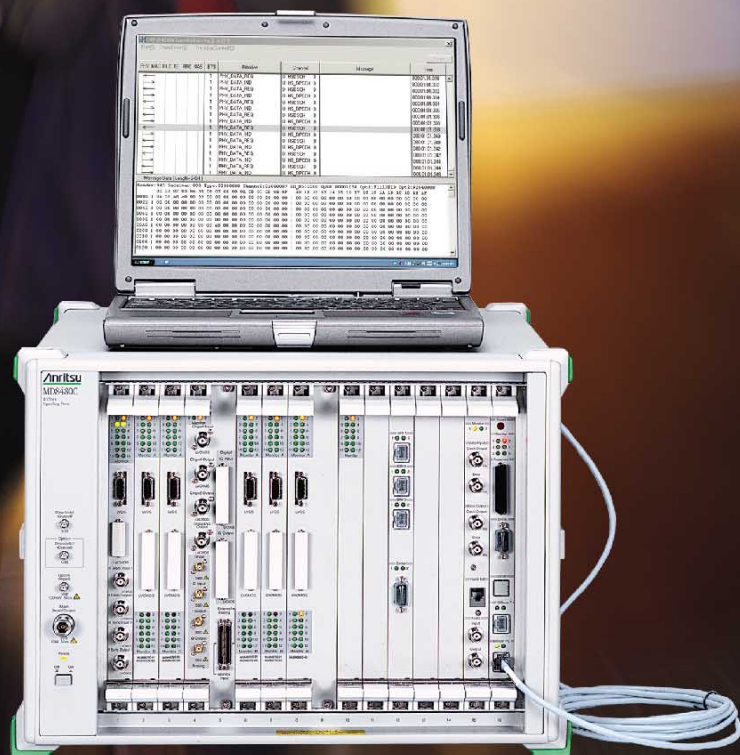


MD8480C

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 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, etc.), 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.

