RTU-320

Remote Test Unit

Test and Monitoring System for Ethernet/IP Networks

The RTU-320 is a Remote Test Unit member of the VeSion™ family of products for Performance Testing and Monitoring of Ethernet/IP networks.

Key Platform/Software Features

- Optimized for Centralized Testing
- Dual plug-in module support with up to four dedicated test ports
- Operated via VeSion
- VeSion integration with CATV RF and fiber monitoring
- Rugged 1U. 19” rack mount profile and construction
- Ideal platform for testing at the different service life cycles; Service Provisioning, Service Activation, and Service Assurance
- Connectivity via 10/100Base-T management interface
- DC 15V and -48V powering options
- Web Browser and VNC access in standalone operation (not integrated with VeSIon) available

Key Ethernet Test Features

- RFC6349 V-PERF TCP test suite
- Supports up to 64 TCP sessions
- Jumbo MTU support of 10,000 bytes
- Auto and Manual mode TCP Window Size settings for performance benchmarking testing
- UDP Throughput support compatible with iPerf
- V-SAM test suite compliant with ITU-T Y.1564 standard
- RFC2544 Throughput, latency, frame loss, and back to back test suite
- Smart Loopback

System Architecture

Hardware Overview

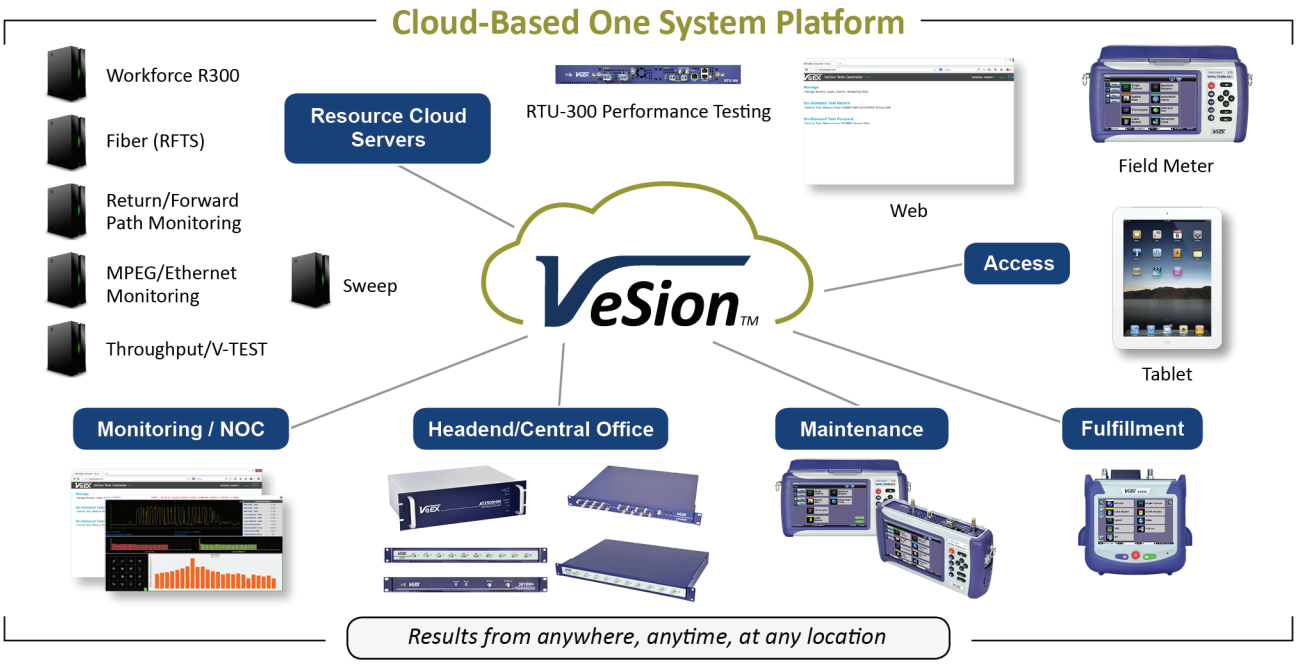
The Remote Test Unit (RTU) is a self-contained, scalable 1U rack mount solution offering Plug-and-Play operation. The RTU can be configured with single or dual RTU-320 test modules.

