

ME7834

Mobile Device Test Platform



- Protocol test solutions**
- Development
 - Conformance
 - Carrier acceptance

Ubiquitous Wireless Coverage - The Next Challenge

We travel the world and expect to be able to talk, text, browse and more importantly be informed wherever we are. "Staying connected" is now expected.

Wireless technologies all compete and collaborate for market share and although GSM started a trend for a Global Standard, many evolving systems now appear to provide alternative or hybrid systems.

Today there are more variables, more applications and more features providing a new challenge for terminals.

LTE

LTE (Long Term Evolution) is fast becoming the front runner for next generation, with many legacy systems and even variants being integrated. The challenge for terminal developers is to back the winners and also be able to support the other systems to be sure of globally connected devices.



Multi-cell simulation in the lab

There is a growing trend to simulate scenarios found or expected to be found in the field, by creating them in the laboratory. This way the development teams have a better chance of isolating and fixing any problems before the products are commercially deployed.

Initially, simple single cell simulations are required for early development. Conformance tests may require additional active cells. As interoperability and network acceptance is introduced, sophisticated multi-cell, multi-system simulations are required to ensure terminals are tested in conditions as close to real networks as possible.

High quality, advanced and dependable

Anritsu is reputed for dependable test solutions that offer innovation, high performance and excellent functionality.

Supporting standards bodies

Anritsu actively participates in many industry standards bodies and forums to ensure that products meet their requirements. Anritsu also provides engineering resources for the MCC TF 160 group that develops the conformance tests in co-operation with 3GPP.

Environmentally aware

The company prides itself on its "green" credentials and contributes to promote a safe, secure and comfortable society. It has achieved ISO14001 certification over many years and aims to exceed its responsibilities to protect our environment.



ME7834 Mobile Device Test Platform

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.

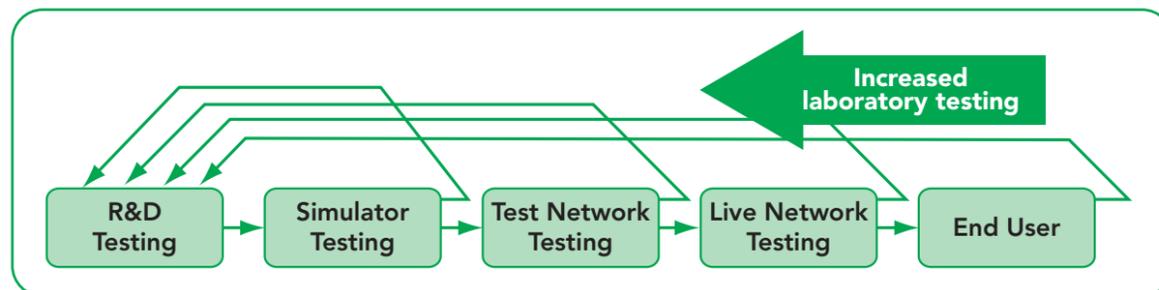
Anritsu led the way with 3rd generation mobile development programs. It is now delivering intelligent test solutions to LTE development teams that need to accelerate their designs to stay competitive.



Global support

With firmly established R&D centres in Europe, Japan and North America, Anritsu can claim to be a truly global company with industry leading expertise.

Systems are supported through a world-wide network of engineering hubs that can provide calibration as well as application support.



Reduce costs by finding errors earlier in the process

System Simulators - The Building Blocks of a Test System

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.

2 X 2 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 1xRTT/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.



MD8430A LTE Signaling Tester

- LTE for FDD and TDD covering 350 to 3000 MHz frequency band
- 100 MB (DL): 50 MB (UL)
- 4 RF supports 2x2MIMO handover
- Up to 6 Cells (2 communication, 4 neighbour)
- Future proof – Category 4 today
- Compliant with 3GPP TS 36.523 for GCF and PTCRB certification



MD8480C Signaling Tester

- Up to 4 W-CDMA cells and 2 TDMA cells
- Up to 2 physical RF channels
- Enhancement to HSPA Evo



MD8470A Signaling 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 EVDO Sectors on up to 2 RFs
- CDMA2000 1X/1xEV-DO Rev. A

ME7834 - flexible configurations

The ME7834 can be configured to provide solutions for individual applications or combinations that allow functionality to be shared or expanded as needs mature.

