

HSPA/HSPA Evolution

Test & Measurement Solutions





Anritsu's HSPA/HSPA Evolution Solutions














Anritsu has supported the global spread of mobile systems from the earliest days by providing solutions supporting major systems, including GSM/GPRS/EGPRS, W-CDMA, and CDMA2000.

Now we are focusing our extensive know-how in mobile technologies on solutions for HSPA/HSPA Evolution.

Our instrument lineup already provides wide-ranging support for R&D into HSPA/HSPA Evolution equipment and devices, as well as for base station construction and maintenance.

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HSPA/HSPA Evolution Product Lineup

		R&D	Manufacturing	Maintenance & Service
Handset Testing	HSPA HSPA Evolution	 MD8475A Signalling Tester		
	HSPA HSPA Evolution	 MD8480C W-CDMA Signalling Tester		
	HSPA HSPA Evolution	 ME7834A/ME7834L UTRAN/LTE Mobile Device Test Platform		
	HSPA HSPA Evolution	 ME7873F/ME7874F W-CDMA TRX/Performance Test System W-CDMA RRM Test System		
	HSPA HSPA Evolution	 MF6900A Fading Simulator		
	HSPA HSPA Evolution		 MT8820C Radio Communication Analyzer	
	HSDPA		 MT8870A Universal Wireless Test Set	
	HSPA	 MG3710A/MG3700A Vector Signal Generator		
	HSPA HSPA Evolution	 MS2690A/91A/92A, MS2830A Signal Analyzer		
Base Station Testing	HSPA	 MG3710A/MG3700A Vector Signal Generator		
	HSPA HSPA Evolution	 MS2690A/91A/92A, MS2830A Signal Analyzer		
	HSDPA			 MS2720T/MS2712E/MS2713E Spectrum Master
	HSDPA			 MT8212E/MT8213E, MT8221B/MT8222B Cell Master, BTS Master



The MD8475A Signalling Tester simulates the operation of multisystem base stations supporting the world's common mobile communications systems, including LTE FDD/TDD, W-CDMA, GSM, CDMA2000 1X/1xEV-DO Rev. A/TD-SCDMA. The easy-to-use dedicated StartStudio GUI eliminates the need for base-station simulator scenarios. As well as voice and packet data tests, the all-in-one MD8475A desktop platform tests emergency information, which is hard to evaluate on live networks.



Features

SmartStudio supports following performance tests:

- Throughput measurements for UE categories
- RRC State Change and CPC battery-life tests while checking UE Tx power
- Measurement HO using W-CDMA 2-cell
- ETWS/CMAS Tests

3GPP TS 25.306 Category List

HSDPA/HS-PA Evolution/DC-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
13	15	1	35280	259200	Not Applicable (dual cell operation not supported)	17640000
14	15	1	42192	259200		21096000
23	15	1	35280	518400	QPSK, 16QAM, 64QAM	35280000
24	15	1	42192	518400	QPSK, 16QAM, 64QAM	42192000

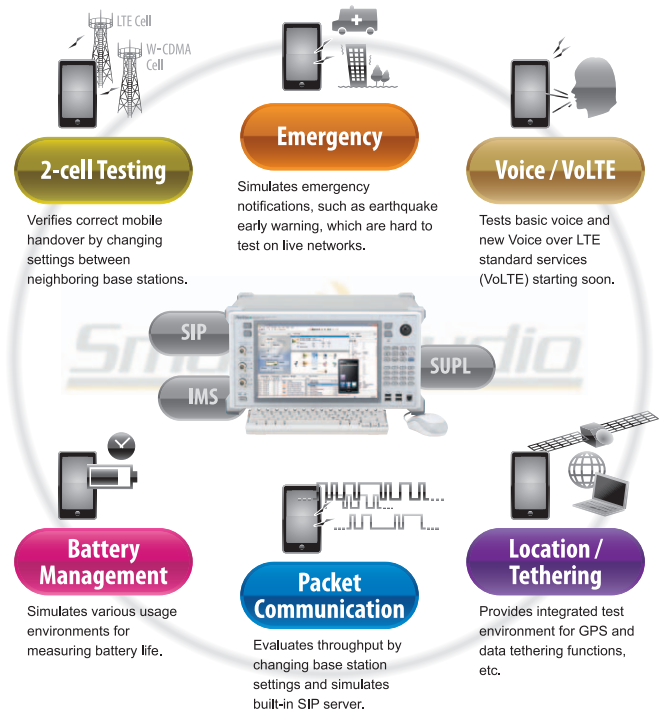
HSUPA

E-DCH Category	E-DCH Codes	Minimum Spreading Factor	Support for 10 and 2 ms TTI EDCH	TB-Sizes within 10 ms E-DCH TTI	TB-Sizes within 2 ms E-DCH TTI	Maximum Throughput [bps]
1	1	SF4	10 ms TTI only	7110	—	729600
2	2	SF4	10 ms and 2 ms TTI	14484	2798	1459200
3	2	SF4	10 ms TTI only	14484	—	1459200
4	2	SF2	10 ms and 2 ms TTI	20000	5772	2000000
5	2	SF2	10 ms TTI only	20000	—	2000000
6	4	SF2	10 ms and 2 ms TTI	20000	11484	2000000
						5760000

Purpose

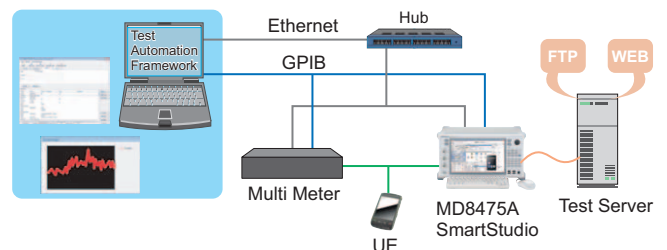
- R&D for W-CDMA UE deployment
- Continuous testing using remote commands

