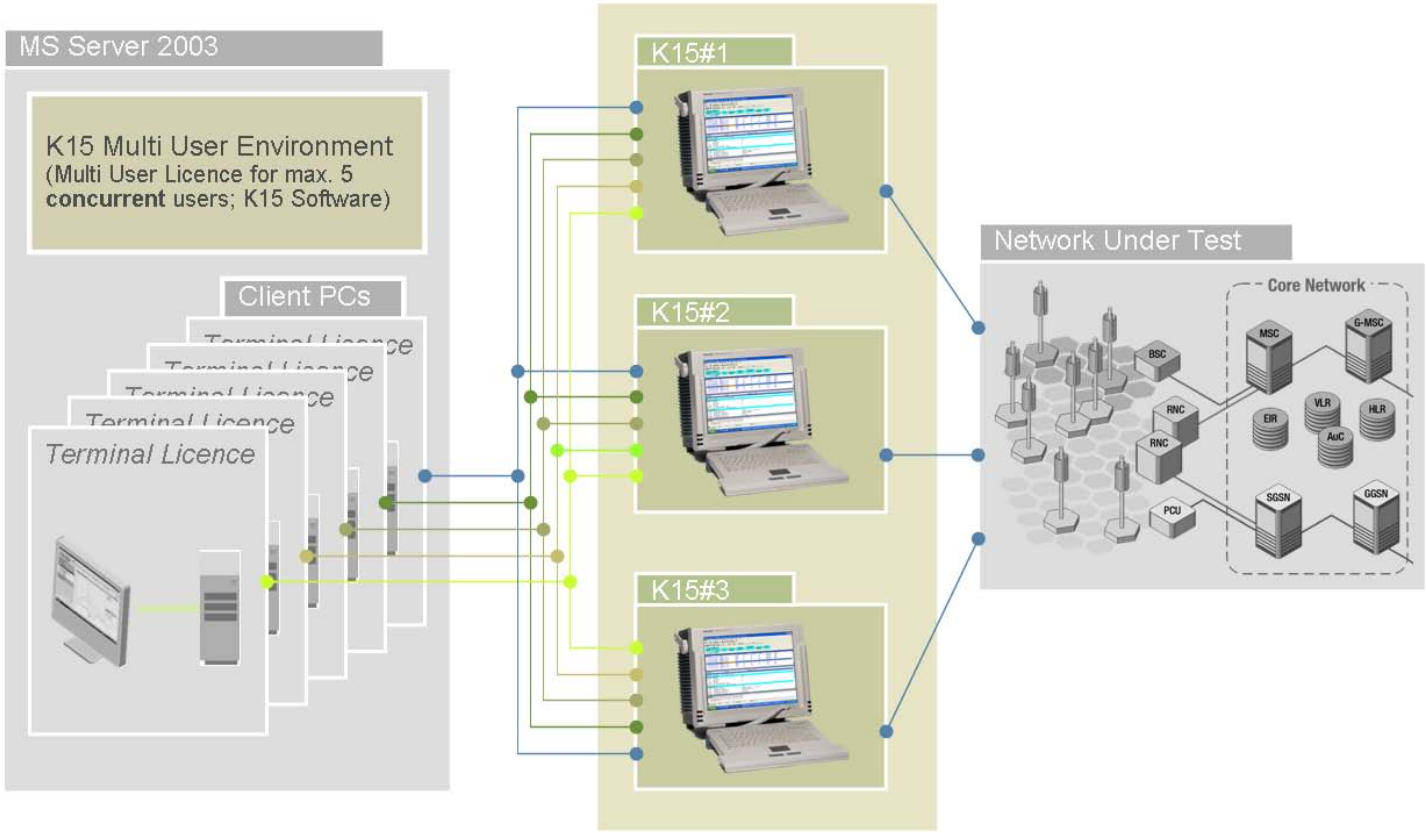
K15 at work

Protocol Analysis

The K15 monitors a wide range of SS7, GSM, GPRS, EDGE, UMTS, HSDPA,cdmaONE and cdma2000 protocols, and features a graphical user interface that allows easy visualization of protocol messages with increasing level of details, along with easy to use powerful filtering capabilities.

Multi-user Environment

Five users can work completely independently concurrently on the same K15 hardware connected to one server. The multi-user feature also allows the merging of information from multiple K15 units. The system is scalable with additional servers. Multi-user offers full functionality with full performance and results in each user being able to carry out real-time analysis using data from all test ports.



K15: A Multi-User Environment

Interfaces Available on the K15-2 Hardware Platform

Interface Type	Rear I/O	Front I/O
USB 2.0	2 x Type A	2 x Type A
COM 1 (RS232)	_	1 x RJ45
1000Base-Tx (Gb Ethernet)	2 x RJ45	2 x RJ45
DVI-I		1 x MicroCross 29 pol. MOLEX#74320
Keyboard/Mouse		1 x PS/2
IPMI (EMP)	1 x RJ45	
Line IN	1 x 3.5 mm phone jack	
Line OUT	1 x 3.5 mm phone jack	
MIC IN	1 x 3.5 mm phone jack	
Extension Modules Slot		1 x PMC

