Voice Quality Testing Solutions
(Wireless, VoIP, T1/E1, Landline)
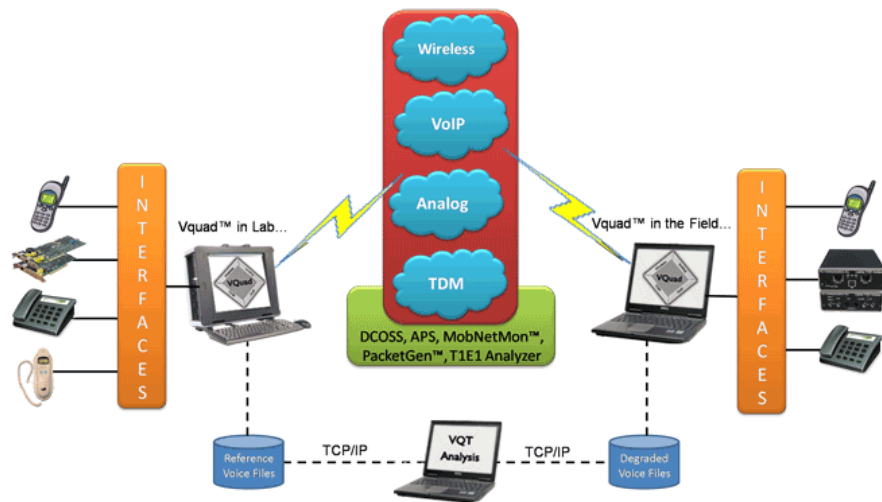
GL's Voice Quality Testing (VQT) along with GL's VQuad™, both accessed through easy to use GUI interfaces provides the voice quality measurement and analysis tools for all types of networks carrying voice traffic. Typical network applications include VoIP systems, PSTN, ATM networks, Frame Relay, and Wireless Networks.

The **GL VQuad™** with **Voice Quality Testing (VQT)** software provides a single box solution to automatically establish calls (PSTN, VoIP, Wireless, T1/E1), send/record voice over the established call and perform voice quality analysis on the captured voice files. Up to 8 fully independent tests using different interfaces can be executed simultaneously.

The VQT software utilizes three widely accepted algorithms PESQ LQ/LQO/WB, PAMS, and PSQM (+). It can perform the voice comparisons using two voice files (Reference File and Degraded File) and provide the ITU and analytical results in both graphical and tabular format.

Visit http://www.gl.com/completevqtsolutions.html for more details.

Main Features

- VQuad™ provides single-box solution with the following interfaces:
    - Wireless / Landline / Handset interface using GL's UTA
    - 2-Wire Analog (FXO) interface using GL's VQuad™
    - VoIP interface
    - TDM interface using GL's USB T1/E1 Analyzer
- Supports up to 8 simultaneous devices
- Supports drive testing with GPS Mapping (most countries supported)
- Supports sending and receiving traffic over established calls
- Indoor Tracking System (ITS) to provide tracking information during Voice Quality Testing within remote locations where GPS is not available (ex: underground)
- Voice Quality Testing (VQT) using PESQ (ITU-P.862.1/P.862.2), PAMS (ITU - P.800), and PSQM (ITU-P.861)
- VQT uses the File Transfer Utility (FTU) to perform automated measurements on remote locations
- Full automation & traffic scripting with VQuad™ Command Center to control all network nodes and obtain the VQT measurements remotely
- VQT NetViewer™ remotely monitors the status of the centralized Command Center along with each distributed voice collecting node. VQT NetViewer™ also provides the mechanism for querying the VQT database and displaying the results.
- VQT WebViewer™ provides query and result display, both tabular and graphical, using a simple web browser application

VQuad™ Network Interfaces

Wireless Phones/Radios

Wireless networks can impair voice quality by various means including poor mobile phone quality, voice compression and decompression algorithms, delay, loss or gain in speech levels, noise, acoustic and landline echo, and other distortions. GL provides a compact and portable Wireless enclosure kit that can be used for

