/\nritsu

MD8430A
Signalling Tester

MD8430A
Signalling Tester
Product Introduction

Ver. 7.0

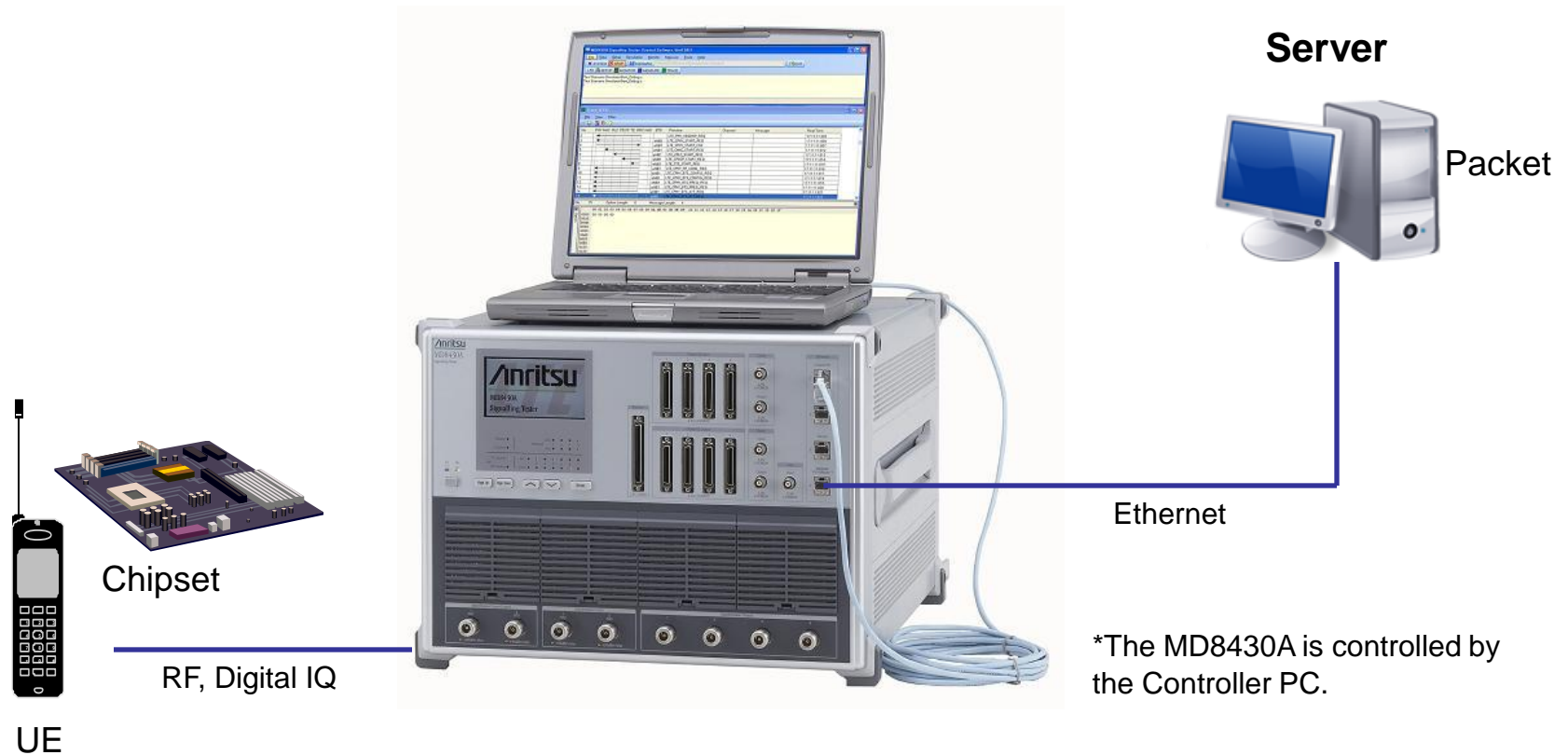## Anritsu Corporation

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Contents

- **Product Overview**
- **Key Features**
- **Applications**
- **Product Configuration**
- **Specifications**
- **Controller PC**
- **Appendix**
  – LTE Terminal Protocol Test Solutions –

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MD8430A-E-L-1

Product Overview

- ## MD8430A Basic Setup

MD8430A and Controller PC

Server

Packet

Ethernet

Chipset

RF, Digital IQ

*The MD8430A is controlled by the Controller PC.

UE

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Product Overview

- ## Signalling Tester Concept

  - ☐ **All mobile terminal (UE) specifications are determined based on agreed standards (3GPP, etc.). UE must be developed based on these standards**

  - ☐ **For developers to verify the operations of a new terminal, they must connect to an actual base station finally**

  - ☐ **The key points are verification of the protocol stack and the mobile terminal integration test**

  - ☐ **Anritsu is a leading supplier of 3G solutions for simulating base stations to test and verify mobile terminal connections with base station and networks**

  - ☐ **Adding the latest 3GPP LTE standards to the MD8430A offers an ideal solution for developers needing to bring new LTE terminals to market in time for the upcoming start of LTE services**

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Product Overview

- **What is MD8430A?**
  - ◆ **The MD8430A is a base station simulator with the functions needed for testing the performance of 4G mobile terminals supporting the LTE standard (3GPP Long Term Evolution) and LTE-Advanced**
  - ◆ **Supports LTE-Advanced (FDD and TDD) and LTE (FDD and TDD) by single unit**
  - ◆ **Supports 3GPP LTE air-interface for coding/decoding tests, protocol tests such as registration, origination, termination, handover, disconnection from terminal or network, as well as application tests to evaluate chipset and mobile devices**

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Key Features

- **Confirm Maximum Throughput**
  - ◆ **The MD8430A supports the high-speed UE Category6(Carrier Aggregation + MIMO) DL 300 Mbps and UL 50 Mbps data communications in the radio bearer and IP packet level specified by 3GPP LTE standards**

