

MD8430A

Signalling Tester

MD8430A Signalling Tester Product Introduction

Ver. 4.0

Anritsu Corporation

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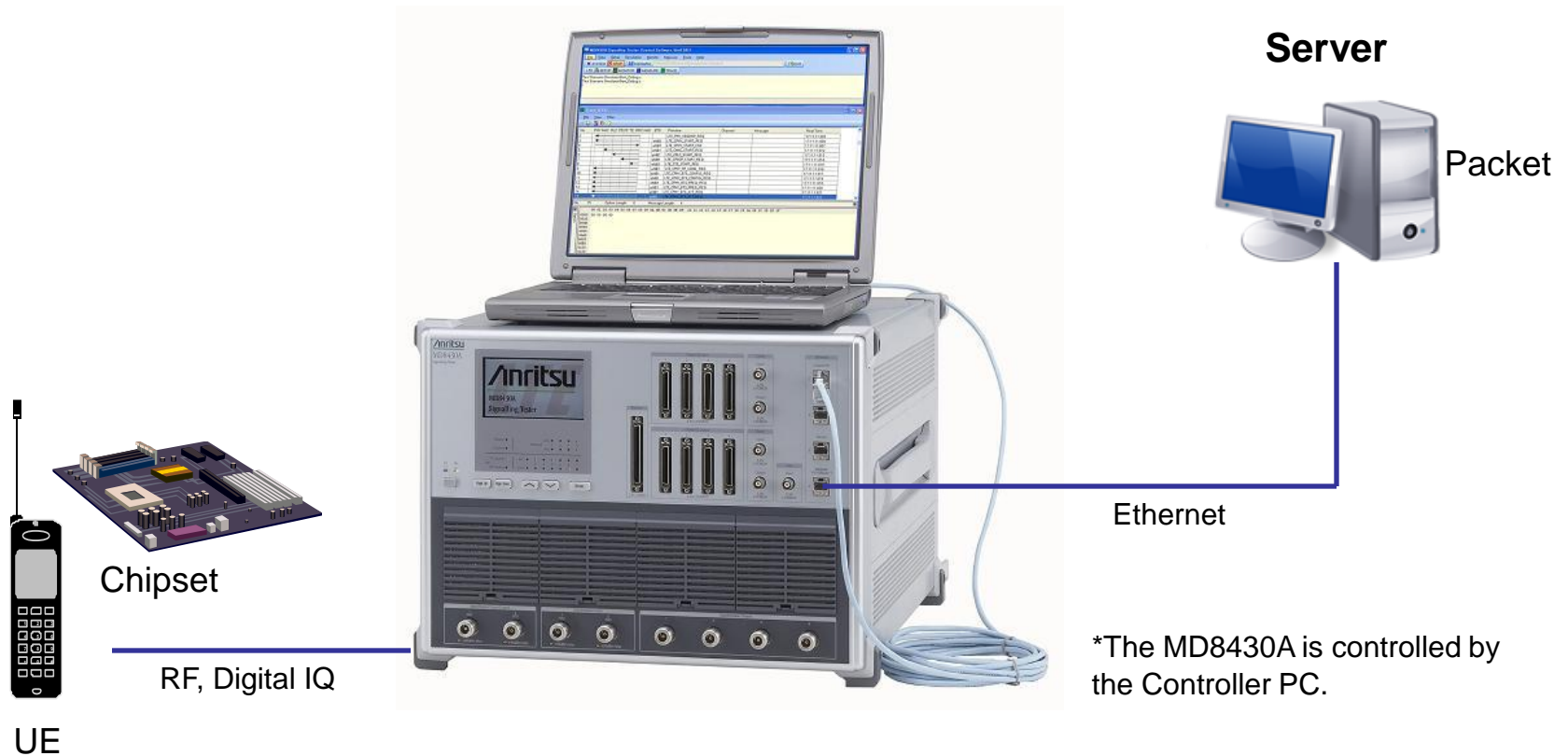
- **Product Overview**
- **Key Features**
- **Applications**
- **Product Configuration**
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 - **LTE Terminal Protocol Test Solutions –**

MD8430A Signalling Tester

Product Overview

- MD8430A Basic Setup

MD8430A and Controller PC



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**

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 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**