- Testing mobile end-to-end voice quality and provide VQT measurement results along with VQT analysis results
- Mobile Phone call control (currently available for most phone manufactures/models)
- Automatic Round Trip Delay (RTD) measurements with complete results sent to GL VQT
- Synchronized software for sending/recording of voice files
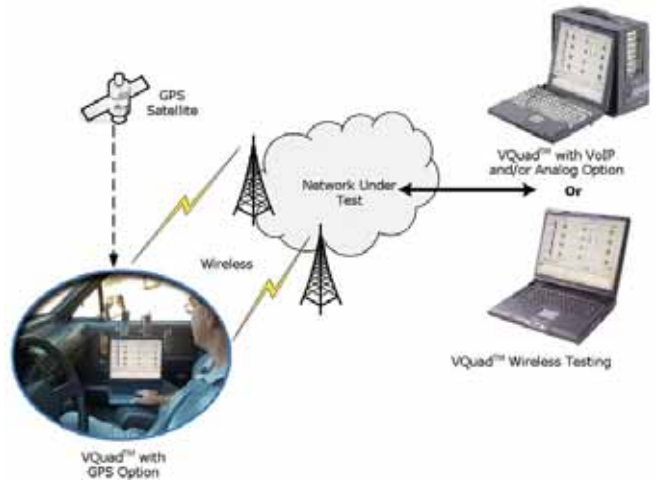
GPS and ITS

- The Indoor Tracking System (ITS) in VQuad™ is developed to test the VQT in remote and unreachable GPS signal locations
- The ITS information (location, timestamp) is saved in the VQT database per VQuad™ Measurement
- The GPS mapping provides real-time GPS information during the VQuad™ test as well as saved to the VQT database.
- GPS Location includes stamping each VQT result with Latitude, Longitude, and GPS Time Stamp
- GL VQT Automatic Mode allows automatic execution of the VQT algorithms (PESQ LQ/LQO/WB, PAMS, PSQM+)

VoIP (SIP/RTP) VQT

With the growing requirements for voice quality testing within VoIP networks, a major concern is testing the VoIP Network, VoIP phones and the Analog Telephone Adaptors (ATA).

GL's VQuad™ with VoIP option, along with VQT, provides the ability to perform manual or automated tests on the VoIP network. The VQuad™ provides direct connection to the VoIP network with up to eight instances connected simultaneously. VQuad™ with Analog option provides the ability to test the ATA's while connected to the VoIP Network.

- Manual or Automatic call control (SIP protocol) with user-defined parameters for authentication and proxy
- Automatic send/receive of voice files over already established calls
- Time/Digit/Tone triggering of send/receive voice files
- Allows automatic execution of the VQT algorithms (PESQ LQ/LQO/WB, PAMS, PSQM+)
- Additional measurements include Clipping, Jitter, Latency, Noise, and Signal Levels
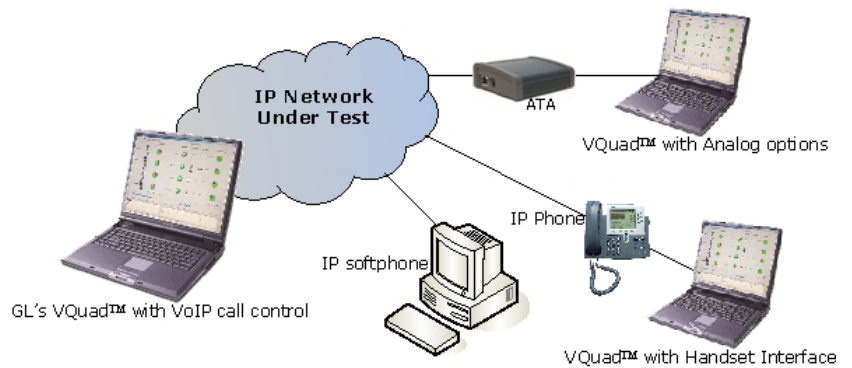
2-Wire Analog (POTS)

GL's VQuad™ w/ FXO Analog option provides solutions for testing analog 2-wire interfaces. GL's VQuad™ w/ FXO Analog option along with Voice Quality Testing (VQT) provides the complete automated network testing solution including voice quality measurement and analysis tools.

