

UMTS Consultants

Network Monitoring and Analysis Tools

The UMTS Consultants are analysis tools, providing online/offline session analysis and QoS monitoring of UMTS networks. As part of RADCOM's Cellular Performer suite, they address issues on both the signaling and user planes, and are suitable for vendors developing and installing UMTS equipment, wireless operators testing and deploying UMTS networks, network integrators, QA and inter-networking labs.

The UMTS Consultants focus on key testing issues in the evolving UMTS networks: signaling and user data transmission problems, QoS, performance and network functioning. Analyzing the various transactions on the line, they display a clear session summary view, as well as user data sessions, showing actual throughput, used protocols and more. Statistics for signaling procedures are saved continuously, allowing analysis of network performance.

The UMTS Consultants analyze the network layer, offering a unique expert tool for infrastructure problems related to configuration or capacity. Additionally, they save data for offline analysis, enabling tendency research and benchmarking.

The UMTS Consultants are an integral part of the Cellular Performer distributed model, and can be accessed from any authorized client console across the LAN or WAN.

Highlights

- ▶ Measure QoS parameters.
- ▶ Troubleshoot from top-down with session-level problem detection.
- ▶ Automatically discover, display and monitor thousands of active and closed UMTS IP sessions and voice calls.
- ▶ Monitor various network interfaces, including Iub, Iur, Iu-CS, Iu-PS, Gn, Gr, Gf, Gc, Gd, Gi.
- ▶ Display session information, such as identities, status and traffic size.
- ▶ Measure signaling performance.
- ▶ Analyze IP traffic, including throughput, protocol distribution, TCP window size and frame length.
- ▶ Detect network-level errors such as rejected calls (and cause) and discarded frames.
- ▶ Decode and analyze all 7 layers of the UMTS signaling and user planes.
- ▶ Run in both Online and Offline modes.

The screenshot shows the 'UMTS Consultant - [Session Summary]' window. It features a menu bar (File, View, Configuration, Application, Window, Help) and a toolbar with various icons. Below the toolbar, there are two main sections: 'Open Sessions' and 'Closed Sessions'. The 'Open Sessions' section has a legend with 'Open' (grey), 'Attached' (green), 'PDP Active' (yellow), and 'Error' (red). The 'Closed Sessions' section has a legend with 'Normal Closed' (grey), 'Cut' (green), 'No Response' (blue), and 'Error' (red), along with a 'Stick to Last' checkbox. Both sections display a table with columns for Index, Status, Start (Hour: Min: Sec: ms), IMSI, LAC, RAC, IP address, PDP count, Downlink (bytes), Uplink (bytes), Last P-TMSI, GTP TEID, and RNC MTP OPC. The 'Closed Sessions' table contains 9 rows of data.

Index	Status	Start (Hour: Min: Sec: ms)	IMSI	LAC	RAC	IP address	PDP count	Downlink (bytes)	Uplink (bytes)	Last P-TMSI	GTP TEID	RNC MTP OPC
1	RANAP: Reset	00:00:00:000										
2	Truncated	00:00:02:664					1	135280			5EEFCA23	
3	Truncated	00:00:02:648					1	135128			60EFCA23	
4	Truncated	00:00:02:664					1	135280			5FEFCA23	
5	PDP Truncated	00:00:00:241	240999999000011	1	2	1.2.255.22	1			A402400F		773
6	PDP Truncated	00:00:03:523	240999999000012	1	1	1.2.255.23	1			9672400F		773
7	PDP Truncated	00:00:09:114	240999999000013	1	2	1.2.255.30	1			8672400F		773
8	PDP Truncated	00:00:08:792	240999999000014	1	1	1.2.255.29	1			A672400F		773
9	PDP Truncated	00:00:03:820	240999999000015	1	2	1.2.255.35	1			88E2400F		773

Session Summary display shows the changing connection status and main parameters of every UE

