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Anritsu

MD8480B

W-CDMA Signalling Tester



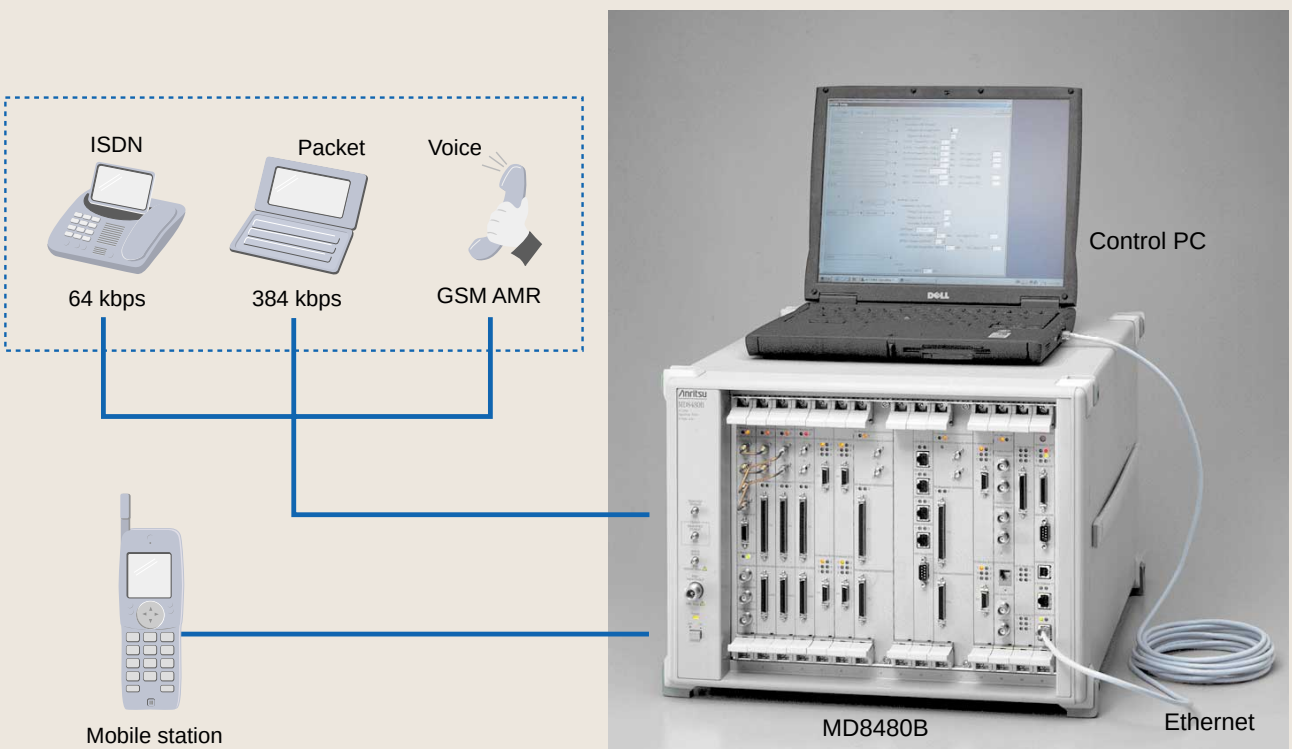


For the Development of W-CDMA · GSM/GPRS Mobile Stations

One Unit Supporting Development of 3G W-CDMA Mobile Stations

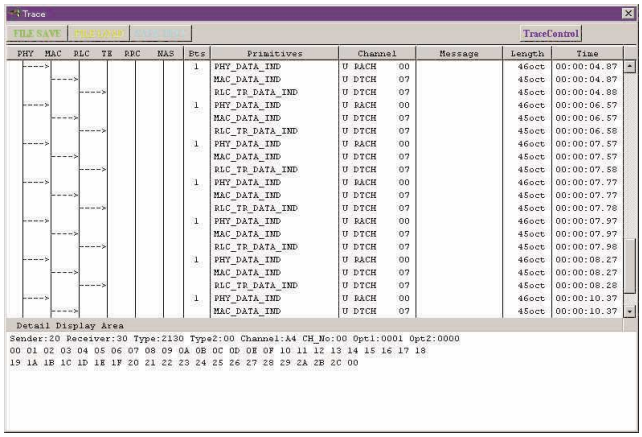
The MD8480B has a full lineup of advanced functions for testing third-generation W-CDMA mobile stations. Its air interface meets the 3GPP specifications and it can be used as a base station simulator. The test functions include mobile station modulation and demodulation processing, protocol sequence tests such as location registration, origination, termination, handover (option), disconnection from mobile station/network, various applications such as voice and packet communications as well as communications between two mobile stations (two sets of MD8480B are required).
Moreover, the addition of the function (option) of GSM/GPRS can perform the handover test between W-CDMA to GSM/GPRS.
In summary, the MD8480B is the ideal instrument for developing 3G W-CDMA mobile stations and application software.

