CMA 3000

SPECIFICATIONS

GSM/GPRS Test Options

Field testing has never been easier.

CMA 3000 is Anritsu's new portable, compact and user-friendly field tester. It's designed specifically for field technicians who install and maintain mobile-access and fixed-access networks, transmission networks and switching.

Equipped with the GSM/GPRS Abis protocol decode options, the battery-powered CMA 3000 is an easy-to-use, portable field test instrument for the installation, operation and maintenance of Abis interfaces on 2 Mbps lines in GSM/GPRS networks. It's also possible to outfit the CMA 3000 with the Gb interface protocol decode option and the powerful frame relay option to support the installation, operation and maintenance of Gb interfaces on 2 Mbps lines in GPRS/EDGE networks. Yet other options allow you to use the CMA 3000 for analyzing other 2 Mbps interfaces in GSM/GPRS networks.
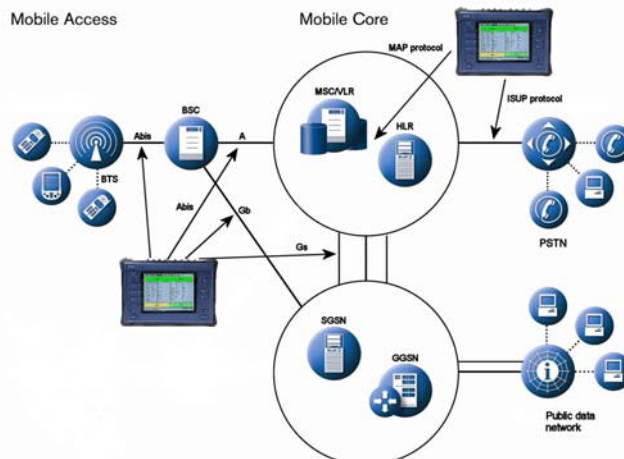
KEY FEATURES

- Full-featured 2 Mbps transmission test set
- Dedicated GSM/DCS 1800 Abis test facilities
- Simultaneous monitoring of both directions of a line
- In-depth analysis of GSM/DCS 1800 Abis, GPRS Abis and GPRS/EDGE Gb signaling
- GSM Abis MEASUREMENT_RESULT message filter
- Signaling channel traffic statistics
- Traffic channel overview
- Decode of GSM voice encodings
- Other protocol analysis options for GSM A-interface, GPRS Gs interface, MAP and SS7
- Automatic configuration to the line

KEY APPLICATIONS

- Installation testing
- Rapid in-service diagnostics and troubleshooting
- Transmission quality measurement
- Signaling analysis and troubleshooting
- Identification of frame relay channels on the Gb interface
- Installation testing
- Traffic channel usage
- Speech quality
- GSM radio quality parameters

When equipped with SDH interface options you can also analyze GSM/GPRS Abis and Gb interfaces on 2 Mbps lines embedded in SDH signals.

For in-service analysis and troubleshooting you get access to the all-level decode of the signaling on the supported GSM/GPRS interfaces allowing you to make a detailed analysis of signaling problems in the network.

On the GPRS Abis interface the CMA 3000 collects and presents the basic PCUs and the assembled messages at the LLC layer. For unencrypted messages in-depth signaling decode is available enabling you to analyze the signaling problems in the network in details. The captured data can also be used to analyze the transmission quality on the air interface.

The CMA 3000 Frame Relay option is a powerful tool for turning up the frame relay service on the Gb interface lines through the simulation of frame relay data packets with user-defined characteristics.

As user you can automatically configure the CMA 3000 to the monitored 2 Mbps line, including identification of signaling channels.