- **Optimized Cost Performance**
  - ◆ **Connecting the MD8480C (UTRAN/GERAN) supports handover tests between UTRAN/GERAN and LTE**
  - ◆ **Combining the MD8470A (CDMA2000) also supports CDMA2000-LTE Inter-working tests**
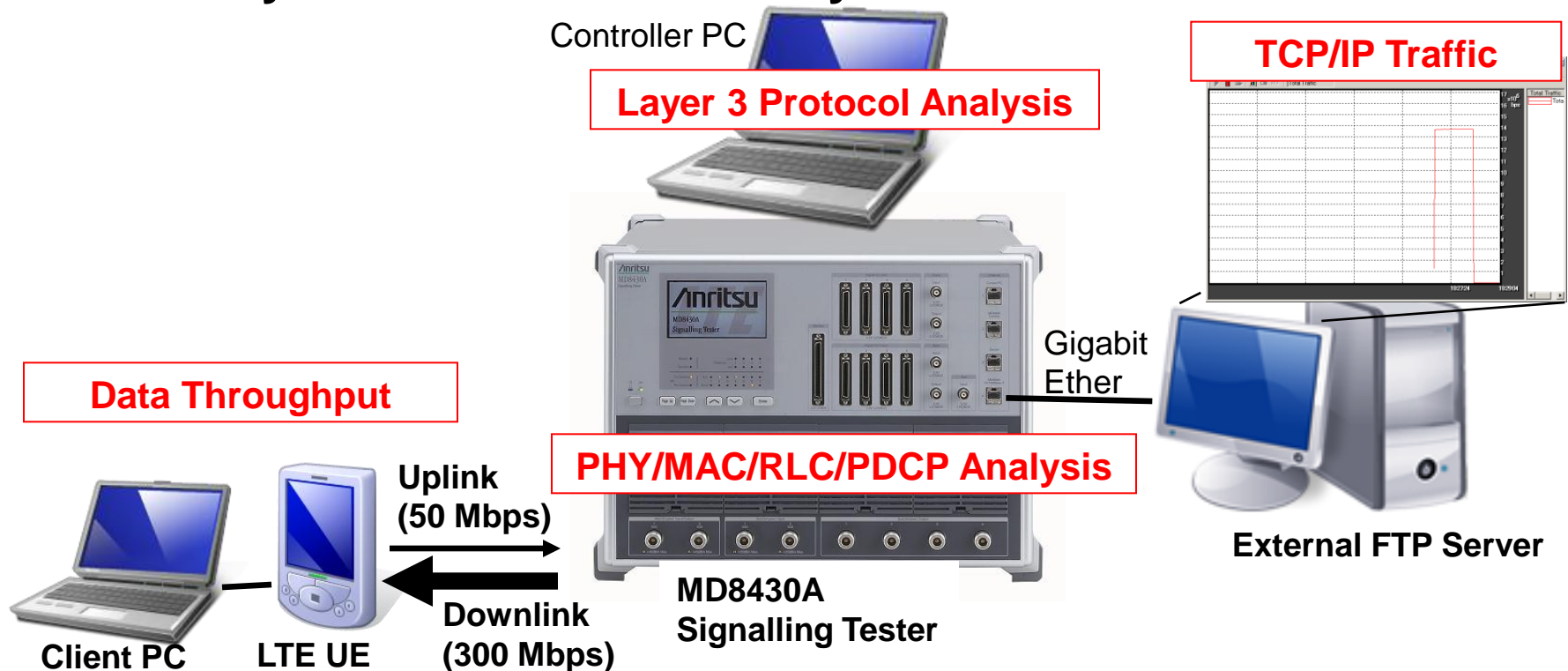 - ◆ **Efficient investment in current hardware and test scenarios helps customers cut development costs**

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MD8430A Signalling Tester

Key Features

- **Supports Carrier Aggregation (CA) and transmission of two component carriers on downlink.**

- **2x2 MIMO Handover and 4x2 MIMO Tests by Built-in 4RF**
  - ◆ **Built-in 4RF supports inter-system handover using 2x2 MIMO or 4x2 MIMO(PTM / ETM) tests in a near-to-real network environment**
  - ◆ **In case of ETM, built-in 4 communication cell supports CA + 2x2/4x2 MIMO with intra-frequency handover by 1 unit.**

- **Strong Baseband Evaluation Support**
  - ◆ **The built-in digital baseband interface supports stable LTE chipset performance and function evaluation tests irrespective of the performance of the RF section**
    - ☐ **Reliable coding and decoding tests are supported by digital IQ signals using a slow clock obtained by changing the clock frequency**
    - ☐ **It supports the severe mobile test environment required by LTE mobile developers to evaluate performance as well the environment required for high-reproducibility tests**

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Applications (1/7)

- **IP Packet /L3 Protocol Tests**
  - ◆ **Throughput and TCP/IP analysis using FTP server**
  - ◆ **Layer 3 (RRC/NAS) protocol analysis**
  - ◆ **Layer 1 and 2 Bearer analysis and monitor tool**

Controller PC

Layer 3 Protocol Analysis

TCP/IP Traffic

Data Throughput

Gigabit Ether

PHY/MAC/RLC/PDCP Analysis

Uplink (50 Mbps)

Downlink (300 Mbps)

Client PC   LTE UE

MD8430A Signalling Tester

External FTP Server

Slide 8

MD8430A-E-L-1

Applications (2/7)

● Throughput Performance Test

Throughput Performance test
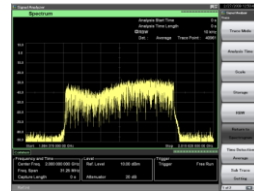in fading condition

