

CMA5000 - UTA

SPECIFICATIONS

Universal Transport Analysis Module / 10 GigE Application



Content:

- 10 Gig Ethernet tests made virtually automatic with the CMA 5000-UTA module
- Testing both 10 GigE LAN-PHY and WAN-PHY networks
- Automated RFC 2544 tests
- Field exchangeable XFP
- Fast and professional reports

10 Gig Ethernet tests made virtually automatic with the CMA 5000-UTA module

The 10GigE application of the Universal Transport Analysis (UTA) module provides a powerful set of test functions for all the technicians and engineers tasked with the installation, commissioning and troubleshooting of today's 10GigE networks. All they need for testing 10GigE LAN-PHY and WAN-PHY networks is available in one single module including: traffic monitoring and generation, performances analysis according to RFC2544, continuity check (PING), loop back tests in switched networks and more. In particular, RFC 2544 tests are completely automated and provide simple acquisition of Throughput, Frame Loss, Latency and Burstability. But the UTA 10GigE application also authorizes a complete user control of the line load, frame size, frame rate and frame contents for customized tests.

In addition, the unsurpassed ease-of-use of the application helps the engineers to be quickly operational. In the configuration phase, the user is guided step-by-step and when the measurement is running, thresholds may be set for all parameters to provide a quick, unmistakable and visual indication of pass/fail test status.

Key Features	Key Applications
<ul style="list-style-type: none"> • Support of LAN-PHY and WAN-PHY (option) • Pluggable XFP (10GBASE-SR, -LR, -ER, -SW, -LW, -EW) • Supports generation & analysis of Ethernet traffic at 100% line load • Automated RFC 2544 tests: <ul style="list-style-type: none"> ○ Throughput ○ Frame Loss ○ Latency ○ Burst ability • Capture function (option) <ul style="list-style-type: none"> ○ Record traffic (one shoot or continuously) ○ Filter traffic: per MAC addresses, IP addresses, Protocols ○ Hexadecimal representation of each frame captured • End-to-end tests in switched networks via Reflector mode (automatic swap of MAC/IP addresses) • User-programmable thresholds for visual pass/fail indicators • Automatic test report in PDF format • BERT test (option) • Sequence test (option) 	<ul style="list-style-type: none"> • Installation, commissioning and troubleshooting tests • Measure network limitations during installation / commissioning • Verify Service Level Agreement (SLA) criteria as per RFC 2544 • Check network bandwidth utilization • Test indifferently 10GigE LAN-PHY or WAN-PHY networks

Testing both 10GigE LAN-PHY and WAN-PHY networks

The IEEE 802.3ae standard defines 2 PHY layers that have different bit rate and frame structure. The 10GigE LAN-PHY is the natural evolution to 10 Gbit/s of the legacy GigE. The MAC Ethernet frames are transmitted at 10 Gbit/s. Due to the 64B/66B physical coding used, the line bit rate is slightly higher: 10.3125 Gbit/s.

The 10GigE WAN-PHY encapsulates the MAC Ethernet frames into a STM64/OC-192-like frame. Consequently the line bit rate is 9.953 Gbit/s and the MAC Ethernet frames are mapped into the VC4-64c/STS-192c container at 9.2942 Gbit/s (after 64B/66B decoding). It is important to understand that WAN-PHY interface doesn't connect directly to SDH/SONET network. Many costly aspects of SDH/SONET are not supported by WAN-PHY interface: jitter specifications, clock accuracy, optical specifications.

The UTA module supports both LAN-PHY and WAN-PHY (WAN-PHY is an option). It is a future-proof solution as the WAN-PHY option can be added just by software.

10GigE LAN-PHY and WAN-PHY Comparison			
Type	Bit Rate of MAC Layer	Bit Rate of Physical Layer	Coding (PCS)
10 GigE LAN-PHY	10 Gbit/s	10.3125 Gbit/s	64B/66B
10 GigE WAN-PHY	9.2942 Gbit/s	9953.28 Gbit/s	64B/66B

