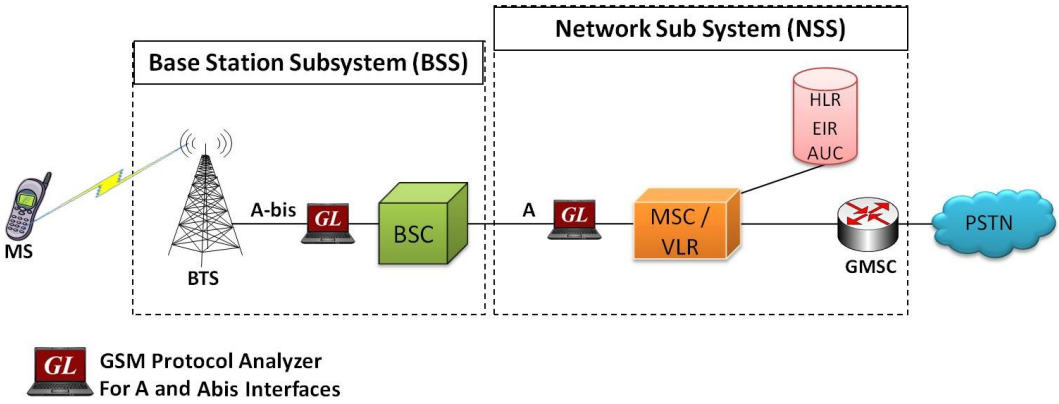
GSM Protocol Analyzer



Overview

GL's **GSM Analyzer** is used to analyze GSM protocols, a switching and signaling telecommunication protocol between MSC and BSC, BSC and BTS and so on. GSM Analyzer also supports decoding proprietary 'Mobis' Interface (Motorola equivalent of the GSM A-bis interface - requires additional license XX151) between BSC (Base Site Controller) - BTS (Base Transceiver Station) and BSC (Base Site Controller) - PCU (Packet Controller Unit).

GSM Analyzer also supports complete analysis, decode and monitoring of GSM-Railway (GSM-R) - an international wireless communications standard for railway communication and applications. These probes now supports Packet Data Analyzer with recording capabilities. Packet Data Analysis (PDA) is an outstanding tool for live monitoring of signaling and traffic over TDM. Allowing users to monitor live TDM networks including capture, analysis, and reporting of every call-in detail.

GSM analyzer collects physical and line level status and performance information, voice, data, protocol, statistics, and transmit information to a central / distributed Network Management System (NMS).

GL Communications supports the following types of GSM analyzers:

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

For more details, refer GSM Protocol Analysis webpage.

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 MTP2, MTP3 information, GSM Message types, information about various channels used during the call, and so on in a tabular format
- 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 create multiple aggregate column groups and prioritize the groups as per the requirement to display the summary results efficiently

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Main Features (*Contd.*)

Supported Protocols

- A, A-bis, Mobis, Gs, Up, Ls, Lb, and Lp

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

Capturing Streams

- Streams can be captured on the selected time slots (contiguous or non-contiguous), sub-channels or full bandwidth
- Frames can be transmitted/captured in either 64 kbps, 56 kbps, n x 64 kbps, or n x 56 kbps data channels (hyper-channels)
- Multiple streams of GSM traffic on various T1 E1 channels can be simultaneously decoded with different GUI instances

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

- Decoding of many RR layer non-transparent messages such as “System Information”, “Measurement Result”, “Immediate Assignment” etc.
- Decodes many SS layer messages such as Register, Facility, Release Complete
- User to User Information IE is added to GSM CC, BCC and GCC protocols to support GSM-R features according to EIRENE specification (H 22 T 0001 2) and ETSI TS 102 610

Call Detail Recording

- 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

Packet Data Analyzer (PDA)

