Product Brochure

Anritsu

MD8480C

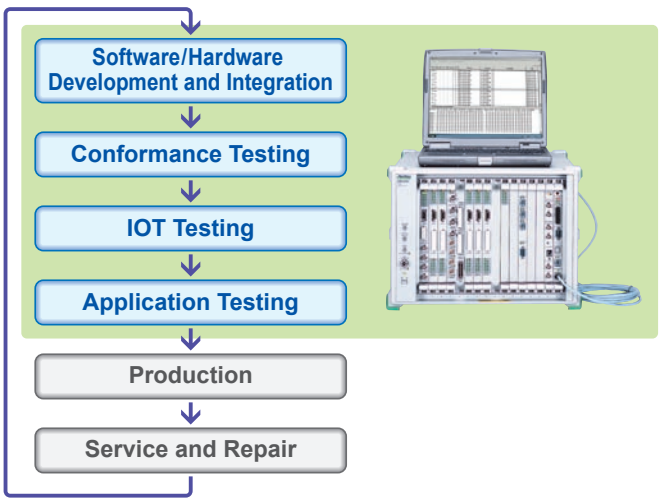
W-CDMA Signalling Tester

All-in-One Solution for W-CDMA/HSPA and GSM/GPRS/EGPRS Chipset and UE Development

The current worldwide proliferation of 3G mobile services is promoting increasingly high-speed data packet access in the mobile communications environment. W-CDMA-based systems are starting to use HSPA*1 to achieve high data transfer speeds while GSM-based systems are using EGPRS*2. Demand for high-speed data services by mobile users worldwide is driving development of mobile terminals (UE) that can secure optimum data throughput under any conditions.
The MD8480C W-CDMA Signalling Tester is a base station simulator with ideal protocol development and test functions for developing 3.5G W-CDMA UE supporting HSPA. It has an air interface conforming to 3GPP specifications as standard and supports a full range of applications and protocol tests, coding/decoding processing, protocol sequence testing (registration, origination, termination, handover), voice and data communications testing (circuit switch, packet switch), and UE end-to-end testing*3 for chipsets and UE.
Moreover, adding options for GSM/GPRS/EGPRS base stations supports Inter-RAT handover tests between W-CDMA/HSPA and GSM/GPRS/EGPRS systems. The MD8480C is the ideal instrument for developing increasingly popular UMTS UE and high-performance chipsets and UE for HSPA/EGPRS*4.

*1: High Speed Packet Access
*2: Enhanced GPRS
*3: Requires two MD8480C units
*4: Handover Testing between W-CDMA/HSPA and GSM/EGPRS at Voice/Data Communications

Major Role in Development Cycle

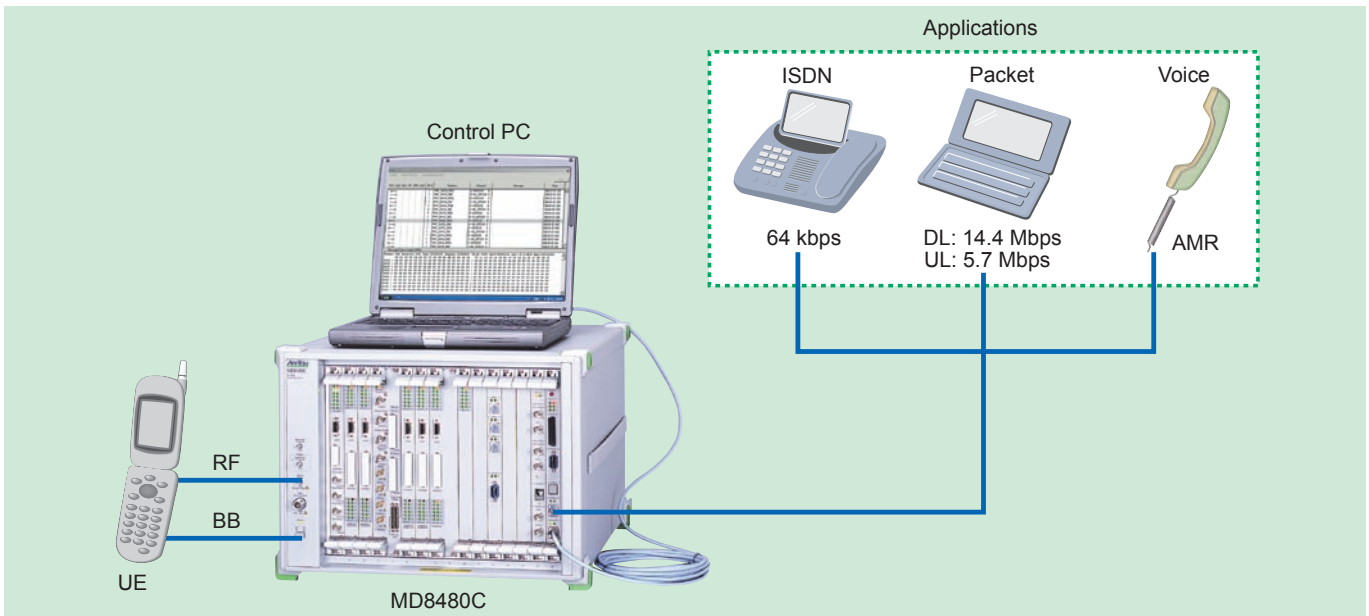


Features

- **Supports 3GPP Release 7 (HSPA Evolution and HSPA)**
- **Full HSDPA/HSUPA Support for All UE Categories**
- **Data Throughput Test (DL 14.4 Mbps/UL 5.7 Mbps)**
- **One Unit Supports Expanded Functions for 4 BTS max. (W-CDMA/HSPA)**
- **Optional GSM/GPRS/EGPRS 2BTS Functions**
- **Inter-RAT Handover Tests between HSPA and EGPRS**

Main Uses

- **3G/3.5G UE Protocol Sequence Tests**
- **Inter/Intra-RAT Handover UE Protocol Sequence Tests**
- **HSPA/EGPRS Packet Data Communications Tests**
- **Inter-RAT HO Packet Data Communications Tests (Ping, FTP, Browsing)**
- **3G/3.5G UE Coding/Decoding Function Tests (RF/BB)**
- **Applications Tests, including Voice and Packet**
- **Data Throughput Monitoring Test**



For Developing W-CDMA/HSPA Chipsets and UE

Features

- **Supports All UE Categories**
- **Genuine Maximum Throughput (DL: 14.4 Mbps/UL: 5.7 Mbps)**
- **Diversity Reception Testing using Four Base Stations**

Main Uses

- **W-CDMA/HSPA UE Protocol Sequence Tests**
- **HSDPA/HSUPA Packet Data Communications Tests (Ping, FTP, Browsing)**
- **High-speed Packet Data Throughput Measurement**
- **Other Function Tests for Voice, Packets, MS-to-MS**
- **W-CDMA-HSPA UE Coding/Decoding Tests (RF/Baseband)**

Main Test Functions

- W-CDMA/HSPA Handover Tests (SHO/HHO)
- Slow Clock and Fading Tests using DBB
- Log Analysis (each TTI parameter verification)
- Throughput Monitor Function
- UE Scheduling Function
  User-defined E-AGCH and E-RGCH
- H-ARQ Test Functions
  NACK and DTX Insertion for ACK

Basic Functions (W-CDMA)

- Downlink (DL) Signal Sending
- Uplink (UL) Signal Receive
- Basic Signalling (Call Processing)
- Inner-loop Power Control (TPC)
- BLER Measurement
- Soft/Hard Handover (Option)
- Tx Diversity (Option)
- Compressed Mode (Option)
- Ciphering (Option)
- Baseband Interface (Option)
- AWGN, OCNS Tests
- TE Connection Test
  (ISDN, AMR, User Data, IP, PPP, MS-to-MS)

Supported Services

- HSPA Evolution (Release 7, Option)*
- HSDPA/HSUPA (Option)
- W-CDMA CBS
- W-CDMA CSD (Option)
- MBMS
- Multiple PDP Context
- IPv6

*: Also requires future options to enable the 64QAM for HSDPA, 16QAM for HSUPA, and 2x2 MIMO functionalities.

Supports All UE Categories

The MD8480C uses new hardware and signal processing technologies to achieve data transfer speeds that are 30 times faster than earlier Anritsu instruments. By using the HSDPA/HSUPA Base Station Function it supports HSDPA/HSUPA for all UE categories meeting the 3GPP TS25.306 (Release 6) recommendations.

• 3GPP TS.25.306 (Release 6) Category List

HSDPA

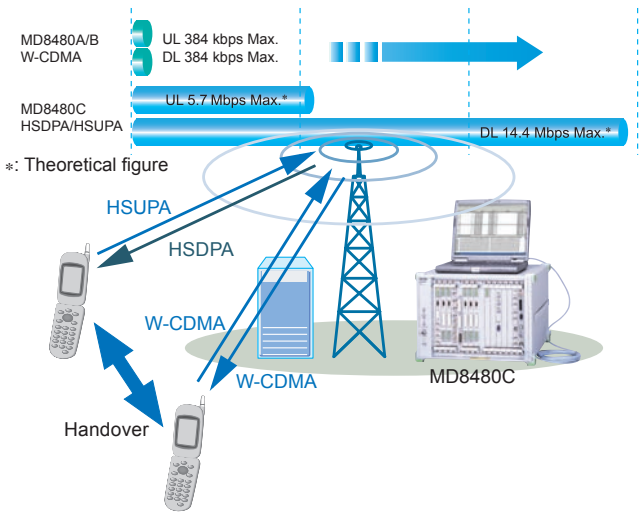
HS-DSCH Category	HS-DSCH Codes	Minimum Inter-TTI	TB-Sizes	Total Number of Soft Channel Bits	Modulation	Maximum Throughput [bps]
1	5	3	7298	19200	QPSK/16QAM	1216333
2	5	3	7298	28800	QPSK/16QAM	1216333
3	5	2	7298	28800	QPSK/16QAM	1824500
4	5	2	7298	38400	QPSK/16QAM	1824500
5	5	1	7298	57600	QPSK/16QAM	3649000
6	5	1	7298	67200	QPSK/16QAM	3649000
7	10	1	14411	115200	QPSK/16QAM	7205500
8	10	1	14411	134400	QPSK/16QAM	7205500
9	15	1	20251	172800	QPSK/16QAM	10125500
10	15	1	27952	172800	QPSK/16QAM	13976000
11	5	2	3630	14400	QPSK	907500
12	5	1	3630	28800	QPSK	1815000

HSUPA

E-DCH Category	E-DCH Codes	Minimum Spreading Factor	Support for 1 and 2 ms TTI EDCH	TB-Sides with 10 ms E-DCH TTI	TB-Sizes within 2 ms E-DCH TTI	Maximum Throughput [bps]
1	1	SF4	10 ms TTI only	7110	–	711000
2	2	SF4	10 ms and 2 ms TTI	14484	2798	1448400
						1399000
3	2	SF4	10 ms TTI only	14484	–	1448400
4	2	SF2	10 ms and 2 ms TTI	20000	5772	2000000
						2886000
5	2	SF2	10 ms TTI only	20000	–	2000000
6	4	SF2	10 ms and 2 ms TTI	20000	11484	2000000
						5742000

Max. Throughput (DL 14.4 Mbps/UL 5.7 Mbps)

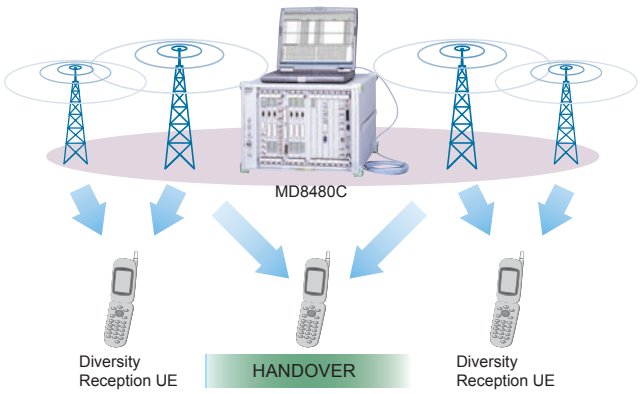
The MD8480C HSDPA/HSUPA function supports maximum throughput (DL 14.4 Mbps/UL 5.7 Mbps) even at interactive packet communications, making the tester ideal for developing chipsets for next-generation high-speed packet data services.