Abis interface status display

With the CMA 3000 you get a quick overview of the activity on the GSM/GPRS Abis interface, as the instrument provides information on the contents of the sub-channels on the monitored Abis interface in the GSM/GPRS Abis status display. Sub-channels used for GPRS and HSCSD are indicated together with traditional GSM speech channels in the GPRS Abis status display. Sub-channels used for AMR encoded speech are also indicated.
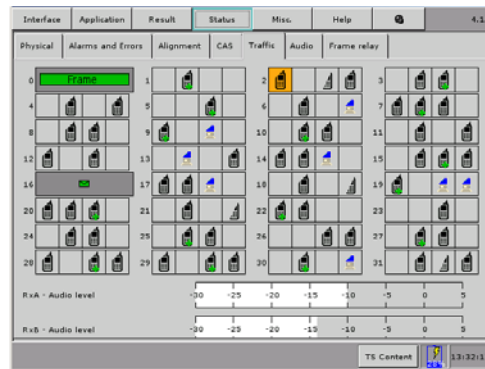
Figure 1 The Abis status display.

Protocol analysis

During installation or troubleshooting CMA 3000 provides valuable and detailed information on the signaling by collecting signaling messages from the GSM/GPRS Abis interface and the Gb interface, in addition to its powerful 2Mbps transmission line testing functionality.

The instrument captures and presents the basic PCUs and the assembled messages at the LLC layer on the GPRS Abis interface. For unencrypted messages all layers of signaling messages (GMM/SM or SMS) are decoded. This allows you to make a detailed analysis of the signaling problems in the network.

The CMA 3000 presents the recorded information in different ways: The Result List gives a one-line indication of each message for a rapid overview of the signaling information. This makes it simple to identify the input on which the message was detected, and subsequently you can easily detect message sequences.
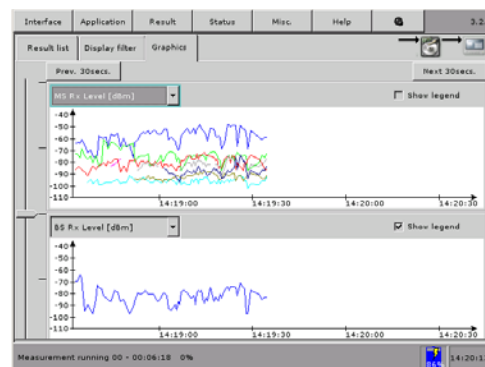

Figure 2 Graphical presentation of GSM Abis interface MEASUREMENT_RESULT message information.

The result list presentation can be expanded to show relevant parts of the messages, making it easy to identify the information carried. The contents of a message can also be shown, either presenting the main information elements or all parts of the signaling message and the hexadecimal values for detailed inspection and analysis.

Signaling statistics

The CMA 3000's signaling statistics provide data on the total traffic load and the quality of the signaling link.
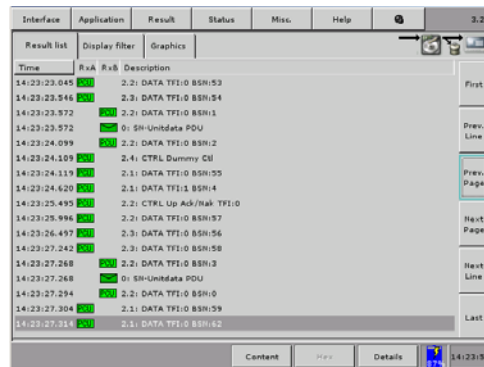

Figure 3 The result list display of GPRS Abis signaling messages with both PCU frames (marked with PCU) and assembled LLC level messages (marked with a green envelope).

For network optimization the GSM Abis Layer 3 and DTAP message type statistics opens many possibilities to the user. Call completion can be examined by comparing the count of SETUP messages on one side of the line with CONNECT messages on the other side of the line. Release cause statistics are also available for the Abis protocols.

On GPRS Abis the load of various PCU frame types can be examined. And for unencrypted messages on the GPRS Abis and on the Gb interface Layer 3 statistics can provide information like *attach request* counts together with information on *attach complete*.
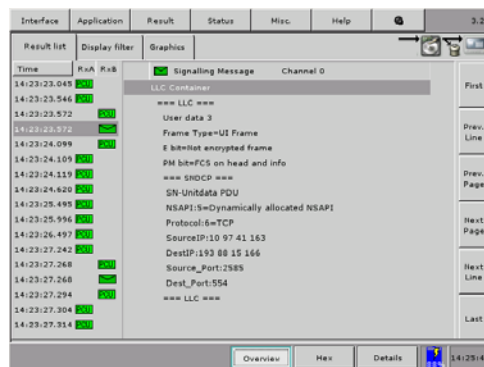

Figure 4 The contents of the higher levels of an encrypted GPRS Abis signaling message.

Frame relay channel scanning for Gb interface

In typical GPRS implementations the Gb interface is a 2 Mbps line carrying several frame relay connections. Each frame relay connection consists of a number of time slots.

The CMA 3000 provides a search facility that scans the contents of a monitored 2 Mbps line and identifies the frame relay connections on the line. This way you will easily and rapidly obtain the essential information on the Gb interface configuration.
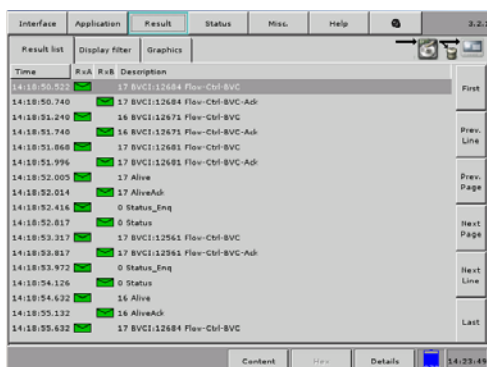

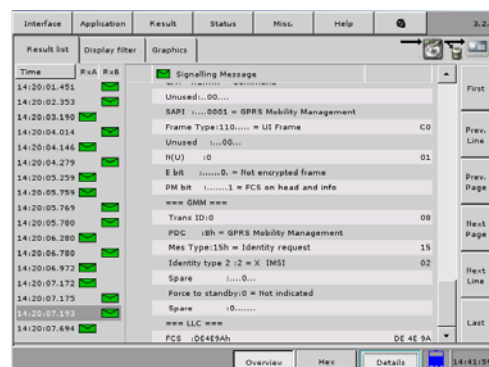Figure 5 The Result List overview presentation of Gb interface messages.   Figure 6 The detailed contents of an unencrypted Gb interface signaling message.

Specifications

The specifications overleaf cover the functionality when installing the basic Abis interface and protocol option, in addition to the GSM and GPRS protocol decode options in the CMA 3000.
For further information on the basic functionality please refer to the CMA 3000 Basic instrument specifications sheet.

General Specifications	

Protocol decoders	GSM Abis (Basic Abis interface and protocol functionality is required):
	• ETSI GSM Abis protocol
	• Vendor specific protocols for:
	  - Ericsson (RBS200/RBS2000)
	  - Lucent
	  - Motorola (Mobis)
	  - Nokia
	  - Siemens
	GPRS Abis (Basic Abis interface and protocol functionality is required):
	• Vendor specific protocols for:
	  - Ericsson
	  - Lucent
	  - Motorola
	  - Nokia
	  - Nortel
	  - Siemens
	Gb interface protocol (Frame Relay test option is required):
	• ETSI GPRS/EDGE Gb interface protocol

Channel access	GSM Abis: • Access to 64 kbps, 16 kbps and 8 kbps sub-channels for traffic • For signaling analysis 1 x 64 kbps, 32 kbps, 16 kbps or 8 kbps can be selected. Alternatively, up to 16 x 16kbps channels or up to 4 x 64 kbps channels can be selected for signaling analysis (access to traffic channels is disabled) GPRS Abis protocols: • Real-time monitoring of GPRS Abis protocols in one signaling channel with up to 16 x 16 kbit sub-channels or 8 x 32 kbit sub-channels Gb interface protocol: • Support of real-time monitoring of GPRS Gb protocols on one frame relay connection in a single or multiple 64 kbps time slots on a framed 2 Mbps line • The GPRS Gb protocol decode option supports frame relay on Permanent Virtual Circuits (PVC) with HDLC framing with a 16-bit FCS. DLCI formats: 10 bits (2 octets address field format), 16 bits (3 octets address field format), and 23 bits (4 octets address field format)
Signal insertion (GSM Abis)	One of the following can be inserted in a selected sub-channel: • Artificial speech (FR, EFR, AMR, HR). • PRBS11. • User-defined 1, 2, 4, 8 or 16-bit pattern. • 1kHz tone
GSM speech decodes	• In 16 kbps sub-channels: Full Rate (FR), Enhanced Full Rate (EFR), Half Rate (HR) and Adaptive Multi Rate (AMR). • In 8 kbps sub-channels: HR
Detected patterns (GSM Abis)	One of the following patterns can be detected in one sub-channel: • PRBS11 • User-defined 1, 2, 4, 8 or 16-bit pattern
Display of logged events	Unencrypted information is decoded GPRS Abis: Messages with both PCU frames and resulting assembled LLC level messages are decoded Max. length of recorded messages: 300 bytes. If a longer message is received, the first 300 bytes of the message are recorded and decoded/displayed