Key Application



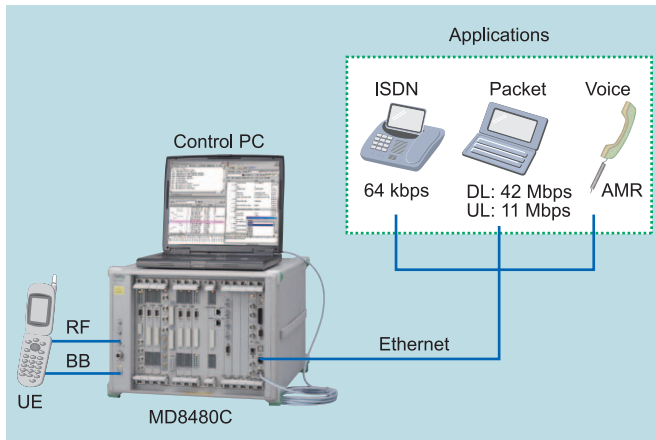
Remote Interface

Supports configuration of automatic test system over Ethernet/GPIB



MD8480C W-CDMA Signalling Tester

All-in-One Support for W-CDMA/HSPA and GSM/GPRS/EGPRS



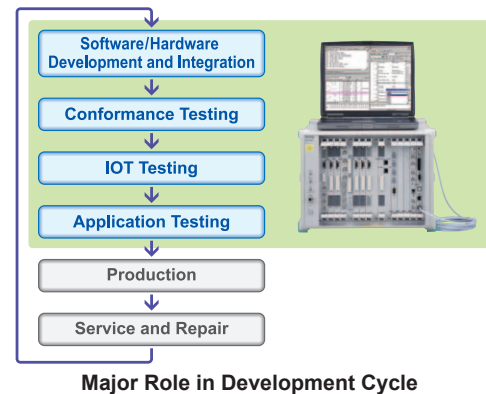
- Supports 3GPP Release 9 HSPA Evolution
- Data Throughput Test (DL 42 Mbps/UL 11 Mbps)
- One Unit Supports Expanded Functions for 4 BTS max. (W-CDMA/HSPA)
- Optional GSM/GPRS/EGPRS 2 BTS Functions

The MD8480C is a base station simulator with ideal protocol development and test functions for developing 3.5G W-CDMA UE supporting HSPA Evolution. 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*1 for chipsets and UE. Moreover, adding options for GSM/GPRS/EGPRS*2 base stations supports Inter-RAT handover tests*3 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.

*1: Requires two MD8480C units

*2: Enhanced GPRS

*3: Handover Testing between W-CDMA/HSPA and GSM/EGPRS at Voice/ Data Communications



MF6900A Fading Simulator

Digital Fading Simulator supporting W-CDMA/HSPA



The MF6900A Fading Simulator supports W-CDMA/HSPA mobile terminals with a full range of preset 3GPP fading profiles as well as easy configuration of fading performance and stress test environments. The dedicated digital interface for connecting the MD8480C Base Station Simulator guarantees high simulation reproducibility, easy maintenance, and calibration-free stability. Makes easy test environment for 3GPP TS 25.101 and TS 34.121 Fading performance tests, data throughput performance test required by operator's UE acceptance tests.

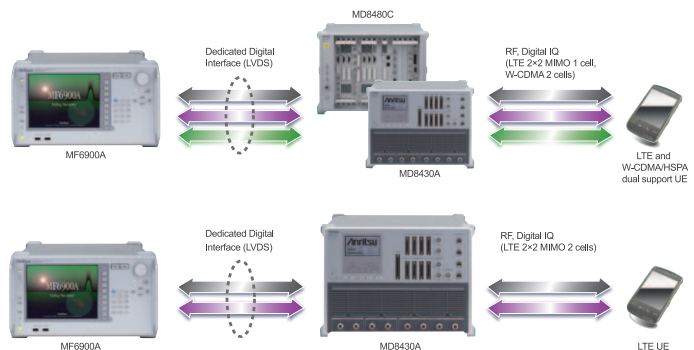
- High reproducibility and maintainability due to digital baseband processing
- Easy fading settings using dedicated interface with MD8480C
- All-in-one unit supports W-CDMA/HSPA ↔ LTE 2x2 MIMO dual test environment

Purpose

- Coding and Decoding Tests for W-CDMA/HSPA UE (RF/Baseband)
- Fading Performance Tests
- Data Throughput Tests

Applications

- RF Conformance and Pre-conformance Tests
- Network Interoperability Tests (IOT)
- Operator Terminal Acceptance Tests
- QA Terminal Evaluation



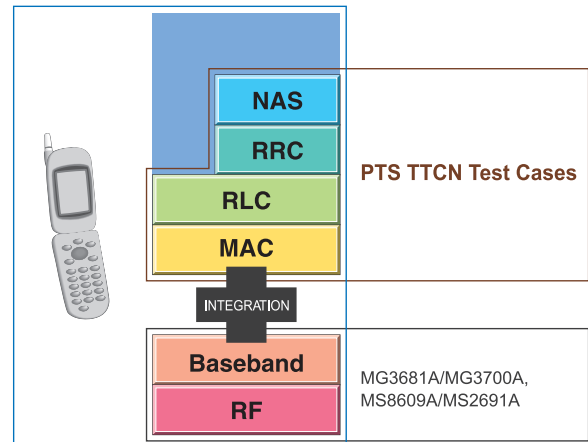
The MD8480C Signalling Tester for W-CDMA supports all-in-one LTE/ W-CDMA inter-system handover tests (with MF6900A-001 option installed).

Application Software for MD8480C W-CDMA Signalling Tester

MX785201A W-CDMA Protocol Test System (PTS) Test and Verification Tools for 3G Wireless Products



The MX785201A PTS Core Software is used with the MD8480C W-CDMA Signalling Tester 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.



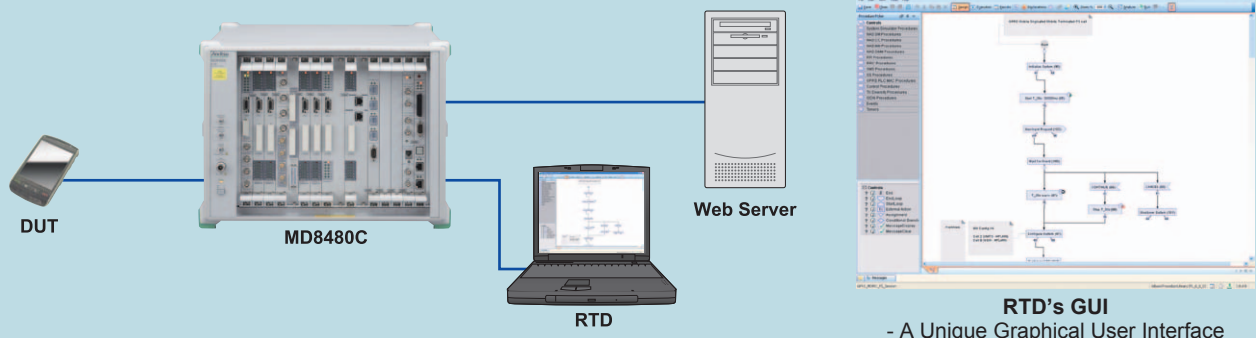
Protocol Testing

- W-CDMA/HSPA, GSM/GPRS/EGPRS Protocol Testing
- 3GPP Standard Compliant Development Tools
- Common User Interface Across Anritsu Development Tools
- Inter-RAT Capability for 2G/3G Testing
- Environment Supporting TTCN Test Case Execution
- TTCN Test Libraries for Development, Integration and Conformance Testing