For Developing W-CDMA/HSPA Chipsets and UE

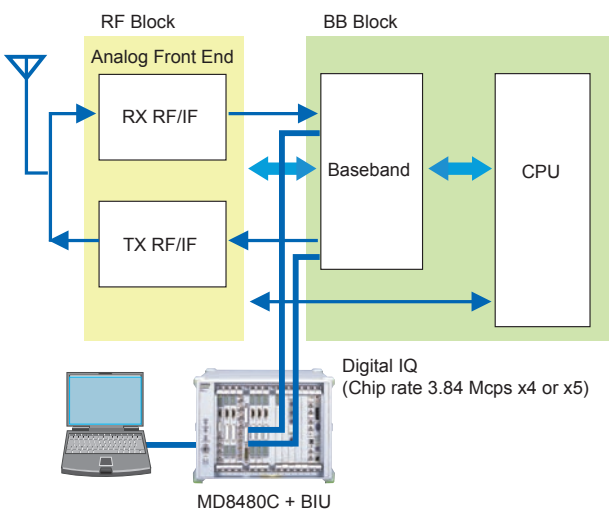
Diversity Reception Test Using Four Base Stations

To guarantee the best data throughput for mobile UE supporting HSPA, most models have built-in diversity reception functions. The expandability of the MD8480C supports UE throughput and handover tests for a maximum of four base station cells.
Adding the HSDPA Tx Diversity option allows a single MD8480C to simulate a diversity reception and handover test environment approaching a real UTRAN network. Previously, diversity reception and handover could only be tested in the field and this ability to realistically simulate these tests increases work efficiency.



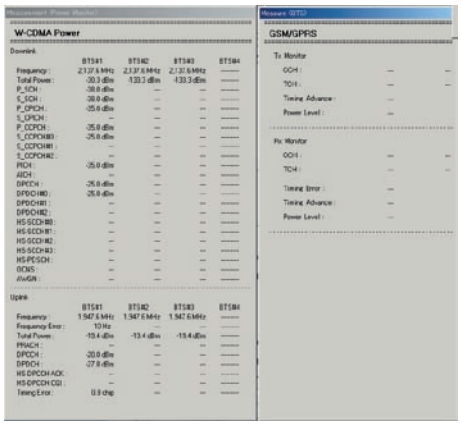
Slow Clock Tests Using DBB

The MD8480C has I/O interfaces for both digital baseband (DBB) and analog baseband (ABB) where the MU848077C Baseband Interface Unit (BIU) can be installed.
The BIU supports performance and function tests, including analog/digital IQ coding and decoding tests, plus baseband chip testing independent of the RF block performance.
Moreover, the BIU supports configuration of a coding and decoding test environment with high reproducibility at HSDPA/HSUPA required for function tests in a severe mobile environment, such as precision coding/decoding tests using Chip Rate x 4 or x 5 by slowing the clock rate.

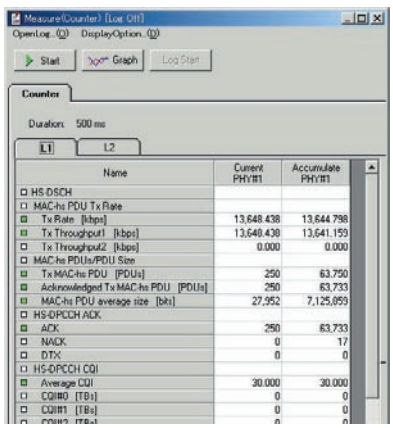


Log Analysis and Throughput Monitoring Functions

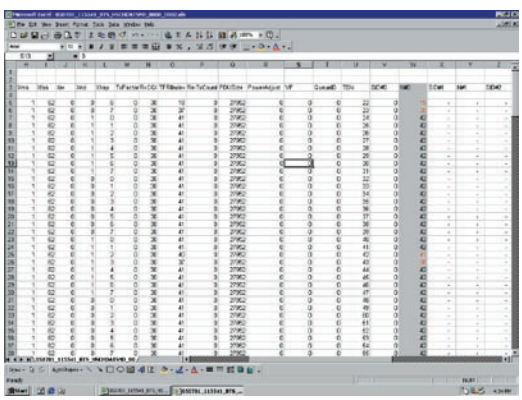
The MD8480C has a full line of log analysis and monitoring functions supporting development of HSPA UE that can process data instantaneously in the lower layers. For example, the built-in Measure Counter function monitors the Layer 1/ Layer 2 throughput in real time during testing, and the ACK, NACK, DTX, and CQI values are displayed too.
In addition, if an abnormality is discovered by testing, the built-in converter software can convert the saved log files for statistical analysis of the HSPA TTI parameters (ACK, NACK, DTX and CQI) every 2 ms using spreadsheet software.



Power Monitor



Measure (Counter) Screen



HSDPA Parameter Statistical Analysis

For Developing GSM/GPRS/EGPRS UE

Features

- **Supports all GSM bands**
- **Supports GSM to GSM handover**[*1]
- **Supports EGPRS**[*2]
- **Supports DTM (Dual Transfer Mode)**

*1: Requires two TDMA2 units (MU848060C)
*2: Supports 3GPP Rel. 99 (June 2001)

Main Test Functions

- **EGPRS Packet Data Communications Test**
- **DTM (CS ↔ CS + PS, PS ↔ CS + PS) Test**
- **GSM/W-CDMA Inter-RAT Handover Test**
- **EGPRS/HSPA Inter-RAT Handover Test**
- **GSM Intra-RAT Handover Test**
- **GSM DTM ↔ W-CDMA Multi Call Handover Test**

Basic Functions (GSM)

- Protocol Sequence Test (Basic Connection)
- Voice Communications Test (Handset Loopback)
- GPRS/EGPRS Packet Communications Test
- System Handover Test (GERAN ↔ UTRAN)
- Frequency Hopping (Option)
- GSM/GPRS Ciphering (Option)
- DTM (Dual Transfer Mode: Option)
- SMS (Short Message Service)
- SMSCB (SMS Cell Broadcast)

Supported Data

- Enhanced Full-Rate Speech (EFS)
- Full-Rate Speech (FS, Loopback)
- Half-Rate Speech (HS, Loopback)
- Adaptive Multiple Rate Speech (AMR)
- AMR-WB (Option)
- Packet (GPRS/EGPRS: Option)
- GSM CSD (57.6 kbps max.: Option)
- GPRS Multiple PDP context

Supports All GSM Bands

The MD8480C supports a new additional RF unit (MD8480C-03) to increase the frequency band and support the 8PSK reception modulation method required by EGPRS. The added bandwidth between 350 MHz and 2700 MHz will also support anticipated future bands.

Supported GSM Bands:
GSM450, GSM480, GSM850, GSM900, DCS1800, PCS1900

Supports GSM to GSM Handover Test

Adding two TDMA2 (MU848060C) units[*3] supports GSM to GSM handover tests.
Since one MD8480C unit can simulate handover between W-CDMA and GSM base stations or between GSM base stations, this greatly enhances the investment in the test environment.

*3: The MU848077C Baseband Interface Unit cannot be installed.

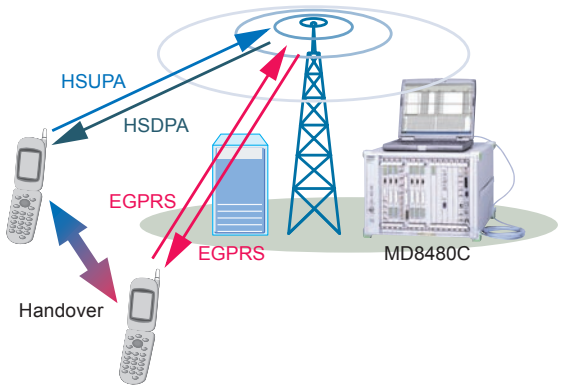
Supports EGPRS

More GSM service regions are using EGPRS services, which is an enhanced version of the GPRS packet, to offer faster packet data services. The MD8480C supports EGPRS packets by installing the TDMA2 (MU848060C) and EGPRS options (MU848060C-01) to perform data tests up to 230 kbps.

Main Specifications

- Supports 3GPP: Rel. 99 (June 2001)
- Supports MCS (Modulation & Coding Scheme): 1 to 9
- Supports MSC (Multislot Class): 1 to 12, 32 to 34
- ARQ Types: 1, 2
- Bit rate: 230 kbps max.

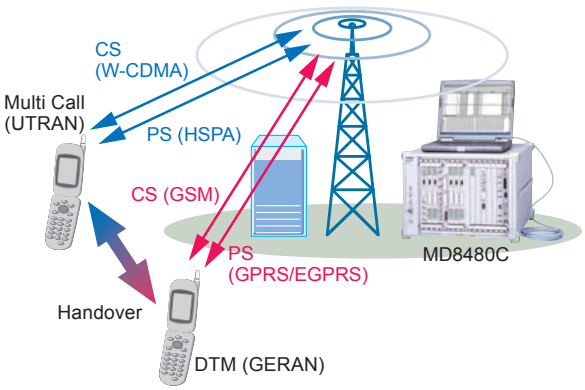
In addition, expanding development of global GSM and 3G services is increasing sales of dual-mode UE supporting HSPA. The future will see increasing demand for handover tests between GERAN and UTRAN networks, but just a single MD8480C unit combining the EGPRS and HSPA functions will support EGPRS-HSPA Inter-RAT handover tests.



EGPRS-HSPA Handover Test

DTM (Dual Transfer Mode)

Adding the DTM option (MX848001C-30) supports simulation of the Dual Transfer Mode Function at actual Voice (CS) + Data (PS) connection. When the EGPRS (MU848060C-01) option is added to support both CS ↔ CS + PS and PS ↔ PS + CS, GSM DTM and EGPRS function testing is supported. Moreover, when the DTM option is used in combination with the W-CDMA Multi Call configuration, a single MD8480C can also handle W-CDMA Multi Call Handover testing.

