VIDEO TELEPHONY CONFORMANCE TESTING WITH THE ANRITSU MD8480C AND IXMOBILE

Mobile video telephony is changing the way that consumers and business people communicate. Person-to-person video telephony enables mobile video conferencing and allows video messages to be left in the same way as voice messages. Person-to-content video telephony delivers live program streams such as news or sporting events or delayed streams such as last week's episode of a television program. As an example of the growing adoption of video telephony, mobile equipment provider Ericsson says that twelve mobile operators, primarily in Europe and Asia, are already using its video gateway to provide video telephony services.

Conformance testing plays a critical role in bringing video telephone products and services to market. Chipset developers are continually testing new hardware and software on large numbers of different phones. Phone manufacturers require video testing to verify the performance of their phones. Service providers also run tests on handsets before they agree to certify them for use on their network.

**IMTC/GCF conformance test suites**

The International Multimedia Telecommunications Consortium (IMTC) and the Global Certification Forum (GCF) provide the standards used for verifying video telephony interoperability. The IMTC defines more than 100 test cases to address 3G video telephone interoperability and compliance. The GCF, a partnership between handset manufacturers and network operators, has developed a test suite with just under 40 test cases to prove video telephone certification for handsets.

Conformance test cases ensure that headsets support the basic features required to make video telephone calls. These test cases include H.263 Video Codec Support, GSM-AMR Audio Codec Support, and H.245 Control Signaling Protocol Support. Interoperability test cases ensure that handsets with different feature sets can talk to each other. This type of testing typically involves attempting a call while requesting a specific feature and then verifying that the call remained active whether the handset being tested supported that feature or not.

Need for an emulator

Conformance and interoperability testing requires a stable test environment so that tests can be run multiple times under the exact same conditions. Live networks are not suitable for conformance testing because they have varying loads and coverage patterns. Problems in the cellular connection might affect the performance of the phone. Engineers trying to analyze the performance of the phone will have no way of knowing whether a problem they are seeing is caused by the network itself or by a problem with the phone under test. Another problem with performing tests over an actual network is that coverage gaps or high levels of traffic may delay testing for an extended period of time. The need may also exist to perform testing in areas that do not yet support video telephony.

For these reasons, an emulator is needed that can duplicate the performance of the cellular network to test the handset performance. This type of instrument eliminates the loading and coverage problems inherent in the real cellular network. The MD8480C is a base station simulator with the ideal protocol and test functions for video telephony conformance testing. It has an air interface conforming to 3GPP specifications and supports a full range of application and protocol tests, coding/decoding processing, protocol sequence testing, voice and data communications testing, and user equipment (UE) end to end testing.
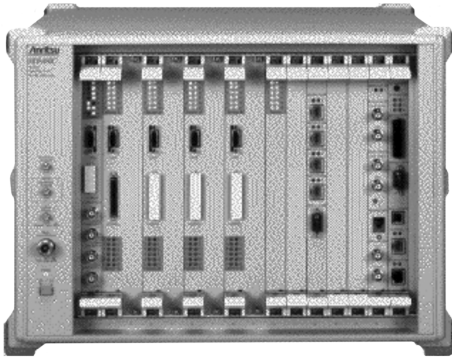
MD8480C W-CDMA signaling tester

The MD8480C was the industry's first High-Speed Downlink Packet Access (HSDPA) tester and is the only one with that supports full HSDPA capabilities up to 14.4 mbps maximum data throughput. To guarantee the best data throughput for mobile UEs supporting HSDPA, most models have built-in diversity reception functions. The MD8480C supports UE throughput and handover to a maximum of four base station cells. Adding the HSDPA Tx Diversity option allows a single MD8480C to simulate a diversity reception and handover test environment approaching a real UTRAN network

Configuring MD8480C with IxMobile

The MD8480C can be combined with the IxMobile software package from Ixia to provide a complete video telephony conformance and interoperability testing solution. IxMobile provides facilities for diagnosing, analyzing, and troubleshooting all aspects of video telephony calls. The MD8480C uses an ISDN blade to connect to the control PC running IxMobile. A control PC is used to administer the MD8480C. The control PC typically runs Rapid Test Designer (RTD), a graphical user interface based networking testing program, or Protocol Test System (PTS), a script-based network testing program. Both applications require an ISDN connection script that describes the ISDN connection protocol and call scenario. These scripts can be written by the user or supplied by Anritsu.

RTD Rapid Test Designer (RTD) software is a revolutionary new tool that significantly speeds up the development and deployment of W-CDMA UE by simplifying the way in which tests are created, executed, and analyzed. No knowledge of TTCN is required so users can concentrate on testing specific functions and protocols within the UE without having to be an expert on all the 3GPP protocol layers. The intuitive graphical interface includes branching and decision making. GSM and W-CDMA (UMTS) protocol and communications tests can be created and run in a fraction of the time required for traditional testing methods. After tests are complete, the RTD matches criteria against actual performance and reports on the success or failure of each criterion.

3G UE

NodeB Emulator

TCP/IP API
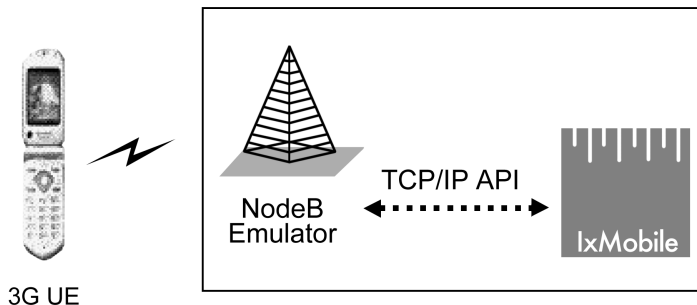
IxMobile

IxMobile may be installed directly on the NodeB Emulator, or as a separate unit.

Overview of test configuration

Control PC -------Ethernet------->MD8480C----------BRI---------->IxMobile

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| RF cable

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Handset

On the Anritsu side:

1) The Ethernet cable is a crossover cable from the PC to the MD8480C chassis.

2) The RF cable comes with the chassis and plugs into the RF port of a typical phone.

3) On the control PC for the RTD you must kick off Test Video Calls --> R5 --> ISDN-M0M0-BRI-1 (script).

On the IxMobile side:

1) Bit reversal is not used during the test.

2) The mobile level may be set to any value. the default of 2 is recommended.

3) Connect the BRI cable from the IxMobile into the ISDN-BRI port on the chassis and dial 4444444.

4) If Auto Answer is selected on IxMobile the UE can originate or terminate calls.

Running the tests

The user can select a test campaign from within IxMobile such as the GCF WI-019 Standard and WI-019 Reversed test campaigns that are pre-configured within the software package. Each test campaign includes a number of profiles that define each specific test case. The profiles for the GCF WI-019 campaigns have been configured according to the appropriate specifications. Users can also easily create their own profiles for feature tests, unit tests, negative tests, etc.
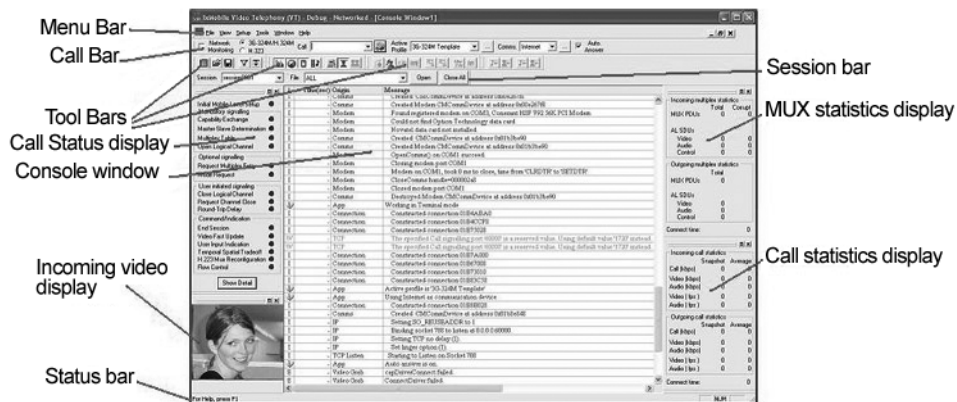
IxMobile user interface

The user simply selects the test campaign and the first profile. The first instruction is usually to establish a call. The user enters the destination address of the handset under test into the call field in the call bar and then presses the call button. Questions are built into each profile that automatically prompts the user for a response during the test. A typical question is: Does the video appear on the device under test? The user can answer each question by clicking on the appropriate icon. At the end of each test case, IxMobile checks for expected events and the results of the test case questions. A message is then printed in the console dialog indicating the result of the test. Typically, a single no or fail answer to any test case question causes the test to fail.

IxMobile also generates a complete GCF report that provides the test results. The user can select all the available sessions or a subset of the sessions logged under the test campaign. If the specific test cases were run more than once, the user can select the individual run to be used in the summary report. IxMobile can help explain why test case did not pass by providing log files, including full text H.245 message decodes, channel summary details and complete binary records of the bearer path. Users can look at the details of the message path to identify problems with the message sequence, such as one side failing to take over as the master for the call. For example, they might look at the log file to determine what flags were set, what options were chosen and why certain flags were negotiated, in order to identify protocol violations.

Users can also view graphs and reports which identify the bandwidth usage and signal quality. As an example, the MD8480C and IxMobile software were recently used by a cell phone manufacturer to test and diagnose a new handset. A 3G video call should have about 64 kbps bandwidth including 48K for video and 12K for audio. In this case, the bandwidth usage report showed that incoming bandwidth to the headset dropped to 32K. This information helped the handset manufacturer identify and fix an incompatibility with the network.

The Anritsu MD8480C plus IxMobile software provide the perfect combination for video telephony handset conformance testing. Users can quickly set up tests and run through the entire suite in a very short amount of time. The detailed console messages, information reports, and log files provide information make it easy to quickly identify problems and diagnose failures.

/Anritsu

Anritsu Corporation
5-1-1 Onna, Atsugi-shi, Kanagawa, 243-8555 Japan
Phone: +81-46-223-1111
Fax: +81-46-296-1264

● **U.S.A.**
Anritsu Company
1155 East Collins Blvd., Richardson, TX 75081, U.S.A.
Toll Free: 1-800-ANRITSU (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.
Praca Amadeu Amaral, 27 - 1 Andar
01327-010-Paraiso-São Paulo-Brazil
Phone: +55-11-3283-2511
Fax: +55-11-3288-6940

● **U.K.**
Anritsu EMEA Ltd.
200 Capability Green, Luton, Bedfordshire LU1 3LU, U.K.
Phone: +44-1582-433280
Fax: +44-1582-731303

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

● **France**
Anritsu S.A.
9, Avenue du Québec Z.A. de Courtabœuf
91951 Les Ulis Cedex, France
Phone: +33-1-60-92-15-50
Fax: +33-1-64-46-10-65

● **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
Borgafjordsgatan 13, 164 40 KISTA, Sweden
Phone: +46-853470700
Fax: +46-853470730

● **Finland**
Anritsu AB
Teknobulevardi 3-5, FI-01530 Vantaa, Finland
Phone: +358-20-741-8100
Fax: +358-20-741-8111

● **Denmark**
Anritsu A/S
Kirkebjerg Allé 90 DK-2605 Brøndby, Denmark
Phone: +45-72112200
Fax: +45-72112210

● **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.
10, Hoe Chiang Road, #07-01/02, Keppel Towers,
Singapore 089315
Phone: +65-6282-2400
Fax: +65-6282-2533

● **P.R. China (Hong Kong)**
Anritsu Company Ltd.
Suite 923, 9/F., Chinachem Golden Plaza, 77 Mody Road,
Tsimshatsui East, Kowloon, Hong Kong, P.R. China
Phone: +852-2301-4980
Fax: +852-2301-3545

● **P.R. China (Beijing)**
Anritsu Company Ltd.
Beijing Representative Office
Room 1515, Beijing Fortune Building,
No. 5, Dong-San-Huan Bei Road,
Chao-Yang District, Beijing 10004, 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

● **India**
Anritsu Corporation
India Liaison Office
Unit No. S-3, Second Floor, Esteem Red Cross Bhavan,
No. 26, Race Course Road, Bangalore 560 001, India
Phone: +91-80-32944707
Fax: +91-80-22356648

Please Contact:

061127