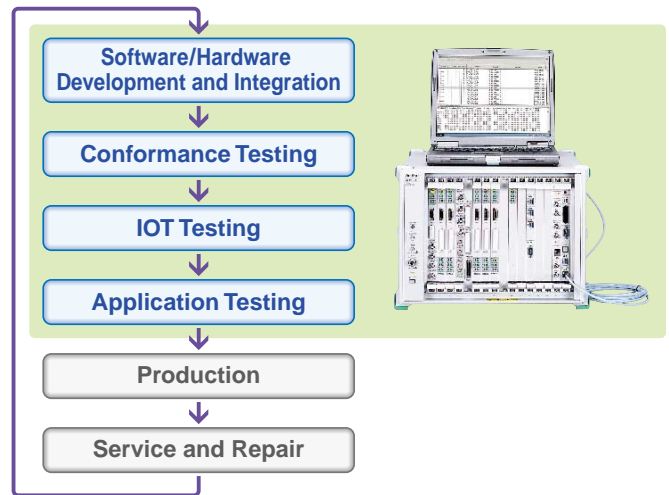
*1: High Speed Packet Access

*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

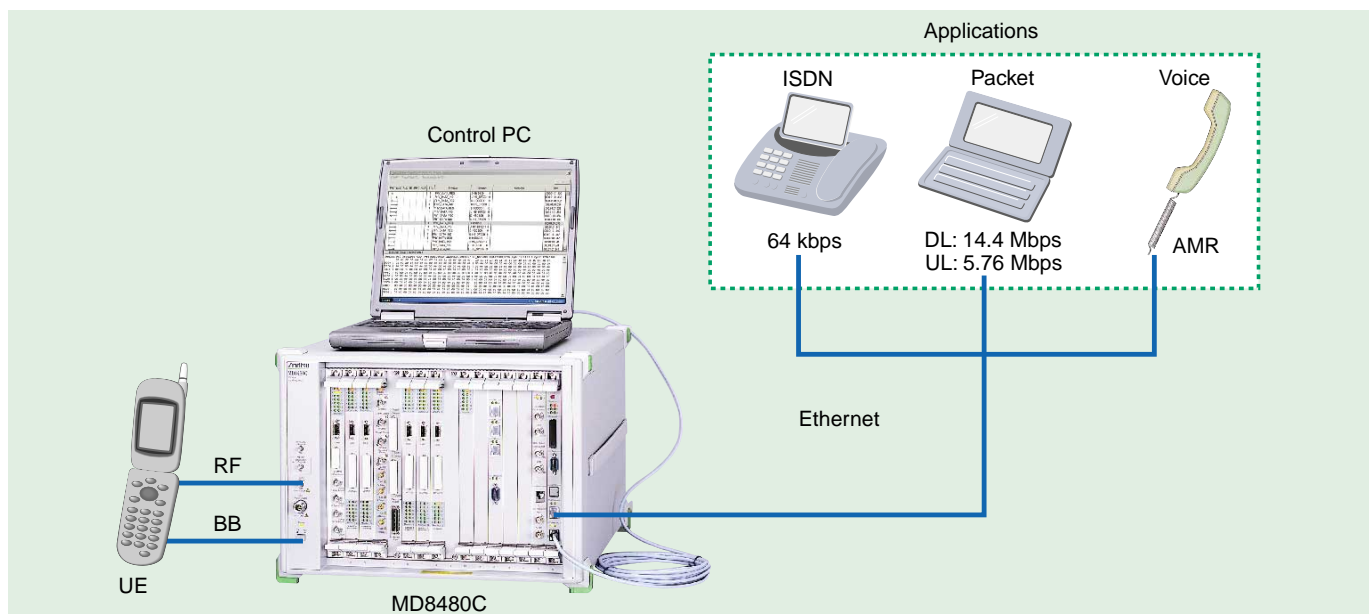


Features

- Supports 3GPP Release 6 (HSPA) and Release 5 (HSDPA)
- Full HSDPA/HSUPA Support for All UE Categories
- Data Throughput Test (DL 14.4 Mbps/UL 5.76 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, etc.)
- 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 (3GPP TS25.306)
- Genuine Maximum Throughput
(DL: 14.4 Mbps/UL: 5.76 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, etc.
- 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

- HSDPA/HSUPA (Option)
- W-CDMA CBS
- W-CDMA CSD (Option)
- Multiple PDP Context
- MBMS (L1, L2)

Supports all UE categories (3GPP TS 25.306)

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 recommendations.

3GPP TS.25.306 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

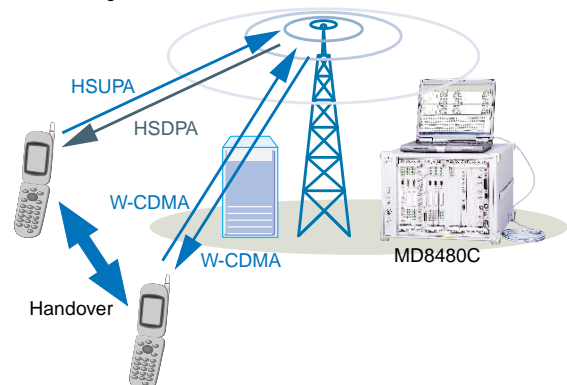
E-DCH Category	E-DCH Codes	Minimum Spreading Factor	Support for 1 and 2 ms TTI EDCH	TB-Sizes with 10 ms E-DCH TTI	TB-Sizes within 2 ms E-DCH TTI	Maximum Throughput [bps]
1	1	SF4	10 ms TTI only	7296	—	729600
2	2	SF4	10 ms and 2 ms TTI	14592	2919	1459200 1459500
3	2	SF4	10 ms TTI only	14592	—	1459200
4	2	SF2	10 ms and 2 ms TTI	20000	5837	2000000 2918500
5	2	SF2	10 ms TTI only	20000	—	2000000
6	4	SF2	10 ms and 2 ms TTI	20000	11520	2000000 5760000

Max. Throughput (DL 14.4 Mbps/UL 5.76 Mbps)

The MD8480C HSDPA/HSUPA function supports maximum throughput (DL 14.4 Mbps/UL 5.76 Mbps) even at two-way packet communications, making the tester ideal for developing chipsets for next-generation high-speed packet data services.



*1: Theoretical figure



For Developing GSM/GPRS/EGPRS UE

Features

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

*1: Requires two TDMA2 boards (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)
- 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) modules*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.

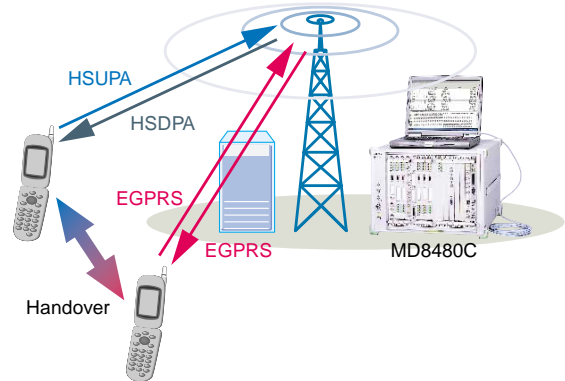
Supports EGPRS

More GSM service regions are using EGPRS services, which is an enhanced version of the GPRS packet method, 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 (Multi Slot Class): 1 to 12, 32, 33
- ARQ Types: 1, 2
- Bit rate: 230 kbps max.