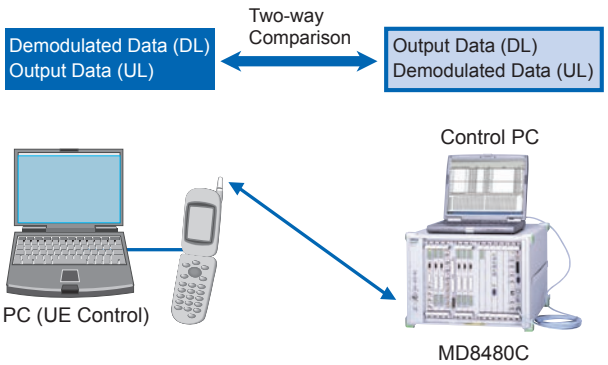


GERAN-UTRAN Handover Test

For Coding/Decoding Test and Baseband Tests

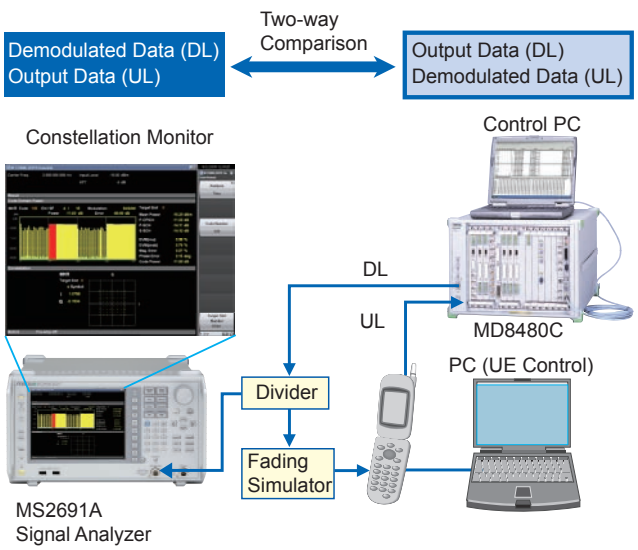
Coding/Decoding Test Setup 1 (RF, Harikiri Test)

W-CDMA mobile station coding and decoding functions can be tested using the setup shown in the diagram below.
In the coding test, fixed and variable data (such as PN9) output from the W-CDMA mobile station coding unit is compared with the decoding results shown on the Trace screen.
In addition, simultaneous BLER and BER tests are supported (BER tests require an external BER counter) and received signal timing errors can be displayed.



Coding/Decoding Test Setup 2 (RF, Demodulation Test)

The setup shown on the right can monitor the MD8480C downlink output constellation (QPSK/16QAM) and power control condition, using the MS2691A Signal Analyzer to configure a fading simulator. This also enables visual checking of various mobile station operations in a dynamic environment, such as CQI notification to base station.



Coding/Decoding Test (BB + AWGN + Fading)

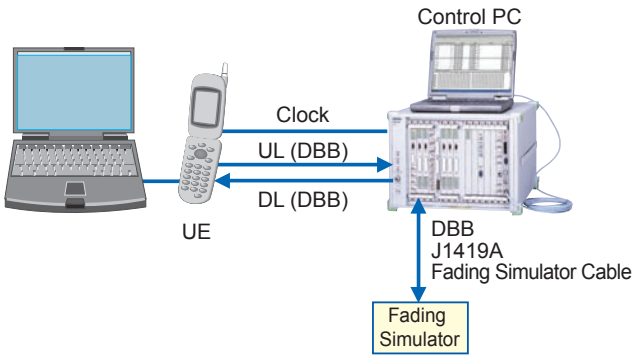
The MU848077C Baseband Interface Unit (BIU – sold separately) with both DBB (digital baseband) and ABB (analog baseband) I/O functions can be installed in the MD8480C.
The BIU supports coding/decoding tests with good reproducibility. In addition, the AWGN signal source built into the MD8480C supports evaluation in a noisy environment, as well as coding/decoding tests under a fading environment by connecting an external digital fading simulator*1.

<Main BIU Functions>

- Analog IQ I/O
- Digital IQ I/O
- Digital Fading Simulator interface*1
- Select either internal or external clock synchronization for each I/O
- Select any frequency within range of 0.01 to 19.2 MHz at external clock
- Select either 4 or 5 times chip rate for either internal or external clock
- Install two BIU units in one MD8480C*2, and add different fading signal to each for output from one of analog or digital IQ interface

Item	I/O Level	Chip X5		Chip X4	
		Internal	External	Internal	External
Analog I/Q	–1.0 to +1.0 V	√	√*3	√	√*3
Digital I/Q	3.3 V CMOS OUT, TTL IN	√	√	√	√
Fading	LVDS	√	√	√	√

*1: ELEKTROBIT PROPSim C2, C8 recommended
*2: The TDMA2 (MU848060C) modules cannot be installed. When two BIU modules are installed, the GSM test function using the TDMA2 is not supported.
*3: Only data as analog output. Supports only clock input at sync to external clock

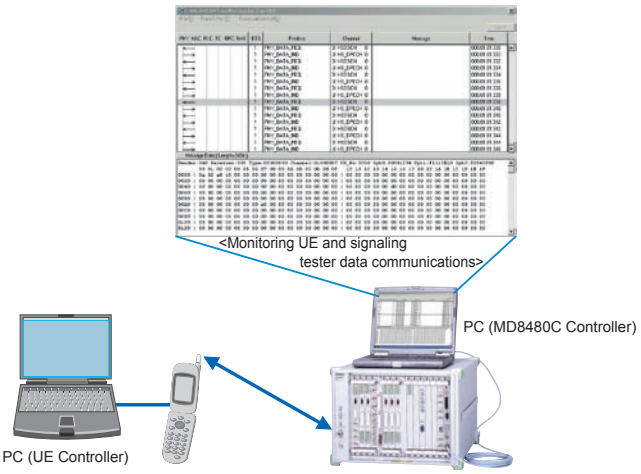


Coding/Decoding Test Setup 3 (DBB + Fading)

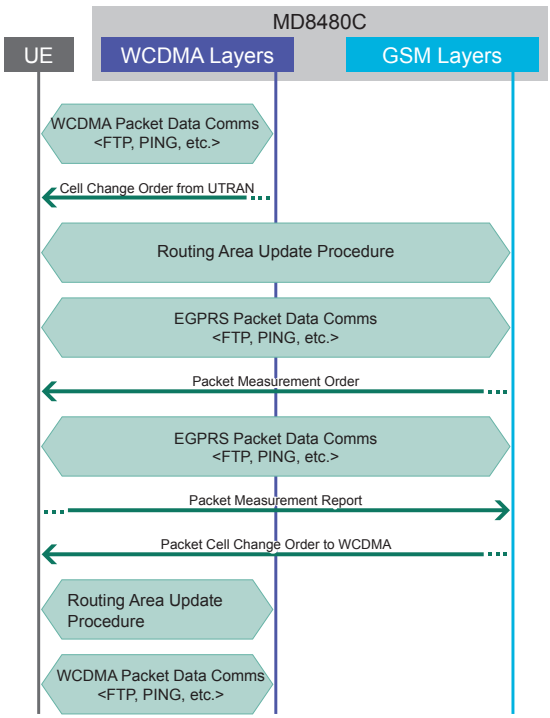
Protocol Tests

Protocol Sequence Test (in C)

The protocol sequence of W-CDMA/GSM UE can be tested by connecting the equipment as shown in the following diagram to test broadcast information transmission, location registration, mobile station origination, disconnection from mobile station/ network, handover. Test parameters and sequence can be defined freely to perform quasi-normal and interrupt testing.
In addition, data transfer between the UE and MD8480C can be monitored simultaneously in real time. These functions support troubleshooting as well as efficient protocol sequence tests for chipsets and UE.



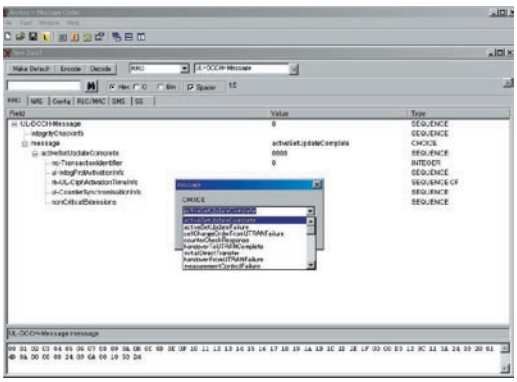
Protocol Sequence Test Example



W-CDMA and EGPRS HO Protocol Sequence Test Example

Scenario Creation and Simulation Result Analysis (Message Coder)

The MD8480C has a built-in Message Coder tool for encoding/ decoding important protocol messages at C scenario creation and analysis of simulation results. Message Coder is a software tool for creating and analyzing higher-layer messages exchanged between W-CDMA/GSM base stations and UE.
It supports encoding/decoding of RRC, NAS (RR, CC, MM, GMM, SM), SMS, SS (Supplementary Service) protocol messages for efficient scenario creation, including layer-3 messages.



Message Coder Main Screen

• Supported Messages

Category	Message	Reference Spec. *1
RRC	RRC Layer	3GPP TS25.331
NAS	NAS Layer	3GPP TS24.007, TS24.008
Config	Layer 1, Layer 2 Control	-
RLC/MAC Control	RLC/MAC Control	3GPP TS04.60
SS	Supplementary Service	3GPP TS24.080
SMS	SMS (SM-RL/SM-TL)	3GPP TS23.040
CBS	CBS	3GPP TS23.041, TS25.324
Layer 3 Messages *2		Reference Spec. *1
CC	Messages for Circuit-switched Call Control (35)	3GPP TS24.008, 9.3
MM	Messages for Mobility Management (22)	3GPP TS24.008, 9.2
GMM	GPRS Mobility Management Messages (23)	3GPP TS24.008, 9.4
SM	GPRS Session Management Messages (16)	3GPP TS24.008, 9.5
SMS	Messages for Short Message or Notification Transfer on CM (3)	3GPP TS24.001, 7.2
RR	Messages for Radio Resource Management (82)	3GPP TS04.18, 9.1
SS	Messages for Supplementary Services Control (3)	3GPP TS24.080, 2.2

*1: Bundled RRC and NAS definition files are standardized by 3GPP in June 2001 (R99), March 2002 (R99), December 2002 (R99), and December 2005 (Rel. 5). RRC definition files standardized in June 2006 (Rel. 6) and September 2007 (Rel. 7) are also bundled.
*2: High-layer protocols in messages are not supported.

Protocol Tests

Bundled Reference Sample Scenarios

The MX848000C Control Software bundle has over 400 sample scenarios (in C). Of course, there are scenarios for Harikiri testing using encoding/decoding tests, plus sample scenarios*1 based on actual connections with commercial W-CDMA UE, allowing protocol testing to be started almost immediately.
Furthermore, for GSM systems, GSM-GSM Intra-RAT handover and GSM-WCDMA Inter-RAT handover sample scenarios are also bundled as standard. Since any test sequence and parameters can be created and set based on these sample scenarios, protocol tests are easily performed for handover between a huge range of systems*2.

*1: The default setting uses the W-CDMA/GSM Test USIM (P0027/P0035A). Functions are not guaranteed for all commercial UE.
*2: Ensure that the required hardware and software are setup.

• Main Sample Scenario List

W-CDMA

Type	Function	Remarks
Registration	Idle, Attach (CS, PS, Combined)	
Voice (AMR-NB, AMR-WB)	Originate, Terminate (UE/Network)	Handset, Loopback
Packet (PPP)	Originate, Release (UE/Network)	Internal Server, External Server
Packet (IP)	Originate, Rate Change, Release (UE/Network)	External Server
Videophone	Originate, Release (UE/Network)	TE, Loopback

GSM

Type	Function	Remarks
Registration		
Voice (EFR, AMR)	Originate, Terminate (UE/Network)	Handset, Loopback
Voice (AMR-WB)	Originate, Terminate (UE/Network)	Handset, Loopback
Voice + SMS	Voice (EFS) + SMS Receive	SACCH
SMS	SMS Receive	SDCCH, SACCH
SMS Cell Broadcast	SMSCB Receive	
Packet (GPRS)	Originate, Terminate (UE/Network)	
Packet (EGPRS)	Originate, Terminate (UE/Network)	
CSD/HSCSD	Originate, Terminate (UE/Network)	
Frequency Hopping	Originate, Terminate (Voice Call)	
Multiple PDP Context	IP Packet Originate (UE), Terminate (Network)	Primary + Primary, Primary + Secondary
DTM (Dual Transfer Mode)	Voice (EFS) + Packet (GPRS/EGPRS)	CCCH/BCCH, PCCCH/ PBCCH Comb11
Intra-RAT Handover, Cell Reselection, Cell Change	Intra-cell Handover, Inter-cell Handover (Sync/Async), GSM/GPRS Cell Reselection, GPRS Packet Cell Change Order Inter-SGSN	
Inter-RAT Handover	Voice Handover (W to G to W), GPRS Packet cell change (G to W, W to G)	

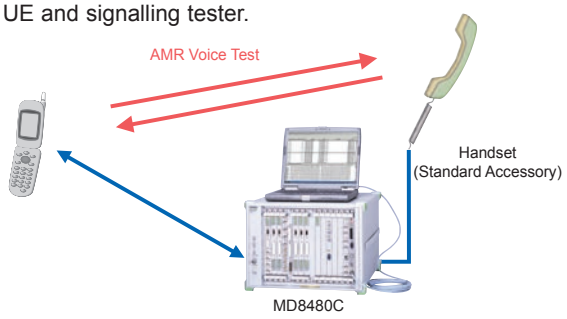
Application Tests

Application Tests (Voice)

The MD8480C supports a full range of application tests.