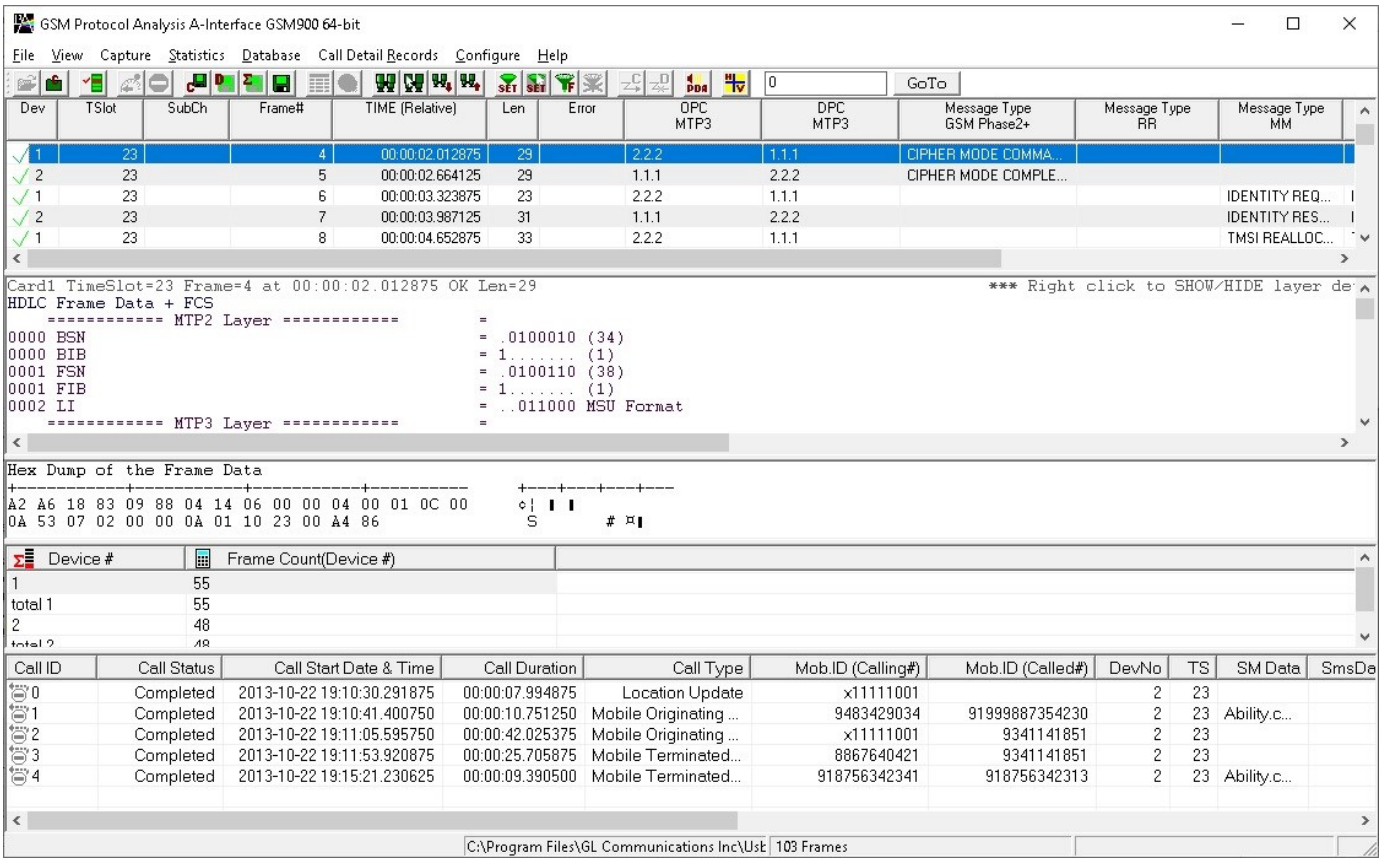
- Provides options to capture voice, digits, tones or FAX traffic
- Segregates, captures, and collects statistics on TDM calls
- Provides graphical representation of call analysis, such as ladder diagrams of protocols

GSM-R Services

- Supports monitoring GSM-R services as per GSM supplementary services (GSM-SS)
  - Enhanced Multi-Level Precedence and Pre-emption (eMLPP)
  - Line identification services like CLIP, CLIR etc
  - Call Forwarding, Call Waiting, and Call Hold
  - MultiParty
  - Closed User Group
  - Advice of Charge
  - Call Barring and Call Deflection
  - User-to-user signaling
  - Follow Me (Based on USSD and CF)
  - Voice Group Call Service (VGCS)
  - Voice Broadcast Service (VBS)
  - Location Services, USSD and more

