

# Cheetah™ Integrated Test Point VoIP Test Module

For DOCSIS®-based Transponders  
and End-of-line Devices

Tollgrade's Cheetah Integrated Test Point (ITP) Module is a field-down-loadable component for DOCSIS-based transponders and end-of-line (EOL) devices enabling cable operators to remotely test and monitor the network's ability to deliver VoIP services from the headend across the HFC trunk and feeder network.

The ITP Module emulates an E-MTA, providing a dedicated NCS endpoint for VoIP testing. PacketCable™-based telephony calls are auto-answered using Network-Based Call Signaling (NCS) protocol while measuring and reporting call quality in real-time.

## Features

Tollgrade's Cheetah ITP Module:

- Provides a true gauge of VoIP quality-of-service within the DOCSIS network;
- Decreases "non-responder" uncertainty of CPE devices;
- Provides a "standard candle" performance benchmark;
- Measures MOS, R-factor, jitter, packet loss and latency;

- Provides forward- and return-path RTP stream analysis in conjunction with many third-party call generators/call analyzers;
- Monitors performance using Telchemy™ VQmon™ call quality analysis agent;
- Facilitates end-to-end network testing (both scheduled and ad-hoc);
- Detects partial CMS outages and other region issues;
- Facilitates remote troubleshooting and testing;
- Can be utilized anywhere within the RF network (via Tollgrade's Cheetah CMD-E VoIP EOL Test Point);
- Provides the ability to identify, separate and test specific network segments; and
- Includes downloadable firmware to upgrade for new VoIP testing features.

## Functionality

The Cheetah ITP Module functions include:

- Auto-answering of incoming calls;
- NCS Loopback;
- Media generation: 1-, 2- and 3-khz tone generation;
- RTCP XR Reports— IETF RFC 3661; and
- Interoperability with many popular softswitches.

(continued on back)

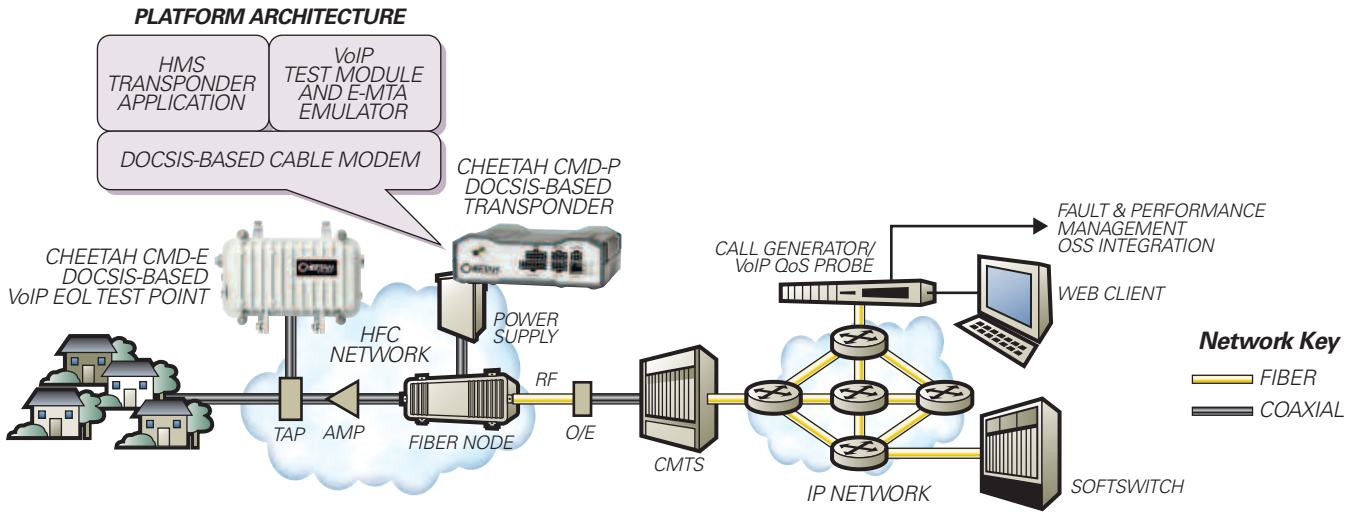
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A VoIP test module  
for DOCSIS-based  
transponders and EOL  
devices providing a true  
gauge of VoIP quality-  
of-service within the  
DOCSIS network.





### VoIP Performance Analysis

The VoIP performance analysis capabilities of the Cheetah ITP Module are based on the RTCP-XR (Real Time Control Protocol Extended Reports— IETF RFC 3661) call metrics and are enabled through a license program managed by the CheetahXD™ Broadband Assurance Platform License Manager.

The RTCP-XR call metrics include:

- MOS Listening Quality;
- MOS Conversation Quality;
- R factor;
- External R factor;
- Network packet loss;
- Packets discarded due to jitter;
- Density of lost/discarded packets in burst periods;
- RTP round trip delay (mS);
- End system delay (mS);
- Average jitter buffer delay (mS);
- Current max jitter buffer delay (mS);
- Max jitter buffer size (mS);
- Density of lost/discarded packets in gap periods;
- Average duration of gap periods (mS);
- Average duration of burst periods (mS);
- Signal level (dBm);
- Noise level (dBm);
- Residual echo return loss (dB);
- Gmin—typically 16, which classifies >5% loss as burst; and
- Packet Loss Concealment (PLC) and jitter buffer configuration.

### Upgradable Platform

RTCP-XR analysis and reporting is only the first level of VoIP and IP data testing and analysis possible with the Cheetah ITP Module. Available through separate licensing by Tollgrade, the ITP Module test capabilities can be expanded to include call originate, advanced call quality records and, in particular, tests specific to HFC networks.

## Telephony Specifications

### Communications

DOCSIS .....	Version 2.0
SNMP .....	Versions 1, 2 and 3
PacketCable .....	MGCP/NCS 1.0
CODEC .....	G.711(μ & A-law), G.728, G.729 Annex E

### Protocol

GCP/NCS 1.0

### CODECS

G.711 μ-law  
G.711 A-law  
G.728  
G.729e

### Media Generation

User-defined fixed audio tones

### NCS Endpoint

Single Line

### Answer Mode

Auto-answer call termination

### Test Features

NCS Loopback  
RTCP XR call quality metrics (RFC 3611)

## Ordering Information

Please contact your Tollgrade representative for ordering information.