The product can be configured to automatically send/record a multitude of voice files and to perform VQT algorithms immediately after the voice file recording is complete. VQuad™ can send and detect DTMF digits while the call is established. This allows two-stage dialing as well as path confirmation.

- Four Analog ports using industry standard RJ-11 connections.
- Manual or Automatic operation of traffic generation and full call control
- Remote Access for starting/stopping the tests along with retrieving results.
- GL VQT Automatic Mode allows automatic execution of the VQT algorithms (PESQ LQ/LQO/WB, PAMS, PSQM+).
- Additional measurements include Clipping, Jitter, Latency, Noise and Signal Levels.
- Results available in real-time or post-processing
- Each analog port may be controlled independently for traffic and call control

PSTN Network Under Test

GL's VQuad™ with Analog Option
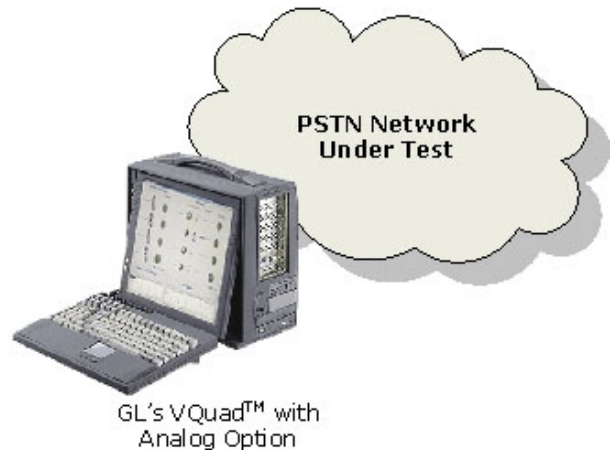
TDM (T1/E1) VQT

Voice quality is essential for all Networks as well as Gateways and Switches. Providing the mechanism for VQT over T1/E1 trunks is essential. The VQuad™ with TDM option includes the Ultra T1/E1 Analysis cards (PCI) or Portable USB T1 E1 Analyzer for a truly portable solution. Using the T1/E1 Analyzer, the VQuad™ can generate and receive up to 8 simultaneous CAS or PRI ISDN or No Call Control (NOCC) calls on T1 or E1 trunks. Once the call is up, sending/recording voice is provided via the VQuad™ traffic configuration yielding in VQT MOS results. The T1/E1 option includes a script based CAS State Machine for creating any desired CAS protocol. Included with the PRI ISDN are all variants associated with ANSI and ETSI specifications.
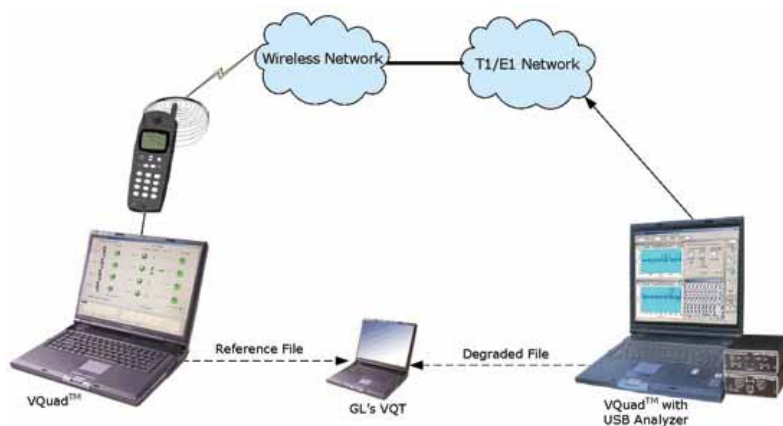
- T1/E1 Network Support
- Supports Call Control for PRI ISDN and CAS Protocols
- Also supports No Call Control (NOCC), where the T1/E1 call is connected without any call control required.
- Voice File sending/recording for VQT analysis
- Send/detect digits/tones
- Supports up to 8 simultaneous T1/E1 channels using VQuad™ interface
- GL VQT Automatic Mode allows automatic execution of the VQT algorithms (PESQ LQ/LQO/WB, PAMS, PSQM+).

Voice Quality Testing (VQT) Software
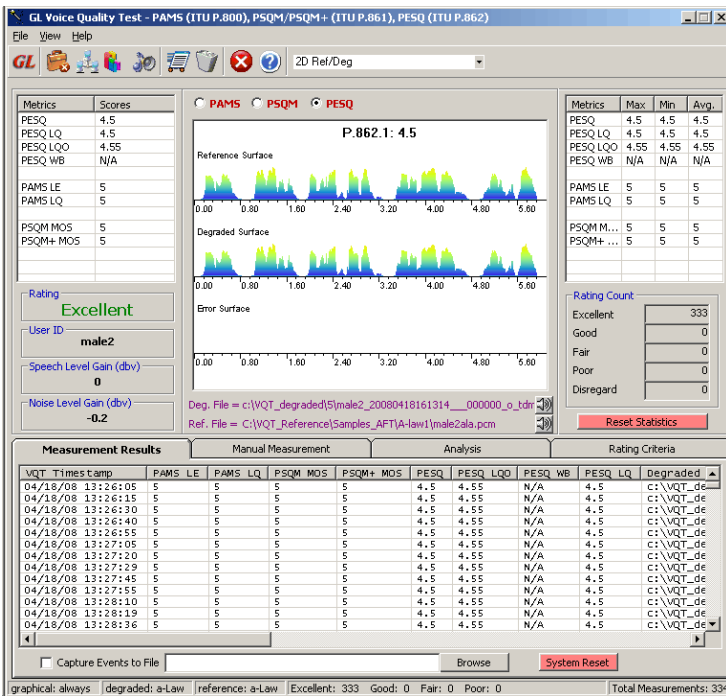
GL's **Voice Quality Testing (VQT)** software compares the two voice files ('reference' and 'degraded') and provides an ITU-standard score (PESQ LQ/LQO/WB, PAMS and PSQM)

- Several additional analytic metrics for determining the reasoning for the resultant score.
- Other GL products (PacketGen™, DCOSS), including VQuad™, assist in interfacing to the network under test for sending/recording the voice samples.
- PacketGen™ and DCOSS are used for highly scalable networks to provide the bulk calling features.
- VQuad™ supports integrated solution for all interfaces for a low- density, low-cost networks.
- Results are displayed both in tabular as well as graphical formats.
- Displays analytical results such as jitter, clipping, noise level, and delay (end to end as well as per speech utterance).

The VQT software allows users to perform manual and automated voice quality assessments. In manual mode, simply enter the reference file and the degraded file path.

The auto mode allows the VQT to reside on a network computer (or connected via the Internet) and point to a single or multiple user-specified network drives/directories. Degraded voice files are recorded to

this network drive/directory and VQT automatically performs the voice quality analysis. Multiple VQT Auto-Measurement sessions may be configured, each session with a unique set of requirements and a unique reference voice file. In addition, the user may specify voice files to be saved based on the rating criteria (i.e. if VQT is fair or poor, save the degraded voice file).

File Transfer Utility
- As a supplement to the auto mode, the VQT can operate in a central location and receive degraded files transferred via TCP/IP from one or more remote locations using the File Transfer Utility (FTU).
- VQT results are saved to database where they may be queried (based on many options) and displayed in both tabular and graphical formats.

VQT WebViewer™
- Multiple VQT applications automatically save all results to a centralized VQT database.
- The VQT WebViewer™ queries the VQT central database and displays the results in both tabular and graphical formats.
- Multi-user support, and user-friendly interface is remotely accessible via browser based clients

Network Voice Quality Testing Solution

GL's Network VQT solution provides a complete solution that consists of **Distributed VQuad™ Nodes**, **Regional VQuad™ Command Center**, **VQT Software**, **Remote Client NetViewer™**, and the other assisting tools.
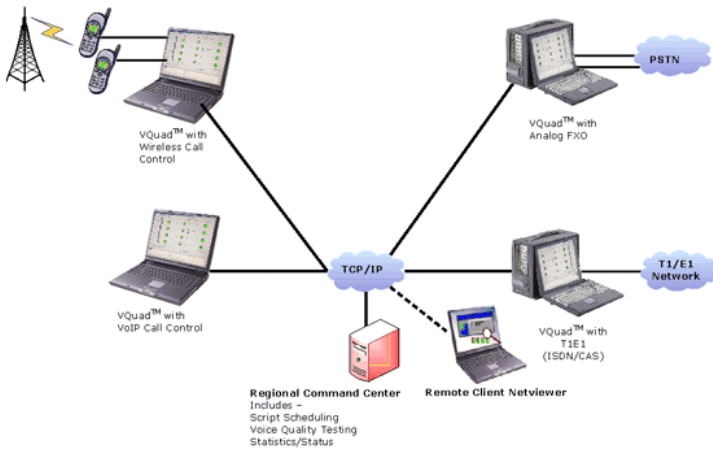

- VQT NetViewer™ remotely monitors the status of centralized command center and each distributed degraded voice collecting node (user site)
- VQuad™ Command Center controls all network node locations, with each node location comprising of VQuad™ devices (Mobile / landline phones / VoIP Terminal / FXO / TDM), or DCOSS APS
- Full automation scripting for the entire process (scheduler, call control, degraded voice collecting, remote file transfer, voice quality calculating, and others)
- Provides real-time Call Control information, VQT scores, Round Trip Delay value and Active Speech and Noise Level, Jitter, Clipping and power measurement, and others

Regional VQuad™ Command Center

- Automatically initiates voice collecting tasks for each site
- With a scheduler, customizes the time at which daily tasks are executed
- Provides automation with flexible and easy to use scripting
- Full automation scripting for the entire process (scheduler, call control, degraded voice collecting, remote file transfer, voice quality calculating, and others)
- Provides real-time Call Control information, VQT scores, Round Trip Delay value and Active Speech and Noise Level, Jitter, Clipping and power measurement, others
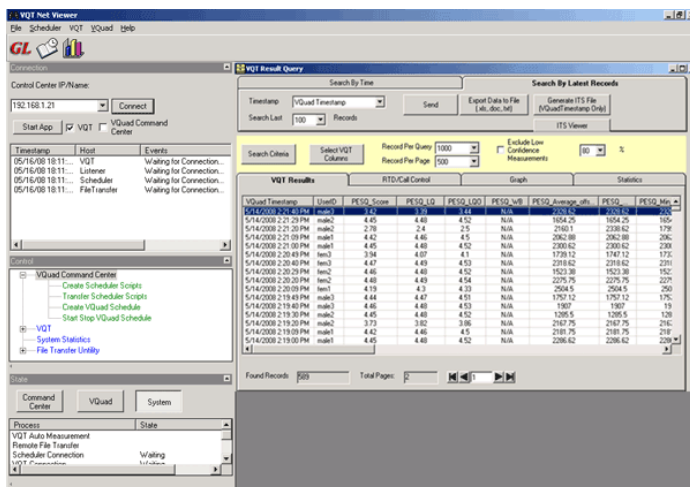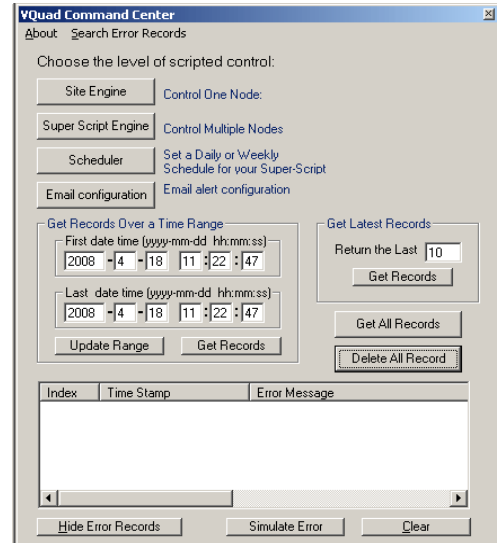
Remote Client NetViewer™ and WebViewer™