- Modulation/demodulation tests for W-CDMA, GSM/GPRS mobile station
- Protocol sequence tests for W-CDMA, GSM/GPRS mobile station
- Flexible settings of test parameters and sequences for protocol sequences
- Voice and packet communications test, and communications testing between two mobile stations



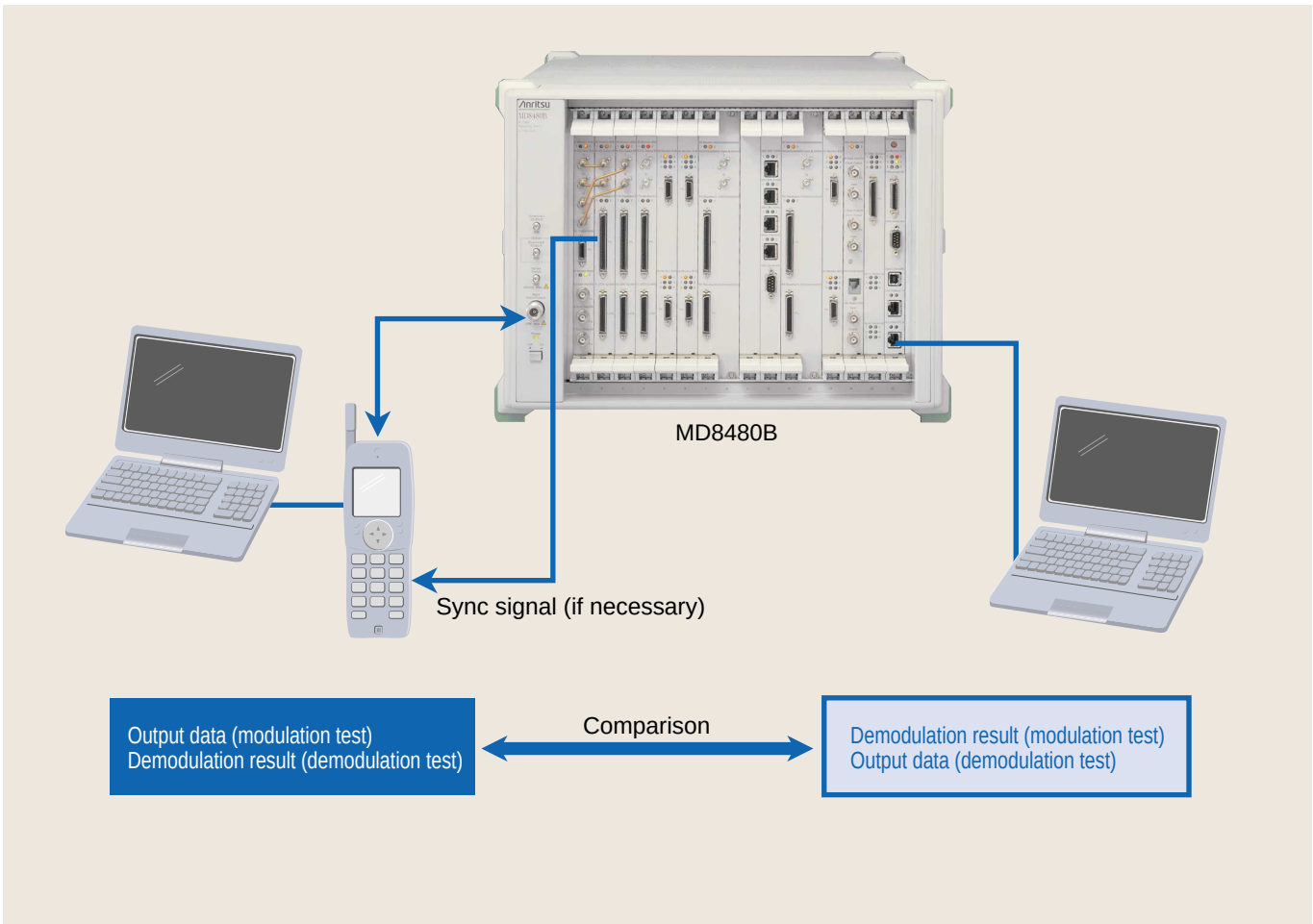
Modulation/Demodulation Function Tests

The setup in the following diagram is used to test the modulation and demodulation functions of W-CDMA mobile stations. In the modulation test, fixed-pattern or PN9 data is output from the mobile station modulation section and compared with the obtained demodulation result on the trace screen of the MD8480B. It is also possible to simultaneously measure BLER and BER (BER requires external BER counter). In addition, the received signal timing error can also be displayed.
In the demodulation test, fixed-pattern or PN9 data is output from the MD8480B and compared with the modulation signal from the mobile station.



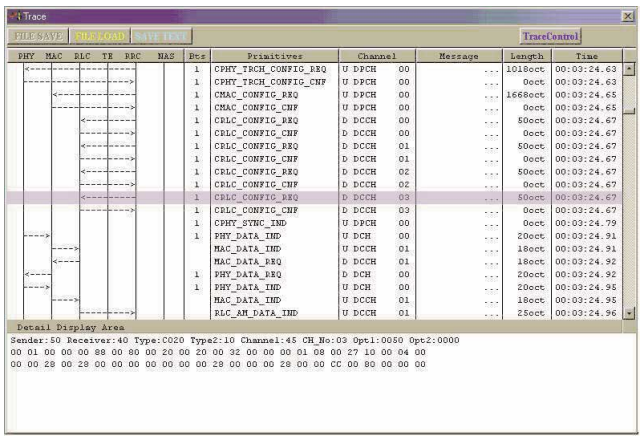
Trace screen receive results (modulation function test).