Supports DL 2x2 MIMO
and 4x2 MIMO

50 Mbps max.

Controller PC

300 Mbps

Fading Performance

Throughput Performance

Connecting MF6900A
Fading Simulator

LTE UE

Fading Signal

Application Server
or FTP/UDP Server

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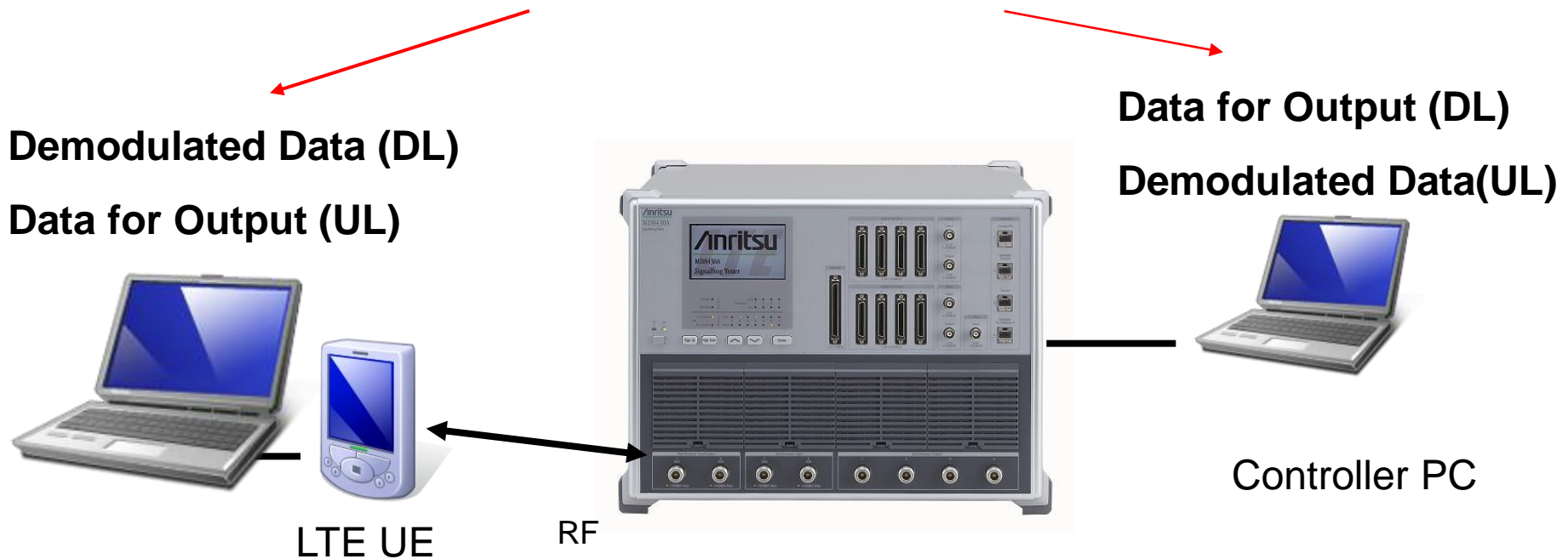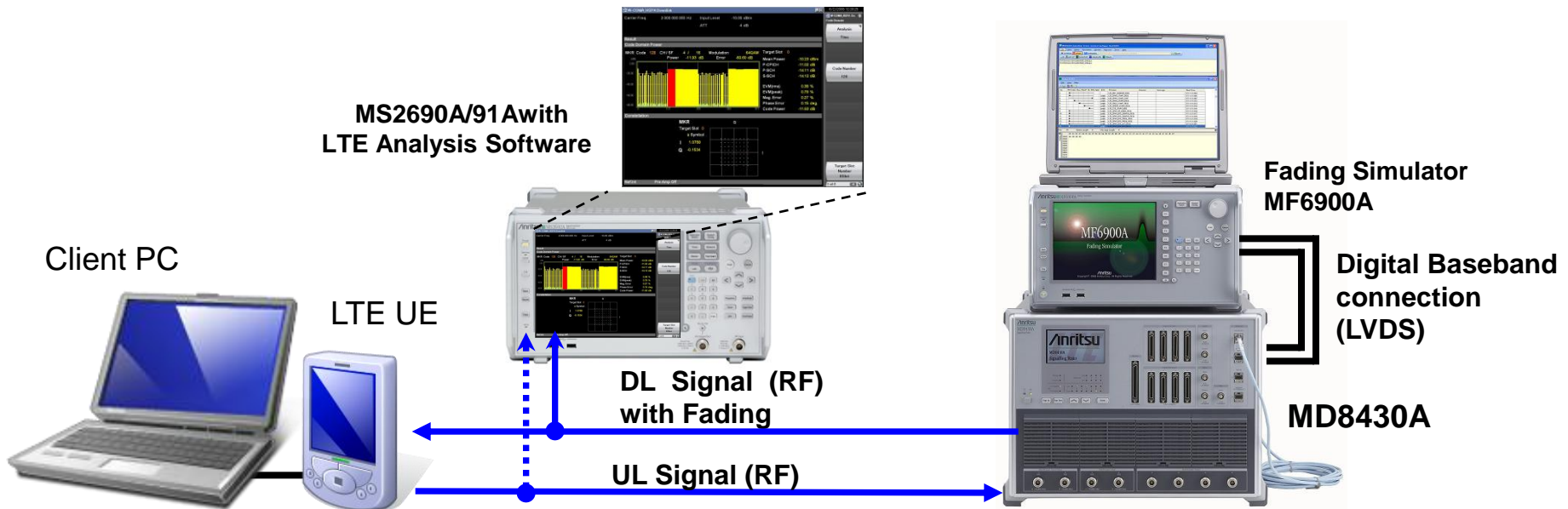
Applications (3/7)

- **Coding / Decoding Test**
  - ◆ **The mobile terminal's coding/decoding function can be tested using the following configuration**

Comparison of Both Methods

Data for Output (DL)

Demodulated Data(UL)

Demodulated Data (DL)

Data for Output (UL)