Fig.1: Main Differences between LAN-PHY and WAN-PHY

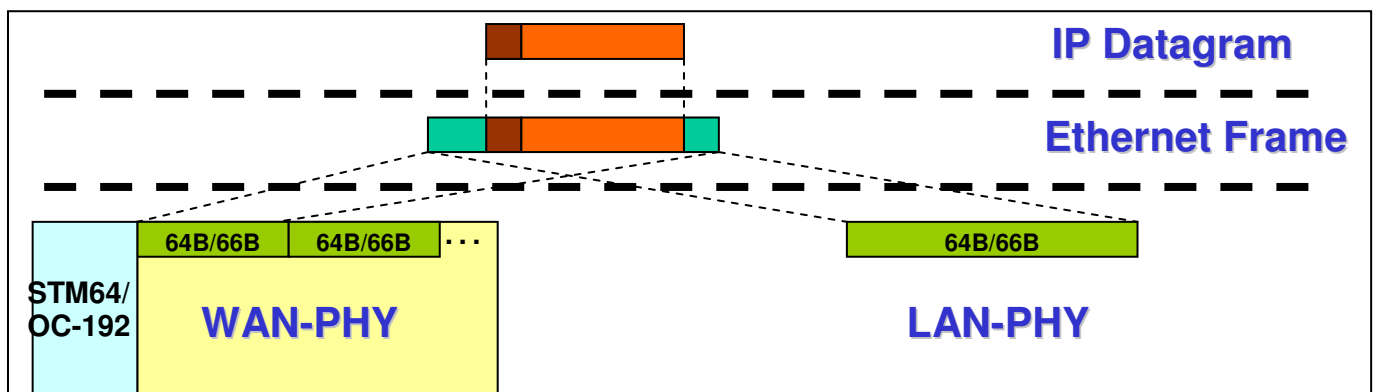


Fig.2: The UTA module supports 10 GigE LAN-PHY and 10 GigE WAN-PHY formats. Additional modes are also available in WAN-PHY as per 802.3ae like Mixed-frequency WAN-PHY and Unframed WAN-PHY (PRBS 31 pattern)

Automated RFC 2544 tests

Assessing performance is crucial for any type of network. For SDH/SONET networks, performance objectives are given in official recommendations like M.2100, M.2101.1, G.826 etc.... There is no equivalence for Ethernet or IP networks. Nevertheless, the RFC (Request For Comments) 2544 discusses and defines a number of tests that can be used to describe the performance characteristics of a network interconnecting device. Today, RFC 2544 has been widely adopted by the industry and is the de facto reference document for testing performance of Ethernet and IP networks. It is important to note that these tests are done out-of-service as they require generating traffic.

The main RFC2544 tests are:

- Throughput: Maximum bit rate as a function of frame size
- Frame Loss: Frame loss as a function of frame rate and size
- Back-to-Back Frames: Burst size as a function of frame size
- Latency: How long for the signal to traverse the network

The UTA application performs all these tests automatically and can display the results either in table or graph format for easy analysis.



Fig.3: Throughput and Frame Loss tables screen shot

Field exchangeable XFP transceivers

The UTA module supports hot pluggable XFP transceivers. This feature brings a lot of configurability to the module. In the field, the user just has to replace the XFP by another to change the optical interface characteristics. This is particularly important as many optical interface standards exist today, each of them specifying a wavelength and a maximum transmission range. Whatever the 10GigE link or equipment to test, the field engineer has the insurance to be able to equip his UTA module with the right optical interface.



Fig.4: Change the optical interface of your module in the field via XFP transceiver

10 GigE Optical Standards				
PHY	Interface	Line Rate	Fiber	Range
LAN-PHY	10GBASE-SR	10.3125 Gbit/s	850 nm (Multimode)	300 m
	10GBASE-LR		1310 nm (Singlemode)	10 km
	10GBASE-ER		1550 nm (Singlemode)	40 or 80 km
WAN-PHY	10GBASE-SW	9.953 Gbit/s	850 nm (Multimode)	300 m
	10GBASE-LW		1310 nm (Singlemode)	10 km
	10GBASE-EW		1550 nm (Singlemode)	40 or 80 km

Fig.5: 10 GigE optical standards as per IEEE 802.3ae

Fast and professional reports

Creating professional report has never been so easy with the UTA application. After stopping a measurement, the report is just one click away: produce, save, print reports directly from the application. Select the set of results you want to produce, fill in the header information associated with the measurement and the UTA application will generate professionally presented reports in PDF format.

The figure shows three overlapping screenshots of the Anritsu UTA application interface, demonstrating the process of generating a test report.