Key Features

- **Confirm Maximum Throughput**
 - ◆ The MD8430A supports the high-speed DL 300 Mbps(*) and UL 50 Mbps data communications in the radio bearer and IP packet level specified by 3GPP LTE standards (*: 300Mbps for Layer 1 testing, 150Mbps for Layer 2 testing)
- **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

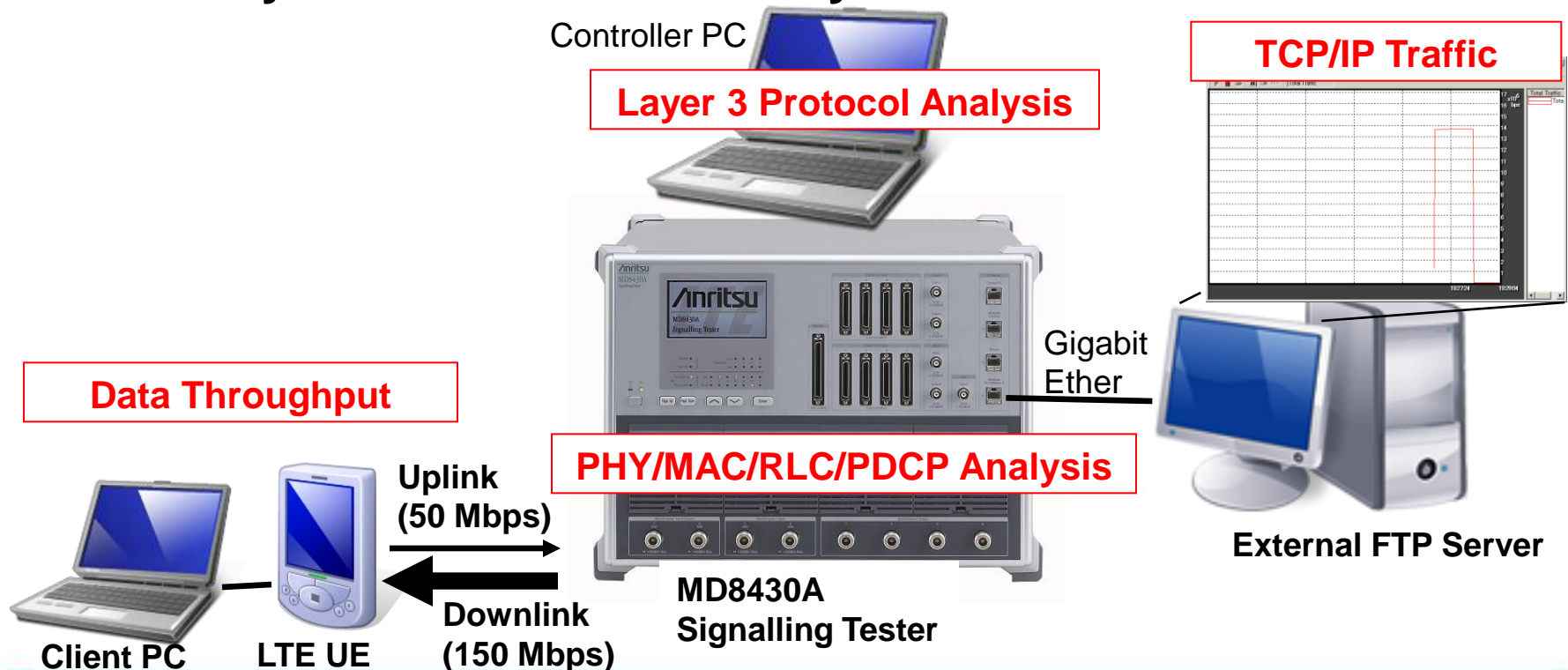
Key Features

- **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 tests in a near-to-real network environment**
- **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**

MD8430A Signalling Tester

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



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Applications (2/7)

- **Throughput Performance Test**

Throughput Performance test
in fading condition

Supports DL 2x2 MIMO
and 4x2 MIMO

50 Mbps max.

150Mbps max.

