Voice, Video, and Data Quality Testing Solutions
Captured Files Analyzed at Central System

- Captured files analyzed at central system for Voice, Video, and Data Quality
- Send the Events/Results to Central System and receive remote commands from Central System
Complete VQT System

w/o Dual UTA Interfaces

- Video Conference Testing on Android, Windows, or Linux Devices
- Data Testing on Smartphone, Tablet, or PC (TCP, UDP, HTTP, VoIP, FTP, DNS, SMS, Email)

w/ Dual UTA Interfaces

- Wireless Mobile Phones
- GPS
- 4-Wire Mobile Phones
- WiFi / 3G / 4G / VoLTE
- 2-wire FXO
- PSTN / TDM Analog
- Military Radio
- Radio w/ PTT

VQuad™ Probe HD (VQuad™, Dual UTA HD, PC)

Ethernet

GL Central QoS System

Control, Analysis, Data Retrieval

WebViewer™
Hardware Platforms
Dual UTA HD Hardware Unit
VQuad™ Probe HD

Back Panel

Front Panel
VQuad™ mTOP™ Specifications

Front and Back Panel of VQuad™ mTOP™ 1

Front and Back Panel of VQuad™ mTOP™ 2

GPS connection on mTOP™ 1 daisy chains the GPS to multiple mTOP™ systems
Network Types
Single-box Portable QoS Testing Solution

- For Wireless Network:
  - Connectivity - Bluetooth® NB & WB, PTT, GPS, 4-wire Balanced I/O Interfaces on Dual UTA HD
  - Devices – Military/Mobile Radios, 4G/3G/Wifi Smartphones (iPhone, Android, Blackberry), Bluetooth® Headsets/Stereo/Car Kits, Wired Headset with Smartphone Automated Call Control (ACC)

- For VoIP Network:
  - Connectivity – Internal SIP cores within VQuad™ (SIP and H.323 Signaling - Does not require Dual UTA HD), 4-wire Balanced I/O, HSET Interfaces on Dual UTA HD
  - Devices – VoIP Phones, HATS

- For TDM Network:
  - Connectivity – T1/E1 Interface facilitated through GL’s T1/E1 Analyzer Hardware (ISDN and CAS Signaling - Does not require Dual UTA HD)
  - Devices – Digital Phones, PBX, Media Gateways over TDM network

- For PSTN Network:
  - Connectivity – FXO Interface on Dual UTA HD
  - Devices – Analog Phones, Media Gateway, PBX, ATAs over PSTN network

- GPS and ITS location tracking with results overlay
Automated QoS Testing of Wireless Network

- **Connectivity** - Bluetooth® NB & WB, PTT, GPS, Wired Headset Smartphone ACC, 4-wire Balanced I/O Interfaces on Dual UTA HD
- **Devices** – Military/Mobile Radios, 5G/4G/3G/Wifi Smartphones (iPhone, Android, Blackberry), Bluetooth® Headsets/Stereo/Car Kits, Mobile devices with Smartphone ACC
Automated QoS Testing of Analog Network

- **Connectivity** – 2-Wire FXO, 4-Wire Balanced I/O, HSET Interfaces on Dual UTA HD
- **Devices** – Analog Phones, Next Generation Gateways, PBX, ATAs over PSTN network
Automated Testing of VoIP (SIP) Interface, Digital VoIP Phones, VoIP Softphones

- **Connectivity** – Internal SIP cores within VQuad™ (SIP and H.323 Signaling - Does not require Dual UTA HD), 4-wire Balanced I/O, HSET Interfaces on Dual UTA HD

- **Devices** – VoIP Phones, Soft Phone, HATS

VoIP

- SIP Phone
- HATS (Head and Torso)
- PCMU, PCMA, G726_40, G726_32, G726_24, G726_16, GSM, G729, & Wideband (HD Audio) Codecs

SIP

RTP
Automated Testing of TDM Network

• **Connectivity** – T1/E1 Interface facilitated through GL’s T1/E1 Analyzer Hardware (ISDN and CAS Signaling - Does not require Dual UTA HD)

• **Devices** – Digital Phones, PBX, Media Gateways
Test Types
Single-box Portable- QoS Testing Solution

