Agilent PXT Wireless Communications Test Set (E6621A)

Agilent N6062A LTE Message Editor User's Guide

Agilent Technologies

Notices

Trademark Notices

Windows®, MS Windows XP®, and MS Windows 7® are either registered trademarks of Microsoft Corporation in the United States and/or other countries.

Warranty

The material contained in this document is provided "as is," and is subject to being changed, without notice, in future editions. Further, to the maximum extent permitted by applicable law, Agilent disclaims all warranties, either express or implied, with regard to this manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Agilent shall not be liable for errors or for incidental or consequential damages in connection with the furnishing, use, or performance of this document or of any information contained herein. Should Agilent and the user have a separate written agreement with warranty terms covering the material in this document that conflict with these terms, the warranty terms in the separate agreement shall control.

Statement of Compliance

This product has been designed and tested in accordance with accepted industry standards, and has been supplied in a safe condition.   The documentation contains information and warnings that must be followed by the user to ensure safe operation and to maintain the product in a safe condition.

Manual Part Number

E6621-90003

Edition

May 2013
Documents Software Version 6.5

Agilent Technologies, Inc.

Technology Licenses

The hardware and/or software described in this document are furnished under a license and may be used or copied only in accordance with the terms of such license.

Restricted Rights Legend

If software is for use in the performance of a U.S. Government prime contract or subcontract, Software is delivered and licensed as "Commercial computer software" as defined in DFAR 252.227-7014 (June 1995), or as a "commercial item" as defined in FAR 2.101(a) or as "Restricted computer software" as defined in FAR 52.227-19 (June 1987) or any equivalent agency regulation or contract clause. Use, duplication or disclosure of Software is subject to Agilent Technologies' standard commercial license terms, and non-DOD Departments and Agencies of the U.S. Government will receive no greater than Restricted Rights as defined in FAR 52.227-19(c)(1-2) (June 1987). U.S. Government users will receive no greater than Limited Rights as defined in FAR 52.227-14 (June 1987) or DFAR 252.227-7015 (b)(2) (November 1995), as applicable in any technical data.

Safety Notices

The following general safety precautions must be observed during all phases of operation of this instrument.   Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Agilent Technologies Inc. assumes no liability for the customer's failure to comply with these requirements.

CAUTION

A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Where to Find the Latest Information

Agilent will periodically update product documentation. For the latest information about this wireless test set, including software upgrades, operating and application information, and product and accessory information, see the following URL: http://www.agilent.com/find/pxt

Is your product software up-to-date?

Agilent will periodically release software updates to fix known defects and incorporate product enhancements. To search for software updates for your product, go to the Agilent Technical Support website at

http://www.agilent.com/find/softwaremanager

IMPORTANT	An active N6050AS software and technical support contract (STSC) is required to access the software manager website (displayed above), together with the login credentials registered by you or your company for activation. See the section on licensing in the *Agilent PXT Wireless Communications Test Set Getting Started Guide* for instructions to activate your STSC.

This page is intentionally left blank.

Table of Contents

1 Introduction

Welcome to the ***N6062A LTE Message Editor User's Guide*** for the Agilent E6621A PXT Wireless Communications Test Set (PXT). The purpose of this guide is to provide you with installation instructions and user information for the Agilent N6062A LTE Message Editor (N6062A) software application. For more information about the PXT and other PXT software products, refer to the ***Agilent PXT Wireless Communications Test Set Getting Started Guide*** and the ***Agilent PXT Wireless Communications Test Set User's Guide***.

Latest Documentation

For the latest version of all documentation, please go to www.agilent.com/find/pxt.

Latest Software Application Releases

For the latest release of all PXT related software, please go to http://www.agilent.com/find/softwaremanager.

IMPORTANT	An active N6050AS Software and Technical Support Contract (STSC) is required to access the software manager website (displayed above), together with the login credentials registered by you or your company for activation. See the section on licensing in the ***Agilent PXT Wireless Communications Test Set Getting Started Guide*** for instructions to activate your STSC.

2   System Architecture

The N6062A LTE Message Editor software application runs on PCs using the Microsoft (MS) Windows XP/Windows 7 operating systems. The N6062A is connected to the PXT via a private Ethernet interface to enable you to create and modify scenario files for download into the PXT. An example N6062A user interface is shown below.
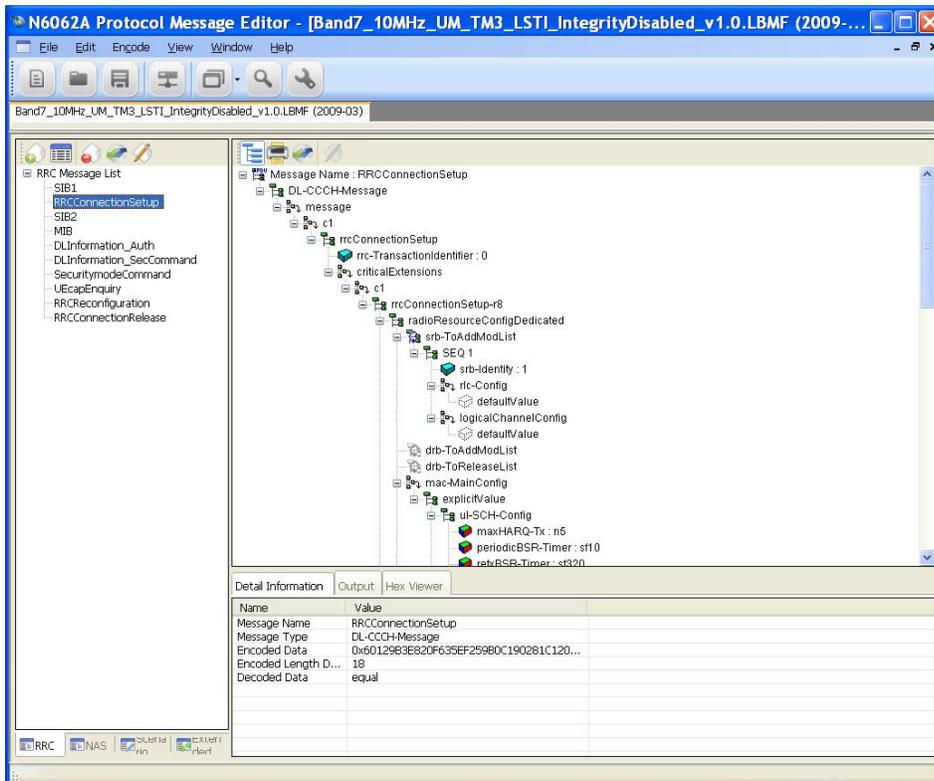

Figure 2-1: N6062A Message Editor

3 N6062A Software Installation

Installation Computer Minimum Requirements

For successful operation, the installation computer for the N6062A LTE Message Editor must meet or exceed the following specifications:

Minimum System Requirements	
Operating System	Computer running Windows XP or Windows 7
Communication with Test Set(s)	Ethernet
RAM (Memory)	4 GB RAM (Minimum)
Processor	>2.5 GHz Intel Pentium® Quad core or equivalent
.NET Framework	Version 2.0 or later

NOTES:

1. Consideration for storage space should be given for storing scenario files and supporting documentation.

2. A clean installation of the Operating System is required to ensure freedom from Ad-ware, Spy-ware, updaters and other processor resource consuming applications. For expected performance, Antivirus software should not be running.

3. Connecting the PXT and the message editor PC to a network is not recommended.

Downloading the Latest Version of N6062A Message Editor Software

To ensure you have the latest version, download the N6062A software from the Agilent software manager web site. To access this site, you must first register and activate your N6050AS Software and Technical Support Contract (STSC) for the E6621A PXT.

If you have not already done so, follow the instructions on your N6050AS Entitlement Certificate to activate your Contract. For more information on activating licenses, see the section on licensing in the *Agilent PXT Wireless Communications Test Set Getting Started Guide* for instructions to activate your STSC.

On the www.agilent.com/find/softwaremanager download site, locate the N6062A Message Editor Software, and save it to a location on your PC.

Locate the file on your PC and double-click the setup file to install the software. Follow the on-screen instructions to complete the installation.

Before running the software, plug your N6062A USB license key into your PC.

NOTE	Always check the release notes for the latest information about any known issues and other important information about your product. Release notes are available for download from www.agilent.com/find/softwaremanager.

Connecting the Computer and Test Set

Connect the N6062A LTE Message Editor installation computer to the LAN port on the E6621A PXT rear panel.
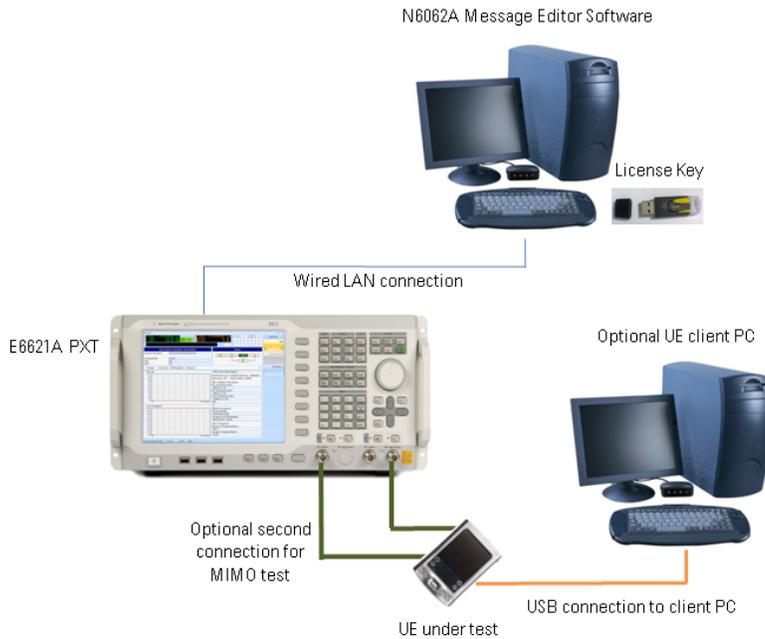
Figure 3-1: System Configuration

Launch the N6062A Message Editor Software

Start the N6062A LTE Message Editor application from the Windows Start menu by selecting Start, All Programs, Agilent PXT, N6062A Message Editor, N6062A, or by double-clicking on the

desktop icon.

4 Menus for N6062A LTE Message Editor

The N6062A Message Editor is presented in a single window. Some functions are available from the menu bar. Frequently used functions are duplicated in the tool bar.

The Menu Bar

| File | Edit | Encode | View | Window | Help |
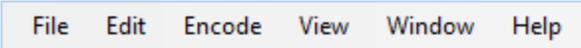
There are six drop-down menus: File, Edit, Encode, View, Window, and Help. Before any files have been opened, only two menus are displayed: File and Help.

Using your mouse to select the following menu options performs the described task:

The File Menu

The N6062A Message Editor works with a file type known as a scenario file which contains message definitions and defines the desired sequence of messages exchanged between the PXT and a UE. These file types have an .LBMF file extension.

```
File    Help
   New...           Ctrl+N
   Open...          Ctrl+O
   Close
   Save             Ctrl+S
   Save All    Ctrl+Shift+S
   Save As...
   Search           Ctrl+F
   File Transfer...
   Print                    ▶
   Exit
```
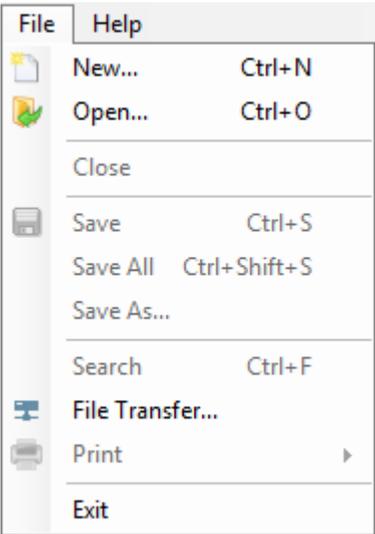
Top Level Menu Option	Drop-Down Menu Options	Task Performed
File		Opens the Drop-Down Menu
	New...	Creates a new scenario file.
	Open...	Opens an existing scenario file.
	Close	Closes the active scenario file.
	Save	Saves the active scenario file.
	Save All	Saves all open scenario files.
	Save As	Save a scenario file with a different name or location.

Top Level Menu Option	Drop-Down Menu Options	Task Performed
	Search	Enables you to search for text phrases or terms within a scenario file.
	File Transfer...	• Downloads a scenario file *to* the PXT. • Uploads a scenario file *from* the PXT.
	Print	Selects the file for printing.
File (Continued)	**File, Print**	Prints selected scenario file.
	Tree Print	Print an individual message.
	File Preview	Provides a preview of the selected scenario file.
	Tree Preview	Prints a preview of the individual message.
	Exit	Closes the application.

The Edit Menu
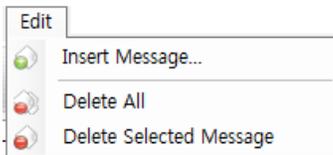
Top Level Menu Option	Drop-Down Menu Command	Task Performed
Edit		
	Insert Message	Inserts a new RRC or NAS Message into the scenario file.
	Delete All	Deletes All RRC or NAS Messages from a scenario file.
	Delete Selected Message	Deletes a selected RRC or NAS Message from a scenario file.

The Encode Menu
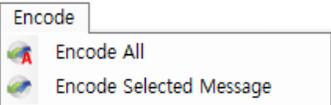
Top Level Menu Option	Drop-Down Menu Command	Task Performed
Encode		
	Encode All	Encodes all RRC or NAS Messages in a scenario file.
	Encode Selected Message	Encodes a selected RRC or NAS Message.

The View Menu

Top Level Menu Option	Drop-Down Menu Command	Task Performed
View		
	RRC Editor	Displays the RRC Editor window.
	NAS Editor	Displays the NAS Editor window.
	Scenario Editor	Displays the Scenario Editor window.
	Extended Editor	Displays the Extended Editor window.
	Properties	Displays the properties of the .LBMF file. • File Name • File Path • Spec Version • RRC Version • NAS Version • Description

The Help Menu

- Click **About...** to display the About (Version Information) Window.

The Tool Bars

The Message Editor Tool bar provides quick access to frequently used functions.

- The ⬜ icon duplicates the function of File, New (Ctrl+N).

- The ⬜ icon duplicates the function of File, Open (Ctrl+O).

- The ⬜ icon duplicates the function of File, Save (Ctrl+S).

- The ⬜ icon duplicates the function of File, File Transfer (Ctrl+S).

- The ⬜ icon duplicates the function of View, LTE BSE ME, NAS Editor, Scenario Editor, Extended Editor

- The ⬜ icon enables the function of Search.