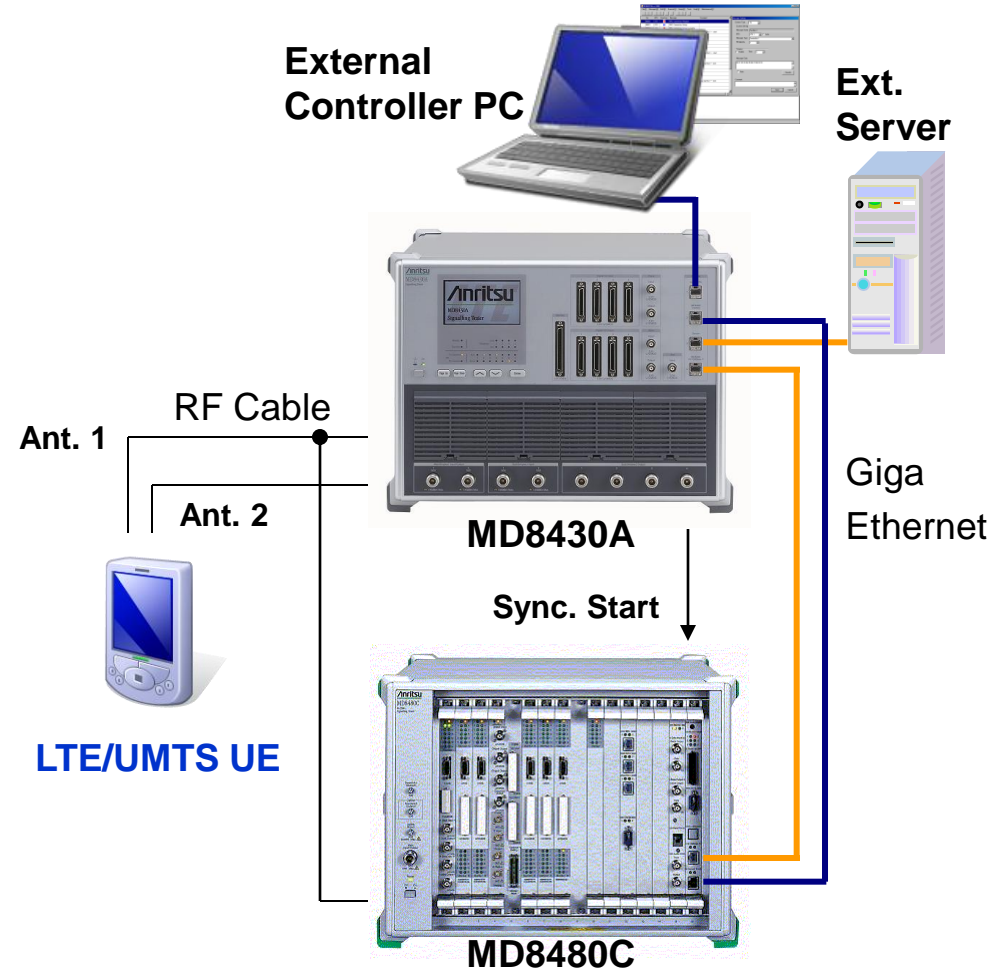Controller PC

LTE UE

RF

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Applications (4/7)

- **Coding / Decoding Test**
  - ◆ **Connecting MF6900A Fading Simulator supports configuration of a dynamically changing environment for checking various mobile operations (CQI notification to BTS, etc.) with fading condition**

**MS2690A/91A with
LTE Analysis Software**

**Fading Simulator
MF6900A**

Client PC

**Digital Baseband
connection
(LVDS)**

LTE UE

**DL Signal (RF)
with Fading**

UL Signal (RF)

MD8430A

Slide 11

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Applications (5/7)

- ## UTRAN/GERAN- LTE FDD Inter-RAT Handover

External Controller PC

Ext. Server

MD8430A

RF Cable

Ant. 1

Ant. 2

LTE/UMTS UE

Sync. Start

Giga Ethernet

MD8480C

(1) The MD8430 and MD8480C are connected by a coaxial cable for 10 MHz Clock sync and wireless Frame sync. Giga Ethernet is used for the C-Plane and U-Plane sync.

(2) At the LTE–UTRAN and LTE–GERAN handover tests, the MD8480C is controlled via the MD8430A. Running the MX843010A Control Software application on the external Controller PC allows easy testing with integrated operation.
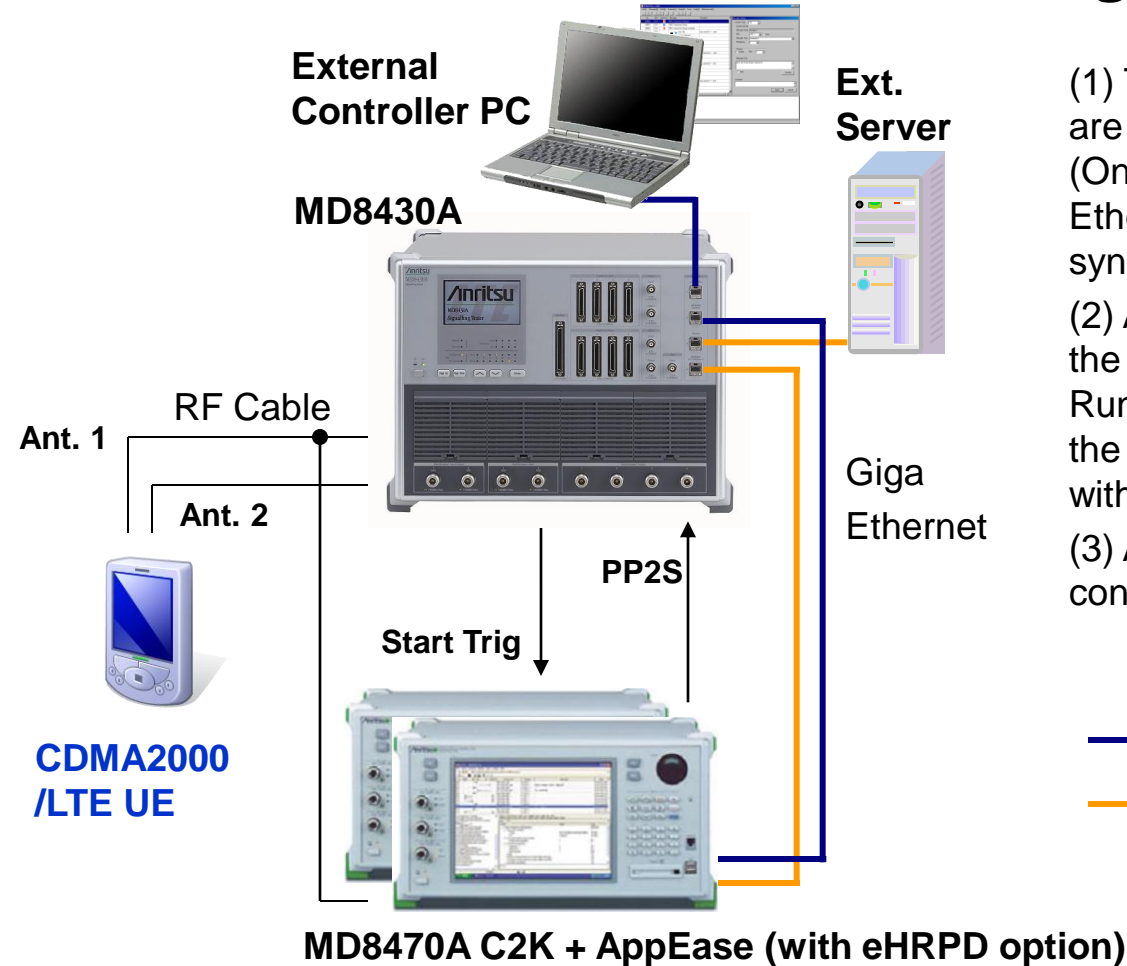
(3) At UTRAN and GERAN testing, the MD8480C is controlled directly, bypassing the MD8430A.