• VQuad™ provides a single-box solution with the following interfaces:
  ➢ Any Communication Device (Mobile phone, Smart phones (iPhone, Android, Blackberry), Military/Mobile radio, Bluetooth®, WiMax, WiFi)
  ➢ 2-Wire POTS (connect to PSTN, ATA, Media Gateway) using GL's Dual UTA
  ➢ SIP Call Agent (act as a SoftPhone and configure Proxy and Registrar)
  ➢ VoIP Ethernet (connect directly to any SoftPhone or any digital/VoIP hardware phone)
  ➢ T1/E1 (CAS and PRI ISDN protocols supported) using GL's USB T1 / E1 Analyzer

• VQuad™ analysis functions include:
  ➢ Send/Record voice for Voice Quality Testing (VQT) using PESQ (ITU-P.862.1/P.862.2)
  ➢ One Way Delay (OWD) and Round-Trip Delay (RTD) measurements
  ➢ Echo Measurements and Analysis using EMU
  ➢ Automated Data Testing via VQuad™ scripting
  ➢ Fax Emulation supporting up to 4 simultaneous sessions with speeds up to 33600 baud

• VQuad™ supports drive testing with GPS Mapping and Indoor Tracking System (ITS) to provide tracking information during Voice Quality Testing at remote locations
VQuad™ Functionalities

One Way Delay (OWD)
End points at same location

ONE-WAY DELAY (OND)
-End points at same location

AUDIO NETWORK UNDER TEST

SIDE 1 PROCEDURE:
1. Tx AUDIO
   Send pulse through network

SIDE 2 PROCEDURE:
1. START TIMER
   At exact time of SIDE 1Tx’s Audio
2. Rx(detect) PULSE and STOP TIMER
   Report delay
**One Way Delay (OWD)**

End points at separate location

### ONE-WAY DELAY (OWD)
- End Points at two separate location

#### Steps:
1. **Tx AUDIO**
   - At pre-determined time (12:00:00.000)
   - Send pulse through network

1. **Start Timer**
   - At pre-determined time (12:00:00.000)
2. **Rx (detect) pulse and Stop Timer**
   - Report delay (12:00:00.000 delay)

**Diagram:**
- GPS Satellite
- Dual UTA HD
- Audio Networking
Round Trip Delay Functionality

RTD on two systems (geographically separated)

VQuad™ Functionalities

Round Trip Delay (RTD)
Echo Measurements

Echo Identification

Acoustic Echo Canceller Testing

NETWORK with ECHO

Network Interface

SIDES 1 and 2

DUAL UTA HD

Device Under Test

Network Interface

Acoustic Echo Models

SIDES 1 and 2

DUAL UTA HD

Measure / ID Echo's (Levels, Delays, etc.)
Voice Band Analysis

- Monitor voice band traffic
- Measure Active Speech Level, Activity Factor, RMS Factor, DC Level, Noise Level, Echo Return Loss, Echo Delay, and Echo Dispersion statistics

Voice Calls

Tx/Rx

Dual UTA HD

Voice Calls

Tx/Rx

Recorded Voice Files

GL Central QoS System

Control, Analysis, Data Retrieval

- Speech Level Analysis
- Line Echo Analysis
- Traffic Classification
- FaxScan Analysis
- Tone Decoder

 Tx/Rx

WebViewer™
Automated Data Quality Testing

GL Test Device

GL MDC (Mobile Device Connector)

3G/4G/LTE

Internet

GL Central QoS System

Control, Analysis, Data Retrieval

Femtocell

WiFi

3G/4G/LTE/5G

Router

GL Target Servers

3G/4G/LTE

GL MDC (Mobile Device Connector)

Vquad™

Vquad™

Wireless

3G/4G/LTE/5G

GL Test Device

3G/4G/LTE

INTERNET
End-to-End SMS Testing

VQuad™ Probe HD

GSM Call

Wireless & Wired

NetTest
Script based control

Target Server

IP Network

HTTP, FTP, DNS
Email, TCP, UDP

Smartphone
(GL's NetTestApp)

PC based NetTest
(wired Ethernet, WiFi, or even Broadband card)