From a simple bench-top development system, to a rack that provides comprehensive simulation of real networks, ME7834 combines hardware with tools and a framework for efficient use of resources.

Additionally users that have purchased Anritsu's established protocol tools may integrate them into a ME7834 platform to protect their investment.



Flexibility & Resource Sharing for Optimum Cost Performance

ME7834 systems are fully configured and can be supplied racked or as individual components.

Commissioning and training can be tailored to individual requirements.



Development systems need to deliver functionality on time and to specification. To make complex and evolving protocols simple to manipulate and maintain and deliver on time, TTCN and RTD test interfaces can be integrated into the ME7834. This provides test developers flexibility to use proven TTCN scripts or create tests based on graphical interfaces for fast and flexible maintenance.



Conformance test systems may be configured to test against specific work items through to comprehensive parallel test systems that are able to run test campaigns efficiently.

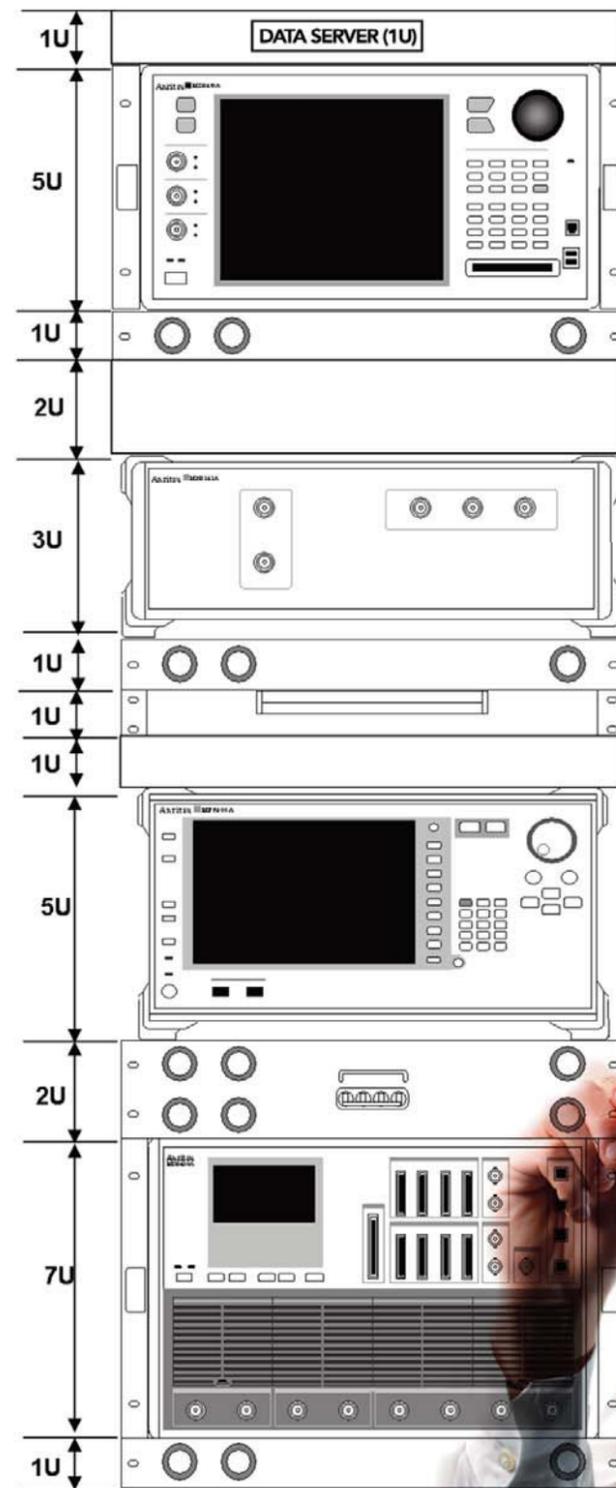
ME7834 can be configured for GCF / PTCRB conformance testing for all bands and automated to provide the fastest conformance test solution.



