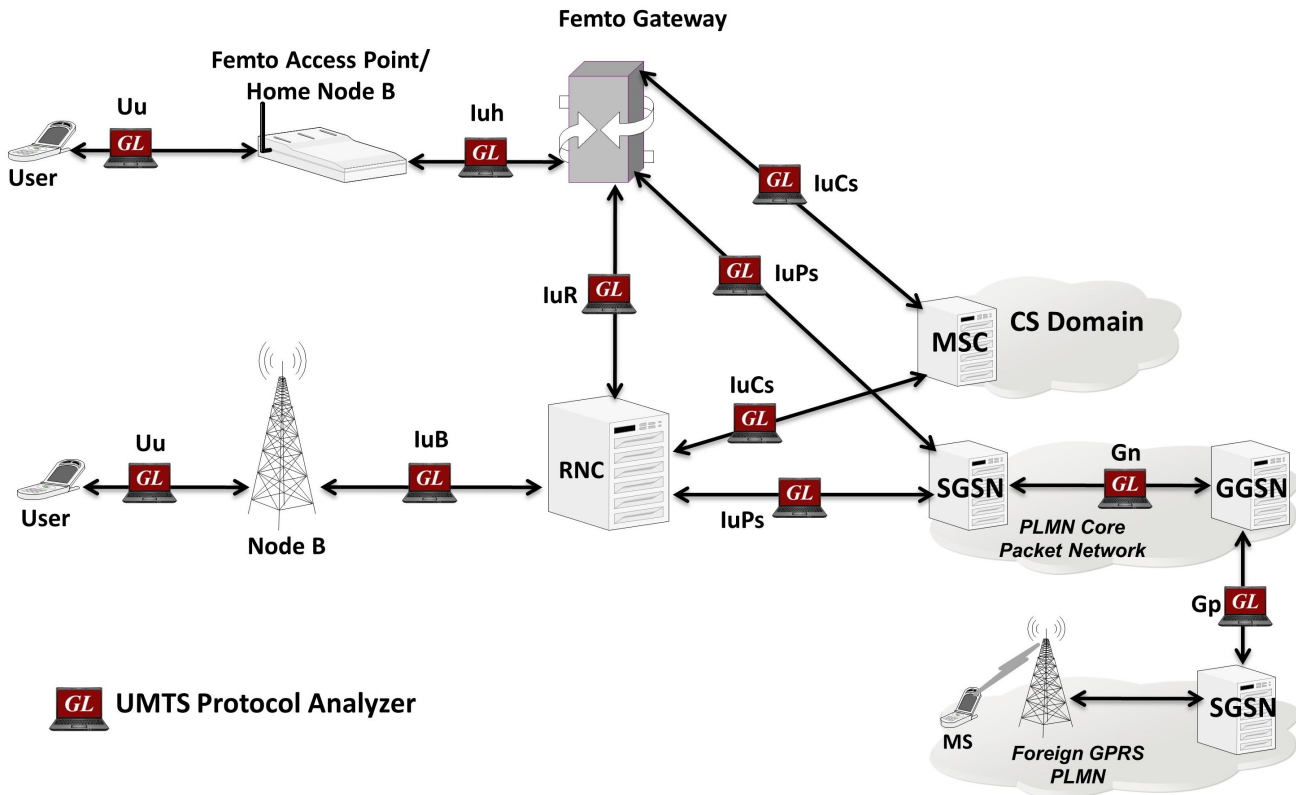


UMTS Protocol Analyzer



Overview

UMTS (Universal Mobile Telecommunications System) is capable of handling both Circuit-Switched (CS) as well as Packet-Switched (PS) data simultaneously through its UTRAN network.

GL's UMTS Analyzer adds capability to monitor various interfaces within UMTS network. The tool allows end user to capture, decode and collect essential information across various interfaces i.e. Iub, Iuh, IuCs, and IuPs. Also, it supports GSM over ATM i.e. DTAP Layer over BSSAP. Simultaneous handling of ATM based AAL2 and AAL5 virtual channels and reassembly, helps in fault diagnosis and troubleshooting UMTS network. GL Communications supports the following types of UMTS analyzers:

- Real-time UMTS Analyzer (Pre-requisites: GL's T1 E1 internal cards or USB T1 E1 external units, required license, and Windows® Operating System)
- Offline UMTS Analyzers (Pre-requisites: Hardware dongle and Windows® Operating System)

For more details, visit [UMTS Protocol Analyzer](#) webpage.