Results

WebViewer™

Central Database System
Automated Video Quality Testing

Video End Clients Running on Android, Windows, or Linux PCs

Interactive Video Clients

Network

Video Quality Tests (Video and Audio)
MPEG, H.261, H.263, H.264 & more

MOBILE DEVICE CONTROLLER

MOBILE DEVICE CONTROLLER

Initiate Video Tests From
Devices running GLNetTest App

Initiate Video Tests From
Multiple VQuad™ Nodes

VAC SERVER
(Video Test Plans)

VAC

VIDEO APPLICATION CONTROLLER

WebViewer™

Control, Analysis,
Data Retrieval

WebViewer™

• Video/ Audio Quality Metrics
• Network Diagnostics Statistics
• Call Configuration Information

GL Central QoS System

GL Communications
Voice and Data Drive Testing

Drive Testing Voice & Data
On the Go…

Voice, Data Quality Testing
• Voice Quality (using POLQA)
• Call failures, call drops,
• Delay and level measurements,
• RSSI (Signal Strength)
• TCP, UDP, VoIP, Route, HTTP, FTP,
  DNS Email, and SMS
• Network and Phone Information

Voice & Data Testing
In the lab...

VQuad™ with Dual UTA HD

Central System w/ Analysis Modules and Command center

Results and Call Control Info Plotted on Google Maps

WebServer™

GL Communications

(Bluetooth®, WiFi, 3G, 4G, LTE), PTT
Military Radios
Balanced I/O
HATS (Head and Torso)
SIP/RTP
VoIP
PSTN/TDM
2-Wire FXO/FXS
Analog & Digital Phones

WebViewer™
• Sending and receiving 4 independent and simultaneous T.30 faxes (selectable up to V.34)
• Configurable Tx Rx fax rate from 2400 bps up to 33600 bps (V.34 fully supported)
• Fax Testing using the Dual UTA 2-wire FXO or 4-wire analog interfaces
• 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 GL Insight™ and GL Fax Demodulator/Decoder
Interactive Voice Response (IVR) Systems

IVR SYSTEM

Menu (DTMF digits)
Announcements (Voice Prompts)

Caller Agents
Voice Mail

T1 E1, Analog, Digital, IP, Wireless

VQuad™
Dual UTA HD

IVR USERS

IBN Quad™

Supports NB, WB

Interfaces

Smart Phones
Phone
Handset
IP Phone

2-wire FXO
4-Wire
Over IP

WiFi / 3G / 4G / LTE
GPS

Announcements
(Voice Prompts)

Caller Agents
Voice Mail

GL Communications
HD WB Audio Support
WB Bluetooth Testing

Test Bluetooth® Enabled Mobile Devices and Associated Network

Dual UTA HD Configured as Bluetooth Headset

Supports NB, WB

Dual UTA HD

Voice Quality Testing (NB, WB)
VoLTE Supported

Dual UTA HD

Supports NB, WB

Dual UTA HD Configured as Bluetooth Headset

Supports NB, WB

Dual UTA HD

Voice Quality Testing (NB, WB)
VoLTE Supported

Wireless Network Under Test
WB Bluetooth Testing

Test Bluetooth® Devices (Headsets, Car Stereo Kit …)

Dual UTA HD Configured as Bluetooth® Mobile Phone

Voice Quality Testing (NB, WB)

Test Bluetooth® Devices

Bluetooth Headset

Bluetooth in the Car
VQuad™ with Dual UTA HD - WB 2-wire Analog FXO

PSTN

Dual UTA HD

2-Wire FXO

WB GW

IP

WB GW

2-Wire FXO

Dual UTA HD

PSTN
24-Port VQuad™ HD Analog Phone Simulator

- Supports 24 independent HD FXO ports per VQuad™ system (2U)
- Scalable solution for unlimited number of FXO ports
- Wide Band (WB) and Narrow Band (NB) support (for HD and SD Audio)
VQuad™ with Dual UTA HD - WB 4-wire Analog

Supports NB, WB

Dual UTA HD

Handset phone

Headset

Mobile Phones

Balanced I/O

HATS (Head and Torso)