MX786201A Rapid Test Designer (RTD)

Test Solution for AT&T 3G UE Pre-certification

AT&T USA IOT Test System for HSPA Evolution/UMTS/GSM UE Test Solution



RTD's GUI
- A Unique Graphical User Interface

The MX786201A Rapid Test Designer (RTD) IOT Test System provides terminal protocol verification environment using MD8480C for AT&T IOT Pre-Certification Testing Environment for Mobile Chipset/UE manufacturers who wish to sell their devices to AT&T USA. Anritsu's AT&T 3G UE testing solutions help pre-testing to applicable specifications to determine if it complies before sending it for AT&T lab testing, helping time-to-market (TTM) and eliminating the risk of potential product re-designs and lengthy delays.

Test Coverage

- 2G Advanced Features
- 2G PS Data
- 2G PS Data Performance
- 3G PS Data Performance
- AMR
- AT Command
- Call Processing
- Encryption
- ENS
- EONs
- HSPA Functional
- MWI
- Network Selection
- Physical RF
- RAB/Multi RAB/SRB
- Rel 7 HSPA
- RRC & IRAT
- SIM-ME Interface
- TTY
- UICC Application Inter-operability
- UMTS Functional

Applications

- Acceptance Testing

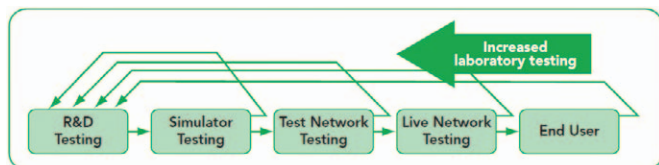
- Applications Testing
- Regression & Integration Testing



The ME7834 is a configurable system that provides flexible protocol test solutions throughout the lifecycle of modern wireless terminals. ME7834 systems are able to address applications in development and conformance and evolve to provide advanced system simulation. Anritsu led the way with 3G mobile development programs. It is now delivering intelligent test solutions to LTE development teams that need to accelerate their designs to stay competitive.

Protocol Test Solutions

- 2G/3G/LTE
- Development
- Conformance
- Carrier Acceptance



Reduce Costs by finding errors earlier in the process

ME7834 System Simulators

Anritsu has a well-earned reputation for capable and dependable wireless simulators. The MD8430A has the ability to generate 6 LTE cells: which means that as terminal designs mature, the test system is ready to create new complex testing environments without the need to add more equipment or change out cables. 2x2 MIMO handovers are already possible using one MD8430A. Adding MD8480C(s) and MD8470A(s) provides simulations that add multiple UTRAN/GERAN cells and multiple CDMA2000 1xEV-DO (HRPD and/or eHRPD) cells. This means that for InterRAT handovers the most realistic network simulation is provided and resources are not time shared, with a likely performance compromise. The hardware is designed to ensure that an investment today provides capability for the future.

ME7834 for Conformance Testing to Meet Evolving Specifications

The Global Certification Forum (GCF) and the PCS Type Certification Review Board (PTCRB) include the ME7834 as an approved platform to provide test coverage for GERAN, UTRAN, HSPA Evolution and LTE technologies. The ME7834 is registered as GCF TP119 and tracks TS 36.523 for LTE and TS 34.123 for UTRAN. It has met critical deadlines set by the industry for test platform approval. The system may also be configured to meet tests mandated by several network operators.

ME7834 systems are easily upgraded as requirements change. A system used for LTE development can easily be adapted to also run carrier acceptance tests. Existing PCT users will be able to upgrade to ME7834, protecting their equipment investment and more importantly tests.

The systems are the most reliable and provide results that can be trusted.

- Comprehensive test case libraries to meet the requirements of GCF & PTCRB
- Test case modification in TTCN-3
- InterRAT capable solution

ME7834 for Acceptance Testing for Carriers

Carriers are making use of the intelligent test tools to ensure that terminals behave correctly on their networks. Terminal development teams simulate conditions in networks that may be thousands of miles away and may not yet support the updated functionality present in new handsets.

The tests are created and validated with the RTD to take advantage of the graphical layout. This makes it straight forward to visualize test flow and hence verify and debug the terminals behavior. These tests are validated against stringent requirements before they are provided as a commercial test package.

Test packages that keep pace with network requirements Anritsu are able to provide and support a number of carrier specific tests. (Note: some test packages may need to be obtained directly from carriers) ME7834 users now have the ability to purchase carrier acceptance test packages outright or subscribe to them on an annual basis to suit their fiscal needs.



MD8430A Signalling Tester

- LTE for FDD and TDD covering 350 MHz to 3000 MHz frequency band
- 150 MB (DL), 50 MB (UL)
- 4-RF supports 2x2 MIMO handover
- Up to 6 Cells (2 communication, 4 neighbor)
- Future proof – Category 4 today
- Compliant with 3GPP TS 36.523 for GCF and PTCRB certification



MD8480C Signalling Tester

- Up to 4 W-CDMA cells and 2 GSM cells
- Up to 2 physical RF channels
- Enhancement to HSPA Evolution



MD8470A Signalling Tester

- All-in-one platform supporting functional testing of mobile terminal applications, including voice and video calling, content download and messaging.
- Wide frequency coverage (400 MHz to 2.7 GHz)
- Up to 6 CDMA Sectors and 3 EV-DO Sectors on up to 2 RFs
- CDMA2000 1X/1xEV-DO Rev. A

ME7873F-74	WI-014 Toolkit	ME7873F/74F-76	WI-025 Toolkit	ME7873F-80	WI-069 Toolkit	ME7873F-60	WI-113 Toolkit
ME7873F/74F-75	WI-024 Toolkit	ME7873F-78	WI-076 Toolkit	ME7873F-81	WI-070 Toolkit	ME7873F-61	WI-129 Toolkit



The ME7873F and ME7874F test platform is compliant with GCF*1 / PTCRB*2 specifications.