• AMR Voice Test

The handset (standard accessory) is connected to the MD8480C and an AMR Voice Test can be performed between the UE and signalling tester.



AMR Voice Test Example

• EFR/FR/HR (GSM) Voice Test

The MX848062C Multimedia Interface Software (MIS) option is installed in an external PC and when a handset (PC accessory) is connected to the PC, EFR (Enhanced Half Rate Speech), FR (Full Rate Speech) and HR (Half Rate Speech) voice tests can be performed between the GSM UE and PC handset.

• AMR-WB (W-CDMA/GSM) Voice Test

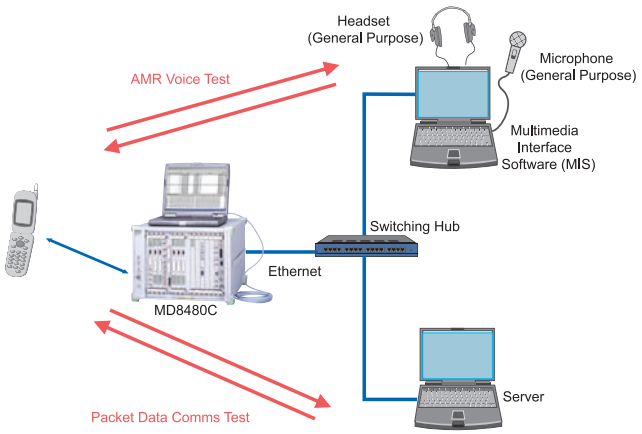
When the MX848062C-001 AMR-WB option is added to the MX848062C MIS installed in the external PC and a handset (PC accessory) is connected to the PC, voice tests between the UE and PC handset can be performed using the AMR-Wideband codec.

• Supported Voice Codecs

Supported Codec	MU848056A Voice Codec (Standard Unit)	MX848062C MIS (option, external PC)	MX848062C-001 AMR-WB (option, external PC)
AMR-NB (W-CDMA, GSM)	√	√	
GSM - EFR (GSM)	√	√	
GSM - FR (GSM)	√ (Loopback only)	√	
GSM - HR (GSM)	√ (Loopback only)	√	
AMR-WB (W-CDMA, GSM)			√

• AMR + Packet Test

Inserting a switching hub enables multicall testing with simultaneous AMR Voice tests using the MIS and packet data communications tests with a connected FTP/application server.



AMR + Packet Test Setup Example

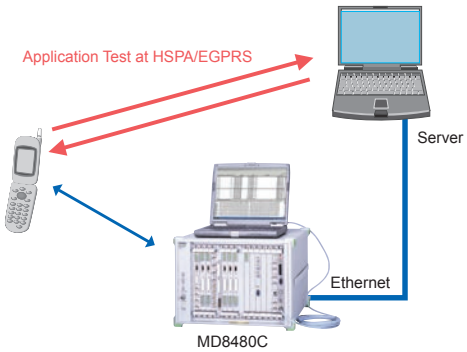
Application Tests (Packet/AV/UDI)

• IP Packet Test

Connect a PC (using 10/100BASE-T) to the MD8480C and perform IP protocol tests.

• PPP (Built-in Server) Packet Test

This packet data test uses the MD8480C built-in PPP protocol stack. Since the connection with the PC is over Ethernet, data communications are performed at high speed (DL: 14.4 Mbps/UL: 5.7 Mbps when HSDPA/HSUPA option installed). A unique feature is the PPP termination in the MD8480C.



IP Packet Test

• PPP (Serial Connection) Packet Test

Connect a PC (using serial connection) to the MD8480C and data communications can be performed using PPP (requires MU848055C ISDN/CSD).

• User Data Test

Any data can be inserted into the Tx DTCH and the demodulated DTCH data can be captured externally, which is useful for error-rate measurements.

• Videophone (AV) Test

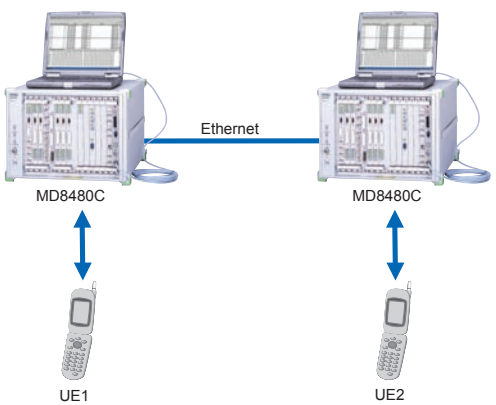
Videophone tests can be performed by using the Loopback mode to loop-back the video and voice to the base station and confirm mobile operation. Moreover, connecting the ISDN Videophone terminal to the MD8480C using an ISDN I/F supports End-to-End videophone tests between the mobile and videophone terminal.

• UDI Communications Test

Using an ISDN I/F and connecting a terminal adapter (TA) supporting UDI allows UDI communications tests.

• MS-to-MS Test

When two MD8480C units are connected by 100BASE-T/BASE-TX, MS-to-MS tests of two mobile terminals can be performed.



MS-to-MS Test

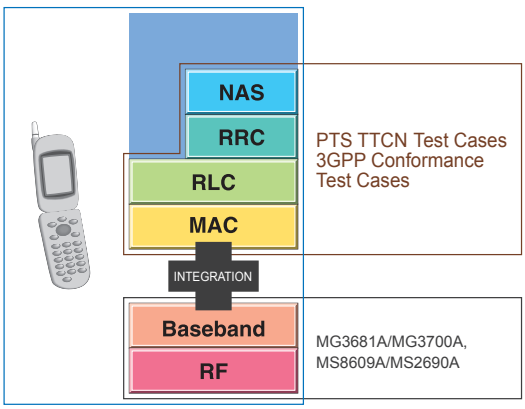
For 3GPP Protocol Conformance Tests

MX785201A

W-CDMA Protocol Test System (PTS)

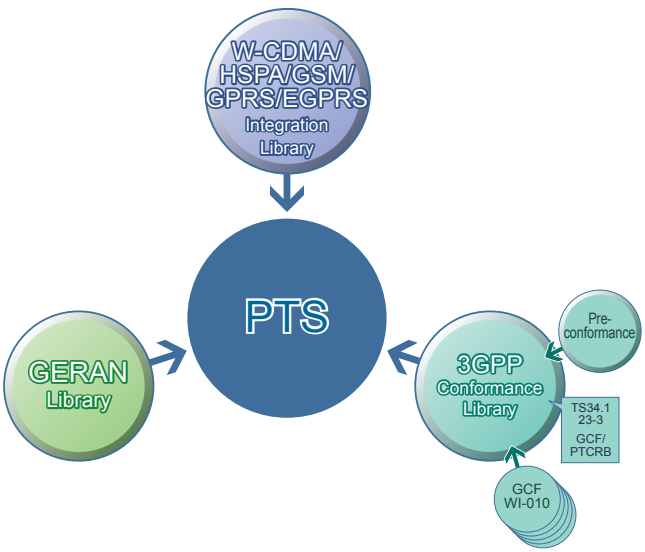
The MD8480C W-CDMA Signalling Tester is used with the MX785201A PTS Core Software to configure a measurement system for Layer 3 and Layer 2 signalling protocols defined by the Third Generation Partnership Project (3GPP). The PTS is designed for testing 3G W-CDMA UE signalling protocols.

Protocol Testing



∗ See the MX785201A data sheet for more details.

PTS Libraries



- Frequency band options and Library options can be purchased separately.
- For details of Band options and Libraries, see the MX785201A and MX785220A data sheet.

Integration and Conformance

Software/Hardware Development and Integration

- Protocol stack development
- UE Integration testing – debugging hardware and software
- Regression testing of new builds

Conformance Testing

- Pre-conformance testing
- GCF/PTCRB Certification

GCF/PTCRB Approved Test Platform

The PTS and MD8480C capability will be extended in-line with the 3GPP specifications. The PTS will run the 3GPP Conformance Test Suite defined in TS34.123 (when published). In addition, the PTS will support the Layer 1 and Layer 2 parameter sets defined in TS34.108.
The standard PTS includes 3GPP T1 approved test cases. However, for GCF/PTCRB terminal certification, PTS delivered with GCF/PTCRB Protocol Conformance Test Toolkits option.

PTS + MD8480C

MX785220A
GCF/PTCRB Protocol
Conformance Test Toolkit

- Certification Environment MX785220A-xx GCF Work Item Test Cases
- MX785220A-xx Frequency Band Options
- MX785220A-20 Annual Update and Maintenance Contract

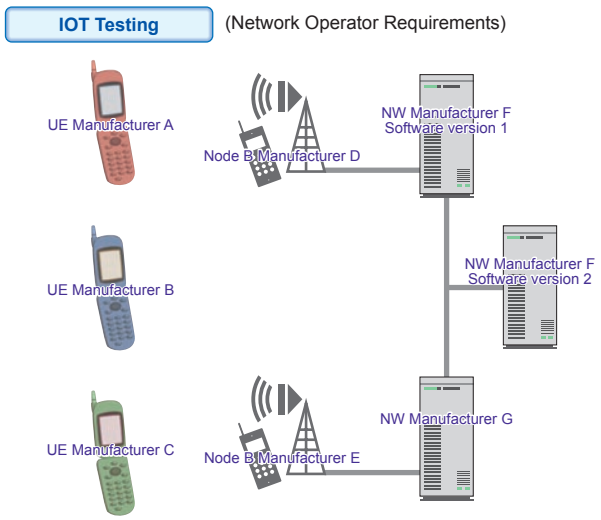
∗ See the MX785220A data sheet for more details.
∗ Contact Anritsu sales for supported Work Item status.

Protocol Analyzer

The PTS Core Software includes the Protocol Analyzer which displays comprehensive test results and logs using a web browser.

For Interoperability Test (IOT)

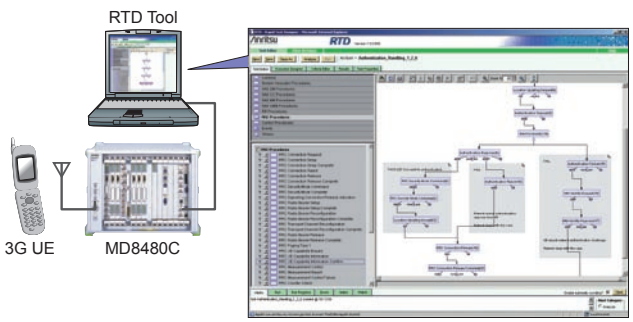
Interoperability



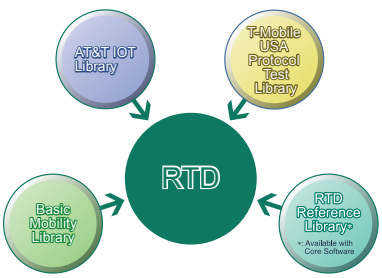
- Test correct functioning of different manufacturers' equipment in real network.
- Ensure terminals stay on their (or preferred) networks.
- Perform initial evaluation of products in 'real world' controlled environments.
- Test future network upgrades in laboratory.