- Build/edit individual Scheduler scripts, Super scripts, and Site scripts
- Accessible remotely via TCP/IP, multi-user support, and user-friendly interface
- Provides database query methods in order to query VQT results, and gather status, statistics, events and error information of entire region.
- Remotely controls operations of command center and distributed VQuad™ nodes
- Provides ITS Viewer functionality software to plot the VQT measurements on the ITS (Indoor Tracking System) map

Automation through scripts

The scripting editor allows the user to create and edit **Call Control Scripts**, **Site Scripts**, and **Super Scripts**. The Super Script controls (start/stop) multiple Site Scripts, while the Site Scripts run simultaneously or sequentially. Each site script corresponds to one VQuad™ node.

Call control scripts are used to control calling process and VQuad™ actions, locally and remotely. The call control script creates VQuad™ devices (Mobile phones, Analog phones, VoIP, TDM, and 2-wire), loads auto traffic configuration file on the devices, and starts traffic generation and detection on the devices.

These scripts can be saved locally and transferred to **VQuad™ Command Center** using transfer script function within the VQT NetViewer™. Scheduler scripts are created and edited through the VQT NetViewer™.
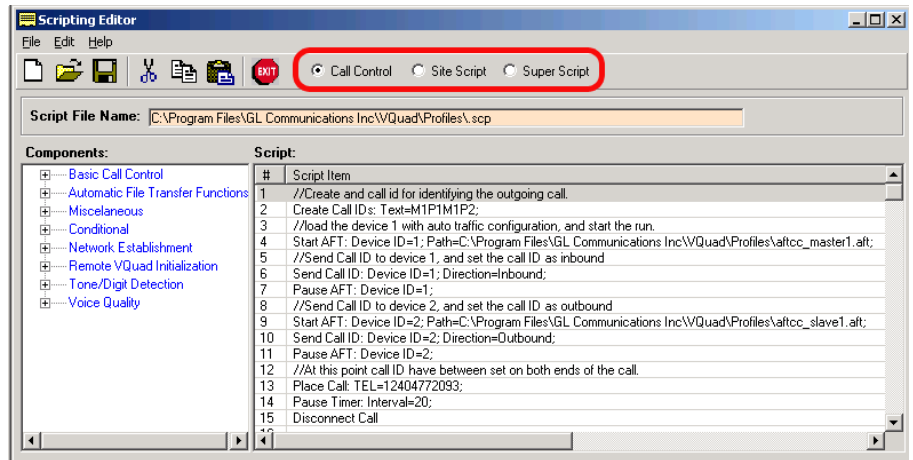
Buyer's Guide

Related Software

VQuad™ Network Options

VQT010 - VQuad™ Software (Stand Alone)

VQT020 - VQuad™ Wireless Phone Call Control

VQT012 - VQuad™ Analog FXO 4-port Call Control

VQT013 - VQuad™ with SIP (VoIP) Call Control

VQT015 - VQuad™ with T1 E1 Call Control

VQT035 – FXO RJ11 Hardware Tap and Audio Capture Software

PTP001 - 2-Wire Phone Tap

VQuad™ Miscellaneous

VQT202 - VQuad™ GPS Location and Timing Option (per node - including GPS receiver)

VQT030 - Network Command Center (Multi-Node Command and Control Center for VQuad™ Systems)

VQT210 - Indoor Tracking System

VQT (includes VQT NetViewer™)

VQT002 - Voice Quality Testing (PESQ LQ/LQO/WB)

VQT004 - Voice Quality Testing (PESQ LQ/LQO/WB, PAMS, PSQM)

VBA032 - Near Real-time Voice-band Analyzer

Related Hardware

HDT001/HDE001 - HD T1 or E1 PCI Card

UTE001 - Portable USB based Dual T1 or E1 Laptop Analyzer