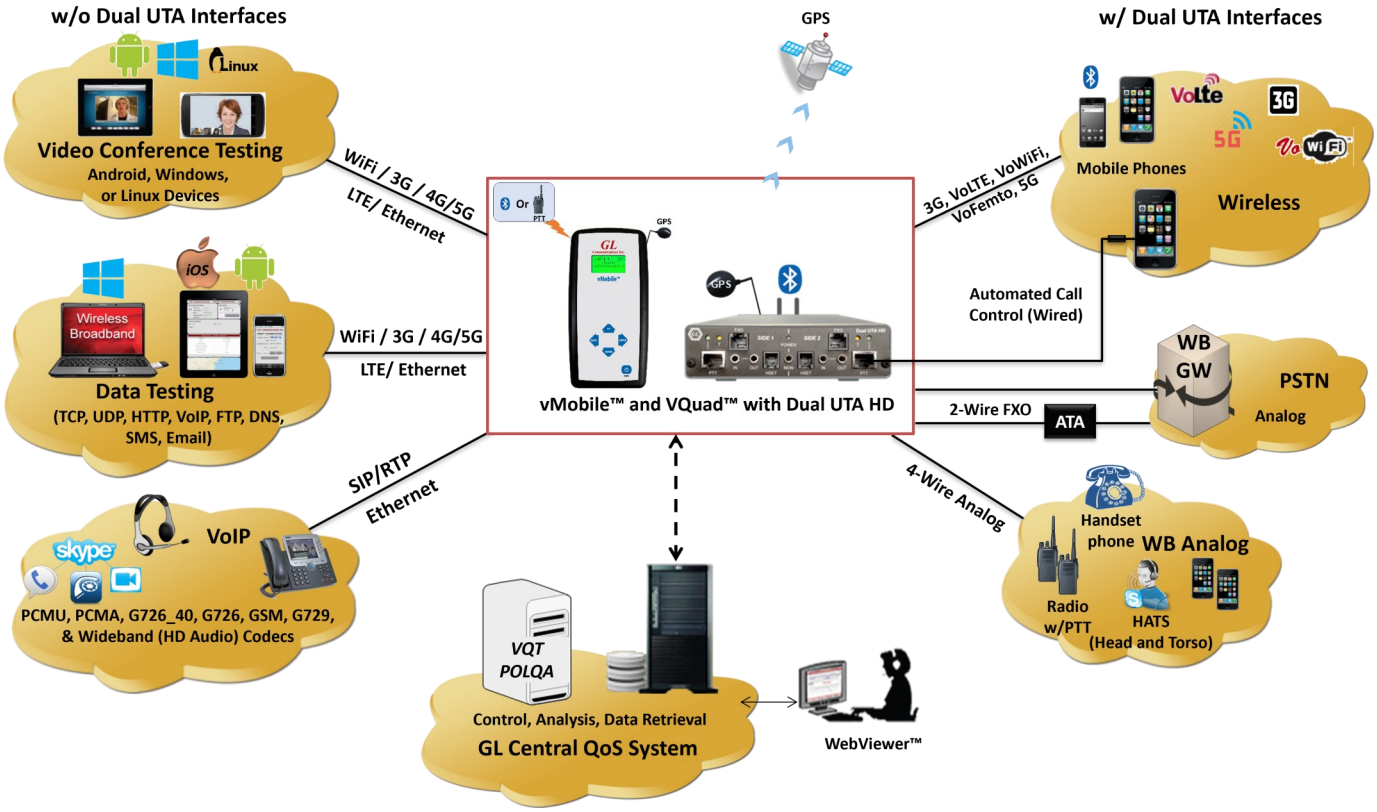
Voice, Video, and Data Testing Solutions



Portable Solution Interfacing with:

- Any Communication Device (Mobile phones, Military/Mobile radio, Bluetooth®, WiMax, WiFi, Broadband 5G/4G, LTE/3G/ Smartphones - iPhone, Android, Blackberry)
- 2-Wire WB FXO Analog (connect to PSTN, ATA, Media Gateway)
- 4-Wire WB Analog (Balanced I/O, Handset, HATS, PTT, Mobile)
- SIP Call Agent (act as a SoftPhone and configure Proxy and Registrar)
- T1 or E1 (CAS and PRI ISDN protocols supported)

For more details, refer to Voice, Video, and Data Quality Test Solutions webpage.

GL Communications Inc.

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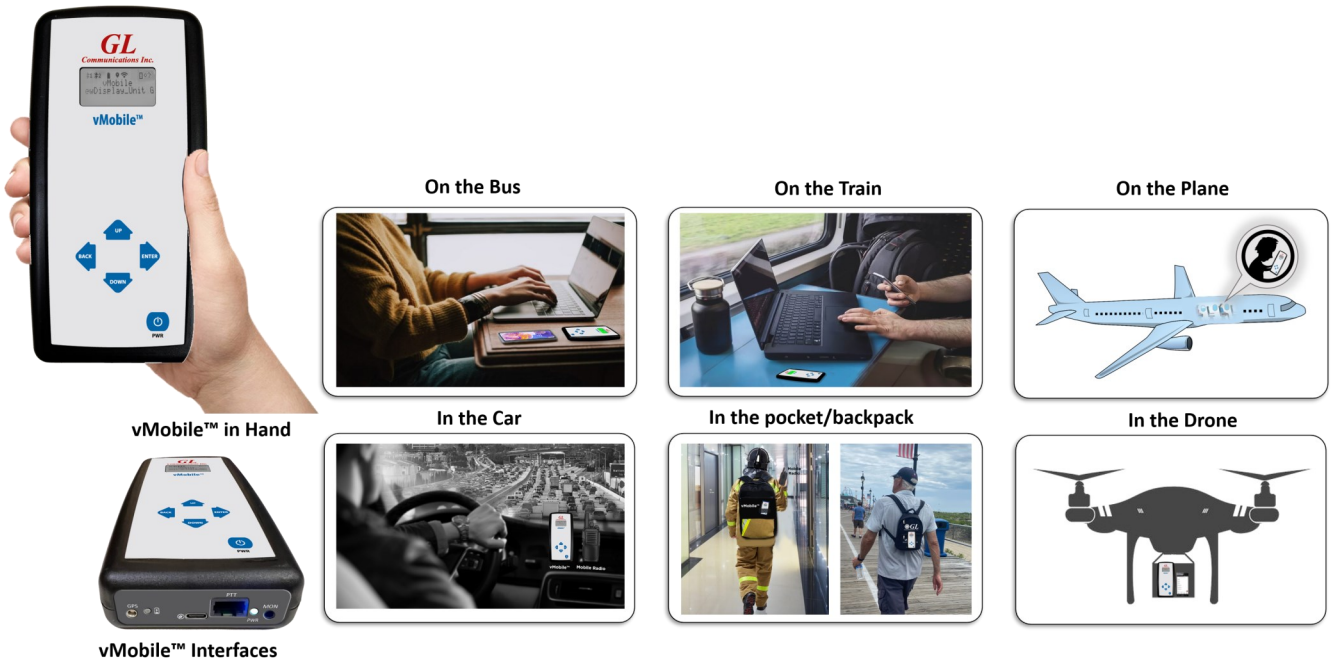
Analysis and Functionality such as:

- Supports multiple devices with single vMobile™/VQuad™ software/hardware node
- Testing includes Voice, Data, and Video Quality Analysis, Echo analysis, Call Failure Rates, Dropped Calls, Echo, and Noise measurements
- Data testing is available for Wireless devices as well as PC internet connection (supports WiFi and Broadband)
- Hand Portable including several remote options for operation and configuration
- Fully automated Video Conference testing on Smartphones (Android) and PCs (Android, Windows® and Linux®) end points
- GPS connectivity for timing and location
- Drive testing with real-time GPS option and Google Maps
- Round Trip Delay (RTD) and One Way Delay (OWD) measurements
- Voice Quality Testing (VQT) using POLQA (ITU-T P.863), PESQ (ITU-T P.862), PESQ LQ, LQO (P.862.1), PESQ WB (P.862.2)
- AutoVQT™ application analyze thousands of bulk PCM voice files in mere minutes using POLQA v2 algorithm
- GL's NetTest VQT app on rooted Android devices includes features to place and receive calls over the network along with Play and Record voice over the established call
- Wideband audio (supports both 8k and 16k samples/sec); all VoIP codec supported including mu-law, a-law, linear PCM, 16 bit raw Bluetooth®
- VoLTE testing supported using either Bluetooth or wired headset
- Fax emulation and analysis supporting up to 4 independent and simultaneous sessions with speeds up to 33600 baud (V.34)
- Supports two methods of automated testing of mobile devices, Bluetooth and Wired Headset using Smartphone with Automated Call Control (ACC)
- Enhanced scripting with additional commands available for Bluetooth® enabled Mobile phones including RSSI, Battery Level, and Network identity
- VQuad™ mTOP™ Probe HD, self contained unit includes VQuad™, Dual UTA HD and PC and control via Ethernet Remote Desktop (with support for mouse/keyboard)
- Complete automation and remote operation including traffic generation and call control scripting
- Remote monitoring with result query and real-time statistics using web based WebViewer™
- Full support for VQuad™ Command Line Interface (CLI) and API (both Windows® and Linux®) on both IPv6 and IPv4
- Enhanced to support Python Scripting for automation and remote access of voice quality testing
- Voice and Data testing can be run simultaneously (if the network allows) using the GL vMobile™ scripting and installation of the GL NetTest apps on the mobile devices
- Plot results using GPS coordinates or Indoor Tracking System (ITS) when GPS is not available

Ultra-Portable Equipment for Voice and Data Testing



vMobile™ is GL's new offering under its wide variety of Voice and Data Quality Testing tools. The vMobile™ is a handheld ultra-portable device that brings true mobility to voice and data quality testing for any mobile phone and any mobile radio, changing the way automated drive and walk testing is performed. The vMobile™ is simple to setup and conduct operate for running these tests in order to benchmark both mobile phone networks and mobile radio networks.

The vMobile™ handheld device supports fully automated audio testing for mobile phones (any phone, any carrier, any network) including Voice Quality using POLQA, Delay measurements, Audio Dropout analysis, and full call control with Call Fail and Call Drop metrics. All tests include GPS location for plotting results and events within Google Maps using the GL WebViewer™. In addition, the vMobile™ device supports fully automated audio testing for mobile radios (including connectivity to any 4-Wire Analog device). This allows remote testing of mobile radios with automated PTT (Push to Talk) along with Voice Quality and Delay measurements.

The vMobile™ can be hand-carried for walk and drive testing (includes GPS) as well as left in labs and can work directly with GL's VQuad™ solution for very flexible end-to-end testing. All functionality and configuration of the vMobile™ is provided using the remote web-based Console and Console App which is installed on any Android or iOS device. In essence, the vMobile™ is an expansion of GL's current VQuad™ Voice and Data testing solution.

The vMobile™ handheld portable hardware includes two Bluetooth® modules (connecting to two mobile phones simultaneously), a 4-Wire analog port with PTT for connecting to any mobile radio or any analog headset interface, an embedded Wi-Fi module for communicating to the Central System , and an onboard GPS receiver. The user can easily select either Bluetooth or Analog mode The embedded Wi-Fi supports remote operation along with remote audio analysis and sends all results/events to a Central Database, accessed through WebViewer™ (web browser).

GL's Indoor Tracking System (ITS) functionality supports plotting voice quality results when GPS is not available (for instance indoors). The ITS allows viewing the results directly plotted on a user provided floorplan or map.

GL's Voice Analysis Tool (VAT™) application is used to analyze the audio content within any PCM audio files and generates a variety of audio metrics. VAT™ has a user-friendly interface to perform manual and automated analysis of multiple tests using a single PCM audio file received from the VQuad™, vMobile™, or any other applications.

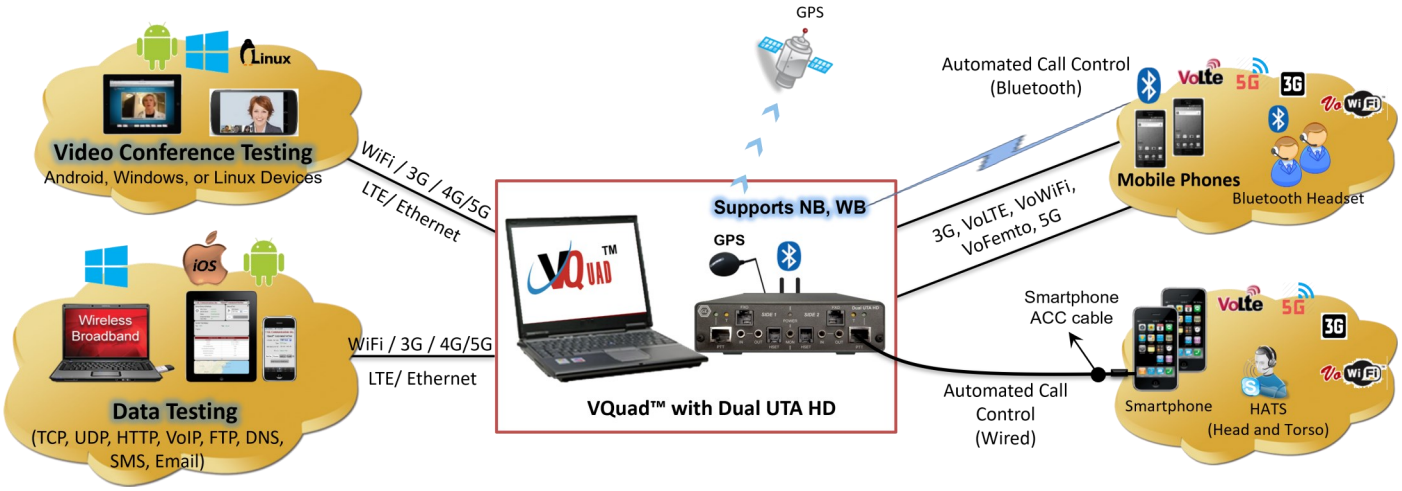
For complete details, refer to vMobile™ - Ultra-Portable Equipment for Voice and Data Testing webpage.

Automated Testing of Mobile Radio and Wireless Devices (Wi-Fi, Bluetooth®, 3G, 4G-WiMax, LTE, 5G) using Dual UTA HD

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 Dual UTA HD, a compact and portable solution for Wireless devices and Mobile Radio testing, which provides WB audio on all interfaces.

- Testing mobile end-to-end voice, data, and video quality
- Control Smartphones on any wireless network (Bluetooth®, 5G, VoLTE, VoWiFi, VoFemto, 3G) - both NB and WB voice supported
- Mobile Phone call control – supports Bluetooth®, Dual PTT, and 3.5mm Output Audio Jack, and Dual 3.5mm In/Out terminations
- Support for Bluetooth Wideband with 16000 Sampling Rate used in VoLTE network with AMR Wideband codec
- Control Mobile Radios with Push-to-Talk functionality; Supports radio keying and send/record audio
- Automatic One-Way Delay (OWD) and Round Trip Delay (RTD) measurements with results sent to GL VQT database
- Supports fully Automated Mobile Phone Testing using either Bluetooth or the new Smartphone ACC (Automated Call Control) cable
- Call Setup and Messaging using Siri/Google Voice on mobile devices and Text-to-Speech conversion within VQuad™
- Ability to include RSSI measurement as part of Bluetooth or Mobile VQT results
- Synchronized software for sending/recording voice files



For complete details, refer to Voice, Video, and Data Quality Test Solutions webpage.

Automated Testing of 2-Wire and 4-Wire WB Analog Interface (PSTN, ATA, Media Gateway) using Dual UTA HD

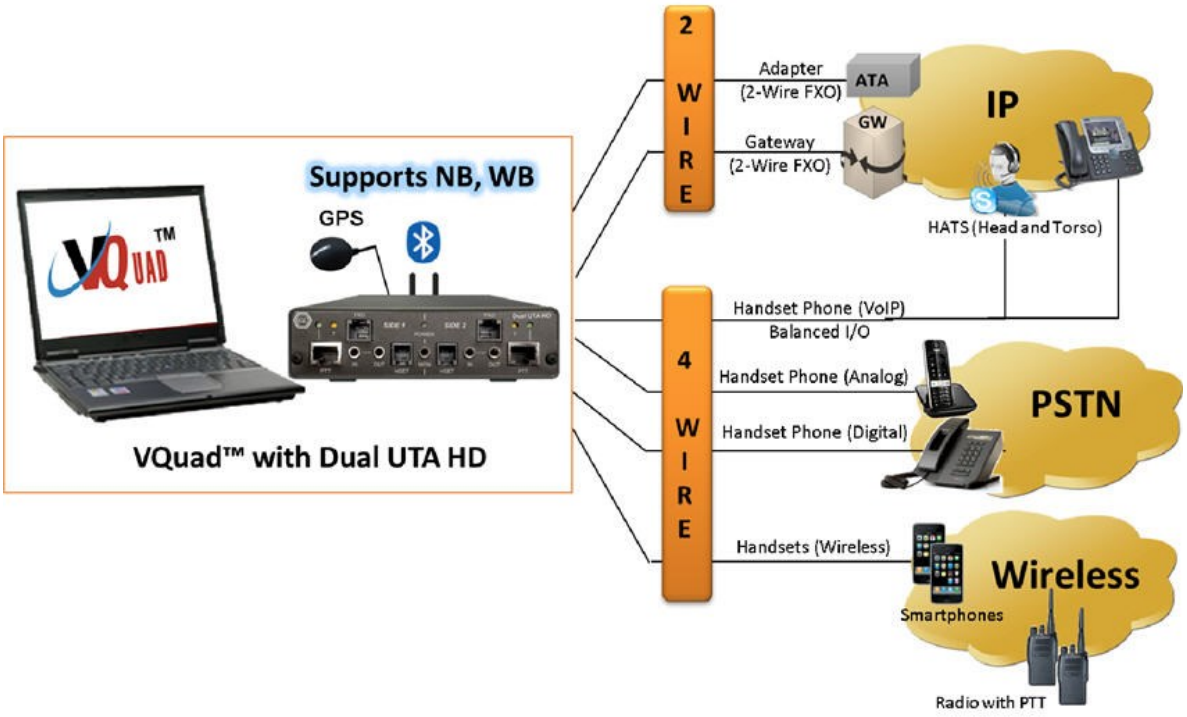
GL's VQuad™ with Dual UTA HD provides the solution for testing 2-Wire WB Analog FXO interfaces (PSTN, ATA, Media Gateway). VQuad™ with Dual UTA HD, also supports 4-Wire WB Analog interfaces, which connects to PTT, Balanced I/O, and Mobile phones. The Dual UTA HD Analog interface supports two-stage dialing, IVR testing, Double-Talk Testing, Voice Quality Testing, Delay Measurements, and Echo Measurements. This solution can be configured to automatically send/record a multitude of voice files and perform VQT immediately after the voice recording is complete.

2-Wire Analog FXO:

- Wide Band (WB) and Narrow Band (NB) support
- Supports Call Progress tones, Loopcurrent drop and Call ID
- Supports Flash hook and all supplementary services
- Global support – can connect to any 2-Wire interface anywhere
- Connect to any PSTN, ATA, Gateway
- Outward and Port-to-Port Loopback of 2-Wire and 4-Wire interfaces with or without delay

4-Wire Analog:

- Balanced – replaces headset (mic/speaker) anywhere
- RJ22 – replaces the phone Handset on any phone at the Curly Cord
- PTT – connect to any mobile radio (DoD, Emergency Services, Government) and supports voice and keying the radio
- Mobile – connect to any mobile phone, the phone will recognize the Dual UTA HD as a headset

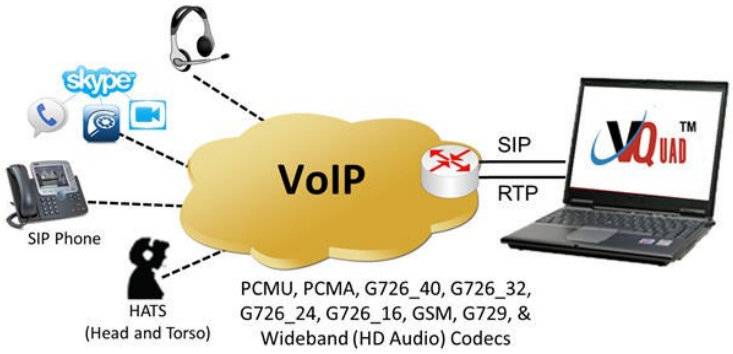


For more details, please refer to Automated Analog (2-Wire, 4-Wire) Voice Quality Testing webpage.

Automated Testing of VoIP (SIP) Interface, Digital VoIP Phones, VoIP Softphones using Dual UTA HD

GL's VQuad™ with VoIP option, along with VQT, provides the ability to perform manual or automated tests on the VoIP network with up to eight instances connected simultaneously. VQuad™ with Dual UTA HD provides the ability to test ATA's and Softphones while connected to the VoIP Network.

- Manual or Automatic call control (SIP protocol) with user-defined parameters for authentication and proxy
- Supports up to 4 SIP cores and each SIP core supports up to 12 UAs
- Automatic send/receive voice files over already established calls
- G.711 A-law, G.711 U-law, G.729, G.729B, G.726 (40,32,24,16 kbps), G.722, G.722.1, GSM-FR, GSM-HR, GSM-EFR, AMR, AMR-WB, EVRC, EVRC-B, EVRC-C, SMV, iLBC (15.2 and 13.33 kbps), Speex and Speex-WB



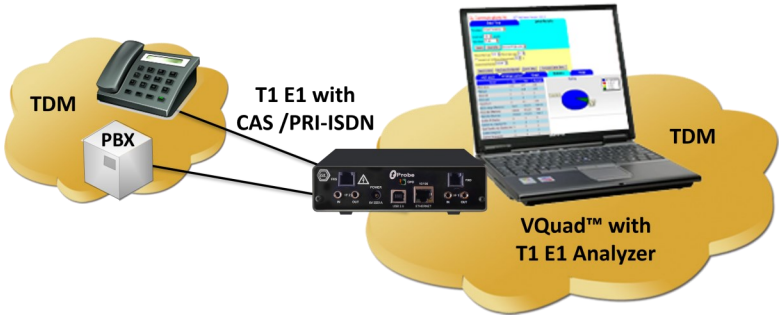
- Time/Digit/Tone triggering of send/receive voice files
- Both VQuad™ and VQT support POLQA (ITU-T P.863) voice quality testing standard
- VQT supports other voice quality testing methods (PESQ LQ/LQO/WB)
- EC Testing and Measurements, Data/Video Testing from PC or Mobile Device, Round Trip Delay ,and One Way Delay Measurements

For complete details, refer to VoIP Testing using VQuad™ webpage.

Automated Testing of TDM T1 E1 Interface (CAS/PRI ISDN) using T1 E1 Analyzer

Voice quality is essential for all networks as well as Gateways and Switches. The VQuad™ with TDM option includes a truly portable solution for VQT over T1 or E1 trunks. VQuad™ can generate and receive up to 12 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.

- T1 E1 Network Support
- Supports Call Control for PRI ISDN and CAS Protocols
- Supports No Call Control (NOCC), where the T1 or E1 call is connected without any call control required
- Sending/recording voice files for VQT analysis and EC testing

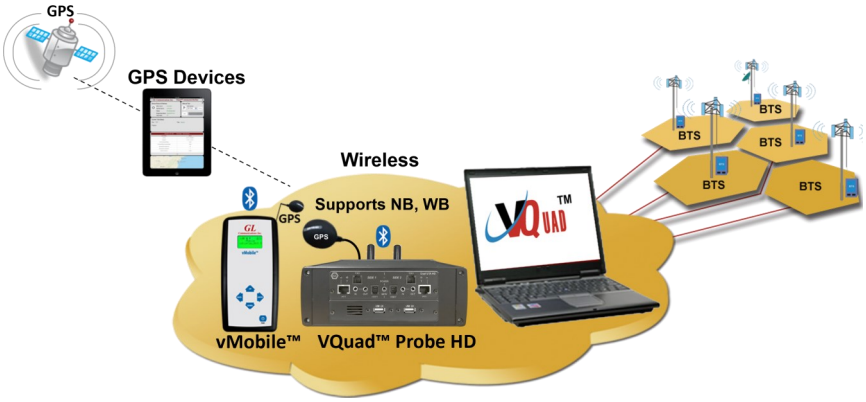


- Send/detect digits/tones
- Both VQuad™ and VQT support POLQA (ITU-T P.863) voice quality testing standard
- VQT also supports other voice quality testing methods (PESQ LQ/LQO/WB)

For complete details, refer to VQT in TDM Networks webpage.

GPS and ITS Location Stamping

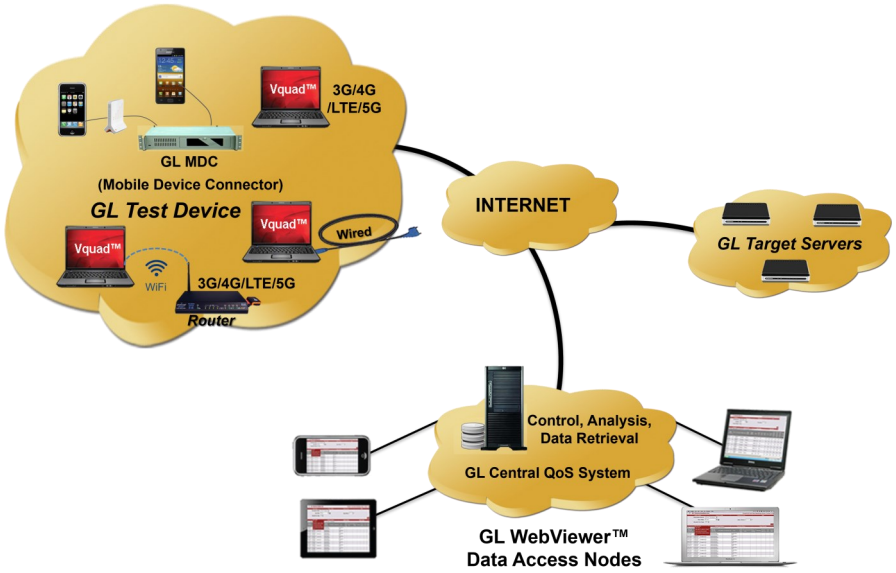
- Associating a GPS co-ordinate (Drive Testing) with the voice, video, and data test results gives the necessary information to determine why the voice quality in a certain area was good or poor
- GPS information is recorded and added to the Nodes, and to results from the analysis applications VQT, EMU, VBA, VAC, and NetTests automatically
- GPS Location includes stamping each result with Latitude, Longitude, and GPS Time Stamp



Automated Data Testing

VQuad™ supports Data Testing including TCP, UDP, VoIP, Video, Route, HTTP, FTP, DNS, SMS, Email, PhoneInfo, SimInfo, and UEInfo. The Data Tests are configured via the VQuad™ scripting and supports **Mobile Devices** as well as **PC Based Ethernet** connections (wired, WiFi, Broadband 3G/4G, LTE, and 5G).

- Network independent, supports 3G, 4G, WiMax, LTE, and 5G
- Both IOS (iPhone/iPad) and Android supported with downloadable GL app
- Mobile device communicates with Mobile Device Controller from anywhere in the world
- PC based supports WiFi, wired, and Broadband card (3G, 4G, LTE)
- Fully automated and remote testing with all results accessible via WebViewer™
- Multiple interfaces connected to same VQuad™ providing simultaneous testing

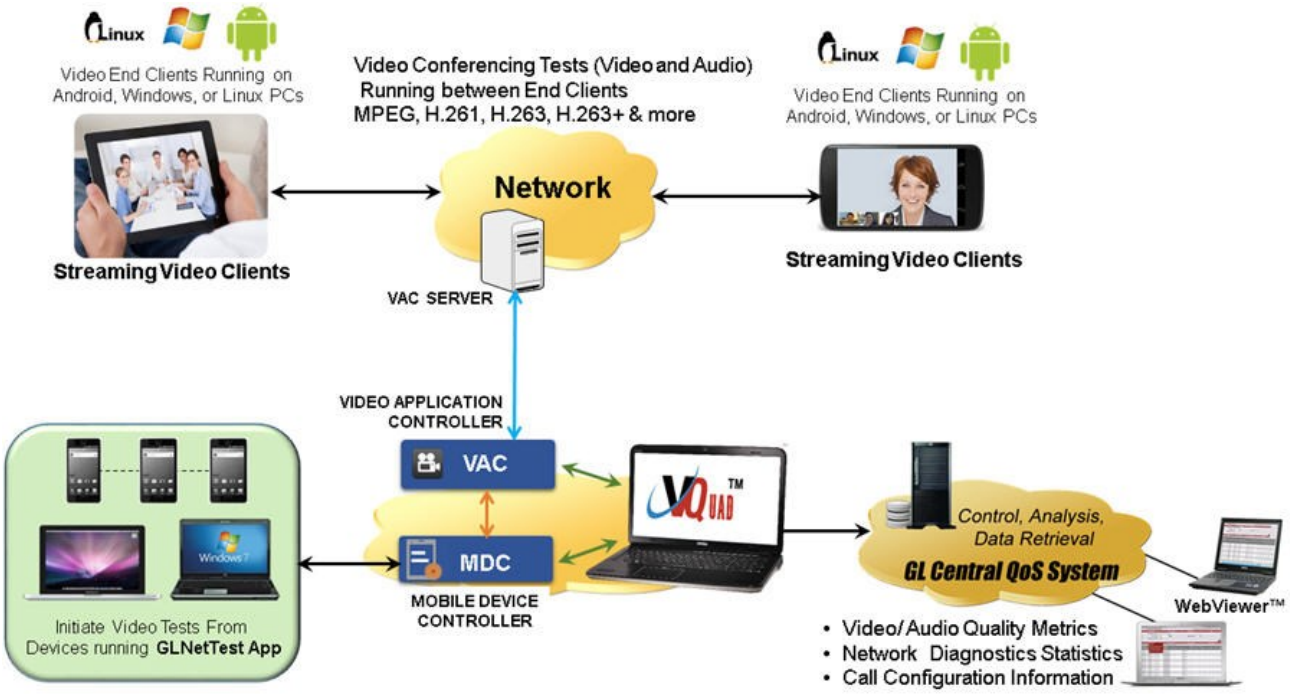


For complete details, refer to Automated Data Testing over Wired and Wireless Networks webpage.

Automated Video Quality Testing

Video Application Controller (VAC™) provides a solution to determine video quality over a given network with active communication to/from multiple VQuad™ nodes, and the active Video Test Agents (end Points). Video Test agents generates simulated video calls to other test agents. A test can run between android-to-android, android-to-PC and PC-to-PC.

- Fully automated Video Conference testing can be performed to get QoS results along with several analytical metrics
- Perform active Video Quality Testing from Android, Windows®, and Linux® based PC clients (or end points)
- Tests can also be initiated directly from the VQuad™ interface, or from the Android phones using GLNetTest App
- Unlimited test plans configurations with Codec, Frame Rate, GoP (Group of Pictures) Structure and Video Image Size
- Results include Video MOS, Audio MOS, and A/V MOS along with a variety of analytical and quality metrics
- Fully automated and remote testing with all results accessible via WebViewer™



For complete details, refer to Automated and Manual Video Quality Testing webpage.

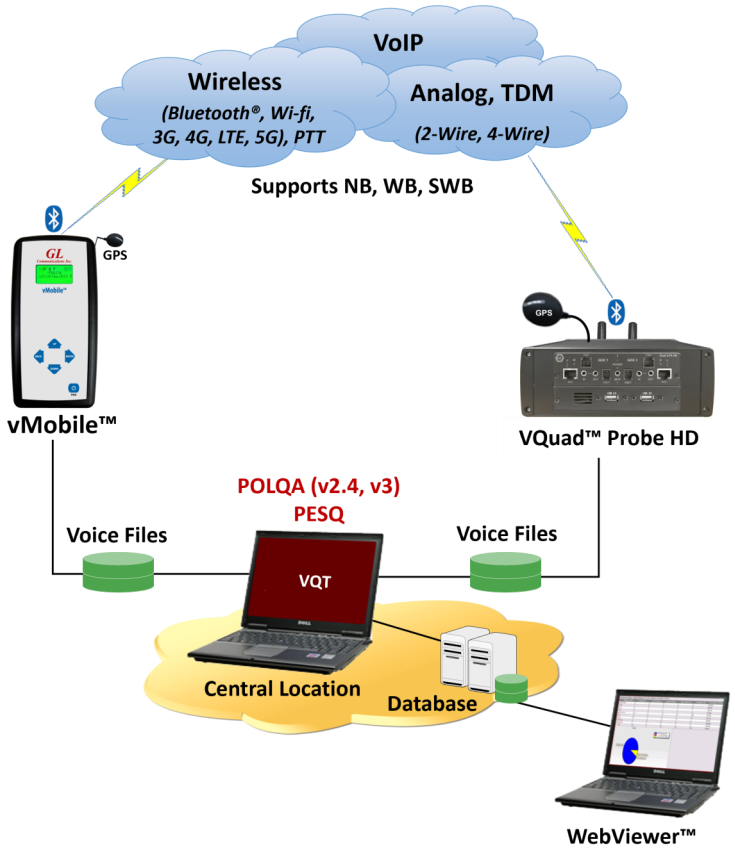
Voice Quality Testing (PESQ, POLQA)

GL's Voice Quality Testing (VQT) system supports the next-generation voice quality testing standard for fixed, mobile and IP-based networks using POLQA (ITU-T P.863), PESQ (ITU-T P.862), PESQ LQ / LQO (P.862.1), and PESQ WB (P.862.2).

The VQT supports analysis using POLQA algorithm for NB (8000 sampling), WB (16000 sampling), and SWB (Super Wideband) (48000 sampling) in both manual and automated testing. It also supports analysis using latest PESQ ITU release including ITU-T P.862, 862.1 and 862.2 (supports PESQ, PESQ LQ, PESQ LQO, PESQ WB).

- Automatic Mode allows the GL's VQT to execute on a network system and point to a user-defined network drive
- VQT CLI or API is enhanced to fully support both Windows® and Linux® for remote operations
- Remote monitoring with result query and real-time statistics using web based WebViewer™
- Real-time mapping of results with GPS option used in conjunction with VQuad™

GL has improved its voice quality test with AutoVQT™, an advanced automatic application that utilizes the POLQA algorithm (following the ITU-T P.863 version 2.4 standard). This enhancement allows for the analysis of thousands of voice files within minutes, effectively evaluating the quality of voice communication across various applications, including VoIP, Mobile, and PSTN networks



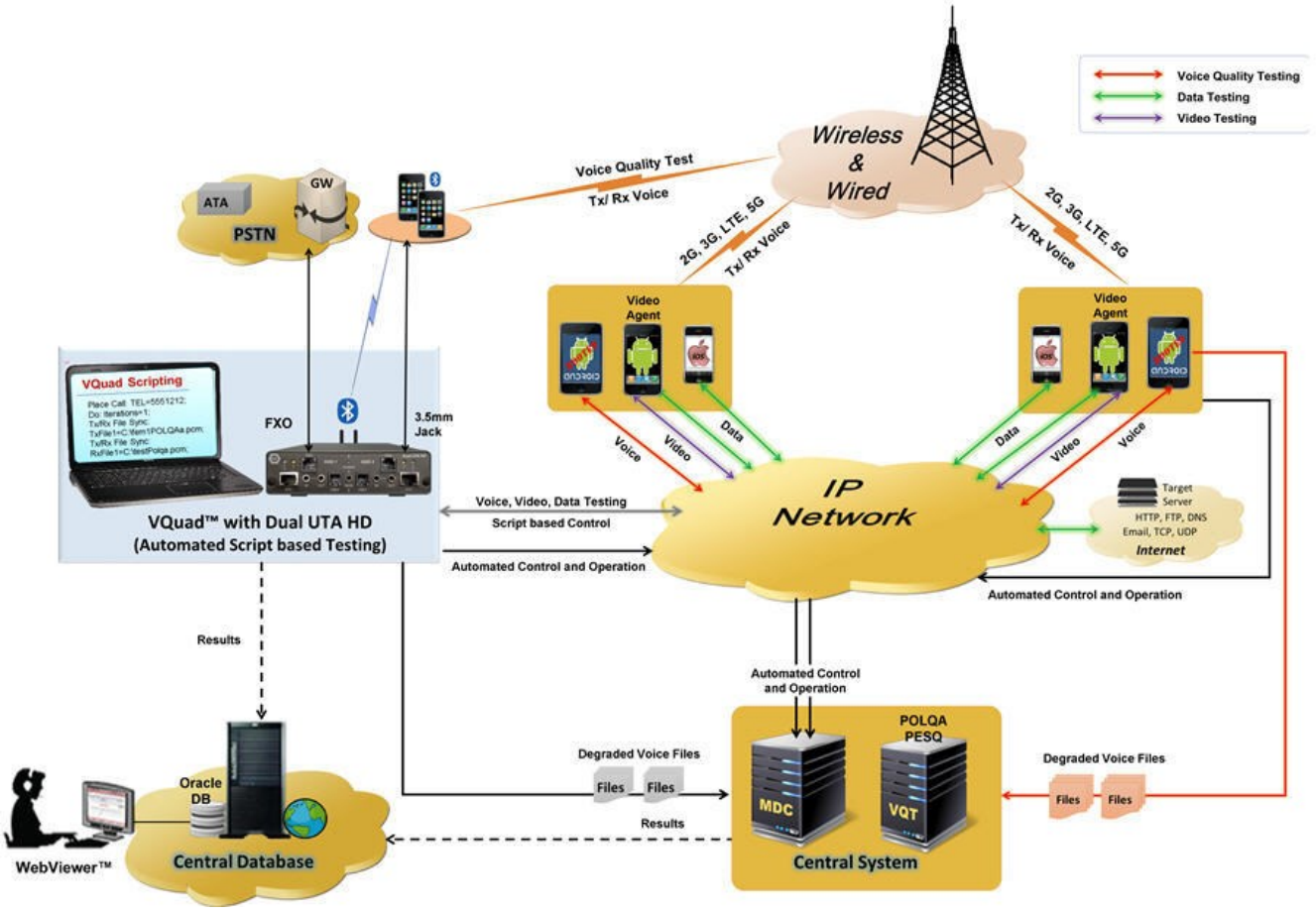
For complete details, refer to Voice Quality Testing (VQT) webpage.

Voice Quality Testing using Android Mobile Application

Additionally, GL's NetTest VQT app, supported on rooted Android devices, supports both manual and automated testing of Voice Quality within the network. The GL NetTest VQT app includes features to place and receive calls over the network along with Play and Record voice over the established call.

The call control functions and ability to send/record voice (for voice quality analysis) can be run manually from the app, automated from the app (using predefined scripts) or automatically and remoted using VQuad™ scripting.

- Supports voice quality testing on rooted Android devices with support for Playing and Recording voice files during an established call
- VQuad™ scripting, when connected to the GL NetTest VQT app, provides automation, mobility, remote accessibility
- Recorded voice files (*.pcm) are transferred to the VQT central system for analysis
- Google map plotting of the VQT test location feature is available within VQT mobile application which is helpful during drive testing
- Analyzed voice test results are sent to the Central Database, accessible via WebViewer™

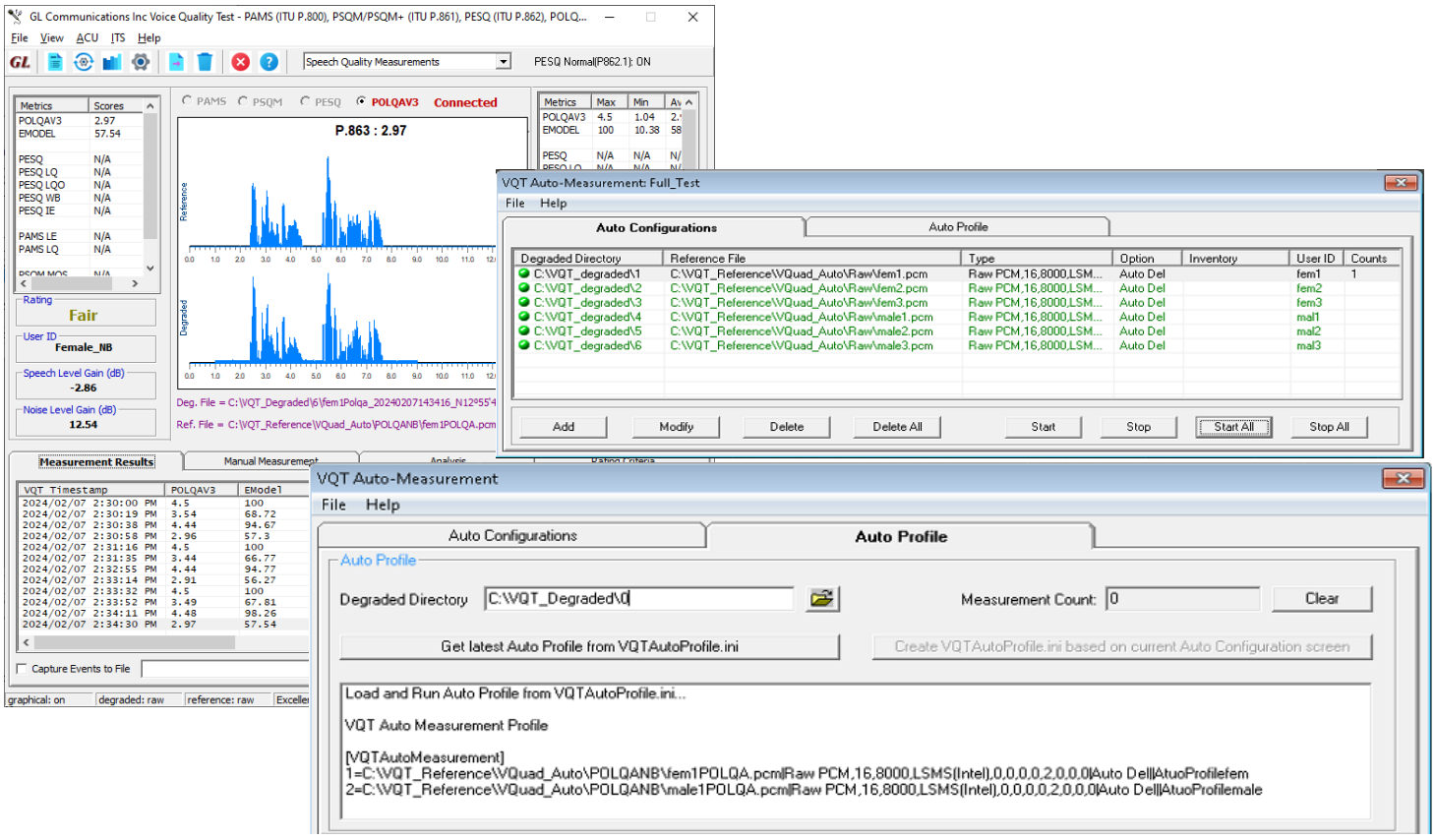


For complete details, refer to Voice Quality Testing using Android Mobile Application webpage.

Associated Applications with VQuad™ - VQT, and EMU

GL's **Voice Quality Testing (VQT)** software compares the two voice files ('reference' and 'degraded') and provides an ITU-standard score (POLQA, and PESQ LQ/LQO/WB). The VQT software allows users to perform **manual** and **automated voice quality assessments**.

- Several additional analytic metrics for determining the reasoning for the resultant score
- POLQA (ITU-T P.863), PESQ (ITU-T P.862), PESQ LQ, LQO (P.862.1), PESQ WB (P.862.2)
- VQuad™ supports an integrated solution for all interfaces for low- density networks as well as expanded high density networks
- Degraded voice files automatically transferred from VQuad™ nodes to VQT analysis via File Monitor Utility
- Multiple VQT Auto-Measurement sessions may be configured, each session with a unique set of requirements and a unique reference voice file
- Auto Profile method of measurement uses an INI file (VQTAutoProfile.ini) and allows a Single Degraded Directory to support multiple file types
- Files are automatically analyzed as per the configurations in the VQTAutoProfile.ini file without the user starting or stopping the test manually
- 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)
- Allows voice files to be saved based on the rating criteria (i.e., if VQT is fair or poor, save the degraded voice file) to the hard drive
- Fully supports POLQA ITU version 2.4 for POLQA NB and SWB (including WB) modes



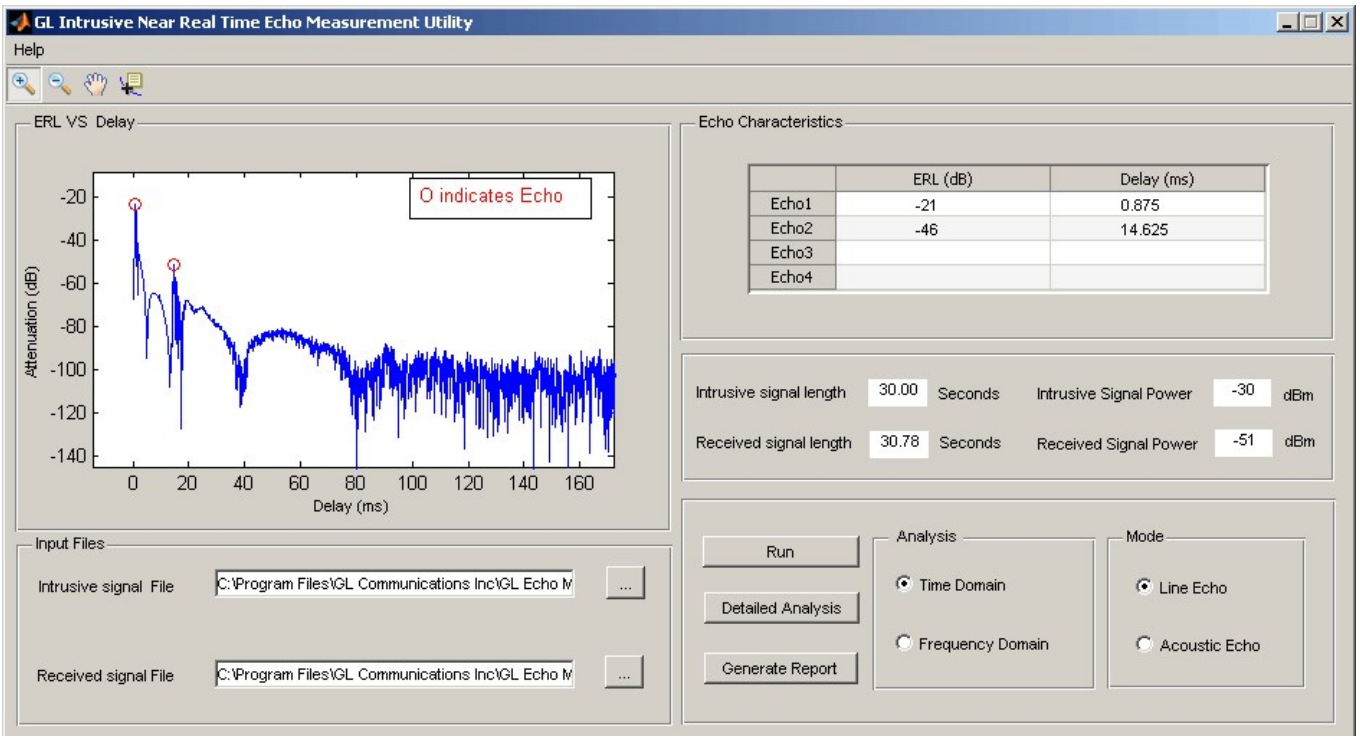
For complete details, refer to Voice Quality Testing (VQT) webpage.

Associated Applications with VQuad™ - EMU

Echo Measurement Utility (EMU) Software

The Echo Measurement Utility is used for Echo, delay, and voice quality analysis of voice calls in VoIP, TDM, 2Wire, and Mobile networks.

- Ability to automate the entire test process using VQuad™ scripting, including sending the results to the central database for access via GL's WebViewer™
- EMU uses EMU Client software to automatically detect the incoming degraded voice files and send the measurements to database after analysis
- Supports both line and acoustic echo measurements



For complete details, refer to Echo Measurement Utility (EMU) webpage.

Associated Applications with VQuad™ - NetTest

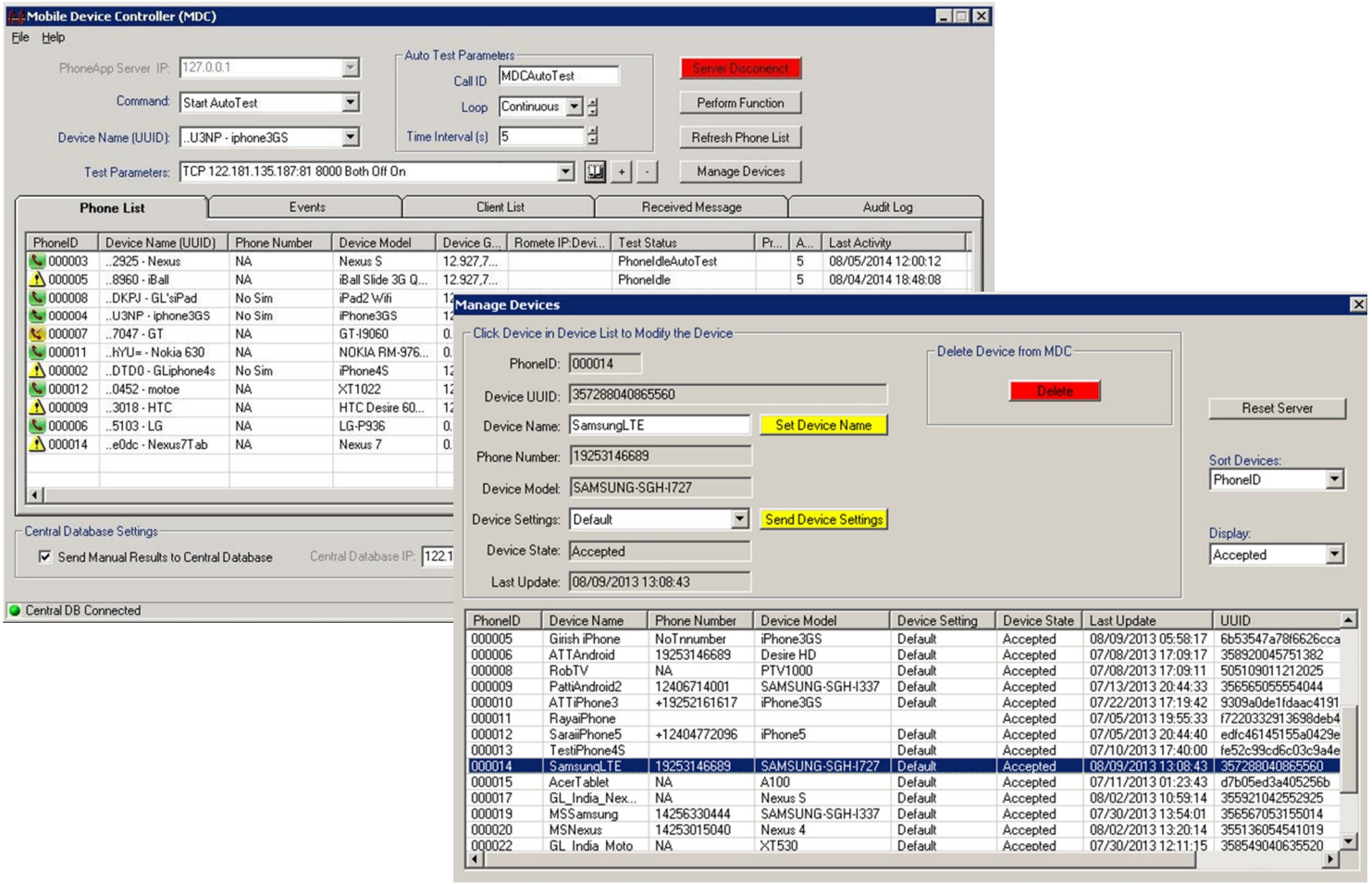
NetTest from PC and Mobile Devices

GL's VQuad™ solution is enhanced to support Data Testing using the NetTest application from PC and from mobile devices (using Mobile Device Controller).

VQuad™ can send commands (via the VQuad™ scripting) to the MDC and automate the NetTest to be performed on any connected Mobile Device. Manage Devices option gives the flexibility to manage the NetTest supporting devices (with MDC app installed) connected to MDC server. The Mobile Device will run the specified NetTest irrespective of whether the phone is on a voice call or not. MDC can manually set up the NetTest on the mobile devices using Test Type Editor.

- Automated Data Testing (NetTest) includes TCP, UDP capacity, VoIP, Route, HTTP, FTP, DNS, SMS, Email, Phone Info, SIM Info, and UE Info
- Statistics and complete results are available through the WebViewer™ for both Mobile Device NetTests and PC based NetTests
- Flexibility to manage the mobile device connections within the MDC server
- Send all Results and Mobile Device information along with GPS co-ordinates to the Central Database and plot using the WebViewer™ Google Map
- Email Alert to automatically generate an email with the Phone Info and Geographical location of the mobile devices with pending requests

Note that the NetTest requires a GL Data Server at each target location, and the Mobile Device requires a GL deployed app (Apple or Android based) for operation.



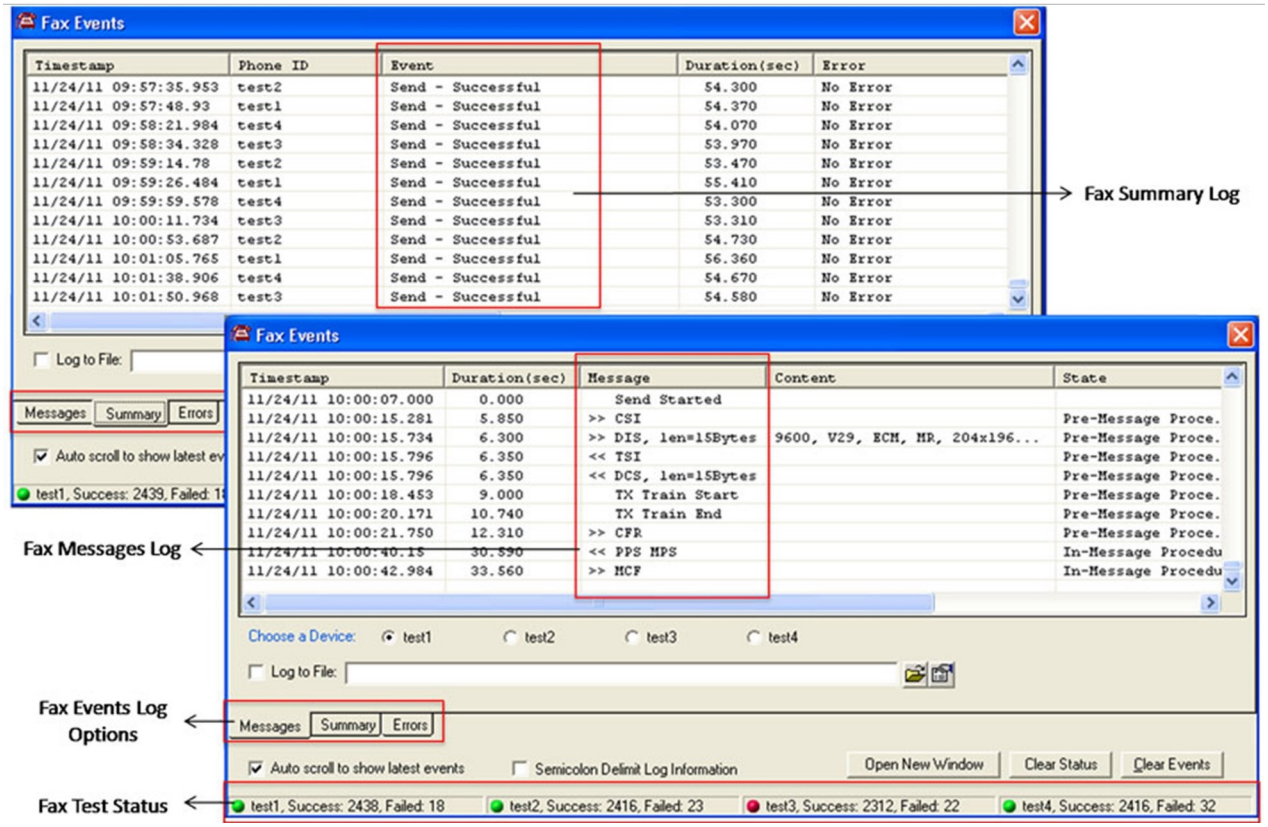
For complete details, refer to Automated Data Testing over wired and wireless network webpage.

Associated Applications with VQuad™ – FAX

VQuad™ FAX Emulation

VQuad™ with Dual UTA HD supports sending and receiving up to 4 independent and simultaneous T.30 faxes. The user can configure the Tx and Rx fax rate from 2400 baud to 33600 baud with V.34 fully supported. Interfaces supported for fax generation include 2-Wire FXO and 4-Wire analog.

- Capability of 4 independent and simultaneous T.30 faxes (selectable up to V.34)
- Supports fax rate ranging from 2400baud up to 33600baud (V.34 fully supported)
- Supports Fax Tx Rx for 2-Wire analog (FXO) and 4-Wire analog networks
- VQuad™ Fax events includes messages, summary, and errors log
- Ability to auto save fax (both East and West directions) to PCM file for enhanced analysis using GLInsight™ and Fax Decoder
- VQuad™ scripting supports fax send or receive sessions configurations
- Support for additional interfaces such as T1 or E1 and VoIP (T.38)



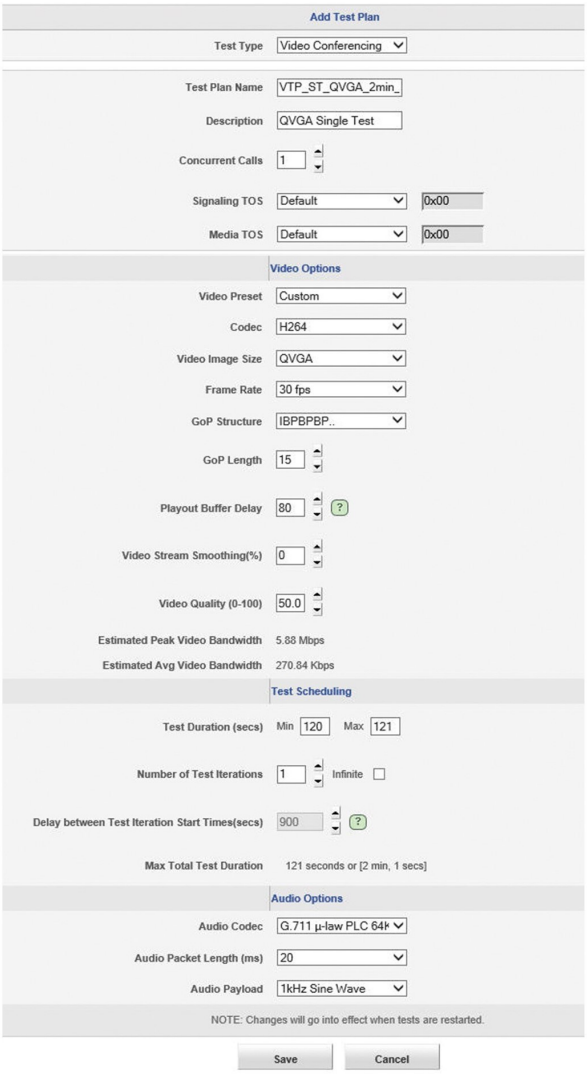
For complete details, refer to Fax Emulation Using VQuad™ webpage.

Associated Applications with VQuad™ - VAC™ and VBA

The GL's **Video Conference** test solution uses the **Video Application Controller (VAC™)** for fully automated control of all active test agents as well as communication from individual VQuad™ nodes for initiating tests and retrieving test results. The VAC™ supports active testing of video conferencing services, as well as advanced IP network diagnosis. To achieve active video testing, GL's video test agents are installed on Android mobile devices as well as PCs/servers (both Windows® and Linux® supported) at key locations within a service network.

The VAC server allows video tests to be configured between any two active agents by specifying the characteristics of the video test. Typical low end video conferencing system characteristics includes:

- One to one chat bandwidth of at least 1 Mbps uplink / 1 Mbps downlink; One to many chat may require at least 1 Mbps uplink / 2 Mbps downlink; more bandwidth will be required for better quality
- Minimal one way latency of 150 to 300 ms is needed to avoid double talk, this is independent of video quality
- Resolution (Image size) can vary from 320 x 240 pixels, 15 frames/sec, 640 x 480 pixels, 30 fps, to 1280 x 780 pixels, 30 fps
- Acoustic echo cancelation is necessary if speakerphones are used to improve audio quality
- Codecs used include MPEG, H.261, H.263, and H.264
- Group of Pages (GOP) structure – a group of frames are treated together to achieve greater compression



For complete details, refer to Automated and Manual Video Quality Testing webpage.

Voice Band Analysis (VBA)

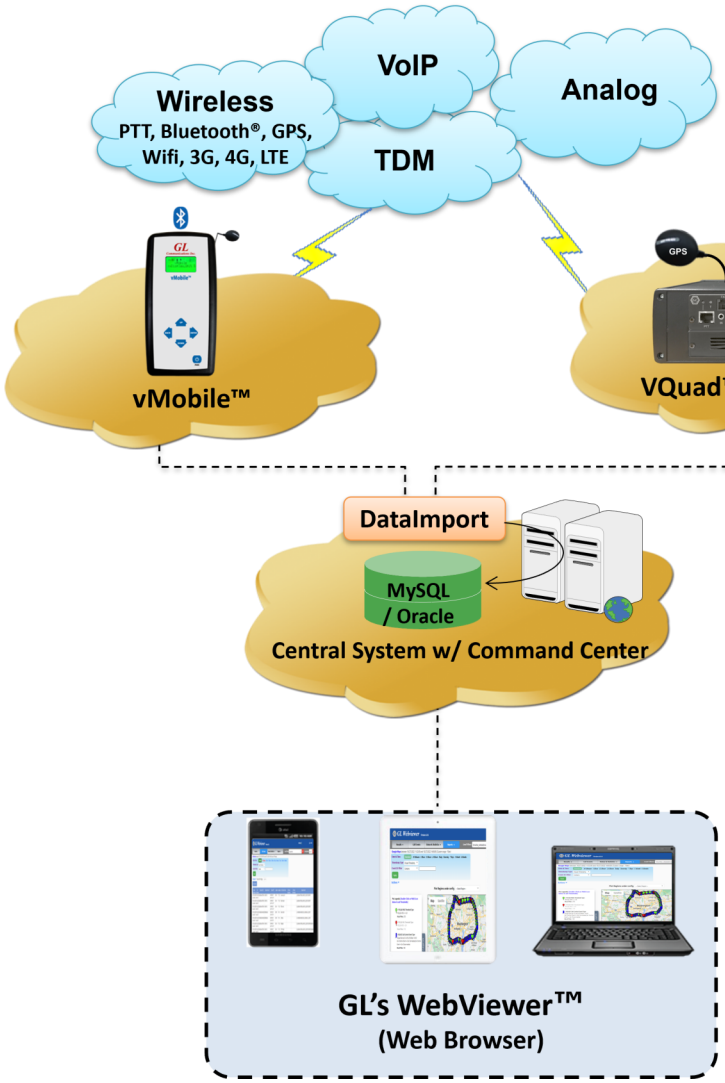
The Near Real-time Voice-band Analyzer (VBA) is an analysis tool for monitoring voice band traffic over VoIP, TDM, 2-Wire and Wireless network. All results from VBA are automatically sent to WebViewer™ central database (Oracle or MySQL). The results that can be queried over web interface include Active Speech Level, Activity Factor, RMS Factor, DC Level, Noise Level, Echo Return Loss, Echo Delay, and Echo Dispersion statistics along with the additional analytical Call information.

For complete details, refer to Voice Band Analyzer to webpage.

Network Voice, Video, and Data Quality Testing System

GL's **Network VQT System** provides a complete solution that consists of Distributed VQuad™ Nodes, VQT Software, VQT WebViewer™, and the other assisting tools.

- **Distributed VQuad™ Nodes** - These nodes control individual or multiple wireless, landline, VoIP or T1 or E1 telephony terminals
- **vMobile™** - Supports fully automated audio testing for mobile phones (any phone, any carrier, any network) including Voice Quality using POLQA, Delay measurements, Audio Dropout analysis, and full call control with Call Fail and Call Drop metrics
- **Voice Quality Testing Software (VQT)** – provide VQT POLQA, PESQ, Echo, Delay, Fax, and various Data testing results. Fully automated and remotely accessible, all results are automatically transferred to the Central Database for access via the GL WebViewer™ and PESQ results are Jitter, Clipping, Signal and Noise Levels, and POLQA results are POLQA MOS, E-Model, Signal Level, SNR, and Jitter
- **Remote Client WebViewer™** - remotely access all results associated with the VQuad™ test including Call Control (Call Failure and Call Dropped), Voice Quality, Round Trip Delay, One Way Delay, Echo Measurement, Fax Events, Data Testing from PC or Mobile Device, and Video Testing. Provide user-defined reports as well as statistics



- POLQA, PESQ LQ/LQO/WB
- MOS, Jitter, Clipping, Speech and Noise Levels
- Data Testing - Wired and Wireless Networks
- Video Quality Test Results
- Call Events - Progress & Failures
- Fax Events - Encoding, Resolution, ECM
- Audio and Delay Analysis
- E-Model, SNR, Signal Level
- Echo Measurements - ERL, Delay
- QoS, Timeouts, Retransmissions
- Google Mapping

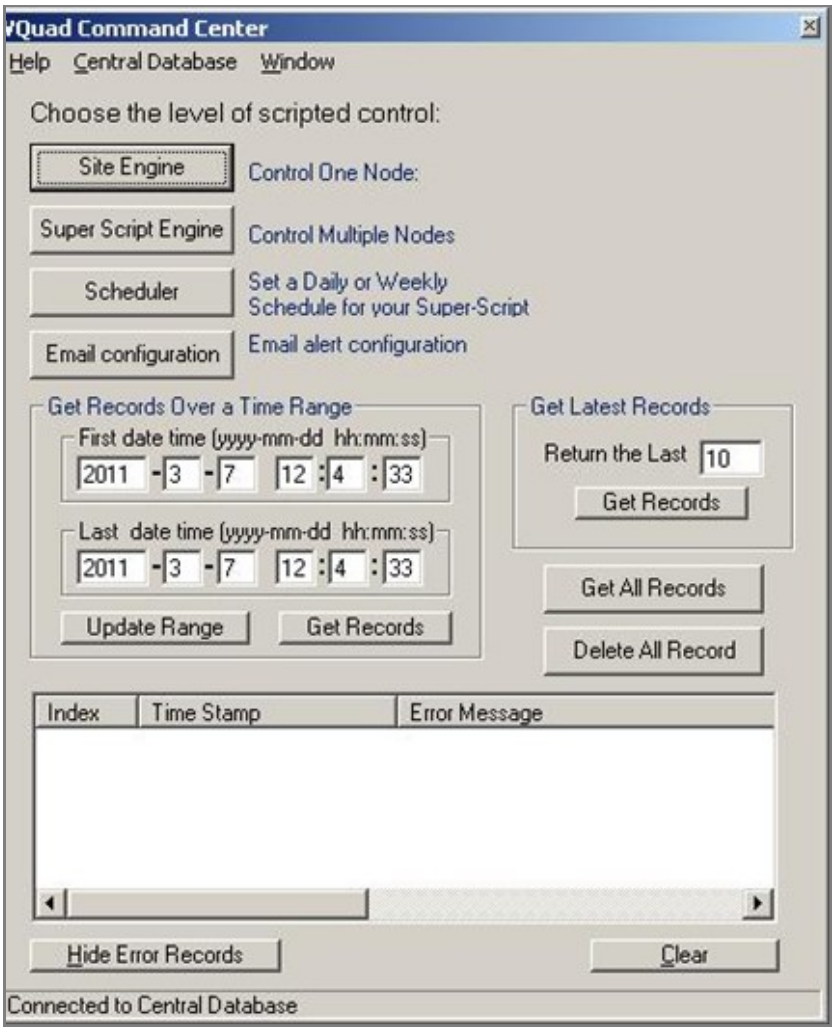
For complete details, refer to Intrusive Method of Speech Quality Assessment webpage.

VQuad™ Command Center

VQuad™ Command Center controls all network node locations, with each node location comprising of VQuad™ devices (Mobile Bluetooth®/landline phones/VoIP Terminal/FXO/TDM).

The Command Center controls all distributed sites, including actions such as -

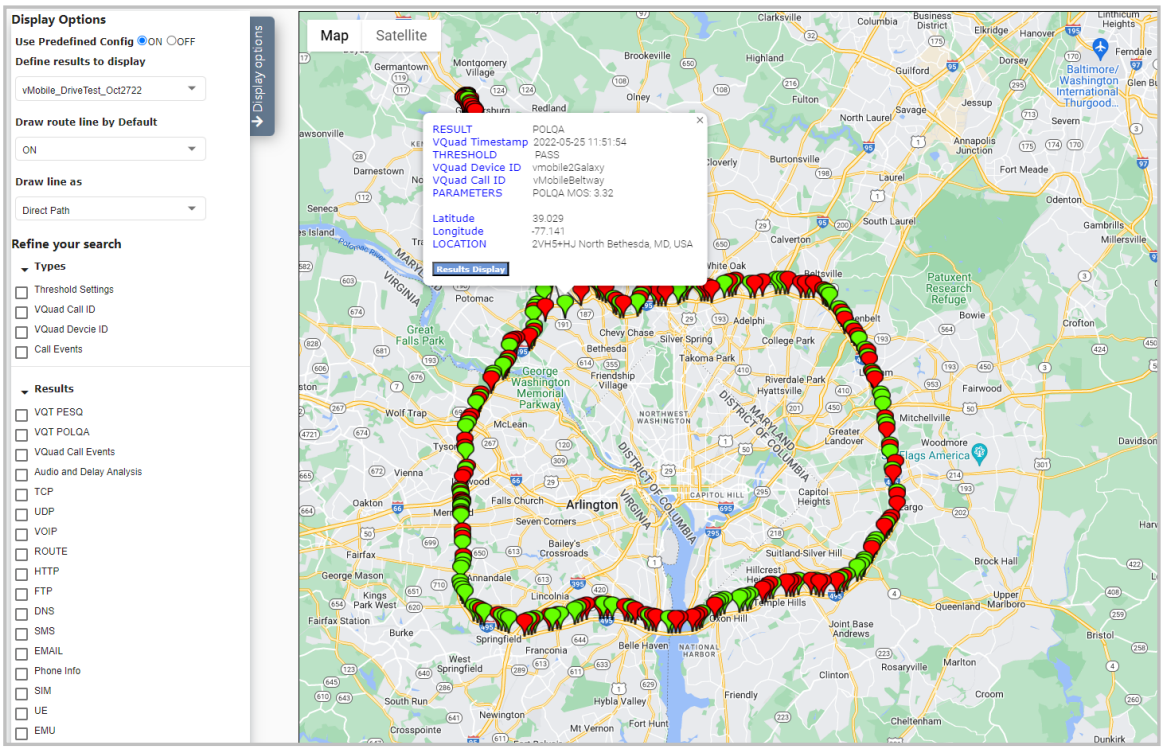
- **Central Monitoring** - Controls and checks the status of all distributed network nodes in real-time and each Network Node executes individual scripts and is remotely controlled via the RCC VQuad™ Command Center
- **Automation** - Provides automation with flexible and easy to use scripting
- **Scheduling** - Initiates voice collecting tasks periodically for each site at user-defined time
- **E-mail Support** - is the ability to provide user-defined automated email associated with VQuad™ errors as well as VQT failed results and the email alerts are user-defined and supports multiple email addresses



For complete details, refer to Intrusive Method of Speech Quality Assessment webpage.

Remote Client WebViewer™

- Multi-user support, and user-friendly interfaces are remotely accessible via browser based clients (PC and IOS devices supported)
- WebViewer™ is a simple, easy to use Web browser which can operate on both PC and Mac systems (including iPhone and iPad)
- Query and Access results, generate reports, display user-defined statistics in tabular and graphical views
- Display real-time status of entire network with ability to remote access all nodes associated with the network
- WebViewer™ queries the central database and displays the results in both tabular and graphical formats
- Results include Call Event, Bluetooth® events, Data Test (Net Test results from PC and Mobile Devices) results, Video Quality Test, Fax Events, Echo Measurements, VQT Results, VBA Results, Delay Measurements and User-defined Results
- Voice and Data Testing, Echo Measurements and Analysis over TDM, VoIP, and Wireless networks
- Customize report generation with result statistics, tabular data, bar graphs, and line graphs
- Report Scheduler provides the ability to schedule a report with the schedule period and user-specified filters



For complete details, refer to WebViewer™ webpage.

VQuad™, VQT CLI and API for Windows® and Linux®

Full support for VQuad™ and VQT CLI and Python API (both Windows® and Linux®) on both IPv6 and IPv4. The Remote Access (Client) allows VQuad™ and VQT operations to be remotely controlled by one (or several) VQuad™/VQT clients over a LAN, WAN, or Internet. Each VQuad™/VQT client supports MS Windows, Unix, or Linux operating systems and includes a DLL component, which gives the users the ability to control the VQuad™/VQT server remotely and to integrate within their own custom software.

The supporting Call Control and Traffic commands help VQuad™ users to run the application installed on remote PC. The supporting VQT commands includes - Start/Stop VQT, Get VQT Status, Auto and Manual Measurement, Capturing Events, Retrieve Log files and others.

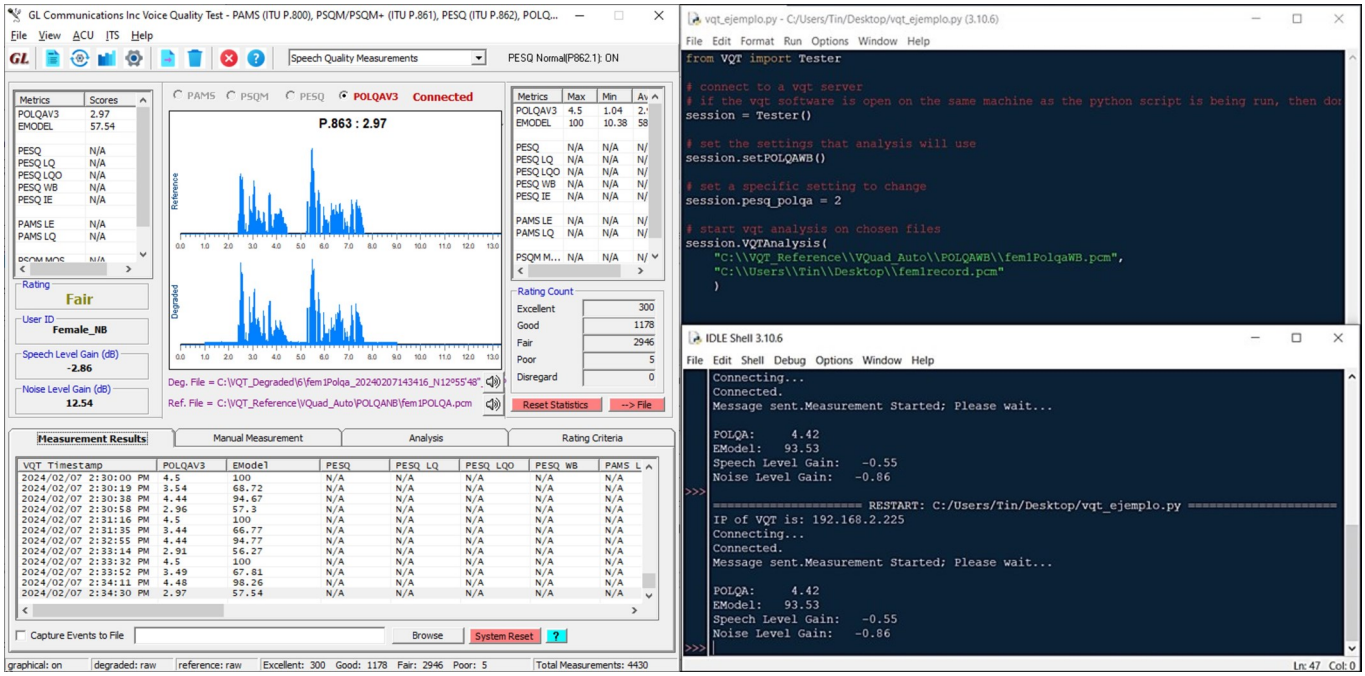
For complete details, refer to Command Line Interface for remote access webpage.

VQuad™ and VQT with Python API

The VQuad™ and VQT Python libraries provide a range of Python functions which can be used to remotely or locally control these two applications. The VQuad™ library provides the functionality of the existing VQuad™ CLI as well as the ability to run prewritten scripts sequentially. The VQT library can be used to run automatic and manual VQT tests with custom settings.

Python for VQuad™ works by connecting to the existing VQuad™ CLI and using a portion of the CLI commands to make simple functions. This connection to the CLI makes the library fast and responsive. Python scripts can perform a variety of Call Control and Audio operations on any device associated with the VQuad™ system. Additionally, access to the original CLI functions is possible through use of the VQuad™ library and the Python ctypes library

Python for VQT works by connecting to the existing VQT CLI and using a portion of the CLI commands to run manual and automated VQT tests. Class variables are linked to the settings for each test and can be changed easily.



Main Features

- Python scripts support accessing VQuad™ and VQT functionalities remotely
- Controls VQuad™ and VQT nodes located at various destinations
- Automation with enhanced Python scripting and remote operation includes traffic generation, call control, and automated scheduling of operation

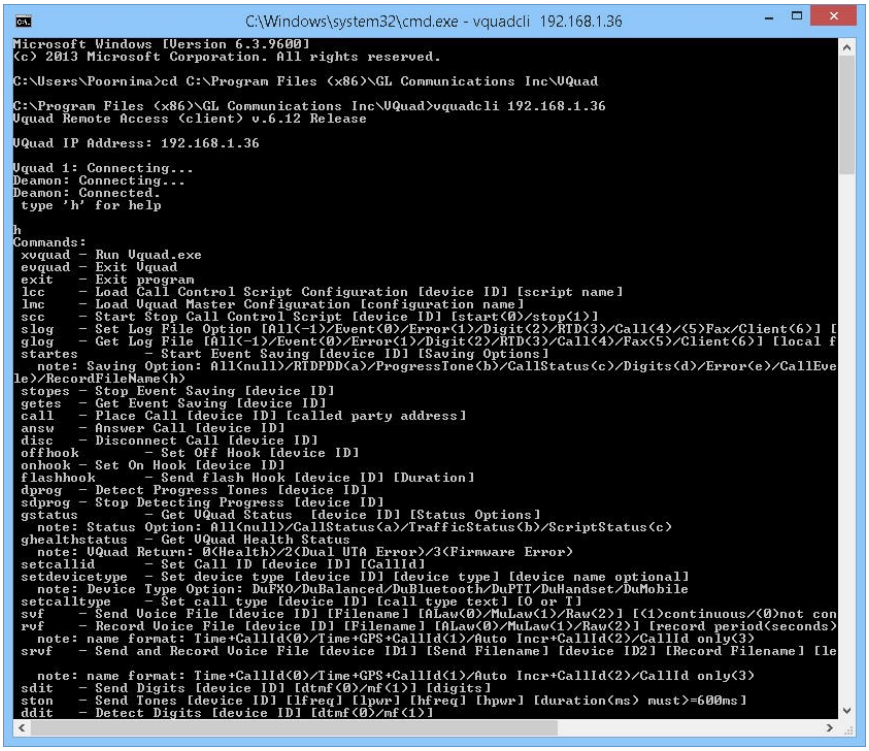
For complete details, refer to Command Line Interface for remote access webpage.

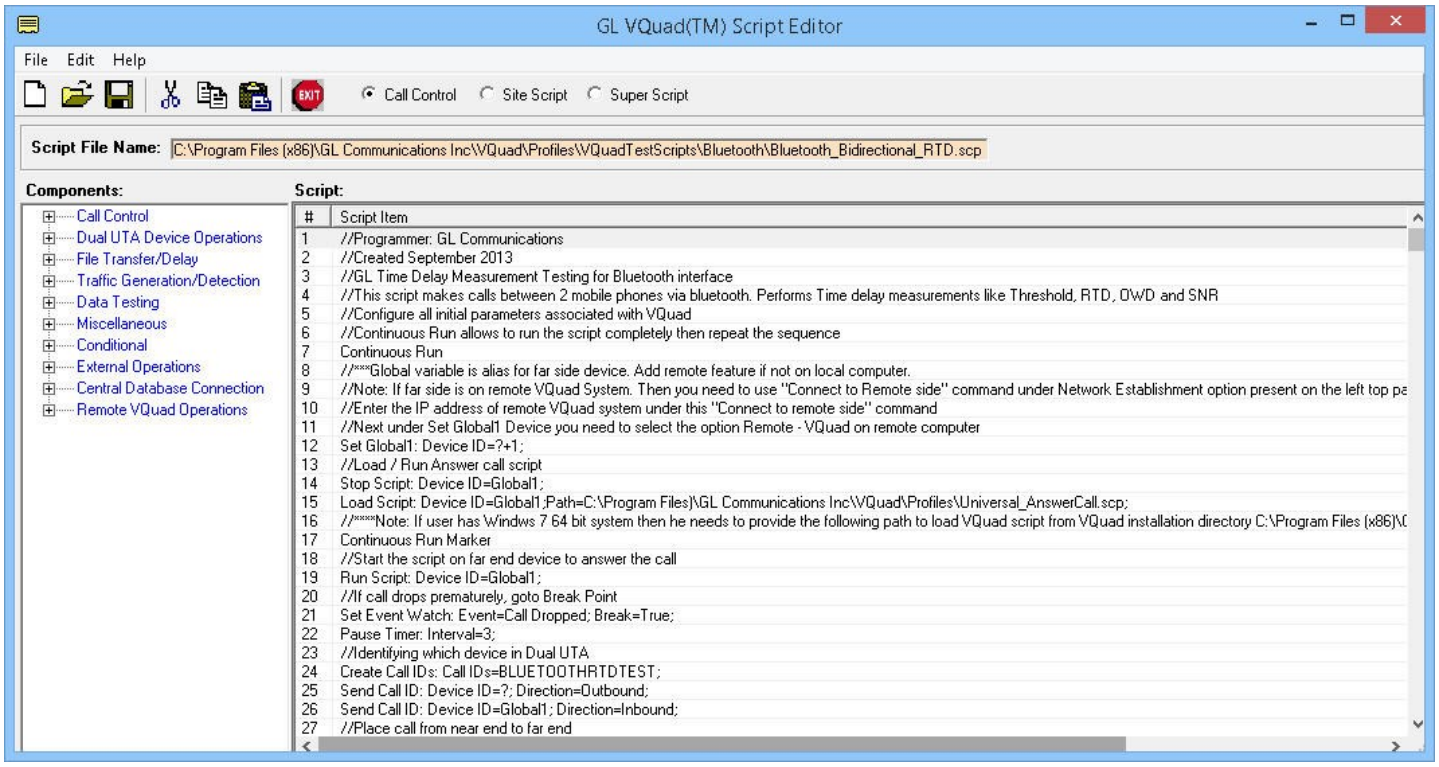
VQuad™ Scripts

The VQuad™ script 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.

VQuad™ Software Specifications	
Tone Generation	200-4000Hz
Tone Detection	0-4000Hz





Buyer's Guide

Item No	Product Description
VQT010	VQuad™ Software (Stand Alone)
VQT014	AutoVQT™ (POLQA v2.4)
VQT014U	Upgrade from VQT POLQA to AutoVQT™
VQT251	Dual UTA HD Next generation Dual UTA with FXO Wideband support
VQT461	Dual UTA HD Smartphone ACC Cable
VQT252	Dual UTA HD – Bluetooth Option
VQT280	VQuad™ Probe HD (with Dual UTA HD)
VQT013	VQuad™ with SIP (VoIP) Call Control
VQT015	VQuad™ with T1 E1 Call Control
VQT040	VQT WebViewer™

Item No	Related Software
VQT006	Voice Quality Testing (POLQA)
VQT002	Voice Quality Testing (PESQ only)
VBA032	Near Real-time Voice-band Analyzer
EMU037	Echo Measurement Utility (EMU) Software
VQT600	VQuad™ NetTest Data Server Solution (Requires annual license renewal to remain functional)
VQT601	Mobile Device Controller (MDC) Software
VQT650	VAC (includes VAC Server and VAC companion software)
VQT022, VQT022a	VQuad™ Fax Emulation (2 / 8 ports)
VQT442	Mobile Audio Interface for Smartphones
VQT443	3-wire headset interface Adaptor for Smartphones
VQT273	VQuad™ Probe Watchdog Service

Note: PCs which include GL hardware/software require Intel or AMD processors for compliance.

For more details, refer to Voice, Video, and Data Quality Test Solutions webpage.

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