- The ⬜ icon duplicates the function of View, Properties.

The Scenario File Tool bar provides quick access to frequently used functions.
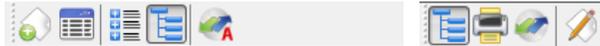
- The ⬜ icon duplicates the function of File, New (Ctrl+N).

- The ⬜ icon displays the Hex viewer window.

- The ⬜ icon changes Sorting Type.

- The ⬜ icon expands All Message List.

- The ⬜ icon duplicates the function of Encode, Encode Selected Message.

- The ⬜ icon expands All Message List in RRC Message window.

- The ⬜ icon duplicates the function of File, Print.

- The ⬜ icon duplicates the function of Encode, Encode Selected Message.

- The ⬜ icon edits Value in RRC Message window.

5 Scenario File Overview

The N6062A LTE Message Editor provides the ability to create and modify a type of file known as a scenario file. Scenario files contain message definitions and a desired sequence of message exchanges at the RRC level between the PXT and a UE. Since many RRC messages also contain NAS messages, the N6062A also enables the creation of NAS messages. These can be included as payload in the generated RRC messages.

The content of the RRC messages also determines lower layer behavior. For example, the Bandwidth of the cell is defined using the dl-Bandwidth parameter in the Master Information Block.

Scenario files are downloaded to the PXT via the N6062A LTE Message Editor, where they are then selected to run from a menu on the PXT.

Message Editor Fields that can be Overwritten by PXT Front-panel Menu Keys

When a scenario file is loaded on the PXT, the parameters from the scenario file that have PXT menu keys associated with them are updated on the PXT to reflect the values from the scenario file. The table below shows those values from the scenario file that can be changed using the PXT front-panel menu keys without requiring modification of the scenario file using the N6062A LTE Message Editor.

Message Editor Field	PXT Menu Key	Key Path
freqBandIndicator controls which frequency band is transmitted in System Information Block 1(SIB1).	*Band*	**Freq**
PA is one of the parameters that controls the power boosting applied to the PDSCH. It is signaled in the RRC Connection Setup message.	*PA*	*BSE > Func > More > DL Power Control->PDSCH channel*
PB is one of the parameters that controls the power boosting applied to the PDSCH. It is signaled in the System Information Block 2 message.	*PB*	*BSE > Func > More > DL Power Control->PDSCH channel*
dl-Bandwidth determines the channel bandwidth defined in the Master Information Block (MIB) message.	*CH Bandwidth*	**Mode > BSE > Mode Setup**
Max-HARQ-Tx controls the number of times an UL-SCH transmission is transmitted if it does not receive an ACK. (This parameter appears in the RRC Connection Setup message of the scenario file.)	*UL HARQ Max Trans*	**BSE** > Mode Setup> More > *MAC Settings*
transmissionMode controls the transmission mode assigned in the RRC Connection Setup message. If this value is set to TM3 or TM4, the codebook subset restriction field is also enabled.	*Transmission Mode*	**BSE > Mode Setup> More >** *RRC Settings*

Message Editor Field	PXT Menu Key	Key Path
p-Max is carried in SIB1 and provides a value for the maximum power the UE is allowed to transmit. If this value is not present in the scenario file, the p-Max On/Off setting is overwritten, but this setting is not.	*p-Max*	BSE > Mode Setup> More > *RRC Settings*
p-Max On/Off determines whether the p-Max value is present in the scenario file by controlling whether the Information Element (IE) is present or not.	*p-Max On/Off*	BSE > Mode Setup> More > *RRC Settings*
p0-NominalPUSCH contributes towards the power of the PUSCH and is carried in SIB2.	*p0-NominalPUSCH*	BSE > Mode Setup> More > *RRC Settings*
p0-UE-PUSCH contributes towards PUSCH power and is carried in the (RRC Connection) Setup message.	*p0-UE-PUSCH*	BSE > Mode Setup> More > *RRC Settings*
defaultPagingCycle controls how frequently the UE can be paged and is contained in SIB2.	*Default Paging Cycle*	BSE > Mode Setup> More > *RRC Settings*
nB controls how frequently the UE can be paged and is contained in SIB2.	*NB*	BSE > Mode Setup> More > *RRC Settings*
additionalSpectrumEmission controls how much leakage the UE is allowed into adjacent frequencies and is contained in SIB2.	*Additional Spectrum Emission*	BSE > Mode Setup> More > *RRC Settings*
PDNAddressInformation is the IP Address assigned to the UE in the Activate Default EPS Bearer Context Request message. Since this is #1, it is the IP address that is contained inside the (Non-Access Stratum) NAS Attach Accept message.	*DUT IP Address #1*	BSE > Mode Setup> More > *RRC Settings*
drx-Config determines if the DRX Config IE in the RRC Connection Reconfiguration message is set to setup or release.	*Connected DRX On/Off*	BSE > Mode Setup> More > *RRC Settings* > More
longDRX-Cycle is related to Connected Mode DRX and is present in the RRC Connection Reconfiguration message.	*longDRX-Cycle*	BSE > Mode Setup> More > *RRC Settings* > More
longDRX-CycleStartOffset is present in the RRC Connection Reconfiguration message.	*DRX-CycleStartOffset*	BSE > Mode Setup> More > *RRC Settings* > More

Message Editor Field	PXT Menu Key	Key Path
onDurationTimer is related to Connected Mode DRX and is present in the RRC Connection Reconfiguration message.	*onDurationTimer*	BSE > Mode Setup> More > *RRC Settings* > More
drx-InactivityTimer is related to Connected Mode DRX and is present in the RRC Connection Reconfiguration message.	*drx-InactivityTimer*	BSE > Mode Setup> More > *RRC Settings* > More
shortDRX is related to Connected Mode DRX and is present in the RRC Connection Reconfiguration message. This field controls whether shortDRX IE is present or not.	*Short DRX Cycle On/Off*	BSE > Mode Setup> More > *RRC Settings* > More
shortDRX-Cycle is related to Connected Mode DRX and is present in the RRC Connection Reconfiguration message.	*shortDRX-Cycle*	BSE > Mode Setup> More > *RRC Settings* > More
shortDRX-CycleTimer is related to Connected Mode DRX and is present in the RRC Connection Reconfiguration message.	*drxShortCycleTimer*	BSE > Mode Setup> More > *RRC Settings* > More
sr-ConfigIndex controls the frequency and on which subframe scheduling request messages can be sent. (This parameter appears in the RRC Connection Setup message of the scenario file.)	*SR Config Index*	BSE > Mode Setup> More > *RRC Settings > More > More*
UL-DL Configuration, used only in TDD, controls how many subframes are used for DL transmission, how many for UL transmission and how many are special subframes (used for both). It appears in the SIB1, with the name subframeAssignment.	*UL-DL Configuration*	BSE > Mode Setup> More > *RRC Settings >More > More > SIB1*
Special Subframe Configuration, used only in TDD, controls the configuration of the special subframe – how many symbols of the subframe are used for downlink transmission and how many for uplink. It appears in SIB1, with the name specialSubframePatterns.	*Special Subframe Configuration*	BSE > Mode Setup> More > *RRC Settings >More > More > SIB1*
AS Ciphering Algorithm controls the Ciphering Algorithm selected for use in the Access Stratum. This is signaled in the RRC layer's Security Mode Command.	*AS Ciphering Algorithm*	BSE > Mode Setup> More > *RRC Settings > More > More > SMC*

Message Editor Field	PXT Menu Key	Key Path
MCC is carried in SIB1. It also exists in the NAS Attach Accept message: • in the TAIList • in the Globally Unique Temporary Identity (GUTI), if it is present and overwrites both of these values.	*MCC*	**BSE** > **Mode Setup**> **More** > *NAS Settings*
MNC is carried in SIB1. It also exists in the NAS Attach Accept message: • in the TAIList • in the Globally Unique Temporary Identity (GUTI), if it is present and overwrites both of these values.	*MNC*	**BSE** > **Mode Setup**> **More** > *NAS Settings*
This setting controls the number of digits of MNC. It is carried in SIB1. It also exists in the NAS Attach Accept message: • in the TAIList • in the Globally Unique Temporary Identity (GUTI), if it is present and overwrites both of these values.	*2 or 3 Digit MNC*	**BSE** > **Mode Setup**> **More** > *NAS Settings*
NAS Ciphering Algorithm controls the Ciphering Algorithm selected for use in the Non Access Stratum. This is signaled in the EMM layer's Security Mode Command.	*NAS Ciphering Algorithm*	**BSE** > **Mode Setup**> **More** > *NAS Settings*
This enables the EPS Bearer ID associated with each of the configured Default EPS Bearer Contexts in the scenario file to be read back.	*Default EPS Bearer Config # 1 (-4)*	**BSE** > **Mode Setup**> **More** > *NAS Settings*
IP Address Type controls what type of IP address is assigned to the UE in the Activate Default EPS Bearer Context Request message. You can assign an IPv4 address, an IPv6 address, or both an IPv4 and IPv6 to the UE.	*IP Address Type*	**BSE** > **Mode Setup**> **More** > *NAS Settings* > *Default EPS Bearer Config #(1-4)*

Message Editor Field	PXT Menu Key	Key Path
V4 Address controls the IPv4 address that is assigned to the UE in the Activate Default EPS Bearer Context Request message, if the IP Address Type selection has enabled this.	*V4 Address*	**BSE** > **Mode Setup> More >** *NAS Settings* > *Default EPS Bearer Config #(1-4)*
V6 Address controls the IPv4 address that is assigned to the UE in the Activate Default EPS Bearer Context Request message, if the IP Address Type selection has enabled this.	*V6 Address*	**BSE** > **Mode Setup> More >** *NAS Settings* > *Default EPS Bearer Config #(1-4)*
DNS State controls whether a DNS address will be assigned to the UE in the Activate Default EPS Bearer Context Request message.	*DNS State*	**BSE** > **Mode Setup> More >** *NAS Settings* > *Default EPS Bearer Config #(1-4)*
DNS Address Type controls what type of IP address (IPv4, IPv6 or IPv4v6) is assigned as a DNS address in the Activate Default EPS Bearer Context Request message.	*DNS Address Type*	**BSE** > **Mode Setup> More >** *NAS Settings* > *Default EPS Bearer Config #(1-4)*
V4 DNS Address controls the IPv4 address that is assigned as a DNS address in the Activate Default EPS Bearer Context Request message, if the DNS Address Type selection and DNS State have enabled this.	*V4 DNS Address*	**BSE** > **Mode Setup> More >** *NAS Settings* > *Default EPS Bearer Config #(1-4)*
V6 DNS Address controls the IPv6 address that is assigned as a DNS address in the Activate Default EPS Bearer Context Request message, if the DNS Address Type selection and DNS State have enabled this.	*V6 DNS Address*	**BSE** > **Mode Setup> More >** *NAS Settings* > *Default EPS Bearer Config #(1-4)*
APN selects the value of the APN that is assigned to the UE in the Activate Default EPS Bearer Context Request. Based on the APN Overwrite menu key, it is also used to overwrite the APN in the Communication Scenario. For more information, see Access Point Name on page 23.	*APN*	**BSE** > **Mode Setup> More >** *NAS Settings* > *Default EPS Bearer Config #(1-4)*
APN Overwrite controls whether the APN is overwritten only in the Default EPS Bearer Context Request message, or whether the value also overwrites the APN in the Communication Scenario. For more information, see Access Point Name on page 23.	*APN Overwrite*	**BSE > Mode Setup> More >** *NAS Settings* **> More**

Message Editor Field	PXT Menu Key	Key Path
P-CSCF State controls whether the IP address of a Proxy-Call Session Control Function server is supplied to the UE in the Activate Default EPS Bearer Context Request message.	*P-CSCF State*	**BSE** > **Mode Setup> More >** *NAS Settings* > *Default EPS Bearer Config #(1-4)* > **More**
P-CSCF Address Type controls what type of IP address (IPv4, IPv6 or IPv4v6) is assigned as the IP address of the P-CSCF server.	*P-CSCF Address Type*	**BSE** > **Mode Setup> More >** *NAS Settings* > *Default EPS Bearer Config #(1-4)* > **More**
V4 P-CSCF Address controls the IPv4 address that is assigned as the IP address of the P-CSCF server – assuming the P-CSCF State has enabled this.	*V4 P-CSCF Address*	**BSE** > **Mode Setup> More >** *NAS Settings* > *Default EPS Bearer Config #(1-4)* > **More**
V6 P-CSCF Address controls the IPv6 address that is assigned as the IP address of the P-CSCF server – assuming the P-CSCF State has enabled this.	*V6 P-CSCF Address*	**BSE** > **Mode Setup> More >** *NAS Settings* > *Default EPS Bearer Config #(1-4)* > **More**
Cause Code State controls whether the Activate Default EPS Bearer Context Request message will contain a Cause Code (which usually indicates a requested service is not available)	*Cause Code State*	**BSE** > **Mode Setup> More >** *NAS Settings* > *Default EPS Bearer Config #(1-4)* > **More**
Cause Code controls the cause code that will be contained in the Activate Default EPS Bearer Context Request message, assuming the Cause Code State has enabled this.	*Cause Code*	**BSE** > **Mode Setup> More >** *NAS Settings* > *Default EPS Bearer Config #(1-4)* > **More**

6 Creating a New Scenario File

It is often easiest to start with an existing scenario file as a template and make modifications from that. However, you may want to create a new scenario file to use as a completely blank canvas.

1. Click **New** Insert Icon　　　or Click **File**, **New**

Figure 6-1: Creating New Scenario File

2. Click the **OK** button, This creates a new, blank, scenario file.

3. Save this under an appropriate name before making further edits to it.

7 Modifying a Scenario File

After you save a new scenario file or open an existing one, you see four tabs at the bottom left of the scenario file window, which enables you to access the various functions of the N6062A Message Editor. They are described in each of the sections below:

The RRC Window

NAS Window

Scenario Window

Extended Window

File Transfer

Examples of Common Changes

The RRC Window

The N6062A LTE message editor provides a comprehensive tool for generating and manipulating RRC (Radio Resource Control) messages.

The RRC Message List box displays all the user defined RRC messages. By clicking on the Insert Message button, you can easily insert, delete, and edit RRC messages. You can select an individual message on the list to view its structure and parameters on the Message Structure box to the right of the RRC Message List.
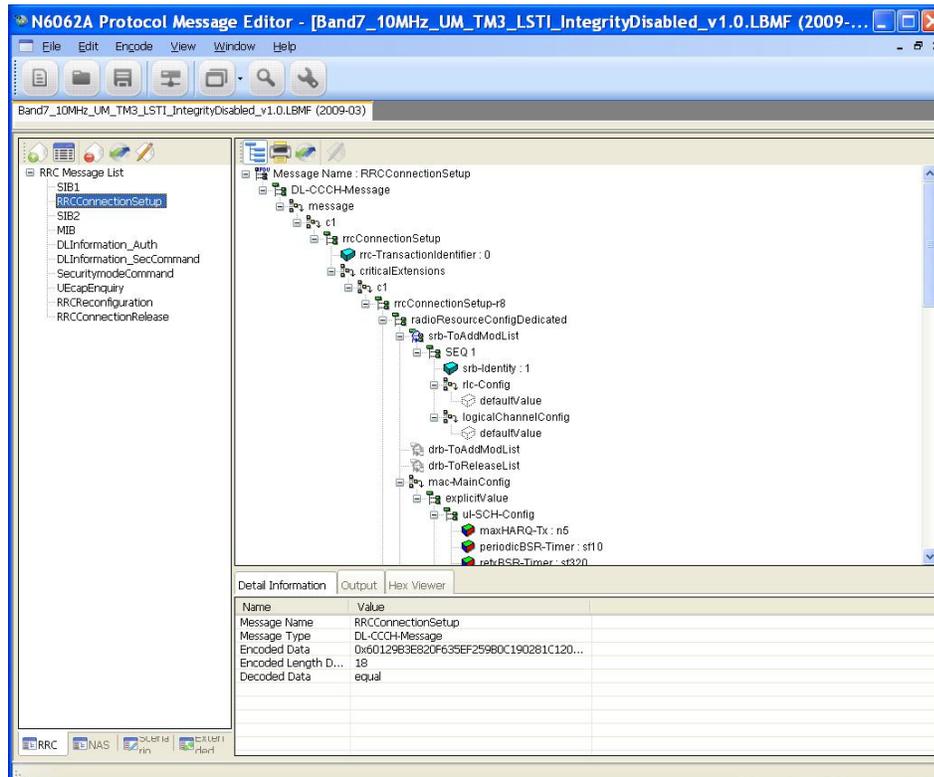
Figure 7-1: RRC Message Structure

1. Click on the **Insert Message** icon. The window below is displayed.

2. Select the **PDU Type** (Protocol Data Unit) of message you would like to include.

3. Double-click or drag and drop to insert it into the **Insert Message** window.

4. Name the message by double-clicking in the **Name** column and typing the desired name. (For example: "Master Information Block")
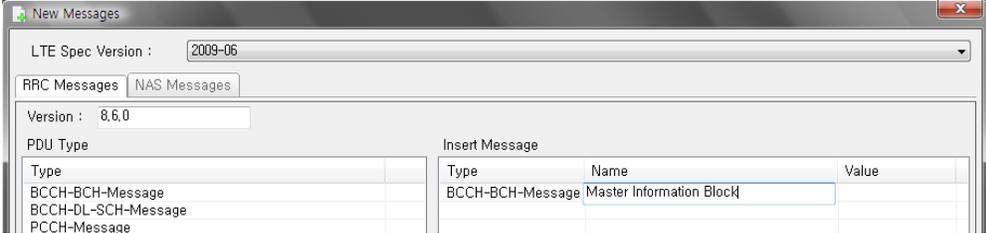
Figure 7-2: Insert a New Message Type

5. A message can be created directly by inserting a hex value into the **Value** column or this can be left blank.

6. Click the **OK** button.

A new message now appears in the **RRC Message List**.

NOTE	If the message name appears in red, this indicates that it still needs to be encoded. To encode a message, select either of the ![icon] icons at the top of the new message windows.

If a hex value has been specified for the message, a decoded RRC message corresponding to that hex value appears on the right-hand side, when the message name is highlighted.

If the hex value has not been specified, a blank message corresponding to the selected PDU type appears in the right-hand side.
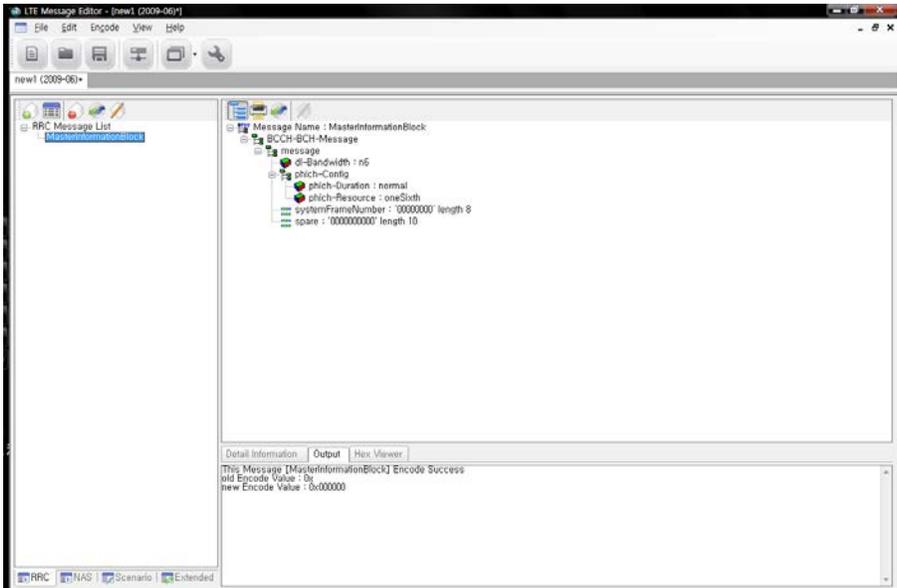
Figure 7-3: New RRC Message

The fields of the message can be manipulated by selecting a modifiable parameter on the right-hand side, right-clicking and selecting **Change Value**. Depending on the field type, a value can either be entered directly, or chosen from an enumerated list.

NOTE	Any applied changes to an RRC message on the list are not finalized unless the message is encoded again.

Figure 7-4: Detail Information - Output - Hex Viewer

The Input box (the top-right-side window, where you can change values) shows a brief summary of a selected item. Once you encode an item, the result is shown in the **Output** box.

NAS Window

Non-Access Stratum (NAS) Editor enables you to easily generate and decode encoded HEX NAS data. These are very important features to create a wide range of PXT scenario files. Generated, encoded HEX NAS data can be used in the N6062A to generate RRC messages containing NAS data; any received NAS messages on the eNodeB emulator side can be decoded for debugging.

NOTE	It is not sufficient to construct an NAS message for it to be included in a scenario file – the hex content associated with the NAS message must appear inside an RRC message for it to be sent to the UE during a message exchange. This can be easily accomplished from the RRC menu tab, by right-clicking on the NAS field and selecting the NAS message you wish to include from the drop-down list. See step #7 on page <u>42</u> as an example.
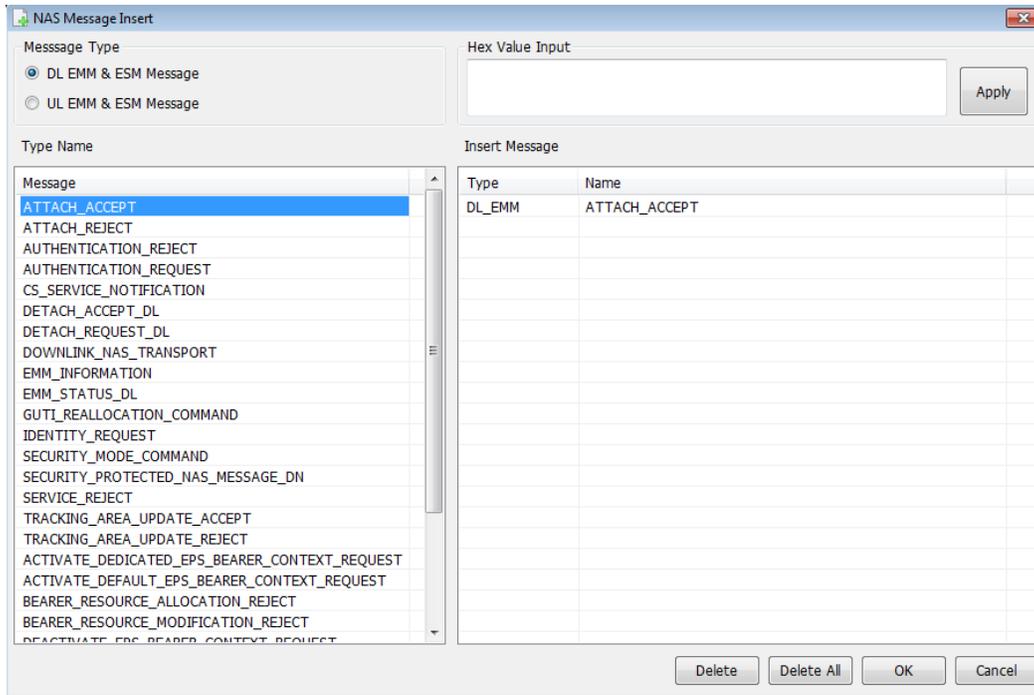
Figure 7-5: NAS Message Insert Window

To generate a new message, first select one of the DL/UL radio buttons in the Message Type box.

NAS Message Insertion Procedure

1. Click the **Insert Message** icon or **Edit**, **Insert Message.**

2. Select **Message Type**.
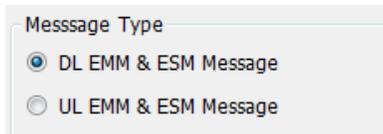
3. Select **Message.**

4. Double-click or drag and drop to the **Insert Message** window.

5. Click **OK** button.

Linking a NAS Message to an RRC Message

Linking NAS messages to RRC messages enable you to update the NAS message parameter and automatically update the RRC message containing the NAS message.

1. Select an RRC message that contains a NAS message.

2. Right-click on the parameter you wish to change in the NAS message list. In the example below, RRC Reconfiguration is the RRC message that contains the dedicatedInfoNASList. As shown, right-clicking on SEQ 1 displays a 'Change NAS' choice.
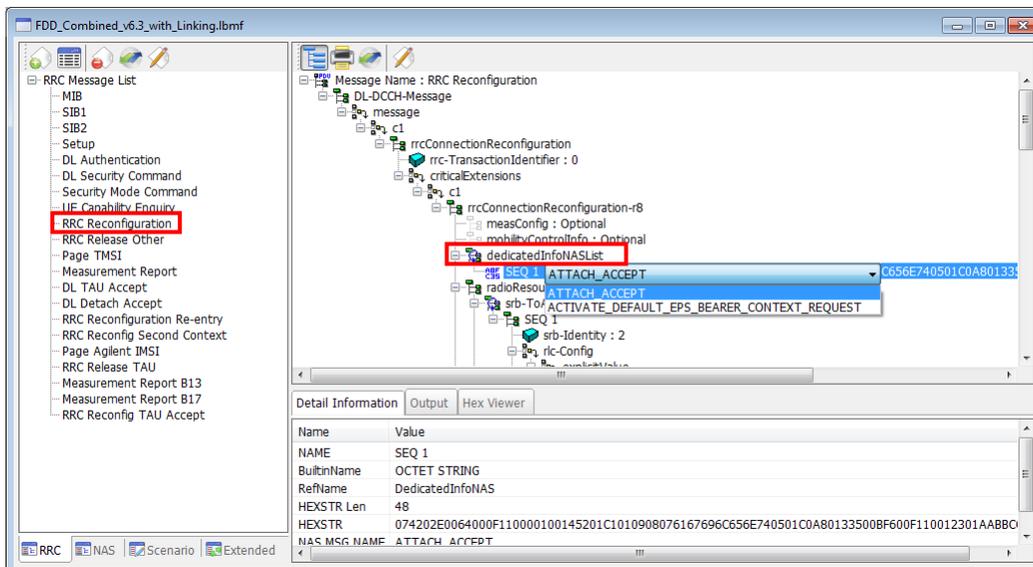
Figure 7-6: Linking ATTACH_ACCEPT to RRC Reconfiguration Message

3. Selecting 'Change NAS' enables you to choose the NAS Message you wish to link. In this example, ATTACH_ACCEPT is selected.

4. Select 'Enter' on your keyboard or click in any of the white areas of the software user interface. Notice that the value for SEQ 1 has changed.

5. Select the **encode Message** icon at the top of the screen and verify the encoding was successful by the text shown in the Output tab section at the bottom of the display.

6. The NAS message is now linked to the RRC message, so any changes made to the NAS message can be automatically updated in the RRC message if you choose. Refer to a continuation of this example in Changing the Initial DUT IP Address on page

Scenario Window

The Scenario Editor provides a simple interface for you to create and modify various test scenarios for the eNodeB emulator. Use the DL RRC messages (which may contain NAS data) defined in *N6062A LTE Message Editor* software as well as those you have pre-defined. Each scenario is divided into two sub-scenarios:

- Start Scenario
- Communication Scenario

Start Scenario

The Start Scenario window defines master information block and system information block messages that are broadcast by the PXT; you can double-click or drag and drop to place a selected MIB/SIB message in Start Scenario box. The index in the Start Scenario box indicates the order of message transmission from eNodeB.

Figure 7-7: Start Scenario Window

Communication Scenario

The Communication Scenario window defines the desired message exchange between the PXT and a UE. The UL RRC Message contains the name of a standard RRC Message (for example, rrcConnectionRequest). The right-hand DL RRC Message column contains the name of the message that is sent to the UE as a result of receiving the UL RRC Message Type. The messages in the DL RRC column are those that have been constructed by the user and appear in the RRC Window.

Some UL RRC messages can carry NAS messages inside them. For those messages, it is possible to further qualify the DL RRC message that are sent based on the NAS content of an UL RRC message. So, for a received UL Information Transfer message at RRC, different DL RRC messages could be sent to the UE depending on the NAS message that was carried inside the UL RRC Message.

Figure 7-8: Communication Scenario Window

There are four tabs in the Communication Scenario window:

- RRC_CONNECTION (Initial Attach) – This tab shows those messages and events related to the initial attach.

- RRC_CONNECTION_1 (Service Request) – This tab shows those messages and events related to the UE requesting service.

- RRC_CONNECTION_2 (TAU Request) – This tab shows those messages and events related to a Tracking Area Update (TAU), required when performing handovers as it updates the UE location to the enodeB.

- RRC_CONNECTION_3 (Ext Service Request) – This tab shows those messages and events related to an extended service request.

You can change the NAS message from this view by double-clicking the message and then making your selection from a drop-down list, as shown below.
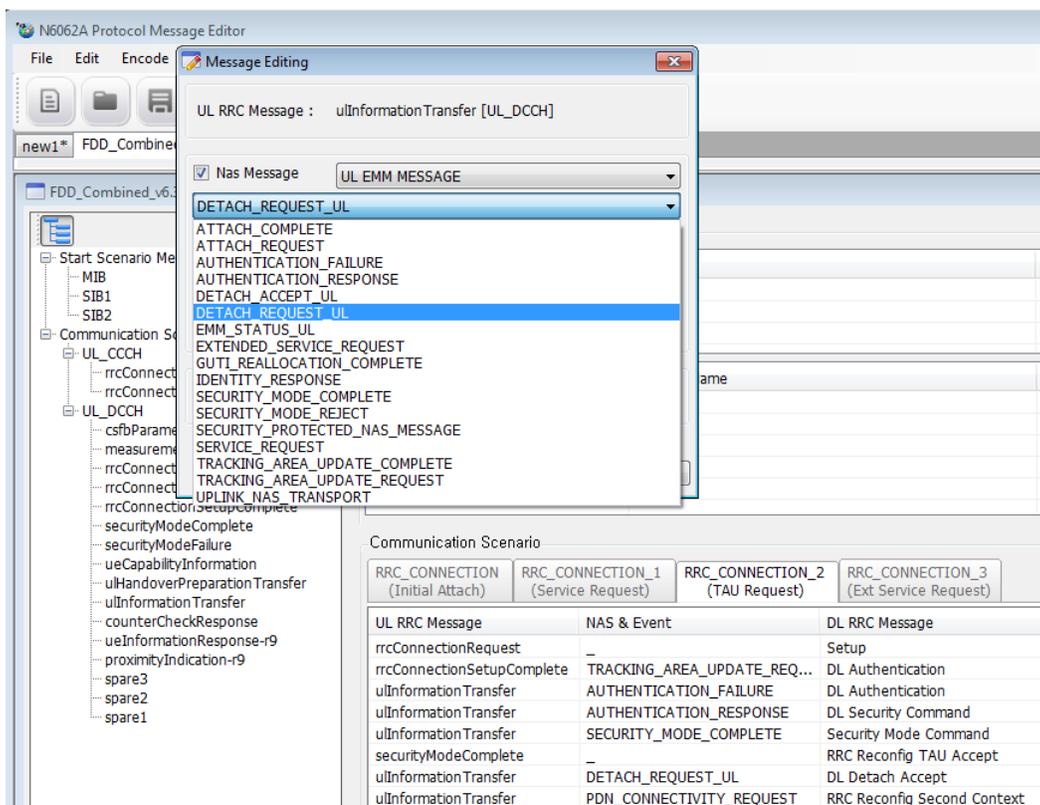
Figure 7-9: Changing NAS Messages
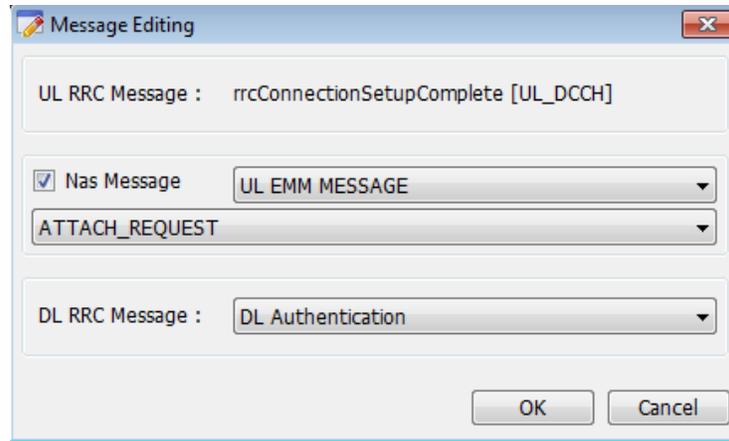
Figure 7-10: Qualifying Message Response to UL NAS Message

As well as qualifying a message response based on the UL NAS message that is being carried, there is the option to further qualify the response to certain messages based on message content.

Access Point Name

The PDN Connectivity Request message can carry information on the Access Point Name. It is possible to determine the response needed to be sent, based on the Access Point Name carried inside the message. This means that different responses can be sent in response to different PDN Connectivity Request messages.

If the PXT front-panel menu-key, *APN Overwrite* = Msg + Scenario, this Access Point Name is overwritten with the APN specified inside the key menu corresponding to the relevant EPS Bearer Identity.

For the example in the figure below, if the 'RRC Reconfig Second Context' message specifies an EPS Bearer ID of 9, then there is a PXT menu available under the 'NAS Settings' menu, enabling the configuration of parameters associated with EPS Bearer Id 9. (**BSE** > **Mode Setup> More** > *NAS Settings > Default EPS Bearer Config #2* – this menu key has a preset value of " EPS Bearer ID 9".) The APN parameter in this menu overwrites not only the APN parameter in the Activate Default EPS Bearer Context Request message, but also the Access Point Name below. This means that the 'RRC Reconfig Second Context' message is only sent when the selected APN is received inside the PDN Connectivity Request message sent by the UE.

It is also possible to avoid overwriting the Access Point Name by selecting *APN Overwrite* = Msg on the PXT front-panel. This enables the Access Point Name below, to be left blank – meaning that the specified DL RRC Message will be sent in response to any PDN Connectivity Request. It also allows slightly more unusual scenarios to be tested. For example, in a situation where the UE asks to connect to one APN, but is told it has connected to another.
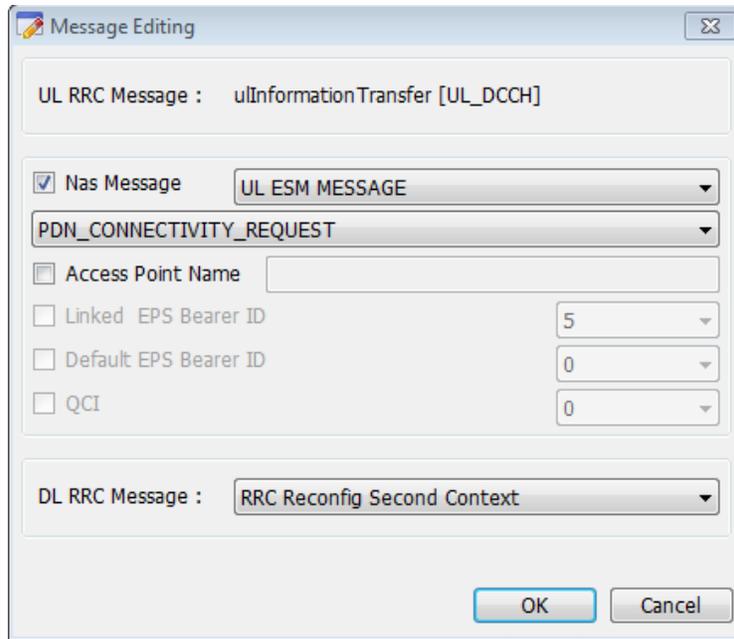
Figure 7-11: Different Responses Available to PDN Connectivity Request Message

The PDN Disconnect Request message specifies an EPS Bearer Identity associated with the PDN that the UE is requesting to disconnect from. Specifying a value in the Linked EPS Bearer ID field enables precise specification of the Deactivate EPS Bearer Context Request message that the PXT should send to the UE.
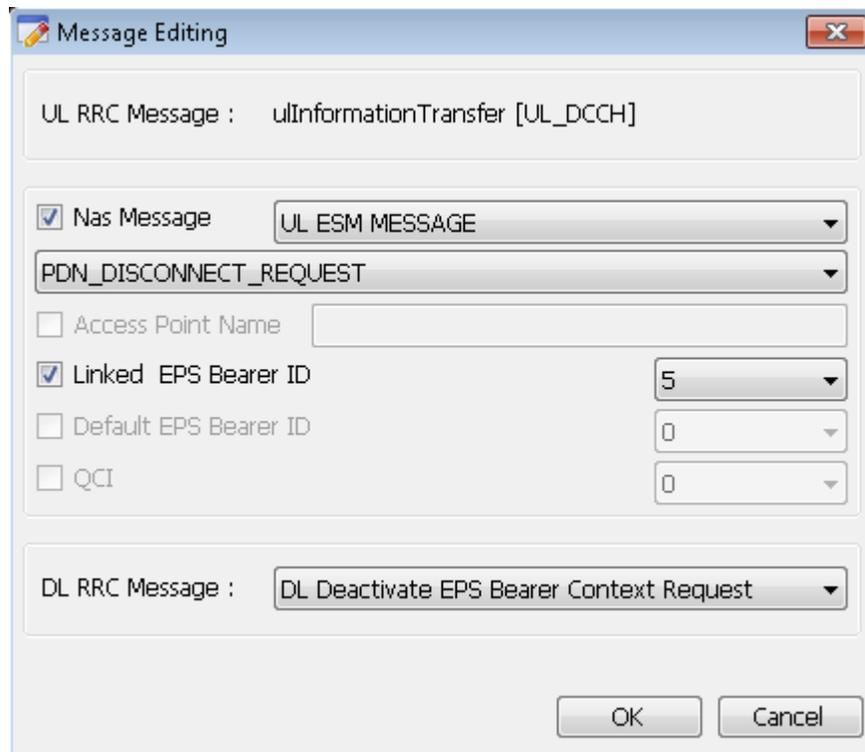
Figure 7-12: Specifying a Value in the Linked EPS Bearer ID Field

The Bearer Resource Allocation Request is a request from the UE that a Dedicated Bearer is established. The message can include different EPS Bearer Identities and different QCI values inside it. The Linked EPS Bearer Identity represents the Default Bearer with which the UE would like the Dedicated Bearer to be associated. The QCI value corresponds to the requested quality of the Dedicated Bearer. This provides the flexibility of choosing different DL RRC Messages that can be sent in response to combinations of these two parameters. These different messages can activate different Dedicated EPS Bearer Contexts.
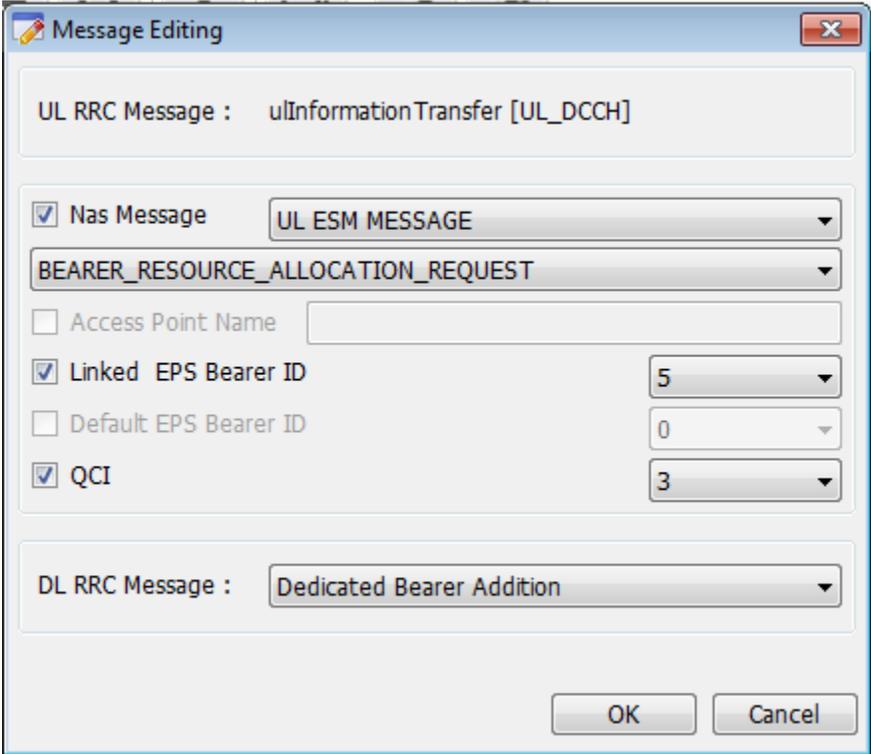
Figure 7-13: Selecting Default EPS Bearer IDs and QCI Values

Measurement Report

The Measurement Report message can carry a different measurement identity (or MeasID). A different response can be sent to measurement reports containing different measurement identities – allowing a certain report to trigger an automatic redirection to another cell, for example.

Figure 7-14: Different Measurement Identity Available for Message Report Message

Extended Window

Using Extended Window, you can add a message that has been defined in the RRC message window to the Custom Message, Page Message, or Release Message pane.
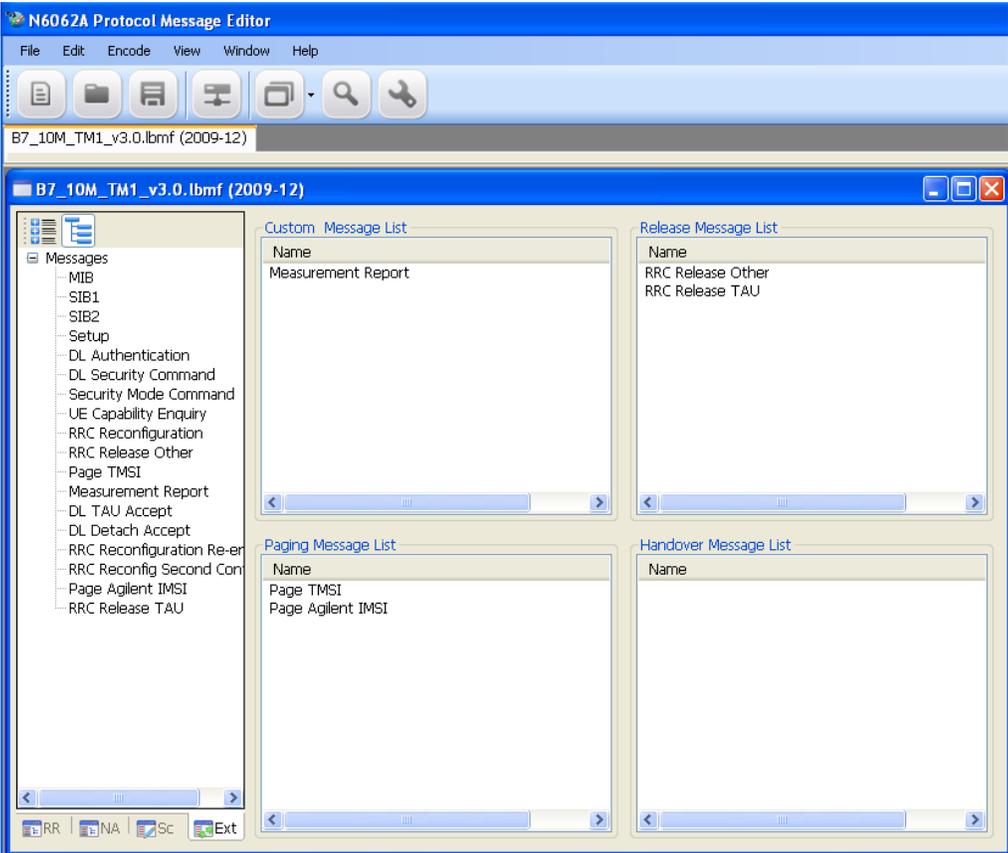
Figure 7-15: Extended Window

On the PXT instrument, it is possible to send these on demand by pressing the appropriate softkeys under the PXT **Func** (Function) menu.

Extended Message Insertion Procedure

1. Select a message in the All Message View.
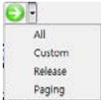
2. Select message and click the icon (**All**/**Custom**/**Release**/**Paging**/**Handover**.

File Transfer

A scenario file must be transferred to the PXT before it can be run. This is done using the procedure below.

File Transfer Procedure

1. Click [icon] icon from the main tool bar or select **File**, **File Transfer.**
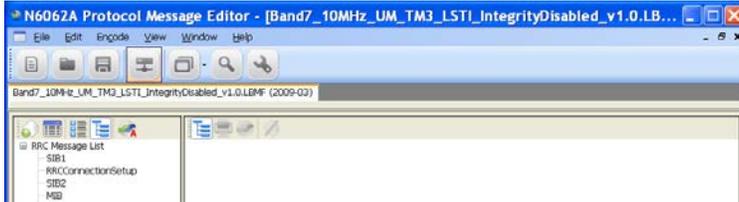
2. Check the IP Address (for example: 192.168.1.60).
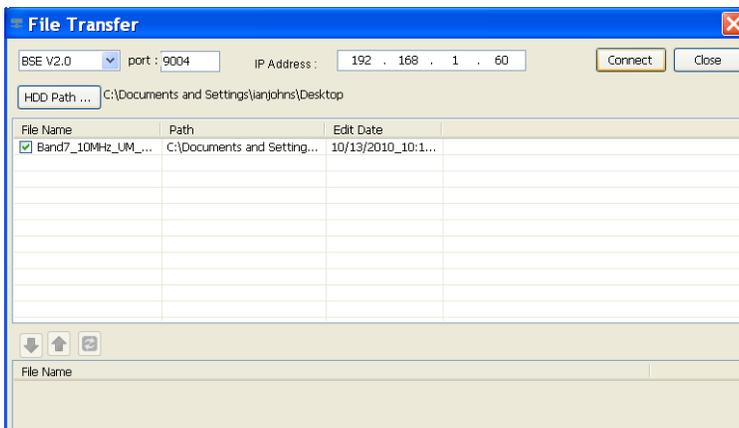
3. Click **Connect** Button.

4. Click the check box from the **File Name** list.

5. Click [icon] icon

6. The file is transferred to the scenario file directory in the PXT. A message indicates whether the message has been successfully transferred.

7. On the PXT, select **Mode > BSE > Mode Setup > Call Scenario** to see the list of available scenario files, and check that the file you downloaded is listed.
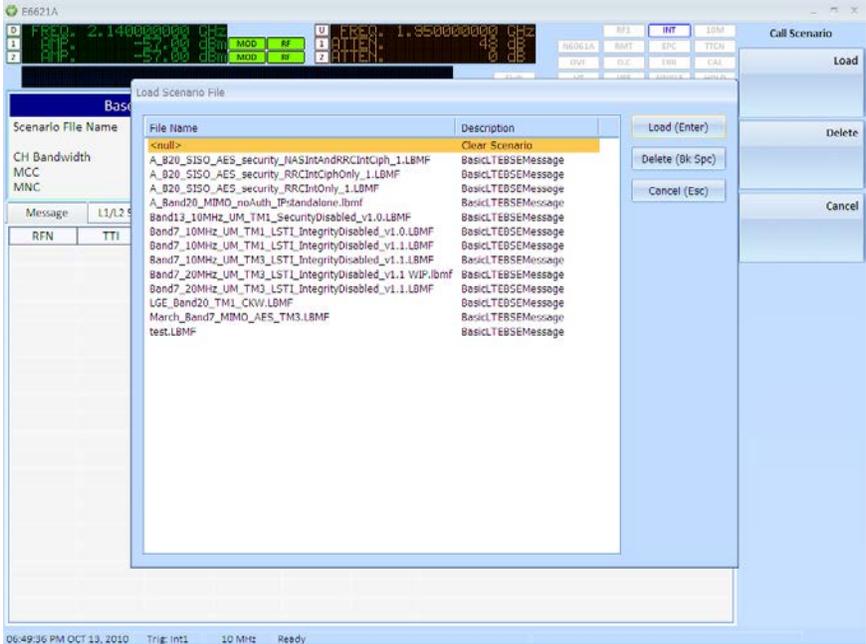
Figure 7-16: Verifying a Successful Download

Examples of Common Changes

Setting the Channel Quality Indicator (CQI) Value

1. Locate the rrcConnectionSetup message on the RRC message tab. The cqi-ReportConfig Information
    Element is near the bottom of this message.
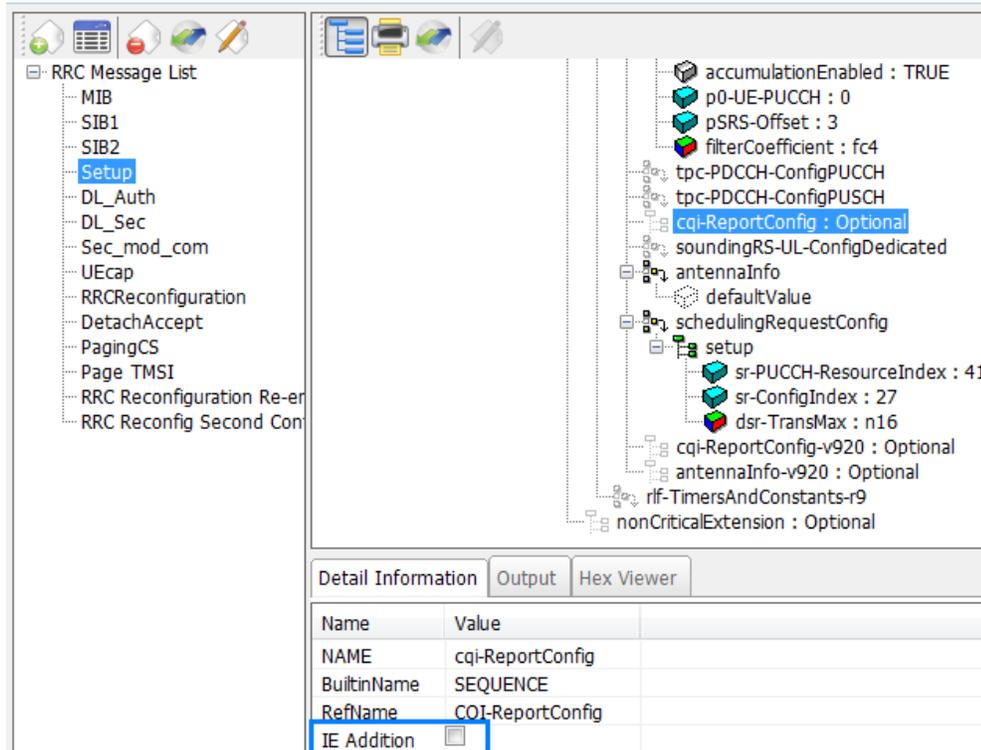
Figure 7-17: Accessing CQI Reporting

2. The Information Element (IE) may not be present in the message – which indicates to the UE that CQI
    reporting is not being configured in this message. To include the IE, highlight the cqi-ReportingConfig
    field as shown above and notice that an IE Addition box becomes available under the Detail
    Information tab. Select the box marked IE Addition. This enables the cqi-ReportConfig information to
    become visible as shown below.
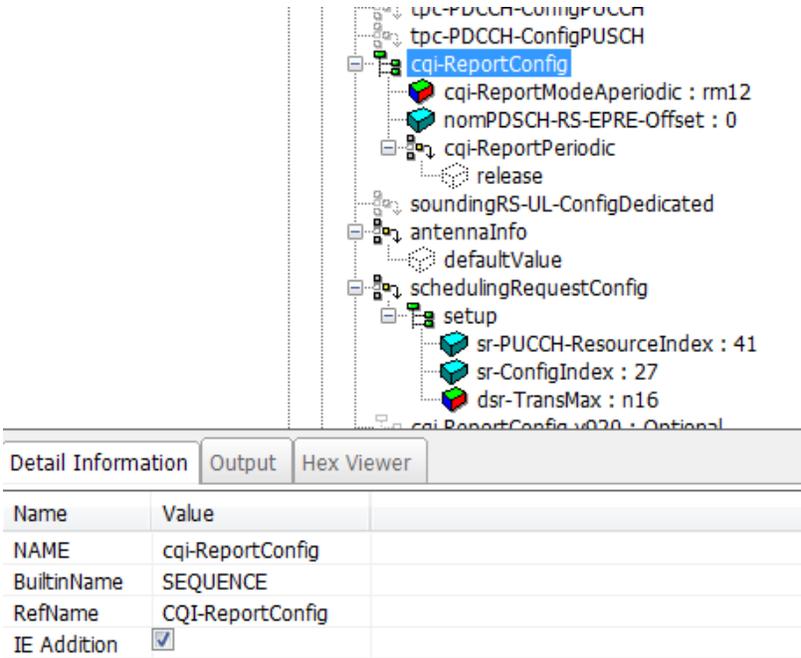
Figure 7-18: Enabling CQI Report Configuration

3. Disable Aperiodic CQI reporting, by highlighting the cqi-ReportModeAperiodic field and de-selecting the **IE Addition** box.
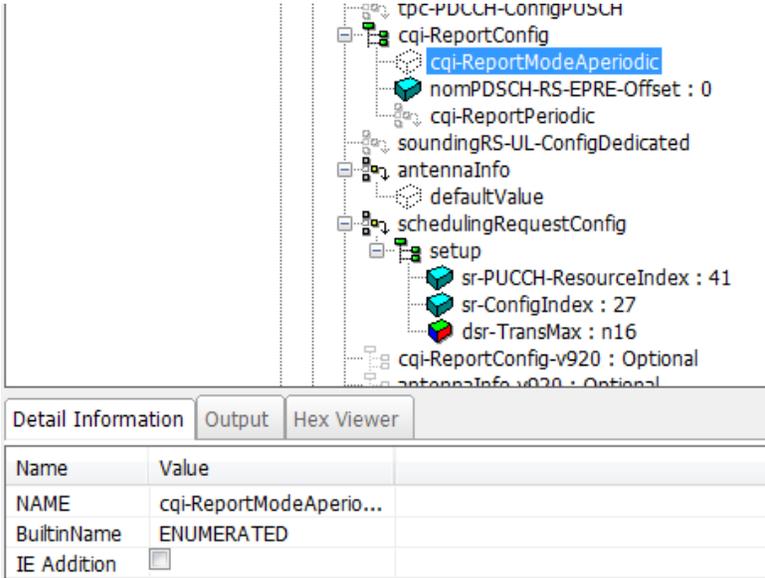
Figure 7-19: Disabling Aperiodic CQI Reporting

4. Enable Periodic CQI reporting, by right-clicking the cqi-ReportPeriodic IE and selecting 'setup' from the drop-down list of possible options.
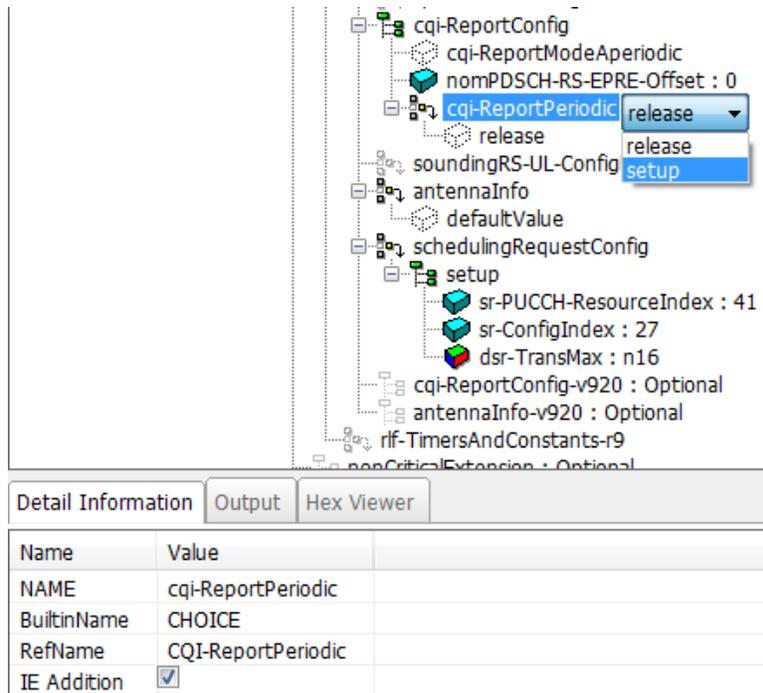
Figure 7-20: Enabling Periodic CQI Reporting

5. The most basic type of CQI reporting is Periodic Wideband CQI reporting. Setting the values shown in the diagram below enable this.
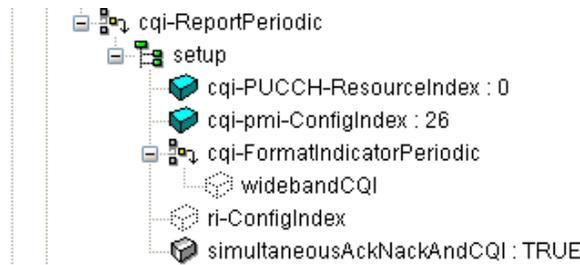
Figure 7-21: Settings for Periodic Wideband CQI Reporting

6. Make sure you encode the message by clicking the **encode Message** button. The Setup message in the **RRC Message List** changes its color, from red to black, indicating the message is encoded.

NOTE	If you navigate away from the message before pressing the **encode Message** button, your changes are lost.

7. Select **File**, **Save As…** and save the file with a new name, retaining the .LBMF extension.

Changing the Initial DUT IP Address

(This procedure changed in software revision 6.4 when the new capability of linking of NAS messages to RRC messages was introduced.)

In this example, you will change the Initial DUT IP Address in the ACTIVATE_DEFAULT_EPS_BEARER_CONTEXT_REQUEST message and automatically update the RRC Reconfiguration message with this new value.

1. You should already have an ACTIVATE_DEFAULT_EPS_BEARER_CONTEXT_REQUEST message in your **NAS Message List**. If not, refer to the "NAS Message Insertion Procedure" on page <u>19</u> to include one.

2. If you have not already done so, use the "Linking a NAS Message to an RRC Message" on page <u>19</u> to link the ATTACH_ACCEPT message to the RRC Reconfiguration message.

NOTE	It is best to link NAS messages to the RRC messages because this enables all NAS message value changes to be automatically updated in the RRC messages to which they are linked.

For this example we are also going to link the ACTIVATE_DEFAULT_EPS_BEARER_CONTEXT_REQUEST NAS message to the ATTACH_ACCEPT message.

3. On the NAS window tab, select the ATTACH_ACCEPT message. Notice the ESMMessageContainer parameter in the Input window on the right-hand side.

4. Right-click on NasMessageDnData and select 'Change NAS ESM'.
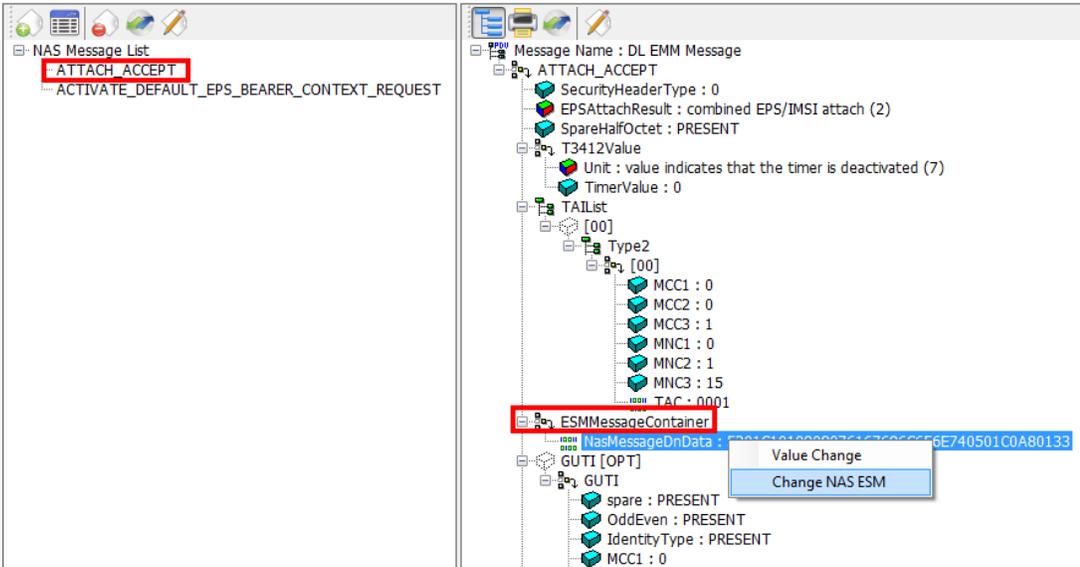
Figure 7-22: Settings for Periodic Wideband CQI Reporting

5. Select the ACTIVATE_DEFAULT_EPS_BEARER_CONTEXT_REQUEST message.

6. Encode the new NAS ESM message by selecting the **encode Message** icon at the top of the window. The following information message pops-up:
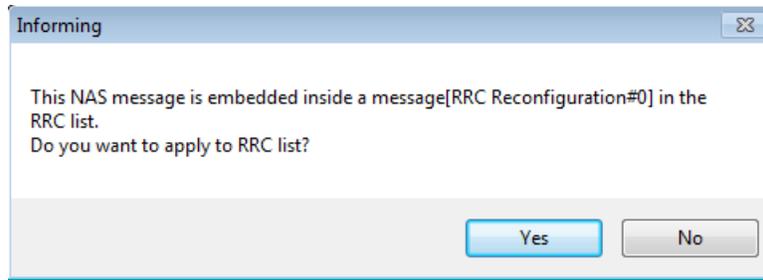
Figure 7-23: Applying NAS Message Update to RRC Message

NOTE	If you do not see the above message, then this NAS message is not linked to any RRC message and you will have to go back to the RRC window and perform the linking procedure as described above or copy and paste the hex values as required in previous versions of *N6062A Message Editor* software.

7. Select 'Yes' because you want this new value to applied in the RRC message. Notice the "Encode Success" message is now displayed in the Output tab window. You now have linked the ACTIVATE_DEFAULT_EPS_BEARER_CONTEXT_REQUEST NAS message to the ATTACH_ACCEPT message, so any changes to either of these messages are reflected in the RRC Reconfiguration message.

8. Right-click the PDNAddressInformation entry and select 'Value Change' when it pops up. The IP address field is now available to be changed.
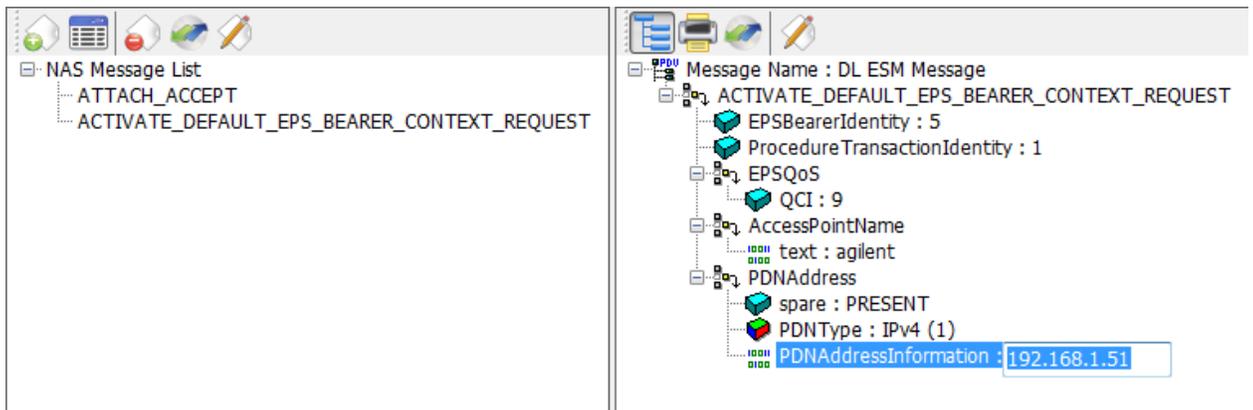
Figure 7-24: Changing the IP Address

9. Enter the new IP address you wish to use.

10. Encode the new IP address by selecting the **encode Message** icon at the top of the window. The following information message pops-up:
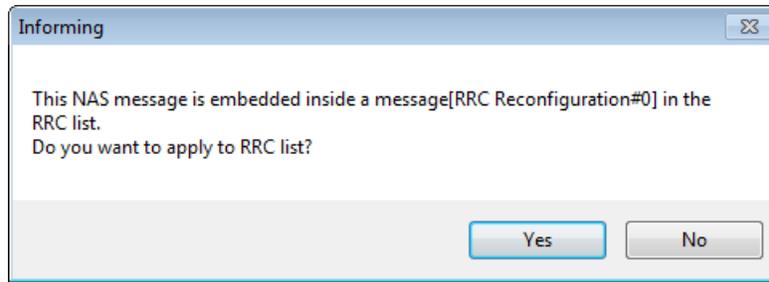
11. Select 'Yes' because you want this new value to applied in the RRC message. Notice the "Encode Success" message is displayed in the Output tab window.

12. Go to the RRC window and notice the RRC Reconfiguration message has turned red. When you select this RRC message you can see that the value for SEQ 1 has changed. Select the **encode Message** icon. The Output tab window now displays "Message is Encoded!". The RRC Reconfiguration message is now black, which also verifies encoding is successful.

Signaling Other Addressing Options

The ACTIVATE_DEFAULT_EPS_BEARER_CONTEXT_REQUEST message is also the method for signaling other addressing options.

- Right-clicking on the message header displays a list of these options.

- Left-clicking on each of these options adds additional fields to the message.

It is possible to enter a list of separate addressing options within a single message. In the example below, ContainerCfgs is set to 3, enabling you to provide 3 addresses to the UE when the ACTIVATE_DEFAULT_EPS_BEARER_CONTEXT_REQUEST message is transmitted to the UE. This example sets one P-CSCF and two DNS addresses.
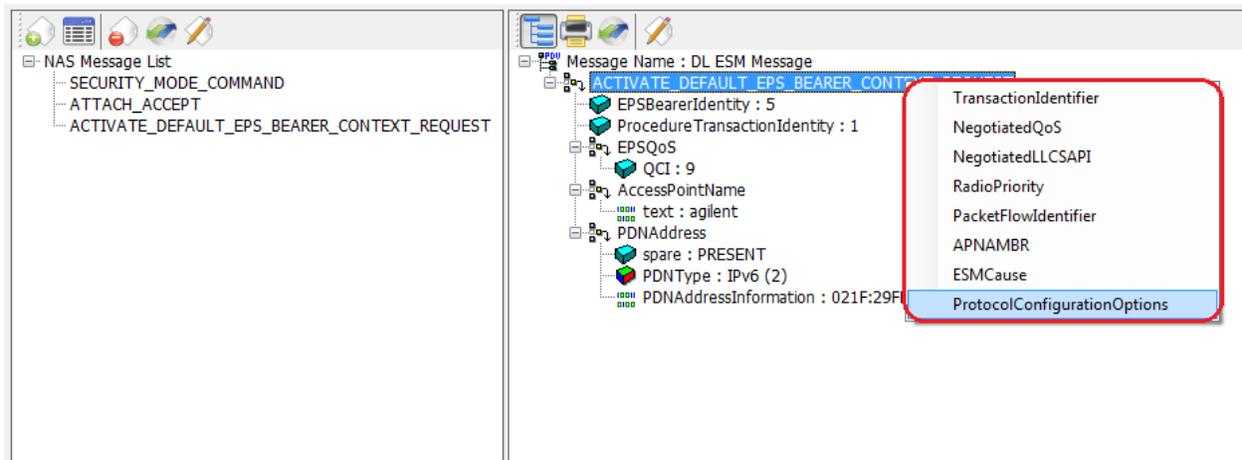
Figure 7-25: DUT IP Address Additional Information Options

1. Select the ProtocolConfigurationOptions line. Right-click on ContainerCfgs and change the content to 3.
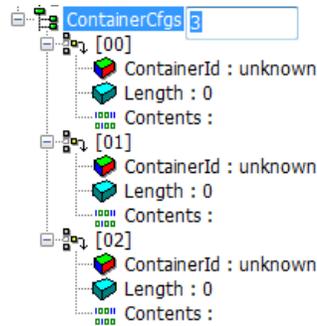
Figure 7-26: Creating ContainerIds for IP Addresses
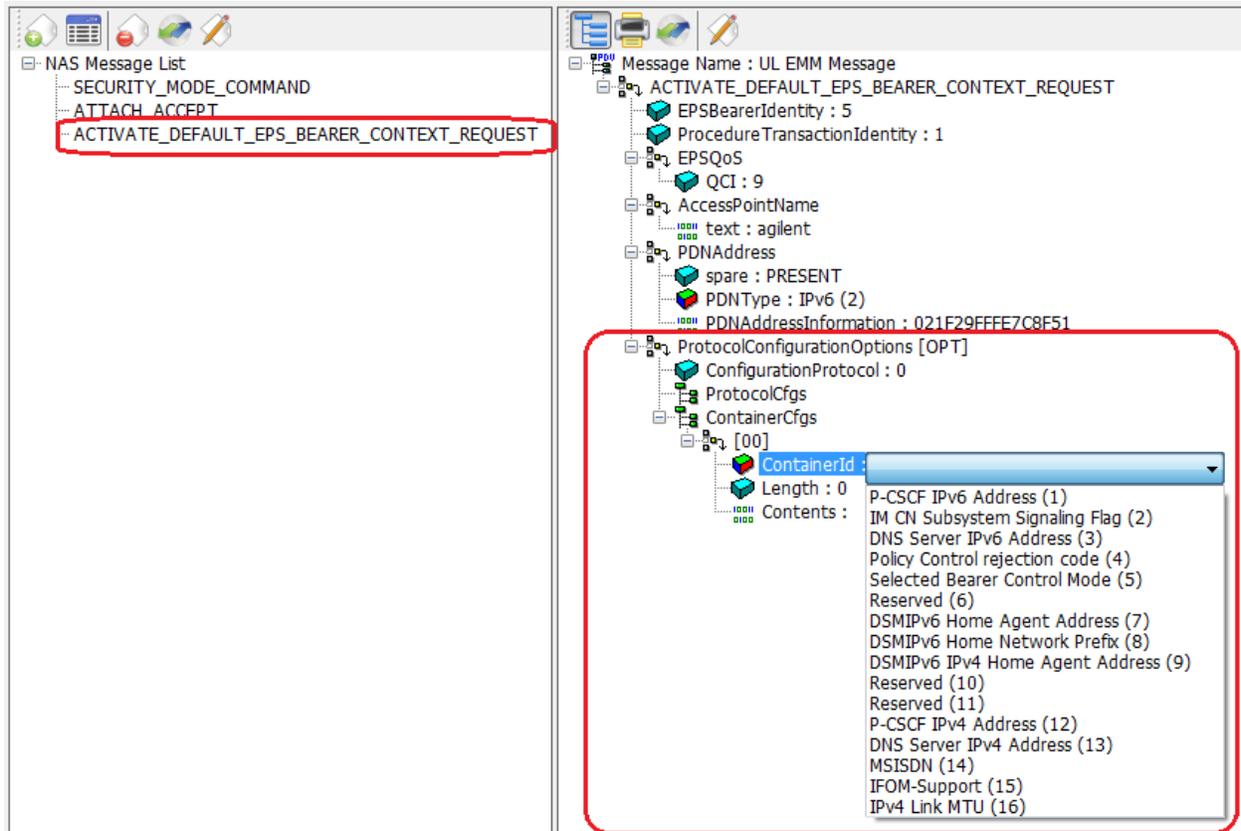
Figure 7-27: DUT IP Address Additional Information Options

2. Right-click on ContainerId, select "Value Change" and then access the additional information element options shown in figure 7-25 by selecting the drop-down list.

3. Use the three containerId fields to select and populate each address for the information elements:

   - P-CSCF IPv6 Address

   - DNS Server IPv4 Address

   - DNS Server IPv6 Address

   The resulting contents are shown in figure 7-28.

.

NOTE	• The UE IP address is entered in the form 021F:29FF:FE7C:8F51.
	• The server addresses also include the header information (resulting in 32 characters), and the colon separators must be omitted.
	• The UE IPv4 address is entered in dot separated decimal.
	• The server IPv4 addresses are entered in HEX with no separators.
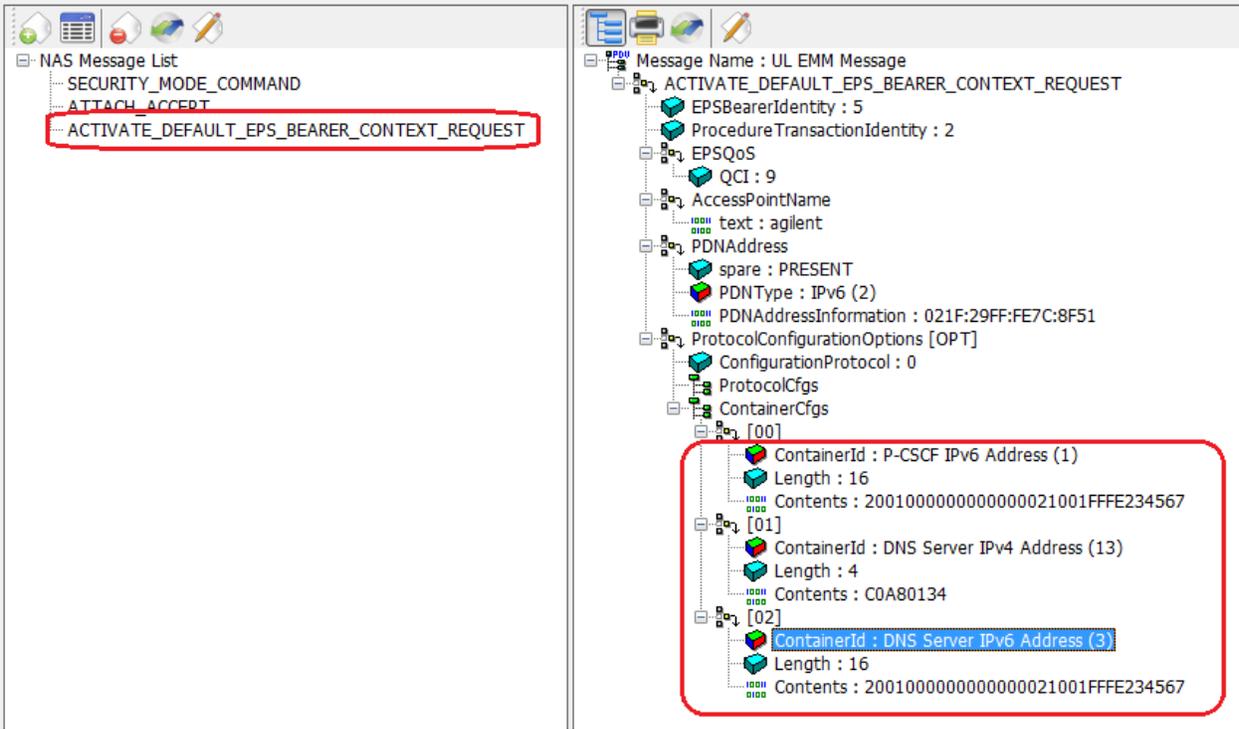
Figure 7-28: DUT IP Address Additional Information Options Final Content

4. Make sure you encode the message by clicking the **encode Message** button.

NOTE	If you navigate away from the message before pressing the **encode Message** button, your changes will be lost.

The following information message pops-up:
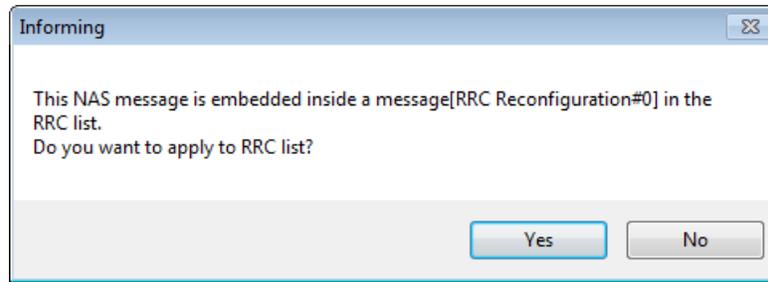
5. Select 'Yes' because you want this new value to applied in the RRC message. Notice the "Encode Success" message is displayed in the Output tab window.

6. Go to the RRC window and notice the RRC Reconfiguration message has turned red. When you select this RRC message you can see that the value for SEQ 1 has changed. Select the **encode Message** icon. The Output tab window now displays "Message is Encoded!". The RRC Reconfiguration message is now black, which also verifies encoding is successful.

Rejecting an Incoming AttachRequest

The basic steps to complete this process are as follows. If you already know how to do any of the steps, they can be skipped and you can focus only on those for which you need help.

Creating a New NAS Message

Creating a New RRC Message

Wrapping it in an RRC Message

Modifying Communication Scenario response to incoming AttachRequest

Creating a New NAS Message

1. Create a new NAS message by following the NAS Message Insertion Procedure on page .

2. Select ATTACH_REJECT from the **Type Name** list, and drag it over to the **Insert message** area.

3. Click **OK**. Notice that the new message is added to the **NAS Message List**.
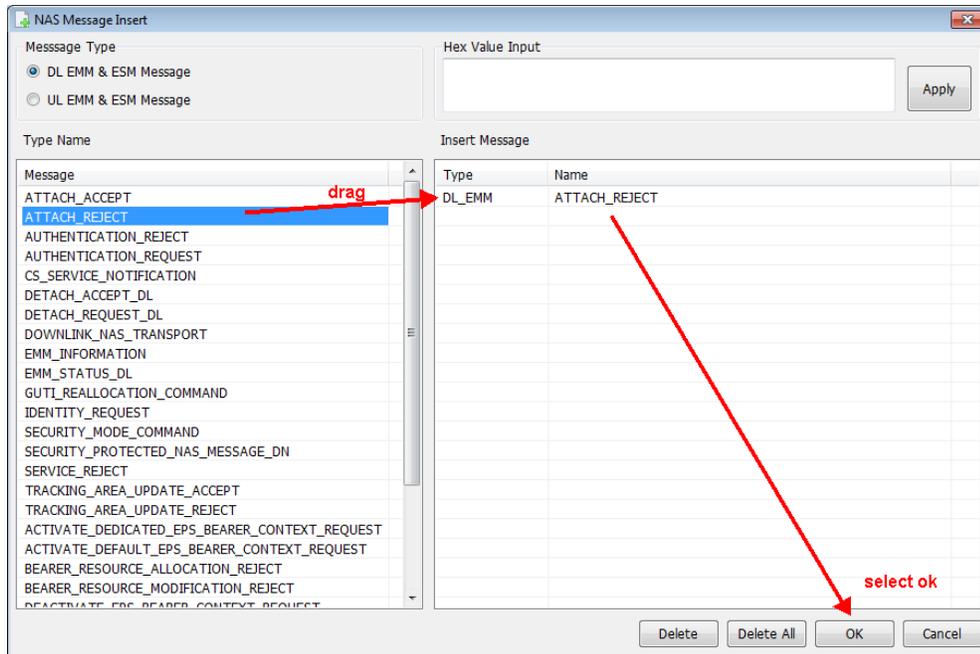
Figure 7-29: Creating New NAS Message

Creating a New RRC Message

4. Select the RRC tab.

5. Then add a new RRC message by selecting the Insert Message icon or Edit, Insert Message.

6. Select message type as DL-DCCH-Message.

7. Drag it to the Insert Message area.

8. Double-click the Name field and rename it to, Attach_Reject.
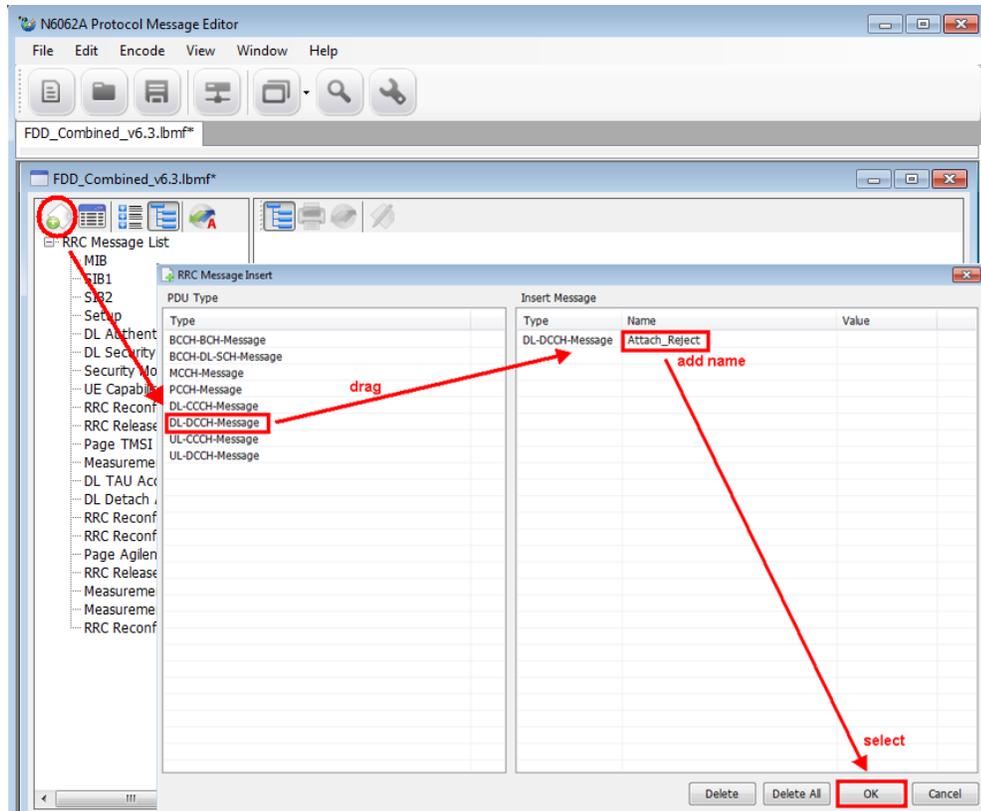
Figure 7-30: Inserting New RRC Message

9.   Click **OK**. Notice that the new message is added to the **RRC Message List**.
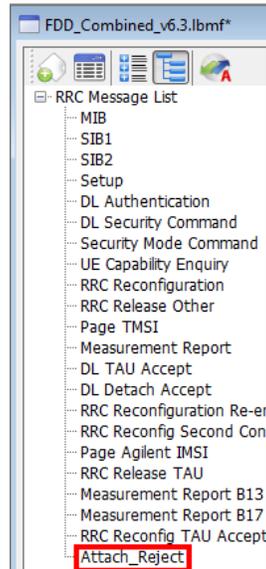
Wrapping it in an RRC Message

1.   Select the new Attach_Reject message.

2. Note that the generic properties of the message you created is csfb to CDMA2000... This must be replaced.

3. Right-click in the **c1** field. Select 'Type Choice' when it pops up.

4. From the drop-down list, select dlInformation Transfer.
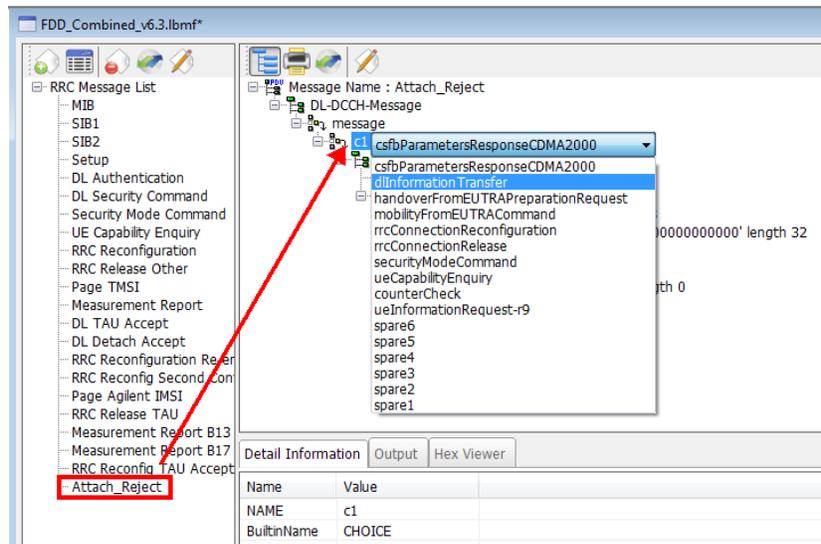
Figure 7-31: Selecting Message Properties as dlInformation Transfer

5. Select the nonCriticalExtension field. Then de-select the **IE Addition** box (at the foot of the screen) – this removes it from the message.
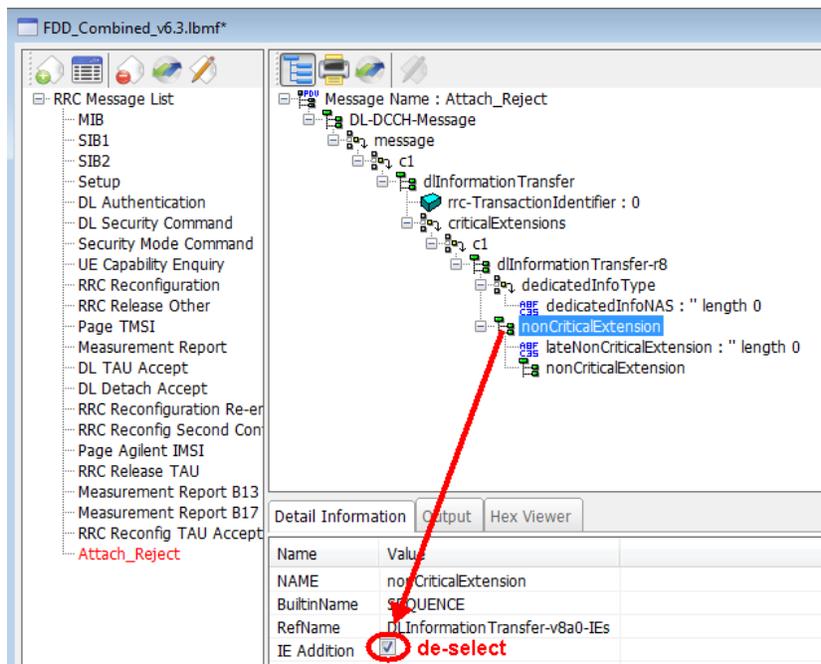
Figure 7-32: De-selecting IE Addition

6. Right-click the dedicatedInfoNAS field and select 'Change NAS'.

7. Select the Attach_Reject NAS message from the drop-down list.
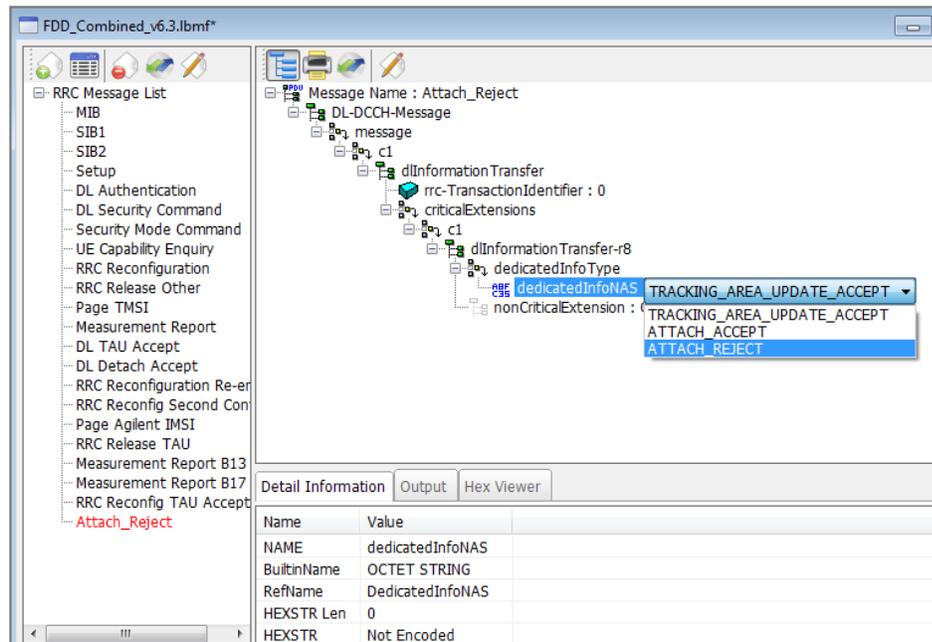
Figure 7-33: Selecting ATTACH_REJECT NAS Message

8. Notice that the RRC name of Attach_Reject has turned red in the left hand **RRC Message List** column. This indicates that you have edited the contents of this RRC message and you must now encode the message. (If you don't encode the message now, you will lose your changes.)