Powering and Connectivity Capabilities

The RTU can be configured with dual, parallel external DC adaptors or -48V DC power supplies. The unit is equipped with a LAN port which can be used to provide communication between the RTU and the Server. The RS-232 Control port can be used to connect to a local PC. The console port allows low level control of the RTU via use of a null-modem cable. The SD card slot supports up to a 64GB card.

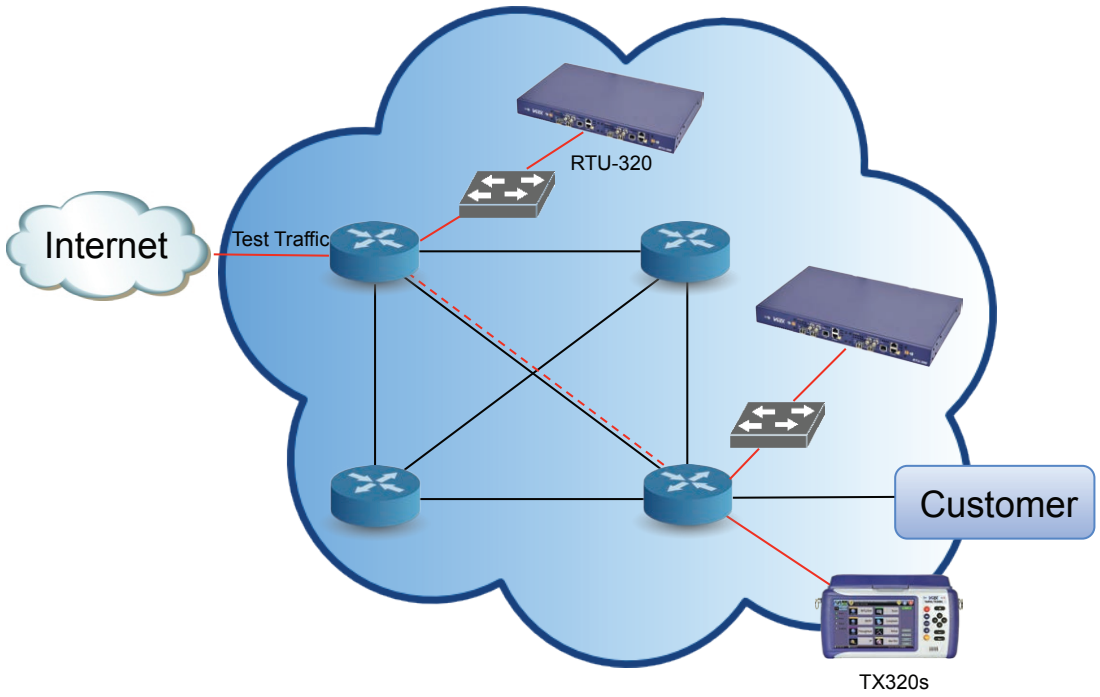
VeSion Server

Depending on network complexity, larger organizations may prefer to deploy RTUs at strategic points throughout their network and have a central server store and manage system information. VeEX's VeSion server architecture is perfectly optimized for such applications. VeSion significantly reduces network troubleshooting and problem resolution time.