Fading Performance

Throughput Performance



Controller PC

Connecting MF6900A
Fading Simulator



Application Server
or FTP/UDP Server

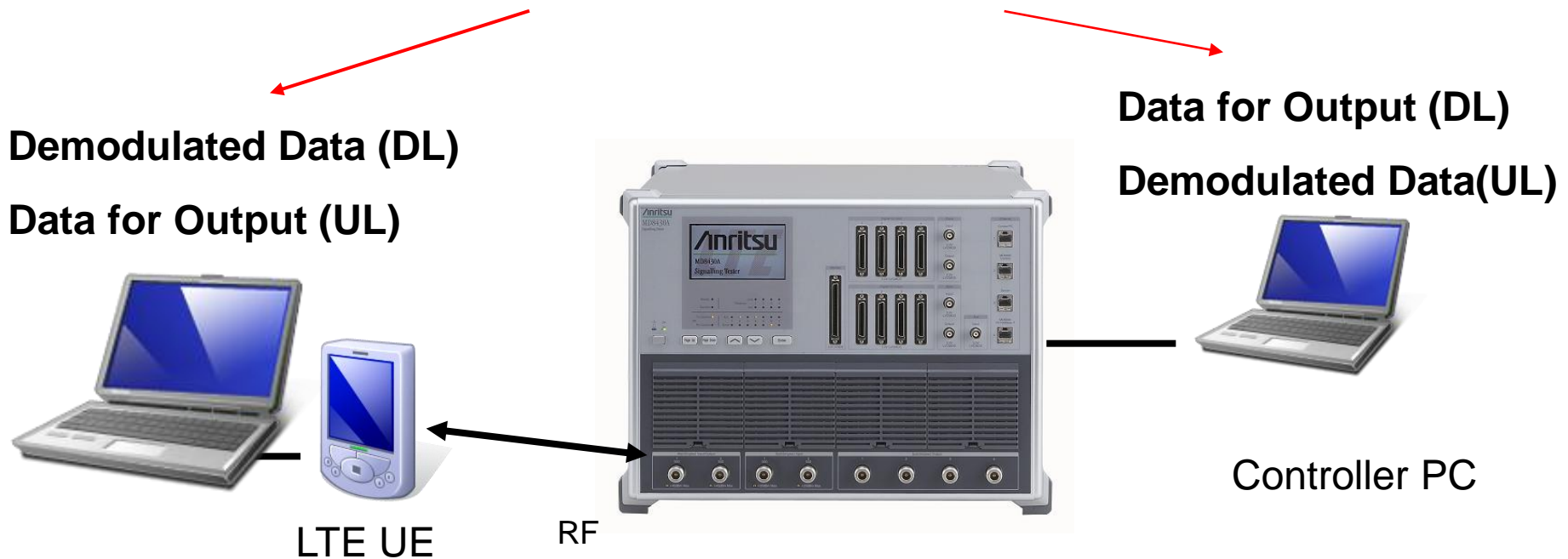
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Applications (3/7)