MX786201A Rapid Test Designer (RTD)

The MX786201A RTD is a unique tool that significantly speeds up testing of W-CDMA/HSDPA/GSM/GPRS/EGPRS.



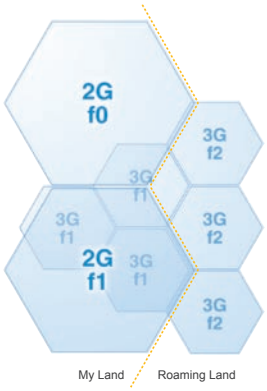
RTD Libraries



- Library options can be purchased separately.
- For details of libraries and specifications, see the RTD (MX786201A) data sheet.
- For details of T-Mobile USA Protocol Test Library, please contact local Anritsu sales team.

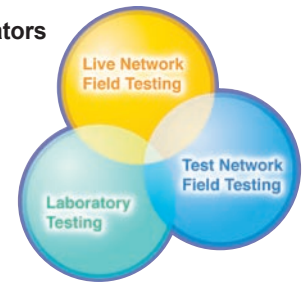
Cell Selection and Re-selection

There is always a compromise between battery life and continuous activities that the UE performs to ensure the correct network cell is used. Setting up controlled network simulations in the laboratory is the best way to check that UE algorithms perform correctly.



Simulation of Foreign Networks
Roaming between networks with different configurations/parameters and even different ways of implementing procedures creates unpredictable outcomes. Today, the cost of sending engineering teams to perform weeks of network testing can be a significant proportion of a proving budget.
Combining the RTD with MD8480C handles roaming between different networks in the real world.

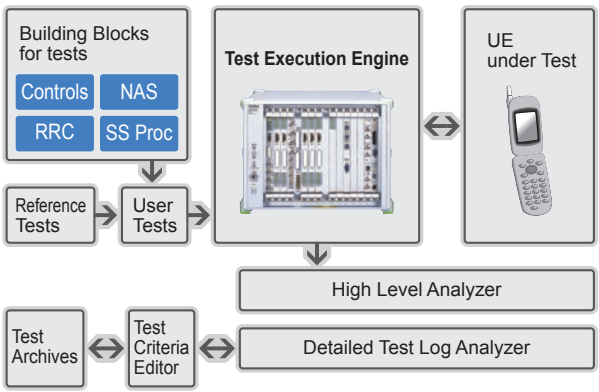
Field Trials vs. System Simulators
Live network testing will always be required, but system simulation in a laboratory is now a viable alternative using the RTD and MD8480C.



Using RTD and MD8480C for Wide Variety of Tasks

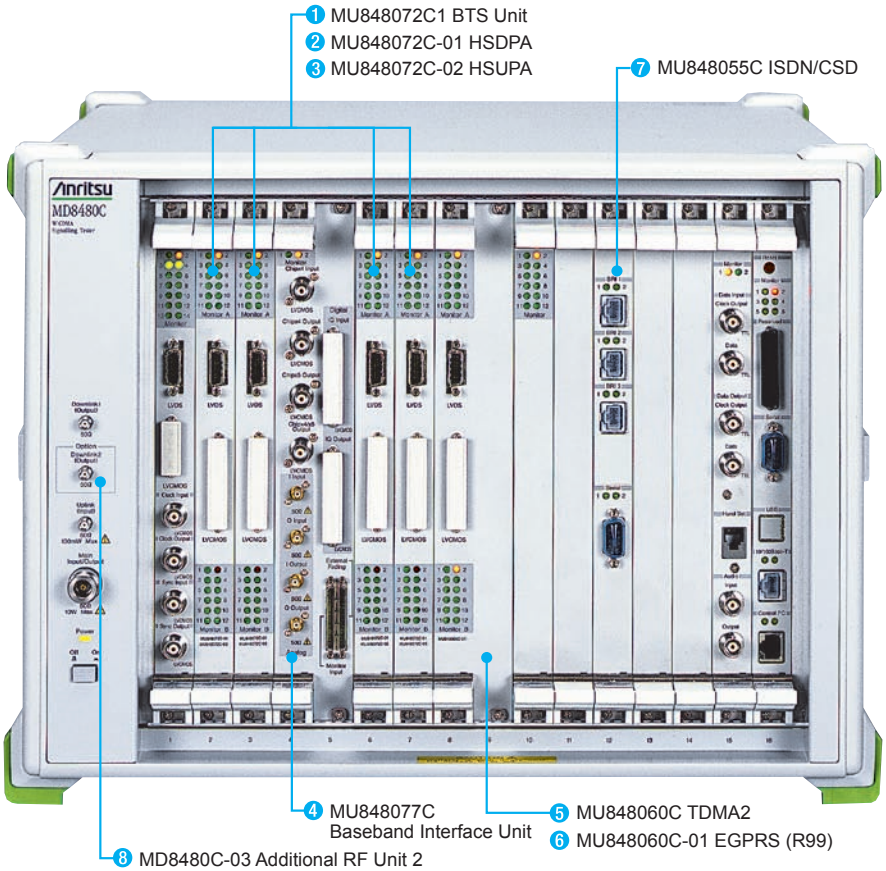
- Operator Acceptance Testing
- Interoperability Testing
- Application Testing
- Regression Testing
- Integration Testing
- Generating Variants
- Pre-conformance Testing
- Prototyping Tests
- Hardware and Software Integration
- Software Development

RTD Tools and MD8480C



* See the MX786201A data sheet for more details.

Additional Options (Hardware)



1 W-CDMA Base Station [MU848072C1 BTS Unit]∗1

The standard MD8480C configuration has one BTS unit for a single W-CDMA base station functionality. Adding this option in a single MD8480C supports for up to four W-CDMA base stations.

∗1: Low-profile 1-slot type. Same functions as previous MU848072C BTS unit.

2 HSDPA Base Station [MU848072C-01 HSDPA]

This option adds the HSDPA functions for up to four base stations to the W-CDMA BTS Unit. Requires adding this option to each BTS unit.

3 HSUPA Base Station [MU848072C-02 HSUPA]

This option adds the HSUPA functions for up to four base stations to the W-CDMA BTS Unit. Requires adding this option to each BTS unit.

4 Baseband Interface [MU848077C Baseband Interface Unit]

This option adds I/O interfaces for DBB (digital baseband and ABB (analog baseband) to the MD8480C. It also adds an interface for connecting an external digital simulator to support baseband evaluation of W-CDMA/HSPA chipsets and UE reference design boards.

5 GSM/GPRS Base Station [MU848060C TDMA2]

This option installs the GSM/GPRS function in the MD8480C to support GSM/GPRS registration, mobile origination and termination, network origination and termination, and handover. In addition, it supports various applications, such as voice and data communications. And handover tests between W-CDMA (HSPA) and GSM/GPRS units are supported when used in combination with the MD8480C-03 Additional RF Unit 2 and the MX848001A-02 Compressed Mode described below.
In addition, up to two units can be installed in one MD8480C, supporting the GSM transmit and receive function for each of two base stations.∗2

∗2: When two TDMA2 (MU848060C) units are installed, the Baseband Interface Unit (MU848077C) cannot be installed.

6 EGPRS Base Station [MU848060C-01 EGPRS (R99)]

This option installs the EGPRS base station function in the MU848060C TDMA2 option. Using the EGPRS method (3GPP Release 99) supports packet testing at up to 230 kbps.

7 ISDN/CSD Unit [MU848055C ISDN/CSD]

This unit is required when adding software supporting CSD (Circuit Switched Data). It also adds an ISDN interface for performing UDI communications and videophone tests at data rates up to a maximum of 2B (64 kbps). PPP packet testing can also be performed using the RS-232C I/F built into this option.

8 Additional RF Interface [MD8480C-03 Additional RF Unit 2]

This option adds support for two different frequencies (transmit and receive) and is required when adding the GSM/GPRS base station option (MU848060C). When it is used with the above-described base station options, it supports hard handover testing (HHO) between different frequencies. The continuously covered transmit and receive frequency range is 350 to 2700 MHz.

Additional Options (Software)

W-CDMA/HSPA Related

- **Diversity Function**
  MX848001A-01
  W-CDMA Signalling Tester Tx Diversity

This option supports the Tx diversity functions, including TSTD, STTD, Closed Loop Mode 1 and Closed Loop Mode 2. This option requires more than one BTS unit (MU848072C1 – 2BTS) as the additional base station option.

- **HSDPA Diversity Function**
  MX848001C-11 HSDPA Tx Diversity

This option supports the Tx diversity function for HSDPA/HSUPA. This option requires the W-CDMA Tx diversity function (MX848001A-01).

- **Compressed Mode Function**
  MX848001A-02
  W-CDMA Signalling Tester Compressed Mode

This option supports the compressed mode function used mainly for hard handover (HHO) tests. SF/2, Puncturing, and Higher Layer Scheduling are also supported by this option.

- **W-CDMA CSD Function**
  MX848001A-06
  W-CDMA Signalling Tester W-CDMA CSD

This option supports W-CDMA CSD (Circuit Switched Data) and adds CSD-dedicated layers (L2RCOP, RLP) providing 14.4/28.8/57.6 kbps asynchronous and non-transparent mode test functions. This option requires the ISDN/CSD (MU848055C).

- **3GPP Release 7 Function**
  MX848001C-12 HSPA Evolution (Release 7)∗1

This option supports the HSPA Evolution functions, including CPC (Continuous Packet Connectivity). This option requires the HSDPA (MU848072C-01) and HSUPA (MU848072C-02).

- **W-CDMA Ciphering**
  MX848041C Ciphering

This option∗2 adds support for ciphering functions to KASUMI (3GPP standards integrity ciphering algorithm).

- **HSDPA Ciphering**
  MX848041C-10 HSDPA Ciphering

This option∗2 adds supports for ciphering functions to KASUMI (3GPP standards integrity ciphering algorithm).

∗1: Also requires future options to enable the 64QAM for HSDPA, 16QAM for HSUPA, and 2x2 MIMO functionalities.

∗2: The integrity function is also supported even without this option.

GSM/GPRS/EGPRS Related

- **GSM CSD Function**
  MX848001A-04 W-CDMA Signalling Tester GSM CSD

This option supports the GSM CSD (Circuit Switched Data) function and PPP packets at data rates from 9.6 to 57.6 kbps (HSCSD). It also supports asynchronous mode data transmission in the non-transparent mode. This option requires the ISDN/CSD (MU848055C).

- **GSM Frequency Hopping Function**
  MX848001A-05
  W-CDMA Signalling Tester GSM Frequency Hopping

This option supports the GSM frequency hopping function, permitting frequency hopping in GSM communications channels at a frame sync of 4.62 ms. This option requires an Additional RF Unit (MD8480B-02 or MD8480C-03).

- **DTM Function**
  MX848001C-30 DTM (R99)

This option adds the Dual Transfer Mode (DTM) function which is able to simulate Voice (CS) + Data (PS) communication based on the 3GPP Release 99. In addition, this option is able to Handover test between DTM and Multi Call connection if used with the W-CDMA Multi Call configuration on the single unit.
This option requires the TDMA2 (MU848060C).

- **GSM/GPRS Ciphering**
  MX848045C GSM/GPRS 2 Ciphering

This option adds the GSM/GPRS ciphering function to support the GSM A5/1, A5/2 and A5/3 ciphering algorithm as well as the GPRS GEA1, GEA2 and GEA3 ciphering algorithm.