PTT

Military Radios
VQuad™ - WB VoIP

VoIP

SIP Phone

HATS
(Head and Torso)

PCMU, PCMA, G726_40,
G726_32, G726_24,
G726_16, GSM, G729, &
Wideband (HD Audio) Codecs

SIP

RTP
Data Testing
Automated Data Testing over Wired & Wireless (Bluetooth®, WiFi, 3G, 4G, LTE) Networks
Mobile Device Controller (MDC) GUI

- GL's Mobile Device Controller application and the supporting downloadable apps on the Smartphones (iPhone, Android), can remotely perform the data tests when the phone is within a voice call or outside a voice call.
Mobile Device Controller (MDC) GUI

- Manage Devices option gives the flexibility to manage the NetTest supporting devices (with MDC app installed) connected to MDC server. Device details such as PhoneID, UUID, Device Name, Phone Number, Model type, Device settings, Device Status and the last device updates can be verified.
Data Testing

VQuad™ NetTest Events Log

• Mobile Device NetTest and PC based NetTest Statistics and complete results are relayed back to VQuad™, which can be access via WebViewer™

Note: 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
Data Tests running on Android and Apple Devices using GLNetTest App
Video Testing
Automated and Manual Video Quality Testing (Android, Windows® and Linux Interface)

- Video End Clients Running on Android, Windows, or Linux PCs
- Interactive Video Clients
- Video Quality Tests (Video and Audio) MPEG, H.261, H.263, H.264 & more
- Network
- VAC SERVER (Video Test Plans)
- VIDEO APPLICATION CONTROLLER
- MOBILE DEVICE CONTROLLER
- Initiate Video Tests From MOBILE DEVICES CONTROLLERS
- Initiate Video Tests From Multiple VQuad™ Nodes
- Video/ Audio Quality Metrics
- Network Diagnostics Statistics
- Call Configuration Information

GL Communications

WebViewer™ Control, Analysis, Data Retrieval

GL Central QoS System
Manual Video Testing using VQuad™

The image shows a graphical interface for manual video testing using VQuad™. The interface includes options for selecting devices, configuring test points, and managing test plans. Key features include:

- **Show Device**: Selecting the device to test.
- **VAC Server IP**: The IP address of the VAC server.
- **Point A**: Configuration for Test Agent A.
- **Point B**: Configuration for Test Agent B.
- **Interface A**: Connection details for Test Agent A.
- **Interface B**: Connection details for Test Agent B.
- **Test Plan**: Selection of the test plan to be used.
- **Status and Results** sections for monitoring the test progress.
- **Buttons** for various actions such as 'Stop Test', 'Get Test Param List', and 'Get Test Param (ini)'.

This interface allows for detailed control and monitoring of video testing processes.
Run tests from the VAC Test Manager:
- Test Point-to-Test Point
- Test Point-to-Test Group
- Test Group-to-Test Group
- Test Group-to-Test Point
# Video Test Results in WebViewer™

<table>
<thead>
<tr>
<th>Direction</th>
<th>Endpoint Name / IP Address</th>
<th>Video Quality</th>
<th>Audio Quality</th>
<th>Audio Video Quality</th>
<th>IP Network Health</th>
<th>Call Config Info</th>
<th>VQuad CallID</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORIG NEHA</td>
<td>192.168.1.70:70:76:30 0 0 0 0 0 0.8 3.50 -23 -61 3.05 0 0 0 0 471</td>
<td>Video Frame Rate (Frames per Second)</td>
<td>Audio Bitrate (kbps)</td>
<td>Audio Bandwidth (Hz)</td>
<td>Signal Level (dBm)</td>
<td>Noise Level (dBm)</td>
<td>Network Packet Loss Rate (%)</td>
</tr>
<tr>
<td>TERM VJAY</td>
<td>192.168.1.80:80:76:30 0 0 0 32.48 4.17 0.5 3.50 -23 -61 3.05 0 0 0 0 473</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ORIG NEHA</td>
<td>192.168.1.70:70:76:30 0 0 0 0 0 0.8 3.50 -23 -61 3.05 0 0 0 0 471</td>
<td></td>
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</tr>
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<td>192.168.1.80:80:76:30 0 0 0 32.48 4.17 0.5 3.50 -23 -61 3.05 0 0 0 0 473</td>
<td></td>
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</tr>
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<td>ORIG NEHA</td>
<td>192.168.1.70:70:76:30 0 0 0 0 0 0.8 3.50 -23 -61 3.05 0 0 0 0 471</td>
<td></td>
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</tr>
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<td>TERM VJAY</td>
<td>192.168.1.80:80:76:30 0 0 0 32.48 4.17 0.5 3.50 -23 -61 3.05 0 0 0 0 473</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Video Testing**

