

# CMA 3000

## SPECIFICATIONS

### Frame Relay Test Option



### Rapid turn up of frame relay lines!

CMA 3000 is Anritsu's next-generation, portable and futureproof field tester for the installation and maintenance of access and core networks.

The CMA 3000 field tester covers a wide range of applications, from fast first-aid troubleshooting to comprehensive, in-depth and all-layer analysis of transmission problems.

When outfitted with the frame relay test option, the battery-powered Anritsu CMA 3000 is an easy-to-use, portable field test instrument for the installation, operation and maintenance of frame relay services on 2 Mbps lines.

The frame relay option provides you with powerful tools for turn up of frame relay lines through the simulation of frame relay data packets with user-defined characteristics. The measurement facilities gives you essential information on the line quality. For in-service analysis and troubleshooting, you have access to extensive frame relay statistics. Using the the CMA 3000 frame relay channel scan feature you can quickly identify multi-time slot frame relay channels.

#### KEY FEATURES

- Extensive frame relay statistics
- Frame relay channel scan
- Out-of-service testing
- In-service bi-directional monitoring
- CIR test
- IP over frame relay ping test

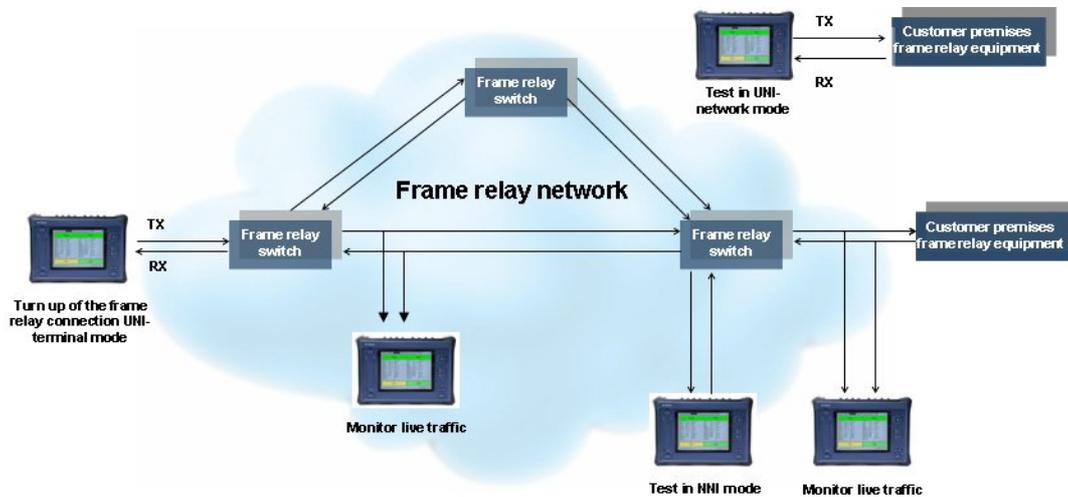


Figure 1 Frame relay network testing with the CMA 3000.

### LMI emulation test

To establish the logical configuration of the link, CMA 3000 generates a LMI Status Inquiry Message, requesting "Full Status" at user-defined intervals. The response from the network helps you verify the correct setup of activated DLCIs on the link in question.

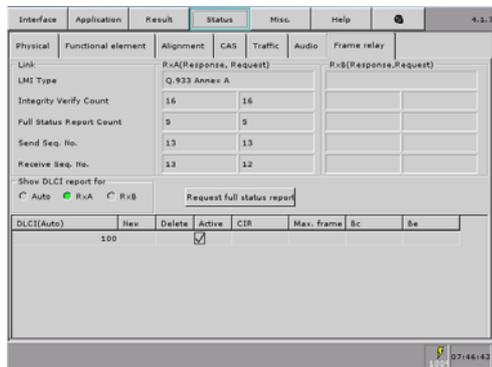


Figure 2 Frame relay LMI information with LMI counts and sequence numbers for both sides of a frame relay line and status for up to 50 DLCIs.

### DLCI and LMI information

CMA 3000 derives network information from the Full Status reports and displays it, allowing you to determine if the network parameters are correct or not.

The CMA 3000 also analyzes the LMI Status messages on the monitored line displaying the results in such way that you can check if the basic surveillance of the frame relay connection works properly.