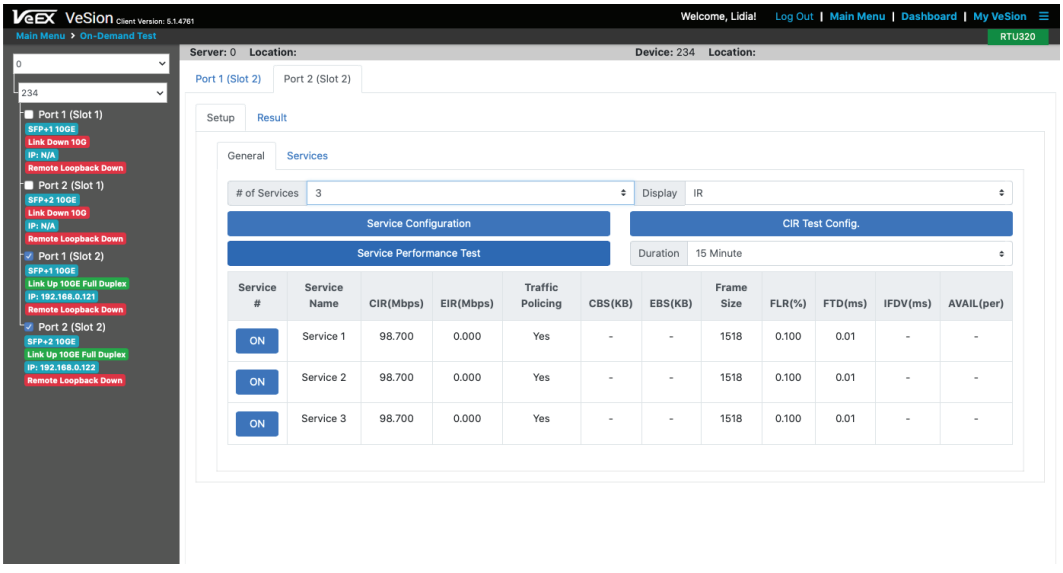
Broadband Service Application

The RTU-320 in conjunction with portable field units like the TX320s, MTTplus, and RXT-1200 products are an ideal solution for Broadband Service applications. In a typical broadband service delivery scenario several types of tests are carried out. A Layer 2/3 throughput test is carried out to verify the Committed Information Rate (CIR) and key performance metrics such as round trip delay, one way delay, packet delay variation, frame loss and bandwidth rates. An additional stateful TCP test (VPERF) is carried from the customer premise to the service provider's edge routers/servers to the internet to verify the true Quality of Experience (QoE) from the point of view of the user. In this service turn-up scenario the RTU-320, sitting at different locations of the service provider network, will act as a Layer 4 stateful TCP server, while the portable units in the field will be the clients testing to the RTU-320. After the service is delivered, network maintenance and troubleshooting tests can be done between the different RTU-320s distributed in the service provider network. This is done periodically by the service provider for service assurance purposes.



Scalability and Connectivity

VeSion scales easily reducing cost of ownership. The system can start out with a few RTUs to monitor critical links and later expand to monitor entire large national networks. The system is accessible anytime, anywhere, using a common web browser or mobile apps. A user can review uploaded test results, system alarms, live traces, and be able to perform on demand tests as required.