Shared

- **Router Connection Function**
  MX848001A-03
  W-CDMA Signalling Tester Router Connection

This option provides support for data communications with PCs on a different subnet mask (segment) and can be used for both W-CDMA and GPRS data. In addition, it can also be used for testing both IP and PPP packets.

- **Message Encoder/Decoder Function**
  MX848001A-07 Message Encoder/Decoder

The provided protocol message encoder/decoder library supporting RRC, NAS (RR, CC, MM, GMM, SM), SMS and SS (Supplementary Service) makes it easy to change or extract message information elements in test scenarios.
This feature supports scenario conditional branch processing and received message analysis.

- **Voice Codec Function**
  MX848062C Multimedia Interface Software∗3

The Multimedia Interface Software (MIS) is application software providing a voice codec function. When it is installed in an external PC connected to the MD8480C by Ethernet cable, End-to-End Voice communications can be tested between a microphone and speaker connected to the external PC and a mobile terminal. (See the table on page 9 for the supported voice codecs).

- **AMR-WB Function**
  MX848062C-001 AMR-WB∗3

This option adds the ANSI-C code for the Adaptive Multi Rate - Wideband (AMR-WB) speech codec (Release 6) specified in 3GPP TS26.173 to the MIS.

∗3: A PC is required to use the MX848062C MIS.
The specifications required for stable operation are listed below.
<Recommended specifications>
OS: Windows 2000/XP
CPU: Pentium III (1.6 GHz) or better
Memory: 512 MB min.
Others: Microphone input connector, Headphone output connector,
One free LAN port

Other Options

Software Maintenance Contracts

• W-CDMA/GSM 1-year Support Service [MD8480C-SS120, MD8480C-SS121]*1

This optional 1-year contract provides the following services for W-CDMA/GSM functions.
• 3GPP Software upgrades and revisions
• Technical support for solving user problems
The MD8480C-SS120 software service contract is for W-CDMA/GSM related functions of the MD8480C; the MD8480C-SS121 contract is for ciphering (MX848041C/MX848045C) related functions.

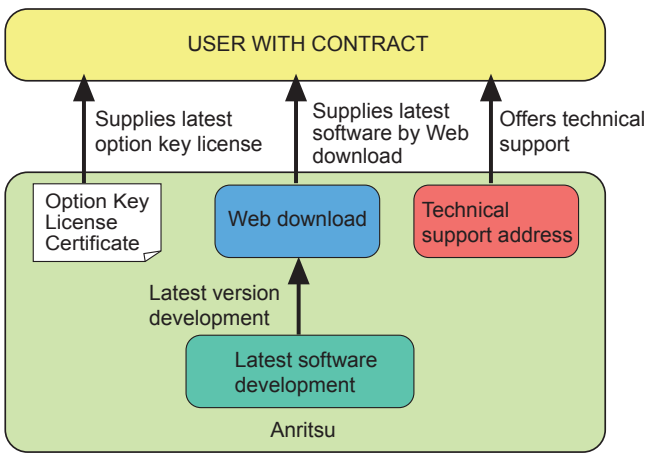
• HSDPA 1-year Support Service [MD8480C-SS122, MD8480C-SS123]*1

This optional 1-year contract provides the following services for HSDPA functions.
• 3GPP Software upgrades and revisions
• Technical support for solving user problems
The MD8480C-SS122 software service contract is for HSDPA-related functions of the MD8480C; the MD8480C-SS123 contract is for HSDPA ciphering (MX848041C-10) related functions. (These contracts also require the MD8480C-SS120/SS121 contracts.)

• HSUPA 1-year Support Service [MD8480C-SS124, MD8480-C-SS125]*1

This optional 1-year contract provides the following services for HSUPA functions.
• 3GPP Software upgrades and revisions
• Technical support for user problems
The MD8480C-SS124 software service contract is for HSUPA-related functions of the MD8480C; the MD8480C-SS125 contract is for HSDPA ciphering (MX848041C-10) related functions. (These contracts also require the MD8480C-SS120/SS121 contracts.)

*1: For contract details, see the appended materials.



MD8480C Support System

• MD8480C 1-year Package Support Service [MD8480C-SS150, MD8480C-151]*2

This optional 1-year contract provides the following services for all system functions of the MD8480C
• 3GPP Software upgrades and revisions
• Technical support for solving user problems
The MD8480C-SS150 software service contract is for all MD8480C systems software (W-CDMA/GSM/HSPA functions); the MD8480C-SS151 contract is for MD8480C ciphering (MX848041C/MX848045C) related functions.

• MD8480C 2-year Package Support Service [MD8480C-SS250, MD8480C-251]*2

This optional 2-year contract provides the following services for all system functions of the MD8480C.
• 3GPP Software upgrades and revisions
• Technical support for solving user problems
The MD8480C-SS250 software service contract is for all MD8480C systems software (W-CDMA/GSM/HSPA functions); the MD8480C-SS251 contract is for MD8480C ciphering MX848041C/MX848045C) related functions.

*2: All options for MD8480C-SS120/SS121/SS122/SS123/SS124/SS125. This option is valid for all W-CDMA/GSM/HSDPA/HSUPA functions of the MD8480C.
See the appended materials for the contract details.

Hardware Maintenance

• 2-year Extended Warranty Service [MD8480C-ES210]*3

This service extends the MD8480C standard 1-year warranty to 2 years.

• 3-year Extended Warranty Service [MD8480C-ES310]*3

This service extends the MD8480C standard 1-year warranty to 3 years.

• 5-year Extended Warranty Service [MD8480C-ES510]*3

This service extends the MD8480C standard 1-year warranty to 5 years.

*3: Consumables not included

Functions

Decoding Test Channels

Logical	Transport	Physical	Symbol Rate
BCCH	BCH	P_CCPCH+P_SCH+S_SCH	15 ksps
–	–	P-CPICH	
		S-CPICH	
		AICH	
		PICH	
PCCH	PCH	S-CCPCH	15 to 480 ksps
CCCH/DCCH/DTCH	FACH		
MCCH/MSCH/MTCH			
DCCH + DTCH	DCH	DPDCH	7.5 to 960 ksps
		DPCCH	
	HS-DSCH*1	HS-PDSCH*1	240 ksps x 15 code
		HS-SCCH	30 ksps x 4 code
–	–	E-HICH*2	30 ksps
		E-AGCH*2	15 ksps
		E-RGCH*2	30 ksps
–	–	F-DPCH	15 ksps

Coding Test Channels

Logical	Transport	Physical	Symbol Rate
CCCH/DCCH/DTCH	RACH	PRACH	15 to 120 ksps
DCCH/DTCH	DCH	DPDCH	15 to 960 ksps
		DPCCH	15 ksps
	E-DCH*2	E-DPDCH*2	15 to 960 ksps x 4 code
		E-DPCCH*2	15 ksps
–	–	HS-DPCCH*1	15 ksps

*1: MU848072C-01 HSDPA is required
*2: MU848072C-02 HSUPA is required

Supported Services

Service		Data Rate	Physical Channel Downlink (1 symbol = 2 bits)	Physical Channel Uplink (1 symbol = 1 bit)
Protocol	Standalone DCCH	–	1xDPCH (15 ksps)	1xDPDCH (15 ksps)
Voice (AMR)		12.2 kbps (VAD Opt. 01)	1xDPCH (30 ksps)	1xDPDCH (60 ksps)
ISDN 1B		64 kbps	1xDPCH (120 ksps)	1xDPDCH (240 ksps)
Packet		32 kbps	1xDPCH (60 ksps)	1xDPDCH (120 ksps)
		64 kbps	1xDPCH (120 ksps)	1xDPDCH (240 ksps)
		128 kbps	1xDPCH (240 ksps)	1xDPDCH (480 ksps)
		384 kbps	1xDPCH (480 ksps)	1xDPDCH (960 ksps)
Audio and visual		32 kbps	1xDPCH (60 ksps)	1xDPDCH (120 ksps)
		64 kbps	1xDPCH (120 ksps)	1xDPDCH (240 ksps)
Reference measurement channel		DCCH	1xDPCH (15 ksps)	1xDPDCH (15 ksps)
		12.2 kbps	1xDPCH (30 ksps)	1xDPDCH (60 ksps)
		64 kbps	1xDPCH (120 ksps)	1xDPDCH (240 ksps)
		144 kbps	1xDPCH (240 ksps)	1xDPDCH (480 ksps)
		384 kbps	1xDPCH (480 ksps)	1xDPDCH (960 ksps)
		BTFD	1xDPCH (30 ksps)	1xDPDCH (60 ksps)
Multi call	Voice + Packet	12.2 + 32 kbps	1xDPCH (15 ksps)	1xDPDCH (240 ksps)
		12.2 + 64 kbps		
		12.2 + 384 kbps		1xDPDCH (960 ksps)
	Voice + ISDN 1B	12.2 + 64 kbps		1xDPDCH (240 ksps)

Specifications

MD8480C W-CDMA Signalling Tester

Electrical characteristics	Frequency range	Tx: 300 to 3000 MHz Rx: 350 to 2700 MHz*1
	Maximum input level (total level)	+40 dBm (Main connector), +20 dBm (Uplink connector)
	RF Input/Output connector	Main: N type, Impedance: 50 Ω, VSWR: ≤1.3 Downlink 1: SMA type, Impedance: 50 Ω, VSWR: ≤2.0 Downlink 2*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 × 10^{-8} (10 minutes after power-on, referenced to 24 hours after power-on) Aging rate: ≤±2 × 10^{-8}/day, ≤±1 × 10^{-7}/year (referenced to 24 hours after power-on) Temperature: ≤±5 × 10^{-8} (0˚ to 40˚C, referenced to 25˚C) External reference input: BNC type, 10 MHz, 2 to 5 Vp-p Reference output: BNC connector, 10 MHz, TTL level
Transmitter	Frequency resolution	100 kHz
	Maximum Tx channels	30 ch (120 ch max. with option)
	Maximum Tx power	Main: –25 dBm/ch Downlink 1: –10 dBm/ch Downlink 2: –10 dBm/ch
	Tx Power setting range	Setting range: 0 to –120 dB from Tx power (by ATT) Resolution: 0.1 dB steps
	Level accuracy	±1.5 dB ≥–113 dBm (18˚ to 28˚C with calibrated CW)
	Modulation	QPSK, 16QAM (with MU848072C-01)
	Chip rate	3.84 MHz
	Modulation band limit	Root Nyquist roll off (α = 0.22)
	EVM	≤7% rms (1 ch)
Receiver	Frequency resolution	100 kHz
	Input level range	Main: –30 to +40 dBm Uplink: –50 to +20 dBm
	Modulation	BPSK
Others	Ambient temperature (operating)	0˚ to +40˚C
	Ambient temperature (storage)	–40˚ to +70˚C
	Power	100 to 120/200 to 240 Vac, 50 to 60 Hz, ≤650 VA
	Dimensions and mass	Dimensions: 426 (W) × 310 (H) × 500 (D) mm Mass: ≤35 kg
	EMC	EN61326 EN61000-3-2
	LVD	EN61010-1

*1: With yellow "Uplink 350-2700 MHz" label attached to MD8480C front panel.
Units with no label are 350 to 550 MHz, 700 to 1100 MHz and 1400 to 2200 MHz.
They are expandable using the Z0901A/B or Z0912A/B MD8480C Modification for HSUPA/EGPRS.
*2: With MD8480C-03 Additional RF units. MD8480C-03 electrical and transmission characteristics same as above.

GSM Specifications: MU848060C TDMA2

Transmitter (GSM)	Frequency resolution	100 kHz
	Maximum Tx RF channel	2 ch*1
	Maximum output power	Main: –15 dBm Downlink 1: 0 dBm*1, *2 Downlink 2: 0 dBm
	Tx power setting range	Setting range: 0 to –120 dB from average Tx power (by ATT) Resolution: 0.1 dB steps
	Level accuracy	≤1.5 dB ≥–113 dBm (18˚ to 28˚C with calibrated CW)
	Modulation	GMSK, 8PSK (with MU848060C-01)
	Symbol rate	270.833 kHz
	Phase error (GMSK)	≤5.0˚ rms
	EVM (8PSK)	≤7% rms
Receiver (GSM)	Frequency resolution	100 kHz
	Input level range	Main: –30 to +35 dBm Uplink: –50 to +15 dBm
	Modulation	GMSK, 8PSK (with MU848060C-01)

*1: Only when two MU848060C TDMA2 units installed
*2: No GSM signal is output from this connector when only one TDMA2 unit is installed.

ISDN Specifications: MU848055C ISDN/CSD

Electrical characteristics (interface and others)	BRI 1	ISDN Basic Rate Interface (BRI) 1 Channels: 2B + D (B: 64 kbps, D: 16 kbps) Connector: 8 pin modular connector
	BRI 2	ISDN Basic Rate Interface (BRI) 2 Channels: 2B + D (B: 64 kbps, D: 16 kbps) Connector: 8 pin modular connector
	BRI 3	ISDN Basic Rate Interface (BRI) 3 Channels: 2B + D (B: 64 kbps, D: 16 kbps) Connector: 8 pin modular connector
	Serial	RS-232C Standard serial interface Connector: 9 pin D-Sub connector
Others	Functions	Connection with ISDN terminals.

Additional Unit/Option Selection Guide

The unit options/quantities marked in the table below are required for each additional function.

Additional Function	Hardware Options									Software Options														
	MU848072C1	MU848072C-01	MU848072C-02	MD8480C-03	MU848060C	MU848060C-01	MU848055C	MU848077C	Z0901A	MX848001A-01 MX848041A-01*1	MX848001C-11 MX848041C-11*1	MX848001A-02 MX848041A-02*1	MX848001A-03 MX848041A-03*1	MX848001A-04 MX848041A-04*1	MX848001A-05 MX848041A-05*1	MX848001A-06 MX848041A-06*1	MX848001A-07 MX848041A-07*1	MX848001C-12 MX848041C-12*1	MX848001C-30 MX848041C-30*1	MX848041C	MX848041C-10	MX848045C	MX848062C	MX848062C-001
2BTS Handover (W-CDMA)	1																							
3BTS Handover (W-CDMA)	2																							
4BTS Handover (W-CDMA)	3																							
HSDPA 1 BTS		1																						
2BTS Handover (HSDPA)	1	2																						
3BTS Handover (HSDPA)	2	3																						
4BTS Handover (HSDPA)	3	4																						
HSUPA 1 BTS			1						√															
2BTS Handover (HSUPA)	1		2						√															
3BTS Handover (HSUPA)	2		3						√															
4BTS Handover (HSUPA)	3		4						√															
HSPA Evolution (Release 7)		1	1						√									√						
Hard Handover (HHO)	1			1					√			√												
Inter System (GSM/GPRS) Handover				1	1				√			√												
Inter System (EGPRS) Handover				1	1	1			√			√												
Intra System (EGPRS) Handover					2	2			√															
Baseband Interface (W-CDMA)								√																
Tx Diversity (1RF, W-CDMA)	1									√														
Tx Diversity (2RF, W-CDMA)	1			1					√	√														
Tx Diversity (1RF HSDPA)	1	2								√	√													
Tx Diversity (2RF HSDPA)	1	2		1					√	√	√													
Ciphering (W-CDMA)																				√*1				
Ciphering (GSM/GPRS)				1	1				√													√*1		
Ciphering (HSDPA/HSUPA)		1	1						√											√*1	√			
Router Connection													√											
GSM, FR, HR																							√	
AMR-WB																							√	√
Message Encoder/Decoder																	√							
CSD (W-CDMA)							√									√								
CSD (GSM)				1	1		√		√					√										
GSM Frequency Hopping				1	1				√						√									
DTM (Dual Transfer Mode)				1	1				√										√					
Support Service (W-CDMA/GSM)																								
Support Service (HSDPA)		1																						
Support Service (HSUPA)			1																					
User Required Configuration																								

Software Support Service				CD-ROM	Web Access Key	Additional Function
MD8480C-SS120 MD8480C-SS121	MD8480C-SS122 MD8480C-SS123	MD8480C-SS124 MD8480C-SS125	MD8480C-SS150/151 MD8480C-SS250/251	Z0904A Z0905A	MC0011A	
√				√*3	√*4	2BTS Handover (W-CDMA)
√				√*3	√*4	3BTS Handover (W-CDMA)
√				√*3	√*4	4BTS Handover (W-CDMA)
√	√			√*3	√*4	HSDPA 1 BTS
√	√			√*3	√*4	2BTS Handover (HSDPA)
√	√			√*3	√*4	3BTS Handover (HSDPA)
√	√			√*3	√*4	4BTS Handover (HSDPA)
√		√	√*2	√*3	√*4	HSUPA 1 BTS
√		√	√*2	√*3	√*4	2BTS Handover (HSUPA)
√		√	√*2	√*3	√*4	3BTS Handover (HSUPA)
√		√	√*2	√*3	√*4	4BTS Handover (HSUPA)
√			√*2	√*3	√*4	HSPA Evolution (Release 7)
√				√*3	√*4	Hard Handover (HHO)
√				√*3	√*4	Inter System (GSM/GPRS) Handover
√				√*3	√*4	Inter System (EGPRS) Handover
√				√*3	√*4	Intra System (EGPRS) Handover
√				√*3	√*4	Baseband Interface (W-CDMA)
√				√*3	√*4	Tx Diversity (1RF, W-CDMA)
√				√*3	√*4	Tx Diversity (2RF, W-CDMA)
√	√			√*3	√*4	Tx Diversity (1RF HSDPA)
√	√			√*3	√*4	Tx Diversity (2RF HSDPA)
√				√*3	√*4	Ciphering (W-CDMA)
√				√*3	√*4	Ciphering (GSM/GPRS)
√	√	√	√*2	√*3	√*4	Ciphering (HSDPA/HSUPA)
√				√*3	√*4	Router Connection
√				√*3	√*4	GSM, FR, HR
√				√*3	√*4	AMR-WB
√				√*3	√*4	Message Encoder/Decoder
√				√*3	√*4	CSD (W-CDMA)
√				√*3	√*4	CSD (GSM)
√				√*3	√*4	GSM Frequency Hopping
√				√*3	√*4	DTM (Dual Transfer Mode)
√				√*3	√*4	Support Service (W-CDMA/GSM)
√	√			√*3	√*4	Support Service (HSDPA)
√		√	√*2	√*3	√*4	Support Service (HSUPA)
						User Required Configuration

*1: The MX848041A-01, MX848041C-11, MX848041A-02, MX848041A-03, MX848041A-04, MX848041A-05, MX848041A-06, MX848041A-07, MX848041C-12 or MX848041C-30 must be ordered when the unit/option is used with the MX848001A-01, MX848001C-11, MX848001A-02, MX848001A-03, MX848001A-04, MX848001A-05, MX848001A-06, MX848001A-07, MX848001C-12 or MX848001C-30.

*2: Package Support Option (supports all systems)
This option integrates the MD8480C-SS120, MD8480C-SS121, MD8480C-SS122, MD8480C-SS123, MD8480C-SS124, and MD8480C-SS125.

*3: Software CD-ROM including latest firmwares and documents.

*4: The Web Access Key (MC0011A) is for downloading the latest firmware and documents from the Anritsu download web site.

Configuration Check List

Please use it for the configuration confirmation when it orders.

	No.	Package Configuration	Minimum Configuration (with 1BTS)						Hardware Option																			
			MD8480C W-CDMA Signalling Tester	MU848051A CPU	MU848056A Voice Codec	MU848071C L2	MU848072C1 BTS Unit	MU848073C Timing Generator	MU848072C1 BTS Unit	MU848072C1 BTS Unit	MU848072C1 BTS Unit	MU848072C-01 HSDPA	MU848072C-01 HSDPA	MU848072C-01 HSDPA	MU848072C-01 HSDPA	MU848072C-02 HSUPA	MU848072C-02 HSUPA	MU848072C-02 HSUPA	MU848072C-02 HSUPA	MD8480C-03 Additional RF Unit 2	MU848060C TDMA2	MU848060C TDMA2	MU848060C-01 EGPRS(R99)	MU848060C-01 EGPRS(R99)	MU848055C ISDN/CSD	MU848077C Baseband Interface Unit	Z0901A MD8480C Modification for HSUPA/EGPRS
Standalone MD8480C	1	3G W-CDMA Minimum (1BTS) Configuration Package	√																									√
	2	3G W-CDMA SHO/HHO (3BTS) Configuration Package	√						√	√										√								√
	3	2G GSM/EGPRS HO (2BTS) Configuration Package	√																	√	√	√	√	√				√
	4	Dual mode 3G/2G Configuration Package A (for W-CDMA 3 BTS & GSM 1 BTS)	√						√	√										√	√							√
	5	Dual mode 3G/2G Configuration Package B (for W-CDMA/HSDPA 3 BTS & GSM/EGPRS 1 BTS)	√						√	√		√	√	√						√	√		√					√
	6	Dual mode 3G/2G Configuration Package C (for W-CDMA/HSPA 3 BTS & GSM/EGPRS 2 BTS)	√						√	√		√	√	√		√	√	√		√	√	√	√	√				√
PTS/CT	1	Non-CT PTS Cofiguration Package (for W-CDMA/HSPA 3 BTS & GSM/EGPRS 1 BTS)	√						√	√		√	√	√		√	√	√		√	√		√					√
	2	TS34.123 GCF Conformance Test Toolkit Configuration Package A (for WI-10,12 & 13)	√						√	√	√									√	√							√
	3	TS34.123 GCF Conformance Test Toolkit Configuration Package B (for WI-10,12,13,14,24 & 25)	√						√	√	√	√	√			√	√			√	√							√
RTD	1	AT&T IOT Library Configuration Package	√						√	√		√	√	√		√	√	√		√	√		√					√

Configuration check column (Please use it for the configuration confirmation when it orders.)

