



Product Introduction

# ME7832L

## LTE Protocol Conformance Test System



# ME7832L

## LTE Protocol

## Conformance

## Test System

## Product Introduction

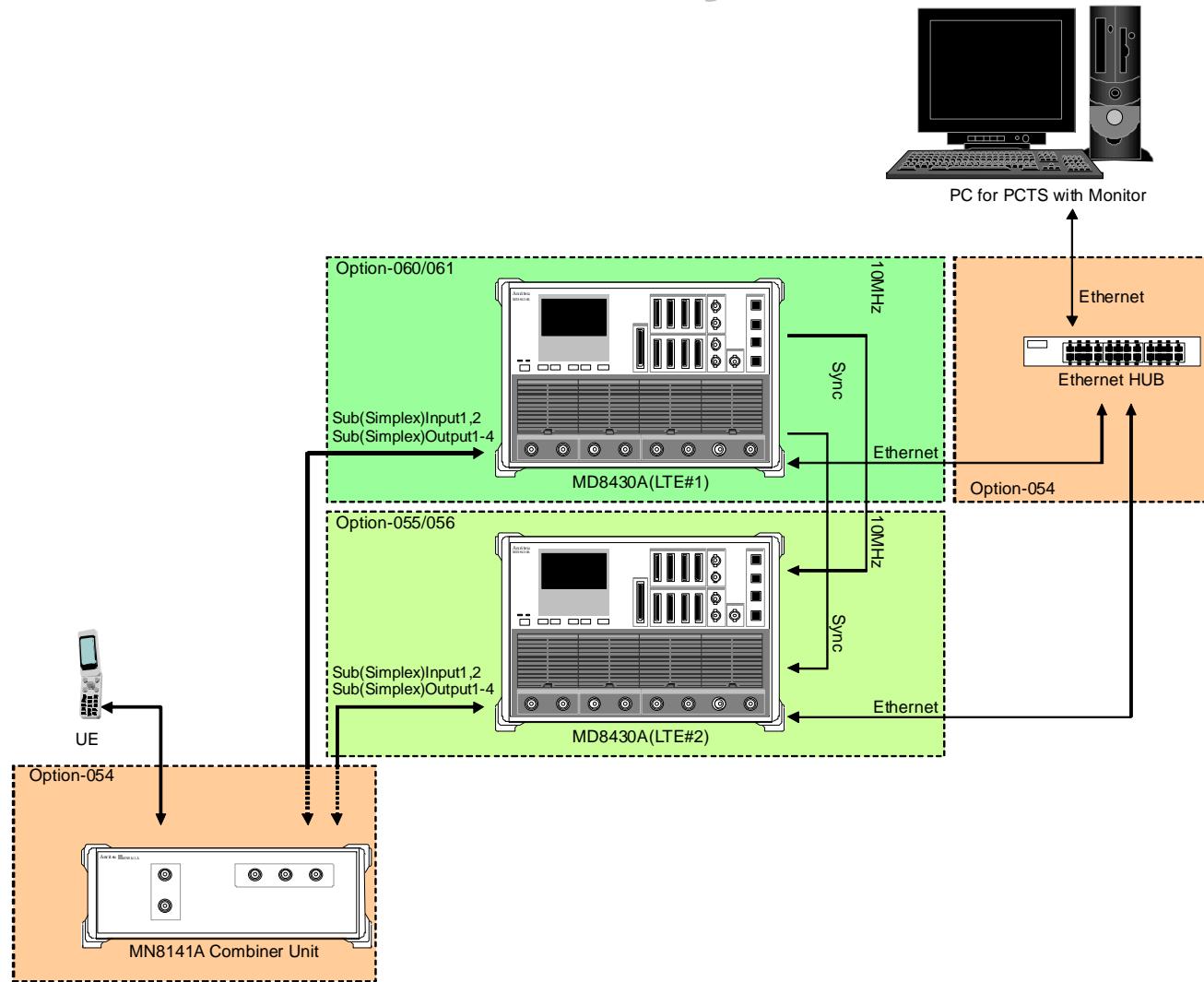


TS36.523 LTE Protocol Conformance Solution

# Approved LTE Protocol Conformance Solution

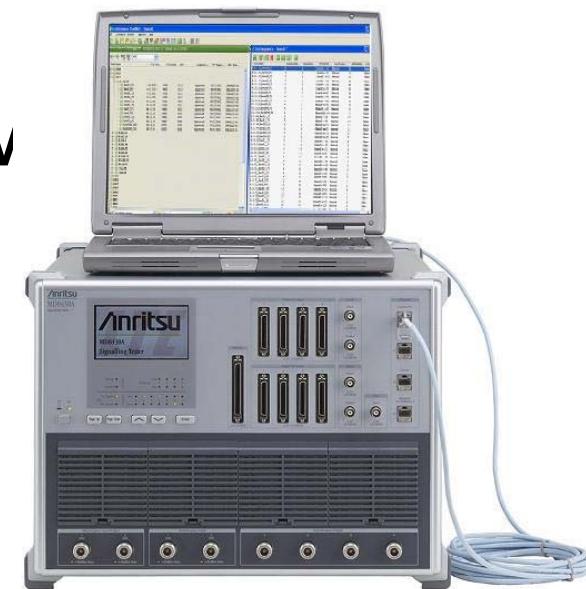
- **ME7832L is the Industry's stable protocol conformance test system solution**
  - Delivers latest test cases for LTE UE protocol conformance
  - Based on TS36.523-1 for GCF/PTCRB Terminal Certification
- **Proven platform to provide LTE Conformance Test Capability**
  - Rel8 LTE Conformance Test solution delivered on Single HW and software platform