Carrier acceptance tests are provided for the unique graphical interface and may be combined with conformance tests when required. ME7834 is available for a number of configurations approved by network operators world-wide. Where required these systems can be combined for greater efficiency.



Systems can be expanded as requirements change



Designed to your requirements

- LTE-FDD
- LTE-TDD
- UTRAN
- GERAN
- HSPA
- cdma2000
- TD-SCDMA



Conformance Testing to Meet Rapidly Evolving Specifications



The world's first test equipment supplier to meet the GCF RF & protocol LTE device certification targets

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+ and LTE technologies.

Hardware, software, tests and test validations all need to keep pace with the latest 3GPP requirements. Anritsu supports the 3GPP standards and RAN5 test specifications always investing in supporting the working groups that architect these specifications. Leading the race to provide the best test coverage for GCF and PTCRB in LTE for Protocol & RF to meet compliance for the latest industry standards.

A 3 month cycle of conformance test evolution puts significant demands on organisations to ensure that their new devices can meet these new test requirements.

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.

• **Reducing risk in product development**

With the integration of many new technologies, it is even more important to have results you can trust. The ability to analyze in detail any issues you may have as quickly and easily as possible, reduces any risks to your development lifecycle. The ME7834 platform is able to provide a robust configuration with no cables to change, reliable operation with approved test cases available when you need them. Combined with advanced analysis tools and real time measurement functionality the ME7834 provides a fully integrated system with an intuitive graphical interface.

• **Accelerating time to market for new technologies**

Launching new products to market as quickly as possible is a challenge facing all manufactures. This generates the need to automate the growing number of tests required to efficiently complete the validation cycle for new products. Anritsu's advanced automation environment solves this problem, allowing the system to be controlled remotely along with device automation. This allows large campaigns to be developed that can contain hundreds of tests which can be executed in an unattended environment.

• **Flexibility to create custom test scenarios**

Standard test cases are not always enough to ensure your product meets the demanding environment of today's networks. The ability to modify the standard test cases in TTCN-3 gives you flexibility and can be further enhanced by the purchase of dedicated acceptance test packages to support all your testing and technology needs.

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



E-UTRA Rel.8 4G
 DC-HSPA LTE
 Improved Layer 2 TDD FDD
 HSUPA MIMO EPC
 Rel.6 PTCRB CPC
 HSDPA 64QAM
 Rel.4 GCF Rel.7 16QAM
 UTRAN HSPA+
 R99 Rel.5 3G Enhanced Uplink
 EGPRS GSM 2G GPRS Interband



The fastest protocol conformance testing for wireless terminals



“The world’s fastest Protocol Conformance Tester”

As the number of conformance tests grows, the need to automate and reduce test execution times becomes essential. Anritsu instigated a project to reduce overall conformance test cycle times with a target of enabling customers to perform a complete regression testing suite in a period of less than 24 hours. Using multiple MD8480Cs, test systems can now be configured to do this. This project also addresses system stability, flexibility and usability features.



- Easy test sequence creation
- Drag ‘n’ drop graphical user interface
- Validated test case catalogue
- Flexible test sequence creation
- Test report generation with export to accepted industry formats



- Custom test case development
- View, edit and create custom test cases based on the TS36.523 specification in TTCN-3
- TTCN-3 editor provides syntax highlighting & navigator view for easy project browsing
- Navigation from a log entry in the protocol analyzer to the associated line of source code for efficient test case debug



- Fast & reliable test execution
- Unique parallel test capability
- Reduce 48 hour regression testing by >50%
- Decrease overall time to certification
- Automatically parameterise test cases according to the UE capabilities
- Advanced automation control via AT & MMI commands
- Easily integrate into proprietary automated test environments using the remote control interface



Registered as an approved GCF & PTCRB TP119 reference platform

Acceptance Testing for Carriers

With finite bandwidth and ever more traffic, the challenge for carriers is to optimize their networks and ensure that terminals obey the rules they set. LTE/SAE attempts to make more efficient use of the spectrum available but still needs to inter-work with legacy systems. There are also regional variations and network specific requirements that terminals will be expected to meet. Load balancing may be important to make best use of network resources and although aesthetics and applications may define a terminal's popularity, the behaviour under specific conditions needs to be tested to ensure a reliable and friendly user experience.