Modulation/demodulation function test configuration



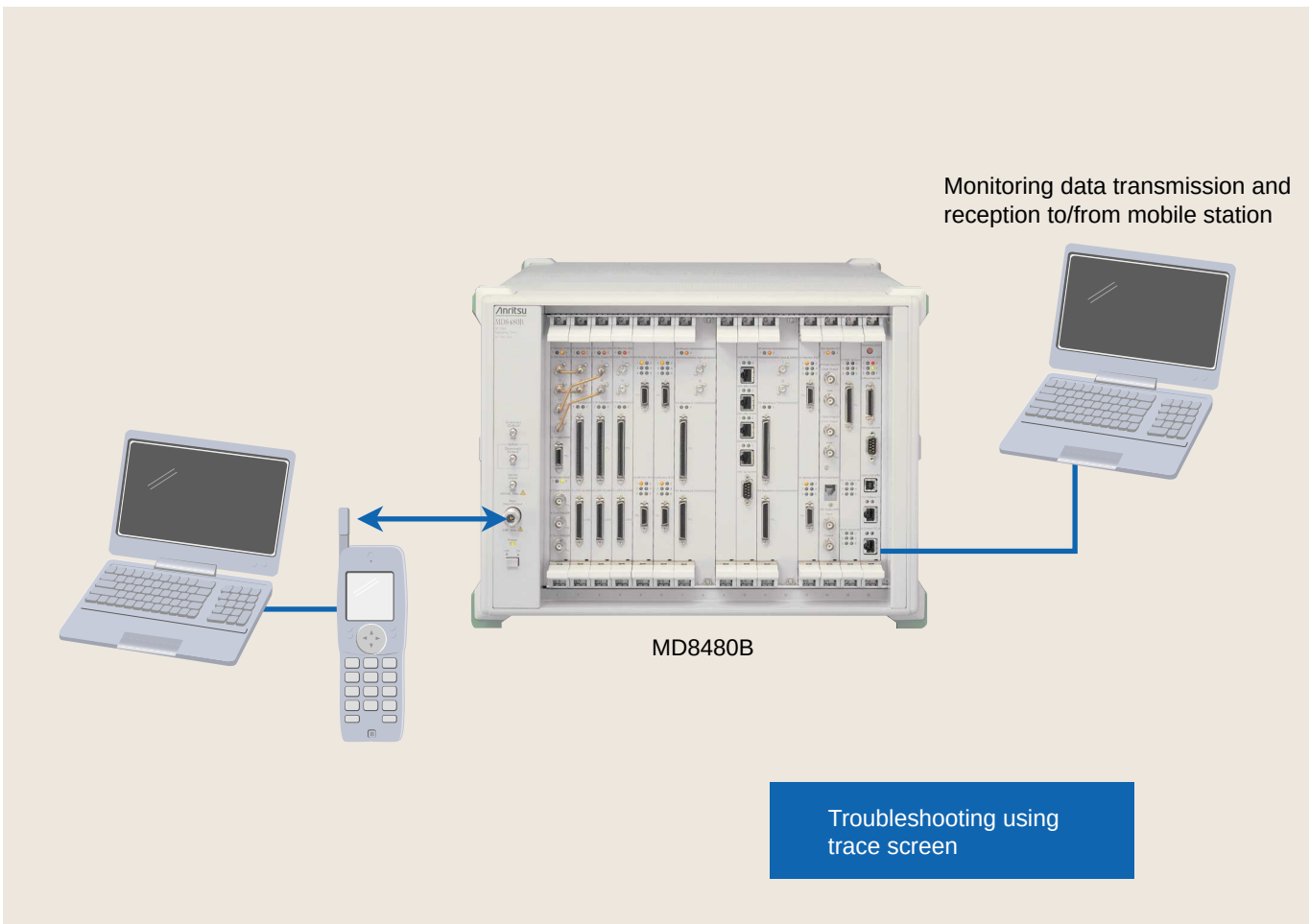
Protocol Sequence Test

The setup shown in the following diagram is used to test the protocol sequence of W-CDMA mobile stations. The test items include broadcast information transmission, location registration, mobile station origination/termination, disconnection from mobile station/network, and handover (option). In addition, any parameter and sequence can be defined and quasi-normal tests and SMS test are also supported. Furthermore, data communications between the mobile station and MD8480B can be monitored simultaneously. These functions are ideal for efficient troubleshooting and testing the mobile station protocol sequence.



Monitoring example: data communication between mobile station and MD8480B (protocol sequence test)

Protocol sequence test



Application Tests

Voice and Data Communication Test

The MD8480B supports a variety of application tests as outlined below:

• AMR Voice Test

A handset is connected to the MD8480B to perform a voice test between the mobile station and MD8480B.

• IP Packet Test

A PC with 10Base-T connection is connected to the MD8480B to test the IP protocol data communications.