The ME7873F is for testing W-CDMA User Equipment (UE) in accordance with measurement items*3 in Chapter 5 (Transmitter Characteristics), Chapter 6 (Receiver Characteristics), and Chapter 7 (Performance Requirements) of the 3GPP TS 34.121-1 standards. Measurement items*3 defined by Chapter 8 (Requirements for Support of RRM*4), Chapter 9 (Performance requirements for HSDPA), Chapter 10 [Performance requirement (E-DCH)], and Chapter 11 [Performance requirement (MBMS)] can also be measured by installing the ME7873F-xx options.

In addition, all Inter-RAT tests*3, including handover tests, can be measured.

Therefore, the RF performance of HSPA UEs can be comprehensively tested.

Supporting Most GCF/PTCRB Approved Test Cases

These test platforms support the GCF/PTCRB requirements for TS34.121-1 Conformance Testing and offer the industry leading GCF/PTCRB approved test cases.

By configuring a test system from various instruments and dedicated software centered around the MD8480C W-CDMA Signalling Tester, these Test Platforms support the testing of W-CDMA UE with non-call-processing conditions*5 as well as loopback conditions.

Supports High-speed HSUPA/HSDPA/HSPA Evolution Test

Both downlink and uplink speeds are being increased to offer new services for high-speed data communications.

This system supports both high-speed uplinks as well as high-speed downlinks, permitting evaluation of both HSDPA and HSUPA UEs with one platform.

Additionally, WI-024 test items included in the Release-6 Enhancements, WI-076 HSDPA RF Performance, WI-069 HSPA-64QAM for HSDPA, WI-070 HSPA-CPC, WI-113 Type 3, WI-129 DC-HSDPA, and WI-148 Type1 are also supported, making this system the optimum test solution for high-speed data communications terminals.

Work Item*6	Chapter in 3GPP 34.121	ME7873F TRX/Performance Test System	ME7874F RRM Test System
WI-014	5	✓ (Option)	
	6	✓ (Option)	
	9	✓ (Option)	
WI-024	5	✓ (Option)	
	7	✓ (Option)	
	8	✓ (Option)	✓ (Option)
WI-025	5	✓ (Option)	
	8	✓ (Option)	✓ (Option)
	10	✓ (Option)	
WI-076	9	✓ (Option)	
WI-069	6	✓ (Option)	
	9	✓ (Option)	
WI-070	9	✓ (Option)	
WI-113	9	✓ (Option)	
WI-129	6	✓ (Option)	
	9	✓ (Option)	

Supports Global Mobile Terminals

This system supports operating bands in most countries worldwide, including Europe and Japan.

In addition to 3GPP Band I (2 GHz), Band II (1.9 GHz), Band IV (1.7 GHz/2 GHz), and Band V (850 MHz) used in the USA, Band VI (800 MHz), Band IX (1.7 GHz) and Band XIX (800 MHz) used in Japan, are also supported.

Moreover, the following bands used in worldwide are also supported.

UTRA Operating Band	UL Operating Band (MHz)	DL Operating Band (MHz)
I	1920 to 1980	2110 to 2170
II	1850 to 1910	1930 to 1990
III	1710 to 1785	1805 to 1880
IV	1710 to 1755	2110 to 2155
V	824 to 849	869 to 894
VI	830 to 840	875 to 885
VIII	880 to 915	925 to 960
IX	1749.9 to 1784.9	1844.9 to 1879.9
XI	1427.9 to 1452.9	1475.9 to 1500.9
XIX	830 to 845	875 to 890

- *1: Abbreviation for Global Certification Forum responsible for certifying conformance to standards for UE and test systems
Composed mainly of European carriers and UE vendors and performs certification for frequency bands used in Europe
- *2: Abbreviation for PCS Type Certification Review Board responsible for certifying conformance to standards for UE and test systems
Composed mainly of N. American carriers and UE vendors and performing conformance certification for frequency bands used in N. America
- *3: In principle, defined by GCF Work Item and targeting measurement items certified by GCF/PTCRB
- *4: Abbreviation for Radio Resource Management
- *5: Not supported by RRM tests
- *6: Name for test item group for each function chosen by GCF for test items for certifying UE conformance



- Supports RF Tx and Rx Tests in UE-connected and Test Modes
- Supports 3GPP-defined Test Signals
- Easy Software Upgrade

The MT8820C combines high-level signalling and high-performance RF measurement technologies in a single hardware platform covering a wide frequency range from 30 MHz to 2.7 GHz.

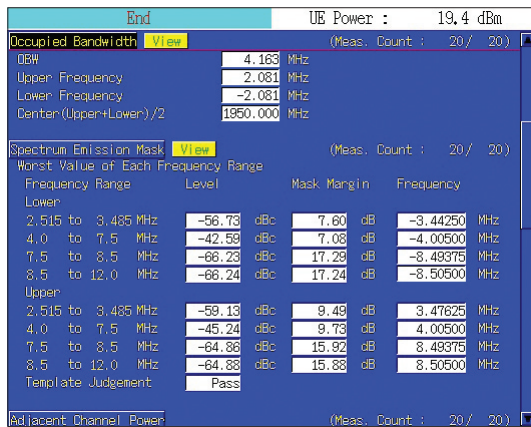
Installing the HSDPA Measurement Software in the MT8820C supports high-speed and high-accuracy RF Tx/Rx testing HSDPA UEs with HS-DSCH category 7 and 8 (7.2 Mbps class) on production lines in either the UE-connected mode or Test mode.

In addition, installing the HSUPA Measurement Software supports RF Tx tests of HSUPA UEs with E-DCH category 1 to 6 (5.76 Mbps class); installing the HSPA Evolution Measurement Software can select HS-DSCH category 14 (21 Mbps class) test signal for throughput measurement.

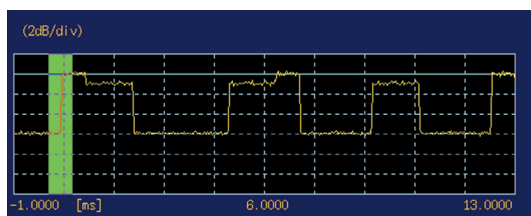
HSDPA UE Evaluation

RF Tx and Rx Testing in UE-connected and Test Modes

All RF Tx and Rx tests defined by 3GPP (TS 34.121 chapters 5 and 6) can be performed in both the HSDPA UE-connected mode and Test mode (UE not connected). In addition, various RF Tx and Rx test-related parameters can be changed.