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

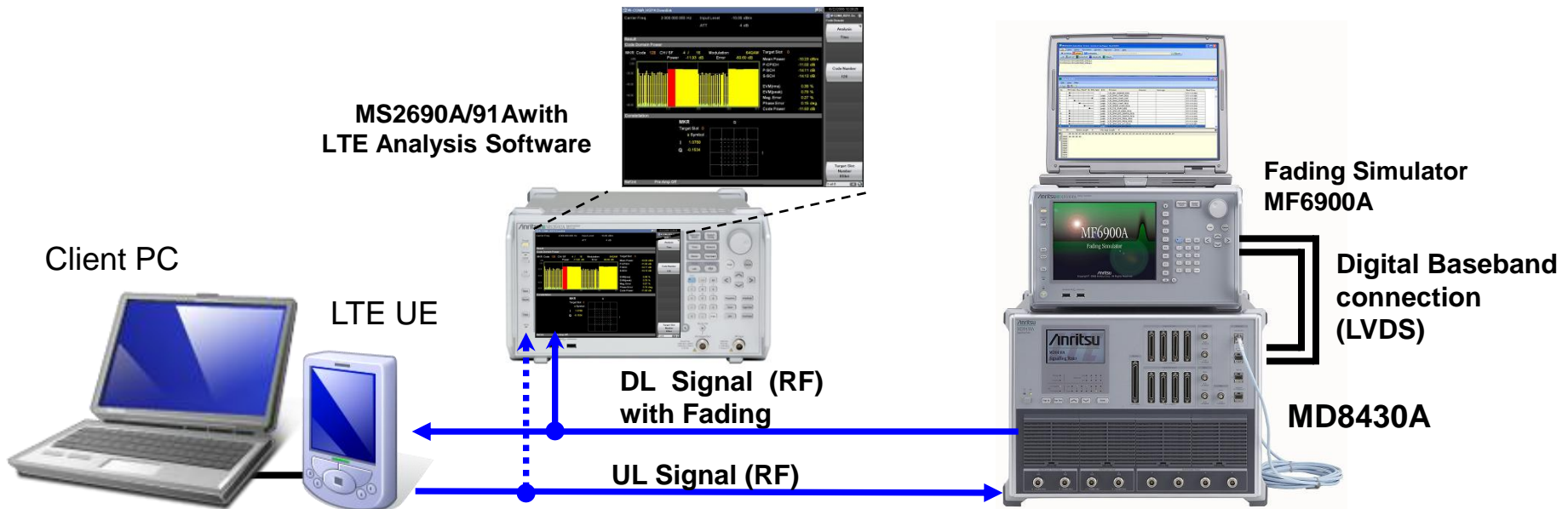
Comparison of Both Methods



MD8430A Signalling Tester

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

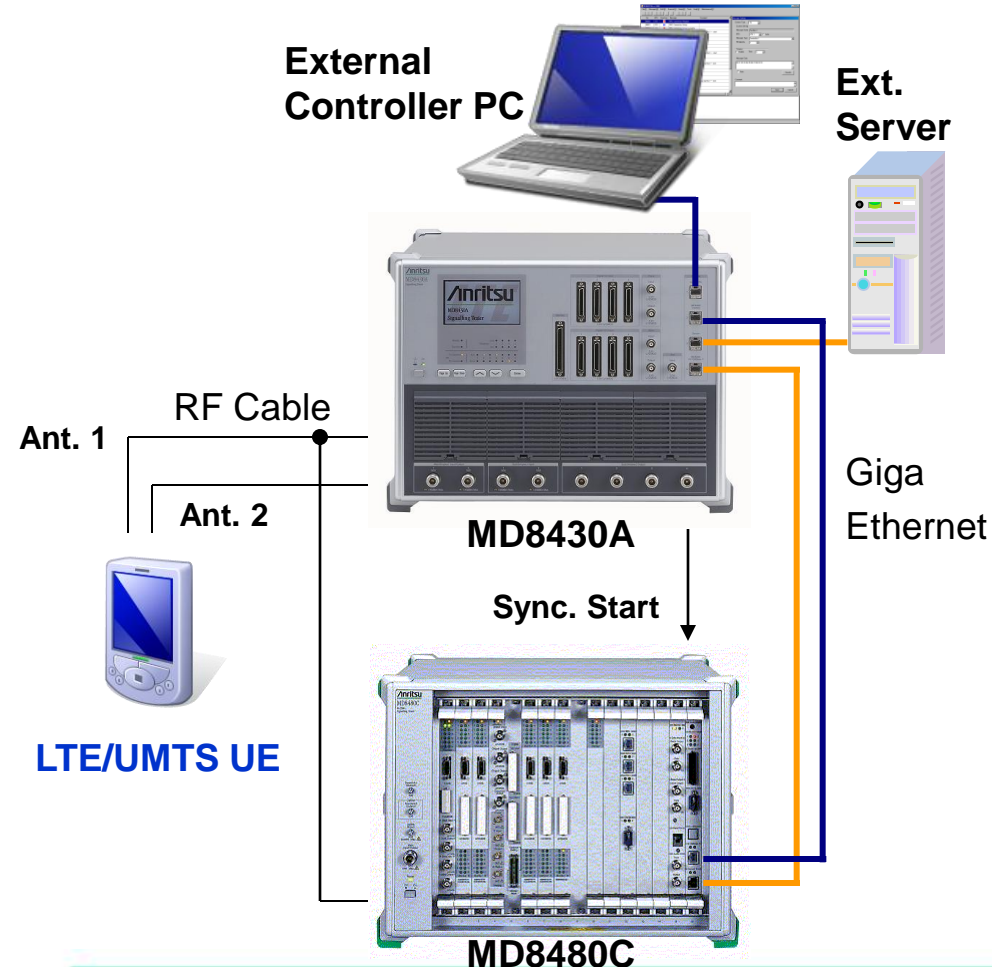


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Applications (5/7)

- UTRAN/GERAN- LTE FDD Inter-RAT Handover



(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.