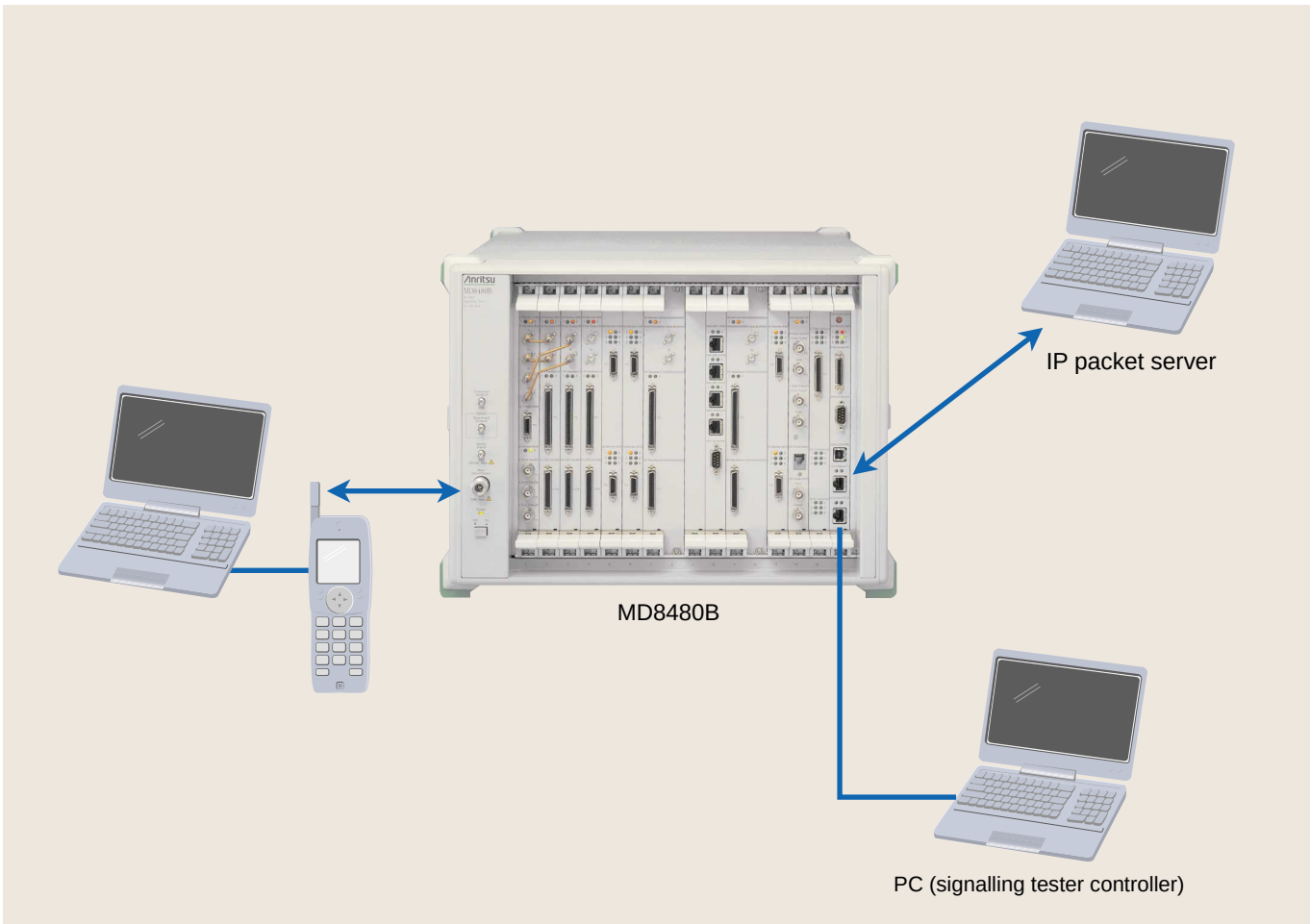
• PPP Packet Test (Option)

A PC with RS-232C is connected to the MD8480B to test the PPP protocol data communications. PPP is the internet dialup connection protocol.

• PPP Test (Built-in Server)

This is another PPP protocol test in which the PPP protocol stack is executed by the MD8480B that acts as the PPP terminal. The PC functions as the Ethernet medium and performs IP level communications. High-speed Ethernet communications at 384 kbps are supported.

IP packet test example



Application Tests

Two Mobile Stations Communications Test Example

• User Data Test

Any data can be inserted into the DTCH being transmitted and the demodulated DTCH data is output externally. This is an effective method for measuring error rate.

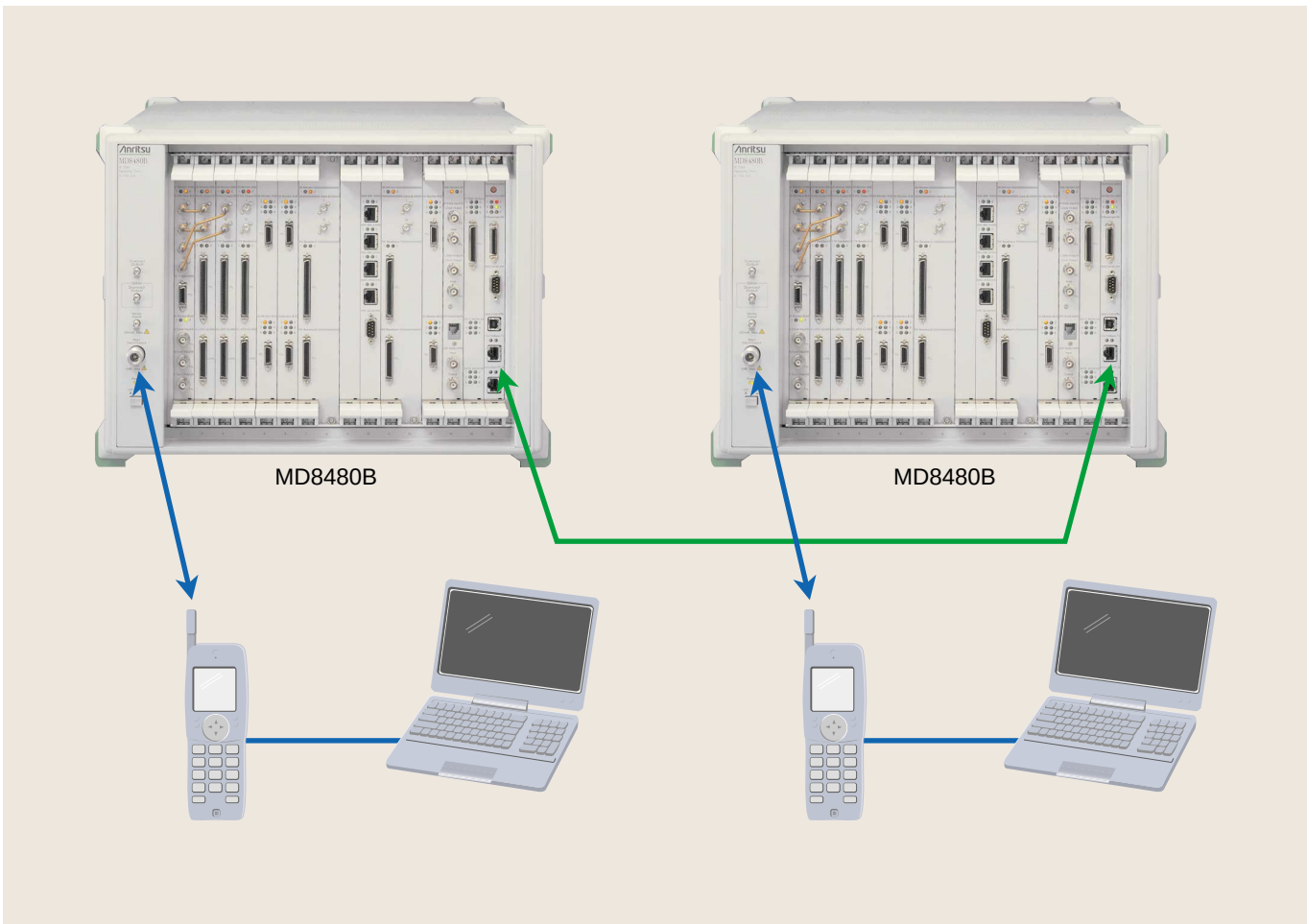
• ISDN Test (Option)

A videophone, etc., is connected to the MD8480B to test the video and audio communications between the mobile station and Terminal equipment.

• Communications between Two Mobile Stations Test

Two MD8480B are connected by a 10Base-T Ethernet connection to test communications between two mobile stations.

Two mobile stations communications test example



Functions

Demodulation test channels

Channel	Logical	Transport	Physical	Symbol rate
Common	BCCH	BCH	P-CCPCH	15 ksps
			P-SCH	
			S-SCH	
			(P-) CPICH	15 ksps
			(S-) CPICH	15 ksps
			PICH	15 ksps
			AICH	15 ksps
	PCCH	PCH	S-CCPCH	60, 120 ksps
	CCCH/DCCH/DTCH	FACH		
Dedicated			DPCCH	15, 30, 60, 120, 240, 480, 960 ksps
	DCCH + DTCH	DCH	DPDCH	15, 30, 60, 120, 240, 480, 960 ksps
	DCCH + DTCH		DPDCH	
	DCCH + DTCH		DPDCH	

Modulation test channels

Channel	Logical	Transport	Physical	Symbol rate
Common			PRACH (preamble)	
			PRACH (control)	
	CCCH/DCCH/DTCH	RACH	PRACH (message)	15, 30, 60, 120 ksps
Dedicated			DPCCH	15 ksps
	DCCH/DTCH	DCH	DPDCH	15, 30, 60, 120, 240, 480, 960 ksps

Supported service

Service		Data rate	Physical channel downlink (1 symbol = 2 bits)	Physical channel uplink (1 symbol = 1 bit)
(Protocol)	(Standalone DCCH)		1 x DPCH (15 ksps)	1 x DPDCH (15 ksps)
Voice (GSM-AMR)		12.2 kbps (VAD Option 01)	1 x DPCH (30 ksps)	1 x DPDCH (60 ksps)
ISDN 1B		64 kbps	1 x DPCH (120 ksps)	1 x DPDCH (240 ksps)
Packet		32 kbps	1 x DPCH (60 ksps)	1 x DPDCH (120 ksps)
		64 kbps	1 x DPCH (120 ksps)	1 x DPDCH (240 ksps)
		128 kbps	1 x DPCH (240 ksps)	Not currently supported
		384 kbps	3 x DPCH (240 ksps)	1 x DPDCH (960 ksps)
Audio and video		32 kbps	1 x DPCH (60 ksps)	1 x DPDCH (120 ksps)
		64 kbps	1 x DPCH (120 ksps)	1 x DPDCH (240 ksps)
Reference measurement channel		DCCH	1 x DPCH (15 ksps)	1 x DPDCH (15 ksps)
		12.2 kbps	1 x DPCH (30 ksps)	1 x DPDCH (60 ksps)
		64 kbps	1 x DPCH (120 ksps)	1 x DPDCH (240 ksps)
		144 kbps	1 x DPCH (240 ksps)	1 x DPDCH (480 ksps)
		384 kbps	1 x DPCH (480 ksps)	1 x DPDCH (960 ksps)
		BTFD	1 x DPCH (30 ksps)	1 x DPDCH (60 ksps)
Multicall	Voice + Packet	12.2 kbps + 32 kbps	1 x DPCH (120 ksps)	1 x DPDCH (240 ksps)
		12.2 kbps + 64 kbps	1 x DPCH (120 ksps)	Not currently supported
		12.2 kbps + 384 kbps	3 x DPCH (240 ksps)	1 x DPDCH (960 ksps)
	Voice + ISDN 1B	12.2 kbps + 64 kbps	1 x DPCH (120 ksps)	1 x DPDCH (240 ksps)

