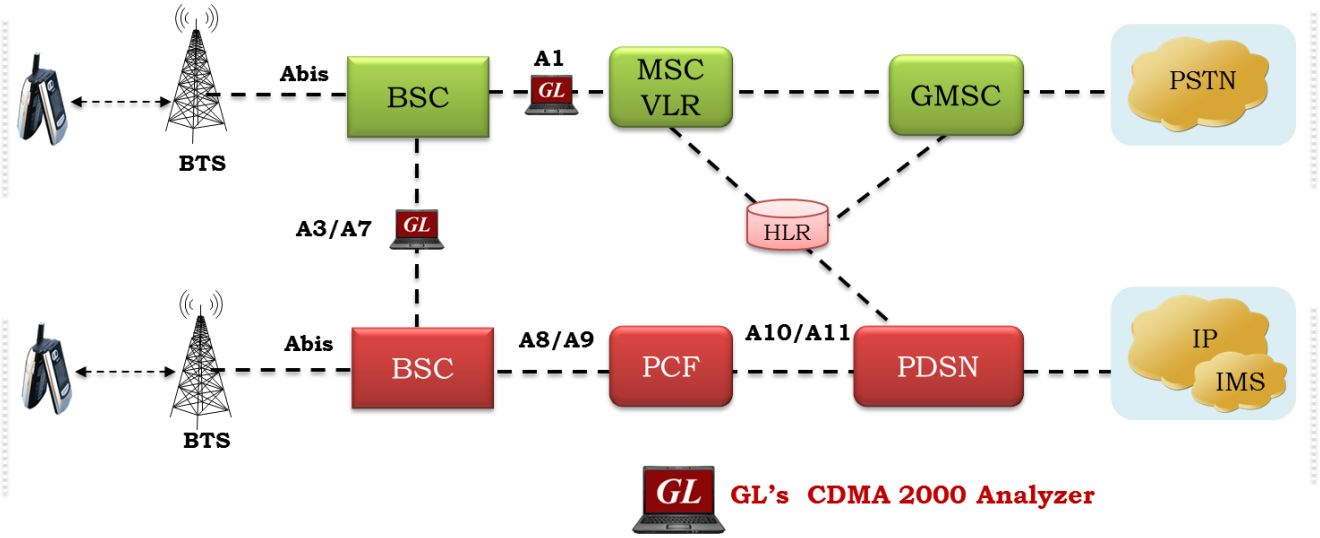
CDMA 2000 Protocol Analyzer



Overview

CDMA technology has undergone many stages of revolution to offer improved voice and data service to the end users. The latest 3G technology/CDMA 2000 1x EV-DV is capable of delivering integrated voice and simultaneous data multimedia services at peak data rates of 3.09 Mbps to the end subscriber. CDMA network has two sub-networks, Radio Access Network (RAN) and Core network, along with the following signaling interfaces (also shown in the above figure).Between BSC and BTS: Abis; Between BSC and BSC: A3 and A7 (also known as 'Ater'); Between BSC and MSC: A1 (also known as 'A').

GL's CDMA analyzer is used to analyze and view protocols across A, Ater, Aquinter, and Aquater signaling interfaces. GL Communications supports the following types of CDMA analyzers:

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

For more details, refer CDMA 2000 Protocol Analyzer webpage.

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Main Features

Display Features

- Displays Summary, Detail, Hex-dump, and Statistics Views
- 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
- Summary View displays Device Number, Time Slots: Sub channels, Frame number, Time, Frame length, and etc in a tabular format
- 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

- BSAP, MTP2 (ITU), MTP3 (ITU), MTP3 (ANSI), SCCP Management, SCCP ITU, SCCP ANSI, Test & Network Management Messages (ITU), Test and Network Management Messages (ANSI)