OBW, SEM Measurement Results

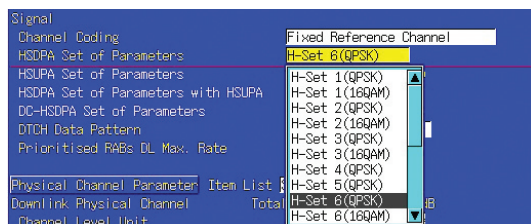


HS-DPCCH Measurement Results

Supports 3GPP-defined Test Signals

The HSDPA Measurement Software supports signals (FRC H-Set 1 to 5) defined by 3GPP for testing HSDPA UEs with HS-DSCH category 1 to 6, 11 and 12 (3.6 Mbps) as well as the QPSK/16QAM modulation methods.

Also, adding the HSDPA High Data Rate option allows selection of the used FRC H-Set 6 signal, supporting HSDPA UE throughput tests for HS-DSCH categories 7 and 8 (7.2 Mbps class).

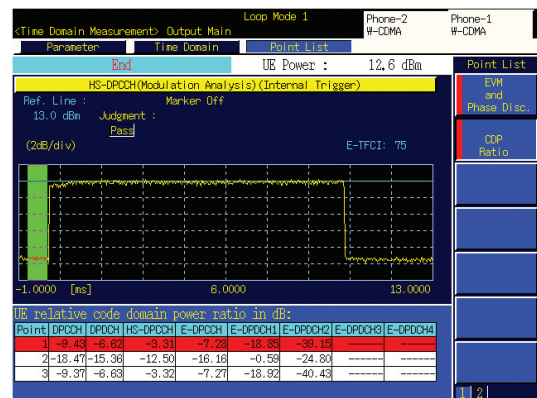


Test Signal Setting Parameters

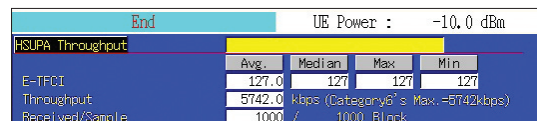
HSUPA UE Evaluation

Supports RF Tx Tests

RF Tx tests defined by 3GPP (TS 34.121 5) can be performed in both the UE-connected mode an HSUPA UE with E-DCH category 1 to 6 (5.76 Mbps), and TTI2 and 10 ms, and in the Test mode.



Relative Code Domain Power Measurement Results



Throughput Monitor

HSPA Evolution UE Evaluation

RF Tx and Rx Testing in UE-Connected and Test Modes

RF Test defined by 3GPP (TS 34.121 5.2E, 5.13.1AA, 5.13.2.C, and 6.3B) can be performed. Also, FRC H-Set 8 (64QAM) and category 14, Max test signals can be selected for throughput measurement.

Expansion by Adding Software

Easy Software Upgrade

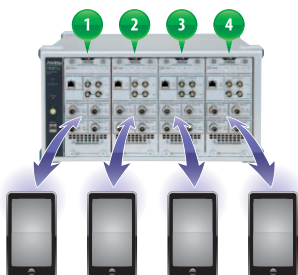
Adding the optional MX882000C-011 HSDPA Measurement Software, MX882000C-013 HSDPA High Data Rate, MX882000C-021 HSUPA Measurement Software, and MX882000C-031 HSPA Evolution Measurement Software to an existing MT8820C test environment for W-CDMA adds support for HSPA and HSPA Evolution measurements.



The remarkable success of smartphones and tablets is driving demand for faster inspection speeds on smartphone and communication module production lines and this market trend is expected to continue. Coupled with this, wireless communication standards are continuing to evolve and develop, leading to a growing range of specifications. In these circumstances, terminal and module makers are looking to increase line efficiency while assuring smooth and flexible support for the various new standards. With support for up to four test modules, the MT8870A Universal Wireless Test Set is the ideal cost-effective solution for high-efficiency inspection lines. The licensed TX measurement software packages and waveform files make it easy to support each communication standard.

Simultaneous Control of Four Modules

Installing four independent modules in the MT8870A Universal Wireless Test Set supports simultaneous measurement of four separate wireless devices. A unique IP address can be allocated to each slot and each module supports remote control by Ethernet or optional GPIB connections.

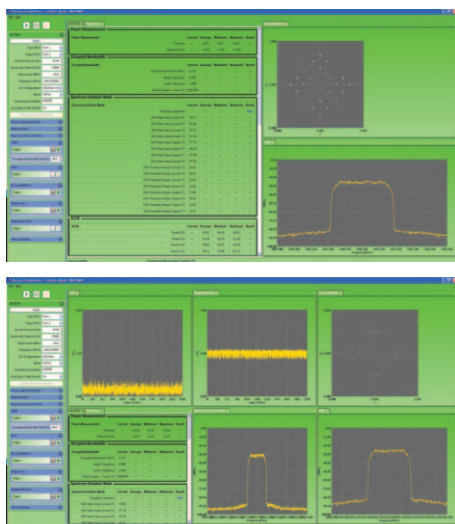


MX887011A W-CDMA/HSPA Uplink TX Measurement MV887011A W-CDMA/HSPA Downlink Waveforms

Installing the MX887011A W-CDMA/HSPA Uplink TX Measurement software in the MT8870A provides support for the following 3GPP W-CDMA and HSPA related TX characteristics measurements.

- TX Power
- Frequency Error
- Occupied Bandwidth
- Spectrum Mask
- Adjacent Channel Leakage Power
- Modulation Analysis

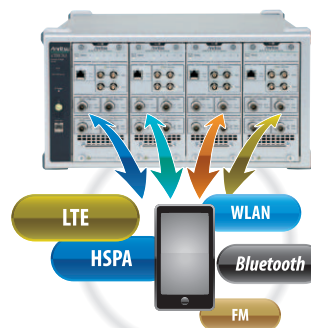
Additionally, the package of MV887011A W-CDMA/HSPA Downlink Waveforms contains downlink signals required for non-signaling measurements; sending the downlink signal for production is as easy as selecting the waveform file.



W-CDMA/HSPA Uplink TX Measurement using CombiView

Four Simultaneous Measurements

Today's smartphones and tablets often support multiple wireless chipsets that all need to be tested and approved in the shortest possible time. Configuring an MT8870A with four modules enables simultaneous testing of all wireless standards and greatly increases throughput efficiency.



One License Supports Four Modules

The TX measurement software packages and waveforms can each be licensed separately. One license can be used for up to four TRX test modules, cutting test equipment costs. A TX measurement software package is required for TX tests for each communication standard and a waveform is required for RX tests.