Specifications

General	Frequency range	W-CDMA Tx: 800 to 900 MHz (only after calibration*1), 2110 to 2170 MHz Rx: 800 to 900 MHz (only after calibration*1), 1920 to 1980 MHz Tx: 300 to 3000 MHz (only after calibration*2) Rx: 350 to 550 MHz, 700 to 1100 MHz, 1400 to 2200 MHz (only after calibration*2) GSM Tx: 300 to 3000 MHz, Rx: 350 to 550 MHz, 700 to 1100 MHz, 1400 to 2200 MHz
	I/O connector	Main N-type, Impedance: 50 Ω, VSWR: ≤1.3 Downlink 1 SMA-type, Impedance: 50 Ω, VSWR: ≤2.0 Downlink 2 SMA-type, Impedance: 50 Ω, VSWR: ≤2.0 Uplink SMA type, Impedance: 50 Ω, VSWR: ≤2.0
	Reference oscillator	Frequency: 10 MHz Startup characteristics: ≤5 x 10^{-8}/day (10 minutes after power-on, reference to 24 hours after power-on) Aging rate: ≤2 x 10^{-8}/day, ≤1 x 10^{-7}/year (reference to 24 hours after power-on) Temperature characteristics: ≤5 x 10^{-8} (0˚ to 50˚C, reference to 25˚C) External reference input: 10 MHz, 2 to 5 Vp-p
Transmitter (W-CDMA)	Frequency	Range: 800 to 900 MHz (only after calibration*1), 2110 to 2170 MHz, Step: 100 kHz Range: 300 to 3000 MHz (only after calibration*2), Step: 100 kHz
	Output level	Maximum output level Main: –25 dBm (each channel) Downlink: –10 dBm (each channel) Setting resolution: 0.1 dB Accuracy: ±1.5 dB
	Spreading	Codes: Scrambling, channelization, synchronization Chip rate: 3.84 MHz
	Modulation	Method: QPSK Modulation band limit: Root Nyquist filter (α = 0.22) EVM: ≤10% rms
	AWGN	Setting resolution: 0.1 dB
Receiver (W-CDMA)	Frequency	Range: 800 to 900 MHz (only after calibration*1), 1920 to 1980 MHz, Step: 100 kHz Range: 350 to 550 MHz, 700 to 1100 MHz, 1400 to 2200 MHz (only after calibration*2), Step: 100 kHz
	Input level	Range: –30 to +40 dBm (main), –50 to +20 dBm (uplink)
	Sync.	Rake receive: None, Capture range: ±200 chip (DPCCH), ±100 chip (PRACH preamble)
Transmitter (GSM)	Frequency	Range: 300 to 3000 MHz (200 kHz steps)
	Output level	Maximum output level Main: –15 dBm Downlink: 0 dBm Setting resolution: 0.1 dB Accuracy: ±1.5 dB
	Symbol rate	270.833 kHz
	Modulation	Method: GMSK, Phase error: ≤5.0˚ RMS
Receiver (GSM)	Frequency	Range: 350 to 550 MHz, 700 to 1100 MHz, 1400 to 2200 MHz (200 kHz steps)
	Input level	Range: –30 to +35 dBm (main), –50 to +15 dBm (uplink)
Power		100 to 120/200 to 240 Vac (250 V max.), automatic switching, 47.5 to 63 Hz, ≤430 VA
Ambient temperature		0˚ to +50˚C (operating), –40˚ to +70˚C (storage)
Dimensions and mass		426 (W) x 310 (H) x 500 (D) mm, ≤35 kg
EMC		EN61326: 1997/A2: 2001 (Class A) EN61000-3-2: 2000 (Class A) EN61326: 1997/A2: 2001 (Annex A)
LVD		EN61010-1: 2001 (Pollution Degree 2)

∗1: Only when the sticker of "W-CDMA 800 MHz Calibrated" is attached to the MD8480B main frame.
∗2: Only when the sticker of "W-CDMA 350-550 MHz 700-1100 MHz 1400-2200 MHz Calibrated" is attached to the MD8480B main frame.

Options

Hardware

• ISDN (MU848055A)

It is the option which makes the ISDN interface usable, and can respond to the data rate of a maximum of 6 B (384 kbps). Moreover, RS-232C interface with which this option is equipped is used, and a PPP packet test can be performed.

• Additional base station (MU848057A, MU848058A, MU848053A)

The standard composition of MD8480B has one transmission/reception function. By adding these options, it is possible to have the transmission function (an equivalent for three base stations) of a maximum of 3 base stations and two reception functions by one-set of MD8480B. The examination of soft handover is possible by this option (see the table of “Option functions” for details).

• Additional RF unit (MD8480A/B-02)

It is an option corresponding to two different frequency (transmission and reception). The hard handover (handover between two base stations of different frequencies) is attained combining the above-mentioned additional base station option.