  - Capable to provide LTE ⇔ UTRAN/GERAN InterRAT (future option)
- **ME7832L is the most reliable and fastest Protocol Conformance Test System with Repeatability**
  - Industry best test execution speed with Parallel Test Capability (Future Option)

# ME7832L LTE CT System Overview



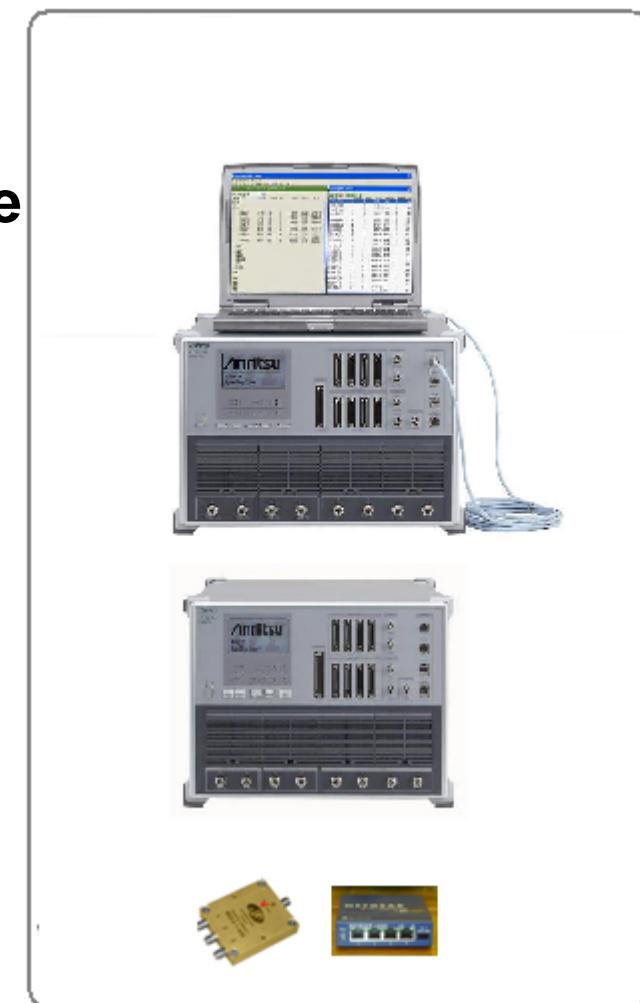
# LTE Protocol Conformance Test System

- **ME7832L Standard Configuration**
  - One MD8430A system simulator (LTE)
  - Conformance Test Toolkit core software
  - Pre-installed high-performance PC
    - Dual Core 3 GHz CPU, 4 GB RAM
    - 21" inch HD Display, 250 GB HDD, DV
  - Setup
    - Installation
    - Commissioning
    - Training