MG3710A/MG3700A Vector Signal Generator

For Testing HSPA Receiver Characteristics



MG3710A



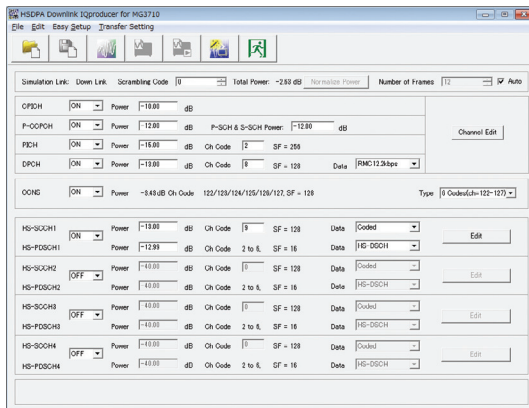
MG3700A

The MX370101A HSDPA/HSUPA IQproducer is GUI-driven PC application software for setting parameters and generating waveform patterns for 3GPP HSPA (Uplink/Downlink) systems. The generated waveform patterns are downloaded to the MG3710A/MG3700A and used to output baseband and RF signals using the MG3710A/MG3700A ARB generation function. Four channel parameters are supported for HSPA: HS-PDSCH and HS-EPDCH for HSDPA, and E-DPDCH and E-DPCCH for HSUPA. Additionally, the HARQ process can also be set at the HARQ process file, while CRC errors can be set at each HSUPA subframe for effective function checks. The Downlink Easy Setup function supports typical parameter sets and makes setting as easy as selecting from a menu.

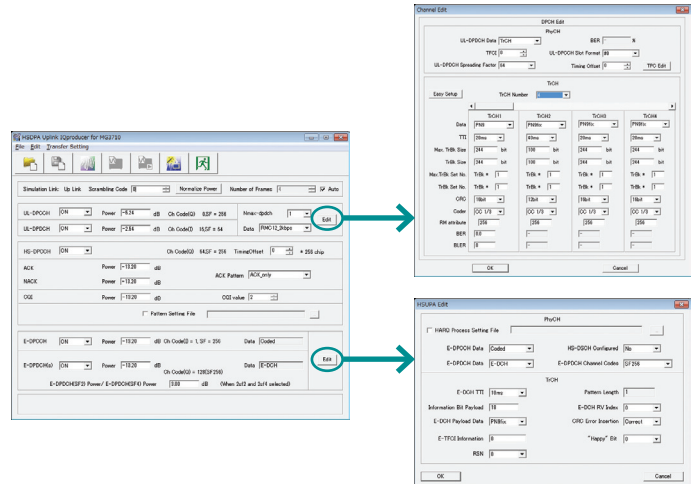
Frequency Range

MG3710A Vector Signal Generator
100 kHz to 2.7 GHz/4 GHz/6 GHz

MG3700A Vector Signal Generator
250 kHz to 3 GHz/6 GHz (Option)



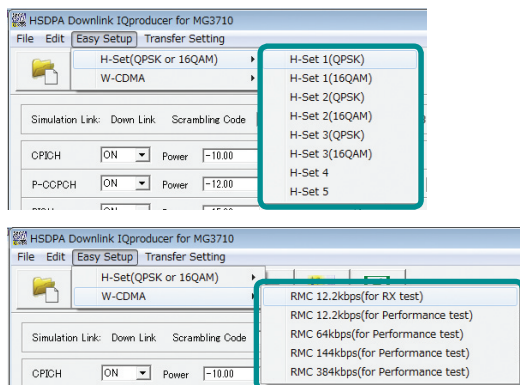
MX370101A HSDPA/HSUPA IQproducer
Downlink Setting Screen



MX370101A HSDPA/HSUPA IQproducer
Uplink Setting Screen

Downlink Easy Setup Function

The Downlink Easy Setup function offers default parameter sheets for "Fixed Reference Channel (FRC) of HSDPA defined in 3GPP TS 25.101" and "Reference Measurement Channel (RMC) defined in 3GPP TS 25.101/TS 25.104." Since the default is displayed for the selected item, the initial work is easy.



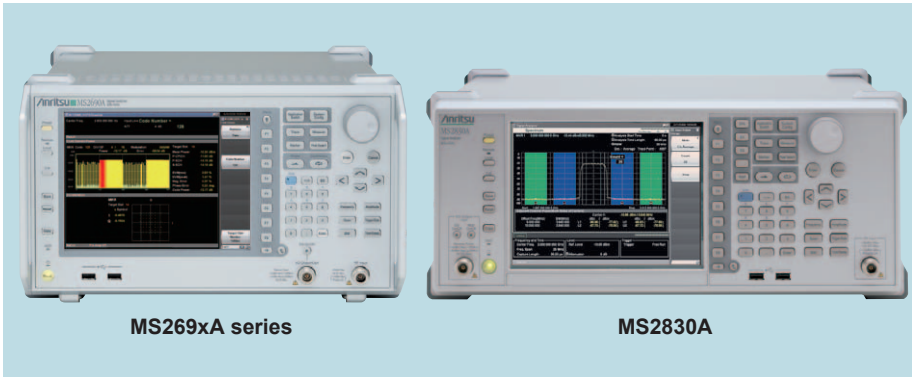
Easy Setup

FRC:

- H-Set1 (QPSK)
- H-Set1 (16QAM)
- H-Set2 (QPSK)
- H-Set2 (16QAM)
- H-Set3 (QPSK)
- H-Set3 (16QAM)
- H-Set4
- H-Set5

RMC:

- RMC12.2 Kbps (for RX test)
- RMC12.2 Kbps (for Performance test)
- RMC64 Kbps (for Performance test)
- RMC144 Kbps (for Performance test)
- RMC384 Kbps (for Performance test)



MS269xA series

MS2830A

The RF characteristics of W-CDMA/HSPA/HSPA Evolution base stations and mobile terminals can be measured at high speed with high accuracy by installing the MX269011A W-CDMA/HSPA Downlink Measurement Software or MX269012A W-CDMA/HSPA Uplink Measurement Software.

In addition, the built-in Vector Signal Generator supports simple configuration of space-saving measurement systems as well as easy signal analysis matching the output timing from the signal generator option.

