Product Introduction

Anritsu

MF6900A

Fading Simulator

MF6900A Fading Simulator Product Introduction

Ver. 3.00

Anritsu Corporation

Contents

Product Overview

- **What is MF6900A?**
  - **The MF6900A is a fading simulator with high maintainability supporting high reproducibility when connected to an Anritsu base station simulator (MD8430A or MD8480C) using the dedicated digital interface**
    - **Supports all Propagation for LTE UE performance test (3GPP TS36.521 Chapter 8)**
    - **One unit can be expanded up to 4 ports supporting LTE 2x2 MIMO 2-cell and 4x2 MIMO tests. Supports easy system tests with excellent cost performance**
    - **Easy fading setting with MD8430A/MD8480C test cases**
    - **Maintenance free with very low MTBF**

Product Overview

- **Installation examples**
  - **Genuine fading simulator installed in ME7873L LTE RF Conformance Test System supporting industry-first 80% of GCF-certified test cases*1**
  - **Used for evaluating throughput performance under fading condition at operator terminal acceptance tests**

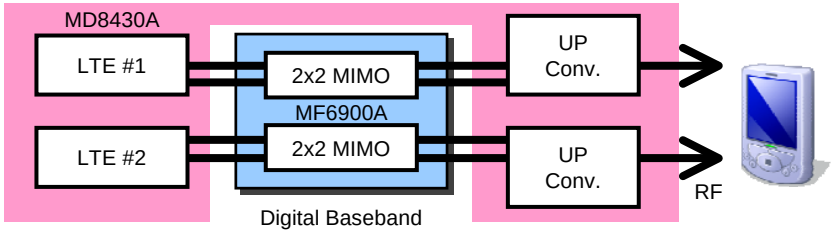
*1: For Band 1 and 13

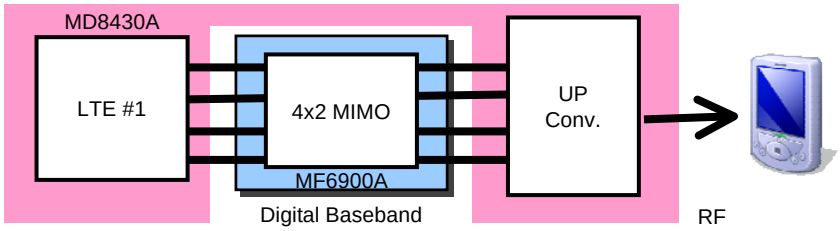
Key Features

- Supports all fading propagation conditions (includes CQI and HST) required for LTE UE RF conformance tests
  - 3GPP TS36.521 Chapter 8 Performance Test
    - Multi-path fading propagation conditions
    - Delay profiles
      - EPA, EVA, ETU
    - Multi-antenna channel model
      - 1x2 SIMO, 2x1 MISO, 2x2 & 4x2 MIMO
  - GCF RF Conformance Test Work Item 080

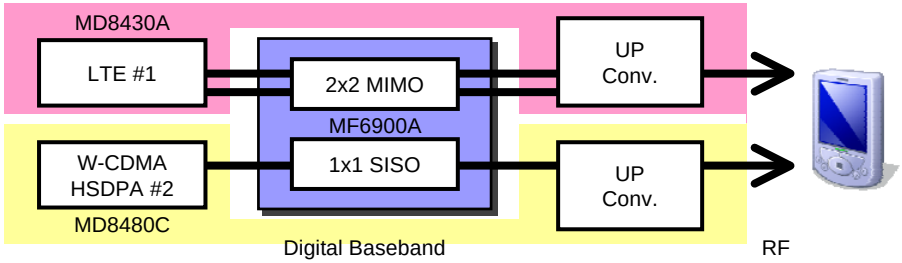
Key Features

- Expandable up to four LVDS input/output interface ports
  - One unit supports LTE 2x2 MIMO handover between two cells and 4x2 MIMO tests