# LTE Protocol Conformance Test System

- **ME7832L Optional Configurations**
  - Choice of adding 2<sup>nd</sup> LTE system simulator for additional test coverage
  - WI packages including USIMs
  - RF Combiner Kit
  - Router and cables
  - Additional FDD Band capabilities
  - Contracts
    - Hardware repair
    - Hardware calibration
  - System Rack Option



# Anritsu Competitive Advantages

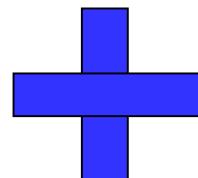
- **LTE Protocol Conformance test Platform for UE certification**
  - For both GCF and PTCRB
- **Anritsu leads the market for new technologies on the existing and new hardware platform**
- **Always aims to use the latest TTCN3 language**
  - Latest IWD releases
- **A highly reliable platform and the most stable platform**
  - Runs without manual interaction for days under Automated Environment
- **Uses less space in the lab**
- **Provides today's most user-friendly and easy GUI**
  - Enables drag-and-drop and run with a single click
- **Easiest setup for automation capability**
- **Real-time log analysis**
- **Best customer support and responsiveness in the industry**

# ME7832AL Solution Benefits

- A complete fully-integrated test system
  - Simplified system options
    - Easier configuration
  - New competitive pricing structure based on a package solution
  - Installation and training included
    - One day on-site
  - One year software and firmware updates included
- GCF/PTCRB Approved Test Platform for UE Certification
- Future expandability for LTE InterRAT (LTE $\leftrightarrow$ UMTS and LTE  $\leftrightarrow$  C2K)
- Graphical User Interface
  - Provides exceptional ease of use
- Standard MD8430A system simulator hardware
  - Proven repeatability and reliability
- Custom Test case development and Execution Capability
  - Inbuilt TTCN3 Viewer to view and analyse the 3GPP TS 36.523 LTE Protocol Test Cases
  - TTCN3 Editor and Builder Option for custom TTCN3 development based on 3GPP TS36.523

# ME7832L LTE System Configuration Options

ME7832L Standard Configuration



ME7832L-055  
2<sup>nd</sup> SS for LTE

ME7832L-01X  
Frequency Bands

MN8141A  
RF Combiner Unit

ME7832L-0XX  
Work Item Test Cases

# Graphical User Interface Benefits

# Graphical User Interface

- **New user interface developed**
  - Test system configuration
  - Test Campaign definition
  - PIKS/PIXIT management
  - Campaign execution
  - Results management and reporting
- **New Graphical User Interface with ease of use**
  - Drag and Drop
  - Single Click to execute the campaign consist of test cases