**GL Communications**

**45**
Voice Quality Testing (VQT)
VQuad™ Functionalities

Centralized Analog Voice Quality Testing

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

![Voice Quality Test Software Interface](image)

#### Voice Quality Test Results

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAMS</td>
<td>4.34</td>
</tr>
<tr>
<td>PSQM</td>
<td>90.12</td>
</tr>
<tr>
<td>PESQ</td>
<td>3.46</td>
</tr>
<tr>
<td>PESQ LQ</td>
<td>3.46</td>
</tr>
<tr>
<td>PESQ LQD</td>
<td>N/A</td>
</tr>
<tr>
<td>PESQ WB</td>
<td>3.87</td>
</tr>
<tr>
<td>PESQ Le</td>
<td>0</td>
</tr>
<tr>
<td>PAMS LE</td>
<td>4.57</td>
</tr>
<tr>
<td>PAMS LQ</td>
<td>4.3</td>
</tr>
<tr>
<td>PSQM MOS</td>
<td>4.85</td>
</tr>
<tr>
<td>PSQM LQ</td>
<td>4.85</td>
</tr>
</tbody>
</table>

**Rating:**
- Excellent: 2
- Good: 0
- Fair: 0
- Poor: 0
- Disregard: 0

**Screen Shot:**
- [Voice Quality Test Software](image)
- [Detailed Screen Shot](image)
PESQ Analysis

[Image of PESQ Analysis software interface]

- **Metrics**: PEMS, PSQM, PSQM+ (TU-P-880), PESQ (TU-P-881), PESQ (TU-P-882), POLQA (TU-P-883)
- **Scores**:
  - PEMS: 3.21, ENMOL: 62.06
  - PSQM: 2.9, PSQM+: 2.59
  - PEMS-LQ: 5.68, PEMS-WB: N/A
  - PEMS-LQ: 4.22, PEMS-WB: N/A
- **User ID**: Good
- **Speech Level Gain (dB)**: -3.93
- **Noise Level Gain (dB)**: -1.75

**Measurement Results**

<table>
<thead>
<tr>
<th>File Timestamp</th>
<th>PEMS</th>
<th>PSQM</th>
<th>PEMS-LQ</th>
<th>PEMS-WB</th>
<th>POLQA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013/06/07</td>
<td>4.97</td>
<td>3.46</td>
<td>3.47</td>
<td>N/A</td>
<td>4.06</td>
</tr>
<tr>
<td>2013/06/07</td>
<td>3.92</td>
<td>3.16</td>
<td>3.13</td>
<td>N/A</td>
<td>3.77</td>
</tr>
<tr>
<td>2013/06/07</td>
<td>5.68</td>
<td>3.24</td>
<td>3.11</td>
<td>N/A</td>
<td>3.85</td>
</tr>
</tbody>
</table>

**Rating Criteria**

- Excellent: 4.06
- Good: 3.77
- Fair: 3.85
- Poor: N/A
- Disregard: N/A
• Support for WB (7kHz) and SWB (14kHz) codecs/networks
• Support for networks delivering HD-quality voice services including VoIP and Mobile
• Supports networks with variable delay and time scaling
VQT Highlights

- Supports ITU Standards (POLQA, PESQ LQ/ LQO / WB, PAMS, & PSQM (+))
- Auto-Measurement Capabilities
- Detailed Results / Statistics
- Criteria Rating System
- Remote Access Capabilities
- Delay (One-Way or Round Trip)
- Jitter (Min, Max, Average per Utterance)
- Clipping (front, back, all)
- Noise/Signal Levels (Activity, Peak, etc.)
- PESQ/Delay per utterance
- Impairment Factor (Ie) measurement
• Automatically analyze the degraded files using GL VQT Software
• Detailed results including Jitter (min / max / avg), Clipping (front/back/all), Latency, and Noise / Signal Measurements (activity / peak)
• VQT uses the File Monitor to perform automated measurements on remote locations VQT Solutions
Auto Measurement...
• For manually specified reference and degraded files measures POLQA/PESQ/PAMS/PSQM
• Tabular view of the results and configured current measurement parameters display
• View / analyze the reference and degraded files with the waveform viewer application
• Rating statistics categorized as Excellent, Good, Fair, and Poor
• Disregard threshold eliminates measurements based on user-defined criteria
• Provides Ratings based on configured threshold values
• Organizes the results into five different categories – Jitter, Clipping, Level, PESQ / Utterance, and Delay / Utterance
• Jitter is the variation in time offset between reference and degraded utterances
• Calculates levels for the reference and degraded files
• POLQA / PESQ / PESQ LQ / PESQ LQO / PESQ WB score is available on a per utterance basis
Graphical Viewer

- Capability to display the results in 2D & 3D
- Provides critical information about the algorithm results
- Displays the error surface as computed by the VQT algorithms
VQT Solutions

System Statistics

- VQT Solutions Displaying statistics for an auto-measurement that has run for about 24 hours
• Filters results based on GPS Lan \ Long criteria (based on GPS positions)
• Filters measurement results based on Timestamp (including range of timestamp) as well as GPS co-ordinates (based on +/- minutes)
Audio Adaptation

Options for RTD Measurement

VQuad™ Functionalities

- Wireless Phone / Radio
- IP, Analog, etc
- Any phone with Handset (Analog, VoIP, etc)
- POTS (2-wire)

Network Under Test

VQuad™ with Dual UTA

GL Communications
VQuad™ Functionalities

Push-To-Talk

End points at separate location

Dual UTA HD

Radio w/ PTT

Near-End

USB

To USB port

Far-End

USB

To USB port

Dual UTA HD

Radio w/ PTT

Network
The Dual UTA provides a contact-closure control to support the push-to-talk (PTT) function of a mobile radio.

Software (VQuad™) Script:
- Enable PTT
- Pause for User-Defined Period
- Send Audio (VQT Reference) File
- Pause for User-Defined Period
- Disable PTT

Supports NB, WB
VQuad™ software along with the Dual UTA hardware supports transmitting and receiving files for echo measurement testing over TDM, VoIP, 2-Wire, and Wireless using **Echo Measurement Utility (EMU)**.
User Interface

• Provides Delay and ERL measurements for all detected echoes, along with an ‘ERL vs Delay’ plot
• Includes signal graphs for source signal, received signal, error signal, and adaptive filter coefficients
Results

- Generated “Result” spreadsheet includes operator information, file information, echo characteristics, and snapshots of all the signal graphs.

Echo Measurement Results

Delay vs ERL Results
Voice Test Mobile App (GLNetTestVQT)
File Monitor Utility

- Runs on all VQuad™ system automatically sending the Degraded voice files to the central location via TCP/IP
- Operates in automatic mode
WebViewer™
(Web Based Client for Voice and Data Quality Testing)
Captured files analyzed at central system for Voice, Video, and Data Quality
Send the Events/Results to Central System and receive remote commands from Central System

Voice Testing:
- VoIP
- PSTN
- Mobile Hotspot
- 5G, 3G, 4G, LTE, PTT

Video Testing:
- Bluetooth®, Wi-Fi, 3G, 4G, LTE, 5G, PTT

Central System:
- VAC (Video Application Controller with Analysis)
- MDC (Mobile Device Controller)
- VQT (PESQ and POLQA)
- EMU (Echo Measurement Utility)

Analysis (VQT, MDC, VAC, EMU, VBA & QoS)