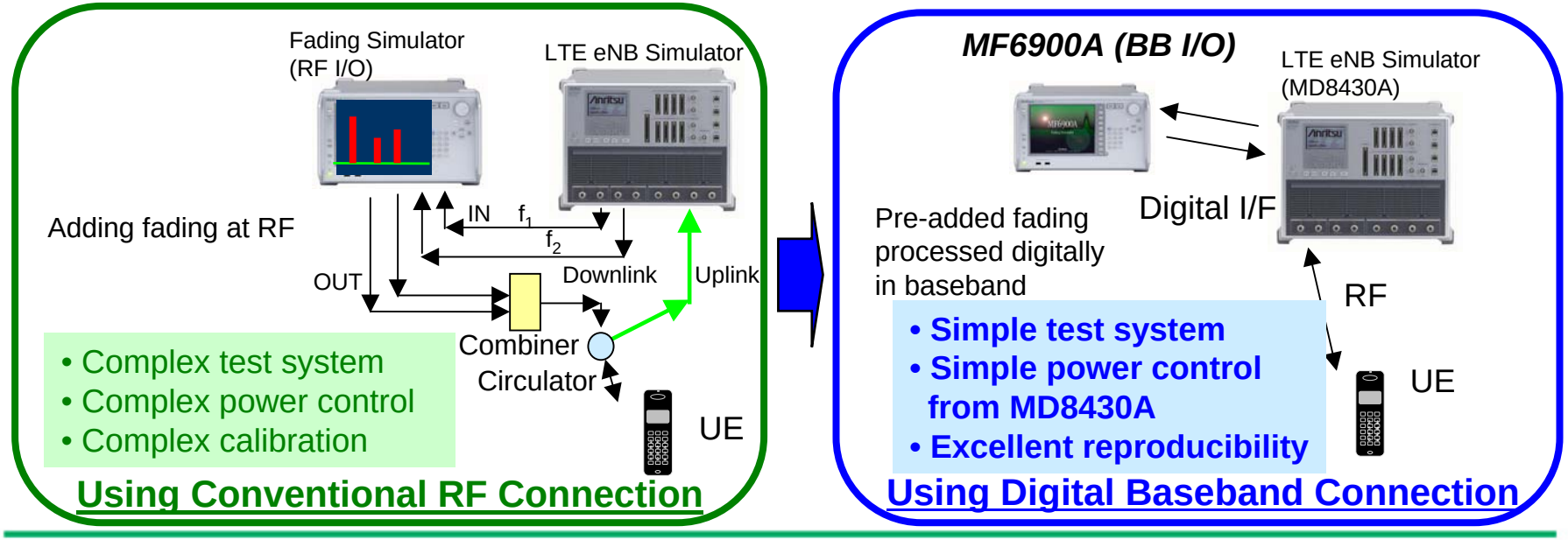


  - Supports LTE 2x2 MIMO ←→WCDMA/HSDPA handover



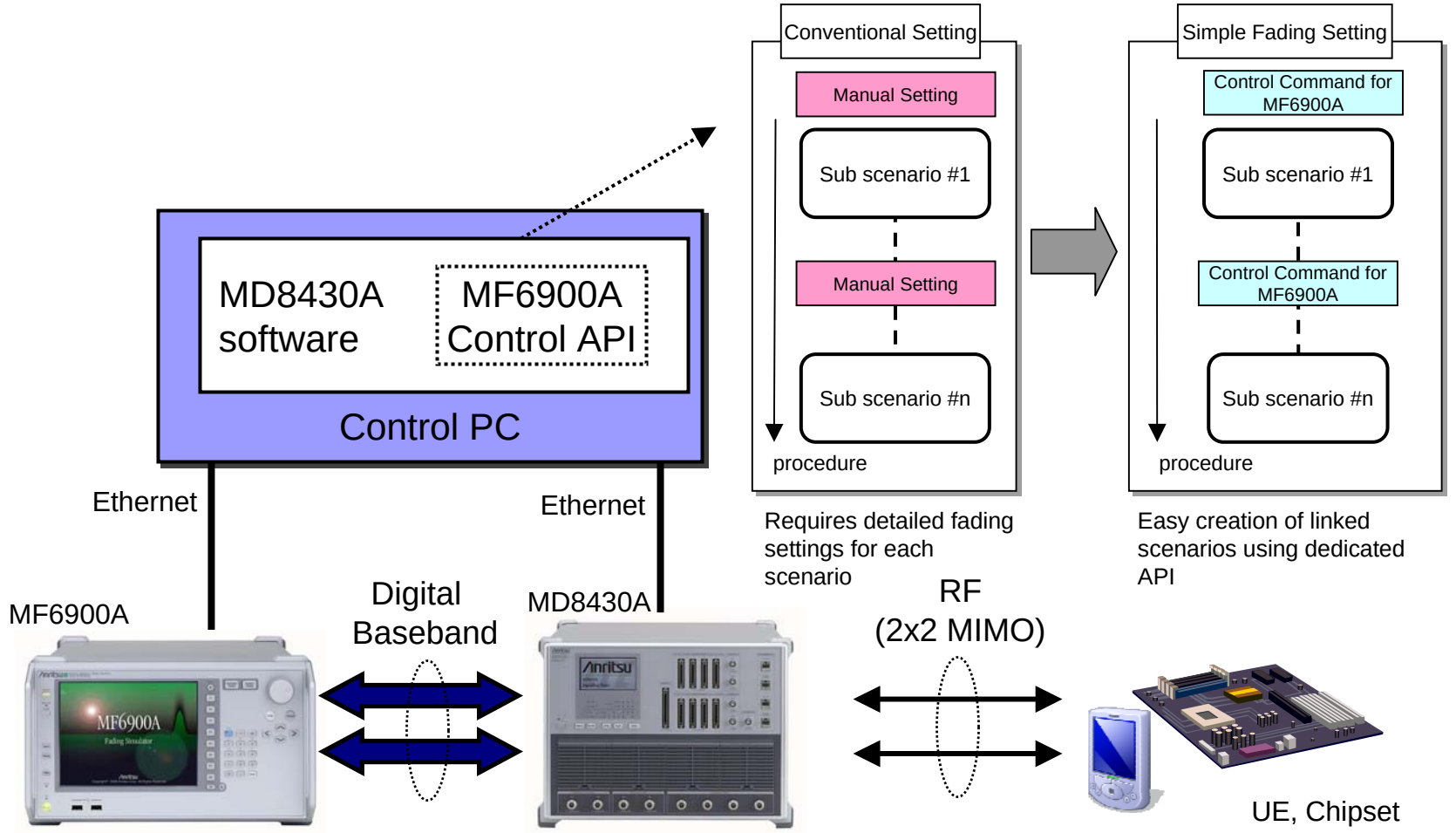
Key Features

- **Simple fading test system**
  - **Simple connection with digital I/F cable eliminates RF combiner, circulator and complex cabling**
  - **Fast easy operation because no need for calibration with power meter**



Key Features

- **Easy fading profile setting using test scenarios**



Applications (1/4)