• TDMA (MU848060B)

It is the option which makes the function of GSM/GPRS usable. As the GSM/GPRS functions, location registration, mobile station origination/termination, disconnection from mobile station/network and handover (intra-system) are possible. And various applications such as voice and data communications are supported. It combines with additional RF unit (MD8480A-01) and compressed mode (MX848001A-02, after-mentioned), and the examination of the hand-over between W-CDMA and GSM/GPRS is enabled.

Software

• Tx diversity (MX848001A-01)

As the option for corresponding to the function of Tx diversity, it corresponds to TSTD, STTD, the closed loop mode 1, and the closed loop mode 2. The MU848057A and MU848058A (two sets) become indispensable as an additional base station option.

• Compressed mode (MX848001A-02)

As the option corresponding to a compressed mode function, it corresponds to SF/2, Puncturing, and Higher Layer Scheduling.

• Router connection (MX848001A-03)

This option achieves data communications with a PC that has different subnet (segment) IP address. It is usable for data communications both W-CDMA and GPRS. Also, it is available for both IP and PPP packet tests.

• GSM CSD (MX848001A-04)

This option brings the CSD function of GSM. It supports PPP packet and the data rate is 9.6 kbps and 14.4 kbps. Also, it supports ‘asynchronous’ mode data transmission in the non-transparent mode.

• GSM frequency hopping (MX848001A-05)

As the option corresponding to GSM frequency hopping function, frequency hopping is realized in the GSM communication channel in 4.62 ms frame cycles. Also, an additional RF unit must be GSM frequency hopping compliant for the use of this option (see the table of "Option functions" for details).

• W-CDMA CSD (MX848001A-06)

This option supports the CSD function of W-CDMA. The addition of CSD dedicated layers (L2RCOP, RLP) allows for testing of asynchronous and non-transparent modes at the rate of 14.4k/28.8k/57.6kbps.

• W-CDMA Ciphering (MX848041A)

As the option which adds the function of authentication and ciphering, it corresponds to KASUMI (authentication and ciphering algorithm of the standard in 3GPP).

• GSM/GPRS Ciphering (MX848045B)

This option supports the Ciphering function of GSM/GPRS, corresponding to the Ciphering Algorithm of A5/1 and A5/2 in GSM, and GEA/2 in GPRS.

Options

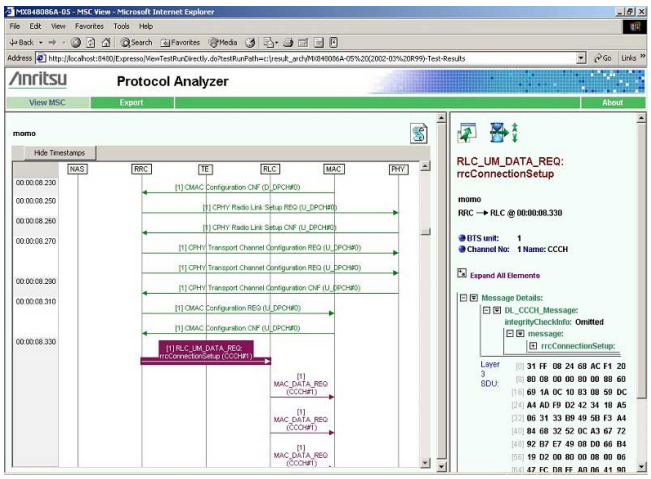
Software maintenance contract (MD8480A-20, MD8480A-21, MD8480B-20, MD8480B-21)

This contract covers minute modification of software functions associated with 3GPP revisions. Also, it gives supports for the help of troubles caused in user side. The MD8480A-20 is a software maintenance contract for MD8480A, the MD8480A-21 is for ciphering authentication (MX848041A) of MD8480A, the MD8480B-20 is for MD8480B and the MD8480B-21 is for ciphering authentication (MX848041A) of MD8480B (Refer to the corresponding materials for details of the contract.).

Application software

• Protocol analyzer (MX848086A)

The execution result containing RRC and a NAS message obtained by MD8480B is decoded automatically. And it is displayed as a message sequence chart. It is possible for other PCs to check the execution result by exporting it to the data of HTML format.



Option functions

Additional functions	MU848057A	MU848058A	MU848055A	MU848053A	MU848060B	MD8480A/B-02	MX848001A-01	MX848001A-02	MX848001A-03	MX848001A-04	MX848001A-05	MX848001A-06	MX848041A	MX848045B	MD8480A/B-20/21
2SB soft handover	√	√													
3SB soft handover	√	√*1													
ISDN			√												
Tx diversity (1RF output)	√	√*1					√								
Tx diversity (2RF output)	√	√*1				√	√								
Hard handover	√	√		√		√		√							
Inter-system (GSM/GPRS) handover					√	√		√							
Router connection (W-CDMA)									√						√
Router connection (GPRS)					√	√			√						√
W-CDMA CSD			√									√			√
GSM CSD			√		√	√				√					√
GSM frequency hopping					√	√*2					√				√
Ciphering (W-CDMA)													√*3		
Ciphering (GSM/GPRS)					√	√								√*3	√

*1: Requires two equipment sets
*2: MD8480A/B-02 is an additional RF unit that supports GSM frequency hopping. Also, when MD8480A-01 Additional RF Unit have been already mounted in main frame, "Z0730 Additional RF Unit for frequency hopping" offers upgrade to an additional RF unit that supports GSM frequency hopping.
*3: When using with the MX848001A-01, MX848001A-02, MX848001A-03, MX848001A-04, MX848001A-05 or MX848001A-06 requires the MX848041A-01, MX848041A-02, MX848041A-03, MX848041A-04, MX848041A-05 or MX848041A-06.