Summary, Detail, and Hex dump Views

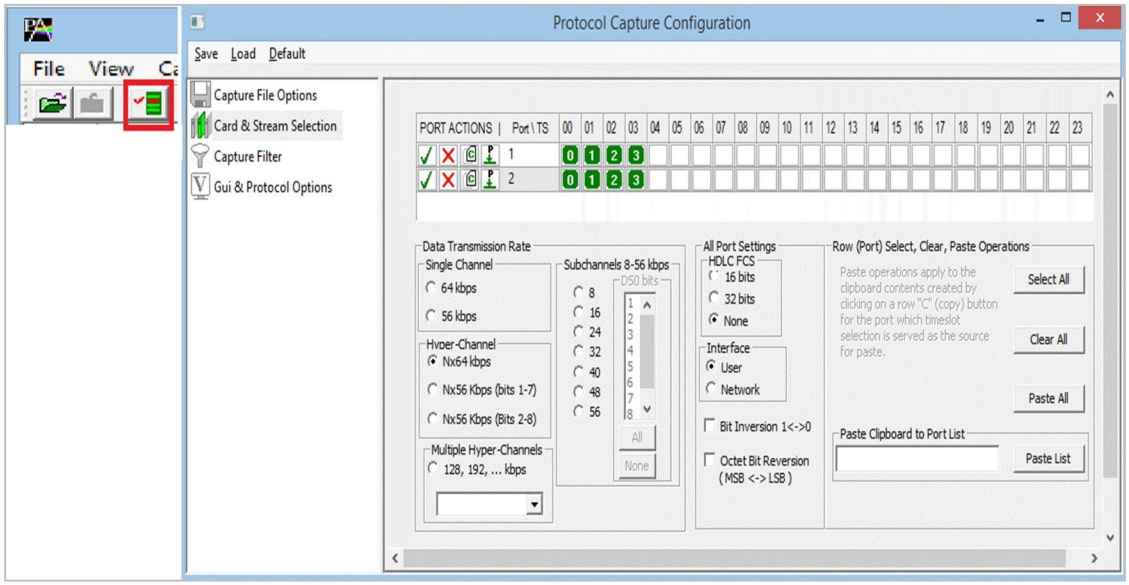
The analyzer displays Summary, Detail, and Hex Dump Views in different panes. Summary View displays Dev#, Time Slot, Frame#, Time, Length, Error, BSN, BIB, FSN, FIB, Status Field, SLC, DPC, OPC, SCCP Message, and so on. User can select a frame in Summary View to analyze and decode each frame in the Detail View. The Hex dump View displays the frame information in HEX and ASCII format. The contents of detail and hex dump view can also be copied to clipboard.



Summary, Detail, and Hex dump Views

Real-time and Offline Analysis

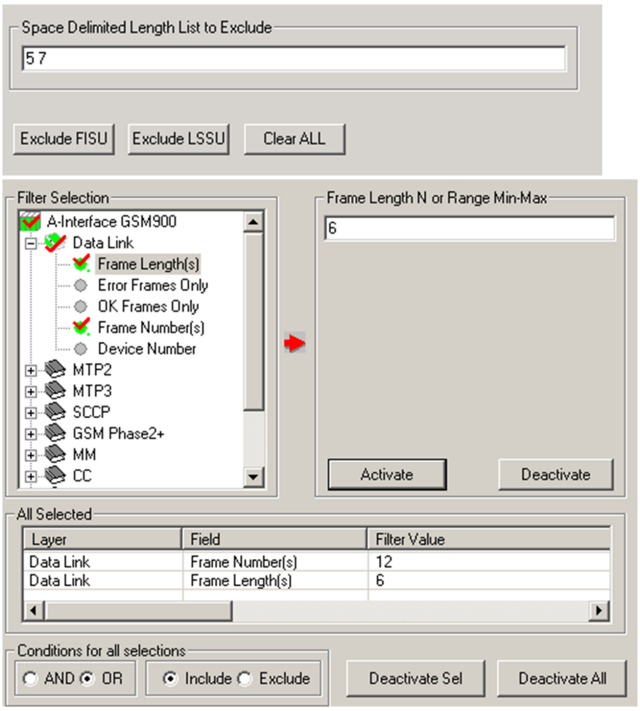
Users can capture and analyze GSM frames in real-time and record all or filtered traffic into a trace file. The recorded trace file can be used for offline analysis or exported to a comma-delimited file, or ASCII file. Real-time capturing requires user to specify timeslots, bit inversion, octet bit reversion, user/network side, FCS, and data transmission rate. Recorded trace file can be played back using the HDLC Playback application.