Frequency Range

MS269xA series Signal Analyzer

MS2690A: 50 Hz to 6.0 GHz
MS2691A: 50 Hz to 13.5 GHz
MS2692A: 50 Hz to 26.5 GHz

MS2830A Signal Analyzer

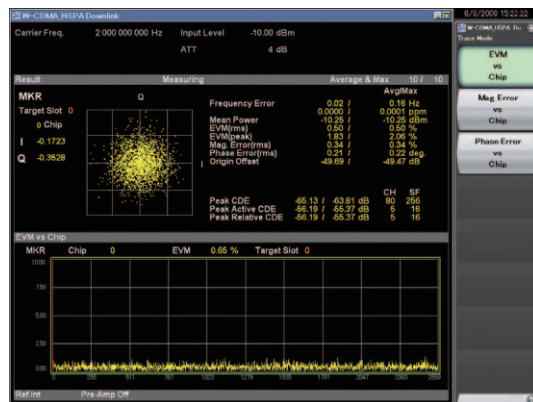
MS2830A-040: 9 kHz to 3.6 GHz
MS2830A-041: 9 kHz to 6.0 GHz
MS2830A-043: 9 kHz to 13.5 GHz

Various Measurement Functions are Built-in

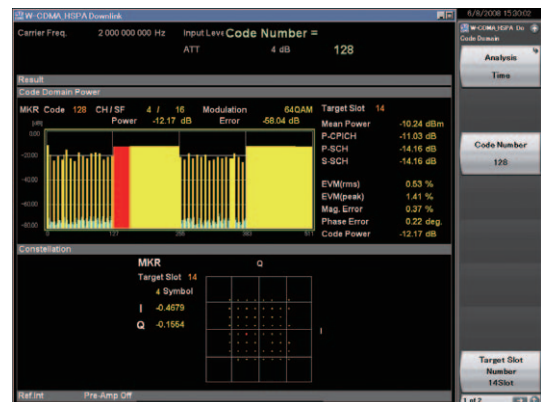
Measure function	SPA	VSA*
Channel power	✓	✓
Occupied bandwidth	✓	✓
Adjacent channel leakage power	✓	✓
Spectrum emission mask	✓	
Spurious emission	✓	
Burst average power	✓	✓
AM depth		✓
FM deviation		✓
Frequency counter	✓	
Limit Line	✓	
2-tone 3rd-order Intermodulation Distortion	✓	

*: MS2830A: VSA is optional.

MX269011A W-CDMA/HSPA Downlink Measurement Software

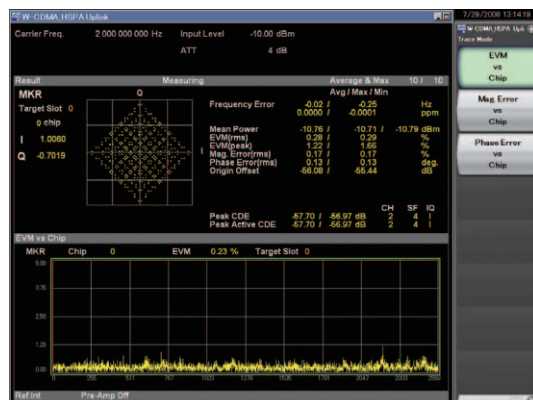


Modulation Analysis

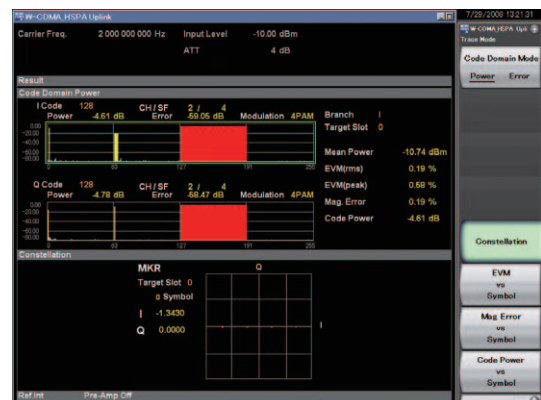


Code Domain (64QAM)

MX269012A W-CDMA/HSPA Uplink Measurement Software



Modulation Analysis



Code Domain (4PAM)

W-CDMA/HSPA Evolution Signal Analyzers

The BTS Master features three W-CDMA/ HSPA Evolution measurement modes:

- **RF Measurements**
- **Demodulation**
- **Over-the Air Measurements (OTA)**

The goal of these measurements is to increase data rate and capacity by accurate power settings, ensuring low out-of-channel emissions, and good signal quality. These attributes help to create a low dropped call rate, a low blocked call rate, and a good customer experience.

Cell site technicians or RF engineers can make measurements Over-the-Air (OTA) to spot-check a transmitter's coverage and signal quality without taking the Node B off-line. When the OTA test results are ambiguous one can directly connect to the base station to check the signal quality and transmitter power.

Frequency Error

Frequency Error is a check to see that the carrier frequency is precisely correct. The BTS Master can accurately measure Carrier Frequency Error OTA if the instrument is GPS enabled or in GPS holdover. Calls will drop when mobiles travel at higher speed. In some cases, cell phones cannot hand off into, or out of the cell.

Peak Code Domain Error (PCDE)

Peak Code Domain Error is a measure of the errors between one code channel and another. High PCDE causes dropped calls, low signal quality, low data rate, low sector capacity, and blocked calls.

Multipath

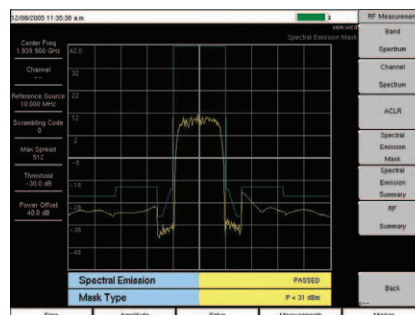
Multipath measurements show how many, how long, and how strong the various radio signal paths are. Multipath signals outside tolerances set by the cell phone or other UE devices become interference. The primary issue is co-channel interference leading to dropped calls and low data rates.

Pass/Fail Mode

The BTS Master stores the five test models covering all eleven test scenarios specified in the 3GPP specification (TS 25.141) for testing base station performance and recalls these models for quick easy measurements.

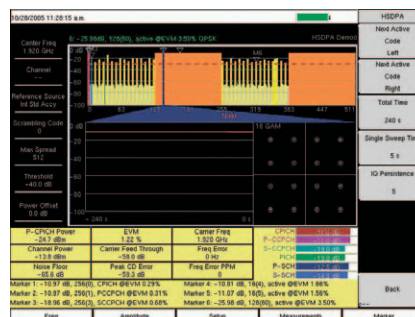
RF Measurement – Spectral Emissions Mask

The 3GPP spectral emission mask is displayed. Failing this test leads to interference with neighboring carriers, legal liability, and low signal quality.



Demodulation – Error Vector Magnitude (EVM)

This is the single most important signal quality measurement. Poor EVM leads to dropped calls, low data rate, low sector capacity, and blocked calls.