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Main Features

Display Features

- Displays Summary, Detail, Hex-dump, and Statistics Views
- Summary View provides the information about few important fields (Dev #, Time Slot, VPI/VCI, PT, HEC, OSF, AAL type, CID, AAL type 2 signaling message (ALCAP message) and more in a tabular format
- Detail View
 - Displays decodes of a user-selected frame from the summary view
 - Provides options to display or hide the required protocol layers
 - Contents of this view can also be copied to clipboard
 - Provides option to toggle detail view vertically or horizontally as feasible for the user
- Hex dump View displays the frame information in HEX and ASCII format, the contents of this view can also be copied to clipboard
- Statistics View displays statistics based on frame count, byte count, frames/sec, bytes/sec etc. for the entire capture data
- Any protocol field can be added to the summary view, filtering, and search features providing users more flexibility to monitor required protocol fields
- Option to combine data from multiple columns under one column
- Option to create multiple aggregate column groups and prioritize the groups as per the requirement to display the summary results efficiently

Supported Protocols

- Supports decoding of protocol across lub, luH, lur, luCs, luPs, and Gn Gp interfaces

Filtering and Search

- Advanced filtering and search based on any user selected protocol fields
- Allows the user to automatically create search/filter criteria from the current screen selection

Capturing Streams

- Streams may be captured on the selected time slots (contiguous or non-contiguous) and on full bandwidth
- Multiple streams of ATM traffic on various T1 E1 channels can be simultaneously decoded with different GUI instances
- Captures, decodes, filters, and reassembles AAL-2 and AAL-5 frames in real-time, from within the ATM cells according to user defined VPI/VCI
- Decodes different control plane protocols i.e. NBAP, RNSAP, RANAP, ALCAP, SSCOP etc and user plane protocols i.e. lu-UP, lu-FP, AMR and so on

Export Options

- Exports Summary View information to a comma delimited file for subsequent import into a database or spreadsheet
- Capability to export detailed decode information to an ASCII file

Record/Playback

- Recorded raw data can be played back using raw data playback application

Main Features (Contd.)

Remote Monitoring

- Remote monitoring capability using GL's Network Surveillance System

Additional Features

- Supports real-time as well as offline analysis
- Recorded raw data can be played back using raw data playback application
- The following variations are accommodated in the software: inverted or non-inverted data, byte reversal or non-reversal, with or without Inverse Multiplexing option
- Unscrambling of ATM cells based on SDH $X^{43} + 1$ algorithm
- Trace files for analysis can be loaded through simple command-line arguments
- Multiple trace files can be loaded simultaneously with different GUI instances for offline analysis
- Ability to configure .ini file for VPI and VCI (for ALCAP, NBAP, RANAP, and so on)

Summary, Detail, and Hex dump Views

The analyzer displays Summary, Detail and Hex dump View in different panes. The Summary View displays Frame Number, Time, Length, Error, VPI, VCI, PT, HEC, OSF, AAL Type, CID, LI, UUI, CPI and Frame Type message. User can select a frame in Summary View, to analyze and decode each frame in the Detail View. The Hex dump View displays the frame information in HEX and ASCII format.

The screenshot displays the UMTS Protocol Analysis (lub-Interface) 64-bit software interface. The main window is divided into several panes:

- Summary View:** A table showing captured frames. The selected frame is Frame #4 at Time 00:00:02.055958, Length 101, VPI 1, and VCI 40.
- Detail View:** Shows the ATM Frame Data for the selected frame. It includes fields like GFC, VPI, VCI, PT, and CLP, along with their values and descriptions.
- Hex Dump View:** Displays the raw data of the frame in hexadecimal and ASCII format.
- Statistics View:** A table at the bottom showing the total number of frames captured for each device.

Dev	TScout	Frame#	TIME (Relative)	Len	Error	VPI ATM	VCI ATM	ProcedureCode RANAP	Message Type RR	Message Type MM	Type
2	30	4	00:00:02.055958	101		1	40				
2	30	5	00:00:03.136054	53		1	40				
2	30	6	00:00:03.204070	53		1	40				
2	30	7	00:00:03.248016	53		1	56				

```

Device2 TScout=30 Frame=4 at 00:00:02.055958 OK Len=101
ATM Frame Data
===== ATM Layer =====
0000 GFC = Scrambled SDH X^43+1
0000 VPI = 0000.... (0)
0001 VCI = 1 (...0000 0001....)
0003 PT = 40 (...0000 00000010 1000....)
0003 CLP = ....000. (0)
          = .....0 (0)
Hex Dump of the Frame Data
+-----+-----+-----+-----+-----+-----+
00 10 02 80 54 00 00 00 00 05 00 02 00 05 00 00      eT
03 E9 08 04 00 14 49 00 00 10 01 00 00 00 00 00      e I
00 00 00 00 00 00 00 00 00 00 00 00 05 00 0C 03 2C 03
2C 01 96 01 96 2D 2D 2D 2D 06 00 04 00 00 00 00 01    | |----
07 00 04 00 00 00 01 00 00 88 00 00 00 00 00 00 00    |
  
```

Device #	Frame Count(Device #)
2	28
total 2	28

C:\Program Files\GL Communications Inc\U: 28 Frames

Figure: Summary, Detail, and Hex dump Views

Real-time and Offline Analysis

Users can analyze UMTS frames in real-time and record all or filtered traffic into a trace file. The recorded trace file can be used for offline analysis or exported to a comma-delimited file, or ASCII file.

UMTS analyzer is capable of capturing & reassembling frames that were transmitted with bit inversion, octet bit reversion, user/network side, ATM mapping, scrambling, and inverse multiplexing (IMA). The captured raw data can be transmitted using playback file application.

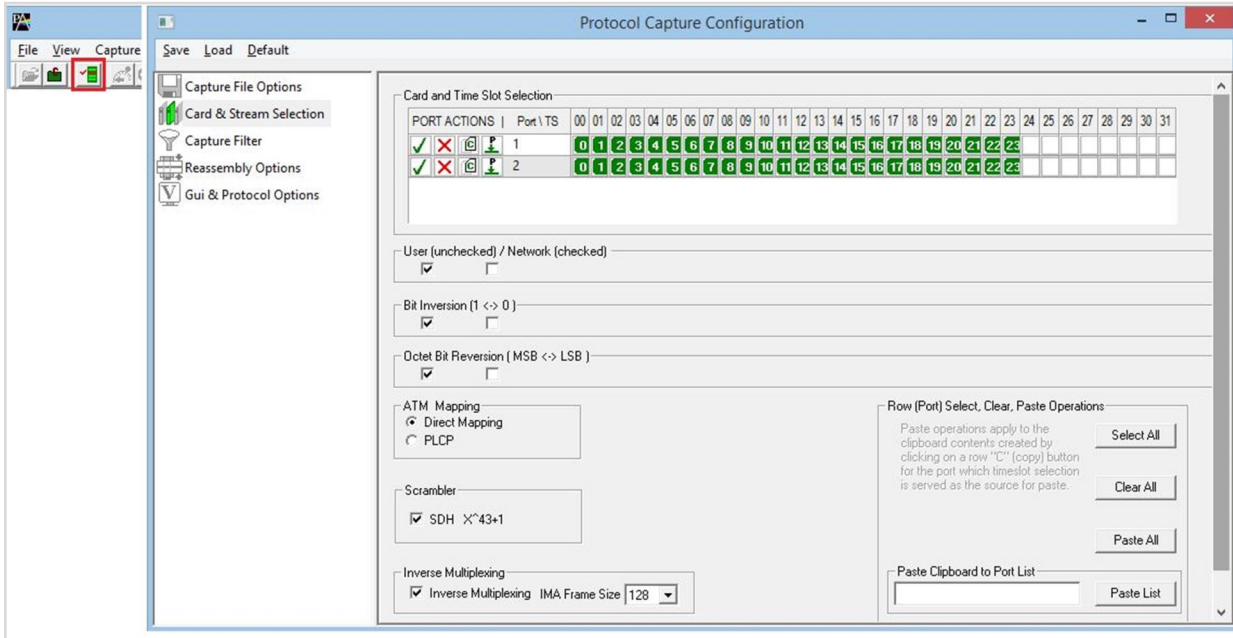


Figure: Stream / Interface Selection

Inverse Multiplexing over ATM (IMA)

The ATM Analyzer is enhanced to capture & reassemble frames that were transmitted with Inverse Multiplexing option. With Inverse Multiplexing over ATM (IMA) feature, up to 8 T1 E1 links can be configured to form a high-speed connection. ATM cells are transmitted across multiple interfaces in a cyclical fashion, and recombined to form the original stream.

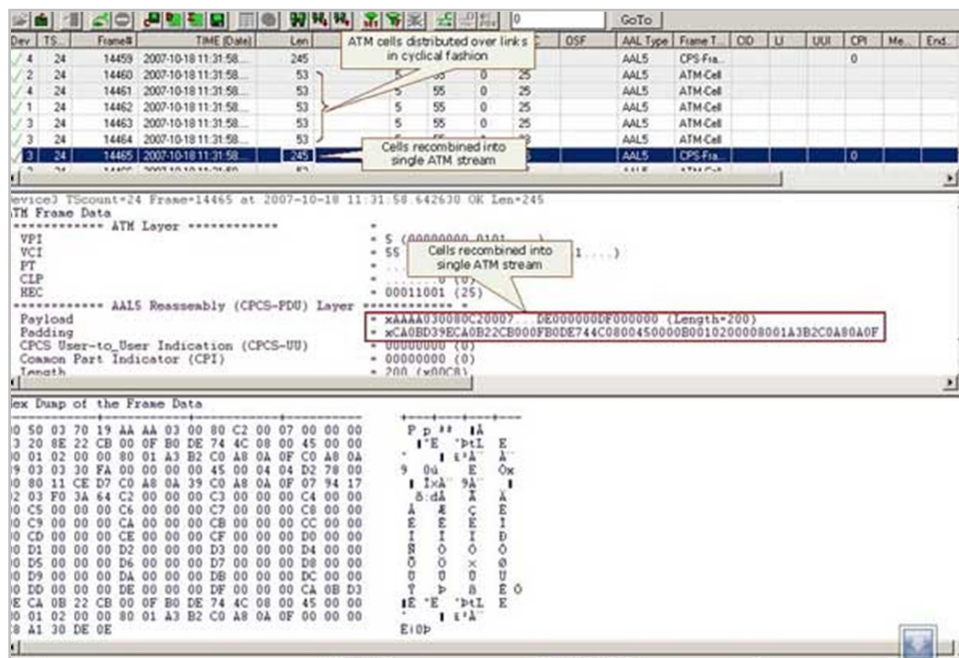


Figure: Captured ATM Frames with IMA

Filtering and Search

Users can record all or filtered traffic into a trace file and also can create search/filter criteria automatically from the current screen selection. Filter and search capabilities add a powerful dimension to the UMTS Analyzer. These features isolate required frames from the captured frames in real-time, as well as offline. Users can specify custom VPI, VCI, and PT type values to filter frames during real-time capture. The frames can also be filtered after completion of capture based on Frame Number, Time, Length, Error, VPI, VCI, PT, HEC, OSF, AAL Type, CID, LI, UI, and more. Similarly, Search capability helps user to search for a particular frame based on specific search criteria.

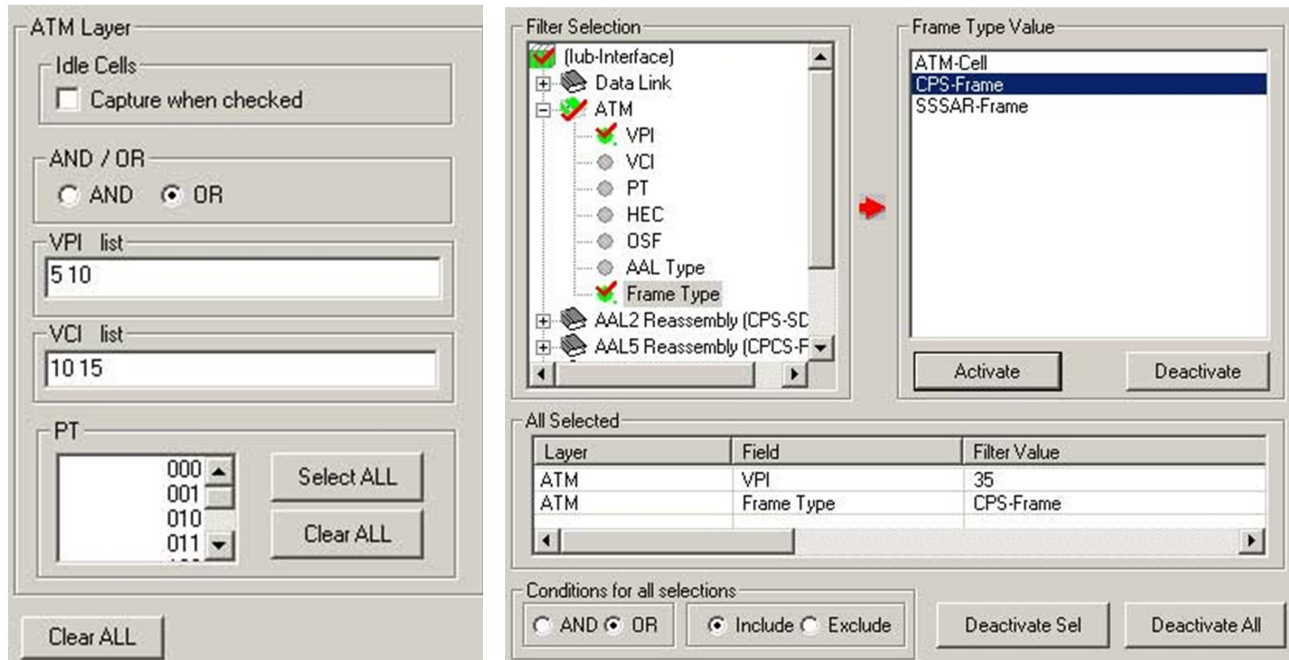


Figure: Real-time and Offline Filter

Reassembly

Using reassembly option user can specify VPI / VCI value to reassemble using the segmentation and reassembly rules defined by the specified AAL type.

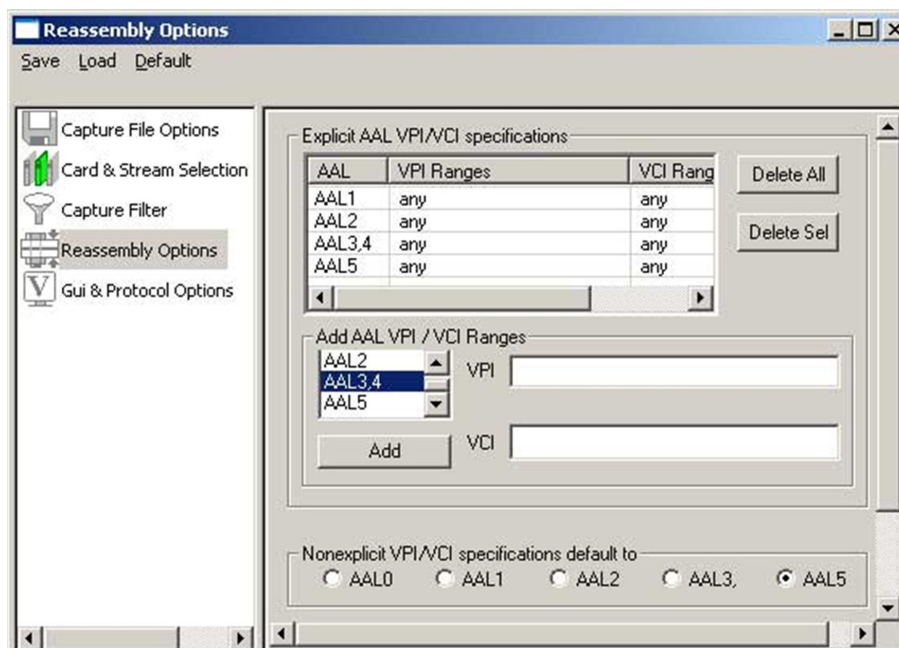


Figure: Reassembly Options

Save/Load All Configuration Settings

Protocol Configuration window provides a consolidated interface for all the important settings required in the analyzer. This includes various options such as protocol selection, startup options, stream/interface selection, filter/search criteria and so on. All the configuration settings can be saved to a file and then loaded for future operations. Users may also just revert to the default settings using the default option.

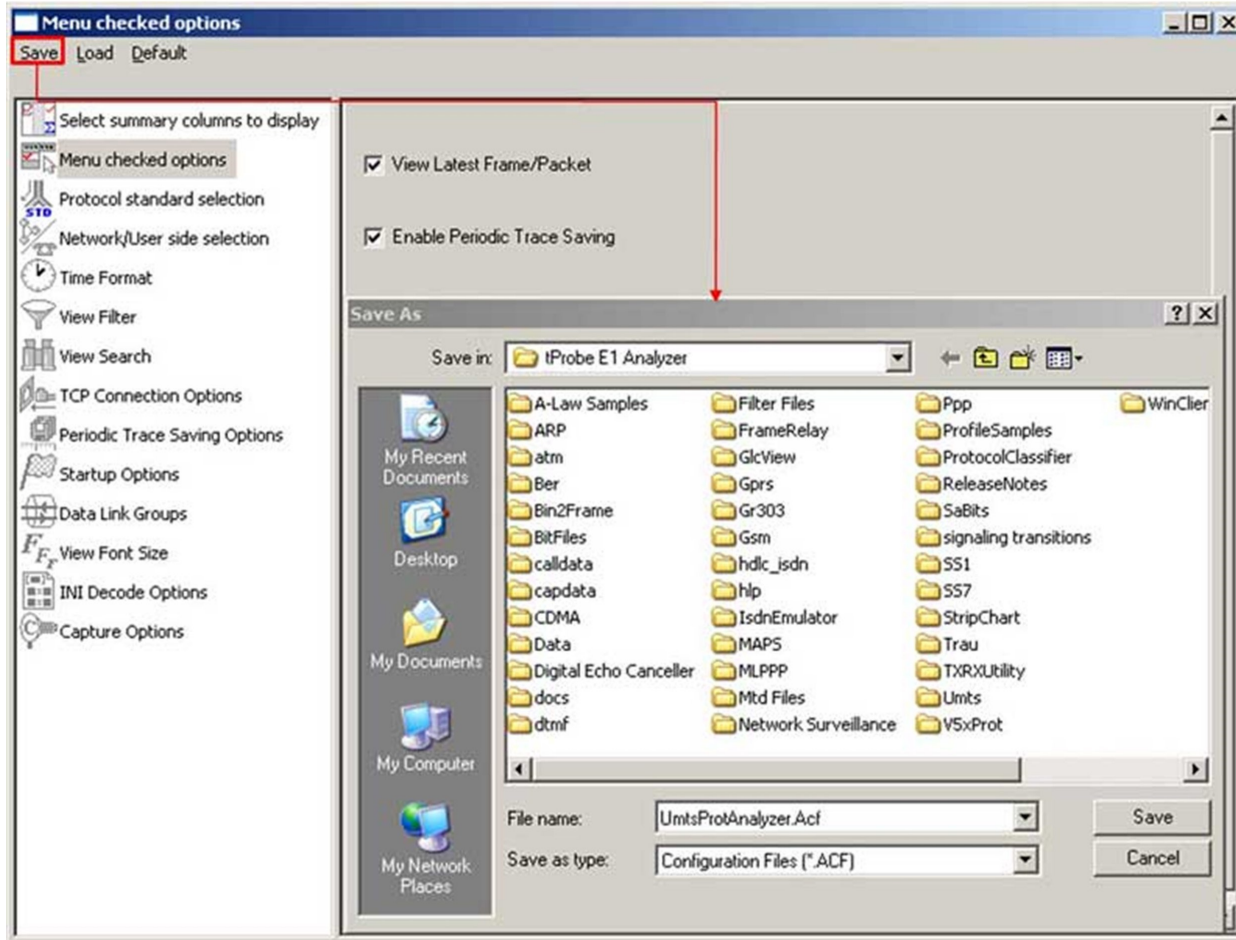


Figure: Save / Load Configuration

Call Detail Record and Statistics View

Important call specific parameters such as Call ID, Call disposition, Call duration, Mobile ID, Called/Calling Number, Call type (SMS/PDP/Setup/Location update etc) are displayed in the Call Detail View. Additionally, users are provided with the option to search a particular call detail record from the captured traces.

Various statistics can be obtained in statistics view to study the performance and trend in the UMTS network on protocol fields and parameters.

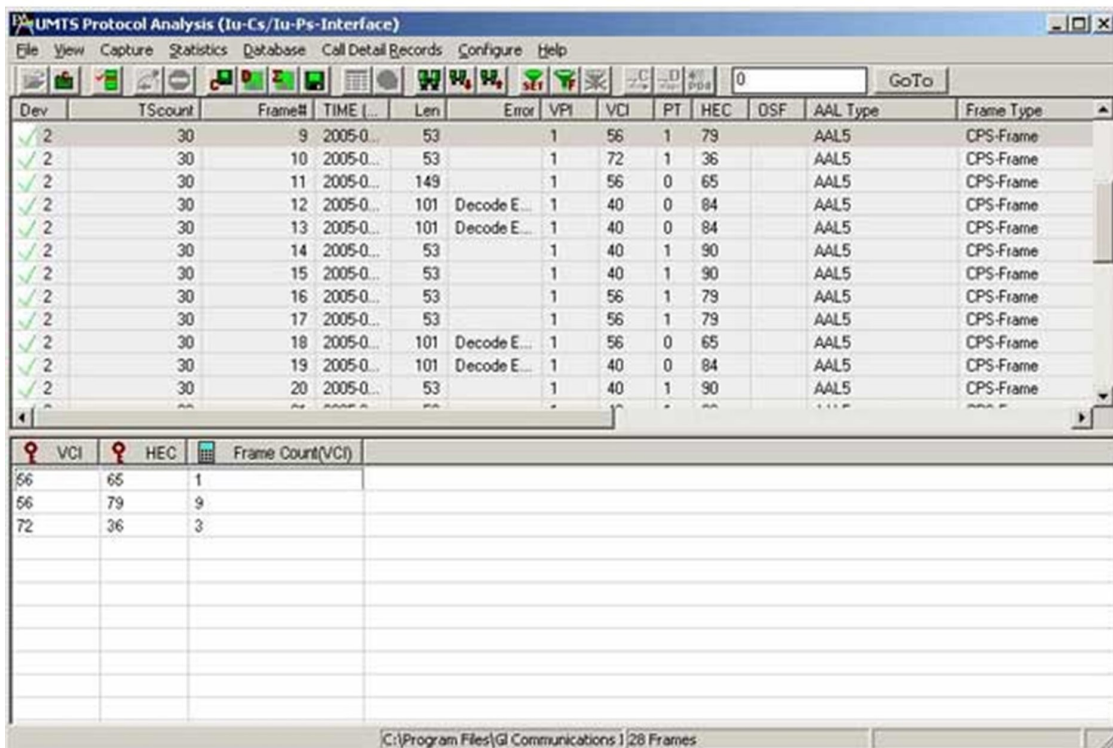
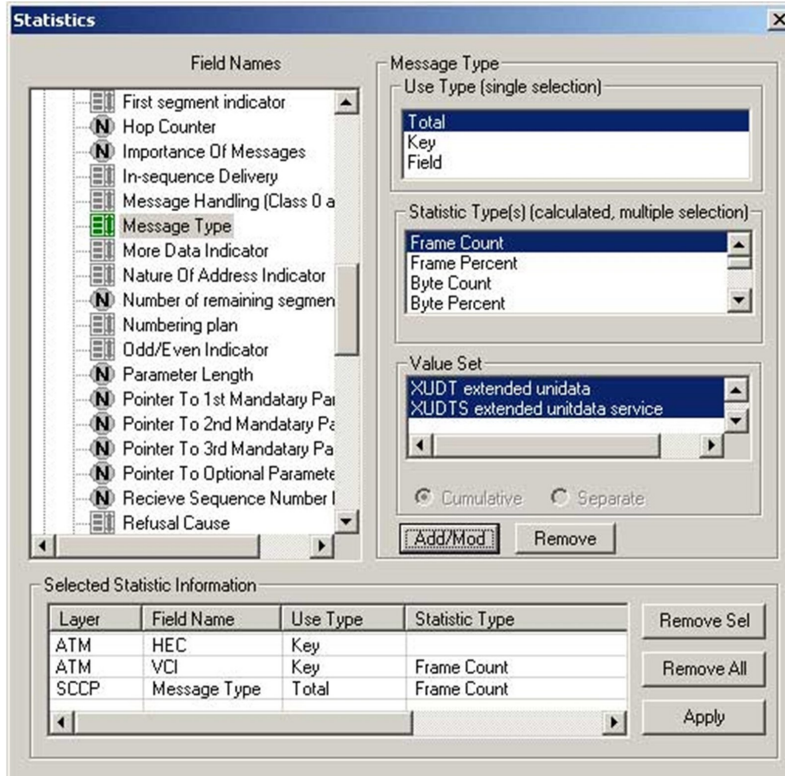