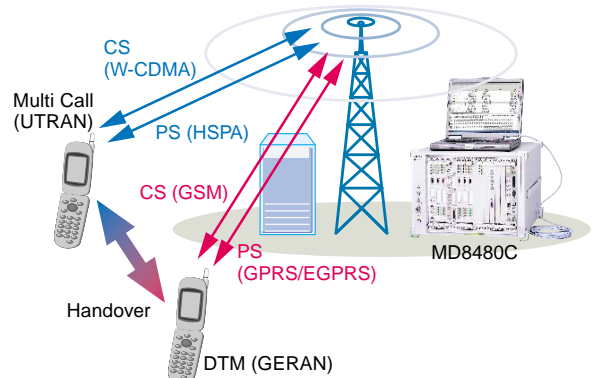
In addition, expanding development of global GSM and 3G services is increasing sales of dual-mode UE supporting HSPA. The future will see increasing demand for handover tests between GERAN and UTRAN networks, but just a single MD8480C unit combining the EGPRS and HSPA functions will support EGPRS-HSPA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

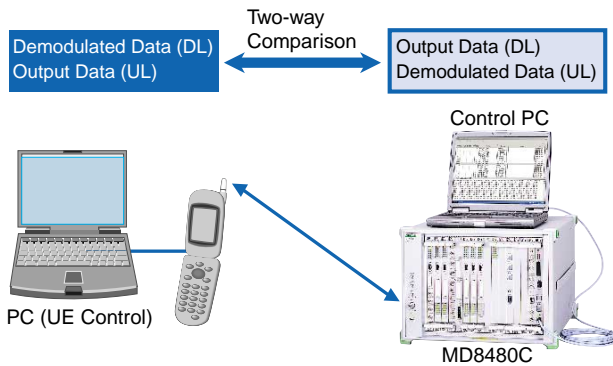


GERAN-UTRAN Handover Test

For Coding/Decoding Test and Baseband Tests

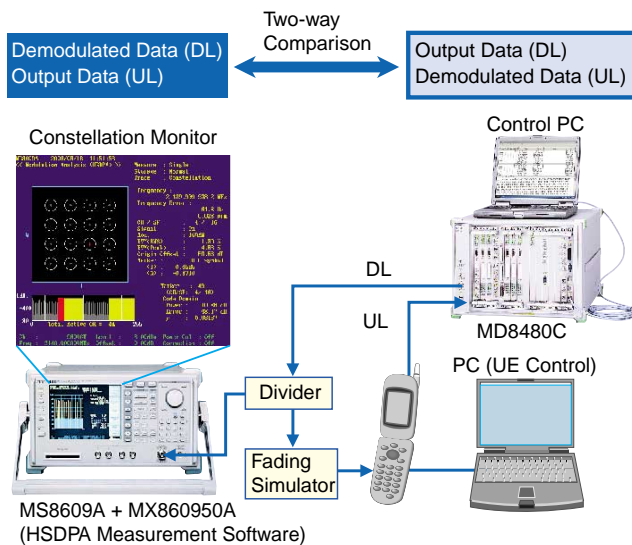
Coding/Decoding Test Setup 1 (RF, Harikiri Test)

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 MS8609A Digital Mobile Radio Transmitter Tester 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>

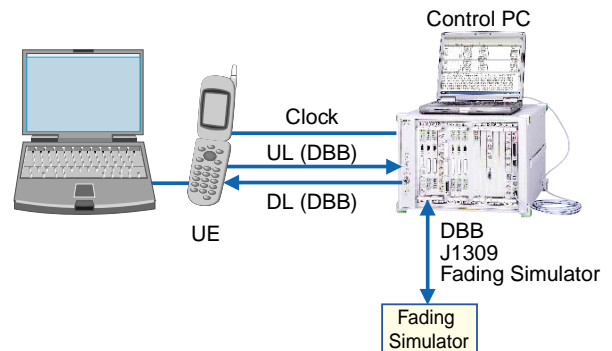
- Analog IQ I/O
- Digital IQ I/O
- Digital Fading Simulator interface*1
- Select either internal or external clock synchronization for each I/O
- Select any frequency within range of 0.01 to 19.2 MHz at external clock
- Select either 4 or 5 times chip rate for either internal or external clock
- Install 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 recommended

