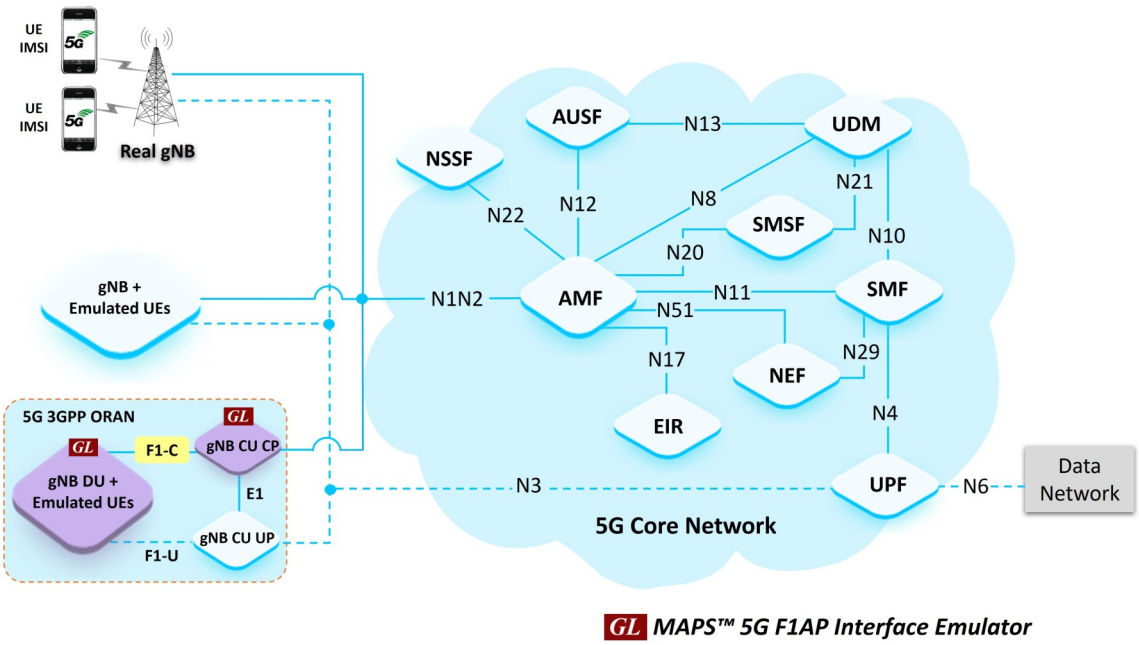
MAPS™ 5G ORAN F1 Interface Emulator



GL MAPS™ 5G F1AP Interface Emulator

Overview

GL's **Message Automation & Protocol Simulation (MAPS™)** tests the **5G ORAN F1AP** interface, emulating both **gNB Central Unit (CU)** and **gNB Distributed Unit (DU)** in compliance with 3GPP TS 38.473 specification. The F1 interface connects CU and DU through F1-C (Control Plane) and F1-U (User Plane), enabling functional split and efficient midhaul communication in 5G ORAN architecture.

The MAPS™ F1AP Interface Emulator supports key 5G midhaul procedures such as UE Context Setup, Bearer Management, and RRC Message Forwarding, ensuring reliable and standards-compliant operation. Users can emulate either gNB CU or gNB DU network elements to test real-world signaling scenarios across both planes.

In addition to control-plane signaling, the application supports user-plane packet emulation using GL's **Mobile Traffic Core – GTP (ETH101)** and **Mobile Traffic Core – Gateway (ETH102)** licenses. This enables end-to-end midhaul traffic generation, verification, and performance analysis between CU and DU.

MAPS™ 5G ORAN F1AP is a versatile tool for functional testing, regression testing, load testing, and fault insertion, allowing engineers to validate performance, interoperability, and QoS handling without requiring live RAN equipment. The platform includes powerful utilities such as Message Editor, Script Editor, and Profile Editor, enabling users to customize signaling procedures, simulate configurations, and verify 5G ORAN midhaul operations.

For more information, visit MAPS™ 5G ORAN F1 Interface Emulator webpage.