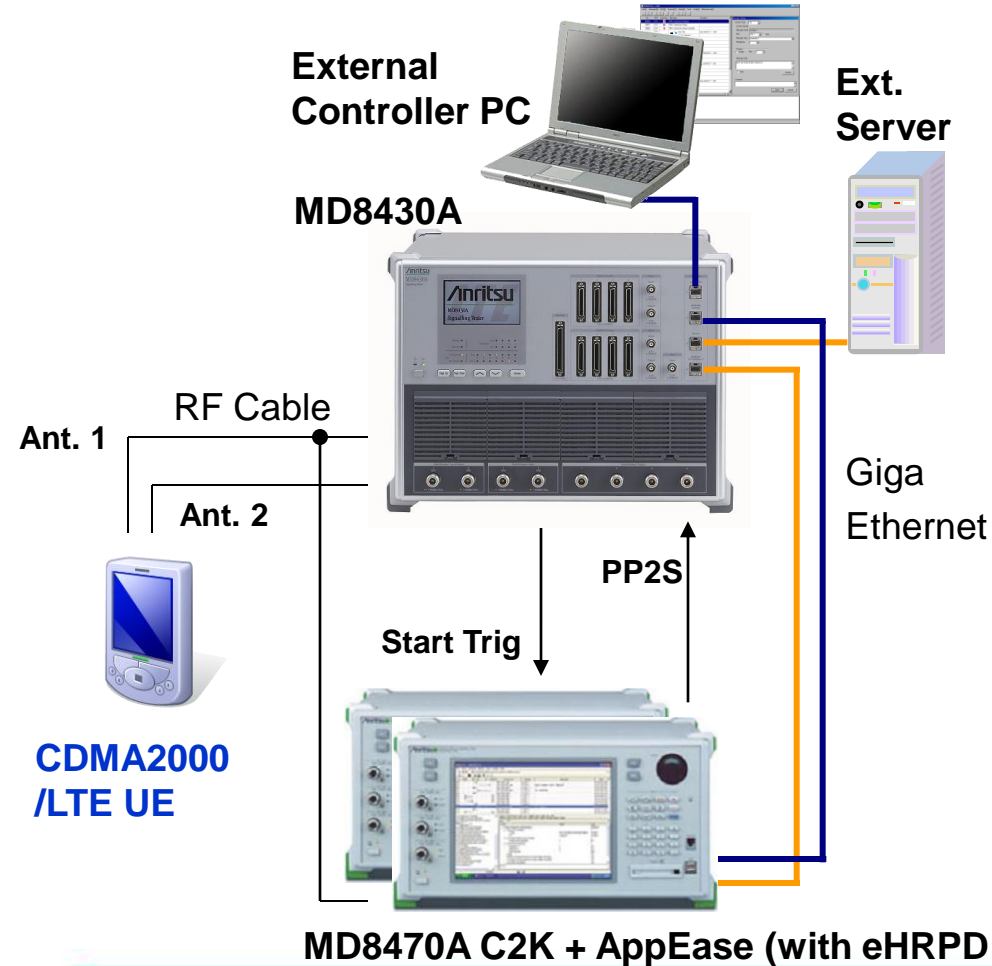
— : C-Plane (Control Line)

— : U-Plane (Data Line)

MD8430A Signalling Tester

Applications (6/7)

- **CDMA2000 - LTE Inter-working**



(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.

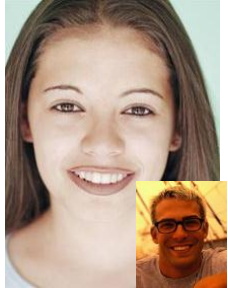
(2) At the CDMA2000 – LTE handover tests, the MD8470A is controlled via the MD8430A. Running the application (MX786201A RTD) on the external Controller PC allows easy testing with integrated operation.

(3) At CDMA2000 testing, the MD8470A is controlled directly, bypassing the MD8430A.

MD8430A Signalling Tester

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



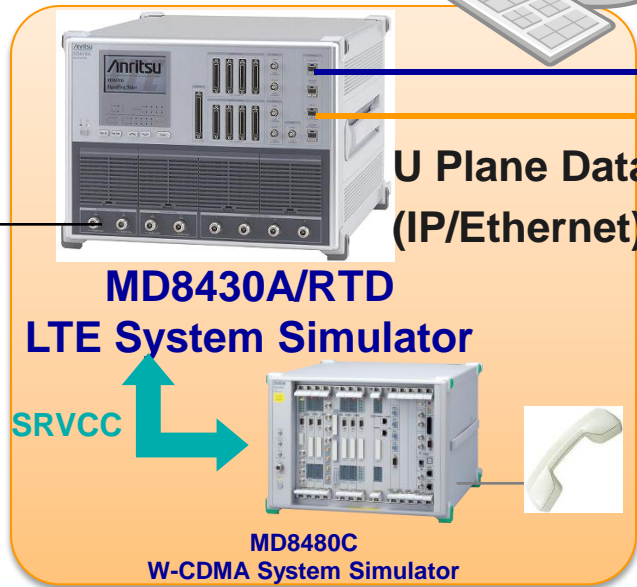
VoLTE Application



LTE Device (VoLTE Client)

LTE Protocol

RF Interface



MD8430A/RTD
LTE System Simulator

MD8480C
W-CDMA System Simulator

ProLab
Control



RADVISION
an Avaya company

ProLab

IMS Core / VoLTE Client
Emulation and Analysis

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

MD8430A Signalling Tester

Product Configuration

Mainframe

MD8430A : Signalling Tester

MD8430A-003 : Extended Frequency Range to 3.8 GHz Hardware

Option

New! MD8430A-002: Extended Frequency Range to 3.8 GHz

MD8430A-060: LTE FDD Option

MD8430A-061: LTE TDD Option

MD8430A-080: LTE Ciphering Option

New! MD8430A-081: LTE ROHC Option

New! MD8430A-082: LTE MBMS Option

New! MD8430A-083: LTE ZUC Ciphering Option

New! 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)

MD8430A Signalling Tester

Product Configuration

Model/Name	LTE Function Test Model (FTM)	LTE MIMO Test Model (MTM)	LTE Handover Test Model (HTM)	LTE Standard Test Model (STM)	LTE Performance Test Model (PTM)
Interface	RF, Digital IQ				
Frequency Band	Max 20MHz				
UE Category	Category 1,2,3			Category 1,2,3,4,6	
Max Data Rate (DL)	75Mbps	100Mbps	75Mbps	300Mbps *1	
Max Data Rate (UL)	50Mbps				
No. of Simultaneous Tx Frequencies	1		2 (2x2MIMO), 4(SISO)		
MIMO	No	2x2 MIMO	No	2x2 MIMO	2x2 MIMO, 4x2 MIMO
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
Handover (including MIMO)	Not available		Intra frequency, Inter frequency handover *5		
Carrier Aggregation : No of Component Carriers (DL) *4	No			2 *3	
Carrier Aggregation : No of Component Carriers (UL) *4	No			1 *3	

*1: For Layer-1 testing; 150 Mbps for Layer-2 (or upper) testing.

*2: 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.

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

*4: Requires MD8430A-085.

*5 : Handover of Carrier Aggregation is not supported.

MD8430A Signalling Tester

Specifications

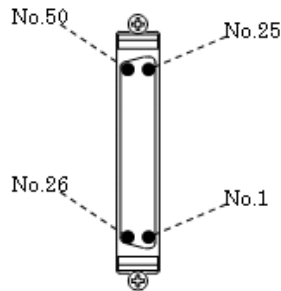
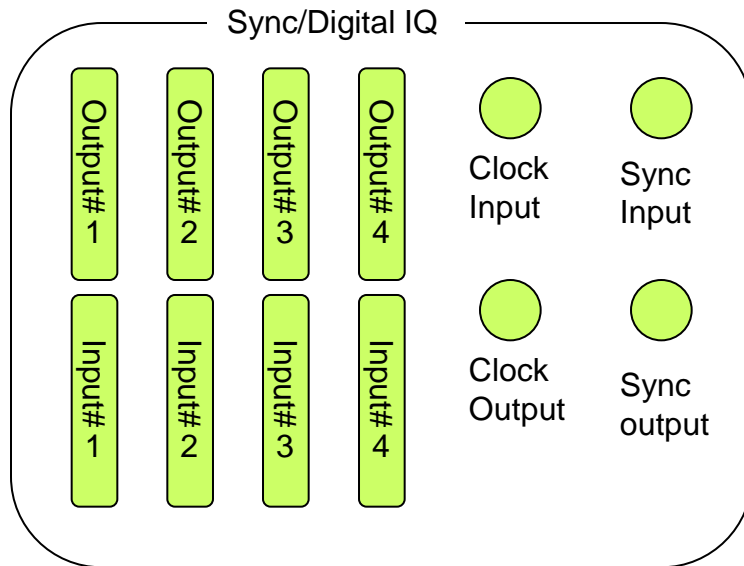
- Hardware