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.

Roaming partners

Today the cost of sending engineering teams to perform network testing over many weeks can be a very significant portion of a carrier's proving budget. More tests can be executed in the laboratory, resulting in cost savings and repeatability.

New network services

Most carriers will not allow new terminals onto their live networks without some proving. ME7834 provides a way to test new terminals and also new services that may be ready to be deployed. Future functionality and applications can be proved in a controlled way.

Automation

Automation of the test execution is preferred to allow tests to run overnight or unattended, presenting the user with an executive summary of the various outcomes. Control of external equipment is provided from the tools.



Test packages that keep pace with network requirements

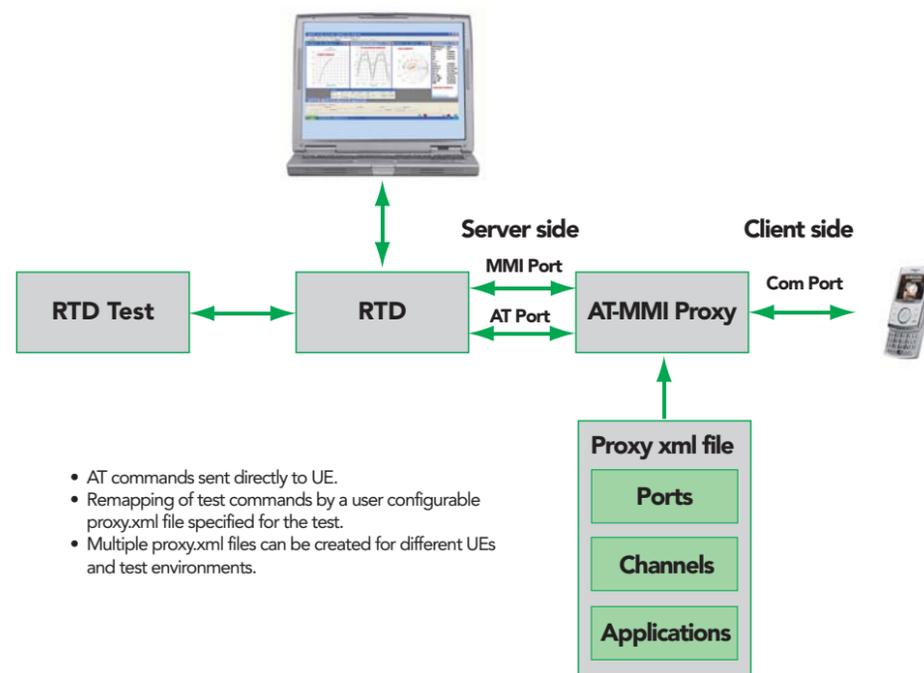
Anritsu is able to provide and support a number of carrier specific tests. (Note: some test packages may need to be obtained directly from carriers)

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

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.

- Purchasing the tests requires the customer to order each individual test package as they are introduced.
- Subscription provides all the tests available at the time of purchase and any that are introduced through the period of subscription.

The documentation provided with the tests includes all the information needed to understand the test method, its purpose and criteria applied to prove a pass or failure. This is documented in a way that will be familiar to users that have studied the 3GPP processes.



Carrier Validation & Acceptance Tests

AT & T

MX786201A - 100 series

T-Mobile (USA)

MX786201A - 200 series

Verizon Wireless

MX786201A - 300 series

AT & T - LTE

MX786201A - 400 series

Please contact your local representative for a data sheet with details of the tests required.

ME7834 for Carrier Acceptance Reports & Results

Annotation

Tests are annotated, enabling easy identification of logical and functional blocks, so that they may be used and modified for acceptance as well as debug purposes.