*2: The TDMA2 (MU848060C) modules cannot be installed. When two 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)

For 3GPP Protocol Conformance Tests

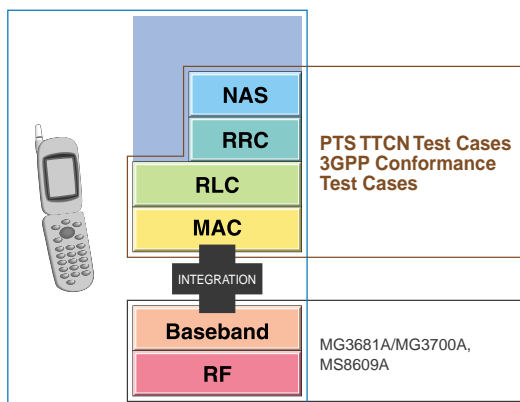
MX785201A

W-CDMA Protocol Test System (PTS)



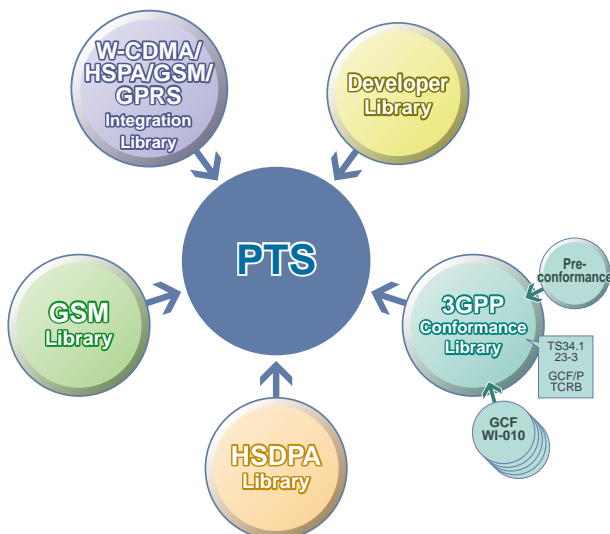
The MD8480C W-CDMA Signaling Tester is used with the MX785201A PTS Core Software to configure a measurement system for Layer 3 and Layer 2 signalling protocols defined by the Third Generation Partnership Project (3GPP). The PTS is designed for testing 3G W-CDMA UE signalling protocols.

Protocol Testing



* See the MX785201A data sheet for more details.

PTS Libraries



- Library options can be purchased separately.
- For details of libraries and specifications, see the PTS data sheet.

Integration and Conformance

Software/Hardware Development and Integration

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

Conformance Testing

- Integration 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, GCF certification is also supported by the GCF-certified PTS with MD8480 and GCF toolkits.



PTS + MD8480

MX785220A Protocol Conformance Test Toolkit

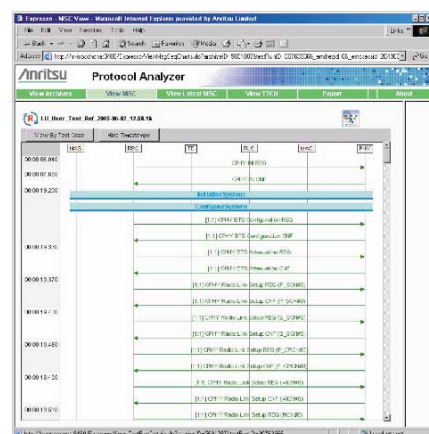
Certification Environment
MX785220A-xx
GCF Work Item Test Cases

MX785220A-xx
Frequency Band Options

MX785220A-20
Annual Update and
Maintenance Contract

* See the MX785220A data sheet for more details.

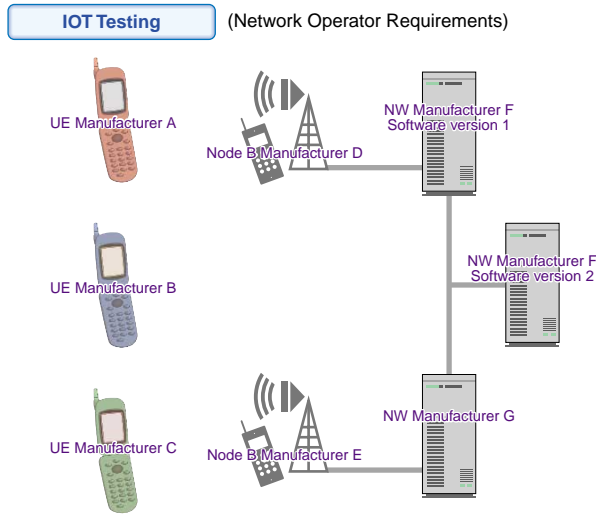
Protocol Analyzer



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

For Interoperability Test (IOT)

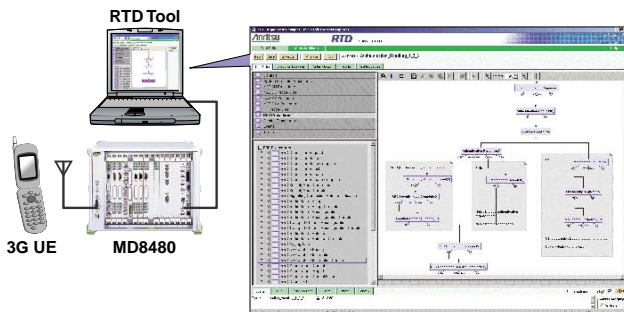
Interoperability



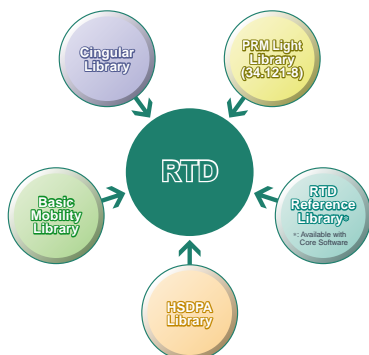
- Test correct functioning of different manufacturers' equipment in real network.
- Ensure terminals stay on their (or preferred) networks.
- Perform initial evaluation of products in 'real world' controlled environments.
- Test future network upgrades in laboratory.

RTD (MX786201A)

The Rapid Test Designer (RTD) is a unique tool that significantly speeds up testing of W-CDMA/HSDPA/GSM/GPRS/EGPRS.



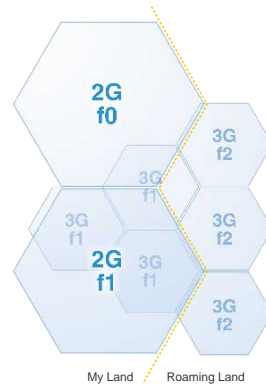
RTD Libraries



- Library options can be purchased separately.
- For details of libraries and specifications, see the RTD (MX786201A) data sheet.

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.



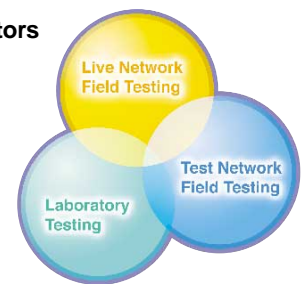
Simulation of Foreign Networks

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

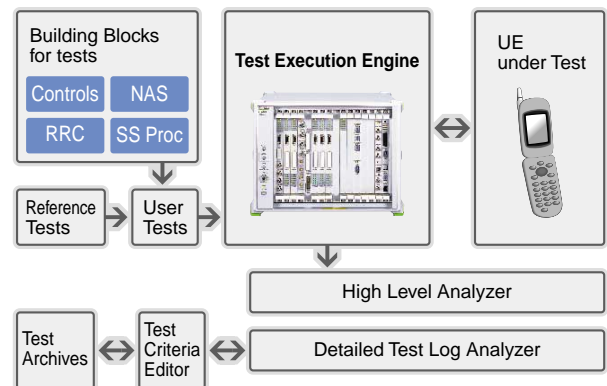
Live network testing will always be required, but system simulation in a laboratory is now a viable alternative using the RTD and MD8480C.



Using RTD and MD8480C for Wide Variety of Tasks

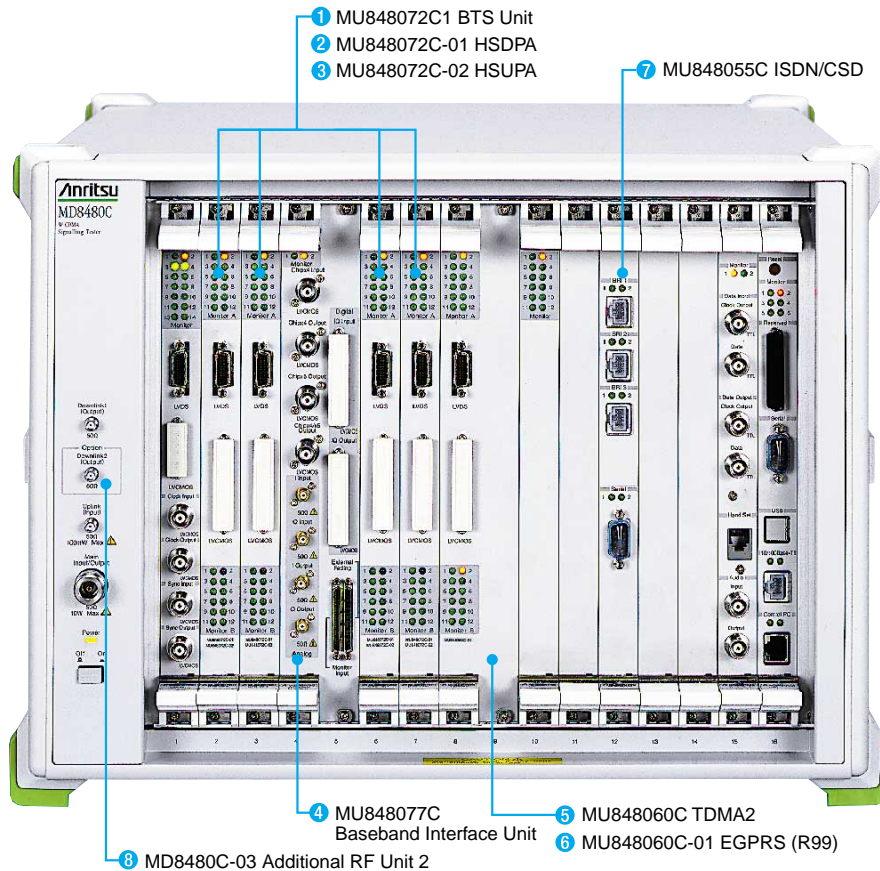
- Interoperability Testing
- Acceptance Testing
- Application Testing
- Regression Testing
- Integration Testing
- Generating Variants
- Pre-conformance Testing
- Prototyping Tests
- Hardware and Software Integration
- Software Development

RTD Tools and MD8480C



* For more details, see the MX786201A Brochure.

Additional Options (Hardware)



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

The standard MD8480C configuration has transmit and receive functions for a single W-CDMA base station. Installing this option in a single MD8480C unit supports W-CDMA transmit and receive functions for up to four 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. It can also be installed in the standard configuration supporting one W-CDMA base station.

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. It can also be installed in the standard configuration supporting one W-CDMA base station.

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 modules can be installed in one MD8480C, supporting the GSM TRX function for each of two base stations.*2

*2: When two TDMA2 (MU848060C) modules 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. It 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. It 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 function requires the ISDN/CSD (MU848055C).

- **W-CDMA Ciphering**

- MX848041C Ciphering**

- This option*1 adds support for ciphering functions to KASUMI (3GPP standards integrity ciphering algorithm).

- **HSDPA Ciphering**

- MX848041C-10 HSDPA Ciphering**

- This option*1 adds supports for ciphering functions to KASUMI (3GPP standards integrity ciphering algorithm).

- *1: 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 function 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. It requires an Additional RF Unit (MD8480B-02 or MD8480C-03).

- **DTM (Dual Transfer Mode) Function**

- MX848001C-30 DTM(R99)**

- This option adds the 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 function 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.



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, MD8480C-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 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.

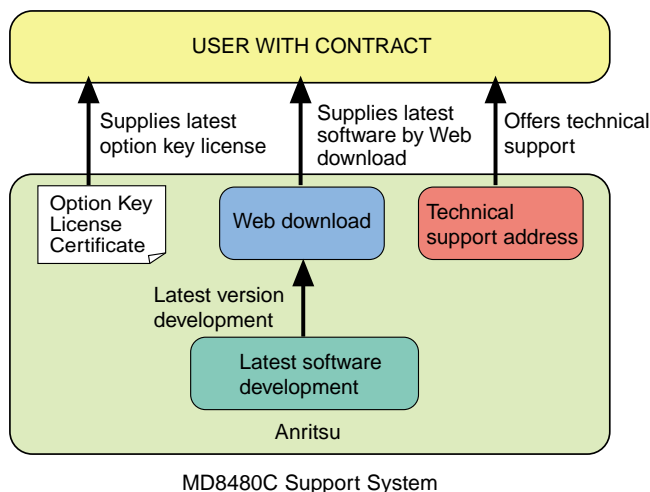
3-year Extended Warranty Service [MD8480C-ES310]*3

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	15 ksps
		S-CPICH	15 ksps
		AICH	15 ksps
		PICH	15 ksps
PCCH	PCH	S-CCPCH	15 ksps to 480 ksps
CCCH/DCCH/DTCH	FACH		
MCCH, MSCH, MTCH			
DCCH + DTCH	DCH	DPDCH	7.5 ksps to 960 ksps
		DPCCH	7.5 ksps to 960 ksps
	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 ksps to 120 ksps
DCCH/DTCH	DCH	DPDCH	15 ksps to 960 ksps
		DPCCH	15 ksps
	E-DCH*2	E-DPDCH*2	15 ksps 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 kbps + 32 kbps	1xDPCH (15 ksps)	1xDPDCH (240 ksps)
		12.2 kbps + 64 kbps	1xDPCH (15 ksps)	1xDPDCH (240 ksps)
		12.2 kbps + 384 kbps	1xDPCH (15 ksps)	1xDPDCH (960 ksps)
	Voice + ISDN 1B	12.2 kbps + 64 kbps	1xDPCH (15 ksps)	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*: SMA type, Impedance: 50 Ω , VSWR: ≤ 2.0 Uplink: SMA type, Impedance: 50 Ω , VSWR: ≤ 2.0
	Reference oscillator	Frequency: 10 MHz Startup characteristics: $\leq \pm 5 \times 10^{-8}$ (10 minutes after power-on, referenced to 24 hours after power-on) Aging rate: $\leq \pm 2 \times 10^{-8}$ /day, $\leq \pm 1 \times 10^{-7}$ /year (referenced to 24 hours after power-on) Temperature: $\leq \pm 5 \times 10^{-8}$ (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 ($\alpha = 0.22$)
	EVM	$\leq 7\%$ 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) \times 310 (H) \times 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 modules installed

*2: No GSM signal is output from this connector when only one module 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. Connection with videophone when combined with MD8480.

Additional Unit/Option Selection Guide

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

Additional Function	Hardware Options																Software Options																									
	MU848072C1	MU848072C1	MU848072C1	MU848072C-01	MU848072C-01	MU848072C-01	MU848072C-01	MU848072C-02	MU848072C-02	MU848072C-02	MU848072C-02	MD8480C-03	MU848060C	MU848060C	MU848060C-01	MU848060C-01	MU848055C	MU848077C	Z0901A/B	Z0912A/B	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-30	MX848041C-30 ^{*1}	MX848041C	MX848041C-10	MX848045C	
2BTS Handover (W-CDMA)	✓																																									
3BTS Handover (W-CDMA)	✓	✓																																								
4BTS Handover (W-CDMA)	✓	✓	✓																																							
HSDPA 1 BTS				✓																																						
2BTS Handover (HSDPA)	✓			✓	✓																																					
3BTS Handover (HSDPA)	✓	✓		✓	✓	✓																																				
4BTS Handover (HSDPA)	✓	✓	✓	✓	✓	✓	✓																																			
HSUPA 1 BTS								✓												✓																						
2BTS Handover (HSUPA)	✓							✓	✓											✓																						
3BTS Handover (HSUPA)	✓	✓						✓	✓	✓										✓																						
4BTS Handover (HSUPA)	✓	✓	✓					✓	✓	✓	✓									✓																						
Hard Handover (HHO)	✓											✓													✓																	
Inter System (GSM/GPRS) Handover												✓	✓							✓						✓																
Inter System (EGPRS) Handover												✓	✓		✓					✓						✓																
Intra System (EGPRS) Handover												✓	✓	✓	✓	✓																										
Baseband Interface (W-CDMA)																		✓																								
Tx Diversity (1RF, W-CDMA)	✓																					✓																				
Tx Diversity (2RF, W-CDMA)	✓											✓										✓																				
Tx Diversity (1RF HSDPA)	✓			✓	✓																	✓	✓																			
Tx Diversity (2RF HSDPA)	✓			✓	✓							✓										✓	✓																			
Tx Diversity (1RF HSUPA)	✓							✓	✓											✓		✓	✓																			
Tx Diversity (2RF HSUPA)	✓							✓	✓			✓								✓		✓	✓																			
Ciphering (W-CDMA)																																							✓ ^{*1}			
Ciphering (GSM/GPRS)												✓	✓							✓																					✓ ^{*1}	
Ciphering (HSDPA/HSUPA)				✓				✓																															✓ ^{*1}	✓		
Router Connection (W-CDMA)																											✓															
Router Connection (GPRS)												✓	✓							✓							✓															
Message Encoder/Decoder																																										
CSD (W-CDMA)																																										
CSD (GSM)												✓	✓					✓		✓								✓														
GSM Frequency Hopping												✓	✓							✓									✓													
DTM (Dual Transfer Mode)												✓	✓							✓																			✓			
Support Service (W-CDMA/GSM)																																										
Support Service (HSDPA)				✓																																						
Support Service (HSUPA)								✓																																		
User Required Configuration																																										

Ordering Information

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

The following name of articles is an order name. The actual name may differ name from the product.

Model/Order No.	Model Name	Remarks
MD8480C	– Main frame – W-CDMA Signalling Tester	
MU848051A	– Standard unit (incorporated in main frame) – CPU	
MU848056A	Voice Codec	
MU848071C	L2	
MU848072C1	BTS Unit	1- slot type
MU848073C	Timing Generator	
	– 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
	– Options/Units –	
MU848055C	ISDN/CSD	Hardware
MU848060C	TDMA2	Hardware
MU848060C-01	EGPRS (R99)	Hardware
MU848072C1	BTS Unit	Hardware
MU848072C-01	HSDPA	Hardware
MU848072C-02	HSUPA	Hardware
MU848077C	Baseband Interface Unit	Hardware
MD8480C-03	Additional RF Unit 2	Hardware
	– Software options –	
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)
MX848001A-07	Message Encoder/Decoder	Software (license document)
MX848001C-11	HSDPA Tx Diversity	Software (license document)
MX848001C-30	DTM (R99)	Software (license document)
MX848041C	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)
MX848041A-07	Message Encoder/Decoder for Ciphering	Software (license document)
MX848041C-10	HSDPA Ciphering	Software (license document)
MX848041C-11	HSDPA Tx Diversity for Ciphering	Software (license document)
MX848041C-30	DTM (R99) for Ciphering	Software (license document)
MX848045C	GSM/GPRS 2 Ciphering	Software (CD-ROM, license document)
	– Software CD-ROM –	
Z0904A	MD8480C Software CD-ROM	Software (CD-ROM)
Z0905A	MD8480C Software CD-ROM with Ciphering	Software (CD-ROM)

Model/Order No.	Model Name	Remarks
– Software support service –		
MD8480C-SS120	1-year Support Service (W-CDMA/GSM)	Software maintenance contract (license document)
MD8480C-SS121	1-year Support Service Ciphering (W-CDMA/GSM)	Software maintenance contract (license document)
MD8480C-SS122	1-year Support Service (HSDPA)	Software maintenance contract (license document)
MD8480C-SS123	1-year Support Service Ciphering (HSDPA)	Software maintenance contract (license document)
MD8480C-SS124	1-year Support Service (HSUPA)	Software maintenance contract (license document)
MD8480C-SS125	1-year Support Service Ciphering (HSUPA)	Software maintenance contract (license document)
MD8480C-SS150	1-year Support Service (W/G/HSPA)	Software maintenance contract (license document)
MD8480C-SS151	1-year Support Service Ciphering (W/G/HSPA)	Software maintenance contract (license document)
MD8480C-SS250	2-year Support Service (W/G/HSPA)	Software maintenance contract (license document)
MD8480C-SS251	2-year Support Service Ciphering (W/G/HSPA)	Software maintenance contract (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) Changes MU848060B → MD848060C (for Asia Oceania)
Z0903A	TDMA2 Upgrade	MD8480C Main frame upgrade
Z0912A	MD8480C Modification for HSUPA/EGPRS (1RF)	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) Changes MU848060B → MD848060C
Z0913A	TDMA2 Upgrade	
– 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) For connecting ELEKTROBIT PROPSim C2
J1309	Fading Simulator Cable	BNC-P · RG58A/U · BNC-P, for extending Ref. connection
J0127A	Coaxial Cord, 1 m	For W-CDMA
P0019	TEST USIM001	For W-CDMA/GSM (different authentication key from P0019)
P0027	W-CDMA/GSM Test USIM	

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/XP (including SP2), CPU: Pentium III 600 MHz min., Memory: 256 Mbyte 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.

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