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TEST-OF-THE-ART

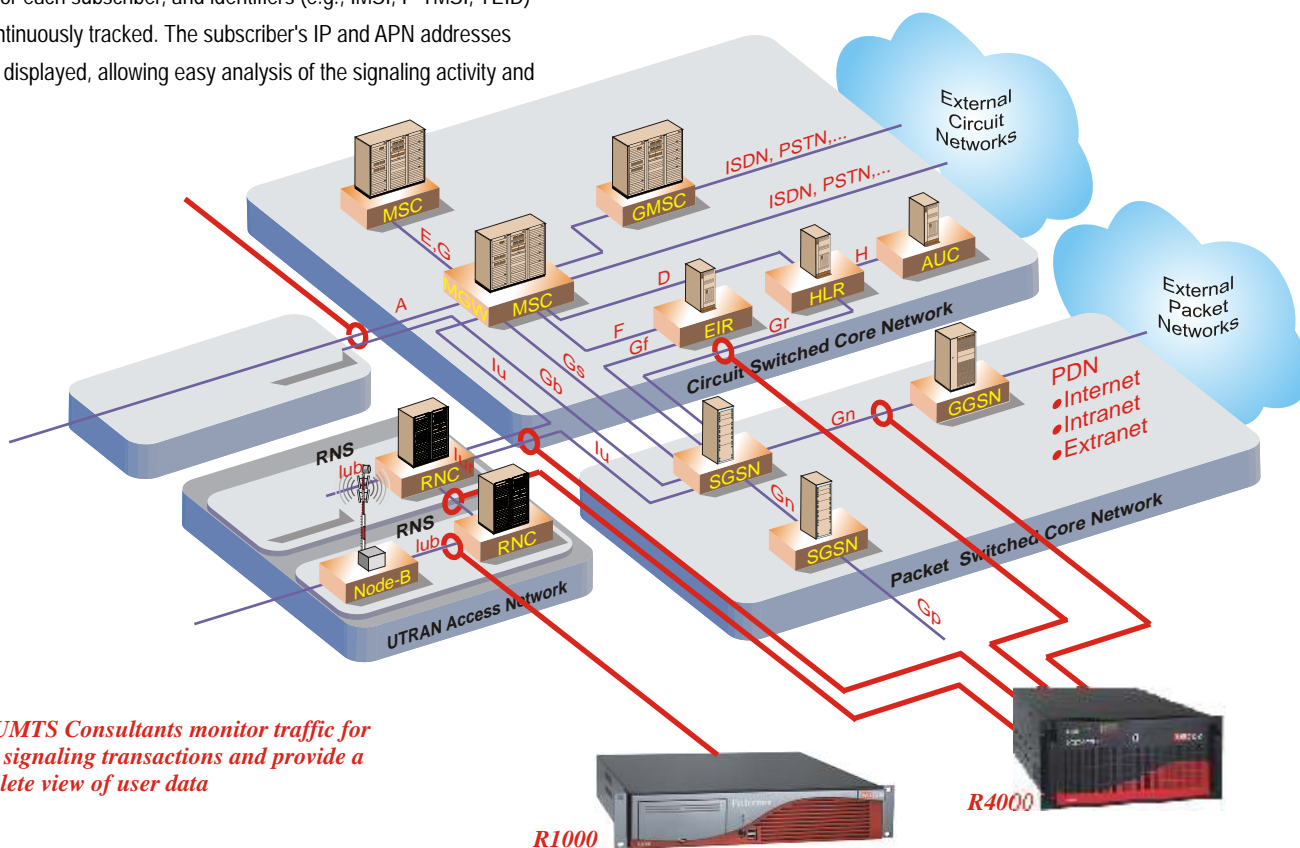
UMTS Consultant

The UMTS Consultants are add-on applications to RADCOM's protocol analyzers. Using RADCOM's remote solutions, they can also be used as a distributed solution, offering network operation centers a tool to analyze UMTS networks.

Monitoring the various UMTS interfaces, the UMTS Consultants display analysis of both the signaling and user planes. They monitor the signaling activity on UMTS interfaces, follow the various flows and then summarize the information per session, displaying the pertinent messages. A state machine is kept for each subscriber, and identifiers (e.g., IMSI, P-TMSI, TEID) are continuously tracked. The subscriber's IP and APN addresses are also displayed, allowing easy analysis of the signaling activity and

simple identification of problems. Following the user plane, the UMTS Consultants summarize the CS and PS sessions, including the user data. Using the UMTS Consultants, monitoring TCP sessions, WAP protocols or top layer applications becomes simple. The UMTS Consultants also monitor the statistics per user, allowing analysis of data protocols and throughput for sessions.

The UMTS Consultants support both online and offline modes of analysis. Online analysis is executed by capturing real-time line traffic, while offline analysis enables processing of previously captured files and analysis of problems.



The UMTS Consultants monitor traffic for main signaling transactions and provide a complete view of user data

R1000

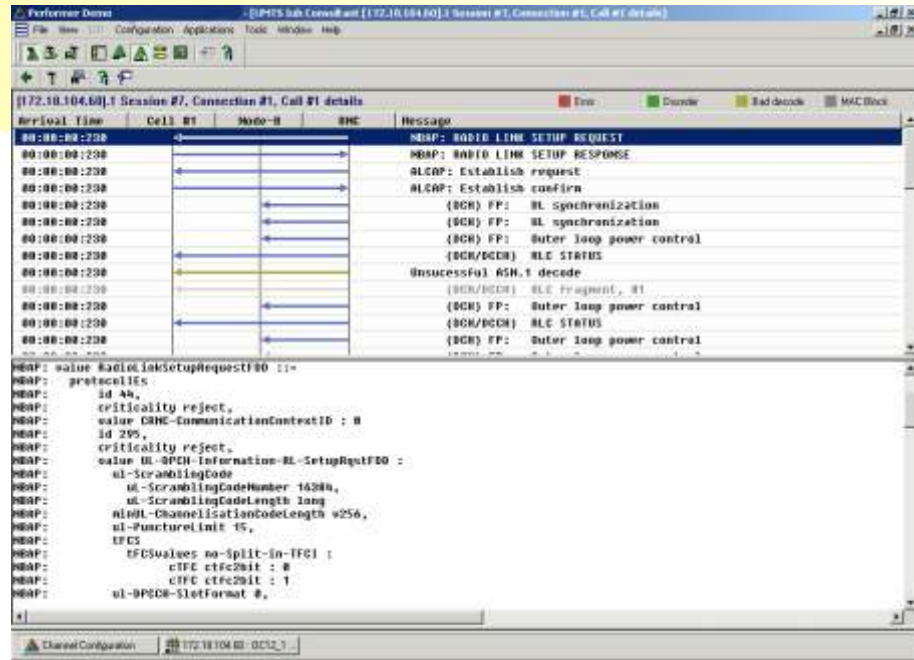
R4000

Network Consultant

RADCOM's Cellular Expert provides service providers and vendors with a comprehensive solution for troubleshooting, maintaining and monitoring the UMTS/GPRS and CDMA2000 networks. This exclusive solution enables pinpointing sources of quality degradation trends and malfunction in the network and its components. It provides web-based analyses and reporting modules and generates real-time alarms, granting preemptive power to maintain quality levels.

The Network Consultant correlates information detected on the different UMTS, GPRS and CDMA2000 interfaces in one view. Its wide range of features provide both online and offline end-to-end radio access, Core signaling and Core IP session and service level overview. The Network Consultant drills-down into each interface, managing both voice and data.

Signaling Details display follows all interface-specific and layer 3 messages of a specific session



Application

Monitoring UMTS Sessions

The UMTS Consultants display the current state of all the detected sessions in real-time: Attach, Active, Detached, etc. as well as the signaling messages and times.

Sample Testing Scenarios

- ▶ Verify that a problematic subscriber is connected and the current state is correct: The UMTS Consultants display all the sessions on the link, easily verifying that a specific subscriber is connected.
- ▶ View the identifiers of the call in real-time, simplifying problem resolution: The UMTS Consultants automatically display the identifiers such as IMSI, P-TMSI and IP address. In addition, they follow the signaling messages and update the identifiers as they change.
- ▶ Verify network performance: The UMTS Consultants analyze setup times for specific users and aggregate statistics for attach and detach procedures, PDP context activation and deactivation, and other procedures.
- ▶ Identify problems caused by improper buildup of transport channels during hand-overs.

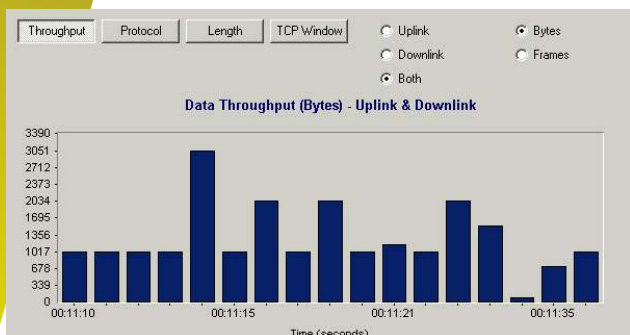
UMTS Network Analysis

The UMTS Consultants allow network operators to see a network-wide view of UMTS sessions. Errors (which are the first sign of problems on the network) such as rejected sessions, forced standbys, dropped packets and timeouts are identified and highlighted by the Consultants.