Watermarking

Tests are watermarked to provide confidence to the user that the tests and results are original and have not been modified.

Fading simulation

The MF6900 Fading Simulator is included in some ME7834 systems, particularly where data performance is measured.

Automation

Where possible, tests are automated allowing overnight unattended runs for greater efficiency. By using a definable proxy, control of a wide range of devices is possible.

Campaign manager

The Campaign Manager can run within the system, making automation very simple. Results are generated that can be filtered and exported for executive reports in XML and CSV format.

Pass/Fail results

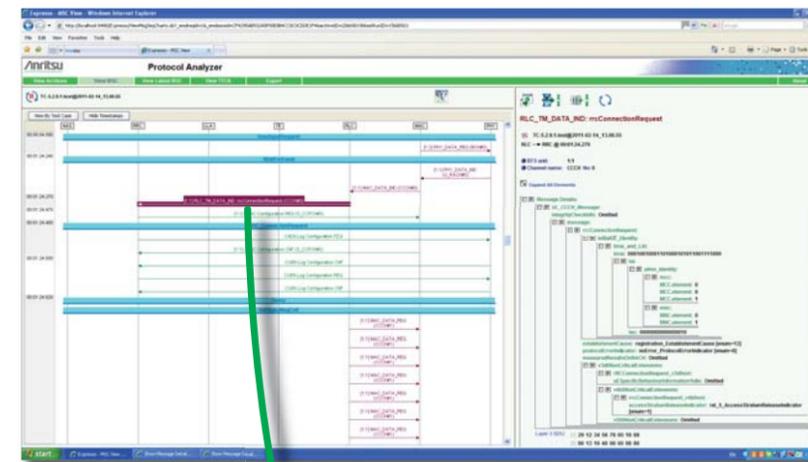
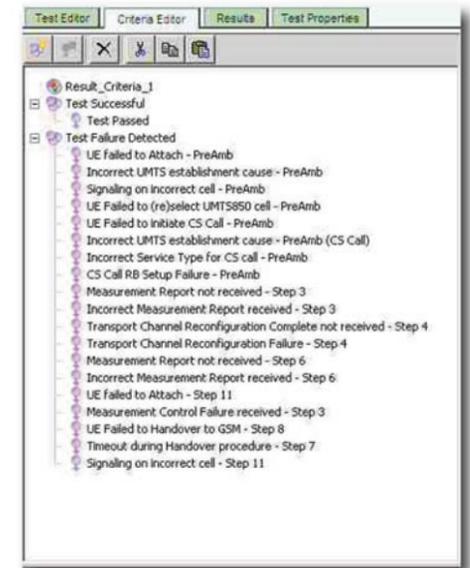
Test results will be given a pass / fail verdict based on criteria set within the test. The verdict is available visually or can be generated in a report.

Criteria editor

To diagnose problems the criteria set in the tests may be able to establish the cause of failure. By opening a log, results are displayed – see example below.

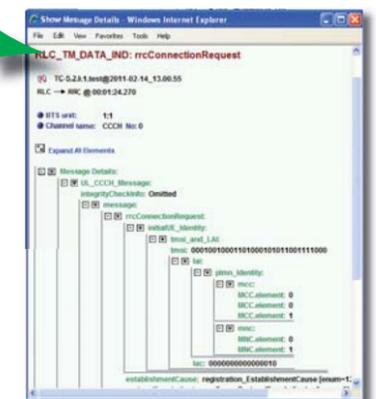
The criteria may be edited and post processed to look for trends and for debugging. This avoids running a suite of tests again. A report is created from the test flow that occurs in every test execution.

If further diagnostics are required the test log is available for full analysis.



Protocol Analyzer

The Protocol Analyzer displays the message flow between the ME7834 and the terminal under test. By selecting a message in the main protocol window, the message is decoded in a new window, allowing simple debug.



Terminal Development from R&D to Conformance & Beyond

Graphical flow chart

As well as traditional TTCN3 scripting language, ME7834 provides a unique graphical flow design tool using the proven RTD (Rapid Test Designer). The RTD is an intuitive and fast way to simulate many different networks scenarios.