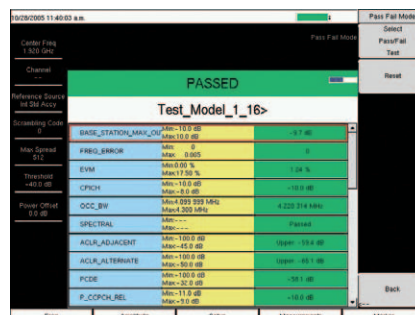
Over-the-Air Measurements – Scrambling Codes

Too many strong sectors at the same location creates pilot pollution. This leads to low data rate, low capacity, and excessive soft handoffs.



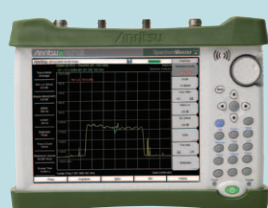
Pass/Fail Test

Set up common test limits, or sets of limits, for each instrument. Inconsistent settings between base stations, leads to inconsistent network behavior.

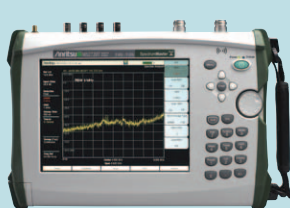


W-CDMA/HSPA Evolution Signal Analyzers (Options 0044, 0065, 0035 or Option 0881 on MS2720T)

Measurements (Option 0881 on MS2720T)		
RF (Option 0044)	Demodulation (Option 0065)	Over-the-Air (OTA) (Option 0035)
Band Spectrum Channel Spectrum Channel Power Occupied Bandwidth Peak-to-Average Power Spectral Emission Mask Single carrier ACLR Multi-carrier ACLR RF Summary	Code Domain Power Graph P-CPICH Power Channel Power Noise Floor EVM Carrier Feed Through Peak Code Domain Error Carrier Frequency Frequency Error Control Channel Power Abs/Rel/Delta Power CPICH, P-CCPCH S-CCPCH, PICH P-SCH, S-SCH HSPA Evolution Power vs. Time Constellation Code Domain Power Table Code, Status EVM, Modulation Type Power, Code Utilization Power Amplifier Capacity Codogram Modulation Summary	Scrambling Code Scanner (Six) Scrambling Codes CPICH Ec/Io Ec Pilot Dominance OTA Total Power Multipath Scanner (Six) Six Multipaths Tau Distance RSCP Relative Power Multipath Power



MS2712E/13E
Spectrum Master



MS2720T
Spectrum Master



MT8212E/13E
Cell Master



MT8221B/22B
BTS Master

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Note:

• United States

Anritsu Company

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

• Canada

Anritsu Electronics Ltd.

700 Silver Seven Road, Suite 120, Kanata,
Ontario K2V 1C3, Canada
Phone: +1-613-591-2003
Fax: +1-613-591-1006

• Brazil

Anritsu Eletrônica Ltda.

Praça Amadeu Amaral, 27 - 1 Andar
01327-010 - Bela Vista - São Paulo - SP - Brazil
Phone: +55-11-3283-2511
Fax: +55-11-3288-6940

• Mexico

Anritsu Company, S.A. de C.V.

Av. Ejército Nacional No. 579 Piso 9, Col. Granada
11520 México, D.F., México
Phone: +52-55-1101-2370
Fax: +52-55-5254-3147

• United Kingdom

Anritsu EMEA Ltd.

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

• France

Anritsu S.A.

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

• Germany

Anritsu GmbH

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

• Italy

Anritsu S.r.l.

Via Elio Vittorini 129, 00144 Roma, Italy
Phone: +39-6-509-9711
Fax: +39-6-502-2425

• Sweden

Anritsu AB

Borgarfjordsgatan 13A, 164 40 KISTA, Sweden
Phone: +46-8-534-707-00
Fax: +46-8-534-707-30

• Finland

Anritsu AB

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

• Denmark

Anritsu A/S (Service Assurance)

Anritsu AB (Test & Measurement)
Kay Fiskers Plads 9, 2300 Copenhagen S, Denmark
Phone: +45-7211-2200
Fax: +45-7211-2210

• Russia

Anritsu EMEA Ltd.

Representation Office in Russia

Tverskaya str. 16/2, bld. 1, 7th floor.
Russia, 125009, Moscow
Phone: +7-495-363-1694
Fax: +7-495-935-8962

• United Arab Emirates

Anritsu EMEA Ltd.

Dubai Liaison Office

P O Box 500413 - Dubai Internet City
Al Thuraya Building, Tower 1, Suit 701, 7th Floor
Dubai, United Arab Emirates
Phone: +971-4-3670352
Fax: +971-4-3688460

• India

Anritsu India Private Limited

2nd & 3rd Floor, #837/1, Binnamangla 1st Stage,
Indiranagar, 100ft Road, Bangalore - 560038, India
Phone: +91-80-4058-1300
Fax: +91-80-4058-1301

• Singapore

Anritsu Pte. Ltd.

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

• P.R. China (Shanghai)

Anritsu (China) Co., Ltd.

Room 1715, Tower A CITY CENTER of Shanghai,
No.100 Zunyi Road, Chang Ning District,
Shanghai 200051, P.R. China
Phone: +86-21-6237-0898
Fax: +86-21-6237-0899

• P.R. China (Hong Kong)

Anritsu Company Ltd.

Unit 1006-7, 10/F., Greenfield Tower, Concordia Plaza,
No. 1 Science Museum Road, Tsim Sha Tsui East,
Kowloon, Hong Kong, P.R. China
Phone: +852-2301-4980
Fax: +852-2301-3545

• Japan

Anritsu Corporation

8-5, Tamura-cho, Atsugi-shi, Kanagawa, 243-0016 Japan
Phone: +81-46-296-1221
Fax: +81-46-296-1238

• Korea

Anritsu Corporation, Ltd.

502, 5FL H-Square N B/D, 681
Sampyeong-dong, Bundang-gu, Seongnam-si,
Gyeonggi-do, 463-400 Korea
Phone: +82-31-696-7750
Fax: +82-31-696-7751

• Australia

Anritsu Pty. Ltd.

Unit 21/270 Ferntree Gully Road, Notting Hill,
Victoria 3168, Australia
Phone: +61-3-9558-8177
Fax: +61-3-9558-8255

• Taiwan

Anritsu Company Inc.

7F, No. 316, Sec. 1, NeiHu Rd., Taipei 114, Taiwan
Phone: +886-2-8751-1816
Fax: +886-2-8751-1817

Please Contact: