Product Brochure

For MD8470A Signalling Tester

# MX847031A

CDMA2000 AppEase

**Anritsu**

CDMA2000
1X/1xEV-DO Revision A
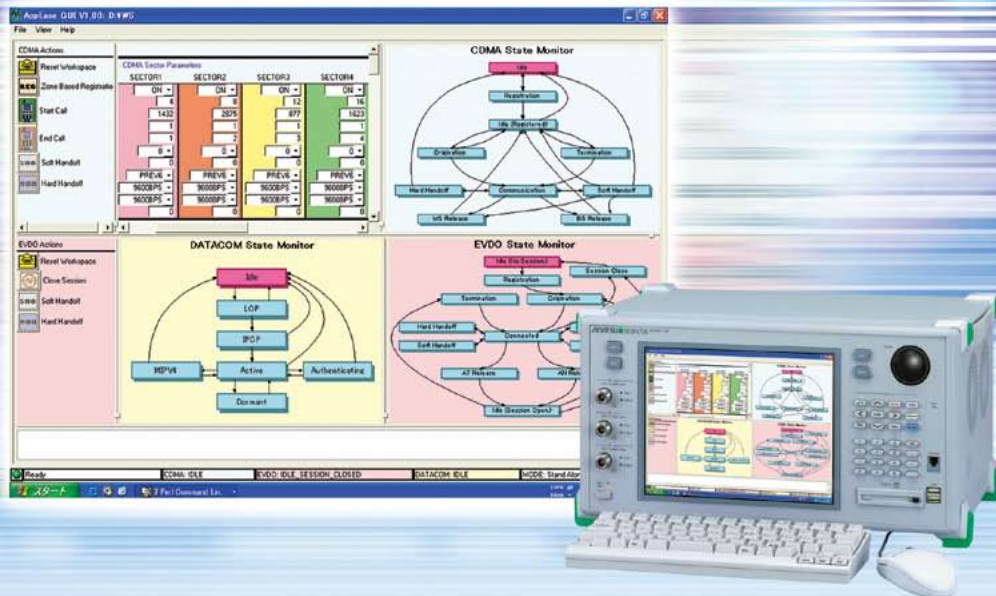
| | |
|---|---|
| Soft/Hard Handoff | PPP / Mobile IP |
| Hybrid Mode | Data Throughput |
| System Determination | Test Automation |

# Flexible Network Simulation for Powerful CDMA2000 Mobile Terminal Operation Tests

Broadband communications systems, such as 1xEV-DO, are being increasingly introduced for high-speed data services in mobile communication market.
An important subject for carriers and vendors is how to become more competitive by building efficient test environments for development of new terminals and services supporting new technologies and high-speed data applications. Anritsu has developed the MX847031A CDMA2000 AppEase software for running a CDMA2000 network simulation environment on the MD8470A Signalling Tester to test CDMA2000 mobile terminal software and services. Its simple user interface supports simulation of a full range of communications conditions while the control interface for configuring automated test systems greatly improves testing productivity.

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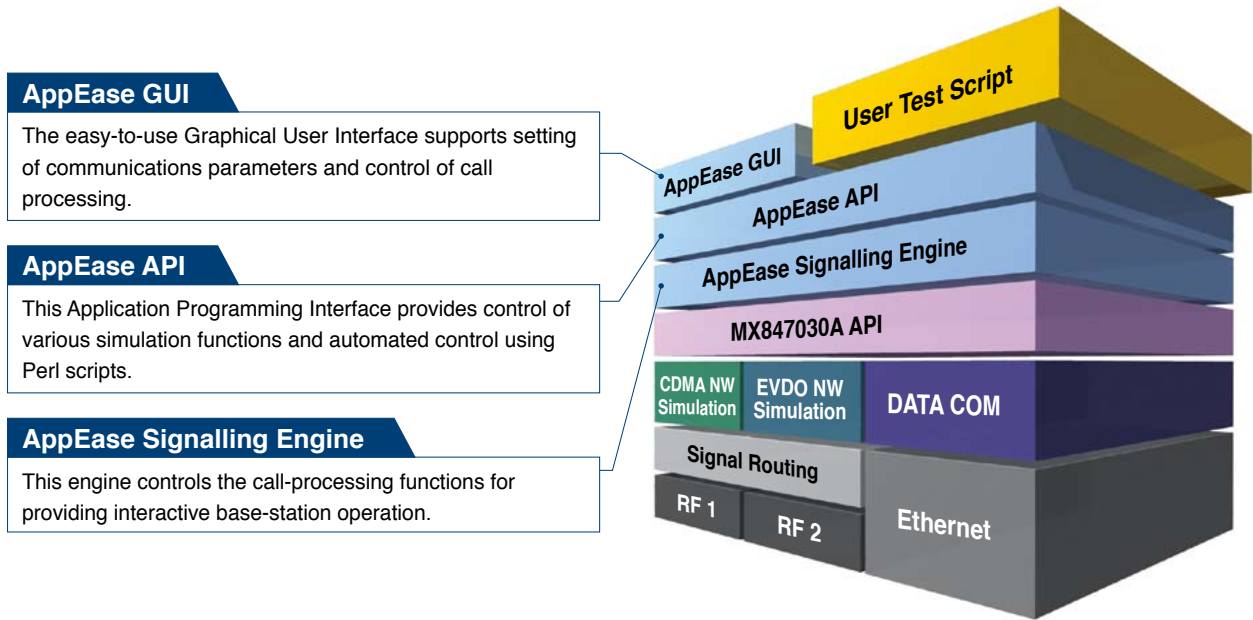
## Key CDMA2000 AppEase Features
- Offers flexible simulation of CDMA2000 1X, 1xEV-DO (Rev. 0 and Rev. A) networks
- Supports voice, data communication, and messaging (SMS, EMS, MMS), etc. services
- Supports handoff and 1X/1xEV-DO hybrid tests in multisector/multicarrier environments
- Offers integrated simulation environment, including PPP, and Mobile IP
- Offers high-speed packet environment required for data throughput function tests
- Supports automated test systems using API (Application Programming Interface)

## Main CDMA2000 AppEase Applications
- Confirming operation at CDMA2000 terminal integration tests
- Confirming connection compatibility by simulating carrier network
- Stress-testing terminals by repeated origination, termination, handoff tests, etc.
- Checking operation at terminal quality assurance
- Confirming carrier terminal acceptance tests
- Using as test platform for building automated test system

## CDMA2000 AppEase Architecture

CDMA2000 AppEase is an application that runs on the MD8470A in which the MX847030A CDMA2000 Simulation Kit has been installed. It uses a simple GUI and script control to offer flexible base station simulation functions.

### AppEase GUI

The easy-to-use Graphical User Interface supports setting of communications parameters and control of call processing.

### AppEase API

This Application Programming Interface provides control of various simulation functions and automated control using Perl scripts.

### AppEase Signalling Engine

This engine controls the call-processing functions for providing interactive base-station operation.



## Flexible and Integrated CDMA2000 Network Simulation Environment

The operation of CDMA2000 terminals can be tested using the flexible network simulation functions provided by CDMA2000 AppEase, including handoff tests in a multisector/multicarrier environment, 1X/1xEV-DO hybrid terminal tests, etc. In addition, not only can 1X base stations and 1xEV-DO access networks be simulated but an integrated CDMA2000 network can also be simulated for supporting protocols and data communications at network nodes such as PPP/Mobile IP nodes.

- Supports both Soft Handoff and Hard Handoff tests used in multisector (1X: 6 sectors, 1xEV-DO: 3 sectors) and multicarrier (2 carriers) environments
- Supports Overhead Message setting for each 1X and 1xEV-DO sector
- Supports PDSN PPP negotiation and Mobile IP Foreign Agent and Home Agent emulation functions
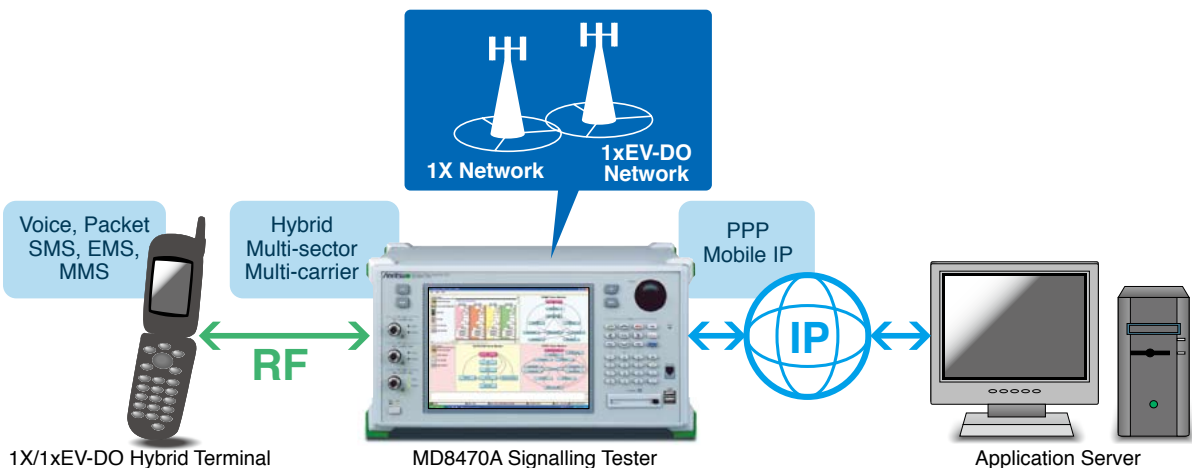
## Work Space

The CDMA2000 AppEase work space function allows multiple users to share one test platform and can also be used for different test objectives.  Using this function, the operator can save CDMA2000 network setup conditions, network parameters, operation screen layouts, etc., in a unique work space that can be switched easily to fetch different test environments.

## GUI-based Simulation Control

All the CDMA2000 AppEase functions, settings, and operations are handled by an easy-to-use graphical  user interface (GUI).

- Various parameters and setting conditions, such as Overhead Message, RF, Sector, Channel, etc., can be set for each CDMA2000 1X and 1xEV-DO sector.
- PPP and Mobile IP negotiation conditions can be set.
- Handoff test condition settings and test execution is easy.
- CDMA2000 1X, 1xEV-DO, data communications (PPP) state transitions can be monitored in real time using the state monitor functions.
- The layout of each setting and state monitor screen can be freely customized.
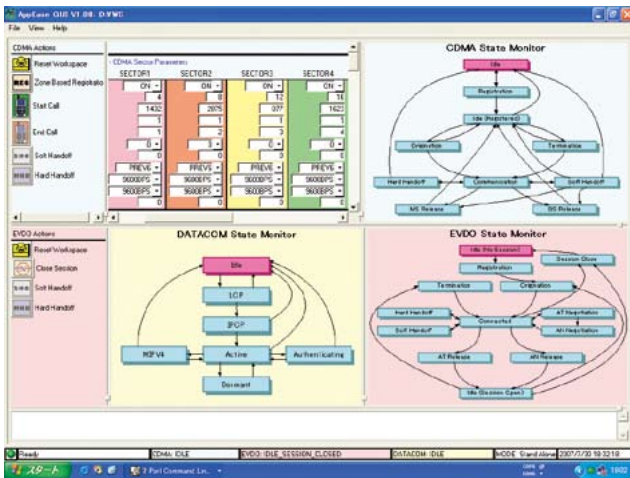


AppEase GUI Screen

## Test System Automation using API

CDMA2000 AppEase provides an API (Application Programming Interface) for running various simulation functions using Perl scripts.  Calling an API from a Perl script allows easy control of parameter settings, starting and stopping of call processing, execution of handoff, etc., simplifying configuration of automated test systems. This eliminates the need to create layer-3 protocol sequences, which increases the efficiency of test case creation required for terminal operation tests.
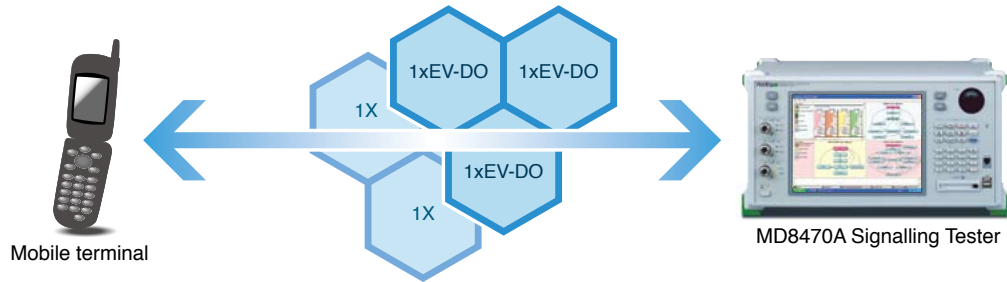
## Efficient Messaging Test Environment using SMSC (SMS Center)

MX847030A has a built-in SMSC (SMS Center) application emulating an SMS (Short Message Service) Center. Using the SMSC function supports creation and sending of SMS messages to CDMA2000 terminals; SMS messages sent from terminals can be displayed too. Moreover, by using the SMSC external interface function, it is also possible to work with MMSC (MMS Center) servers, etc., to run MMS tests.
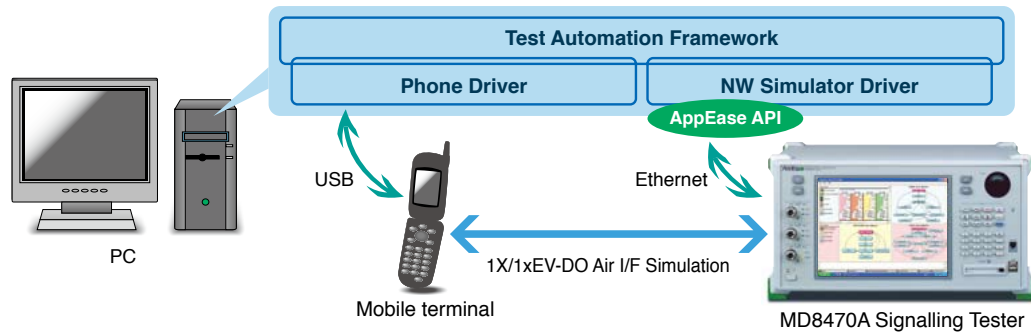


SMSC

Mobile terminal

MMSC
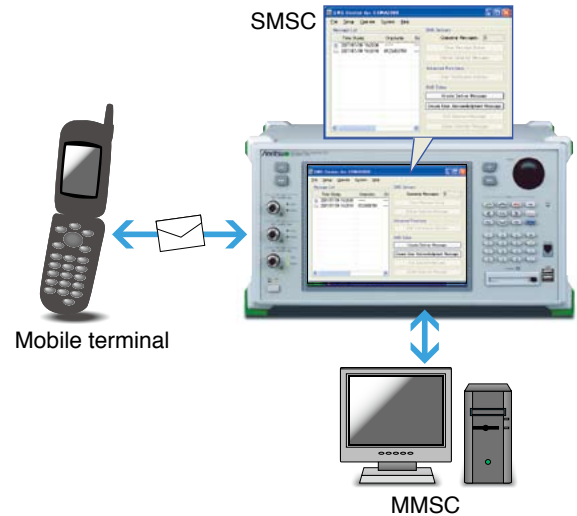
## Example of CDMA2000 AppEase Test System Setup

**Hybrid Operation Test in 1X and 1xEV-DO Multisector Environment**



Mobile terminal

1xEV-DO  1xEV-DO  1X  1xEV-DO  1X

MD8470A Signalling Tester

**Automated Test System Configuration using CDMA2000 AppEase API**



PC

Test Automation Framework

Phone Driver    NW Simulator Driver

AppEase API

USB

Ethernet

Mobile terminal

1X/1xEV-DO Air I/F Simulation

MD8470A Signalling Tester

**End-to-End MMS Test Environment using Two MD8470A Units with CDMA2000**



MD8470A Signalling Tester

MMS

RF

Mobile terminal

RF

MMS

Mobile terminal

MD8470A Signalling Tester

MMSC
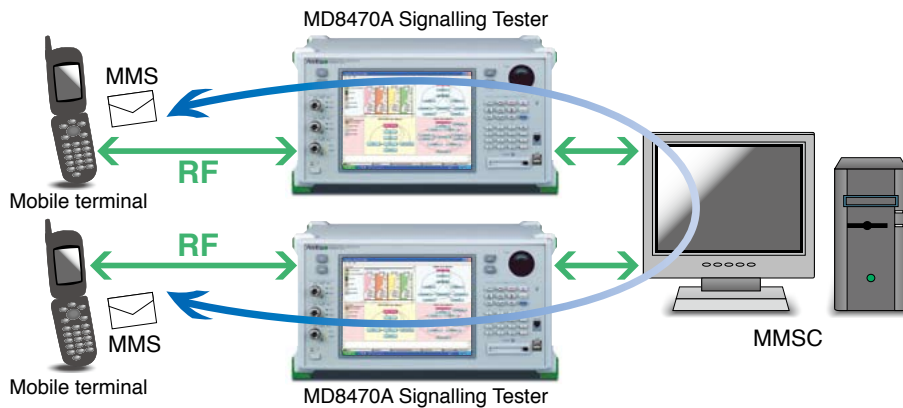
**Outline of CDMA2000 AppEase Functions**

| | | |
|---|---|---|
| **Joint Functions** | Access Network configuration settings (when simulating CDMA2000 1X or 1xEV-DO only) | 1 sector x 1 RF<br>2 sectors x 2 RF<br>3 sectors x 1 RF<br>6 sectors x 1 RF (1X only) |
| | Access Network configuration settings (when simulating CDMA2000 1X and 1xEV-DO hybrid mode) | CDMA2000 1X 1 sector + 1xEV-DO 1 sector<br>CDMA2000 1X 3 sectors + 1xEV-DO 3 sectors<br>CDMA2000 1X 6 sectors + 1xEV-DO 3 sectors |
| | Band Class | 0 to 15 |
| | Handoff Functions | Intra-band hard, Inter-band hard, Soft/Softer |
| | Call Drop Functions | ON/OFF, Timer |
| | Others | State/Monitor Function (1X, 1xEV-DO, DATACOM) |
| **CDMA2000 1X Simulation Functions** | Protocol Revision | PREV6 |
| | Service Option | Voice Service: SO1, SO3, SO68, SO32768<br>Data Service: SO33 (FCH or DCCH for signalling)<br>Short Message Service: SO6, SO14 |
| | Messaging Support (SMS Centre) | SMS, EMS, MMS∗ |
| | RF Settings | Band class, Channel, RF power |
| | Others | MEID, Overhead Message settings |
| **1xEV-DO Simulation Functions** | Protocol Revision | Revision 0, A |
| | Supported Protocol Subtypes | All default subtypes, Generic security protocol,<br>SHA-1 authentication protocol, RTC MAC subtype 1, RTC MAC subtype 3,<br>Enhanced FTC MAC, Enhanced AC MAC, Enhanced CC MAC,<br>Enhanced idle state, Multi-flow packet application, Subtype 2 physical layer |
| | Session Negotiation | Up to 4 personalities, Negotiated subtype query |
| | Others | Overhead message settings,<br>Idle personality handoffs |
| **Data Communications Control** | PPP Protocol | LCP, IPCP |
| | IP Protocol | Simple IP<br>Mobile IPv4 (FA/HA Functions, Error Codes/Secret Key) |
| | Others | PCF Dormancy: Enable, Timeout<br>VJ Compression |

∗: Requires separate MMS application sever

**CDMA2000 AppEase Setting Parameters, Actions and Monitor Information**

| Menu | Category | Parameter/Action/Monitor |
|---|---|---|
| CDMA Actions | (Action) | Reset Workspace, Zone Based Registration, Start Call, End Call, Soft Handoff, Hard Handoff |
| CDMA Parameters | RF | BAND_CLASS, CHANNEL, REV_FREQ, REV_POWER, REV_CONNECTOR, FWD_FREQ, FWD_POWER, FWD_CONNECTOR, AWGN_ENABLE, AWGN_LEVEL |
| | Sector | ENABLE, PN_OFFSET, SID, NID, BASE_ID, FRAME_OFFSET, LEVEL, P_REV, PCH_DATARATE, QPCH_DATARATE, QPCH_LEVELPAGE |
| | Channel | FDCCH_LEVEL, FDCCH_WALSHCODE, FFCH_LEVEL, FFCH_WALSHCODE, OCNS_ENABLED, OCNS_WALSHCODE, PICH_LEVEL, PCH1_LEVEL, PHY_LAYER_TCH_CONFIG, SYNC_LEVEL |
| | Call Related | CALL_DROP_ENABLE, CALL_DROP_TIMER, MSID_ENABLE, MSID, MSID_LEN, MSID_TYPE, NW_ORIG_RC, NW_ORIG_SECTOR, NW_ORIG_SERVICE_OPTION, NW_ORIG_SMS_SERVICE_OPTION, SIGNALING_CHANNEL |
| | Overhead Messages | SCHM, SPM, APM, NLM, CCLM, ESPM, ENLM, GSRDM, GNLM, EGSRDM, ECCLM, A41SPM, MCRRPM, A41RANDM, EAPM, UNLM |
| CDMA State Monitor | (Monitoring) | Idle, Registration, Idle (Registered), Origination, Termination, Communication, MS Release, BS Release, Hard Handoff, Soft Handoff |
| CDMA MS Information | (Monitoring) | MSID, MSID_LEN, MSID_TYPE, MS Slot Cycle Index, DCCH Supported, Mobile Protocol Revision |
| EVDO Actions | (Action) | Reset Workspace, Close Session, Soft Handoff, Hard Handoff |
| EVDO Parameters | RF | BAND_CLASS, CHANNEL, REV_FREQ, REV_POWER, REV_CONNECTOR, FWD_FREQ, FWD_POWER, FWD_CONNECTOR, AWGN_ENABLE, AWGN_LEVEL |
| | Sector | ENABLE, PN_OFFSET, FRAMEOFFSET, LEVEL, SECTORID, COLORCODE |
| | Channel | DRCLENGTH |
| | Session | UATI024, CALL_DROP_ENABLE, CALL_DROP_TIMER, PERSONALITY_INDEX |
| | Personality | NEGOTIATE, PACKET_APPLICATION, SUBTYPE_IDP, SUBTYPE_SP, SUBTYPE_KEP, SUBTYPE_AP, SUBTYPE_CCMP, SUBTYPE_FTCMP, SUBTYPE_ACMP, SUBTYPE_RTCMP, SUBTYPE_PHY |
| | Overhead Messages | SECTORPARAMETERS, ACCESSPARAMETERS, QUICKCONFIG, SYNC, BROADCASTREVERSERATELIMIT |
| EVDO State Monitor | (Monitoring) | Idle (No Session), Registration, Idle (Session Open), Origination, Termination, Connected, AT Release, AN Release, AT Negotiation, AN Negotiation, Hard Handoff, Soft Handoff |
| EVDO AT Information | (Monitoring) | Hardware Id, Hardware Id Len, Hardware Id Type |
| DATACOM Actions | (Action) | Reset Workspace, Renegotiate PPP |
| DATACOM Parameters | IPCP | COMPRESSION_FLAG, IP_COMPRESSION_PROTOCOL, MAX_SLOTID, PRIMARY_DNS_ADDR, SECONDARY_DNS_ADDR, PRIMARY_NBNS_ADDR, SECONDARY_NBNS_ADDR, REMOTE_IPADDR |
| | LCP | ACCM, ACFC_ENABLE, MRU, PFC_ENABLE |
| | Mobile IP | ERROR_CODE_RETURN_ENABLE, ERROR_CODE_RETURN_VALUE, HOME_AGENT_IP_ADDR, REGISTRATION_LIFETIME, SECRET_KEY |
| | PCF | DORMANCY_ENABLE, DORMANCY_TIMEOUT |
| | PDSN | PDSN_IP_ADDR |
| DATACOM State Monitor | (Monitoring) | Idle, LCP, IPCP, Active, Dormant, MIPV4, Authenticating |
| COMMON Actions | (Action) | Reset Workspace, Connect To SMSC, Disconnect From SMSC |
| COMMON Parameters | Common | ADDR, NETMASK, GATEWAY, SMSC_IP_ADDRESS, TIMEFORMAT, TIME |
| Radio Access Network Configuration | (Monitoring) | Radio access network configuration display |
| Script Information | (Information) | IP Address, Version, Script Name, Full Path Name (Call control script information) |

# Product Configuration

## MX847031A CDMA2000 AppEase

This software supports basic call processing and various handover tests in a multi-sector/multi-carrier environment.
In addition to setting various network parameters at the GUI, an automated test system is easily configured using the Anritsu-provided AppEase API.

## MX847031A-20
## MX847031A Support Service (1 year)

This contract covers response to inquiries from users, and maintenance releases.
MX847031A-20 is the software maintenance contract for MX847031A.

## CDMA2000 AppEase and MD8470A Signalling Tester Configurations

The supported CDMA2000 AppEase test functions vary with the MD8470A Signalling Tester configuration as shown in the following table.

| | MD8470A Signalling Tester | MU847030A CDMA2000 1X Signalling Unit | MU847032A CDMA2000 1xEV-DO Signalling Unit | MD8470A-01/02 Second RF Option | MX847030A CDMA2000 Simulation Kit | MX847030A-01 Multisector/Multicarrier |
|---|---|---|---|---|---|---|
| CDMA2000 1X Test Setup | 1 | 1 | | | 1 | |
| CDMA2000 1X Multisector/Multicarrier Test Setup | 1 | 1 | | 1 | 1 | 1 |
| CDMA2000 1X/1xEV-DO Test Setup | 1 | 1 | 1 | 1 | 1 | |
| CDMA2000 1X/1xEV-DO Multisector/Multicarrier Test Setup | 1 | 1 | 1 | 1 | 1 | 1 |

CDMA2000 1X Test Setup: Supports CDMA2000 1X 1BTS simulation
CDMA2000 1X Multisector/Multicarrier Test Setup: Supports CDMA2000 1X multicarrier and multisector simulation
CDMA2000 1X/1xEV-DO Test Setup: Supports CDMA2000 1X 1BTS/1xEV-DO 1BTS simulation (including hybrid tests)
CDMA2000 1X/1xEV-DO Multisector/Multicarrier Test Setup: Supports CDMA2000 1X/1xEV-DO multicarrier and multisector simulation

# Anritsu

Specifications are subject to change without notice.

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