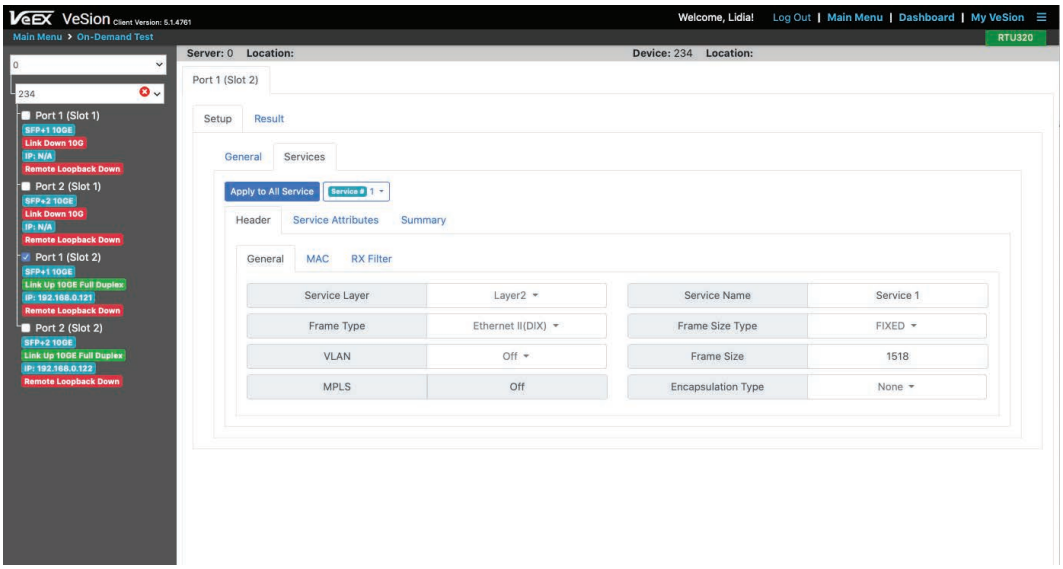


Y.1564 V-SAM Test

VeEX's V-SAM test suite is fully compliant with ITU-T Y.1564 and offers an efficient method to qualify and troubleshoot Ethernet Services. V-SAM addresses some of RCF2544 limitations by testing multiple services at once and providing simultaneous measurements of key SLA parameters.

With the Service Configuration test, services running on the same line are tested one by one to verify the correct service profile provisioning. With the Service Performance test, the services running on the same line are tested simultaneously over an extended period of time, to verify network robustness.

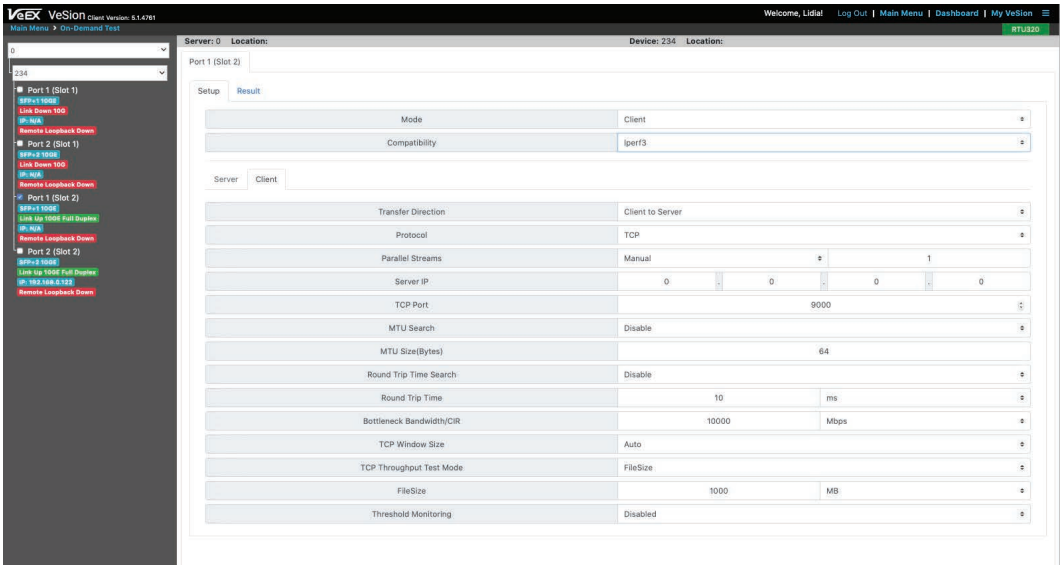
This test suite was designed with the end user in mind and allows for quick provisioning, execution and analysis of the test results, even without prior detailed knowledge of the standard.



RFC6349 V-PERF TCP Test

A common source of customer complaints come from file transfer speeds not matching the throughput rates guaranteed in the SLA. While many factors affect TCP applications performance, including customer's operating system hardware performance and settings (TCP window size), carriers need to prove SLA with a test tool that can show TCP performance independent of Operating System or Server limitations and present repeatable reliable results.

The test set V-PERF feature uses RFC6349 test methodology and metrics for qualifying network TCP performance. It offers a full line rate stateful TCP test with configurable window sizes, client and server modes as well as compatibility with iPerf servers.