- **LTE Data Throughput**

Supports DL 2x2 MIMO 2-cell and 4x2 MIMO

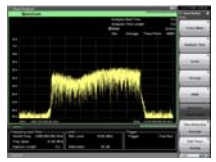
Performance Test in Fading Environment

50 Mbps max.

100 Mbps max.

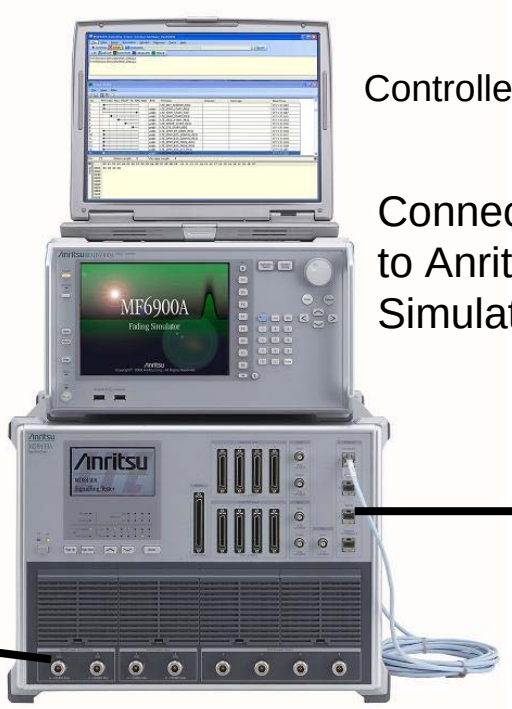
Fading Performance Test

Throughput Test



LTE UE

Fading Signal



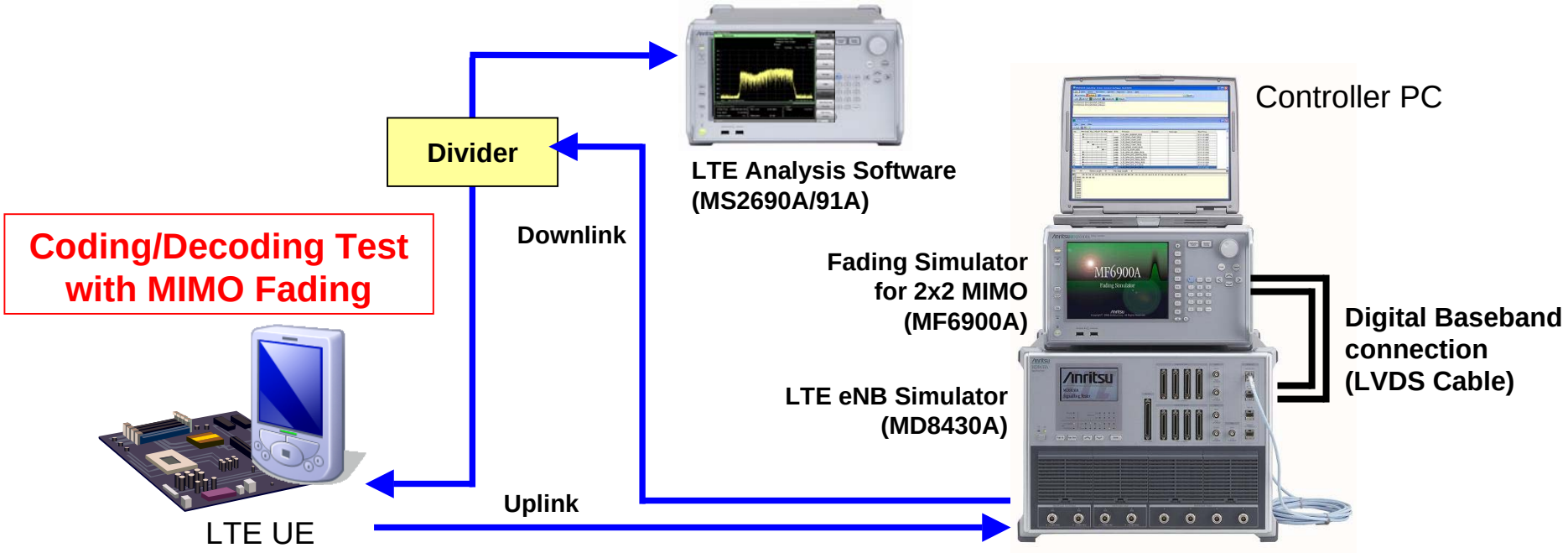
Controller PC

Connect MF6900A to Anritsu LTE eNB Simulator (MD8430A)

Application Server or FTP/UDP Server

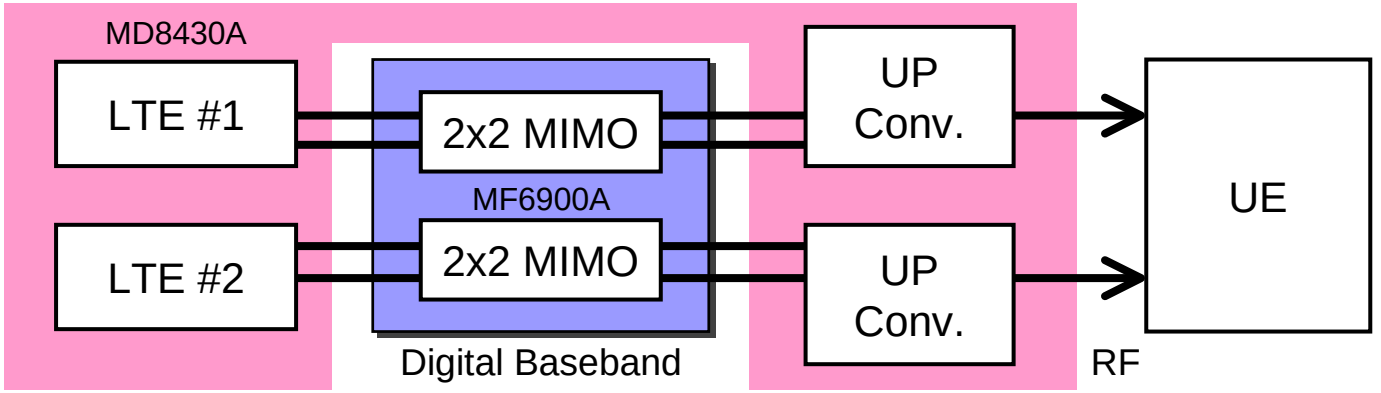
Applications (2/4)

- LTE MIMO Coding and Decoding Test
  - Digital baseband interface connection with MD8430A supports coding and decoding tests with high reproducibility in fading condition



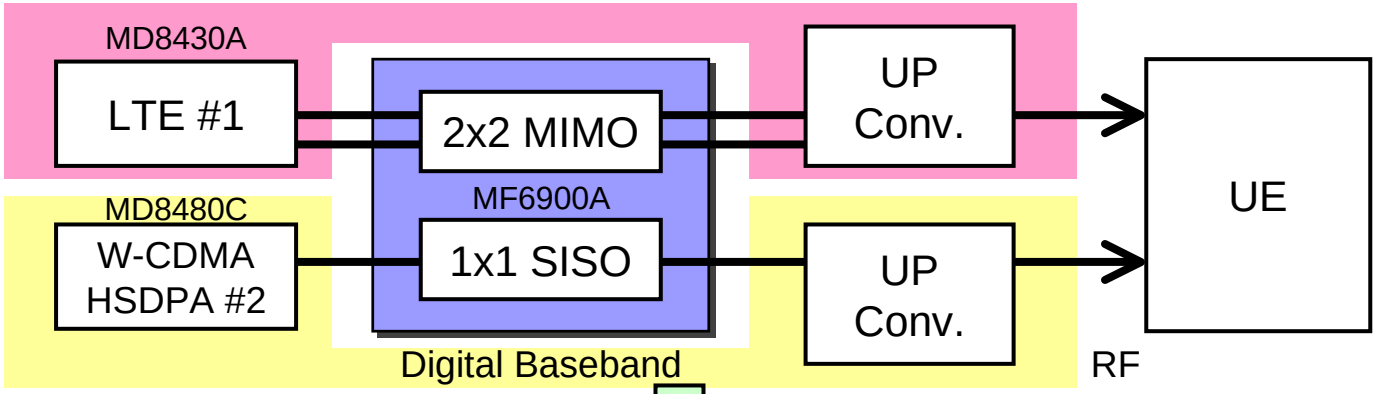
Applications (3/4)

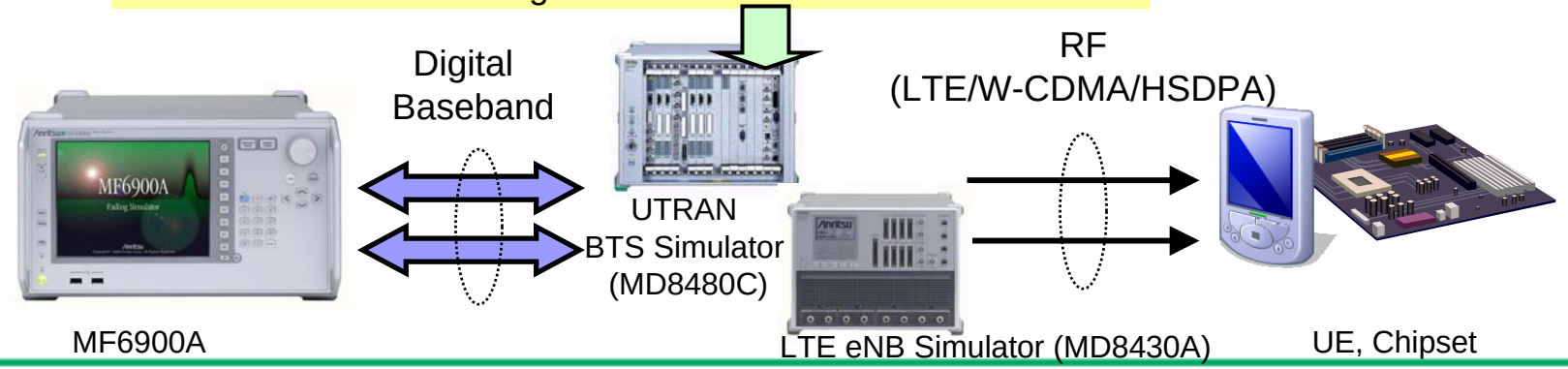
- **LTE MIMO Handover Test**
  - **One MF6900A supports handover tests between LTE 2x2 MIMO cells and 4x2 MIMO**



Applications (4/4)

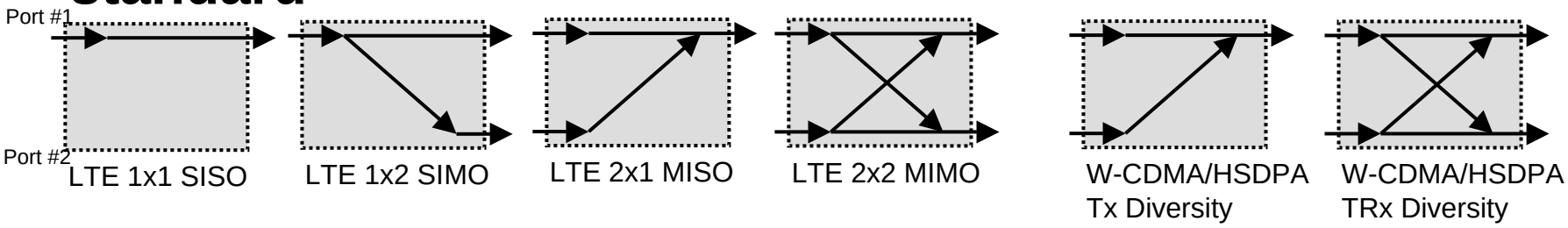
- LTE 2x2 MIMO ←→ WCDMA Inter-RAT handover test
  - One MF6900A supports LTE to UTRAN Inter-RAT handover tests when used with MD8430A and MD8480C



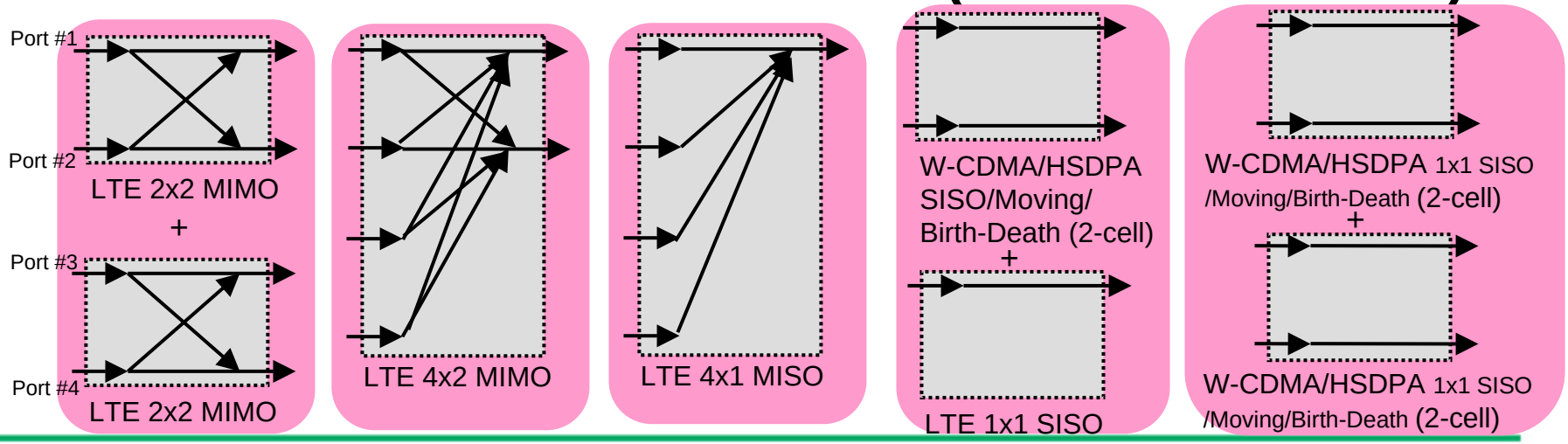


Multi-antenna Channel Model

- **Supports following channel models using 2 ports as standard**



- **One unit expandable to 4 ports supporting LTE 2x2 MIMO 2-cell and 4x2 MIMO tests (with MF6900A-001)**



Fading Profile

- **Pre-installed fading profiles:**

SISO	Case1, Case2, Case3, Case4, Case5, Case6, Case 8, VA3, VA30, VA120, PA3, PB3 [3GPP TS25.101 V8.9.0 (2009-12), TS34.121-1 V8.9.0 (2009-12)]
	EPA, EVA, ETU [3GPP TS36.101 V8.8.0 (2009-12)]
2x2 MIMO/1x2 SIMO *1	EPA, EVA, ETU [3GPP TS36.101 V8.8.0 (2009-12)]
4x2 MIMO/4x1 MISO *2	EPA, EVA, ETU [3GPP TS36.101 V8.8.0 (2009-12)]
1x2 CQI/1x1 CQI *3	Fading conditions for CQI tests [3GPP TS36.101 V8.8.0 (2009-12)]
2x2 HST/1x2 HST/ 1x1 HST *4	HST [3GPP TS25.101 V8.9.0 (2009-12), TS34.121-1 V8.9.0 (2009-12)] [3GPP TS36.101 V8.8.0 (2009-12)]
Moving *5	Moving propagation conditions [3GPP TS25.101 V8.9.0 (2009-12)]
Birth-Death *5	Birth-Death propagation conditions [3GPP TS25.101 V8.9.0 (2009-12)]
Tx/TRx Diversity *5	Case1, Case2, Case3, Case4, Case5, Case6, Case 8, VA3, VA30, VA120, PA3, PB3 [3GPP TS25.101 V8.8.0 (2009-12) , TS34.121-1 V8.9.0 (2009-12)]

*1: Requires MX690010A 2x2 MIMO option. *2: Requires MX690010A 2x2 MIMO and MX690010A-001 4x2 MIMO.
*3: Required MX690011A Propagation for CQI test. *4: Requires MX690030A High Speed Train
*5: Required MX690020A WCDMA Extended model

Product Configuration

- **Options**

Main	MF6900A Fading Simulator	LTE / W-CDMA / HSDPA / User define (1x1 SISO)
Hardware Option	MF6900A-001 Additional LVDS Interface (MF6900A-101 Additional LVDS Interaface Retrofit)	Maximum number of BTS connection (LTE): Expandable to 2 Maximum number of BTS connection (W-CDMA): Expandable to 4
Software Option	MX690010A 2x2 MIMO	LTE (2x2 MIMO, 1x2 SIMO, 2x1 MISO)
	MX690010A-001 4x2 MIMO	LTE (4x2 MIMO, 4x1 MISO)
	MX690011A Propagation for CQI test	LTE/W-CDMA/HSDPA (1x2 CQI, 1x1 CQI)
	MX690020A WCDMA Extended Model	W-CDMA/HSDPA (Tx/TRx Diversity, Moving, Birth-Death)
	MX690030A High Speed Train	LTE/W-CDMA/HSDPA (2x2 HST, 1x2 HST, 1x1 HST)

Product Configuration

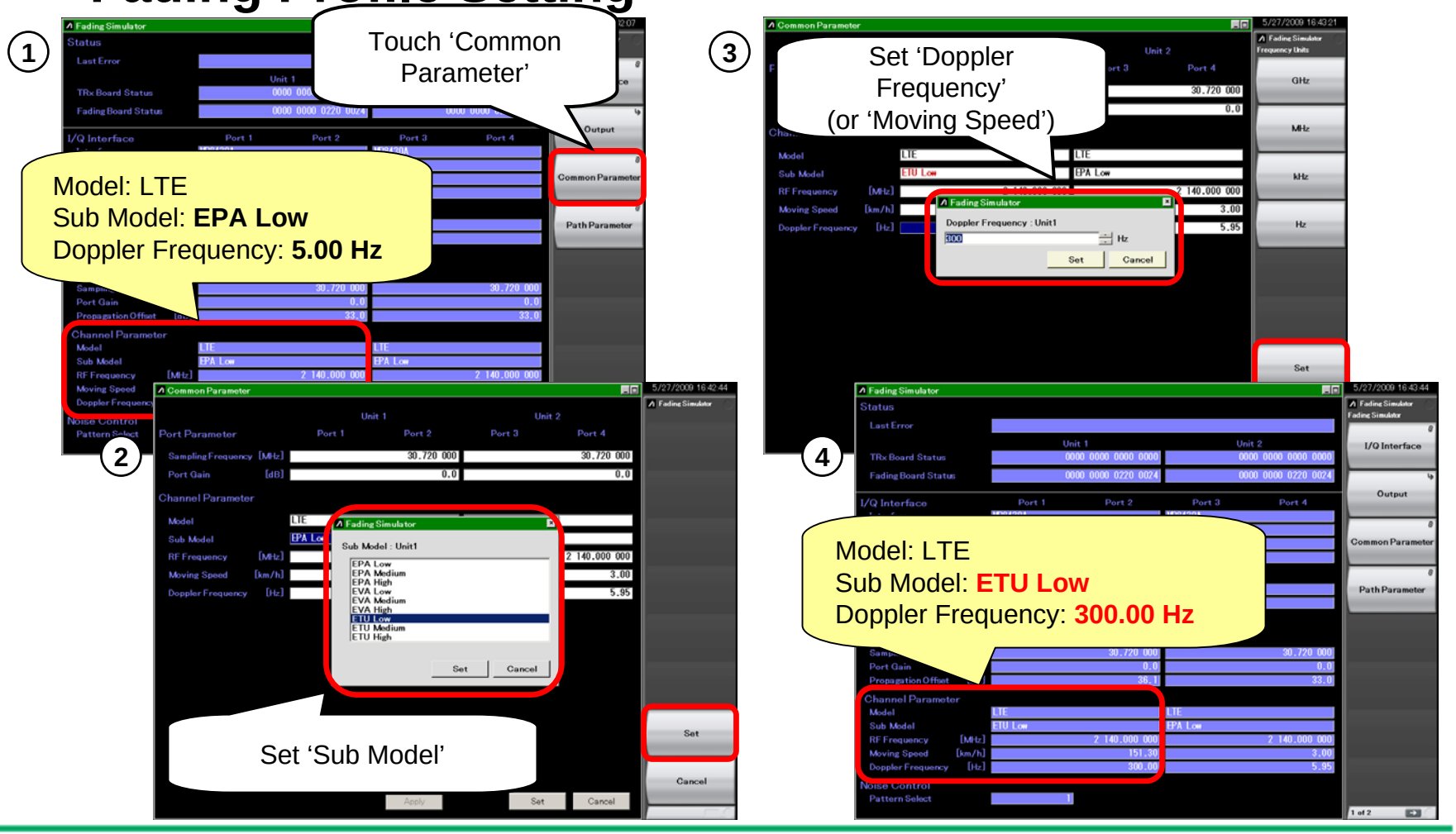
	MF6900A Minimum configuration	MX690010A 2x2 MIMO	MX690011A Propagation for CQI	MX690020A WCDMA Extended Model	MX690030A High Speed Train	LTE Maximum number of BTS (MD8430A)		W-CDMA Maximum number of BTS (MD8480C)	
						-	MF6900A-001	-	MF6900A-001
SISO (Standard)	X	-	-	-	-	1	2	2	4
LTE 2x2 MIMO, 2x1 MISO, 1x2 SIMO	-	X	-	-	-	1	2	-	-
LTE 2x2 MIMO Handover *1	-	X	-	-	-	-	2	-	-
LTE 4x2 MIMO, 4x1 MISO *1*2	-	X	-	-	-	-	4	-	-
LTE/W-CDMA Inter-RAT *1	-	X	-	-	-	-	1	-	2
LTE Diversity (Tx/TRx)	-	X	-	-	-	1	2	-	-
LTE CQI (1x2 CQI, 1x1 CQI)	-	X	X	-	-	1	2	-	-
LTE HST (2x2 HST, 2x1 HST, 1x1 HST)	-	X	-	-	X	1	2	-	-
Birth-Death	-	-	-	X	-	1	2	2	4
Moving	-	-	-	X	-	1	2	2	4
W-CDMA Diversity (Tx/TRx)	-	-	-	X	-	-	-	1	2
W-CDMA HST (2x2 HST, 2x1 HST, 1x1 HST)	-	-	-	X	X	-	-	1	2
W-CDMA MBMS	X	-	-	-	-	-	-	2	4

*1: Requires Additional LVDS Interface option (MF6900A-001)

*2: Requires 4x2 MIMO option (MX690010A-001)

Screens

- **Fading Profile Setting**



Screens

- **Path Parameter Edit**

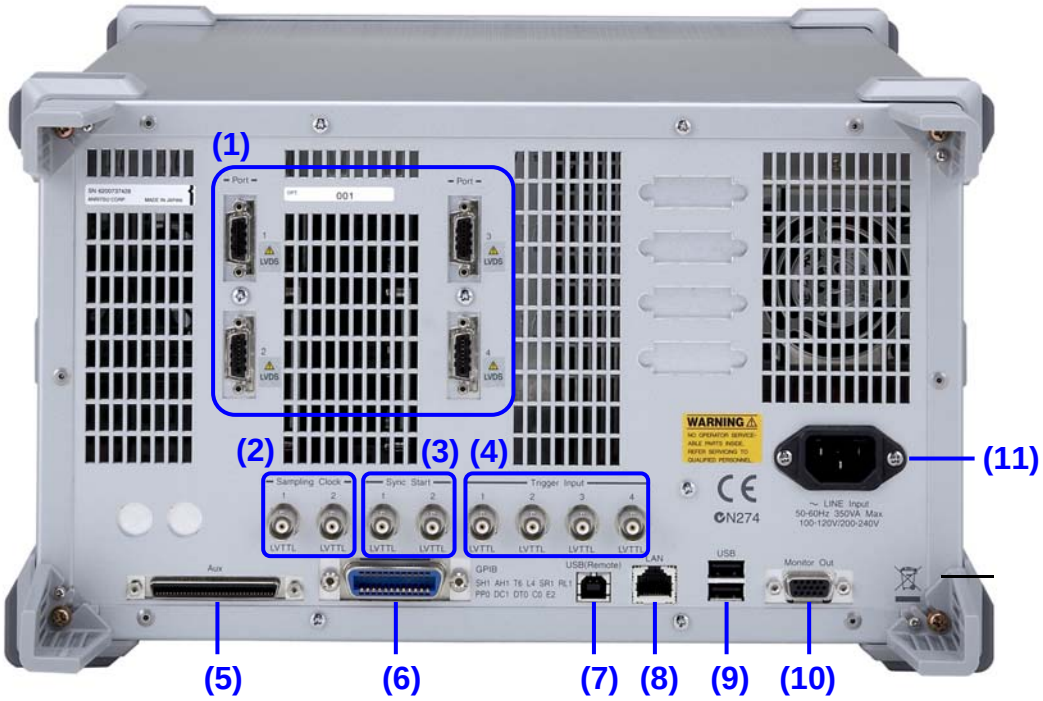
Common Parameters

Delay Profile Information

Edit/Save Defined Path Parameters

Interfaces

- **Back Panel**



(1) Ports 1, 2, 3, 4 (LVDS)
For connections using MD8480C BTS board LVDS connector or MD8430A Fading Simulator Interface LVDS connector accessory LVDS cable to input IQ signals. The standard configuration supports connection to two ports, but this can be expanded to four ports by adding the MF6900A-001 option.

(2) Sampling Clock
For connecting MD8480C Clock Output to input timing Clock. Sampling Clock1 and 2 can be selected for each port.

(3) Sync Start
For connecting Sync Output of MD8480C or MD8430A to input Data output trigger. Sync Start1 and 2 can be selected for each port.

(4) Trigger Input, (5) AUX
For future expanded functions

(6) GPIB
For connecting external controller over GPIB

(7) USB (Remote)
For connecting external controller over USB

(8) LAN
For connecting external controller PC or Ethernet network

(9) USB
For connecting USB flash memory, USB keyboard or USB mouse

(10) Monitor Out
For connecting external display

(11) AC Inlet
For connecting power cord

Main Specifications

Interface	Digital I/F (LVDS)
Channel Configuration	1x1 SISO (Standard), 2x2 MIMO/2x1 MISO/1x2 SIMO (with MX690010A installed), 4x2 MIMO/4x1 MISO (with MX690010A and MX690010A-001 installed), 1x2 CQI/1x1 CQI (with MX690011A installed), Moving, Birth-Death, Tx/TRx Diversity (with MX690020A installed), 2x2 HST/1x2 HST/1x1 HST (with MX690030A installed)
RF Frequency	Frequency Range: 100 to 6000 MHz, Resolution: 1 Hz (except 1x1 HST / 1x2 HST / 2x2 HST)
Sampling Frequency	10 to 80 MHz, Resolution: 1 Hz (except 1x1 HST / 1x2 HST / 2x2 HST)
Port Gain	- 50 dB to 0 dB, Resolution: 0.1 dB, Setting accuracy: 0.05 dB, each port can be set
Path	12 / channel
Path Delay	0 to 600 µs, Resolution: 0.1 ns, Setting Accuracy: 0.1 ns (compared to Delay 0)
Path Gain	- 50 dB to 0 dB, Resolution: 0.1 dB, Setting Accuracy: 0.05 dB, each port can be set
Doppler Frequency	0 or 0.1 Hz to 20 kHz, Resolution: 0.01 Hz
Moving Speed	0 to v_{max} km/h, Resolution: 0.01 km/h
Fading Type	Constant Phase, Pure Doppler, Rayleigh model, Rice model (Pure Doppler and Rice only set for 1 path per channel)
Phase Shift	When Constant Phase selected 0° to 359.9°, Resolution: 0.1°, Setting Accuracy: 0.1°
Rice K Factor	When Rice selected – 30 to 30 dB, Resolution: 0.1 dB
Angle of Arrival	When Pure Doppler and Rice model selected 0° to 359.9°, Resolution: 0.1°
Mass	≤15 kg (when MF6900A-001 installed)
Dimensions	340 (W) × 200 (H) × 448 (D) mm (excluding projections)
Remote Control	Ethernet, GPIB, USB
Power Supply Voltage	100 to 120 Vac, 200 to 240 Vac (–15%/+10% but 250 V max.), 50 to 60 Hz (±5%), ≤350 VA
Ambient Temperature	Operating: +5 to +45 °C, Storage: –20 to +60 °C
EMC	EN61326-1, EN61000-3-2
LVD	EN61010-1

Anritsu

Specifications are subject to change without notice.

Anritsu Corporation
5-1-1 Onna, Atsugi-shi, Kanagawa, 243-8555 Japan
Phone: +81-46-223-1111
Fax: +81-46-296-1238

● **U.S.A.**
Anritsu Company
1155 East Collins Blvd., Suite 100, Richardson,
TX 75081, U.S.A.
Toll Free: 1-800-267-4878
Phone: +1-972-644-1777
Fax: +1-972-671-1877

● **Canada**
Anritsu Electronics Ltd.
700 Silver Seven Road, Suite 120, Kanata,
Ontario K2V 1C3, Canada
Phone: +1-613-591-2003
Fax: +1-613-591-1006

● **Brazil**
Anritsu Eletrônica Ltda.
Praça Amadeu Amaral, 27 - 1 Andar
01327-010 - Bela Vista - São Paulo - SP - Brasil
Phone: +55-11-3283-2511
Fax: +55-11-3288-6940

● **Mexico**
Anritsu Company, S.A. de C.V.
Av. Ejército Nacional No. 579 Piso 9, Col. Granada
11520 México, D.F., México
Phone: +52-55-1101-2370
Fax: +52-55-5254-3147

● **U.K.**
Anritsu EMEA Ltd.
200 Capability Green, Luton, Bedfordshire, LU1 3LU, U.K.
Phone: +44-1582-433200
Fax: +44-1582-731303

● **France**
Anritsu S.A.
12 avenue du Québec, Bâtiment Iris 1- Silic 612,
91140 VILLEBON SUR YVETTE, France
Phone: +33-1-60-92-15-50
Fax: +33-1-64-46-10-65

● **Germany**
Anritsu GmbH
Nemetschek Haus, Konrad-Zuse-Platz 1
81829 München, Germany
Phone: +49-89-442308-0
Fax: +49-89-442308-55

● **Italy**
Anritsu S.r.l.
Via Elio Vittorini 129, 00144 Roma, Italy
Phone: +39-6-509-9711
Fax: +39-6-502-2425

● **Sweden**
Anritsu AB
Borgafjordsgatan 13, 164 40 KISTA, Sweden
Phone: +46-8-534-707-00
Fax: +46-8-534-707-30

● **Finland**
Anritsu AB
Teknobulevardi 3-5, FI-01530 VANTAA, Finland
Phone: +358-20-741-8100
Fax: +358-20-741-8111

● **Denmark**
Anritsu A/S (Service Assurance)
Anritsu AB (Test & Measurement)
Kirkebjerg Allé 90, DK-2605 Brøndby, Denmark
Phone: +45-7211-2200
Fax: +45-7211-2210

● **Russia**
Anritsu EMEA Ltd.
Representation Office in Russia
Tverskaya str. 16/2, bld. 1, 7th floor.
Russia, 125009, Moscow
Phone: +7-495-363-1694
Fax: +7-495-935-8962

● **United Arab Emirates**
Anritsu EMEA Ltd.
Dubai Liaison Office
P O Box 500413 - Dubai Internet City
Al Thuraya Building, Tower 1, Suit 701, 7th Floor
Dubai, United Arab Emirates
Phone: +971-4-3670352
Fax: +971-4-3688460

● **Singapore**
Anritsu Pte. Ltd.
60 Alexandra Terrace, #02-08, The Comtech (Lobby A)
Singapore 118502
Phone: +65-6282-2400
Fax: +65-6282-2533

● **India**
Anritsu Pte. Ltd.
India Branch Office
3rd Floor, Shri Lakshminarayan Niwas, #2726, 80 ft Road,
HAL 3rd Stage, Bangalore - 560 075, India
Phone: +91-80-4058-1300
Fax: +91-80-4058-1301

● **P.R. China (Hong Kong)**
Anritsu Company Ltd.
Units 4 & 5, 28th Floor, Greenfield Tower, Concordia Plaza,
No. 1 Science Museum Road, Tsim Sha Tsui East,
Kowloon, Hong Kong
Phone: +852-2301-4980
Fax: +852-2301-3545

● **P.R. China (Beijing)**
Anritsu Company Ltd.
Beijing Representative Office
Room 2008, Beijing Fortune Building,
No. 5, Dong-San-Huan Bei Road,
Chao-Yang District, Beijing 100004, P.R. China
Phone: +86-10-6590-9230
Fax: +86-10-6590-9235

● **Korea**
Anritsu Corporation, Ltd.
8F Hyunjuk Building, 832-41, Yeoksam Dong,
Kangnam-ku, Seoul, 135-080, Korea
Phone: +82-2-553-6603
Fax: +82-2-553-6604

● **Australia**
Anritsu Pty. Ltd.
Unit 21/270 Ferntree Gully Road, Notting Hill,
Victoria 3168, Australia
Phone: +61-3-9558-8177
Fax: +61-3-9558-8255

● **Taiwan**
Anritsu Company Inc.
7F, No. 316, Sec. 1, Neihu Rd., Taipei 114, Taiwan
Phone: +886-2-8751-1816
Fax: +886-2-8751-1817

1010

Please Contact:

Printed on Recycled Paper

No. MF6900A-E-L-1-(3.00) 公知 Printed in Japan 2010-11 PRS