Figure: Statistics and Call Detail Record View

Supported Protocols Standards and Specifications

Available Standards	Supported Protocols	Specification Used
Iub-Interface	ATM	ITU-T I.361
Iu-Cs/Iu-Ps-Interface	AAL	ITU-T I.363
Iur-Interface	AAL2	Class B (ITU-T I.363.2)
Gn Gp	AAL5	Class C & D (ITU-T I.363.5)
	SSCOP	ITU-T Q.2110
	SSCF for UNI	ITU-T Q.2130 (07/94)
	AAL Type 2 (ALCAP)	ITU-T Recommendation Q.2630.1
	NBAP	3GPP TS 25.433 V6.3.0 (2004-09)
	Iub FP	GPP TS 25.427 V6.1.0 (2004-12) and 3GPP TS 25.435 V6.1.0(2004-03)
	RANAP	3GPP TS 25.413 V6.3.0 (2004-09)
	Iu-UP	GPP TS 25.415 V6.1.0
	MTP3-B	ITU-T Recommendation Q.2210
	RNSAP	3GPP TS 25.423 V6.4.0 (2004-12)
	SCCP ITU / ANSI	ITU-T Q.711-Q.714 / ANSI T1.112-1996
	SCTP	RFC 2960
	IP	RFC 791
	UDP	RFC 768
	GMM (GPRS Mobility Management) / SMG (GPRS Session Management)	3GPP TS 04.08 V7.19.0
	GSM CC / GSM MM	3GPP TS 04.08 V7.17.0
	SMS	3GPP TS 03.40 V7.5.0 & 3GPP TS 04.11 V7.1.0 GSM 03.38 version 7.2.0
	AMR	3GPP TS 26.101 V6.0.0
	SSSAR	ITU-T I.366.1
	UMTS MAC RLC	3GPP TS 25.321 V6.1.0 and 3GPP TS 25.322 V6.1.0
	RRC	3GPP TS 25.331 V6.4.0
	M3UA	RFC 3332
	SSCF-NNI (Service Specific Coordination Function - Network Node Interface) Protocol	ITU-T Recommendation Q.2140 (02/95)
	SAAL-NNI (Signaling ATM Adaptation Layer - Network Node Interface)	ITU-T Recommendation Q.2100 (07/94)

Buyer's Guide

Item No	Product Description
XX165	T1 E1 UMTS Protocol Analyzer
OLV165	Offline UMTS Analyzer

Item No	Related Hardware
PTE001	tProbe™ Dual T1 E1 Laptop Analyzer (Require Basic Software)
FTE001	QuadXpress T1 E1 Main Board (Quad Port)
ETE001	OctalXpress T1 E1 Daughter boards (Octal Port)
XTE001	Dual Express (PCIe) T1 E1 Boards
TTE001	tScan16™ T1 E1 Boards

Item No	Related Software
XX020	Record / Playback File Software
XX654	Inverse Multiplexing over ATM Protocol Emulator

For more details, visit [UMTS Protocol Analyzer](#) webpage.



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