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Cutting CS/PS Network Service Inspection Testing Costs

End-to-End UE Test Solution
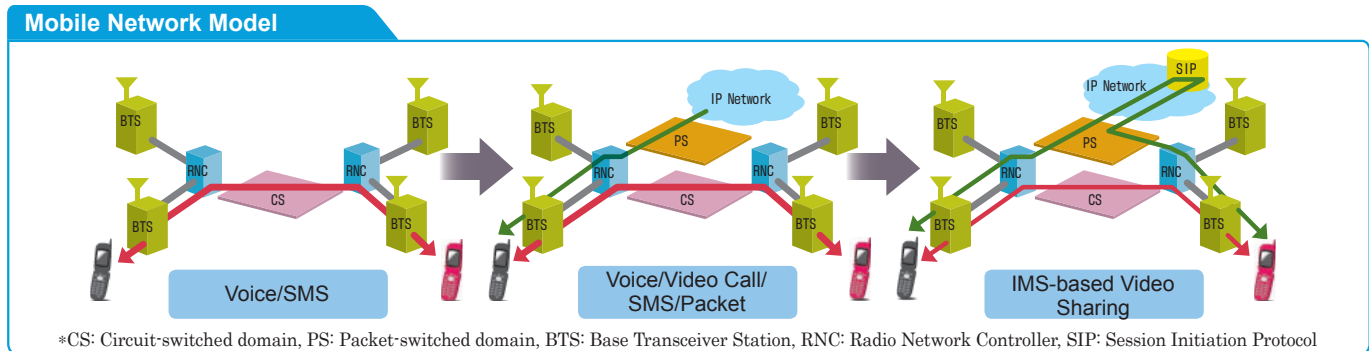## Couple-UE Network Simulator
for W-CDMA/HSDPA/HSUPA, GSM/GPRS/EGPRS

MD8470A
Signalling Tester

Faster Mobile Services Require More Load Testing

Mobile communication systems are expanding from the first voice and SMS services using circuit switching (CS) to packet switching (PS) services such as Web browsing, email, MMS. Additionally, 3G and 3.5G mobile terminals are now offering video calling plus video streaming and full Web browsers using high-speed packet communications over these networks. Now, more advanced services called Video Sharing based on the IP Multimedia Subsystem (IMS), combining CS and PS networks, have launched. In the future, we expect to see mobile terminals evolve from a communications tool into multimedia terminals.

Mobile Network Model

*CS: Circuit-switched domain, PS: Packet-switched domain, BTS: Base Transceiver Station, RNC: Radio Network Controller, SIP: Session Initiation Protocol

Highly developed mobile terminals are becoming increasingly faster as services becoming richer content. As a result, more customers need to perform more pre-verification and load tests. In particular, the test environment for services combining CS and PS is becoming more complex. Efficient fault reproduction and troubleshooting requires operation verification between in-service terminals, which means reproducing the same environment as a live network to verify operation between two terminals.

Mobile Terminal Tests and Issues

The following test environments support the listed tests between two mobile terminals.

Test Environments	Test Lists	Issues
a Live Network	• Various call processing tests • Various user interface tests and running applications communications tests • Model benchmarking at voice and video call • Incoming voice call during Web browsing • Incoming messaging during voice call • Incoming video call during video streaming • Incoming messaging during Web browsing and voice call (multi-call) • Operation tests and benchmarking of new services such as Video Sharing, etc.	• It is difficult to create a stable test environment and to reproduce faults reliably. • Network parameters cannot be set freely. • If there are many faults, the amount of pre-verification work is increased. • In addition, testing is not possible when there is no network service.
b Test Network		• Test locations are restricted. • Additionally, it is difficult to set up a test system for complex services like MMS combining both packet communications and SMS Centre.
c Network Simulator		• Mobile terminal end-to-end testing requires two expensive simulators. • Additionally, it is difficult to create scripts for testing high-level services, such as some service interruption tests and Video Sharing.

MD8470A Solutions

### a Provides a stable test environment with high reproducibility

The CNS simulates interactive base-station operations by performing automated responses to call origination and disconnection requests for voice, video calling, SMS, packet communication and multi-calls combining CS and PS bearers from the mobile terminal side plus call setup and termination. As a consequence, it offers a stable test environment with high reproducibility and allows users to conduct tests easily, like subscribers' mobile operations. Furthermore, fault troubleshooting is easier because tested wireless protocol logs are saved.

b Supports global mobile communication systems in a small-footprint platform

All common mobile technologies including GSM/GPRS/EGPRS, and W-CDMA/HSDPA/HSUPA are supported along with a benchtop test environment for unavailable communication bearers and services at home. Additionally, installing an application server in the built-in PC allows easy configuration of an MMS test environment when used in combination with the standard-installed SMS Centre, while elimination of an external PC saves expensive desktop space in costly R&D environments.

c Supports various end-to-end tests using two mobile terminals

Using the multislot configuration to install two signalling units supports simultaneous connection of two mobile terminals to one MD8470A, saving installation space and equipment costs. Furthermore, setup work is greatly simplified because network parameters for both terminals can be set using a single GUI. In addition to supporting voice, video calling, packet communications, SMS, and MMS end-to-end tests, service interruption tests which are a common source of software bugs are performed easily using a simple GUI without need for complex test scripts.
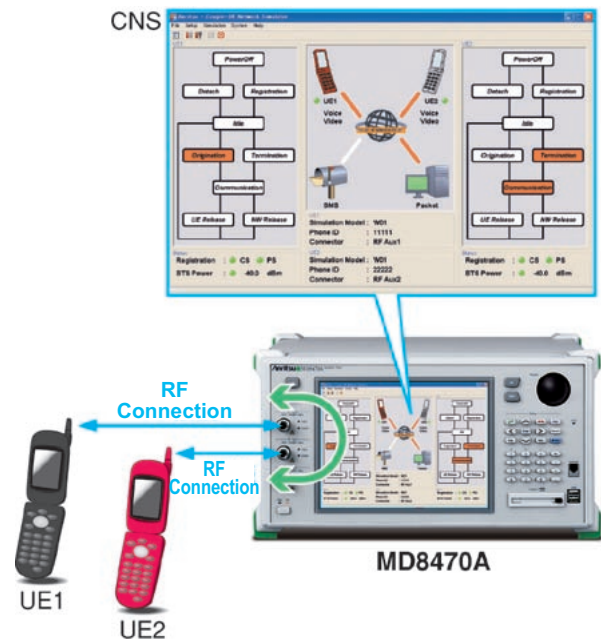
Video Sharing Test (IMS Application)

For added value, the CNS supports configuration of a video sharing test environment for IMS applications. Using the multicall function (Voice: CS + Packet: PS) in combination with a SIP server supports video sharing (packet communications) tests during voice calls for testing leading-edge applications.
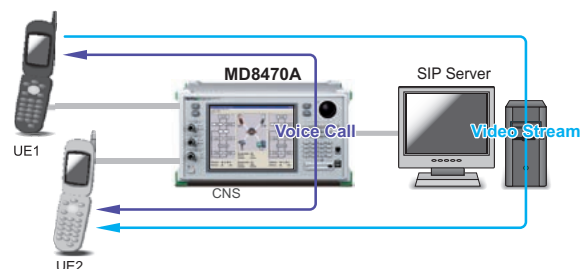
Service Competition Test Examples

■ W-CDMA/HSDPA/HSUPA UE ⇔ W-CDMA/HSDPA/HSUPA UE

Interruption / Status	Voice Call Interruption	Video Call Interruption	SMS Interruption	MMS Interruption
During End-to-End Voice Call			√	√
During Packet Communication*1	√	√	√	√
During End-to-End Video Call			√	√

■ GSM/GPRS/EGPRS UE ⇔ GSM/GPRS/EGPRS UE

Interruption / Status	Voice Call Interruption	SMS Interruption	MMS Interruption
During End-to-End Voice Call		√	√
During Packet Communication*2	√*3	√*3	√*3

√: Testable

*1: Requires HSDPA Software option (MX847010A-11) for HSDPA and HSUPA Software option (MX847010A-12) for HSUPA

*2: Requires EGPRS Software option (MX847010A-01) for EGPRS

*3: Only when packet data not transmitted

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