9. Select the **encode Message** button at the top of the window to encode the message. Verify that the RRC Attach_Reject message name has turned from red to black (left-hand window) and that the **Output** tab text at the bottom of the right-hand window states success. These both indicate that your encoding was successful.
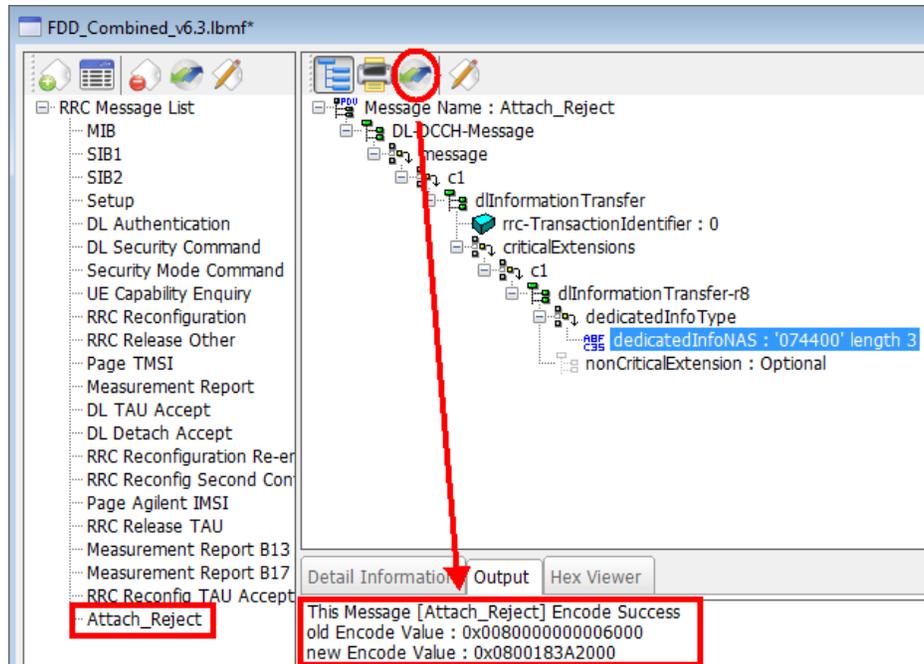
Figure 7-34: Verifying Successful Message Encoding

10. Now save the modified scenario file and transfer it to your PXT.

Modifying Communication Scenario response to incoming AttachRequest

These steps below modify the scenario file to send an Attach_Reject in response to an Attach_Request.

1. Click on the **Scenario** tab

2. From the Communication Scenario area select the 'RRC_Connection (Initial Attach)'

3. Locate the transaction containing the incoming ATTACH_REQUEST. (In this example the PXT has

   been set to respond with a DL Authentication message. That must be replaced with the Attach_Reject

   message that was created above.)

4. Double-click on the transaction containing the **ATTACH_REQUEST** (a message editing window will

   pop up)
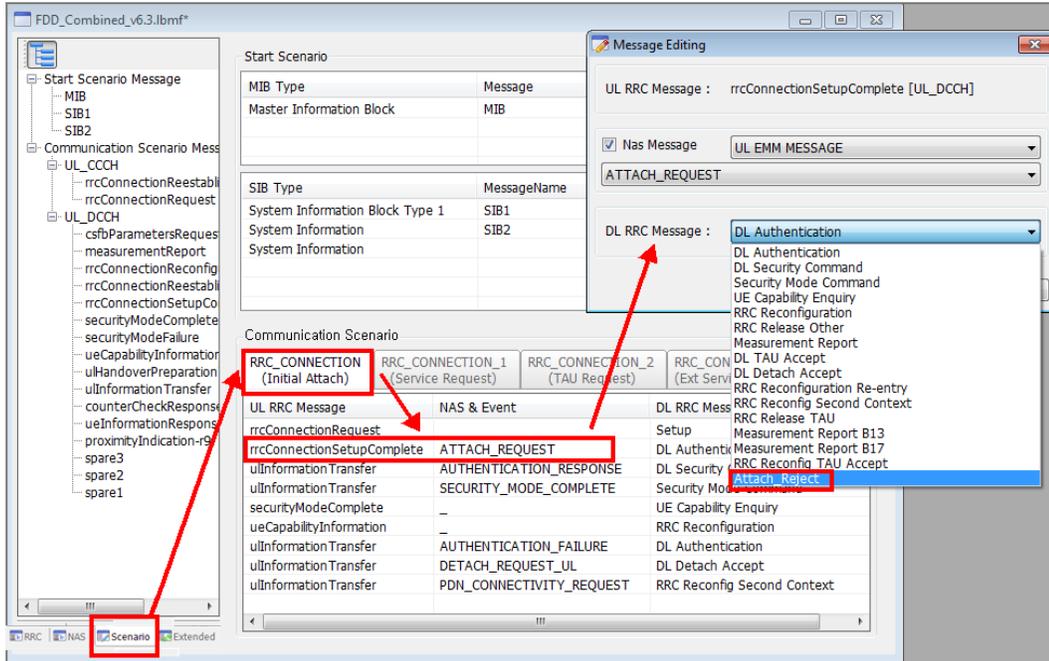
Figure 7-35: Modifying Response to Incoming AttachRequest

5. From the DL RRC MESSAGE drop-down list select Attach_Reject

6. Click OK.

7. The transaction should now show Attach_Reject in response to the ATTACH_REQUEST.
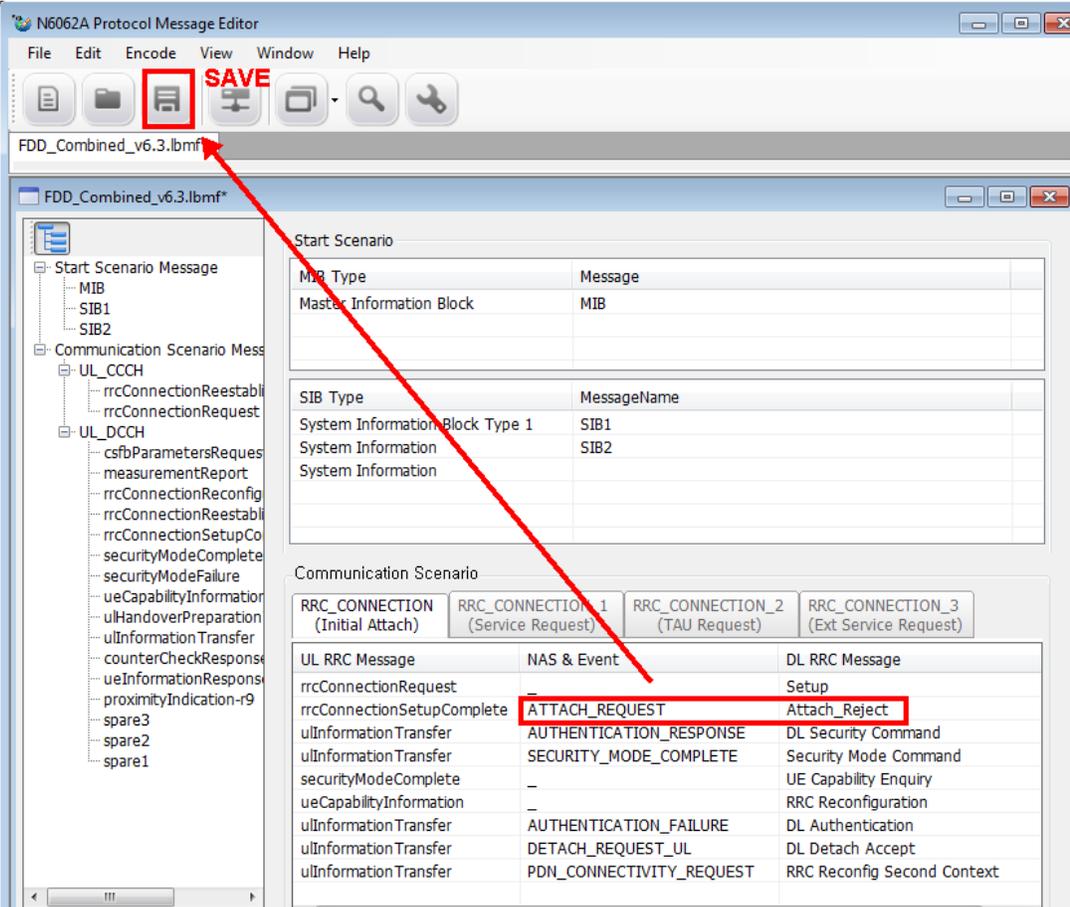
Figure 7-36: Saving Attach_Reject Response to Incoming AttachRequest

8. Now save the scenario and transfer it to your PXT.

8 Service and Support

Calling Agilent Technologies

Agilent Technologies has offices around the world to provide you with complete support for your products. For help, to obtain servicing information or to order replacement parts, contact the nearest Agilent Technologies office listed below. In any correspondence or telephone conversations, you will need the product number, full serial number, software revision and Software and Technical Support Contract (STSC) details.

Press the **INFO** front panel key to view the product number (E6621A), serial number, and software revision information and STSC expiry date.

Locations for Agilent Technologies

Online assistance: http://www.agilent.com/find/assist

If you do not have access to the Internet, one of these centers can direct you to your nearest representative:

If you have a current STSC for the E6621A, you can contact Agilent at the email addresses listed in "Software and Technical Support Contracts" on page .

Should the Declaration of Conformity be required, please contact an Agilent Sales Representative, or the closest Agilent Sales Office. Alternately, contact Agilent at: www.agilent.com.

Americas

Brazil	Canada	Mexico
(11) 4197 3600	(877) 894 4414	01800 5064 800
United States		
(800) 829 4444		

Asia Pacific

Australia	India	Malaysia
1 800 629 485	1 800 112 929	1 800 888 848
China	Japan	Singapore
800 810 0189	0120 (421) 345	1 800 375 8100
Hong Kong	Korea	Taiwan
800 938 693	080 769 0800	0800 047 866

Other Asian Countries:
www.agilent.com/find/contactus

Europe & Middle East

Belgium	Ireland	Spain
32 (0) 2 404 93 40	1890 924 204	34 (91) 631 3300
Denmark	Israel	Sweden
45 45 80 12 15	972-3-9288-504/544	0200-88 22 55
Finland	Italy	Switzerland
358 (0) 10 855 2100	39 02 92 60 8484	0800 80 53 53
France	Netherlands	United Kingdom
0825 010 700*	31 (0) 20 547 2111	44 (0) 118 927 6201
*0.125 €/minute		
Germany		
49 (0) 7031 464 6333		

Other Unlisted Countries:
www.agilent.com/find/contactus

Software and Technical Support Contracts

Software and Technical Support Contracts (STSC) entitle you to software updates and feature enhancements, as well as direct access to a technical expert for technical support for a fixed period, usually one year.

The STSC gives you direct access to technical product experts to increase your productivity and minimize the software difficulties you encounter. These technical support engineers are experts on the E6621A PXT test set and its complementary software products. They have instant access to instruments and software to enable them to resolve your issues as quickly as possible. Agilent will investigate all software defects and operational problems reported through the technical support channel. Upon completion of the investigation, we will advise you on possible solutions and functional alternatives. Where possible, Agilent will provide software releases to address problems caused by defects in the firmware or software.

STSCs for the Agilent E6621A PXT

The N6050AS STSC covers the N6050A, N6051A and N6052A software applications running on the E6621A PXT wireless communications test set, plus the associated N6061A and N6062A PC software applications.

If you have a Software and Technical Support Contract, there are three methods of accessing your technical support:

- Web-based support: My Support Center
- E-mail support
- Phone support

For fastest response times, we recommend using the web-based or email access methods as these provide the most direct route to your technical support expert. All support cases may be viewed and tracked through the online support center (My Support Center), regardless of how you initially contacted technical support.

Web-based support

You can directly enter and manage your support requests online via
www.agilent.com/find/mysupportcenter.

The first time you use My Support Center you will be asked to create a profile and provide proof of entitlement. Once your profile is created, you can use the online support center to enter your support request.
Each support request will be given a unique case number which you can use to track the progress of your support case. A technical expert will contact you via phone or email (whichever you have stated as your preferred option) to resolve your issue.

English, Japanese, Korean, and Mandarin local language support is available.

E-mail support

You can also contact our technical support at the following e-mail addresses:

- wireless_test_support_americas@agilent.com

- wireless_test_support_japan@agilent.com

- wireless_test_support_europe@agilent.com

- wireless_test_support_asia@agilent.com

- wireless_test_support_korea@agilent.com

Your support request will be routed to a technical expert who will contact you via e-mail or phone (whichever you have stated as your preferred option) to help resolve your issue.

English, Japanese, Korean, and Mandarin local language support is available.

Phone support

If you prefer to speak to someone directly, you can call the Agilent customer contact centers at the numbers on page of this document. For Japan, please use the phone number 0120-444-823.

The customer contact center will route your request to a technical support expert, who will contact you about your support request via phone or email. Local language support is available in many countries.

This page is intentionally left blank.