————— : C-Plane (Control Line)

————— : U-Plane (Data Line)

Slide 12

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Applications (6/7)

- ## CDMA2000 - LTE Inter-working

External Controller PC

Ext. Server

MD8430A

RF Cable

Ant. 1

Ant. 2

CDMA2000 /LTE UE

Giga Ethernet

PP2S

Start Trig

MD8470A C2K + AppEase (with eHRPD option)

(1) The MD8430 and MD8470A (CDMA2000) are connected by a coaxial cable for PP2S (One-Pulse-Per-Two-Second). Gigabit Ethernet is used for the C-Plane and U-Plane sync.

(2) At the CDMA2000 – LTE handover tests, the MD8470A is controlled via the MD8430A. Running the application (MX786201A RTD) on the external Controller PC allows easy testing with integrated operation.

(3) At CDMA2000 testing, the MD8470A is controlled directly, bypassing the MD8430A.
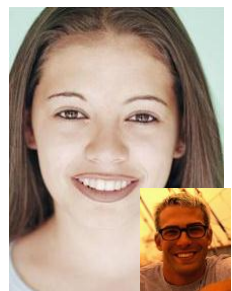
——— : C-Plane (Control Line)

——— : U-Plane (Data Line)

Slide 13

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Applications (7/7)

- ## Voice over LTE, SRVCC

  - ### Radvision ProLab is used for IMS emulation and AUDIO/VIDEO quality measurement.

SIP, RTP, RTCP, AMR-NB, AMR-WB

ProLab
Control

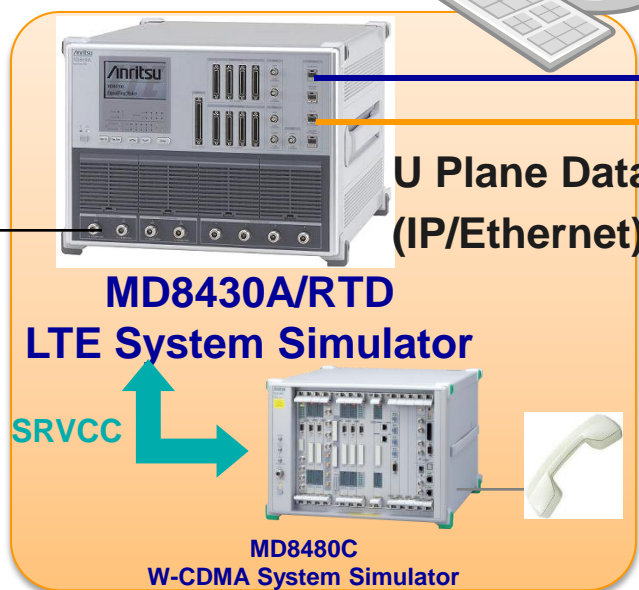**RADVISION** an Avaya company

ProLab

VoLTE Application

LTE Protocol

U Plane Data (IP/Ethernet)

RF Interface

MD8430A/RTD LTE System Simulator

IMS Core / VoLTE Client Emulation and Analysis

LTE Device (VoLTE Client)

SRVCC

MD8480C W-CDMA System Simulator

━━━ : C-Plane(Control Line)
━━━ : U-Plane(DataLine)

Slide 14

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Product Configuration(FTM ~ PTM)

Mainframe

MD8430A   : Signalling Tester
MD8430A-003 : Extended Frequency Range to 3.8 GHz Hardware

Option

MD8430A-002: Extended Frequency Range to 3.8 GHz
MD8430A-060: LTE FDD Option
MD8430A-061: LTE TDD Option
MD8430A-080: LTE Ciphering Option
MD8430A-081: LTE ROHC Option
MD8430A-082: LTE MBMS Option
MD8430A-083: LTE ZUC Ciphering Option
MD8430A-085: LTE Carrier Aggregation Option

Software

MX843010A : LTE Control Software **OR**
MX786201A : Rapid Test Designer (RTD)

+

Please select one test model when you make an order

LTE Function Test Model (FTM)

MD8430A-010: LTE Function Test Model (FTM)

LTE MIMO Test Model (MTM)

MD8430A-020: LTE MIMO Test Model (MTM)