Dimensions	
Width	365 mm
Depth	227 mm
Height (Without cover)	340 mm 305 mm
Weight	
Without Application Boards	11.8 kg
Others	
Inclination	One reclinable central front foot (can reach 70 mm)
Top Cover	Detachable plastic cover; open on the rear
Transport handle	Fiber enforced plastic with rubber overmold
Transport case (optional)	Hard-shell case with wheels and retractable handle. (520 mm H x 695 mm W x 405 mm D)

Monitoring Interface/Measurement Application Boards

Single Slot Boards	
PowerWAN	Interfaces up to 8 E1/DS1/J1 bi-directional PCM links
PowerWAN Light 2	Interfaces up to 4 E1/DS1/J1 bi-directional PCM links
PowerWAN Light 2 with Ethernet Module	Interfaces up to 4 E1/DS1/J1 bi-directional PCM links and up to 2 10/100/1000 Mb/s Ethernet links.
Double Slot Boards	
PCE-2	Can mount up to 2 LIF (LIF type A or LIF type B) in any combination.
LIF type A	Interfaces up to 2 STM-1/OC-3c bi-directional optical links
LIF type B	Interfaces up to 4 E1/DS1/J1 ATM links

Characteristics

General

Host Processor Board

Processor Mobile Pentium M 1.8 GHz, 2 MB L2 cache
Memory 2 GB SDRAM ECC
Timer User-programmable allows real-time functions
Bus CompactPCI; 64-Bit/33 MHz

Front Panel I/O

PS/2 Interface 1 connector for ext. keyboard/mouse
USB 2.0 Interface 2 connectors
Serial Interface 1 RS-232 RJ-45 connector
DVI-I Interface Connector on the board panel
PMC Slots 1, providing connection to the backplane
Gb Ethernet Interface 2 10/100/1000 Base-Tx RJ-45 connectors

Rear Panel I/O

USB 2.0 Interface 2 connectors
Serial Interface 1 RS-232 RJ-45 connector for IPMI
Gb Ethernet 2 10/100/1000Base-Tx RJ-45 connectors
Line IN 1 3.5 mm phone jack
Line OUT 1 3.5 mm phone jack
MIC IN 1 3.5 mm phone jack.

Data Storage

Hard disk I 30+ GB, 2.5" IDE hard disk drive
Hard disk II-III 2 RAID0 SATA HD >250 GB

Display

Type TFT LC active-matrix color display with backlight and sleep mode
Dimensions 15"
Resolution 1400 x 1050 pixel SXGA compliant
An External Monitor may be connected using the DVI-I connector on the top of the unit.

Keyboard

Type Full-QWERTY; attachable to the front of the unit
An External Keyboard may be connected via one of the USB ports available on the front or the rear of the unit.

Touch Pad

Type Integrated Touch Pad with 2 buttons.
An external mouse may be connected via one of the USB ports available on the front or the rear of the unit.

Platform Management Subsystem (IPMI Compliant)

Features Fan speed control; temperature control; platform hardware ID management; power outage control
The IPMI interface connector is for Tektronix service use only.

Operating System

Microsoft Windows XP Embedded.

Backplane – Compact PCI

Features Passive; 6 slots; one CompactPCI segment, PICMG 2.1 compliant, 64-Bit/33 MHz
H.110 Bus (PICMG 2.5) on P4 of peripheral slots
Clock/Sync 4 signals distributed on P2

Power

Type Industrial grade, 350 W; plug-in module with over-temperature protection.
AC Input 460 VA, 100-240 VAC ±10%, 50/60 Hz
DC Output 50 W per application slot (available for the +5 V, +3.3 V, +12 V and –12 V application slots as follows): 35 A; 30 A; 7 A; 2.5 A
Fuse Data 6.3 A time-delayed, 250 V

Regulatory

Safety UL and cUL to UL61010B-1 [reference: PO61]; CE mark: EN61010-1
EMC FCC part 15, class A; CE mark: EN61326, class A.

Environmental

Temperature

Operating +5 ºC to +40 ºC
Non-Operating –20 ºC to +65 ºC

Relative Humidity

Operating Up to 80% below 30 ºC, derate to 45% at 40 ºC, non-condensing
Non-Operating Up to 90% below 20 ºC, derate to 60% at 20 ºC, non-condensing

Altitude

Operating 10,000 ft. (3000 m)
Non-Operating 40,000 ft. (12000 m)

Shock

Operating Half-sine 2 g.
Non-Operating Half-sine 30 g.

Random Vibration

Operating 0.31 g_{RMS}
Non-Operating 2.28 g_{RMS}

Acoustic Noise

ETSI 300 753 for Business area (63 dBa)

Timestamps Accuracy

250 µs among internal boards
NTP ±10 ms with network jitter ±3 ms
GPS ±1 ms

Accessories

GPS Kit Including Antenna, Receiver and Cable
Order MPTAC0003
Transport Case with Wheels and Retractable Handle
Order MPTAC0002.
Cables and Connectors
See www.tektronix.com/Measurement/signaling/index/selection_guide/order.html

About Tektronix:

Tektronix has more than 60 years of experience in providing network operators and equipment manufacturers a comprehensive and unparalleled suite of network diagnostics and management solutions for fixed, mobile, IP and converged multi-service networks.

These solutions support such architectures and applications as fixed mobile convergence, IMS, broadband wireless access, WiMAX, VoIP and triple play, including IPTV.

Learn more about Tektronix' communications test, measurement and network monitoring solutions by visiting:
www.tektronix.com/communications

For Further Information:

Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology.

Please visit www.tektronix.com/communications

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