Sample Testing Scenarios

- ▶ Monitor errors and problems identified on the network: for example, the UMTS Consultants save the attach reject rate, and together with general signaling statistics, benchmark the network.
- ▶ Identify problems before they cause degradation of network performance.
- ▶ Record the call length and bandwidth usage parameters required for billing systems. The UMTS Consultants can be used to verify and test new billing features or new billing systems, without negative impact on paying customers.
- ▶ Locate the cells that create most of the errors or the most loaded cells that need some resource reallocation.

UMTS Consultant



User data traffic characteristics are analyzed

Specifications

Monitored interfaces

Iub, Iur, Iu-CS, Iu-PS, Gn, Gr, Gf, Gc, Gd, Gi

Sample Collected data

Connection status

Start/End/Total Activation time

UE identifiers

Cell/RNC identifiers

Channels identifiers

Scrambling code

Communication Context identifiers

Peak/mean throughput per connection

Session end cause

Routing/location area identifiers

UE/RNC/SGSN/APN IP and SS7 addresses

Number of connections

Downlink/uplink traffic (frames/bytes/MAC blocks)

Sample Statistics

Active PS/CS connections

Error cause distribution

Session Signaling Analysis

Platforms

R1000, Rack-mount 2U, Performer/Probe Server

R4000, Rack-mount 5U, Performer/Probe Server

P1000, Portable Performer/Probe server

PerformerLite, Portable Performer/Probe Server and console

PC Requirements

Notebook or PC with Pentium II 450 MHz and above

128 MB RAM

500 MB available hard disk space

Operating System

Windows 2000/XP

Ordering Information

PA-UMTS Iub Cons

PA-UMTS Iur Cons

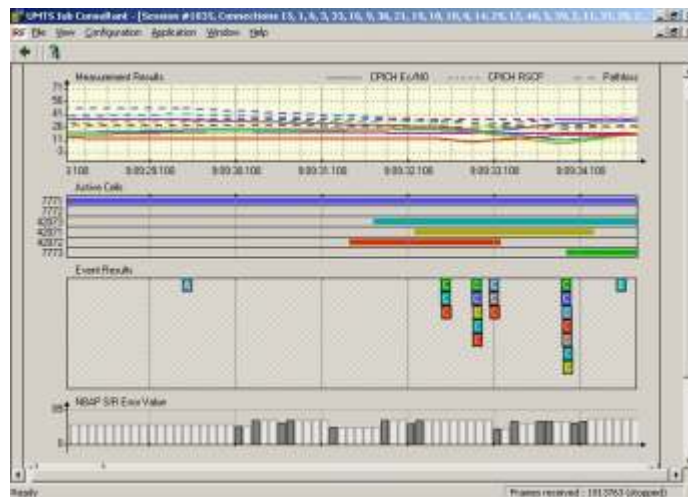
PA-UMTS Iu Cons

PA-UMTS Gn Cons

PA-UMTS CN Cons

PA-Internet Cons

PA-Network Consultant



Radio measurement graph pinpoints radio problems

US Office:

RADCOM Equipment Inc.
6 Forest Avenue
Paramus NJ 07652 USA
Tel: (201) 518-0033
Fax: (201) 556-9030
1-800-RADCOM-4
e-mail: info@radcomusa.com

Israel Office:

RADCOM Ltd.
24 Raoul Wallenberg Street
Tel-Aviv 69719 Israel
Tel: +972-3-6455055
Fax: +972-3-6474681
e-mail: info@radcom.com

China Office:

RADCOM Ltd.
Handerson Center, Office 506, Tower 3
18 Jianguomennei Avenue,
Beijing 1000005, P.R. China
Tel: +86-10-65187723
Fax: +86-10-65187721
e-mail: china@radcom.com

United Kingdom Office:

RADCOM UK
2440 The Quadrant
Aztec West, Almondsbury
Bristol, BS32 4AQ England
Tel: +44-145-487 8827
Fax: +44-145-487 8788
e-mail: uk@radcom.com

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