Ethernet Specifications

Electrical Interfaces

Dual 10/100/1000Base-T Ports: RJ45 connector
Ethernet Classification: Per IEEE 802.3

Optical Interfaces

Dual 1GE and 10GE LAN/WAN XFP/SFP or SFP+ optical Ports: LC connectors

**Data rates, performance, and supported transmission protocols are only guaranteed for XFP/SFP or SFP+ supplied by VeEX Inc. If selecting or using other vendors, users should excercise caution*

Modes of Operation

Terminate
Loopback

Traffic Generation

Layer 2, Layer 3, Layer 4
Test Frame Header

- IEEE 802.3 and Ethernet II (DIX) frames
- Configurable Source and Destination MAC and Ethernet Type
- VLAN stacking up to 3 Q-in-Q tags w/configurable priority & type
- Fully configurable IPv4 or IPv6 header
- MPLS up to 3 labels with configurable Label/S/CoS and TTL fields
- MPLS-TP label with configurable LSP, PW and CW fields
- UDP/TCP header with configurable Source & Destination ports
- Provider Backbone Bridge (PBB) support with configurable Backbone MAC Source and Destination, I-SID, PBB-VLAN ID and priority

1GE Fixed or Uniform distribution frame size from 64 to 10000 bytes (Layer 4 tests Fixed frame size up to 1518 only, 10GE Fixed, Random and Increment/Decrement frame size distribution from 64 to 10000 bytes)
Traffic Pattern: Constant, Ramp, Multi Bursts, Single Burst
1GE Error Injection: Single and Count; Bit, CRC, Pause, IP Checksum, TCP/UDP Checksum
10GE Error Injection: Single, Count and Rate; Bit, CRC, Sync Header Error, Block Type Error, Pause, IP Checksum, TCP/UDP Checksum
Alarm Injection: Count (duration) or Continuous

- 10GE LAN: Local Fault, Remote Fault
- 10GE WAN SONET: Local Fault, Remote Fault, LOF, AIS-L, RDI-L
- 10GE WAN SDH: Local Fault, Remote Fault, LOF, MS-AIS, MS-RDI

Multiple Streams Throughput Testing

Up to 8 independent traffic streams generation and analysis, with configurable filters on 1GE interface
Up to 10 independent traffic streams generation and analysis, with configurable filters on 10GE interface
Each stream can be set with independent frame size, bandwidth, traffic profile, and QoS levels
MAC flooding feature: generates test frames with up to 4096 incrementing Source and/or Destination MAC addresses
VLAN flooding feature: generates test frames with up to 4096 incrementing VLAN IDs
Test Patterns: PRBS: 2^{31}-1, 2^{23}-1, 2^{15}-1, 2^{11}-1, normal and inverted patterns, All 0s, All 1s and User Defined
Error Measurements: Bit/BER (Single Stream only), FCS/CRC, Jabber/Runt frames, IP Checksum, TCP/UDP Checksum, Frame Loss (count and %), Out of Sequence

Alarm Detection

- 10GE: LOS, LOSync, Service disruption (current, total, last, min/max, # of occurrences), Local Fault, Remote Fault, PCS-HI-BER, PCS-LOBL, WAN SONET Alarms: LOF, AIS-L and RDI-L WAN SDH Alarms: LOF, MS-AIS, MS-RDI
- 1GE: LOS, LOSync, Service disruption (current, total, last, min/max, # of occurrences)

Frame/Packet Statistics

- Multicast, broadcast, unicast, pause frames, frame size distribution
- Rates (min, max, average and current): frame rate, bandwidth utilization, frame rate, line rate, data rate
- Frame arrival time (min, max, average and current), Frame Delay Variation
- Round Trip delay or one-way delay* (min, max, average and current) and Histogram distribution with configurable sampling period and threshold

Service Disruption Time (SDT)

- Per stream inter-packet gap based measurement
- Configurable SDT measurement trigger and SDT violation threshold