	Display modes:
	• Result List: showing one line with message type
	• Result List, Details: showing message type and main information elements
	• Message Contents: showing all information elements
	• Message Contents, Details: showing all parts of the message (GPRS: Up to the GMM/SM/SMS/SNDCP layers) plus a hex presentation. GPRS data is shown in hex
	• Plain text help for individual fields
	• Hex-only presentation of messages
	GSM Abis TRAU C-bits are shown with mnemonics
Message filter conditions for unencrypted information	GSM Abis (ETSI):
	• SAPI, TEI, Message Discriminator, Channel Number/TDMA Time Slot, MEASUREMENT_RESULT, DTAP messages.
	• Up to 8 user-defined layer 3 message types for a selected message discriminator or up to 8 user-defined DTAP message types for a selected protocol discriminator.
	• Up to 4 digits (display filter only)
	GPRS Abis:
	• Show only RLC/MAC PCU frames
	• MEAS_RESULT: Show only PCU frames that contain information on the transmission quality on the air interface
	• PCU filter – can allow that SYNC and IDLE messages are stripped away
	• TFI (display filter only)
	• Show only LLC level messages (display filter only)
	• Show GMM/SM/SMS messages (display filter only)
	• Show user data messages (display filter only)
	• Up to 4 digits(display filter only)
	Gb interface:
	• Reject keep-alive messages
	• Show User data messages
	• Show GMM/SM/SMS messages
	• DLCI, BVCI
	• TLLI, Up to 4 digits (display filter only)
Signaling statistics for unencrypted information	GSM Abis (ETSI):
	• Traffic load: total, retransmitted and errored signaling frames
	• Layer 2 traffic load split into Supervisory (S), Unnumbered (U) and Information frames (I/UI)
	• Signaling divided by the Message Discriminator
	• Statistics on up to 32 layer 3 message types or release cause values for a selected Message Discriminator
	• DTAP signaling divided by the Protocol Discriminator
	• Statistics on up to 32 DTAP message types or release cause values for a selected Protocol Discriminator
	GPRS Abis:
	• Traffic load: total, retransmitted and errored PCU frames
	• Count of PCU frames types
	• Count of Layer 3 protocol data (user data messages and GMM/SM/SMS messages)
	• Count of GMM/SM or SMS messages types
	Gb interface:
	• Traffic load: total and errored signaling frames
	• Count of user data messages and GMM/SM/SMS messages
	• Count of GMM/SM or SMS messages types

Memory capacity	
Internal memory capacity	32 Mbytes are available for measurement results • Storage capacity for protocols: up to 8 protocols can be installed

Miscellaneous	
Options related to the GSM/GPRS options	• Frame relay test option • Frame relay decode (requires frame relay test option) • MAP protocol decode (requires basic SS7 functionality option) • A-interface protocol decode (requires basic SS7 functionality option) • Gs interface protocol decode (requires basic SS7 functionality option) • Additional options are available. A list can be found in the Basic instrument specification sheet

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., 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 Electrônica 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, Batiment 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 Denmark
(Test & Measurement except Service Assurance)
Kay Fiskers Plads 9, 2300 Copenhagen S, Denmark
Phone: +45-72112200
Fax: +45-72112210

- **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
PO 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 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