Left Screenshot: TEST SETTINGS

PORT 1

Port Configuration:

- Interface: Electrical
- Service: AutoReport
- Clock: Auto Start
- IPD: 12 Bytes
- FrameSize: 8 Bytes
- Min IPD Threshold: 12 Bytes
- Min FrameSize Threshold: 4 Bytes
- Max FrameSize Threshold: 15 Bytes
- Pause Frames: Disabled

Thresholds:

- Utilization: >=0%
- Frame Throughput: >=0Mbps
- Collision Rate: >=0
- Unicast Frames: >=10
- Multicast Frames: >=10
- Broadcast Frames: >=10
- Pause Frames: >=0
- Error Frames: >=0
- Fragment Frames: >=0
- Undersized Frames: >=0
- Oversized Frames: >=0
- FDI Error Frames: >=0
- IPD Violations: >=0
- FrameSize Violations: >=0
- Alignment Errors: >=0

Filter:

[Channel Stats Resources](#)

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Middle Screenshot: TEST RESULTS

Test Start Time: Wed Aug 30 14:09:00:25

Test Stop Time: Wed Aug 30 14:09:00:25

Test Duration: 00:00:00

Link Status

Link	
Remote Fault	
Signal	
Speed	
Duplex	
Interface	

AutoStop Complete

Click

Signal

Asym. Pause capable

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Right Screenshot: Frame Size Distribution

	Port 1 (Frames)	Port 1 (Bytes)
64-127	72	8470
128-255	11	1281
256-511	2	256
512-1023	0	0
1024-1536	0	0
Other Frames	0	0

	Port 1 (Bytes)
Min. Frame Size	64
Max. Frame Size	256
Avg. Frame Size	95.871

Legend for Pie Chart:

- 64-127
- 128-255
- 256-511
- 512-1023
- 1024-1536
- Other Frames

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Fig.6: Generate automatic test report in PDF format with just one click

Specifications

Interfaces and Signal Specifications		
Signal	Port/Connector	Format
10 Gig Ethernet	One XFP port ¹	As per IEEE 802.3ae: - 10GigE LAN-PHY - 10GigE WAN-PHY ²
Clock Input	Bantam 100 Ohms	NA
	BNC 75 Ohms	NA
Clock Output	BNC 75 Ohms	10 MHz
	SMA 50 Ohms	Line rate divided by 16: - 644.53 MHz (for LAN-PHY) - 622.06 MHz (for WAN-PHY)

Optical Interfaces ^{3,4}						
Ref.	Interfaces	Wavelength	Output Power	Reach	Overload	Sensitivity (OMA)
5610-140-UTA	10GBASE-SR/SW	840-860 nm	-7.3 to -1.0 dBm	300 m	-1 dBm	-11 dBm
5610-141-UTA	10GBASE-LR/LW	1290-1330 nm	-8.2 to +0.5 dBm	10 km	+0.5 dBm	-12.6 dBm
5610-150-UTA	10GBASE-LR/LW	1290-1330 nm	-8.2 to +0.5 dBm	10 km	+0.5 dBm	-12.6 dBm
5610-142-UTA	10GBASE-ER/EW	1530-1565 nm	-4.7 to +4 dBm	40 km	-1 dBm	-14.1 dBm
5610-143-UTA	10GBASE-ZR/ZW	1530-1565 nm	0 to +4 dBm	80 km	-7 dBm	-24 dBm

Notes

- ¹ The XFP interface of the UTA module meets the requirements stated in the MSA standard
- ² 10GigE WAN-PHY is an option
- ³ Requires XFP that must be ordered separately
- ⁴ As defined in IEEE 802.3ae. Real specifications may be different depending on the XFP used