# Test Cases Selection

**Sort by TTCN Suite or WI**

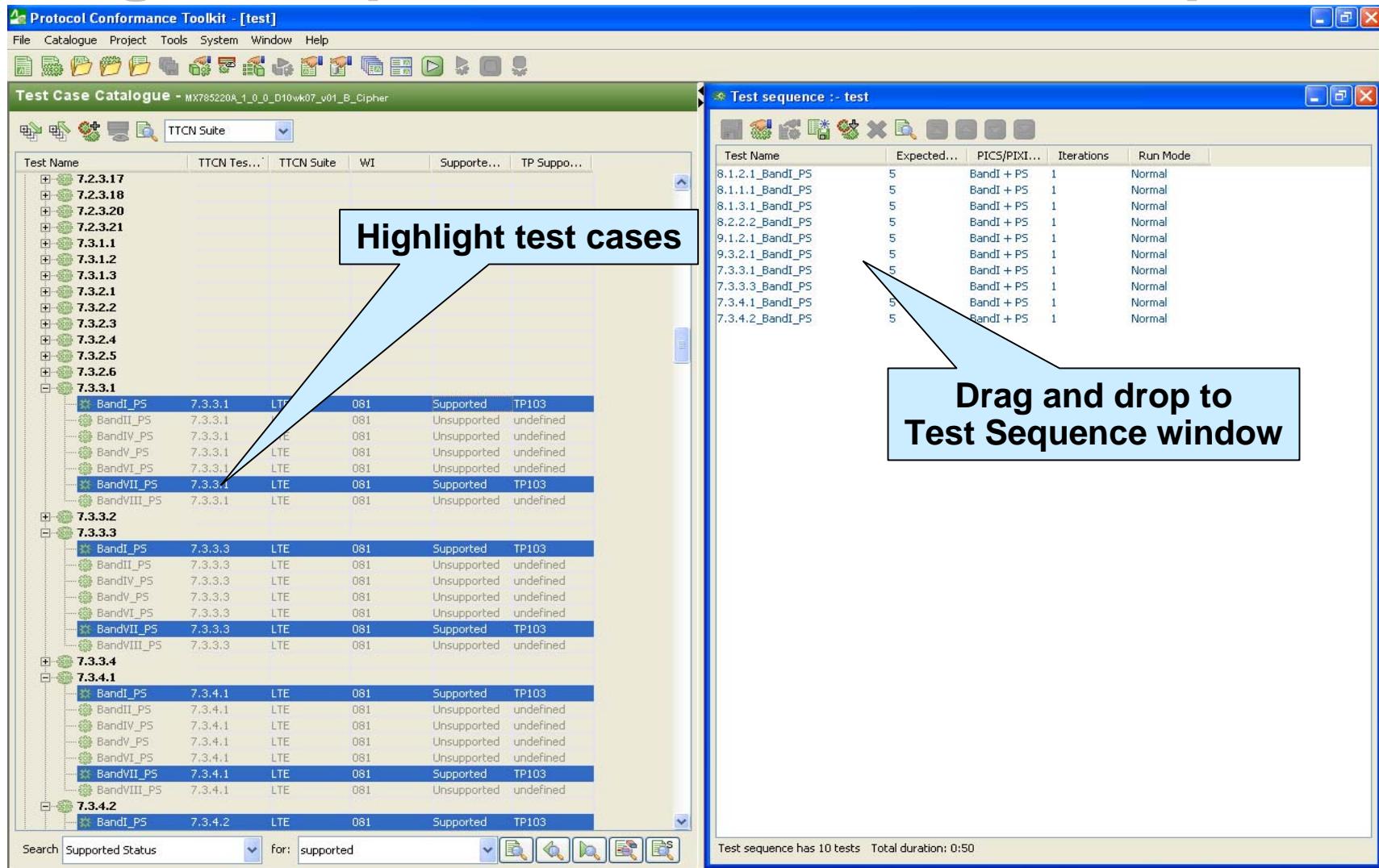
Welcome to the Anritsu Protocol Conformance Toolkit

Please refer to the MX785220A Protocol Conformance Toolkit user manual and release notes for additional information.

Test Name	TTCN Test ID	TTCN Suite	WI	Supported Status	TP Support
7.3.2.6					
7.3.3.1					
BandI_PS	7.3.3.1	LTE	081	Supported	TP103
BandII_PS	7.3.3.1	LTE	081	Unsupported	undefined
BandIV_PS	7.3.3.1	LTE	081	Unsupported	undefined
BandV_PS	7.3.3.1	LTE	081	Unsupported	undefined
BandVI_PS	7.3.3.1	LTE	081	Unsupported	undefined
BandVII_PS	7.3.3.1	LTE	081	Supported	
BandVIII_PS	7.3.3.1	LTE	081	Unsupported	
BandVII_PS	7.3.3.1	LTE	081	Supported	
BandVIII_PS	7.3.3.1	LTE	081	Unsupported	
7.3.3.2					
7.3.3.3					
BandI_PS	7.3.3.3	LTE	081	Supported	
BandII_PS	7.3.3.3	LTE	081	Unsupported	
BandIV_PS	7.3.3.3	LTE	081	Unsupported	
BandV_PS	7.3.3.3	LTE	081	Unsupported	
BandVI_PS	7.3.3.3	LTE	081	Unsupported	
BandVII_PS	7.3.3.3	LTE	081	Supported	
BandVIII_PS	7.3.3.3	LTE	081	Unsupported	
7.3.3.4					
7.3.4.1					
BandI_PS	7.3.4.1	LTE	081	Supported	TP103
BandII_PS	7.3.4.1	LTE	081	Unsupported	undefined
BandIV_PS	7.3.4.1	LTE	081	Unsupported	undefined
BandV_PS	7.3.4.1	LTE	081	Unsupported	undefined
BandVI_PS	7.3.4.1	LTE	081	Unsupported	undefined
BandVII_PS	7.3.4.1	LTE	081	Supported	TP103
BandVIII_PS	7.3.4.1	LTE	081	Unsupported	undefined
7.3.4.2					
BandI_PS	7.3.4.2	LTE	081	Supported	TP103
BandII_PS	7.3.4.2	LTE	081	Unsupported	undefined
BandIV_PS	7.3.4.2	LTE	081	Unsupported	undefined
BandV_PS	7.3.4.2	LTE	081	Unsupported	undefined
BandVI_PS	7.3.4.2	LTE	081	Unsupported	undefined
BandVII_PS	7.3.4.2	LTE	081	Supported	TP103
BandVIII_PS	7.3.4.2	LTE	081	Unsupported	undefined
7.3.5.2					
7.3.5.3					
7.3.5.4					
7.3.5.5					
7.3.6.1					
8.1.1.1					

Search Supported Status For: supported

# Drag & Drop Test Case Into Test Sequence



# Modifying PICS/PIXIT For UE

**Protocol Conformance Toolkit - [test]**

File Catalogue Project Tools System Window Help

Test Case C

Configure UUT...  
Configure UUT PICS/PIXIT Deviations  
Configure Test System  
Execute  
Execute Selected Test  
Terminate All  
Terminate Test  
Project Settings...

Modify the PICS/PIXIT deviations associated with the current UUT

F5 F9

Supporte... TP Suppo...

**Create/Edit Pixit Deviations**

Deviation Selected

UE_BandI	<input type="checkbox"/>
UE_BandII	<input type="checkbox"/>
UE_BandIII	<input type="checkbox"/>
UE_BandIV	<input type="checkbox"/>
UE_BandV	<input type="checkbox"/>
UE_BandVI	<input type="checkbox"/>
UE_BandVII	<input checked="" type="checkbox"/>
UE_BandVIII	<input type="checkbox"/>
UE_BandIX	<input type="checkbox"/>
UE_BandX	<input type="checkbox"/>
UE_BandXI	<input type="checkbox"/>
UE_BandXII	<input type="checkbox"/>
UE_BandXIII	<input checked="" type="checkbox"/>
UE_BandXIV	<input type="checkbox"/>
UE_BandXV	<input type="checkbox"/>
UE_BandXVI	<input type="checkbox"/>
UE_BandXVII	<input type="checkbox"/>
UE_BandXVIII	<input type="checkbox"/>
UE_BandXIX	<input type="checkbox"/>
UECap0	<input checked="" type="checkbox"/>
UECap1	<input type="checkbox"/>

Deviation: UE\_BandI created by Anritsu System (Non editable) UUT deviation  
Comment: If UE supports BandI

OK Cancel

# Executing Test Sequences

**Click to execute test sequences**

The screenshot shows the Protocol Conformance Toolkit interface. On the left, the 'Test Case Catalogue' window displays a hierarchical list of test cases under 'MX783220A\_1\_0\_0\_D10wk07\_v01\_B\_Cipher'. A callout box points to the play button icon in the toolbar above the catalogue, with the text 'Click to execute test sequences'. On the right, the 'Test sequence : - test' window shows a table of tests with columns: Test Name, Expected..., PICS/PIXI..., Iterations, and Run Mode. The table lists various BandI\_P5 and BandII\_P5 tests across different sub-sections like 7.2.3.11 through 7.3.4.1.

Test Name	Expected...	PICS/PIXI...	Iterations	Run Mode
8.1.2.1_BandI_P5	5	BandI + PS	1	Normal
8.1.1.1_BandI_P5	5	BandI + PS	1	Normal
8.1.3.1_BandI_P5	5	BandI + PS	1	Normal
8.2.2.2_BandI_P5	5	BandI + PS	1	Normal
9.1.2.1_BandI_P5	5	BandI + PS	1	Normal
9.3.2.1_BandI_P5	5	BandI + PS	1	Normal
7.3.3.1_BandI_P5	5	BandI + PS	1	Normal
7.3.3.3_BandI_P5	5	BandI + PS	1	Normal
7.3.4.1_BandI_P5	5	BandI + PS	1	Normal
7.3.4.2_BandI_P5	5	BandI + PS	1	Normal

# Viewing Test Results

**Protocol Conformance Toolkit - [test]**

File Catalogue Project Tools System Window Help

**Test Case Catalogue - MX785220A\_1\_0\_0\_D10wk07\_w01\_B\_Cipher**

TTCN Suite

Test Name	TTCN Tes...	TTCN Suite	WI	Supporte...	TP Suppo...
7.2.3.17					
7.2.3.18					
7.2.3.20					
7.2.3.21					
7.3.1.1					
7.3.1.2					
7.3.1.3					
7.3.2.1					
7.3.2.2					
7.3.2.3					
7.3.2.4					
7.3.2.5					
7.3.2.6					
7.3.3.1					
BandI_PS	7.3.3.1	LTE	081	Supported	TP103
BandII_PS	7.3.3.1	LTE	081	Unsupported	undefined
BandIV_PS	7.3.3.1	LTE	081	Unsupported	undefined
BandV_PS	7.3.3.1	LTE	081	Unsupported	undefined
BandVI_PS	7.3.3.1	LTE	081	Unsupported	undefined
BandVII_PS	7.3.3.1	LTE	081	Supported	TP103
BandVIII_PS	7.3.3.1	LTE	081		
7.3.3.2					
7.3.3.3					
BandI_PS	7.3.3.3	LTE	081	Supported	TP103
BandII_PS	7.3.3.3	LTE	081	Unsupported	undefined
BandIV_PS	7.3.3.3	LTE	081	Unsupported	undefined
BandV_PS	7.3.3.3	LTE	081	Unsupported	undefined
BandVI_PS	7.3.3.3	LTE	081	Unsupported	undefined
BandVII_PS	7.3.3.3	LTE	081	Supported	TP103
BandVIII_PS	7.3.3.3	LTE	081	Unsupported	undefined
7.3.4.1					
BandI_PS	7.3.4.1	LTE	081	Supported	TP103
BandII_PS	7.3.4.1	LTE	081	Unsupported	undefined
BandIV_PS	7.3.4.1	LTE	081	Unsupported	undefined
BandV_PS	7.3.4.1	LTE	081	Unsupported	undefined
BandVI_PS	7.3.4.1	LTE	081	Unsupported	undefined
BandVII_PS	7.3.4.1	LTE	081	Supported	TP103
BandVIII_PS	7.3.4.1	LTE	081	Unsupported	undefined
7.3.4.2					
BandI_PS	7.3.4.2	LTE	081	Supported	TP103