Stream / Interface Selection

Filtering and Search

User 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 GSM Analyzer that isolates required frames from the captured frames in real-time/remote/offline.. Users can specify custom values for frame length to filter frames during real-time capture. The frames can also be filtered after completion of capture based on Data Link, MTP2, MTP3, SCCP, LAPD, BTSM, RR, MM and more.Similarly, search capability helps user to search for a particular frame based on specific search criteria.

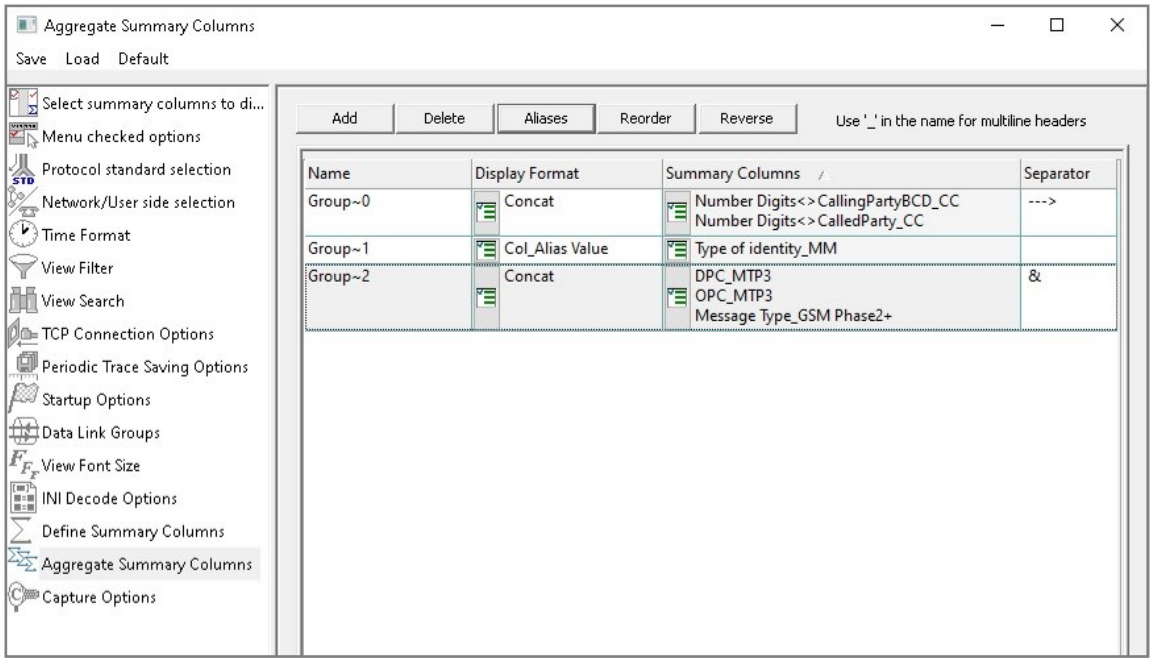


Real-time and Offline Filter

Aggregate Column Group

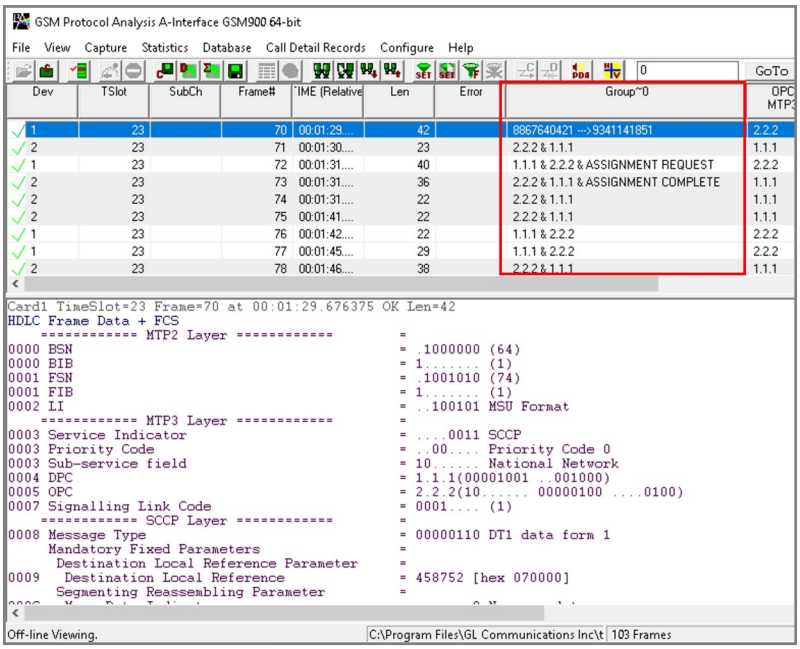
The enhanced feature of the protocol analyzer is aggregate column groups. The user can also create multiple aggregate column groups and prioritize the groups as per the requirement to display the summary results in an efficient way.

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.

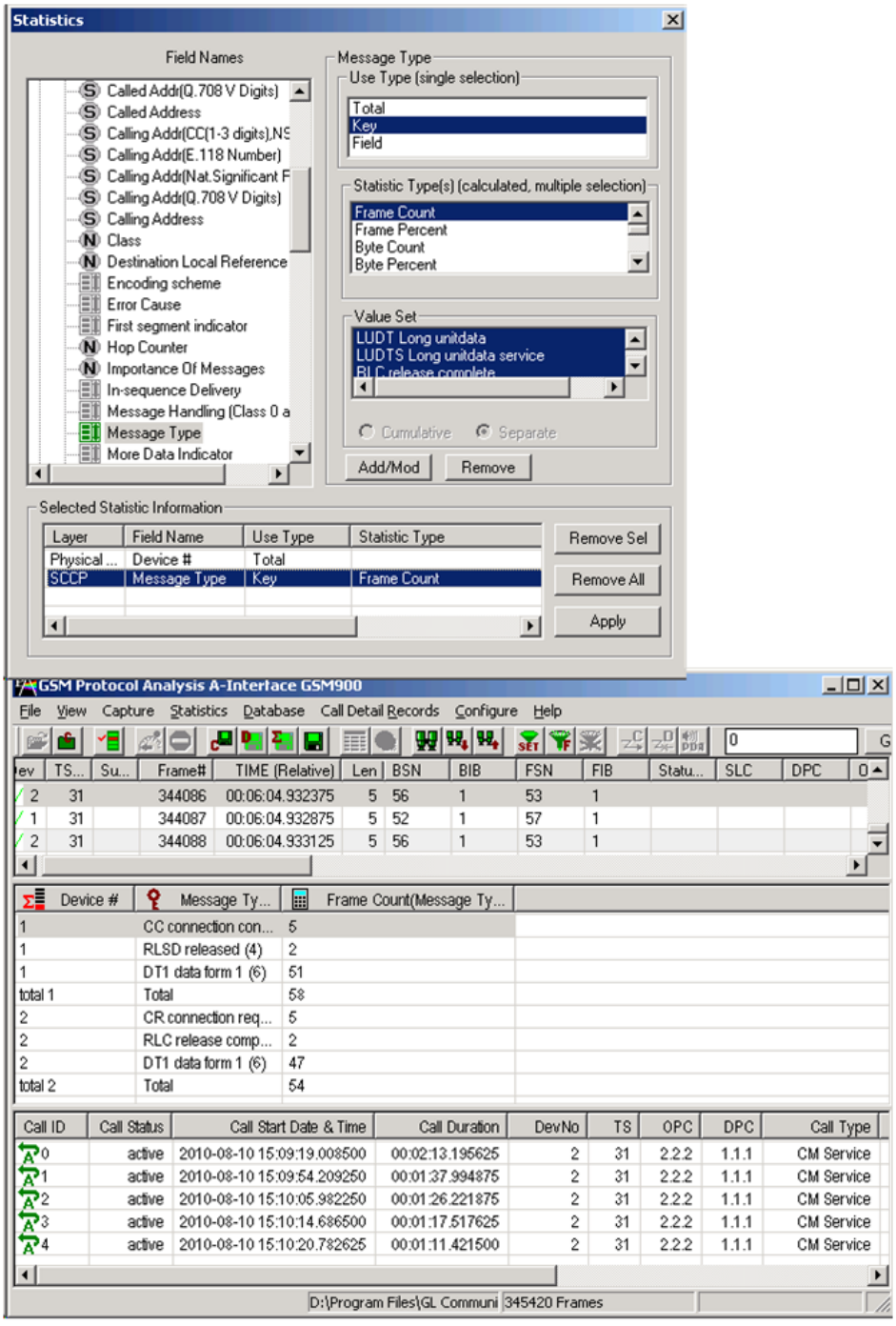


Aggregate Column Group Display

Call Detail Record & Statistics View

Important call specific parameters like Call ID, Call disposition, Call duration, OPC/DPC, Call type (point-to-point/point-to-multipoint etc) are calculated based on signaling messages, and displayed in 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 GSM network based on protocol fields and parameters.



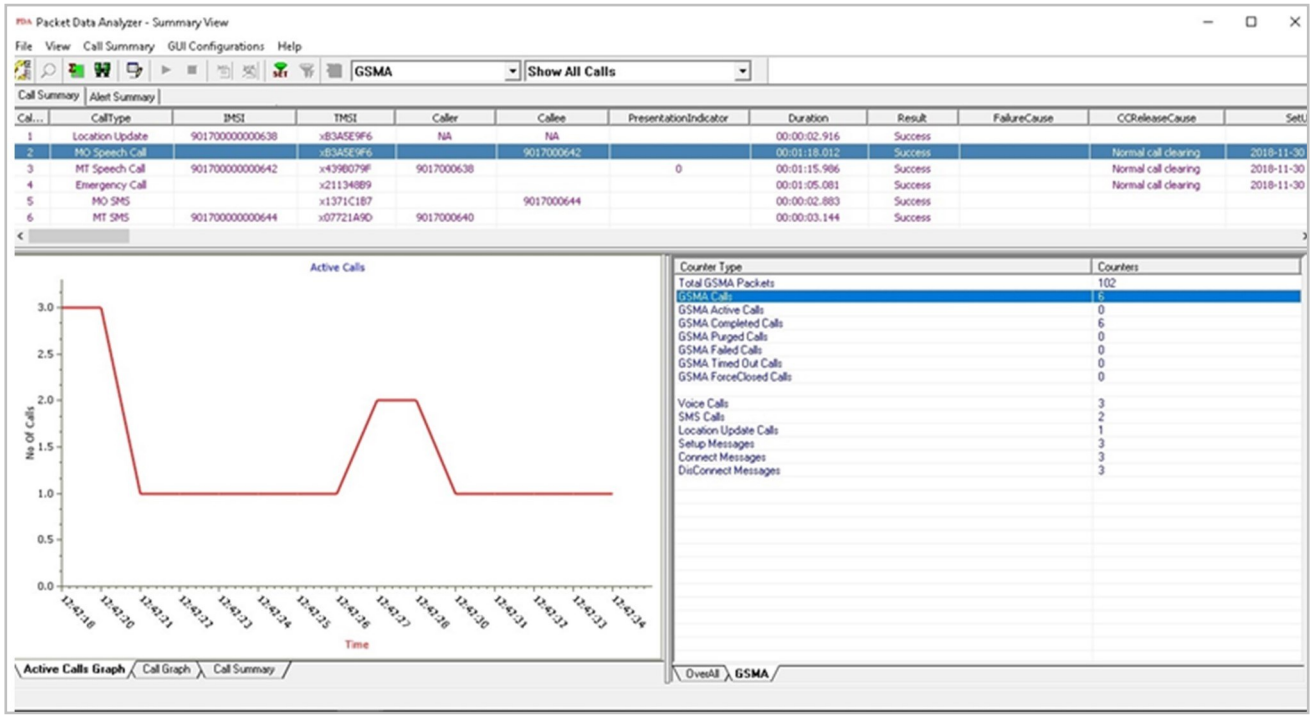
Statistics and Call Detail Record View

Detail Packet Analysis (PDA)

Packet Data Analysis (PDA) is an outstanding tool for live monitoring of signaling and traffic over TDM. Packet Data Analysis (PDA) is distributed with GL's CAS, ISDN, SS7, and GSM protocol analyzer. Allowing users to monitor live TDM networks including capture, analysis, and reporting of every call-in detail.

GL's Packet Analyzers can capture TDM traffic over different transmission lines, including T1, E1, T3, E3, and OC-3 STM-1 / OC-12 STM-4. PDA then processes the captured frames, identifies, and segregates calls based on signaling parameters to generate reports.