Traffic Generation	
Frame Edition	<ul style="list-style-type: none"> • Encapsulation Type (Ethertype/SNAP/LLC1). • Source and Destination MAC addresses. • Source and Destination IP V4 addresses. • ARP function (enable/disable) for destination MAC address discovery. • Gateway function (enable/disable) with configurable gateway IPV4 address and network mask. • VLAN Tag (enable/disable) with configurable PRIORITY (0-7) / CFI (enable/disable) / ID (0-4095) fields. • Payload content: PRBS or User Defined pattern.
Generation Modes (Test duration)	<ul style="list-style-type: none"> • Continuous • Number of seconds • Number of frames
Traffic Profile Edition	<ul style="list-style-type: none"> • Adjustable traffic distribution between broadcast and unicast frames (0% - 100%) (available in uniform traffic profile mode only) • Uniform mode: Line load defined between 0.01 and 10000 Mb/s. • Burst modes: <ul style="list-style-type: none"> ○ Frames per burst (10 – 100000) + Line Load. ○ Frames per burst (10 – 100000) + Inter-Burst-Gap (IBG between 10 and 1000000000 ns).
Frame Size Distribution	<ul style="list-style-type: none"> • Constant frame size • Random frame size distribution with configurable min and max values
Flow Control	<ul style="list-style-type: none"> • Response to Pause frames (enable/disable)
Error Insertion	<ul style="list-style-type: none"> • FCS errors: User programmable number of frames
Pause Frames Insertion	<ul style="list-style-type: none"> • User programmable number of Pause frames • User programmable Pause quanta value

Line Status	
Interface Status	<ul style="list-style-type: none"> • Link: Up (Green) / Down (Red) • Frames present: Yes (Green) / No (Red) • Speed • Duplexity • Wavelength • XFP Vendor Name • XFP Serial Number • XFP Part Number/Rev
Gauges	<ul style="list-style-type: none"> • Instantaneous Utilization (%) • Instantaneous Throughput (Mbps) • Errored Frames

Traffic Monitoring	
Thresholds	<p>User programmable thresholds (to trigger LED error indicators):</p> <ul style="list-style-type: none"> • Utilization (%) • Throughput (Mbps) • Unicast Frames (%) • Multicast Frames (%) • Broadcast Frames (%) • Pause Frames • Errored Frames (%) • Fragment Frames (%) • Undersized Frames (%) • Oversized Frames • FCS Errored Frames (%) • Internal MAC Errors • Symbol Errors • In Range Length Errors • Jabbers
Frame Performance	<ul style="list-style-type: none"> • Utilization (%): Average / Max / Min • Throughput (Mbps): Average / Max / Min • Frame Rate (Fps): Average / Max / Min <p>Display Mode: Cumulative or Instantaneous (refreshed every second)</p>
Frame Statistics (available for both Tx and Rx)	<ul style="list-style-type: none"> • Frames: <ul style="list-style-type: none"> ○ Total frames: Number and % ○ Total good frames: Number and % ○ Unicast frames: Number and % ○ Multicast frames: Number and % ○ Broadcast frames: Number and % ○ Pause frames : Number and % • Errored Frames: <ul style="list-style-type: none"> ○ Total errored frames: Number and % ○ Fragment frames: Number and % ○ Undersize frames: Number and % (only for Rx) ○ Oversize frames: Number and % ○ FCS errored frames: Number and % • Miscellaneous: <ul style="list-style-type: none"> ○ Frames lost due to Internal MAC Errors: Number and % ○ Symbol errors: Number and % ○ In Range Length error: Number and % ○ Jabbers: Number and % <p>Display Mode: Cumulative or Instantaneous (refreshed every second)</p>
Frame Size Distribution (available for both Tx and Rx)	<ul style="list-style-type: none"> • Frames with size between 64 and 127 bytes: Number and % • Frames with size between 128 and 255 bytes: Number and % • Frames with size between 256 and 511 bytes: Number and % • Frames with size between 512 and 1023 bytes: Number and % • Frames with size between 1024 and 1518 bytes: Number and % • Jumbo frames: Number and % • Average frame size (bytes) <p>Display Mode: Cumulative or Instantaneous (refreshed every second)</p>

RFC 2544 Tests	
Test Modes	<ul style="list-style-type: none"> • Switch/Router Test: Only one unit is required. Used to test the data link layer of a switch or a router somewhere in the network. • End-To-End Network Test: Two units are required, one at each end of the network connection.
General configuration parameters	<ul style="list-style-type: none"> • Destination MAC and IPV4 addresses • Source MAC and IPV4 addresses. • ARP function (enable/disable) for destination MAC address discovery. • Gateway function (enable/disable) with configurable gateway IPV4 address and network mask.
Throughput	<ul style="list-style-type: none"> • Frame Size / Profile configuration: <ul style="list-style-type: none"> ○ Constant with frame size from 64 to 9600 bytes ○ Stepped with Start and End frame size from 64 to 9600 bytes and step size from 10 to 1000 bytes. ○ User Defined (64/128/256/512/768/1024/1280/1518/Jumbo) • Line Load configuration: <ul style="list-style-type: none"> ○ Max Throughput: 0.01 to 10000 Mbps. ○ Min Throughput: 0.01 to 10 Mbps. ○ Step Throughput: 0.01 to 10000 Mbps. ○ Auto Search: Enable/Disable. ○ Stop on No Frame Loss @ Max Throughput: Enable/Disable. • Results: <ul style="list-style-type: none"> ○ Throughput is computed automatically according to the settings. ○ Throughput results are displayed either in a table or in a graph, using frame size as "x" axis and maximum throughput with no frame lost for "y" axis.
Frame Loss	<ul style="list-style-type: none"> • Frame Size / Profile and Line Load configuration: same as Throughput • Results: <ul style="list-style-type: none"> ○ Frame Loss is computed automatically according to the settings. ○ Frame Loss results are displayed either in a table or in a graph, using frame lost as "x" axis and throughput for "y" axis.
Latency	<ul style="list-style-type: none"> • Measure Latency Only at Throughputs: Enable/Disable • Frame Size / Profile configuration: <ul style="list-style-type: none"> ○ Constant with frame size from 64 to 9600 bytes ○ Stepped with Start and End frame size from 64 to 9600 bytes and step size from 10 to 1000 bytes. ○ User Defined (64/128/256/512/768/1024/1280/1518/Jumbo) • Line Load configuration: <ul style="list-style-type: none"> ○ Max Throughput: 0.01 to 9980 Mbps. ○ Min Throughput: 0.01 to 9980 Mbps. ○ Step Throughput: 0.01 to 10000 Mbps. • Results: <ul style="list-style-type: none"> ○ Latency is computed automatically according to the settings. ○ Latency results are displayed either in a table or in a graph, using frame size as "x" axis and delay as "y" axis (1 curve for each Throughput)
Burstability (Back-to-Back)	<ul style="list-style-type: none"> • Frame Size / Profile configuration: <ul style="list-style-type: none"> ○ Constant with frame size from 64 to 9600 bytes ○ Stepped with Start and End frame size from 64 to 9600 bytes and step size from 10 to 1000 bytes. ○ User Defined (64/128/256/512/768/1024/1280/1518/Jumbo) • Burst Profile configuration: <ul style="list-style-type: none"> ○ Constant with burst size from 2 to 1024 frames. ○ Stepped with Start and End burst size from 2 to 1024 frames and step burst size from 1 to 100 frames. • Results: <ul style="list-style-type: none"> ○ Burst results are computed automatically according to the settings. ○ Burst results are displayed either in a table or in a graph, using frame size as "x" axis and maximum burst size as "y" axis.

Reflector Mode	
Reflector Mode Description	<ul style="list-style-type: none"> When in Reflector mode, the UTA application filters selected Ethernet frames and swaps MAC/IP Source and Destination addresses before resending them into the network. The Reflector mode is used for end-to-end or loopback tests in switched networks.
Swap Parameters	<ul style="list-style-type: none"> Swap IP Addresses (Layer 3): Enable/Disable. Swap MAC Addresses (Layer 2): Enable/Disable. Reflect Errored Frames: Enable/Disable.
Filter Parameters	<ul style="list-style-type: none"> IP address: <ul style="list-style-type: none"> Source. Destination. Source & Destination. MAC address: <ul style="list-style-type: none"> Source. Destination. Source & Destination. Protocol Layer 2: <ul style="list-style-type: none"> Type Field of Ethernet Frame value. Protocol Layer 3: <ul style="list-style-type: none"> Protocol Field of IPV4 datagram header. None
Flow Control	<ul style="list-style-type: none"> Response to Pause frames: Enable/Disable.
Statistics	<ul style="list-style-type: none"> Total number of frames (cumulative or current second). Total number of Good Frames Number of reflected Layer 2 frames Number of reflected Layer 3 frames <p>Display mode: cumulative or current second</p>

PING Test	
Frame Edition	<ul style="list-style-type: none"> MAC and IP V4 source and destination addresses. ARP function (enable/disable) for destination MAC address discovery. Gateway function (enable/disable) with configurable gateway IPV4 address and network mask.
Test Setup	<ul style="list-style-type: none"> Test Duration: Continuous/Seconds/Frames. Interval (seconds): 1-100 (interval between ping request).
Packet Size Edition	<ul style="list-style-type: none"> User-programmable packet size: 18 to 8900 bytes
PING Statistics	<ul style="list-style-type: none"> Number of transmitted packets. Number of received packets. % of packet loss Round-trip time: min/average/max