LTE Handover Test Model (HTM)

MD8430A-014: LTE Handover Test Model (HTM)

LTE Standard Test Model (STM)

MD8430A-020: LTE Standard Test Model (STM)

LTE Performance Test Model (PTM)

MD8430A-030: LTE Performance Test Model (PTM)

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MD8430A-E-L-1

MD8430A Signalling Tester

Product Configuration(ETM)

Mainframe

MD8430A   : Signalling Tester

MD8430A-005 : Extended Frequency Range to 3.8 GHz Hardware2

Option

MD8430A-002: Extended Frequency Range to 3.8 GHz

MD8430A-060: LTE FDD Option

MD8430A-061: LTE TDD Option

MD8430A-081: LTE ROHC Option

MD8430A-082: LTE MBMS Option

MD8430A-085: LTE Carrier Aggregation Option

MD8430A-086: Ciphering Option

Software

MX843010E : LTE Control Software **OR**

MX786201A : Rapid Test Designer (RTD)

FTM/STM/PTM to ETM upgrade:

Z1670A : LTE FTM to ETM upgrade kit

Z1671A : LTE STM to ETM upgrade kit

Z1672A : LTE PTM to ETM upgrade kit

Z1789A : LTE FTM to ETM upgrade kit(FO)

Z1790A : LTE STM to ETM upgrade kit(FO)

Z1791A : LTE PTM to ETM upgrade kit(FO)

+

Please select test model when you make an order

LTE Enhanced Test Model (ETM)

MD8430A-035: LTE Enhanced Test Model (ETM)

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MD8430A Signalling Tester

Product Configuration

Model/Name	LTE Function Test Model (FTM)	LTE Standard Test Model (STM)	LTE Performance Test Model (PTM)	LTE Enhanced Test Model (ETM)
Interface	RF, Digital IQ			
Frequency Band	Max 20MHz			
UE Category	Category 1,2,3	Category 1,2,3,4,6(PHY)		Category 1,2,3,4,6, (7 Plan)
Max Data Rate (DL)	75 Mbps	150 Mbps (PHY:300Mbps)		300Mbps
Max Data Rate (UL)	50 Mbps	50 Mbps		50Mbps (Plan ~100Mbps)
No. of Simultaneous Tx Frequencies	1	2 (2x2MIMO), 4(SISO)		2 (2x2MIMO, 4x2MIMO), 4(SISO)
MIMO	No	2x2 MIMO	2x2 MIMO, 4x2 MIMO	2x2 MIMO, 4x2 MIMO,(8x2MIMO Plan)
Max No. of Base Station	Active + adjacent BTS : 1 (Max. Active BTS : 1)	Active + adjacent BTS : 4 (Max. Active BTS : 2)	Active + adjacent BTS : 6 *2 (Max. Active BTS : 2)	Active + adjacent BTS : 6 (Max. Active BTS : 4)
Handover (including MIMO)	Not available	Intra frequency, Inter frequency handover *4		Available 2 units for CA with Inter-Frequency
Carrier Aggregation : No of Component Carriers (DL) *3	No	2*2		
Carrier Aggregation : No of Component Carriers (UL) *3	No	2*2		

*1: For 4 x 2 MIMO, the maximum number of base stations is 1, the number of active base stations + number of adjacent base stations is 5.

*2: The active base station is used as the component carrier.

*3: Requires MD8430A-085.

*4 : Hadnover of Carrier Aggregation is not supported.

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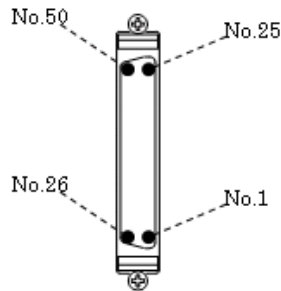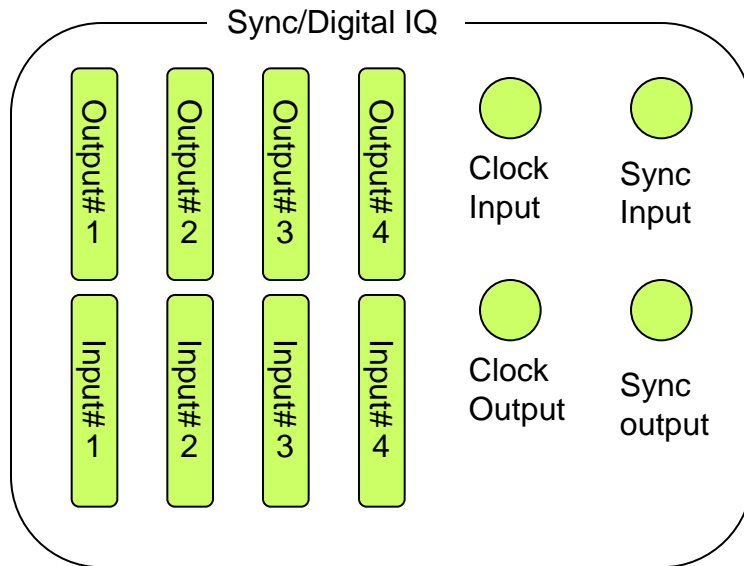# MD8430A Signalling Tester

Specifications

- ## Hardware

Frequency Bandwidth		5, 10, 15, 20 MHz
Max data rate		DL: 300 Mbps(20 MHz, 2x2 , 4x2MIMO) UL: 50 Mbps (20 MHz) [Plan~100 Mbps]
MIMO		DL: 2x2 MIMO, 4x2 MIMO UL: -(MU-MIMO)
Latency		DL: <2ms UL: <1ms
Max number of cell		6 (In case of ETM, Active cell 4, Adjust cell 2)
Max number of RF port		4 (Configure 2x2 MIMO by 2 RF x 2)
Transmit Signal	Frequency	350 MHz to 3 GHz *: 350 MHz to 3.8 GHz using MD8430A-002.
	Access method	OFDMA
	Modulation	QPSK, 16QAM, 64QAM
Receive Signal	Frequency	350 MHz to 3 GHz *: 350 MHz to 3.8 GHz using MD8430A-002.
	Access method	SC-FDMA
	Modulation	QPSK,16QAM

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Specifications

- ## Digital IQ Interface
  - ### Standard 4 ports digital IQ interface installed

Sync/Digital IQ

Output#1 Output#2 Output#3 Output#4

Clock Input　　Sync Input

Input#1 Input#2 Input#3 Input#4

Clock Output　　Sync output

No.50　　No.25
No.26　　No.1

Pin assignment and Electric Characteristics is based on MD8480C-BIU.