** Requires GPS option*

RFC2544 Compliance Testing

Automated tests compliant with RFC2544 with configurable threshold values and maximum transmit bandwidth settings
Throughput, Latency, Frame Loss, and Back-to-Back (burst) tests
Frame sizes: 64, 128, 256, 512, 1024, 1280, 1518 bytes and 2 user configurable frames
Tests can be done to a remote loopback or in Peer to Peer mode to a remote test set configured as a responder. Results from the remote test set are available in the local unit
Peer to peer mode allows asymmetric bandwidth RFC2544 test

ITU-T Y.1564 V-SAM Test

V-SAM test suite compliant with ITU-T Y.1564 standard
Support for Multi-stream traffic generation, Service Configuration and Service Performance tests
Independently configurable for each stream

- Frame size: Fixed or EMIX pattern (1GE only)
- Bandwidth profile parameters: CIR, EIR, CBS (1GE only), EBS (1GE only) Traffic Policing
- Service acceptance criteria: FLR, FTD, IFDV, AVAIL
- Tests according to MEF 23.1 (2012) with integrated pass/fail limits for predefined thresholds (Metro, Regional, Continental a Global with results from the remote test set available in local unit)
- MEF 23.1 support

Simple summary Pass/Fail results tables and drill down capability with detailed measurements (Frame Loss, Frame Transfer Delay, Frame Delay Variation, Availability) for each service

Smart Loopback Mode

Layer 1: incoming traffic looped back unchanged
Layer 2: incoming traffic looped back with MAC source and destination addresses swapped
Layer 3: incoming traffic looped back with MAC and IP source and destination addresses swapped
Layer 4: incoming traffic looped with MAC, IP, and UDP/TCP ports swapped
Configurable traffic filters on MAC and IP source and destination addresses, VLAN ID and Priority, IP Precedence and TOS, UDP source and destination ports
All key measurements on received traffic provided on loopback unit

Layer 4-7 Features

V-Perf Test

TCP Throughput Compliant with RFC6349
Stateful TCP Test at line rate
TCP Client and Server modes
Compatible with iPerf Client/Server
MTU search per RFC4821
Round Trip Time Measurement
Configurable TCP Window sizes
Multi-Window size tests
Up to 64 TCP sessions
UDP support
Can traverse NAT with results from the remote test set available in the local unit
Measurements: TCP Throughput rate (min, max, average), Transfer file size and duration, Transfer time ratio, TCP Efficiency %, Buffer Delay %
IPv4/IPv6 support

Network Troubleshooting Tools

IP Tools

Provides basic Ethernet and Internet connectivity to the test set as well as connectivity troubleshooting tools to Ethernet test ports (10/100/1000BaseT, 100FX/1000BaseX, 10GE) and Management port (10/100BaseT)
IP: IPv4 (Static, DHCP)
VLAN support
Ping, Trace Route check

General

Size	4.4 x 27.3 x 43.2 (H x W x D) 1 ¾ x 10 ¾ x 17 Rack mounted, 1U 19” wide
Weight	3.18 kg (7 lb) including 2 modules 2.87 kg (6.33 lb) including 1 module
Power Consumption	
Active	Chassis: 10W RTU-320 Module: 20W (37W for double) RTU-600x Module: 45W
Unit Power Input	AC Power: 100 to 240 VAC 50/60 Hz 1.5 A DC Power: 16V 5.5A
Environmental	
Operating temperature	0 to 45°C (32 to 113°F)
Storage temperature	-20 to 70°C (-4 to 158°F)
Humidity	5% to 90% relative humidity, non-condensing
Management Interfaces	RJ45, 10/100-T Ethernet, RS-232, Data Card slot and 9-pin female console
Languages	Multiple languages supported
System Memory	SD card option (up to 64 GB)

ROHS compliant and Lead Free per Directive 2002/95/EC

VeEX Inc.
2827 Lakeview Court
Fremont, CA 94538 USA
Tel: +1.510.651.0500
Fax: +1.510.651.0505
www.veexinc.com
customercare@veexinc.com

D05-00-141P C01 2021/05