Capture & Decode (option)	
Capture & Decode Modes	<ul style="list-style-type: none"> • Stop-On-Full Mode: The capture is stopped as soon as the capture buffer is full. • Circular Mode: The capture runs indefinitely. When the capture buffer is full, data are read back by the SW, then the buffer is cleared and a new capture starts. •
Trigger Configuration	<ul style="list-style-type: none"> • Triggering condition: Start capture condition or End capture condition • The triggering criteria: <ul style="list-style-type: none"> ○ IP: <ul style="list-style-type: none"> ▪ Source. ▪ Destination. ▪ Source & Destination. ○ MAC. <ul style="list-style-type: none"> ▪ Source. ▪ Destination. ▪ Source & Destination. ○ Protocol Layer 2. <ul style="list-style-type: none"> ▪ Type Field of Ethernet Frame value. ○ Protocol Layer 3. <ul style="list-style-type: none"> ▪ Protocol Field of IPV4 datagram header. ○ None. •
Filter Parameters	<ul style="list-style-type: none"> • Filtering criteria: <ul style="list-style-type: none"> ○ IP: <ul style="list-style-type: none"> ▪ Source. ▪ Destination. ▪ Source & Destination. ○ MAC. <ul style="list-style-type: none"> ▪ Source. ▪ Destination. ▪ Source & Destination. ○ Protocol Layer 2. <ul style="list-style-type: none"> ▪ Type Field of Ethernet Frame value. ○ Protocol Layer 3. <ul style="list-style-type: none"> ▪ Protocol Field of IPV4 datagram header. ○ None.
Decode Data	<ul style="list-style-type: none"> • Number of frames • Captured Date. • Captured Length. • Ethernet Frame Information: <ul style="list-style-type: none"> ○ Frame Type (Type Field Value). ○ Source MAC Address value. ○ Destination MAC Address value. • IP datagram header information: <ul style="list-style-type: none"> ○ IP Version. ○ TOS. ○ Length. ○ Identification. ○ Fragment. ○ Time –To-Live. ○ Protocol. ○ Source IP Address. ○ Destination IP Address.
Capture Data	<ul style="list-style-type: none"> • Hexadecimal (and ASCII) representation of a selected frame.

SEQUENCE Test (option)	
SEQUENCE Test Description	<ul style="list-style-type: none"> The UTA application generates Ethernet frames with a sequence number in order to analyze special events like duplicated frames, lost frames and more.
Frame Edition	<ul style="list-style-type: none"> MAC and IP V4 source and destination addresses. ARP function (enable/disable) for destination MAC address discovery. Gateway function (enable/disable) with configurable gateway IPV4 address and network mask. Encapsulation Type (Ethertype/SNAP/LLC1).
Test Setup	<ul style="list-style-type: none"> Test Duration: Continuous/Seconds/Frames.
Traffic Edition	<ul style="list-style-type: none"> Uniform: Line load defined by the user between 0.01 and 10000 Mb/s
Frame Size Distribution	<ul style="list-style-type: none"> Constant with frame size between 64 and 9600 bytes. Random distribution with configurable min and max value.
Flow Control	<ul style="list-style-type: none"> Response to Pause frames: Enable/Disable.
Statistics	<ul style="list-style-type: none"> Total number of frames Number of Out Of Order frames Number of Duplicated frames Number of Late frames Number of Lost frames <p>Display mode: cumulative or current second.</p>

BERT Test (option)	
Frame Edition	<ul style="list-style-type: none"> MAC Source Address MAC Destination Address
Test Setup	<ul style="list-style-type: none"> Test Duration: Continuous/Seconds/Frames.
Traffic Edition	<ul style="list-style-type: none"> Uniform: Line load defined by the user between 0.01 and 10000 Mb/s
Frame Size Distribution	<ul style="list-style-type: none"> Constant with frame size between 64 and 9600 bytes.
Result	<ul style="list-style-type: none"> Bit Error Rate

WAN-PHY (option)	
WAN-PHY Modes	<ul style="list-style-type: none"> • 10GigE • WAN-PHY with Mixed-frequency test pattern • Unframed with PRBS 31 pattern
SOH/TOH Overhead Edition	<ul style="list-style-type: none"> • A1, A2, K1, K2, S1, M1 • J0 Path Trace Message: User-programmable 15 bytes ASCII sequence (CRC-7 added)
POH Overhead Edition	<ul style="list-style-type: none"> • C2, G1 • J1 Path Trace Message: User-programmable 15 bytes ASCII sequence (CRC-7 added)
Alarms Analysis	<ul style="list-style-type: none"> • SDH terminology: <ul style="list-style-type: none"> ○ LOS, LOF, OOF, RS-TIM, MS-AIS, MS-RDI, AU-AIS, AU-LOP, HP-TIM, HP-PLM, HP-UNEQ, HP-RDI, ERDI-SD, ERDI-CD, ERDI-PD, LCD, LSS • SONET terminology: <ul style="list-style-type: none"> ○ LOS, LOF, SEF, TIM-S, AIS-L, RDI-L, AIS-P, LOP-P, TIM-P, PLM-P, UNEQ-P, RDI-P, ERDI P-SD, ERDI P-CD, ERDI P-PD, LCD-P, LSS
Errors Analysis	<ul style="list-style-type: none"> • SDH terminology: <ul style="list-style-type: none"> ○ A1A2, B1, B2, MS-REI, B3, HP-REI, ERR • SONET terminology: <ul style="list-style-type: none"> ○ A1A2, B1, B2, REI-L, B3, REI-P, ERR
Pointer Analysis	<ul style="list-style-type: none"> • Value, Positive movements, Negative movements, New Data Flag (NDF)
Alarms Generation	<ul style="list-style-type: none"> • SDH terminology: <ul style="list-style-type: none"> ○ LOS, LOF, OOF, RS-TIM, MS-AIS, MS-RDI, AU-AIS, AU-LOP, HP-TIM, HP-PLM, HP-UNEQ, HP-RDI, ERDI-SD, ERDI-CD, ERDI-PD, LSS • SONET terminology: <ul style="list-style-type: none"> ○ LOS, LOF, SEF, TIM-S, AIS-L, RDI-L, AIS-P, LOP-P, TIM-P, PLM-P, UNEQ-P, RDI-P, ERDI P-SD, ERDI P-CD, ERDI P-PD, LSS
Errors Generation	<ul style="list-style-type: none"> • SDH terminology: <ul style="list-style-type: none"> ○ A1A2, B1, B2, MS-REI, B3, HP-REI, ERR • SONET terminology: <ul style="list-style-type: none"> ○ A1A2, B1, B2, REI-L, B3, REI-P, ERR

Ordering Information

Ordering Information	
5610-000-UTA	UTA base module *Applications must be ordered separately
5610-101-UTA	10 GigE LAN-PHY application (XFP not included)
5610-102-UTA	10 GigE WAN-PHY application (XFP not included)
Options	
5610-111-UTA	"Capture & Decode" option for LAN-PHY / WAN-PHY applications
5610-112-UTA	"BERT" option for LAN-PHY / WAN-PHY applications
5610-113-UTA	"Sequence Test" option for LAN-PHY / WAN-PHY applications
Accessories	
5610-140-UTA	850 nm XFP (300 m) transceiver (LC connector)
5610-141-UTA	1310 nm XFP (10 km) transceiver (LC connector) <i>*Multi-rates XFP supporting STM-64/OC-192/10 GigE</i>
5610-150-UTA	1310 nm XFP (10 km) transceiver (LC connector) <i>*Multi-rates XFP supporting STM-64/OC-192/10 GigE/OTU-2</i>
5610-142-UTA	1550 nm XFP transceiver (40 km) (LC connector) <i>*Multi-rates XFP supporting STM-64/OC-192/10 GigE/OTU-2</i>
5610-143-UTA	1550 nm XFP transceiver (80 km) (LC connector) <i>*Multi-rates XFP supporting STM-64/OC-192/10 GigE/OTU-2</i>
Upgrades	
5610-160-UTA	UTA module upgrade with LAN-PHY application
5610-161-UTA	UTA module upgrade with WAN-PHY application
5610-162-UTA	UTA module upgrade with "Capture & Decode" option
5610-163-UTA	UTA module upgrade with "BERT" option
5610-164-UTA	UTA module upgrade with "Sequence Test" option

Note: For best performance, the CMA5000 platform must have 512M RAM when using UTA with more than one application.

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