Main Features

- MAPS™ 5G ORAN F1AP interface emulates gNB Central Unit (CU) and Distributed Unit (DU)
- Supports 5G F1-C (Control Plane) and F1-U (User Plane) procedures
- Generates and processes valid and invalid F1AP messages for protocol compliance testing
- Supports GTP-U traffic tunneling for end-to-end user-plane emulation
- Provides fault insertion and impairment simulation for robustness and negative testing
- Ready-to-use scripts for quick and repeatable F1 interface testing
- Customizable call flow and message templates using Script, Message, and Profile Editors
- Supports automated call generation, reception, and scheduling for 24/7 remote testing
- Performs performance, load, functional, and regression testing of CU and DU nodes
- Supports SCTP over IP transport layer testing with configurable association parameters
- Simulates large-scale midhaul environments for interoperability, training, and R&D testing

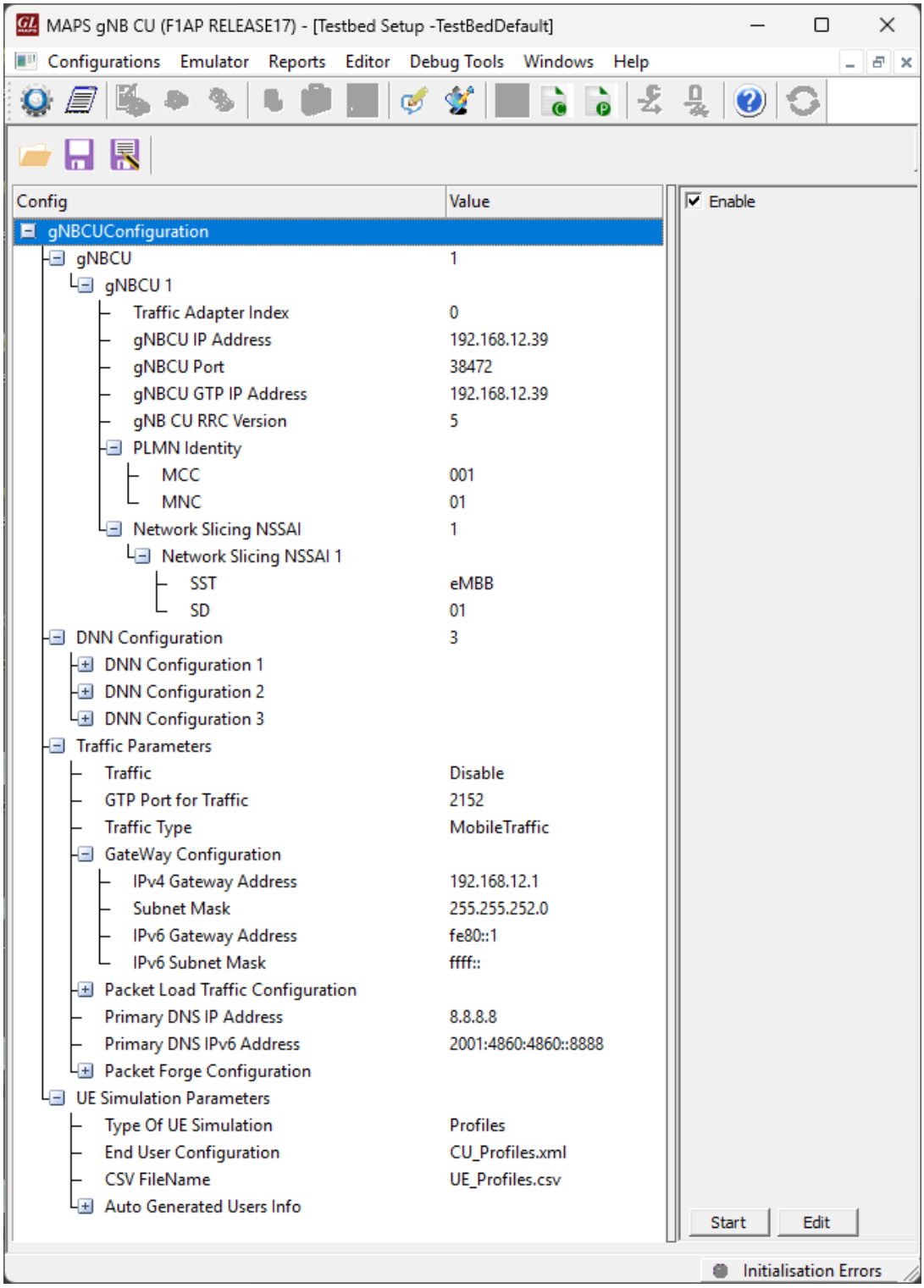
GL Communications Inc.

818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878, U.S.A

(Web) www.gl.com - (V) +1-301-670-4784 (F) +1-301-670-9187 - (E-Mail) info@gl.com

Testbed Configuration

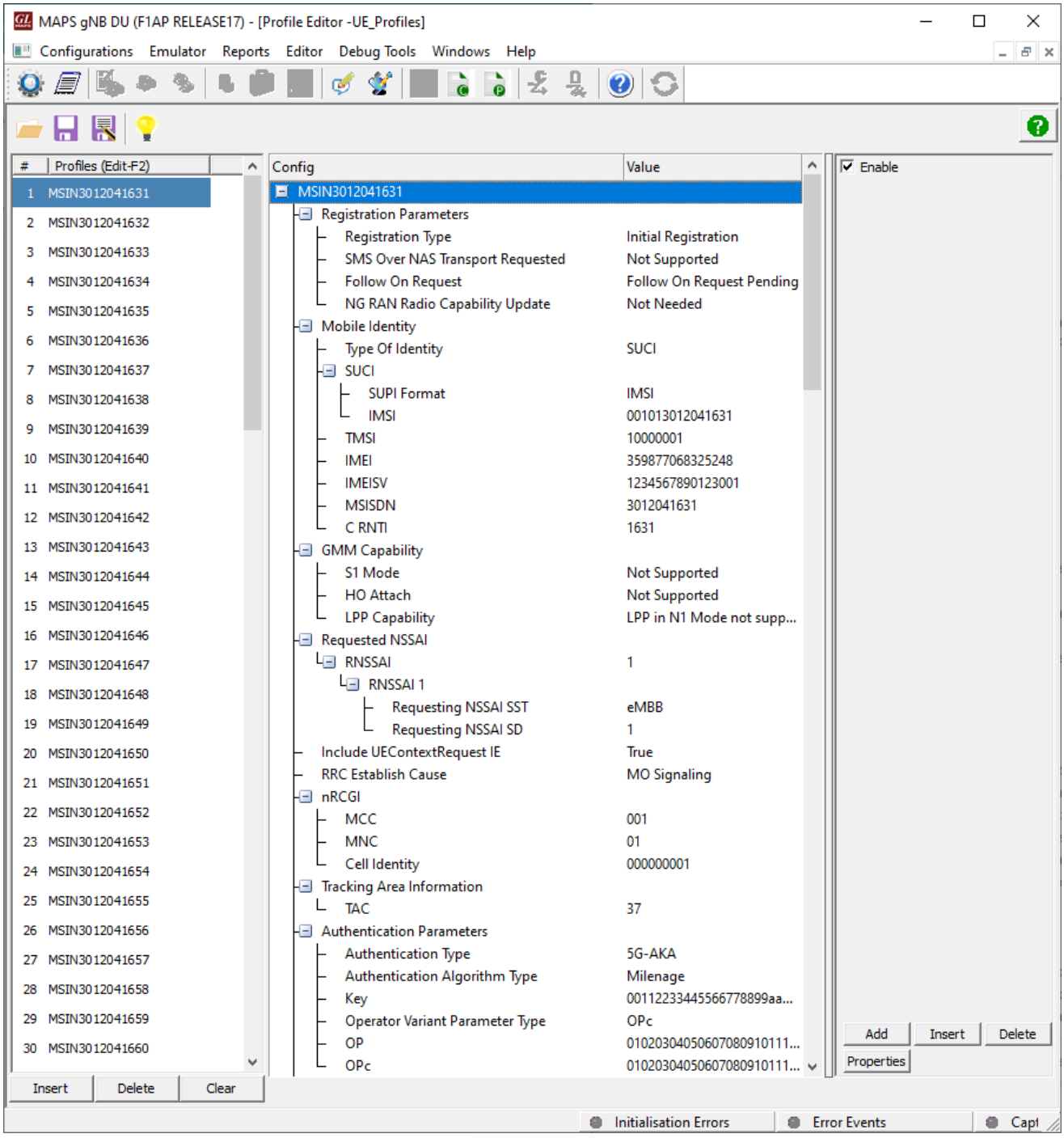
The testbed setup window allow users to setup the required test configurations in F1 interface. It includes a list of variables that are declared and assigned before starting the script. Testbed Setup defines the MAPS™ parameters which communicates with the rest of the test network. End user configuration profile is used to configure MAPS™ 5G F1AP interface with the supported gNB DU and gNB CU parameters.