**Results : Test301107\_Gui\_301107\_2007-12-02\_09.49.40.ptmres**

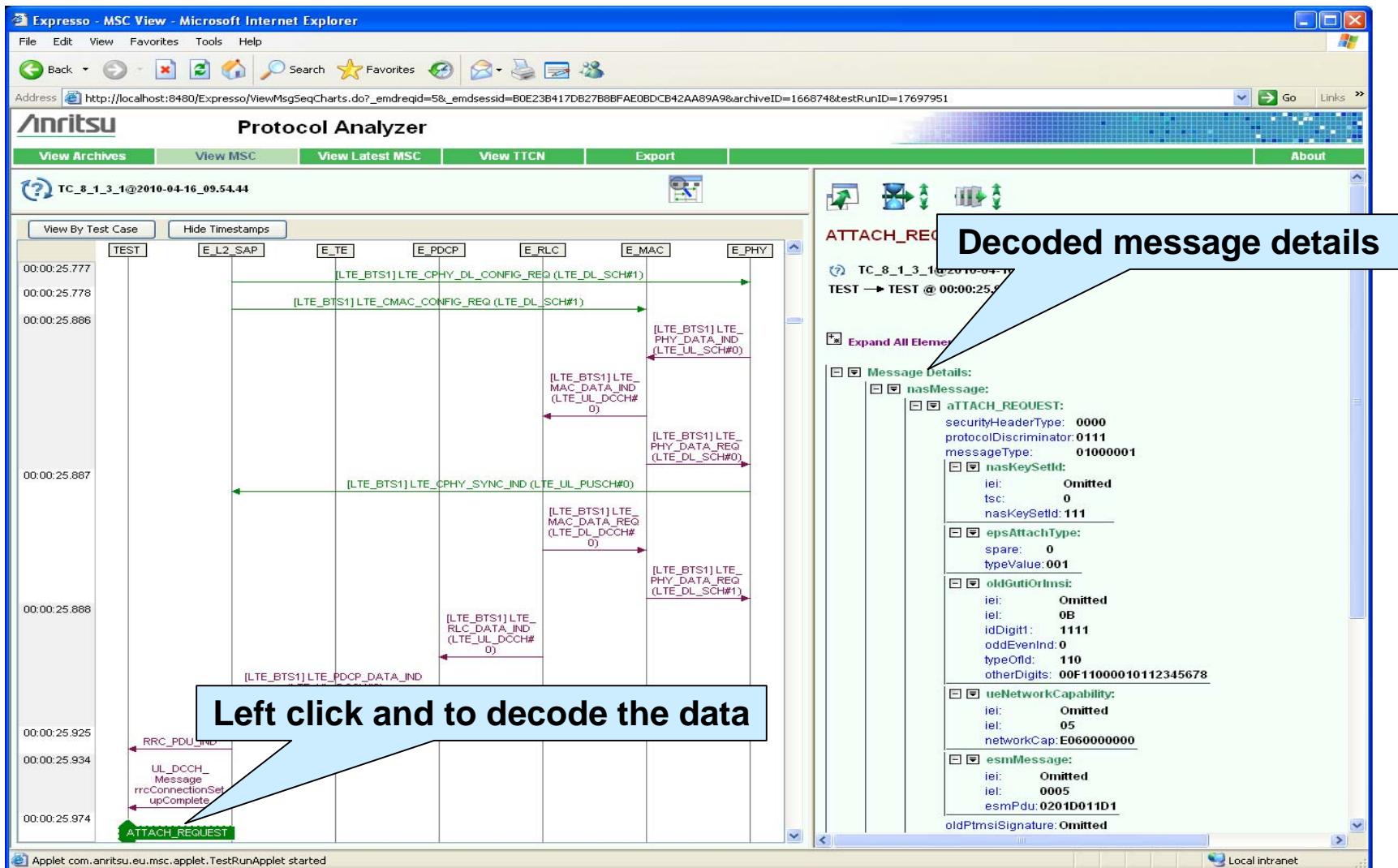
Results Test Case Catalogue UUT Configuration

**Sort by pass/fail or re-run failed tests**

**Left click and to launch Protocol View**

				Verdict
6.1.1.5_BandI_CS	1	2001	show	Passed
6.1.1.5_BandI_PS	1	2007-11-30...	show	Passed
6.1.1.5_BandI_PS	1	2007-11-30...	show	Passed
6.1.1.7_BandI_CS	1	2007-11-30...	161	Passed
6.1.1.7_BandI_CS	1	2007-11-30...	159	show
6.1.1.7_BandI_PS	1	2007-11-30...	157	show
6.1.1.7_BandI_PS	1	2007-11-30...	237	show
6.1.2.10_BandI_CS	1	2007-11-30...	324	show
6.1.2.10_BandI_CS	1	2007-11-30...	234	show
6.1.2.10_BandI_PS	1	2007-11-30...	242	show
6.1.2.10_BandI_PS	1	2007-11-30...	238	show
6.1.2.10a(I-V)_BandI_CS	1	2007-11-30...	241	show
6.1.2.10a(I-V)_BandI_CS	1	2007-11-30...	233	show
6.1.2.10a(I-V)_BandI_PS	1	2007-11-30...	238	show
6.1.2.1_BandI_CS	1	2007-11-30...	233	show
6.1.2.1_BandI_CS	1	2007-11-30...	472	show
6.1.2.1_BandI_PS	1	2007-11-30...	467	show
6.1.2.1_BandI_PS	1	2007-11-30...	473	show
6.1.2.2_BandI_CS	1	2007-11-30...	414	show
6.1.2.2_BandI_CS	1	2007-11-30...	414	show
6.1.2.2_BandI_PS	1	2007-11-30...	413	show
6.1.2.2_BandI_PS	1	2007-11-30...	406	show
6.1.2.3_BandI_CS	1	2007-11-30...	231	show
6.1.2.3_BandI_CS	1	2007-11-30...	229	show
6.1.2.3_BandI_CS	1	2007-11-30...	227	show
6.1.2.3_BandI_PS	1	2007-11-30...	227	show
6.1.2.3_BandI_PS	1	2007-11-30...	231	show
6.1.2.4_BandI_CS	1	2007-11-30...	342	show
6.1.2.4_BandI_CS	1	2007-11-30...	352	show
6.1.2.4_BandI_CS	1	2007-11-30...	352	show
6.1.2.4_BandI_PS	1	2007-11-30...	352	show