Filtering / 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

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

Remote Monitoring

- Remote monitoring capability using GL's Network Surveillance System

Additional Features

- 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

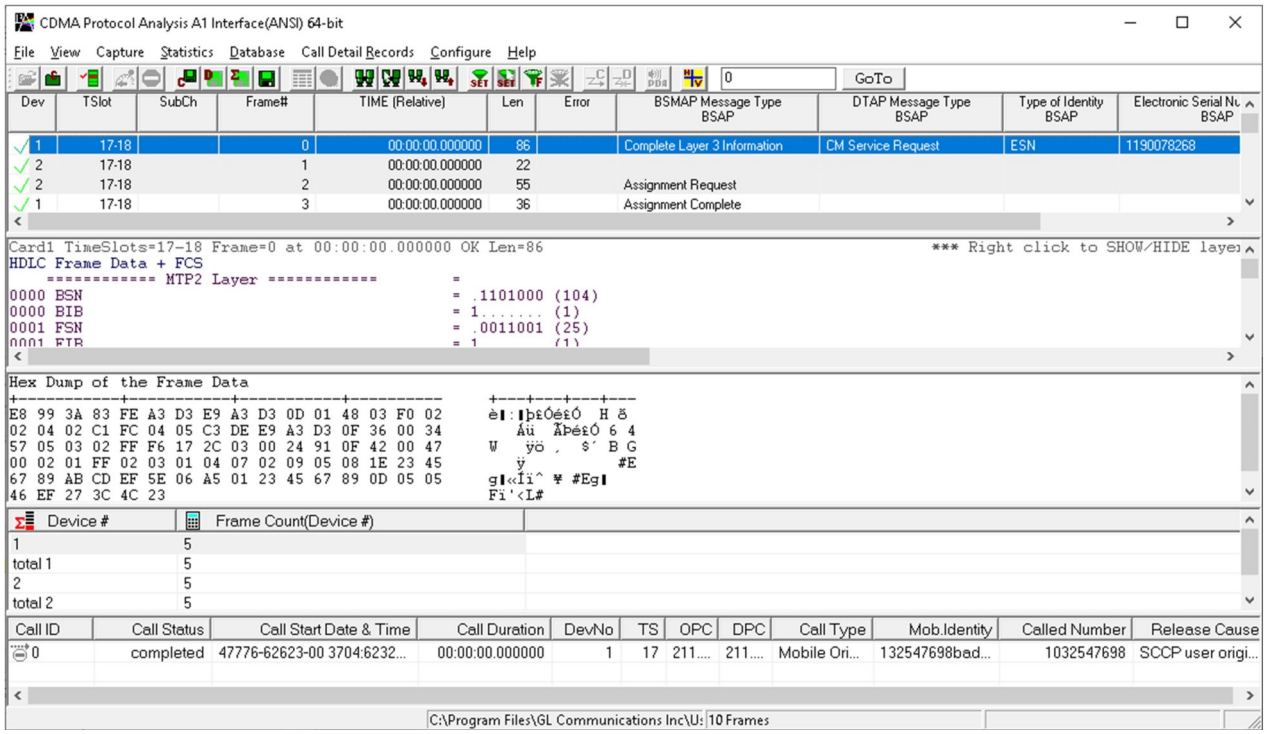
Main Features (*Contd.*)

Capturing Streams

- For A1 interface, streams can be captured on the selected time slots (contiguous or non-contiguous), sub-channels or full bandwidth
  - Frames captured can be filtered real-time based on length of frames (FISSU – Length as 5 and LSSU – Length as 7) can be set
  - Data transmission rate starting from 8kbps to N*64kbps is supported
  - Timeslots selection can be contiguous or non – contiguous
  - Supports decoding of frames with FCS of 16 bits and 32 bits, or none
  - Call Detail Recording feature includes data link groups that help in defining the direction of the calls in a given network and form logical groups comprised of unidirectional (either 'Forward' or 'Backward') data links
- For A3 A7 interface, Streams may be captured on the selected time slots (contiguous or non-contiguous) and on full bandwidth
  - Captures, decodes, filters, and reassembles (with or without Inverse Multiplexing option) AAL-2 and AAL-5 frames in real-time, from within the ATM cells according to user defined VPI/VCI
  - Real-time capturing requires user to specify timeslots, bit inversion, octet bit reversion, user/network side, ATM mapping, scrambling, and inverse multiplexing options
  - Streams may be captured on the selected time slots (contiguous or non-contiguous) and on full bandwidth
  - Unscrambling of ATM cells based on SDH $X^{43} + 1$ algorithm

Summary, Detail, and Hex dump Views

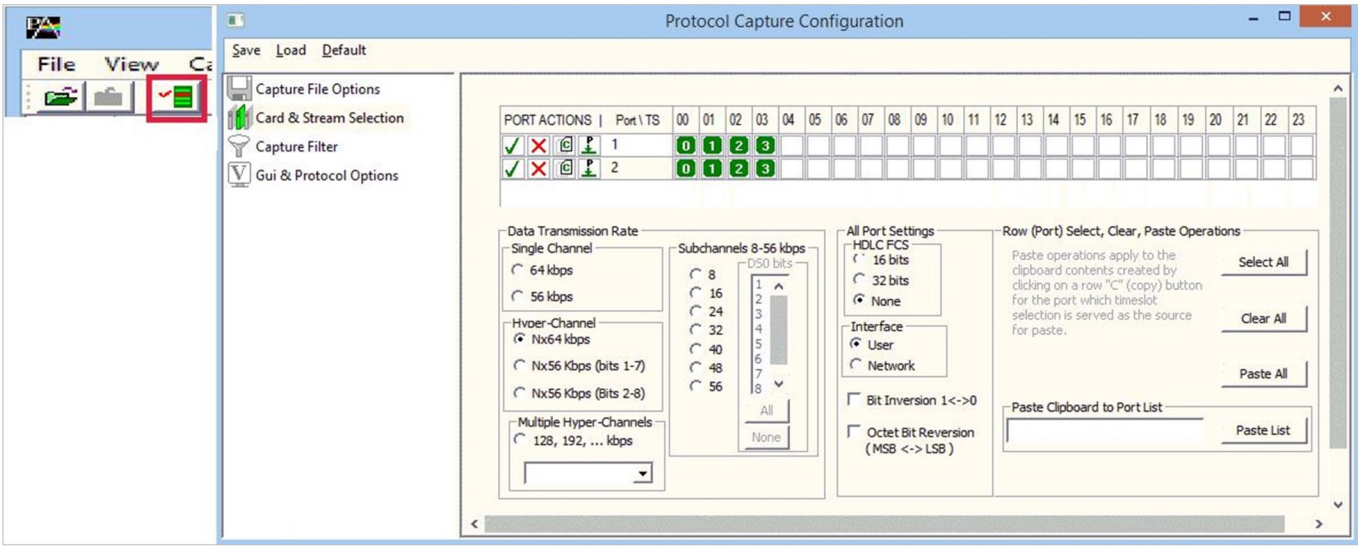
The analyzer displays Summary, Detail, and Hex dump Views in different panes. The Summary View displays frame number, time, length, message types, and IP source and destination addresses and so on. User can select a frame in Summary View to analyze and decode each frame in the Detail View. The Hex dump View displays the frame information in HEX and ASCII octet dump format.



Summary, Detail, and Hex dump Views

Real-time and Offline Analysis

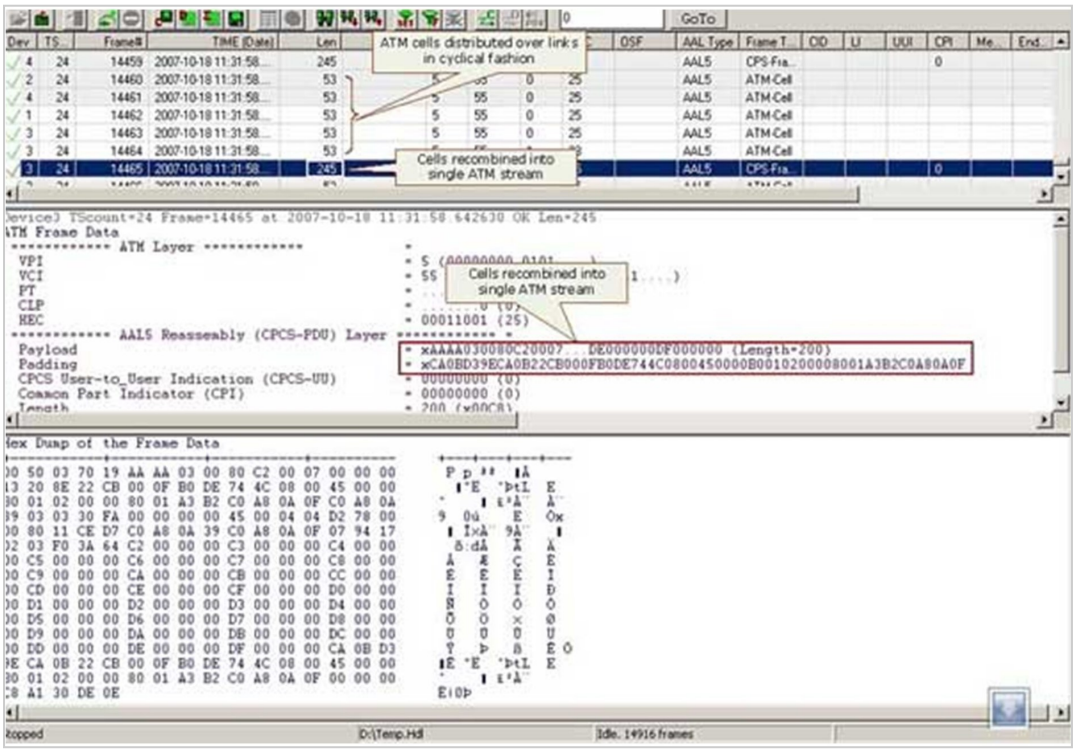
Users can capture and analyze CDMA frames using real-time and record all or filtered traffic into a trace file. The recorded trace file can be used for offline analysis or exported to a comma-delimited file, or ASCII file. For real-time capture in A1 interface, users specify timeslots, bit inversion, octet bit reversion, user/network side, FCS, and data transmission rate options. In case of A3, A7, additional options such as ATM Mapping, scrambling, and inverse multiplexing can be specified. In case of A9 A11 interface, Ethernet boards have to be specified on which data can be received.



Stream / Interface Selection

Inverse Multiplexing in CDMA A3A7

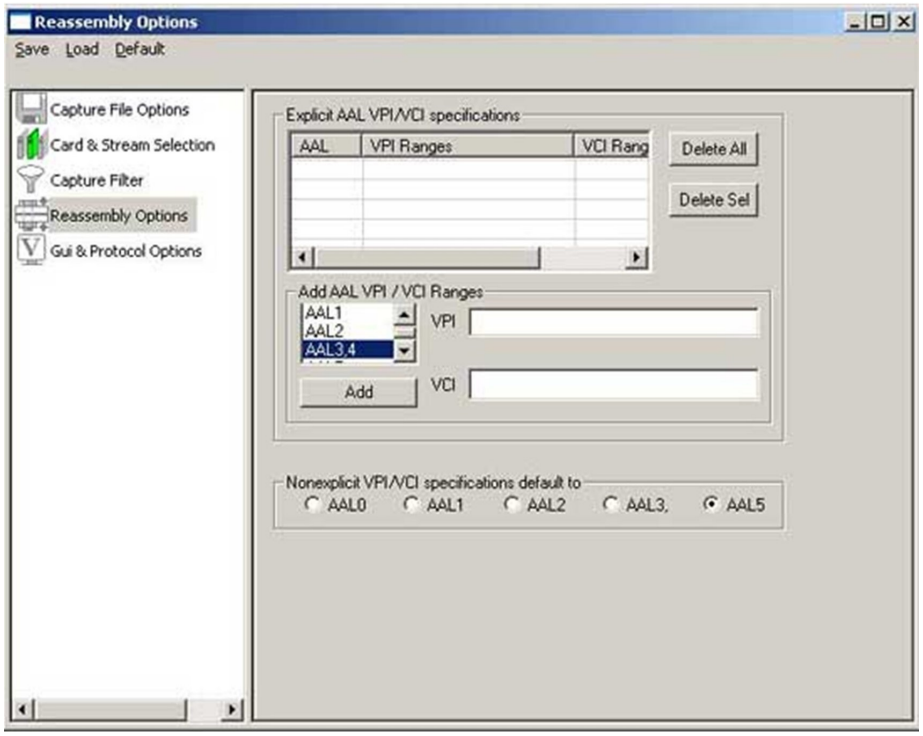
The CDMA Analyzer can capture & reassemble frames that were transmitted with Inverse Multiplexing option. With Inverse Multiplexing over ATM (IMA) feature, up to 8 T1 E1 links can be configured to form a high-speed connection. ATM cells are transmitted across multiple interfaces in a cyclical fashion,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



Captured ATM Frames with IMA in A3A7 Interface

Reassembly in CDMA A3A7

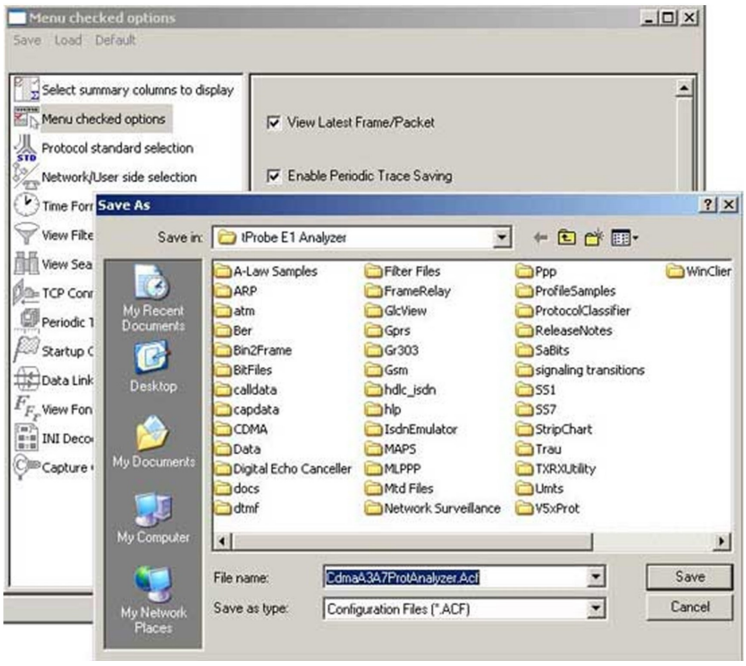
Using reassembly option user can specify VPI /VCI value to reassemble using the segmentation and reassembly rules defined by the specified AAL type.



Reassembly Options in A3A7 Interface

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.

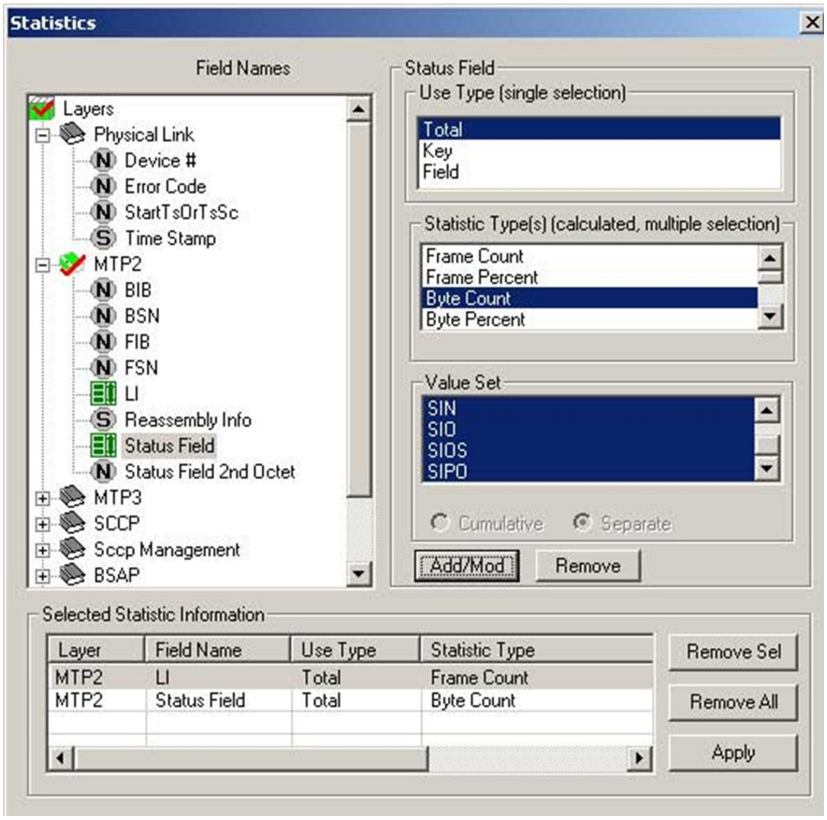


Real-time and Offline Filter for A1 Interface

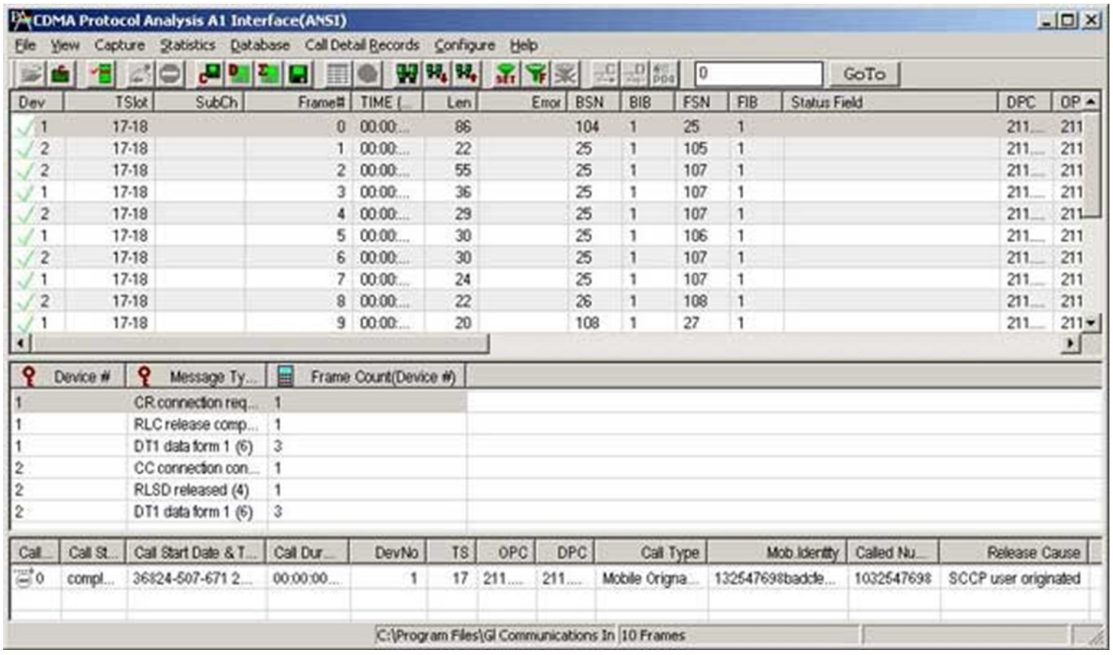
Call Detail Record and Statistics View

Important call specific parameters like Call ID, Call Status, Call duration, Called Number, Release Cause 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 CDMA network based on protocol fields and parameters.



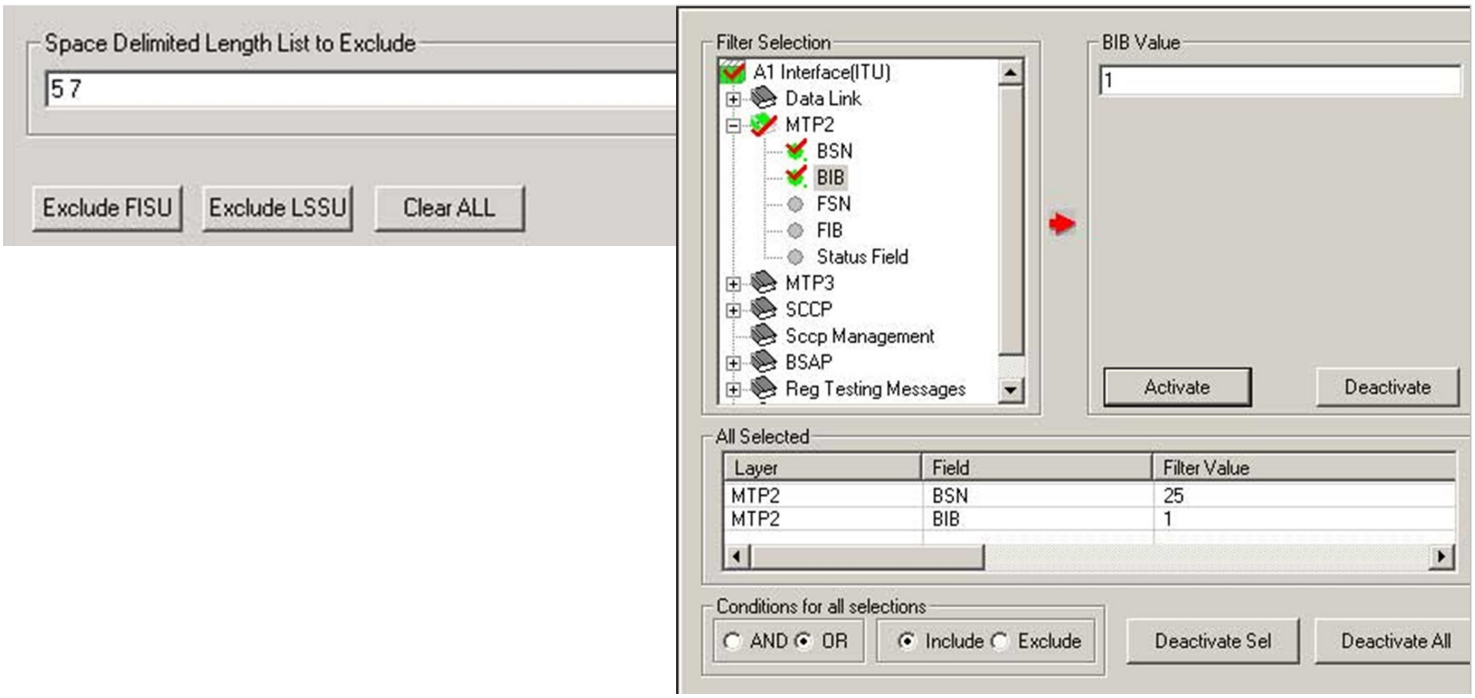
Statistics View Selection



Call Detail Record View for A1 Interface

Filtering and Search

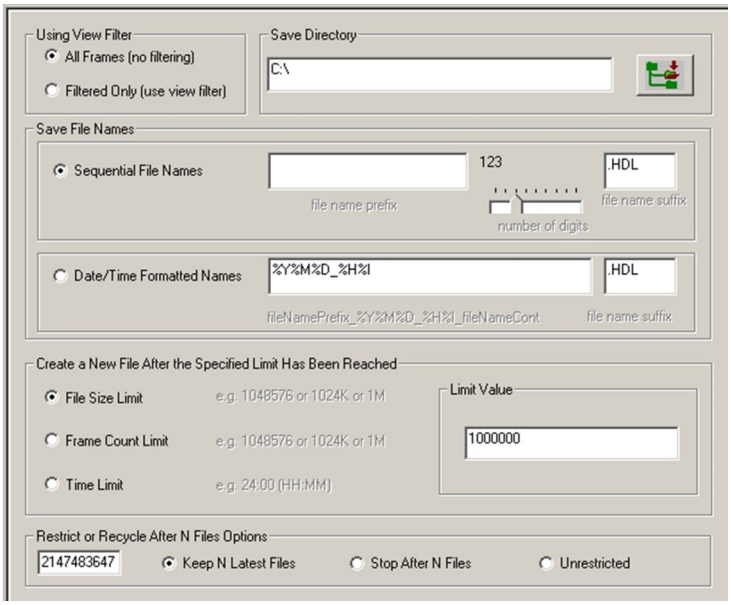
Users can record all or filtered traffic into a trace file and also can create search/filter criteria automatically from the current screen selection. The filter and search options add a powerful dimension to the CDMA analyzer that isolates required frames from the captured frames in real-time/remote/offline. For A1, real-time capturing filter based on length of frames can be set. For A3 and A7 interfaces, users can also specify custom VPI, VCI, and PT type values to filter and reassemble frames during real-time capture. . Similarly, search capability helps user to search for a particular frame based on specific search criteria.



Real-time and Offline Filter for A1 Interface

Enhanced Trace Saving Options

Users can control the captured trace files by saving the trace using different conventions such as trace files with user-defined prefixes, trace file with date-time prefixes, and slider control to indicate the total number of files, file size, frame count, or time limit. This feature also allows the captured frames to be saved into a trace file based on the filtering criteria set using display filter feature.

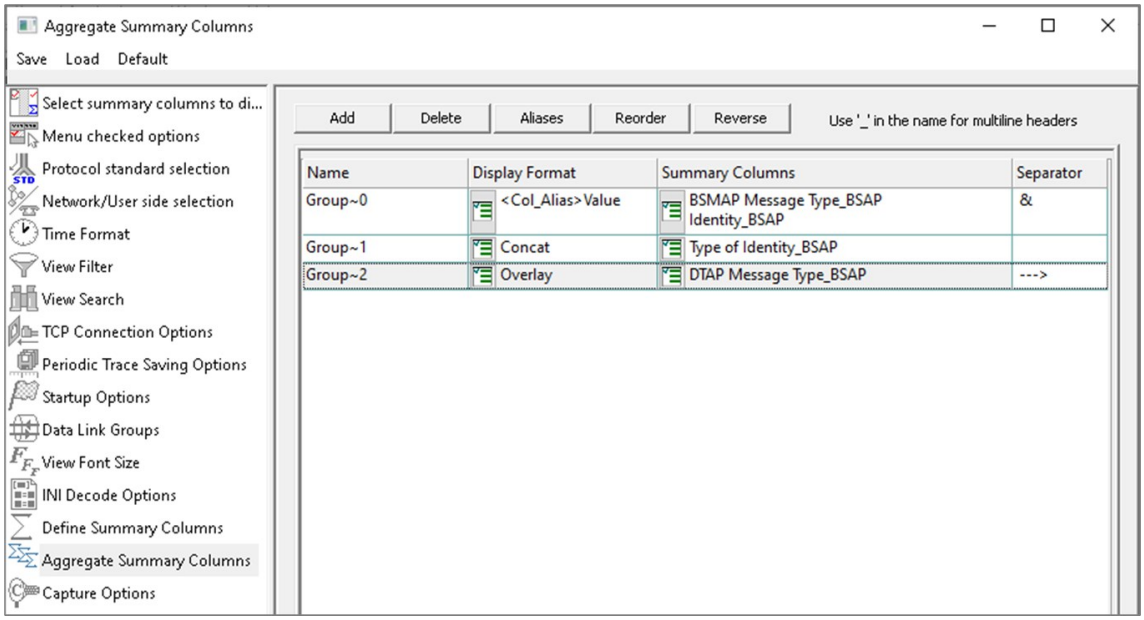


Enhanced Trace Saving Options

Aggregate Column Group

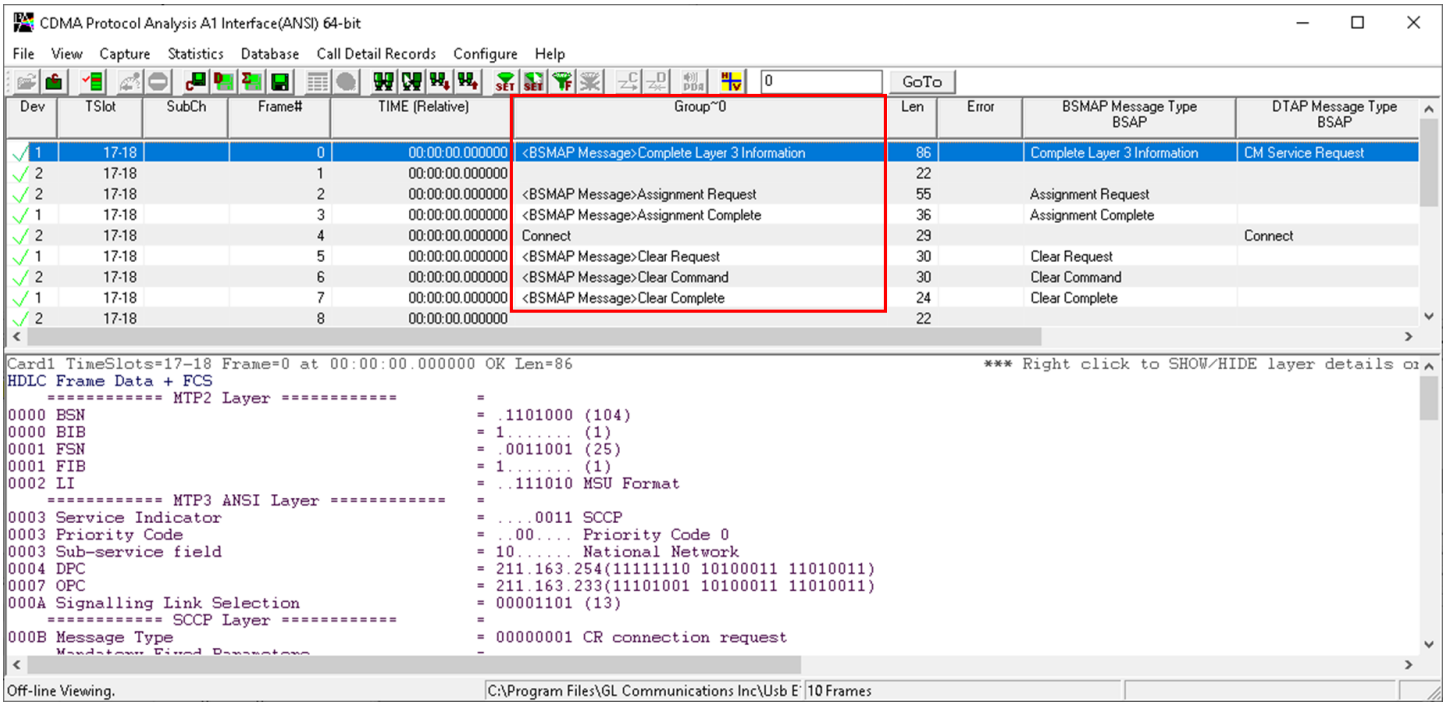
The enhanced feature of the protocol analyzer is aggregate column groups. The user can also create multiple aggregate column groups and prioritize the groups as per the requirement to display the summary results in an efficient way.

If the user has five different aggregate columns and wants to prioritize some columns, the user can create a group of aggregate columns with the highest priority and will display only the columns of chosen priority. If the values are null, then the next group values are displayed. The aggregate columns comprising a group will have the same prefix and suffix index as ~0, ~1 … ~N. The **group~0** is the root aggregate group that has the highest priority.



Aggregate Column Group

The updated results are as shown in the figure below. Here the root aggregate group~0 summary columns are displayed first and then Group~1 and Group~2 as per the assigned priority if the higher group values are null.



Display of Aggregate Column Group in Summary View

Supported Protocol Standards

Available Standards	Supported Protocols	Specification Used
A1 Interface (ANSI)	BSAP	3GPP2 A.S0014-A, Version 2.0.1 July 2003
A1 Interface (ITU)	MTP2 (ITU)	ITU-T Q.703
A3/A7 Interface	MTP3 (ITU)	ITU-T Q.704
	MTP3 (ANSI)	ANSI T1.111-1996
	SCCP Management	ITU-T Q.711 (07/96)
	SCCP ITU	ITU-T Q.711 to Q.714
	SCCP ANSI	ANSI T1.112
	Test & Network Management Messages (ITU)	ITU-T Q.703, Q.704
	Test & Network Management Messages (ANSI)	ANSI T1.111.4, ANSI T1.111.7
	A3/A7 Interface	3GPP2 A.S0015-C, Version 1,0 February2005
	ATM	ITU-T I.361
	AAL	ITU-T I.363
	SSSAR	ITU-T I.366.1
	AAL2	Class B (ITU-T I.363.2)
	AAL5	Class C & D (ITU-T I.363.5)
	IP	RFC 791
	TCP	RFC 793
	MAC	IEEE 802.3
	IP	RFC 791
	TCP	RFC 793
	UDP	RFC 768

Buyer's Guide

Item No	Product Description
XX142	T1 E1 Real-Time CDMA2000 Protocol Analyzer
OLV142	Offline T1 or E1 CDMA Protocol 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)
TTE001	tScan16™ T1 E1 Boards
XTE001	Dual Express (PCIe) T1 E1 Boards

Item No	Related Software
XX090	HDLC Capture and Playback Software (T1 or E1)
XX160	ATM Analysis Software (T1 E1)

Note: PCs which include GL hardware/software require Intel or AMD processors for compliance.

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