Performance metrics for each call includes Caller and Callee id information, call duration, status, call-initiated time, call established time, call stop time, call terminator, call failure reason, and total signaling frames. Graphs are provided for key values to give a pictorial representation of the statistics.



Call Capture Option with PDA

Scripted GSM Emulation over A and Abis interfaces using MAPS™

GL's GSM A Interface Emulator is an advanced protocol simulator/tester for GSM simulation over A Interface that can simulate BSSMAP and DTAP messages and signaling specification as defined by 3GPP standards.

For more details, visit MAPS™ GSM A Interface Emulator webpage.

GL's GSM Abis Interface Emulator is an advanced protocol simulator/tester for GSM simulation over Abis Interface that can simulate BTSM messages and signaling specification as defined by 3GPP standards.

For more details, visit MAPS™ GSM Abis Interface Emulator webpage.

Supported Protocol Standards

Supported Protocols	Specification Used
TCP, UDP, IP, MAC	RFC 793, RFC 768, RFC 791, IEEE 802.3
MTP2	Q.703, ITU-T Blue Book / ANSI T1.111-1996
MTP3	Q.704, ITU-T Blue Book / ANSI T1.111-1996
SCCP	Q.713, CCITT (ITU-T) Blue Book / ANSI T1.112-1996
GSM Phase2 + BSSMAP / DTAP (BSSAP/ DTAP)	3GPP TS 48.008 10.0.0)
SMS	3GPP TS 03.40 V7.5.0 & 3GPP TS 04.11 V7.1.0 GSM 03.38 version 7.2.0 Release 1998
Test & Network Management Messages (ITU / ANSI)	ITU-T Q.703, Q.704 / ANSI T1.111.4, ANSI T1.111.7
MM / CC	3GPP TS 04.08 V7.17
RR	3GPP TS 04.18 V8.13.0
GSM-SS	3GPP TS 24.080 Release 5. – EIRENE FRS (Functional Requirements Specification) 7.1 – EIRENE SRS (System Requirements Specification) 15.1
LAPD	Q.921, CCITT (ITU-T)
BTSM	3GPP TS 08.58 V8.6.0
BSSAP +	3GPP TS 29.018 V6.0.0
RRLP / LLP	3GPP TS 44.031 V 7.5.0 / 3GPP TS 44.071 V 6.0.0
SMLCPP / BSSLAP	3GPP TS 48.031 V 6.6.0 / 3GPP TS 48.071 V 7.2.0
BSSAP-LE (BSSMAP-LE/DTAP-LE)	3GPP TS 49.031 V7.3.0
Mobis Layer 3	BSC-BTS: Motorola GSM Base Station System BSC to BTS Interface Design Specification. Document ID: GSD-GSM_NRS-MULTI_FA-IDS-001. BSC-PCU: Motorola GSL External Interface Specification - GSR9. Document ID: GSD-GSR9-GSL-EIS-001.
UMA Protocols (Stage 3) R1.0.4	TS 24.008, Mobile radio interface layer 3 specification, Core Network Protocols - Stage 3 TS 25.331, RRC Protocol Specification TS 44.018, Mobile radio interface layer 3 specification TS 48.018, Serving GPRS Support Node (SGSN) TS 48.008, BSS GPRS Protocol (BSSGP) TS 45.008, Radio subsystem link control
GCC / BCC	3GPP TS 44.068 V9.0.0 / 3GPP TS 44.069 V9.0.0
MAC	IEEE 802.3
IP	RFC 791
TCP	RFC 793
UDP	RFC 768

Buyer's Guide

Item No	Product Description
XX150	Real-time GSM Protocol Analyzer (T1 or E1)
OLV150	Offline GSM Analyzer
XX151	GSM Motorola Mobis option (Optional license)

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)
XX600	Basic Client/Server Scripted Control Software (Included with Basic Software)
XX693	GSM A-bis Interface Emulator
XX692	GSM A Interface Emulator
PKV170	NetsurveyorWeb™ (Perpetual License, Unlimited Users/Nodes) – Includes Oracle 11g Standard Edition One and Standard Server-Grade Computing Platform

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

*Specifications and features subject to change without notice.

For more details, refer GSM Protocol Analysis webpage.

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