## Frame relay emulation

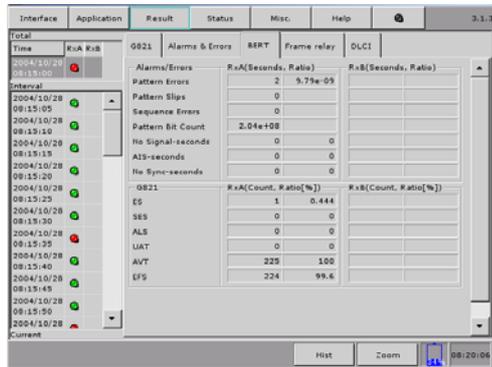


Figure 3 Extensive statistics, including BERT results are available during frame relay emulation.

With the frame relay emulation capability that supports DLCI tests emulation with user-defined setup parameters you can test the frame relay connection for a selected DLCI. These tests allow you to test end-to-end connectivity as well as the network's ability to handle various frames lengths, frame contents and output utilizations.

Bit Error Rate Testing is carried out with a user-defined test pattern in the payload. If required, the emulation testing inserts frame numbering into the test frames in order to determine whether or not frames have been lost. This test can be conducted with or without LMI emulation in the background.

## PING test and InARP

The CMA 3000 can perform a "PING" test, send a proper response to received "PING" patterns and then measure the round-trip delay. It's possible to perform this test with or without LMI emulation in the background. If the IP address of the destination node is unknown, CMA 3000 can send out an InARP IP address request.

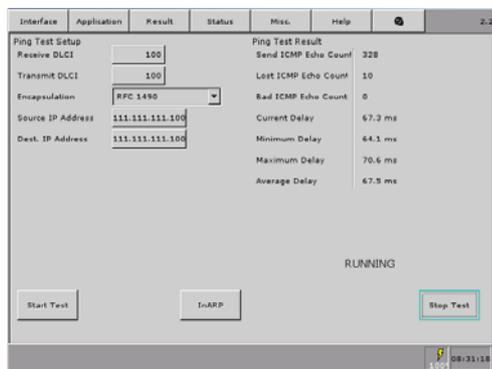


Figure 4 Ping test of connectivity and delay.

## CIR test

The Committed Information Ratio (CIR) is agreed between the customer and the frame relay network operator. The CIR establishes the data rate that the network operator commits to transport through the network. It's therefore vital to verify the CIR of a frame relay circuit.

The CMA 3000 includes an automatic test of the CIR. The instrument will also estimate the CIR value for the monitored DLCIs when measuring live frame relay traffic

## Frame relay statistics

With CMA 3000's extensive frame relay statistics you can perform in-service analysis and troubleshooting of the monitored frame relay connection.

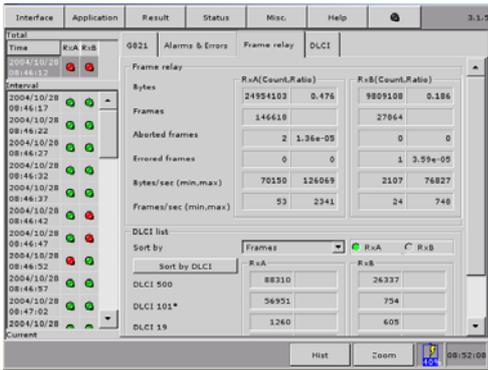


Figure 5 Overview of the frame relay traffic.

The frame relay statistics provide valuable and detailed information for up to 50 individual DLCIs (of which 8 may be user-defined) and a total for all DLCIs on the monitored line. For 2 DLCIs and the total for all DLCIs histograms are available, making it easy for you to analyze changes in traffic pattern over time.

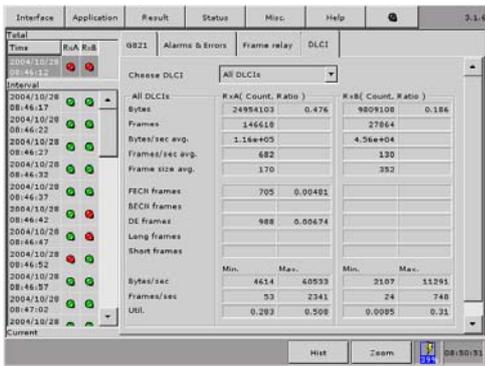


Figure 6 The CMA 3000 monitors a large number of parameters for up to 50 DLCIs simultaneously.

The frame relay statistics visualizes the frame relay connection. The CMA 3000 monitors a large number of parameters for as many as 50 DLCIs simultaneously. This enables you to select which parameter to use as the foundation for the visualization and where to sort. This allows you to quickly and easily analyze the most interesting results. Another display provides all the details for a selected DLCI or for all DLCIs.

## Specifications

The specifications below cover the functionality when installing the frame relay test option. Please refer to the CMA 3000 Basic instrument specifications sheet for further information on the basic functionality.

<b>General</b>	<p>The option supports frame relay on Permanent Virtual Circuits (PVC) with HDLC framing with a 16-bit FCS</p> <p>DLCI formats:</p> <ul style="list-style-type: none"><li>• 10 bits (2 octets address field format)</li><li>• 16 bits (3 octets address field format)</li><li>• 23 bits (4 octets address field format)</li></ul>
<b>Interfaces</b>	<p>Real-time monitoring, analysis and test of frame relay services is supported on the following interfaces:</p> <ul style="list-style-type: none"><li>• Single or multiple 64 kbps time slots on a framed 2 Mbps line</li><li>• Data interfaces (RS-232C/V.24, X.21/V.11, V.35, RS-449/V.36, RS-530) when CMA 3000 is also equipped with the data interface measurement option</li></ul>
<b>Modes of operation</b>	<p>The following modes of operation are supported:</p> <ul style="list-style-type: none"><li>• UNI Terminal</li><li>• UNI Network</li><li>• NNI</li></ul>
<b>Frame relay statistics</b>	<p>Statistics for 50 individual DLCIs of which 8 may be user-defined and a total for all DLCIs on a monitored line. For 2 DLCIs and the total for all DLCIs, statistics and histograms are available with the following user-selectable resolutions: 1, 2, 5, 10, 15, 30s, 1, 5, 15, 30 minutes, 1, 2, 4, 6, 12 hours</p> <p>The following parameters are measured and presented:</p> <ul style="list-style-type: none"><li>• Average, Minimum, Maximum utilisation per second (%)</li><li>• Average, Minimum, Maximum throughput (kbps)</li><li>• Average, Minimum, Maximum throughput (frames/s)</li></ul>

<b>Frame relay statistics cont'd</b>	<ul style="list-style-type: none"> <li>• Average frame size</li> <li>• Total number of frames</li> <li>• FECN frames</li> <li>• BECN frames</li> <li>• DE frames</li> <li>• Short frames</li> <li>• Long frames</li> <li>• Aborted frames</li> <li>• Frames with FCS error</li> <li>• CIR estimate (for individual DLCIs)</li> </ul>
<b>DLCI Information</b>	<p>The following DLCI Information is derived from Full Status reports and presented to the user:</p> <ul style="list-style-type: none"> <li>• Listing of available DLCIs on the facility under test with their status (active, inactive, other) and CIRs and other link information (if available)</li> </ul> <p>The instrument will present the latest available information</p>
<b>LMI information</b>	<p>The following LMI information for the entire network is derived from Status messages and presented to the user:</p> <ul style="list-style-type: none"> <li>• Current sequence numbers for both directions, with a correct/incorrect notation</li> <li>• Total status (and inquiry) messages for keep alive and full status</li> <li>• Detected LMI type</li> </ul>
<b>LMI emulation test</b>	<p>LMI implementations:</p> <ul style="list-style-type: none"> <li>• Q.933 Annex-A</li> <li>• T1.617 Annex-D</li> <li>• Original FRF (Frame Relay Forum)</li> <li>• Automatic detection of the above</li> <li>• None</li> </ul> <p>Heart beat interval:</p> <ul style="list-style-type: none"> <li>• User-programmable from 2 to 40 sec in 1 sec steps</li> </ul> <p>Full Status Inquiry Message rate:</p> <ul style="list-style-type: none"> <li>• User-programmable from 1 to 255 in steps of 1</li> </ul>
<b>Frame relay channel scan</b>	<p>Automatic identification of multi time slot frame relay channels</p>
<b>Frame relay emulation</b>	<p>DLCI:</p> <ul style="list-style-type: none"> <li>• User-defined</li> </ul> <p>Control bits (FECN, BECN, DE, C/R) of transmitted signal:</p> <ul style="list-style-type: none"> <li>• User-programmable</li> </ul> <p>Frame lengths:</p> <ul style="list-style-type: none"> <li>• Up to 4093 bytes (user-definable)</li> </ul> <p>Utilization rates:</p> <ul style="list-style-type: none"> <li>• Up to 100% (user-definable)</li> </ul> <p>Dynamic change of payload:</p> <ul style="list-style-type: none"> <li>• Frame size can automatically be increased during the test</li> </ul> <p>Frames may be sent in bursts up to 255 frames</p> <p>Supported payload test patterns:</p> <ul style="list-style-type: none"> <li>• PRBS 6, PRBS 7, PRBS 9, PRBS 11, PRBS 12, PRBS 15, PRBS 20, PRBS 23</li> <li>• QRBS 11, QRBS 20</li> <li>• All 0s, All 1s</li> <li>• Fox pattern</li> <li>• Alternating (1:1), (1:3), (1:7), (3:1), (7:1), (3:24)</li> <li>• User-defined up to 16 bits. Length in steps of 1 bit</li> <li>• User-defined up to 2048 bits. Length in steps of 8 bits</li> </ul> <p>All patterns, except "All 0" and "All 1" and Fox may be inverted</p>

<b>Frame relay emulation cont'd</b>	<p>Bit Error Testing functionality:</p> <ul style="list-style-type: none"> <li>• Detection of pattern errors and slip-in received signal</li> <li>• Insertion of pattern errors and slip-in generated signal</li> <li>• Error insertion: <ul style="list-style-type: none"> <li>• Manual burst</li> <li>• Burst length: 1-255 consecutive errors</li> <li>• Continuous: burst length * 10<sup>-2</sup>, 10<sup>-3</sup>, 10<sup>-4</sup>, 10<sup>-5</sup>, 10<sup>-6</sup>, 10<sup>-7</sup></li> <li>• Provoking of G.821 events (ES, SES etc.)</li> </ul> </li> <li>• Frame sequence error: manual</li> <li>• Slip insertion: manual</li> </ul> <p>Other measurements:</p> <ul style="list-style-type: none"> <li>• Count of missing (or mis-sequenced) frames</li> <li>• Indication of average frame delay if a far-end loop back appears during frame relay emulation</li> </ul>
<b>CIR test</b>	<p>The following parameters can be set for the CIR Test:</p> <ul style="list-style-type: none"> <li>• Transmit/receive DLCI</li> <li>• Min. and max. frame size (frame size is automatically increased during the test)</li> <li>• Burst length</li> <li>• Min. and max. utilization (utilization is automatically increased during the test)</li> <li>• Tc period</li> </ul>
<b>PING test</b>	<p>DLCI:</p> <ul style="list-style-type: none"> <li>• User-defined</li> </ul> <p>ICMP message formats in accordance with RFC792</p> <p>Length of ICMP echo message: 64 bytes</p> <p>Supported IP encapsulations:</p> <ul style="list-style-type: none"> <li>• RFC1490</li> <li>• RFC1490 with SNAP</li> <li>• Cisco proprietary</li> </ul> <p>IPv4 is supported</p> <p>Repetition rate:</p> <ul style="list-style-type: none"> <li>• 1 ICMP echo message per second during the PING test</li> </ul> <p>The PING test may be conducted with or without LMI emulation in the background</p> <p>Results:</p> <ul style="list-style-type: none"> <li>• Transmitted echo messages</li> <li>• Lost echo messages</li> <li>• Minimum delay</li> <li>• Maximum delay</li> <li>• Average delay</li> </ul> <p>Round-trip delay with accuracy and resolution of 0.1 msec when testing frame relay at 1984 kbps (i.e. 31 time slots of a 2Mbps PCM line)</p>
<b>InARP</b>	<p>Request IP address of a network element in accordance with Inverse Address Resolution Protocol RFC 2390</p>

Miscellaneous	
<b>Options related to the Frame relay option</b>	<ul style="list-style-type: none"> <li>• Frame relay decode (requires frame relay test option)</li> <li>• GPRS Gb interface decode (requires frame relay test option)</li> </ul>

## **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 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, 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: +49-89-442308-5

## • **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