The options are all shared functions.
• Requires MD8480B + MU848057A + MU848058A + MU848058A for 3BS soft handover function.
This configuration also supports 2BS soft handover function.
• Requires MD8480B + MU848057A + MU848058A + MU848058A + MD8480A/B-02 + MX848001A-01 for Tx diversity (2RF output).
This configuration also supports the 2BS soft handover function, 3BS soft handover function and Tx diversity (1RF output) function.

Ordering Information

Please specify model/order number, name and quantity when ordering.

Model/Order No.	Name		Remarks
	Main frame		
MD8480B	W-CDMA Signalling Tester		
	Units (incorporated in the main frame)		
MU848051A	CPU		
MU848052A	Frame Decoder		
MU848053A	Rx Baseband		
MU848056A	Voice Codec		
MU848057A	Frame Coder		
MU848058A	Tx Baseband		
MU848059B	Timing Generator 2		
	Standard accessories		
MX848000A	W-CDMA Signalling Tester Control software:	1 pc	CD-ROM
MX848001A	W-CDMA Signalling Tester Firmware:	1 pc	CD-ROM
MX848002A	W-CDMA Signalling Tester FPGA:	1 pc	CD-ROM
MX848003A	W-CDMA Signalling Tester ISDN/PPP:	1 pc	CD-ROM
MX848005B	GSM/GPRS:	1 pc	CD-ROM
J0892	Twist pair cable, 5 m:	1 pc	53102 cross
G0091	Monitor board:	2 pcs	
J1005	Monitor cable, 80-pin:	1 pc	
J1006	Monitor cable, 20/50-pin:	1 pc	
	Power cord, 2.6 m:	1 pc	
J0127A	Coaxial cord (BNC-P · RG58A/U · BNC-P), 1 m:	1 pc	
J0576B	Coaxial cord (N-P · 5D-2W · N-P), 1 m:	1 pc	
J1010	U-link:	2 pcs	
J0654A	Serial interface cable:	1 pc	For connecting IBM-PC/AT, cross
F0014	Fuse, 6.3 A:	2 pcs	
W1964AE	MD8480B operation manual:	1 copy	CD-ROM
A0010	Blank board:	1 to 6 pcs	At option uninstalled
A0011	Bridge board:	1 to 2 pcs	At option uninstalled
	Option units		
MU848053A	Rx Baseband		Hardware
MU848055A	ISDN		Hardware
MU848057A	Frame Coder		Hardware
MU848058A	Tx Baseband		Hardware
MU848060B	TDMA		Hardware
MD8480A-02	Additional RF unit		Hardware, for MD8480A
MD8480B-02	Additional RF unit		Hardware, for MD8480B
MX848001A-01	W-CDMA signalling tester Tx diversity		Software (license document)
MX848001A-02	W-CDMA signalling tester compressed mode		Software (license document)
MX848001A-03	W-CDMA signalling tester router connection		Software (license document)
MX848001A-04	W-CDMA signalling tester GSM CSD		Software (license document)
MX848001A-05	W-CDMA signalling tester GSM frequency hopping		Software (license document)
MX848001A-06	W-CDMA signalling tester W-CDMA CSD		Software (license document)
MX848041A	W-CDMA Signalling Tester Ciphering		Software (CD-ROM, license document)
MX848045B	GSM/GPRS Ciphering		Software (CD-ROM, license document)
MX848041A-01	Tx diversity for ciphering		Software (license document)
MX848041A-02	Compressed mode for ciphering		Software (license document)
MX848041A-03	Router Connection for ciphering		Software (license document)
MX848041A-04	GSM CSD for ciphering		Software (license document)
MX848041A-05	GSM frequency hopping for ciphering		Software (license document)
MX848041A-06	W-CDMA CSD for ciphering		Software (license document)
MD8480A-20	MD8480A support service		Software maintenance contract (CD-ROM, license document)
MD8480A-21	Support service for ciphering		Software maintenance contract (CD-ROM, license document)
MD8480B-20	MD8480B support service		Software maintenance contract (CD-ROM, license document)
MD8480B-21	Support service for ciphering		Software maintenance contract (CD-ROM, license document)
MD8480B-90	Extended three year warranty service		
MD8480B-91	Extended five year warranty service		
Z0730	Additional RF unit for frequency hopping		GSM frequency hopping compliant of MD8480A-01
P0019	TEST USIM001		For W-CDMA
P0027	W-CDMA/GSM TEST USIM		For W-CDMA/GSM (The authentication key is different from that of P0019.)
	Application softwares		
MX848086A	3GPP Protocol Analyzer		
MX848086A-09	3GPP R99 March 03 support		

MD8480B requires PC*1 and Microsoft Visual C++ Version 6.0*2 or .NET.

*1 PC is for controlling the MD8480B. The following is the required spec;
OS: Windows 95/98/2000, Windows NT4.0 Workstation
CPU: 400 MHz or better with minimum of 64 MB of memory, 10Base-T and RS-232C interfaces (D-Sub 9-pin), and CD-ROM drive

*2 Microsoft Visual C++ Version 6.0 or .NET is a registered trademark of Microsoft Corporation in USA and other countries.
Microsoft Visual C++ Version 6.0 or .NET is standard edition available.

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Specifications are subject to change without notice.

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