Testbed Setup

Pre-processing Tools

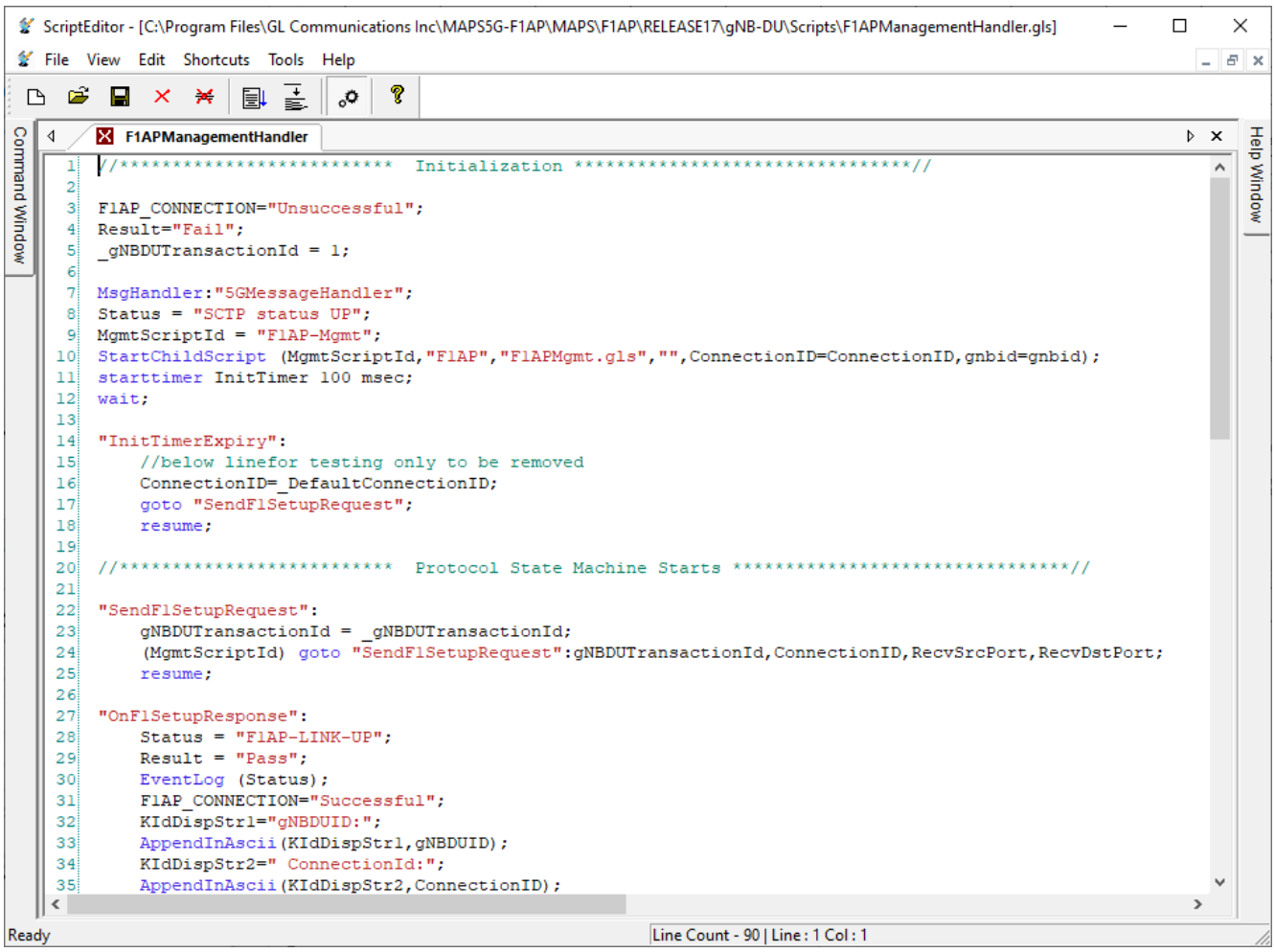
Profile Editor - This feature allows loading profile to edit the values of variables using GUI, replacing the original value of variables in the message template. An XML file defines a set of multiple profiles with varying parameter values which allow user to configure call instances in call generation to receive calls. The **UE_Profiles** include 5G parameters, that is required to configure multiple UEs to emulate Signaling and Traffic.



Profile Editor

Pre-processing Tools *(Contd.)*

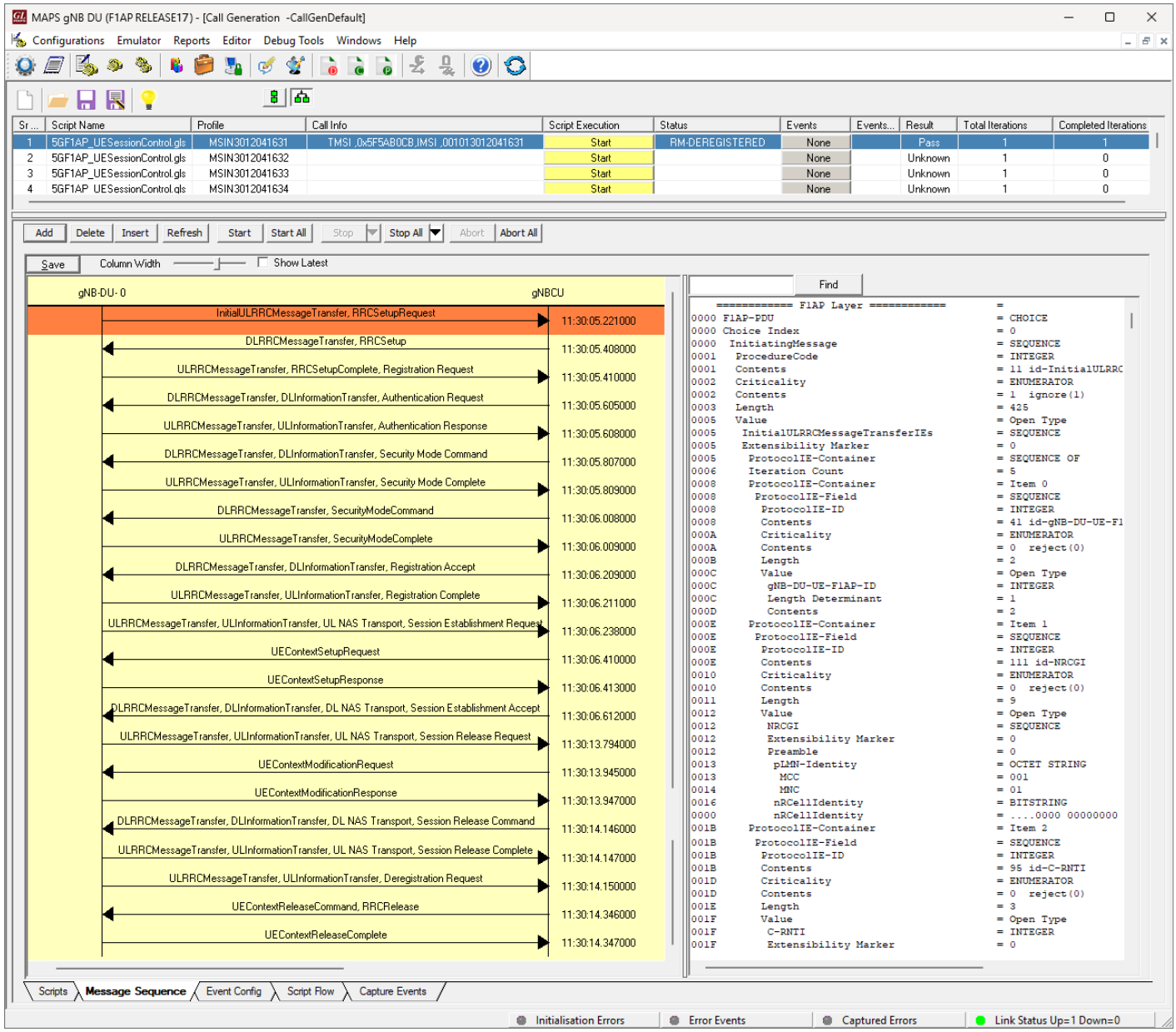
SCRIPT EDITOR - The script editor allow user to create/edit scripts and access protocol fields as variables for the message template parameters. The script uses pre-defined message templates, to perform send and receive actions.



Script Editor

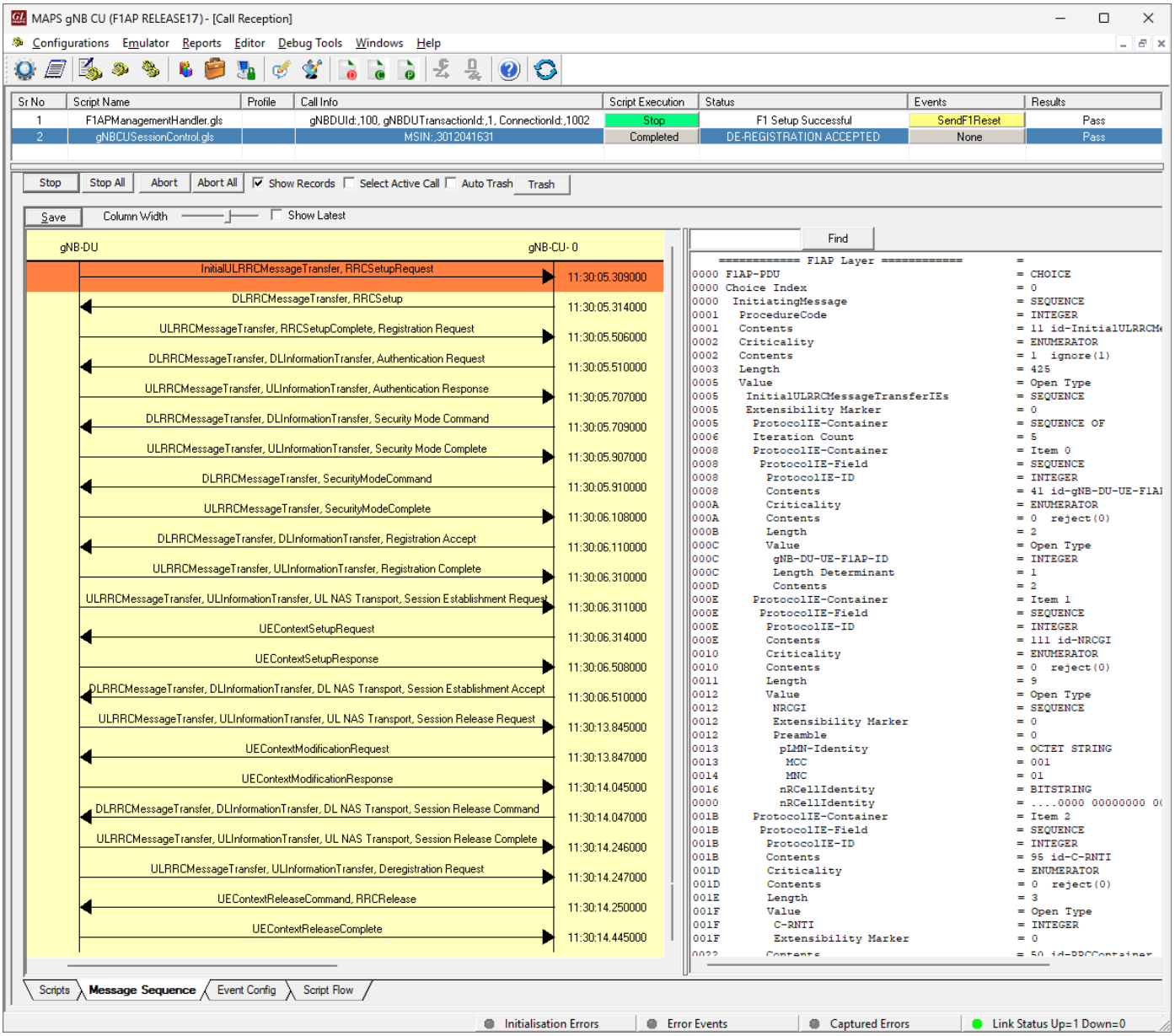
Call Generation and Reception

In call generation mode, MAPS™ is configured for the outgoing messages, while in call receive mode, it is configured to respond to the incoming messages. Tests can be configured to run once, multiple iterations and continuously. Also, allow users to create multiple entries using quick configuration feature. The editor allows to run the added scripts sequentially (order in which the scripts are added in the window) or randomly (any script from the list of added script as per the call flow requirements). The test scripts are started manually at call generation, and at the call reception the script is automatically triggered by incoming messages.