•Specifications for Output#1to#4,Input#1to#4
　Connector: DX10-50S
　Signals:
　　I(16bit) and Q(16bit)
　Electric Characteristics
　　output: 3.3V CMOS
　　Input: TTL

•Specifications for Clock input and output
　Connector: BNC
　Frequency: 0< to 30.72 MHz
　Electric Characteristics
　　output: 3.3V CMOS
　　Input: TTL

•Specifications for Sync input and output
　Connector: BNC
　Signals: Low-Inactive /High-Active
　Electric Characteristics
　　output: 3.3V CMOS
　　Input: TTL

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Specifications

- ## Digital IQ Interface
  - ### LTE UE Connection Example

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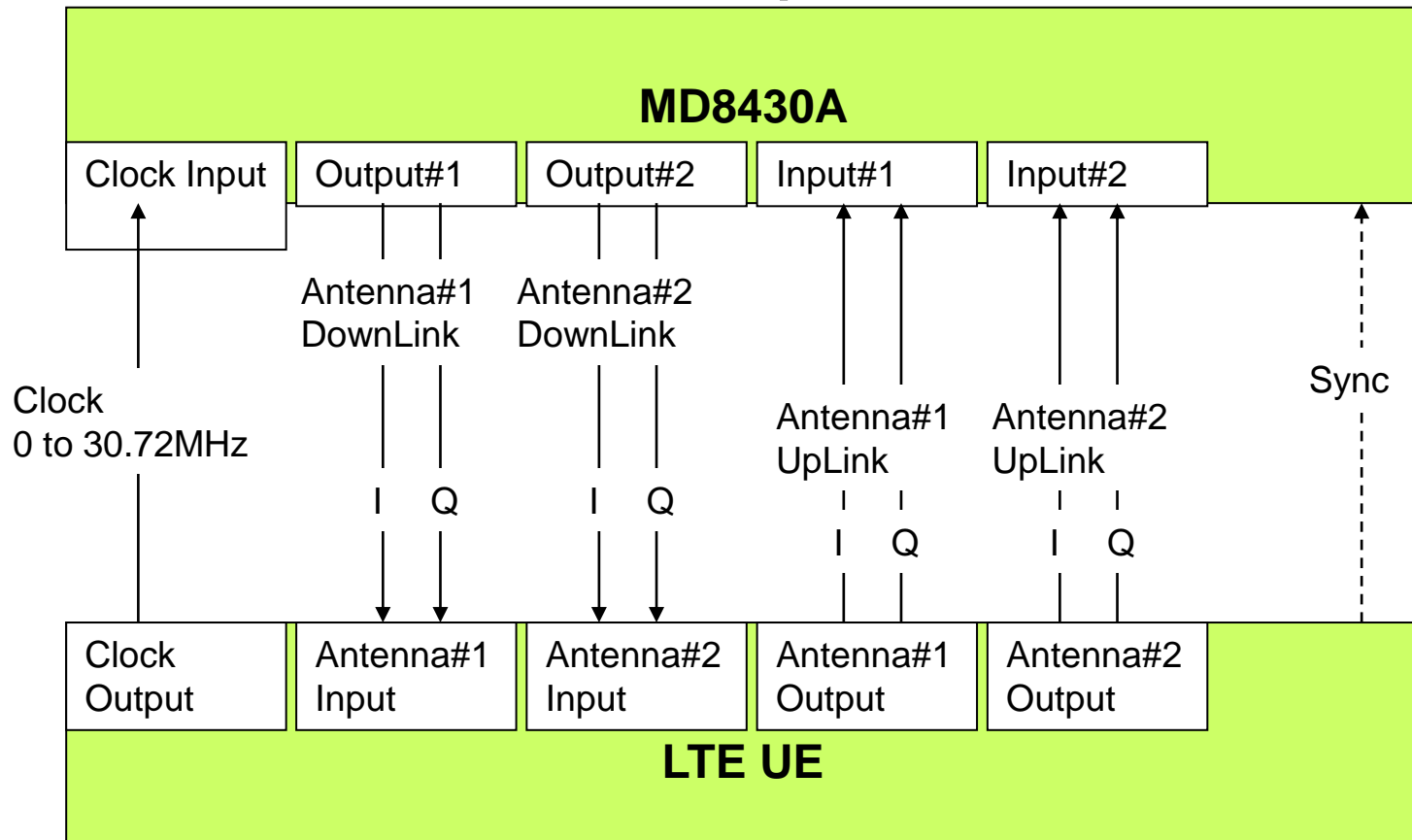
Controller PC

- **The MX843010A LTE Control Software requires a personal computer for control and either Microsoft Visual C++ 2008/2010 or Visual Studio 2008/2010 [*1]**

- **Specifications**
  - ◆ **OS: Microsoft Windows XP (SP3) or Windows 7 SP1 64bit**
  - ◆ **CPU: Intel Core 2 Duo 2 GHz or faster**
  - ◆ **Memory: 2 GB min.**
  - ◆ **Interface: Ethernet (1000BASE-T)**

- **MX843010E LTE Control Software requires Microsoft Windows 7 SP1 64bit.**

*1: The Express Edition of Microsoft Visual C++ 2008/2010 or Visual Studio 2008/2010 is supported.