Customer's Configuration	1		√																									
	2		√																									
	3		√																									
	4		√																									
	5		√																									
	6		√																									
	7		√																									
	8		√																									

Software Option														Software Support Contract							Package Configuration	No.	
MX848001A-01/MX848041A-01 Tx Diversity	MX848001C-11/MX848041C-11 Tx Diversity (HSDPA)	MX848001A-02/MX848041A-02 Compressed Mode	MX848001A-03/MX848041A-03 Router Connection	MX848001A-04/MX848041A-04 GSM CSD	MX848001A-05/MX848041A-05 GSM Frequency Hopping	MX848001A-06/MX848041A-06 W-CDMA CSD	MX848001C-07/MX848041C-07 Message Encoder/Decoder	MX848001C-12/MX848041C-12 HSPA Evolution (Release 7)	MX848001C-30/MX848041C-30 DTM(R99)	MX848041C Firmware for Ciphering	MX848041C-10 HSDPA Ciphering	MX848045C GSM/GPRS2 Ciphering	MD8480C-SS120/SS121 1 Year Support Service (W-CDMA/GSM)	MD8480C-SS122/SS123 1 Year Support Service (HSDPA)	MD8480C-SS124/SS125 1 Year Support Service (HSUPA)	MD8480C-SS150/SS151 1Year Support Service (W/G/HSPA) *2	MD8480C-SS250/SS251 2Year Support Service (W/G/HSPA) *2	Z0904A or Z0905A MD8480C Software CD-ROM *3	MC0011A Web Access Key *4			
										√*1			√					√*3	√*4	3G W-CDMA Minimum (1BTS) Configuration Package	1	Standalone MD8480C
√		√								√*1			√					√*3	√*4	3G W-CDMA SHO/HHO (3BTS) Configuration Package	2	
		√			√				√			√*1	√					√*3	√*4	2G GSM/EGPRS HO (2BTS) Configuration Package	3	
√		√			√					√*1		√*1	√					√*3	√*4	Dual mode 3G/2G Configuration Package A (for W-CDMA 3 BTS & GSM 1 BTS)	4	
√	√	√			√				√	√*1	√	√*1	√	√				√*3	√*4	Dual mode 3G/2G Configuration Package B (for W-CDMA/HSDPA 3 BTS & GSM/EGPRS 1 BTS)	5	
√	√	√			√				√	√*1	√	√*1				√*2	√*2	√*3	√*4	Dual mode 3G/2G Configuration Package C (for W-CDMA/HSPA 3 BTS & GSM/EGPRS 2 BTS)	6	
		√								√*1	√					√*2	√*2	√*3	√*4	Non-CT PTS Cofiguration Package (for W-CDMA/HSPA 3 BTS & GSM/EGPRS 1 BTS)	1	PTS/CT
		√			√					√*1		√*1	√					√*3	√*4	TS34.123 GCF Conformance Test Toolkit Configuration Package A (for WI-10,12 & 13)	2	
		√			√					√*1	√	√*1				√*2	√*2	√*3	√*4	TS34.123 GCF Conformance Test Toolkit Configuration Package B (for WI-10,12,13,14,24 & 25)	3	
		√								√*1	√	√*1				√*2	√*2	√*3	√*4	AT&T IOT Library Configuration Package	1	RTD

																					1	Customer's Configuration
																					2	
																					3	
																					4	
																					5	
																					6	
																					7	
																					8	

*1: The MX848041A-01, MX848041C-11, MX848041A-02, MX848041A-03, MX848041A-04, MX848041A-05, MX848041A-06, MX848041A-07, MX848041C-12 or MX848041C-30 must be ordered when the unit/option is used with the MX848001A-01, MX848001C-11, MX848001A-02, MX848001A-03, MX848001A-04, MX848001A-05, MX848001A-06, MX848001A-07, MX848001C-12 or MX848001C-30.

*2: Package Support Option (supports all systems). This option integrates the MD8480C-SS120, MD8480C-SS121, MD8480C-SS122, MD8480C-SS123, MD8480C-SS124 and MD8480C-SS125.

*3: Software CD-ROM including latest firmwares and documents. Please purchase either CD-ROM.

*4: The Web Access Key (MC0011A) is for downloading the latest firmware and documents from the Anritsu download website.

Ordering Information

Please specify the model/order number, name and quantity when ordering.
The names listed in the chart below are Order Names. The actual name of the item may differ from the Order Name.

Model/Order No.	Model Name		Remarks
	– Main frame –		
MD8480C	W-CDMA Signalling Tester		
	– Standard unit (incorporated in main frame) –		
MU848051A	CPU		
MU848056A	Voice Codec		
MU848071C	L2		
MU848072C1	BTS Unit		
MU848073C	Timing Generator		1- slot type
	– Standard accessories –		
J0491	Shielded Power Cord (13 A):	1 pc	
J1251	Twisted-pair Cable (Cross over):	1 pc	
J0127A	Coaxial Cord, 1.0 m:	1 pc	BNC-P · ERG58A/U · BNC-P
J0576B	Coaxial Cord, 1.0 m:	1 pc	N-P · 5D-2W · N-P
J0654A	Serial Interface Cable:	1 pc	IBM-PC/AT (for remote control)
J1006	Monitor Cable:	1 pc	20/50-pin 0.5 m
F0111	Fuse, 15 A:	1 pc	
T0001	Ferrite Core:	2 pcs	
T0002	Ferrite Core:	1 pc	
G0091	Monitor Board:	1 pc	
A0013	Handset:	1 pc	
A0010	Blank Board:	10 pcs	Quantity varies with product configuration
	– MU848077C Standard accessories –		
J1306	Monitor Cable 68		VHDCI-68P · DX30-50P, for connecting BTS Unit Monitor (LVCMOS)-MU848077C Monitor Input
J1307	Digital I/Q Cable		DX30-50P · DX30-50P, for connecting MU848077C Digital IQ I/O-User Board, and executing self-diagnostic loopback test.
J0127A	Coaxial Cord, 1 m		BNC-P · RG58A/U · BNC-P
T0004	Ferrite Core		SFC-5
	– Hardware options –		
MU848055C	ISDN/CSD		
MU848060C	TDMA2		
MU848060C-01	EGPRS (R99)		
MU848072C1	BTS Unit		
MU848072C-01	HSDPA		
MU848072C-02	HSUPA		
MU848077C	Baseband Interface Unit		
MD8480C-03	Additional RF Unit 2		
	– Software options –		
MX848001A-01	W-CDMA Signalling Tester Tx Diversity		License document
MX848001A-02	W-CDMA Signalling Tester Compressed Mode		License document
MX848001A-03	W-CDMA Signalling Tester Router Connection		License document
MX848001A-04	W-CDMA Signalling Tester GSM CSD		License document
MX848001A-05	W-CDMA Signalling Tester GSM Frequency Hopping		License document
MX848001A-06	W-CDMA Signalling Tester W-CDMA CSD		License document
MX848001A-07	Message Encoder/Decoder		License document
MX848001C-11	HSDPA Tx Diversity		License document
MX848001C-12	HSPA Evoluttion (Release 7)		License document
MX848001C-30	DTM (R99)		License document
MX848041C	Ciphering		CD-ROM, License document
MX848041A-01	Tx Diversity for Ciphering		License document
MX848041A-02	Compressed Mode for Ciphering		License document
MX848041A-03	Router Connection for Ciphering		License document
MX848041A-04	GSM CSD for Ciphering		License document
MX848041A-05	GSM Frequency Hopping for Ciphering		License document
MX848041A-06	W-CDMA CSD for Ciphering		License document
MX848041A-07	Message Encoder/Decoder for Ciphering		License document
MX848041C-10	HSDPA Ciphering		License document
MX848041C-11	HSDPA Tx Diversity for Ciphering		License document
MX848041C-12	HSPA Evolution (Release 7) for Ciphering		License document
MX848041C-30	DTM (R99) for Ciphering		License document
MX848045C	GSM/GPRS 2 Ciphering		CD-ROM, License document
MX848062C	Multimedia Interface Software		License document
MX848062C-001	AMR-WB		License document

Model/Order No.	Model Name	Remarks
	– Software CD-ROM –	
Z0904A	MD8480C Software CD-ROM	CD-ROM
Z0905A	MD8480C Software CD-ROM with Ciphering	CD-ROM
	– Software support service –	
MD8480C-SS120	1-year Support Service (W-CDMA/GSM)	License document
MD8480C-SS121	1-year Support Service Ciphering (W-CDMA/GSM)	License document
MD8480C-SS122	1-year Support Service (HSDPA)	License document
MD8480C-SS123	1-year Support Service Ciphering (HSDPA)	License document
MD8480C-SS124	1-year Support Service (HSUPA)	License document
MD8480C-SS125	1-year Support Service Ciphering (HSUPA)	License document
MD8480C-SS150	1-year Support Service (W/G/HSPA)	License document
MD8480C-SS151	1-year Support Service Ciphering (W/G/HSPA)	License document
MD8480C-SS250	2-year Support Service (W/G/HSPA)	License document
MD8480C-SS251	2-year Support Service Ciphering (W/G/HSPA)	License document
MC0011A	Web Access Key	USB Dongle for online software download
	– Hardware extended warranty service –	
MD8480C-ES210	Extended Warranty Service	Extended 2-year hardware warranty
MD8480C-ES310	Extended Warranty Service	Extended 3-year hardware warranty
MD8480C-ES510	Extended Warranty Service	Extended 5-year hardware warranty
	– Hardware retrofit option –	
Z0745A	MD8480C Upgrade	Upgrade MD8480A/B to MD8480C (1RF)
Z0745B	MD8480C Upgrade	Upgrade MD8480A/B to MD8480C (2RF)
Z0746A	MD8480C Upgrade	Upgrade MD8480A/B to MD8480C (1RF, for Asia Oceania)
Z0746B	MD8480C Upgrade	Upgrade MD8480A/B to MD8480C (2RF, for Asia Oceania)
Z0772	MD8480C Baseband Interface	Adds MU848077C, and updates MU848072C → MU848072C1 (for Asia Oceania)
Z0807	MD8480C Baseband Interface	Adds MU848077C, and updates MU848072C → MU848072C1
Z0901A	MD8480C Modification for HSUPA/EGPRS (1RF)	MD8480C Main frame upgrade (for Asia Oceania) Updates MU848072C → MU848072C1 (expands built-in RF unit and changes fan)
Z0901B	MD8480C Modification for HSUPA/EGPRS (2RF)	MD8480C Main frame upgrade (for Asia Oceania) Updates MU848072C → MU848072C1 (expands built-in RF unit, Additional RF unit updates MD8480B-02 → MD8480C-03 and changes fan)
Z0903A	TDMA2 Upgrade	Changes MU848060B → MD848060C (for Asia Oceania)
Z0912A	MD8480C Modification for HSUPA/EGPRS (1RF)	MD8480C Main frame upgrade Updates MU848072C → MU848072C1 (expands built-in RF unit and changes fan)
Z0912B	MD8480C Modification for HSUPA/EGPRS (2RF)	MD8480C Main frame upgrade Updates MU848072C → MU848072C1 (expands built-in RF unit, Additional RF unit updates MD8480B-02 → MD8480C-03 and changes fan)
Z0913A	TDMA2 Upgrade	Changes MU848060B → MD848060C
	– Application parts –	
J1159A	Coaxial Cord	SMA · MQ198-10S-CV, 1.5 m
J1176	IMT-2000 UE Connection Cable	SMA · MQ198-10S-CV, 0.3 m
J1263	W-CDMA Interface Cable	SMA · Cable for UE Connection, USB
J1264	N-SMA Adaptor	
J0658	Adaptor	SMA, L-type
J1308	Monitor I/Q Cable	DX50-80P · DX50-80P, for connecting G0091 monitor board (G0091 also supports use of J1006)
J1419A	Fading Simulator Cable, 1.5 m	For connecting ELEKTROBIT PROPSim C2/C8
J1310	VStation Cable	For connecting Mentor Graphics VStation
J1420	Palladium Cable	For connecting Cadence Design Systems Palladium
J0127A	Coaxial Cord, 1 m	BNC-P · RG58A/U · BNC-P, for extending Ref. connection
P0019	TEST USIM001	For W-CDMA
P0035A	W-CDMA/GSM Test USIM	For W-CDMA/GSM (different authentication key from P0019)

MD8480C requires PC*1 and Microsoft Visual C++ Version 6.0, .NET or Visual Studio 2005*2.

*1: The PC is for controlling the MD8480C. It must meet the following specifications:
OS: Windows 2000 (SP4)/XP (SP2)
CPU: Pentium III 1.6 GHz min.
Memory: 512 MB min.
Interfaces: RS-232C, Ethernet, 10BASE-T/100BASE-Tx, CD-ROM drive

*2: Microsoft Visual C++ Version 6.0, .NET or Visual Studio 2005 is the standard edition.

Anritsu

Specifications are subject to change without notice.

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