Call Generation

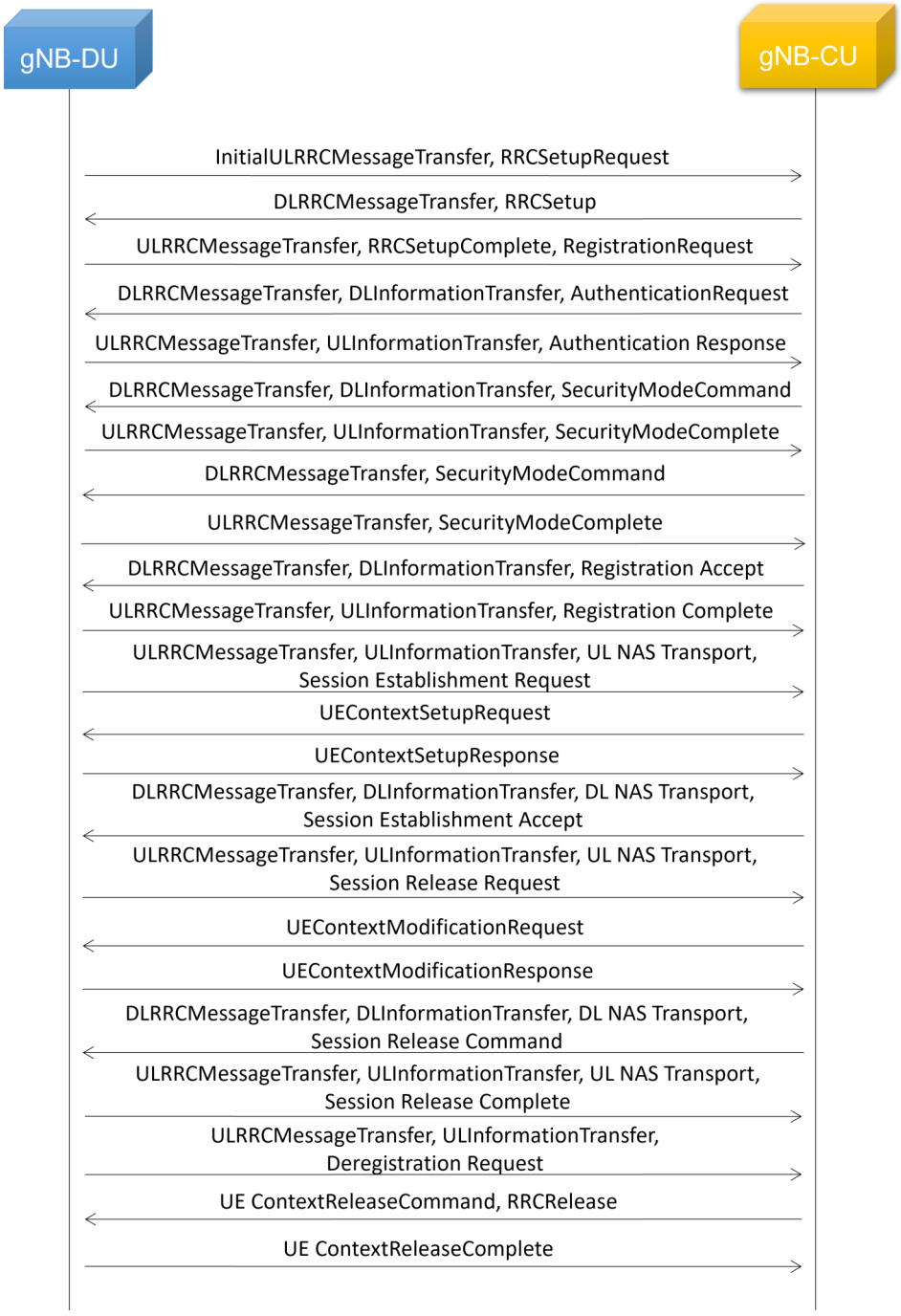
Call Generation and Call Reception (*Contd.*)



Call Reception

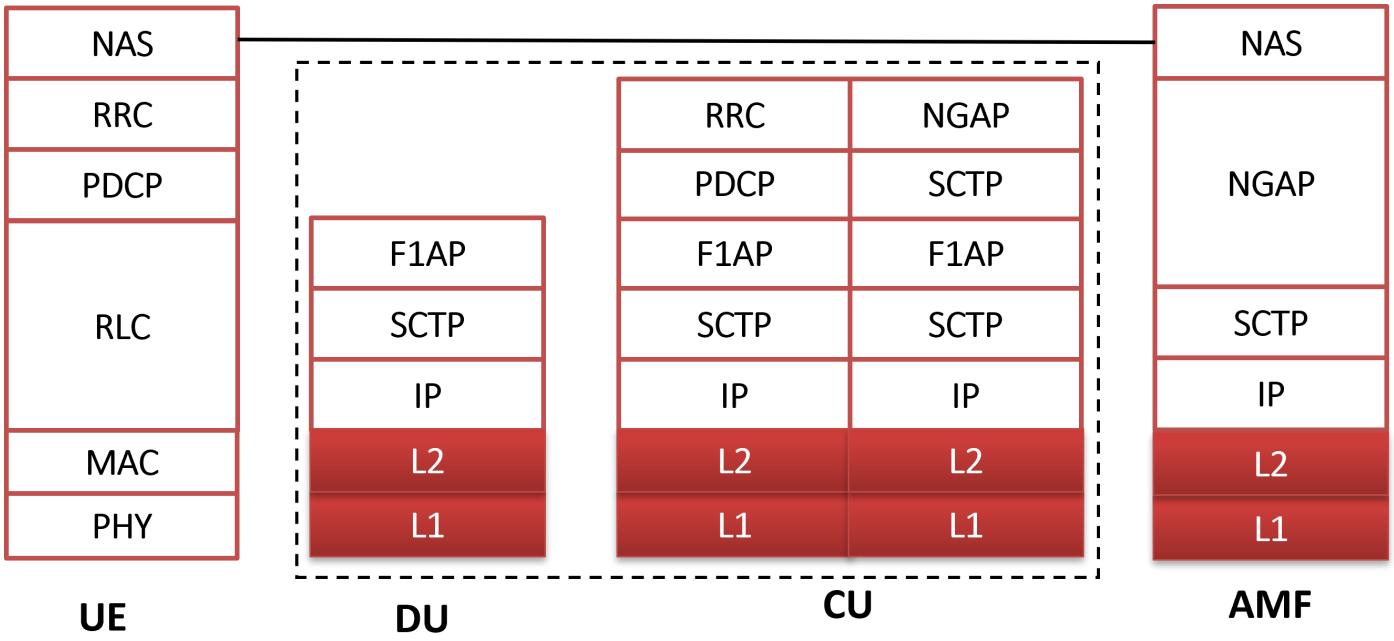
Emulation of 5G F1AP Signaling Procedure

The below 5G F1AP signaling procedure indicates the messages flow between gNB DU and gNB CU , which are emulated using MAPS™ application.



Event Notification Subscription Procedure

Supported Protocols and Specifications



Supported Protocols	Standard / Specifications
F1 Interface (gNB-CU – gNB-DU)	TS38.473
SCTP	RFC 4960
Non-Access-Stratum (NAS)	3GPP TS 24.501
NR and NG-RAN	3GPP TS 38.300 V17

Buyer's Guide

Item No	Product Description
PKS512	MAPS™ 5G-F1AP Interface Emulator
PKS513	MAPS™ 5G-E1AP Interface Emulator

Item No	Related Software
PKS500	MAPS™ 5G N1/N2 Interface Emulator
PKS501	MAPS™ 5G N4 Interface Emulator
PKS502	5G service-based Emulation (Prerequisite base license for all service-based (Open API) interface emulations)
PKS503	MAPS™ 5G N8 Interface Emulator (Requires PKS502)
PKS504	MAPS™ 5G N10 Interface Emulator (Requires PKS502)
PKS505	MAPS™ 5G N11 Interface Emulator (Requires PKS502)
PKS506	MAPS™ 5G N12 Interface Emulator (Requires PKS502)
PKS507	MAPS™ 5G N13 Interface Emulation (Requires PKS502)
PKS502	MAPS™ 5G N17 Interface Emulator
PKS508	MAPS™ 5G N20 Interface Emulator (Requires PKS502)
PKS509	MAPS™ 5G N21 Interface Emulator (Requires PKS502)
PKS510	MAPS™ 5G N22 Interface Emulator (Requires PKS502)
PKS511	MAPS™ 5G N29 Interface Emulator (Requires PKS502)
PKS511	MAPS™ 5G N51 Interface Emulator (Requires PKS502)
PKS305	MAPS™ 5G Multi-Interface Emulation
PKS170	CLI Support for MAPS™

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

For complete list of MAPS™ products, refer to Message Automation & Protocol Simulation (MAPS™) webpage.

For more details on supported MAPS™ 5G interfaces, refer to 5G Core (5GC) Network Test Solution webpage.