The RTD is easy to learn and able to speed up test development significantly over traditional methods, especially where test variants are required. It can be integrated as part of a ME7834 system. Performance and terminal evaluation of many other parameters that go far beyond "over the air protocol" are provided with the ME7834 system.



RTD takes care of the simulator

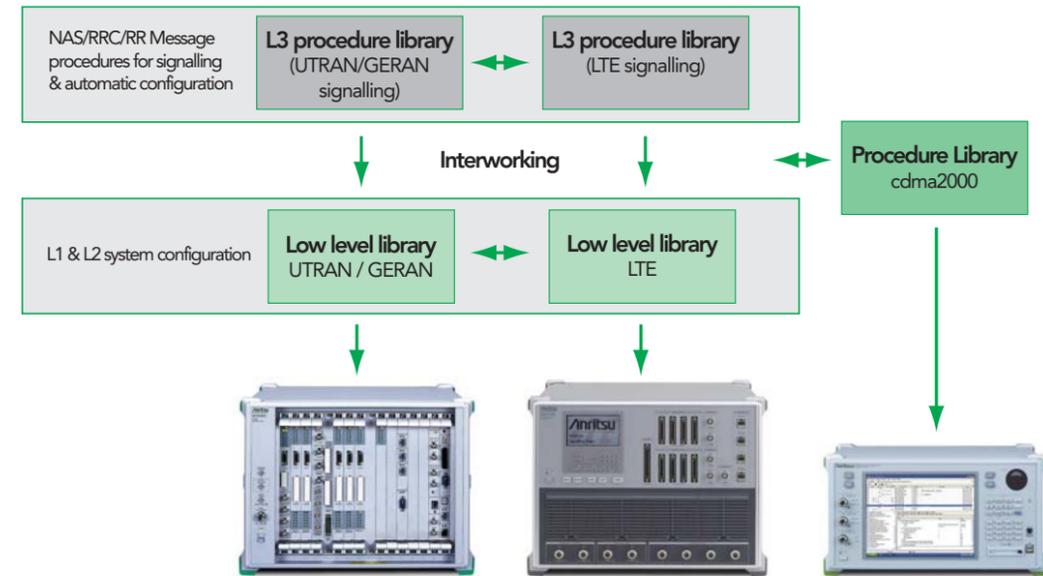
RTD is now adopted by many development teams, who have recognised the time savings and test coverage it provides. When using the Layer 3 procedures, RTD automatically populates the primitives required to control the hardware. Procedural blocks may be modified and the RTD takes care of the simulator control.

One button upgrade

Updating a library of tests to a new 3GPP release using traditional tools is time-consuming and prone to errors, which is why some teams try to avoid the task. With RTD, existing tests or test archives are easily updated when a new RTD Release is installed. The RTD produces a backup of the original tests before automatically updating the tests. During early development this process may happen frequently: RTD saves time and reduces errors. The ME7834 now provides LTE design teams with the confidence that as the standards evolve; the equipment will grow with them.

Procedures for flexibility and simplicity

RTD comes with procedural blocks that can provide major high level functions as well as low level procedures that give experienced engineer the tools to drill into the protocol and create almost limitless scenarios.



RTD Procedural Blocks

Integration Test Packages

As well as reference tests that are supplied with the RTD, there are integration test packages available to allow test coverage to be generated from a known good standard.

Stable UTRAN/GERAN test legacy

Anritsu has a mature base of 3G installations using the MD8480C and is now able to provide a cost effective solution to move to LTE. This combination creates a comprehensive and flexible solution, providing the most powerful protocol development system. Almost limitless network simulations are possible.

Integration Test Packages

LTE Integration

MX786201A - 911

LTE chipset Integration

MX786201A - 912

Why a graphical flow chart

The RTD's unique flowchart display provides a more natural way of creating scenarios and observing test flow and outcomes.

Debugging is especially straightforward as tests can be run and iterative changes made. Because there is no compilation phase, tests can be run immediately and aborted if the wrong path is taken.

With well annotated tests, sharing and consolidation is possible and productive.

"RTD's unique flow chart display provides a more natural way of creating scenarios and observing test flow..."



Branches can be created for detailed analysis and performance testing

Real time monitoring of parameters is possible during test execution

Soft keys can be created to provide flexibility

Name	CodeWord0+1		CodeWord0		CodeWord1
	Current	Accumulate	Current	Accumulate	Current
Transmitting side					
DL-SCH					
Tx MAC PDU [PDUs]	2,000	101,246	1,000	50,623	1,000
Tx Discard MAC PDU [PDUs]	400	20,240	400	20,240	0
Tx Rate [kbps]	102,048.000	81,915.032	51,024.000	40,907.667	51,024.000
Receiving side					
Rate Count					

Messages:

- Action completed. reached EI@test.Rotating RB-MCS(95), 17:43:28
- Action completed. reached OK@test.LTE CMAC TBS Pattern(100), 17:43:28
- Action completed. reached WFEDEF@test.Wait For Event(85), 17:43:32
- Action completed. reached EI@test.Reset Scheduler(96), 17:43:32
- Action completed. reached OK@test.LTE CMAC TBS Pattern(104), 17:43:32
- Action completed. reached OK@test.LTE CMAC TBS Pattern(103), 17:43:32

The RTD Test System for multimode terminals is a complete solution checking the behaviour of terminals in development and before they are deployed on live networks. The RTD system provides a flexible simulation of a LTE/W-CDMA/GSM network.

The RTD presents an intuitive and interactive graphical environment for designing test cases, coupled with an expert system that guides the user through the intricacy of 3GPP protocols. This hides much of the complexity of testing 3GPP protocols. It allows the user to concentrate on testing specific functions and applications within the terminal without having to be an expert on all the protocol layers or TTCN programming.

It is built upon Anritsu's many years of experience in testing 3GPP protocols with the leading terminal vendors.

RTD can be used for a wide variety of purposes:

- Acceptance testing
- Integration testing
- Interoperability testing
- Generating variants
- Application testing
- Regression testing
- Pre conformance testing
- Prototyping tests

ME7834 Highlights



Dependable hardware

Anritsu system simulators are designed to run continuously and perform within specification to ensure test results can be trusted.



Watermarking

Acceptance tests are watermarked to ensure that validated test results are submitted and correct tests have been used.



On-site support

As well as access to the online support teams, engineering resources are available to install and configure systems on-site.



Electronic software delivery

24-7 access to the latest software is available via a secure electronic download site.



One button test upgrade

Tests can be upgraded to the latest RTD release with a single command either manually or from a system command.



Test packages

There are test packages to suit all requirements from conformance to acceptance.



Re-use of hardware

Existing equipment, including soft components can be re-used to build comprehensive network simulations.



On-line support suite

Tracking of support issues can be managed via a secure internet connection. Managerial privileges may be set up to allow filtering and reporting.



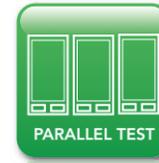
Fading

For performance measurements under fading conditions, MF6900 can be integrated.



Fast test creation and execution

The test systems have been optimised to run efficiently and test creation is the fastest.



Parallel test

Reduce test time by more than 50%



Results analysis

Preliminary judgement can be made without needing to view and analyse test logs.



Automation

Either in-built test campaigns or integrated as part of a test system. Control of device under test and external devices.



Expandable

The ME7834 can be expanded as requirements evolve.



Active participant in standards

Anritsu is represented on various standards bodies' and supports the 3GPP test creation team in Sophia Antipolis.



ME7834 the Complete System Solution

Cost of ownership

The ME7834 provides a suite of support and training options to suit different users and applications. Anritsu is able to supply turnkey solutions or individual components. Systems are installed and supported by teams of highly skilled engineers that are deployed world-wide.

As wireless terminals continue to evolve, it is important to keep up to date with market changes and 3GPP specifications. Product updates and technical support is provided to help the user receive the maximum benefit and to maintain the latest capability from the test system.