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Appendix

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MD8430A Signalling Tester

LTE Terminal Protocol Test Solutions

- **Test Phase and Anritsu Test Solution**
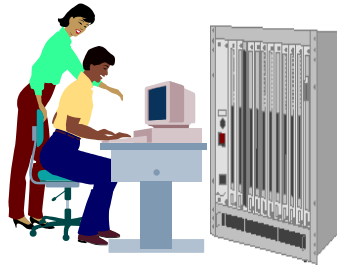
IOT/Pre-IOT Acceptance Tests — ME7834 LTE Mobile Device Test Platform
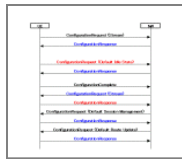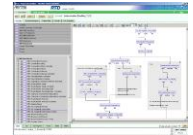
Conformance Pre-conformance Tests — ME7834L PCTS + WI Option (TTCN3)
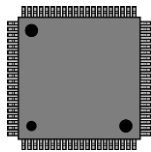
Integration Tests Terminal Design Verification — MX786201A RTD (GUI)

**Platform Verification** — MX786201A RTD (GUI)
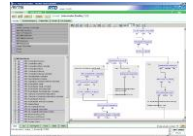
L1/L2 Tests — MX843010A (C++) or MX786201A RTD (GUI)

LTE UE

LTE Protocol

LTE Chipset

MD8430A-E-L-1

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LTE Terminal Protocol Test Solutions

- **L1/L2 Harikiri Tests (non-signalling)**
  - **MX843010A LTE Control Software**
    - **Features**
      - **Powerful L1/L2 tests based on the attached sample C scenarios**
      - **Lower layer analysis by a real-time trace, functional monitor and counter tools**
      - **Easy setting for various RF parameters by BTS Setup window**

LTE Control Software (MX843010A)

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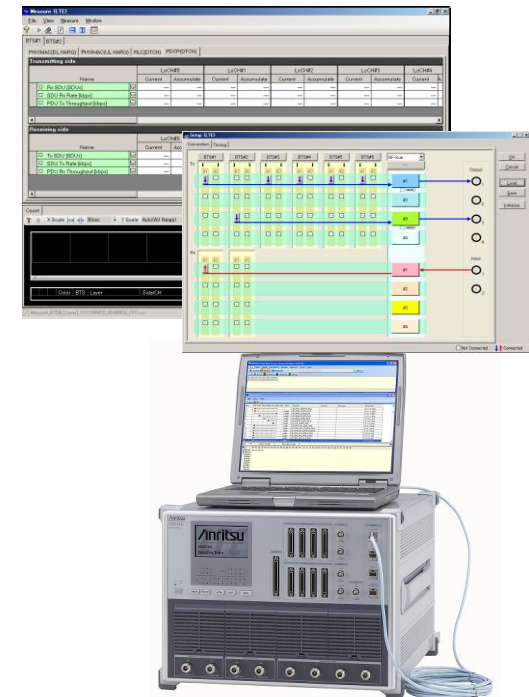
LTE Terminal Protocol Test Solutions

- **Fading and Throughput Performance**
  - ◆ **MF6900A Fading Simulator**
    - ☐ **Features**
      - ▪ **Supports all fading conditions defined by 3GPP LTE specification**
      - ▪ **High reproducibility and maintainability due to full digital baseband processing**
      - ▪ **Supports LTE 2x2 MIMO with 2 cells and 4x2 MIMO by single unit**
      - ▪ **Easy operation by dedicated interface for Signalling Testers (MD8430A/MD8480C)**
   - ▪ **Highly extendible hardware platform**

Fading Simulator (MF6900A)

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LTE Terminal Protocol Test Solutions

- **L3 Protocol or L1/L2/L3 Integration Tests**
  - **MX786201A Rapid Test Designer (RTD)**
    - □ **Features**
      - ■ **Supports test case creation with intuitive Flow-Chart based GUI**
      - ■ **Effective test creation for LTE and UTRAN/GERAN/CDMA2000 Inter-RAT protocol test**
      - ■ **Powerful integrated UE verification from L1 to L3**
      - ■ **Excellent log analysis and external control interface**
      - ■ **Easy test case maintenance**

RTD (MX786201A)

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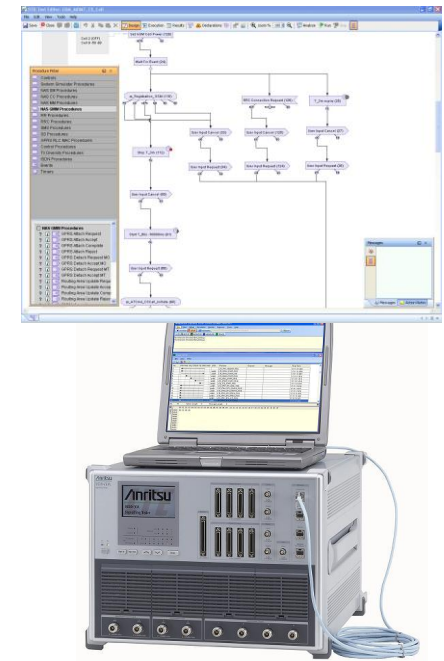
LTE Terminal Protocol Test Solutions

- ## Operator IOT / Acceptance Tests
  - ### ME7834L Mobile Device Test Platform
    - □ **Supports 3GPP TS 36.523 Rel.8 LTE Protocol Conformance tests**
    - □ **Higher number of GCF/PTCRB validated test cases**
    - □ **Integrated Test System for GCF/PTCRB Protocol Conformance tests (PCT) or Operator IOT/UE Acceptance tests**
    - □ **Intelligent Test Sequencer to schedule tests using Drag and Drop Graphical Interface**
    - □ **TTCN 3 Viewer & Editor**
    - □ **Creation of PICS/PIXIT data automatically**
    - □ **Analyze results by Passed/Failed Verdict and Easily re-run any failed tests**
    - □ **Easy test automation**

LTE Mobile Device Test Platform (ME7834L)

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Note

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Specifications are subject to change without notice.

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