# Protocol Analyser View



# TTCN-3 Viewer

**TTCN-3 Source Code View**

The screenshot shows the Danet TTCN-3 Toolbox application window. On the left is the Project Browser pane, which displays a tree structure of project files under '36.523' and 'T3\_LTE\_ETSI\_wk22\_Anritsu'. The 'Source' folder contains several sub-folders and files, including 'IWD\_09wk22', '6.1', '7.1', '7.2', '7.3', '8.1', '8.2', '8.3', '8.5', '9.1', '9.2', '9.3', 'Common', 'CommonEUTRA', 'CommonEUTRA\_Defs', 'CommonEUTRA\_L2', 'CommonEUTRA\_NAS', 'CommonEUTRA\_Templates', 'CommonGERAN', 'CommonIRAT', 'CommonUTRAN', 'Common\_NAS', 'MTC', 'NasEmulation', 'LTE\_EPS\_TS\_SelectionExpressions.ttcn', 'LTE\_EPS\_TS\_Testcases.ttcn', and 'Parameters.ttcn'. The 'Config' folder is also listed.

The main area is the Project Selector, showing the file 'Idle\_CellReselection.ttcn'. The code editor displays the following TTCN-3 source code:

```

/*
// @version: IWD_09wk22
// $Date: 2009-05-28 11:03:57 +0200 (Thu, 28 May 2009) $
// $Rev: 1217 $
*/
module Idle_CellReselection
{
//==Imports
//==

import from EUTRA_RRC_ASN1_Definitions language "ASN.1:1997" all;
import from EUTRA_Component all;
import from EUTRA_CommonDefs all;
import from EUTRA_CellInfo all;

import from EUTRA_RRCSteps all;
import from EUTRA_NASSteps all;
import from UpperTesterFunctions all;
import from EUTRA_CommonProcedures all;
import from EUTRA_ConfigurationSteps all;
import from EUTRA_AuxiliaryFunctions all;
import from Idle_Common all;

import from EUTRA_AspCommon_Templates all;

//==Functions
//==

/* @desc Test case 6.1.2.2 Cell selection, Qrxlevmin
function f_TC_6_1_2_2_EUTRA ( ) runs on EUTRA_PTC {
    timer t_WaitTime := 60.0;
    var Q_Rxlevmin_Type v_Q_Rxlevmin := -42;

    /* @desc Initialise all cell, security and mobile parameters
    f_EUTRA_Init( ci );

    /* @desc Set Cell power level for Cell 1 to be used in creation
    f_EUTRA_CellInfo_InitMaxReferencePower ( eutra_cell1, -79 );

    /* @desc Set Sys. info for Cell 1 to be used in creation
    f_EUTRA_CellInfo_SetSysInfo_Q_Rxlevmin ( eutra_cell1, v_Q_Rxlevmin );

    /* @desc Create and configure Cell 1
    f_EUTRA_CellConfig_1AM_DRB ( eutra_cell1 );

    /* @desc Preamble to ensure USIM is updated with valid TAI
    f_LTE_Preamble ( eutra_cell1, STATE2_IDLEUPDATE );
}

```

# Abbreviations

WI	Work Item
IWD	Interim Working Document
PCT/PCTS	Protocol Conform Test / Protocol Conformance Test System
LTE	Long Term Evolution
CAG/PVG	Conformance and Interoperability Agreement Group / PCS Validation Group
PICS	Protocol Implementation Conformance Statement
TTCN-3	Testing and Test Control Notation Version 3
PTCRB	PCS Type Certification Review Board
GCF	Global Certification Forum
TTCN-2	Tree Tabular Combined Notation

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