You are encouraged to take out annual software update and maintenance contracts to ensure that you are kept up-to-date with both the latest software features and tracking with the latest 3GPP version supported.

Updates

Updates for the test system may be triggered for a number of different reasons. Some of the requirements relate to ongoing product development and are therefore scheduled according to Anritsu's engineering programs and these are described in the product roadmap. Other requirements are triggered by external factors, including, but not limited to the activities of the GCF, PTCRB and ETSI organizations.

In relation to Anritsu's program of continuous product development, a scheduled update to the "Platform" is normally provided at 6 monthly intervals, however it may be necessary to provide additional updates in cases where the core or test specifications change and re-validation of the platform is therefore required (product enhancements and 3GPP updates are provided in the same release).

Approximately every three months a new version of the software is introduced and made available to all participants in the program.

Electronic software delivery

System updates are generally straightforward to install and can often be installed by the customer. Anritsu's support engineer can be available to visit the customer's site to install the update, if needed.

If the customer wishes to install the update themselves, software is available 24-7 via the ESD (Electronic Software Delivery) service. Full installation instructions can be provided in this case and an appropriate level of technical support will be made available to ensure that the process can be completed successfully.

On-line help & tutorials

On-line help is available for many applications with help and tutorials allowing first time users to get the most from the system. The tutorials are designed to guide them through many of the unique features and help understand the architecture and operation of the system.

Training

Training courses are available for the ME7834 and comprise a combination of classroom and practical activities. Training can be provided either at the customer site or at Anritsu facilities.

Installation and commissioning

Installation and commissioning can be provided if required. This service is offered in addition to the initial training for the product.

Calibration

Calibration can be arranged at one of the many accredited calibration and repair laboratories or even on-site in some instances.

Support desk

Where possible local support is provided in territory or from a local field office. This is the first line of support, which is backed up from our international support desks. Users are given a dedicated login to SupportSuite so tracking of support issues can be managed via a secure internet connection. Managerial privileges may be set up to allow filtering and reporting.



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Username:	<input type="text"/>
Password:	<input type="password"/>
Remember Me:	<input type="radio"/> Yes <input checked="" type="radio"/> No
<input type="button" value="Login"/>	

From day one we aim to provide an efficient support service and fast response time to technical questions.

For full details of the services currently available and planned for your territory, please contact your local Anritsu Sales office.

Anritsu Corporation

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

● U.S.A.

Anritsu Company

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

● Canada

Anritsu Electronics Ltd.

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

● Brazil

Anritsu Eletrônica Ltda.

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

● Mexico

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

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

● U.K.

Anritsu EMEA Ltd.

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

● France

Anritsu S.A.

12 avenue du Québec, Bâtiment Iris 1- Silic 638,
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: +49-89-442308-5

● Italy

Anritsu S.p.A.

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

● Singapore

Anritsu Pte. Ltd.

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

● India

Anritsu Pte. Ltd.

India Branch Office

3rd Floor, Shri Lakshminarayan Niwas, #2726, 80 ft Road,
HAL 3rd Stage, Bangalore - 560 075, India
Phone: +91-80-4058-1300
Fax: +91-80-4058-1301

● P.R. China (Hong Kong)

Anritsu Company Ltd.

Units 4 & 5, 28th Floor, Greenfield Tower, Concordia Plaza,
No. 1 Science Museum Road, Tsim Sha Tsui East,
Kowloon, Hong Kong
Phone: +852-2301-4980
Fax: +852-2301-3545

● P.R. China (Beijing)

Anritsu Company Ltd.

Beijing Representative Office

Room 2008, Beijing Fortune Building,
No. 5, Dong-San-Huan Bei Road,
Chao-Yang District, Beijing 100004, P.R. China
Phone: +86-10-6590-9230
Fax: +86-10-6590-9235

● Korea

Anritsu Corporation, Ltd.

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

● Australia

Anritsu Pty. Ltd.

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

● Taiwan

Anritsu Company Inc.

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

Please contact: