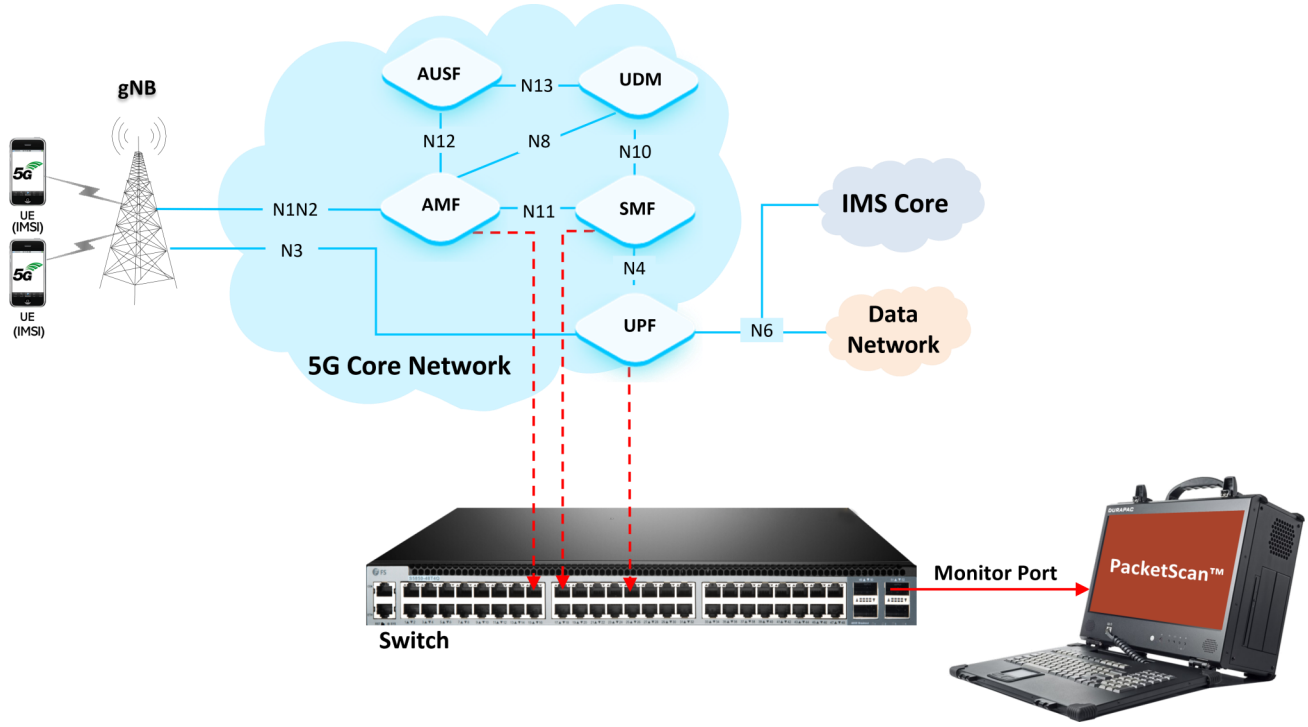
PacketScan™ 5G Protocol Analyzer



Overview

5G is a fifth generation mobile technology for cellular networks. 5G covers three main verticals namely, Enhanced Mobile Broadband (eMBB), Massive Machine Type Communications (mMTC), and Ultra Reliable Low Latency Communications (URLLC) to support a wide variety of use cases such as Smart cities, AR/VR, self-driving cars, IOT etc.

GL's 5G Protocol Analyzer offers comprehensive monitoring capabilities for 5G networks. It captures, decodes, and collects statistics over the N1N2, N4, N8, N10, N11, N12, and N13 interfaces, providing valuable insights into network performance and behavior.

The 5G protocol analyzer is an optional application for PacketScan™. PacketScan™ is a protocol analysis software supporting a large range of protocols and codecs. PacketScan™ is deployed on Windows® PCs and uses the host PC's network interface card to capture Ethernet / IP traffic. The PC should be connected to a network tap or a monitor port on a switch. PacketScan™ can also open packet captures offline and intelligently build call detail records, compute statistics on the calls, create graphs and ladder diagrams and more.

PacketScan™ 5G includes the Packet Data Analysis (PDA) tool allowing users to monitor live IP/TDM networks including capture, analysis, and reporting of every phone call in detail. It also provides graphical presentation of analysis, including ladder diagrams of call flows.

For more details, refer to 5G Protocol Analyzer webpage.

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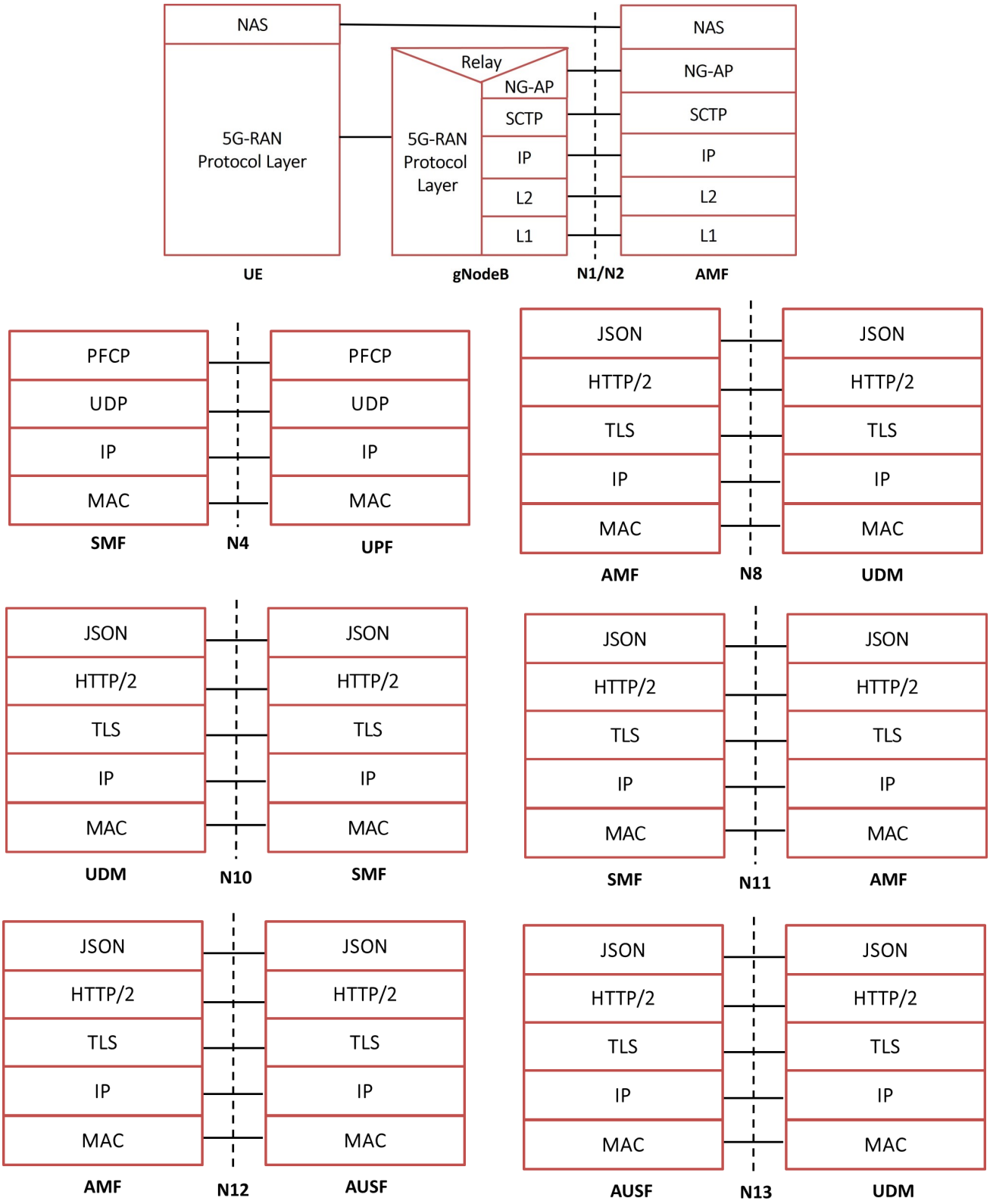
Main Features

- Capture, decode, and analyze calls in the 5G network
- Supported protocols include Non Access Stratum (NAS), Next Generation Application Protocol (NGAP), Packet Forwarding Control Protocol (PFCP), XnAP, SCTP, UDP, TCP, and IP
- Decode Enhanced Common Public Radio Interface (eCPRI) protocol
- Following interfaces are supported in PDA:
  - N1N2 Interface - gNodeB (also called Next Generation RAN), and AMF (Access and Mobility Management Function) nodes
  - N4 Interface - Session Management Function (SMF) and User Plane Function (UPF) elements
  - N8 Interface - Unified Data Management (UDM) and Access and Mobility Management Function (AMF)
  - N10 Interface - Unified Data Management (UDM) and Session Management Function (SMF)
  - N11 Interface - Mobility Management Function (AMF) and Session Management Function (SMF)
  - N12 Interface - Authentication Server Function (AUSF) and Access and Mobility Management Function (AMF)
  - N13 Interface - Authentication Server Function (AUSF) and User Data Management (UDM)
- Provides VoNR call statistics such as caller, callee, MOS scores, discarded packets and voice storage
- Save calls to PCAP (Wireshark® format) and in HDL (GL Proprietary format)
- PDA Packetscan™ provides a complete call flow of a 5G session
- Advanced filtering and search based on user selected 5G protocol fields
- Add any protocol field to the summary view, filtering, and search features. This flexibility allows users to monitor the specific protocol fields they need
- Trigger intelligent actions based on signaling and traffic conditions
- Displays Summary, Detail, Hex dump, Statistics, and Call Detail views
- 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
- Call detail view displays UE information, released calls, call status, and more

Supported Protocol Stack

PacketScan™ supports below 5G stack.



5G Protocol Stack

Supported Protocol Standards

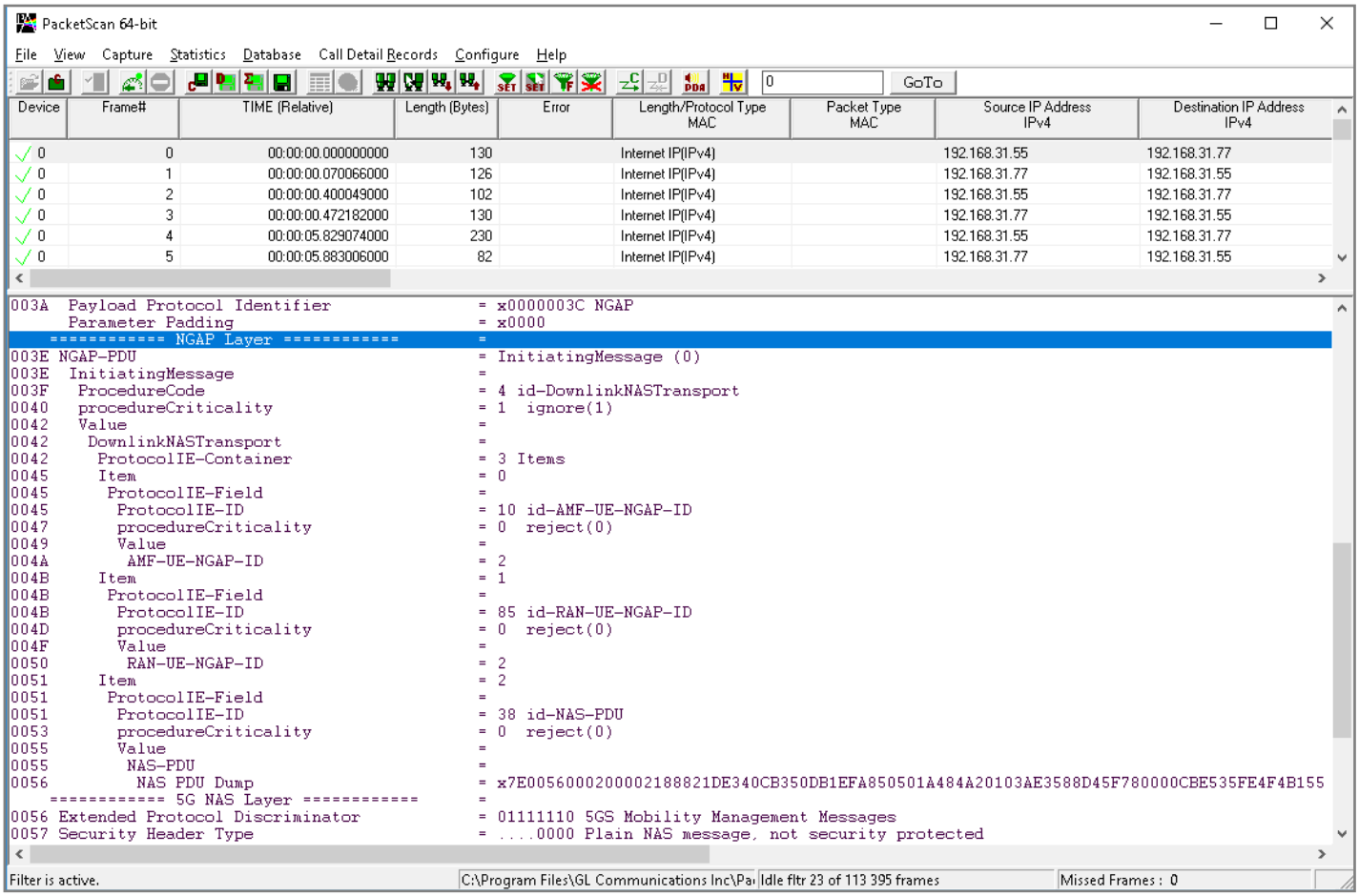
Supported Protocols	Standard / Specification
System Architecture for the 5G	3GPP TS 23.501
NG Application Protocol (NGAP)	3GPP TS 38.413
Non-Access-Stratum (NAS)	3GPP TS 24.501
GPRS Tunneling Protocol for User Plane (GTP-U)	3GPP TS 29.281
NR and NG-RAN Overall Description	3GPP TS 28.300
Packet Forwarding Control Protocol (PFCP)	3GPP TS 29.244
UDP	IETF RFC 768
IPv4	IETF RFC 791 [5]
IPv6	IETF RFC 2460 [6]
JavaScript Object Notation (JSON)	IETF RFC 8259
HTTP/2	IETF RFC 7231 IETF RFC 7540/RFC 7541
TLS	IETF RFC 8446
TCP	IETF RFC 793

5G Protocol Specifications

Summary and Detail View of 5G NGAP Layer

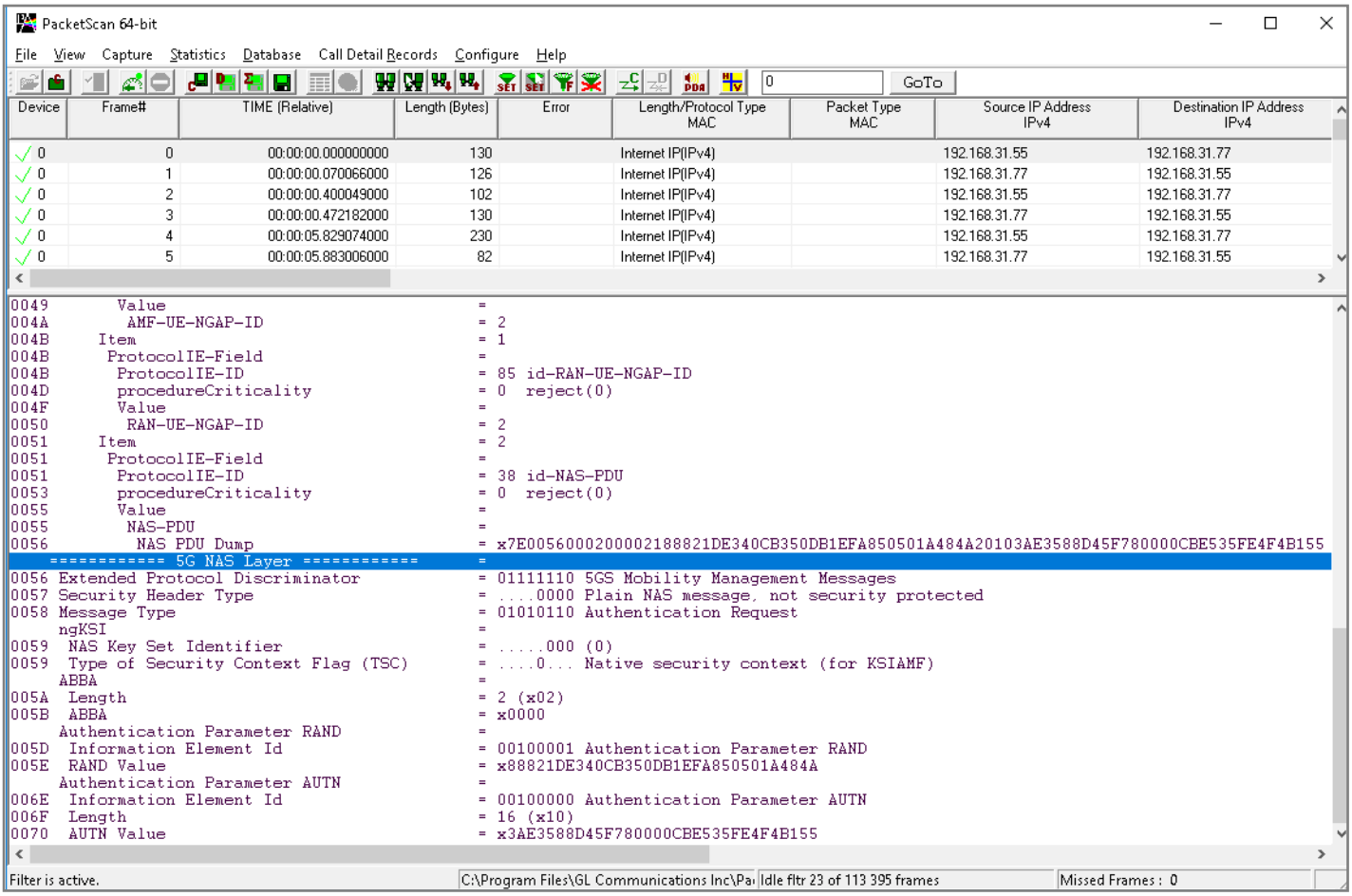
Users can select any frame in **Summary View** to analyze and decode each 5G frame in the Detail View. The detail view of 5G call displays the following:

- MAC Layer
- IPv4 Layer
- SCTP Layer
- NGAP Layer
- NAS Layer



Decode View of NGAP Layer

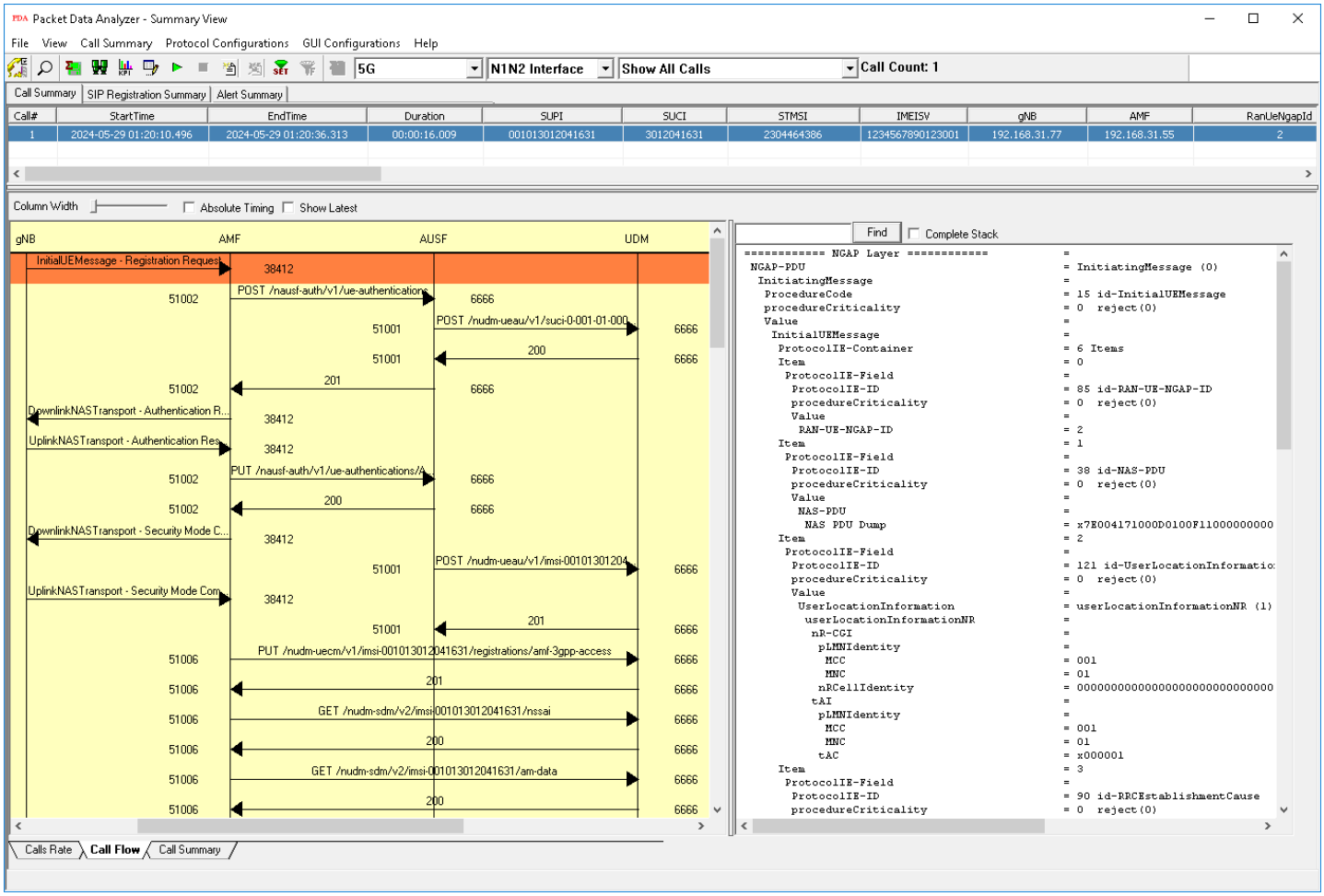
Detail View of 5G NAS Layer



Decode View of 5G NAS Layer

End-to-End Call in 5G Lab Setup

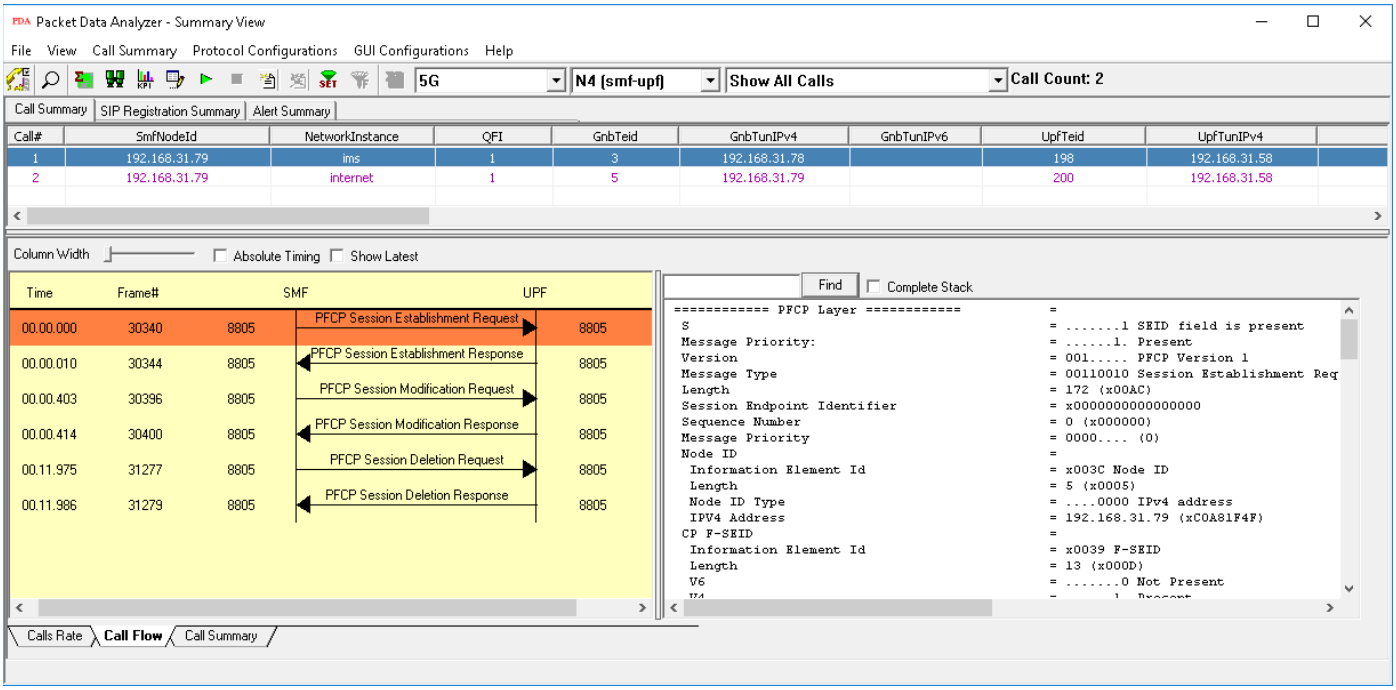
Displays the message sequences of captured 5G end-to-end call. The right pane shows the decoded information of the selected N1N2 message.



5G N1N2 Call Flow

5G N4 Interface between SMF and UPF

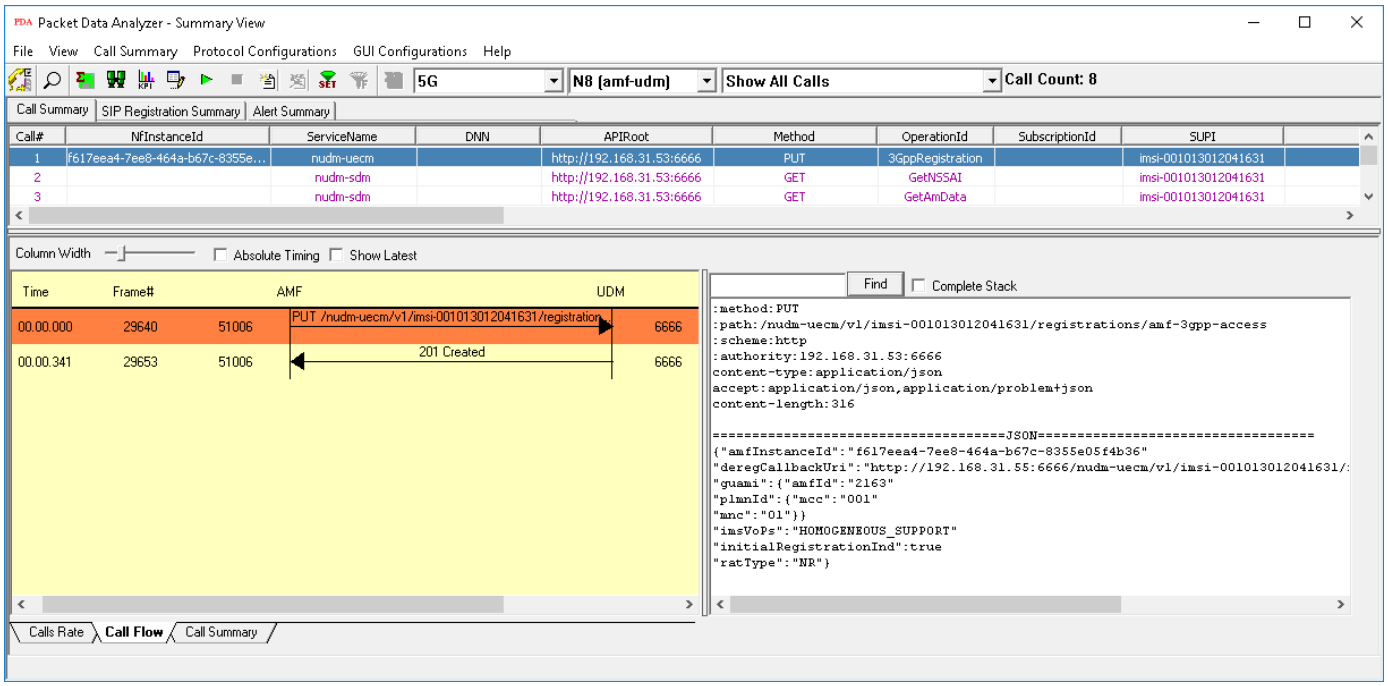
Decodes of the selected N4 message is displayed on the right pane.



5G N4 Call Flow

5G N8 Interface between AMF and UDM

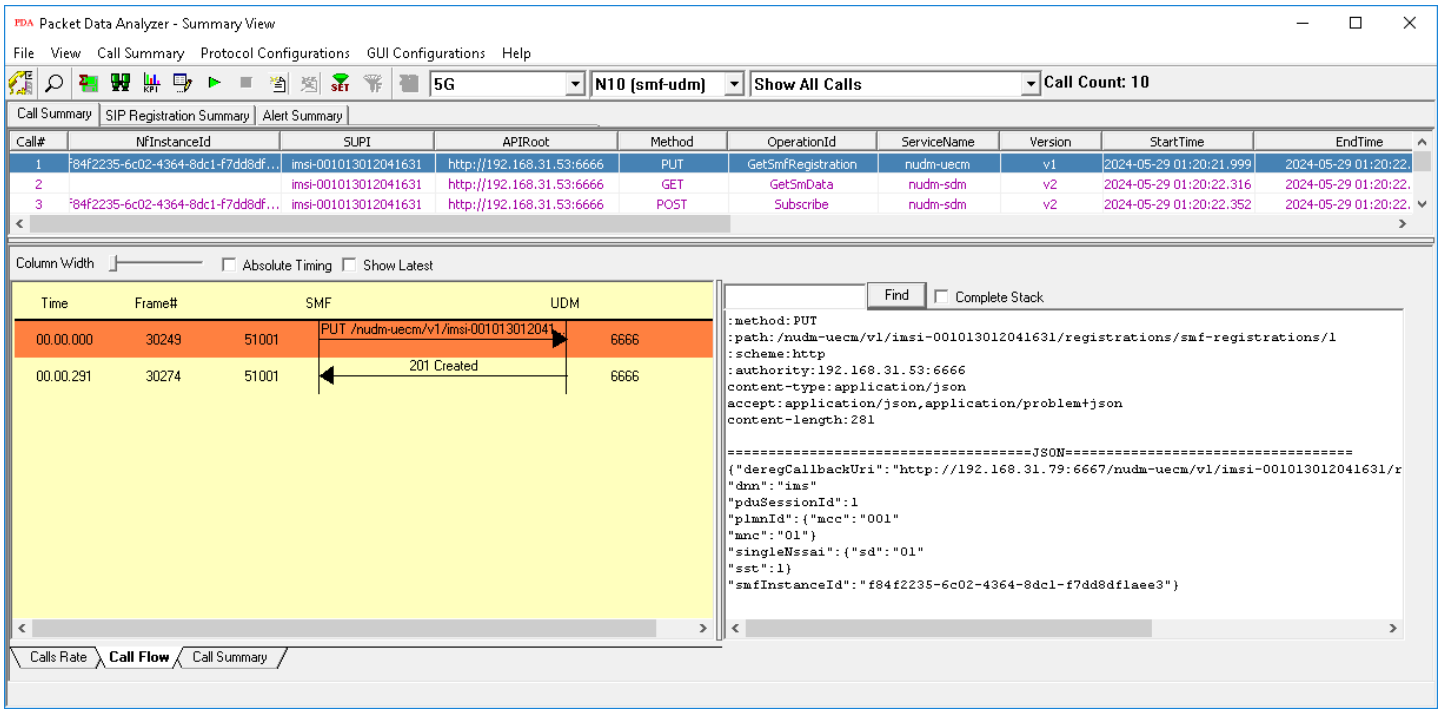
Decodes of the selected N8 message is displayed on the right pane.



5G N8 Call Flow

5G N10 Interface between SMF and UDM

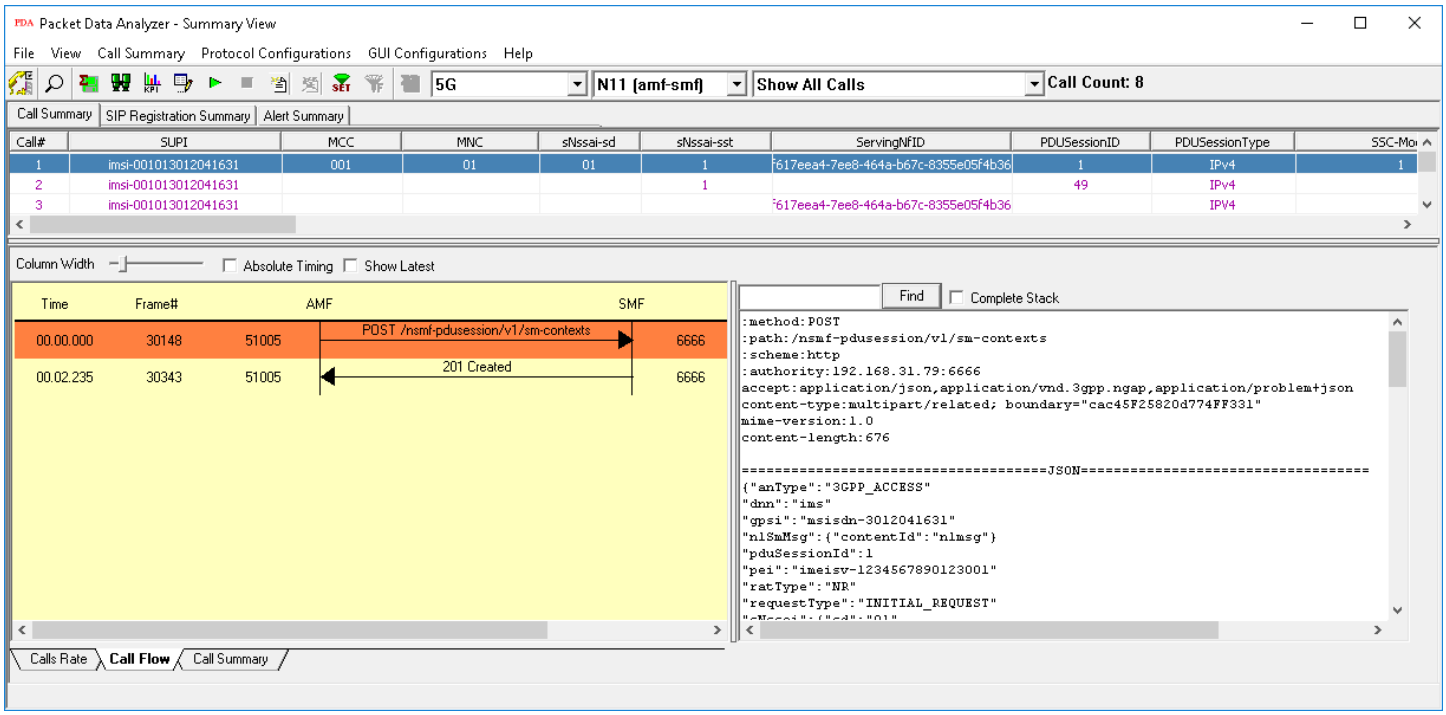
Decodes of the selected N10 message is displayed on the right pane.



5G N10 Call Flow

5G N11 Interface between AMF and SMF

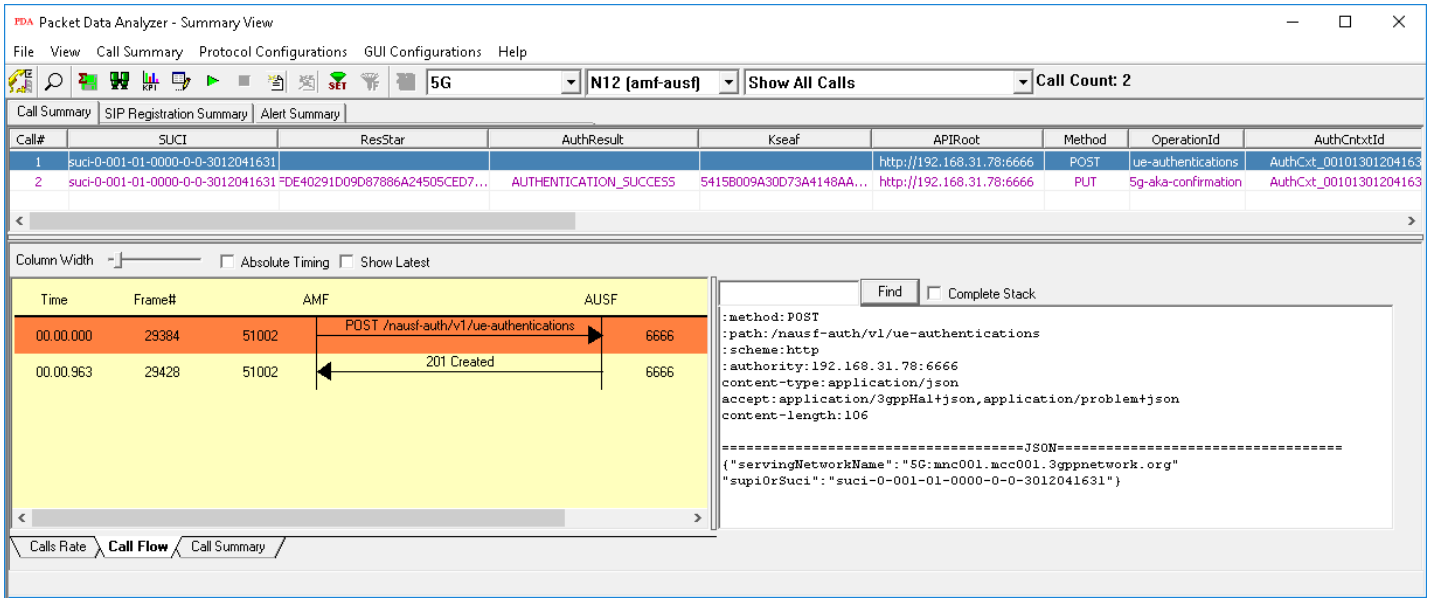
Decodes of the selected N11 message is displayed on the right pane.



5G N11 Call Flow

5G N12 Interface between AMF and AUSF

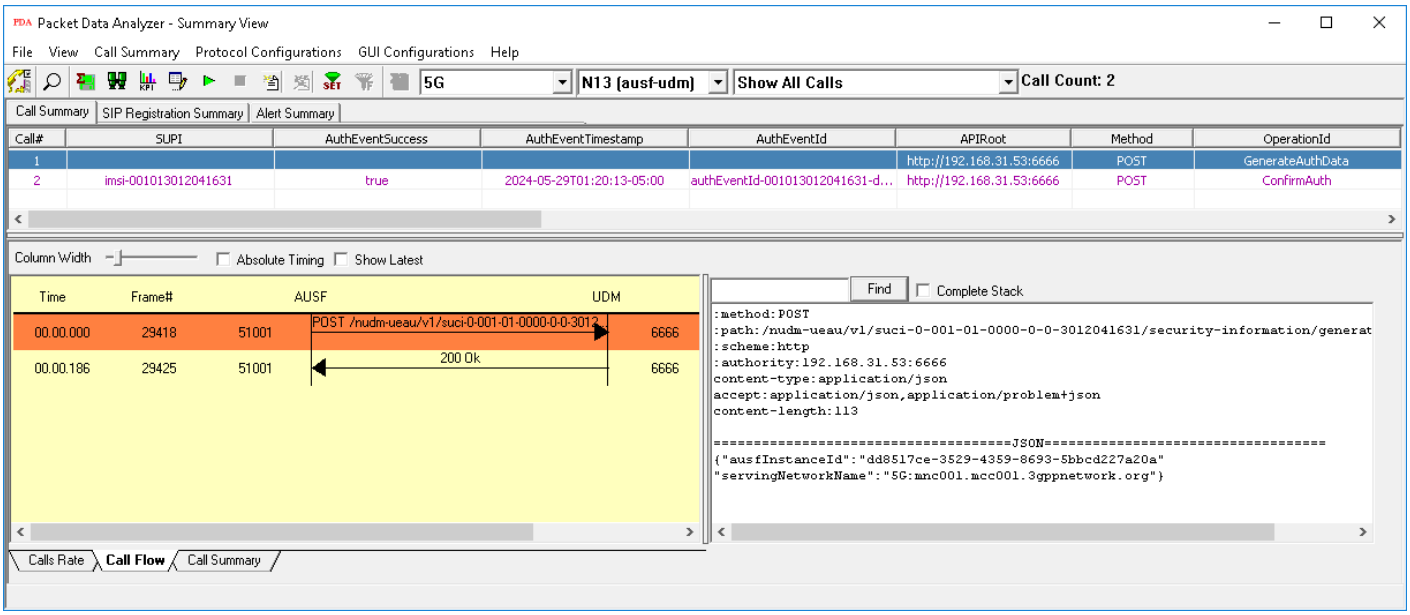
Decodes of the selected N12 message is displayed on the right pane.



5G N12 Call Flow

5G N13 Interface between AUSF and UDM

Decodes of the selected N13 message is displayed on the right pane.



5G N13 Call Flow

Buyer's Guide

Item No	Product Description
PKV112	5G Analyzer (Optional with PacketScan™)
PKV113	Offline 5G Analyzer (Optional with Offline PacketScan™ and NetSurveyorWeb™)
PKV100	PacketScan™ (Real-time and Offline)
PKV101	PacketScan™ - Offline
PKV120	PacketScan™ HD – High Density IP Traffic Analyzer w/ 4x1GigE
PKV301	LAN Switch w/ Mirror Port
PKV104	FaxScan™ - Decodes Fax images in TIFF format from PCAP files
PCD103	AMR Codec for PacketScan™
PCD104	EVRC Codec for PacketScan™
PCD105	EVRC-B Codec for PacketScan™
PCD106	EVRC-C Codec for PacketScan™
PKV170	NetSurveyorWeb™ (Network Surveillance Software) for IP Network

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

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