Item	Specification	
Number of UE connection	1	
Interface	RF, Digital IQ	
Frequency Bandwidth	5, 10, 20 MHz	
Max data rate	DL: 300Mbps(20MHz, 2x2 MIMO) *: with MD8430A-085, for Layer 1 testing UL: 50Mbps (20MHz)	
MIMO	DL: 2x2 MIMO UL: -(MU-MIMO)	
Latency	DL: <2ms UL: <1ms	
Max number of cell	6 (2-cell for MIMO, 4-cell for neighbor cell)	
Max number of RF port	4 (Configure 2x2 MIMO by 2 RF x 2)	
Transmit Signal	Frequency	350MHz to 3GHz *: 350 MHz to 3.8 GHz using MD8430A-002.
	Access method	OFDMA
	Modulation	QPSK, 16QAM, 64QAM
Receive Signal	Frequency	350MHz to 3GHz *: 350 MHz to 3.8 GHz using MD8430A-002.
	Access method	SC-FDMA
	Modulation	QPSK,16QAM

Specifications

- Digital IQ Interface

- ◆ Standard 4 ports digital IQ interface installed



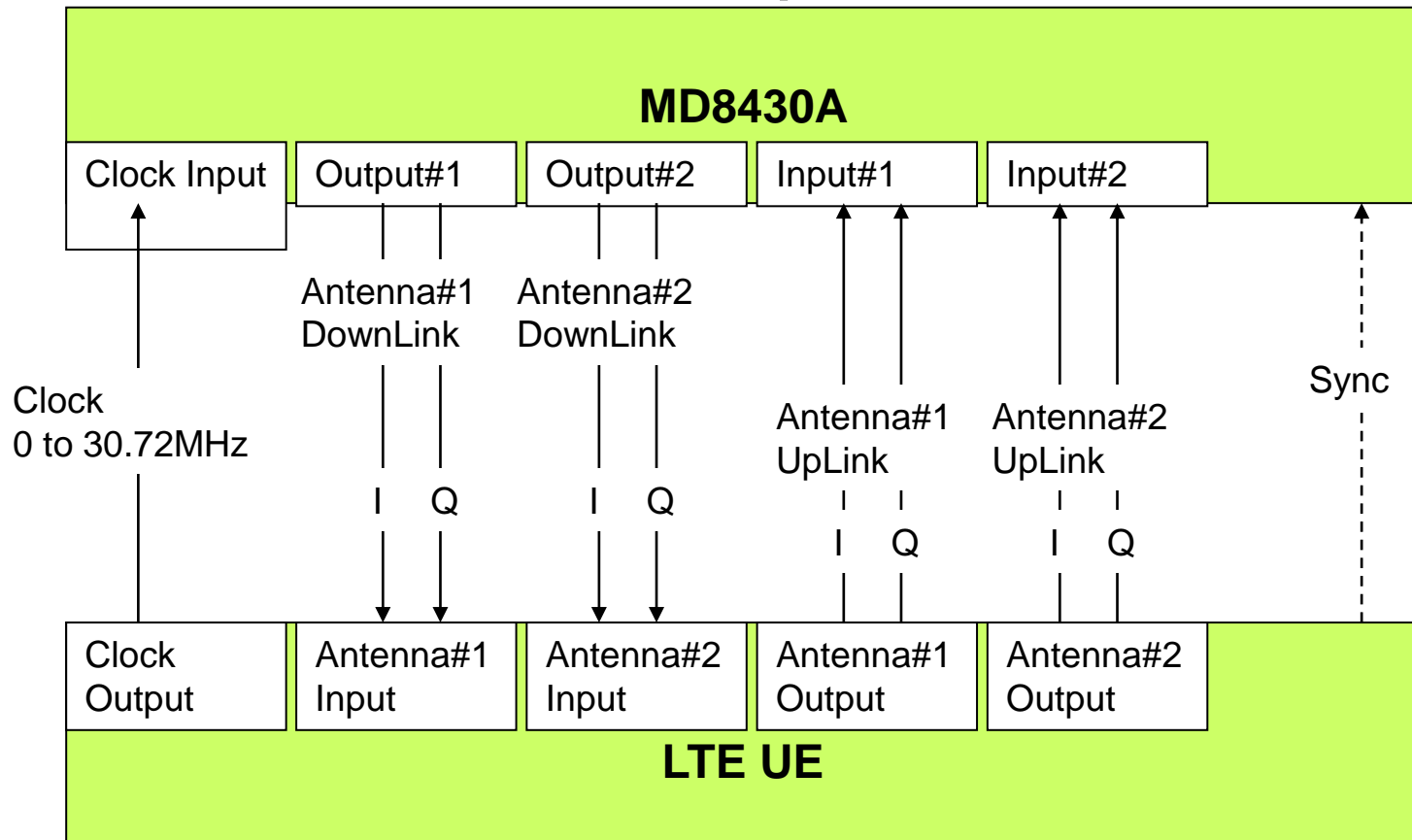
Pin assignment and Electric Characteristics is based on MD8480C-BIU.

- Specifications for Output#1 to #4, Input#1 to #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 30.72MHz
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

MD8430A Signalling Tester

Specifications

- Digital IQ Interface
 - ◆ LTE UE Connection Example



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)**

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

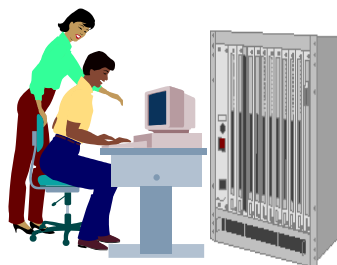
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Appendix

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



LTE UE

Conformance
Pre-conformance
Tests

ME7834L PCTS
+ WI Option (TTCN3)



Integration Tests
Terminal Design
Verification

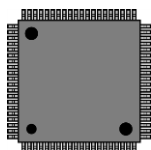
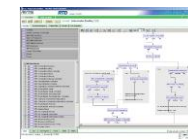
MX786201A RTD
(GUI)



LTE Protocol

Platform
Verification

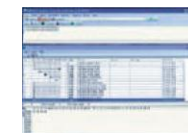
MX786201A RTD
(GUI)



LTE Chipset

L1/L2 Tests

MX843010A (C++) or
MX786201A RTD (GUI)



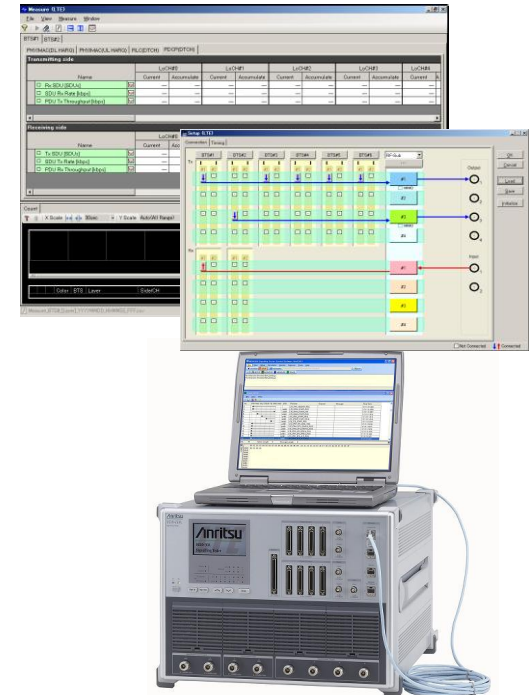
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MD8430A Signalling Tester

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**

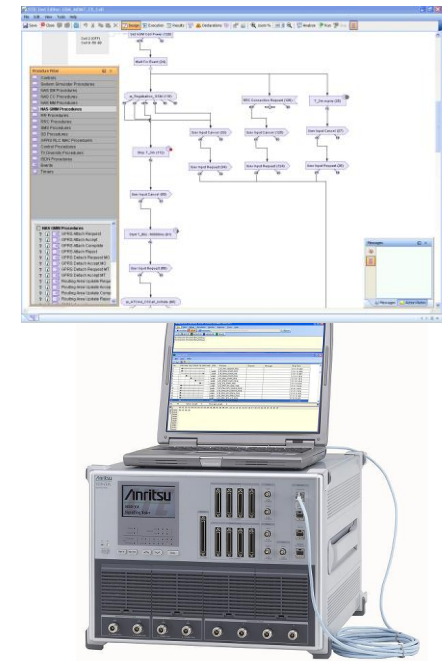
Fading Simulator
(MF6900A)



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)



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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