Custom Report Generator

GL’s WebViewer

Data Testing:
- TCP, UDP, VoIP
- FTP, SMS, DNS, Testing, Testing

Video Testing:
- MOS-AV
- MOS-V

Target Servers:
- GL running NetTest
- HTTP, Testing, Testing, Testing

VQuad™ Probe HD

Smart Phones/Tablets/PCs w/ NetTest App

GL Communications
VQT WebViewer™ Records

- Accessible remotely via browser based clients
- Database stores the real-time and historic data collected
Voice Quality Statistics

![Voice Quality Statistics Graph](image)
Network Status

- Displays status of all the VQuad™ probes, Mobile Devices, VQT, and File Monitor application status, also the VQuad™ device script running status.
Search Filter Criteria

Main Filters

- **Select Configuration:** ManualNetTest
- **Configuration Name:** ManualNetTest
- **GPS Location:** On/Off
- **Start Date:** 2014/07/17 15:29:00
- **End Date:** 2014/07/18 15:29:00
- **PESQ LQ Range:** F (Low) to (High)
- **MOS CQ Range:** F (Low) to (High)
- **RTD Range:** F (Low) to (High)
- **OWD Range:** F (Low) to (High)
- **SNR Range:** F (Low) to (High)
- **PDD Range:** F (Low) to (High)

Parameter Criteria:
- **TCP Download Speed (Mbps):** (Low) to (High)
- **TCP Download Effective Speed (Mbps):** (Low) to (High)
- **TCP Download Max Delay (ms):** (Low) to (High)
- **TCP Download QoS (%):** (Low) to (High)

Use semicolon (;) to delimit multiple entries. Example: enter ‘1000;2000’ in Call Number in order to search database for both 1000 and 2000.

Note: wildcards will be added automatically while searching for partial entry search.

Exact matching values can be searched by placing the INPUT between two asterisk symbols(*...*)

Ex: *3.65*, *Connected*, *VQPhoneID=1*, etc.

Save | Delete
Graphics

NetTest Graphics

- Call Process, Analysis, and NetTest graphic display options.
- Calls in Process - Placing Calls, Incoming Calls, Call Duration, and Error Events
- Analysis results - VQT PESQ, Time/Delay Measurements, & FAX Events
- NetTest graphics for PC based and mobile devices (SMS and Email)
Remote Access

- The systems (VQuad™, VQT, File Monitor) work in conjunction with the VQT WebViewer™ can be accessed or controlled remotely through the web interface.
- Various options are available to operate and control the systems remotely such as Start the application, Configure by loading the required scripts, Executing, and also to Stop and Exit from the applications.
Configuration for Result & Statistics Display

Choose from the configuration menu. Make changes, then save.

Configuration Menu
- User and System Associated Settings
- Voice Quality Pie Chart Slice
- Time Delay Pie Chart Slice
- Call Control Event Searching Criteria
- Custom Stats Searching Criteria
- User Defined Columns Criteria
- User Privileges
- VQuad Auto Remote Configuration
- Customized Google Maps
- Console View Configuration

AdminName: admin
DBType: Oracle 11g Enterprise
ORACLE_Host: gl
ORACLE_UserName: system
ORACLE_Ptn: gl
ORACLE_Port: 1521
ORACLE_IP: localhost
DBPath: C:\Program Files\GL Communications Inc\DataImport\VQT.mdb
LoginType: Require Login
MenuOverflow: OFF
Fail Criteria: fail
Example: Error fail
Output Timestamp Format: 12hrs (AM/PM)
Call Events Customized Statistics & Pie Chart
Output Report Generation

- The user can save the search results to a local PC in *.xls / *.csv / *.pdf formats. Custom reports are generated using DataImport for Events and Statistics, which can be saved to text or Excel output files via WebViewer™
- Google Maps plotting of various test results (VQT, VBA, VAC, EMU, NetTest, FAX, Call Control)
- Console View - customizing the threshold values for the test result parameters to populate the consolidated Average, Min, Max results in tabular format and plot corresponding graphics statistics
Google Map Plotting (VQT POLQA Results)
GPS Mapping Result

• Here is an actual drive test showing the voice quality results along a rural route in the Maryland area
• Colors at each dot show the voice quality score for that location
# Application Summary

<table>
<thead>
<tr>
<th>Part #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VQT006</td>
<td>VQT w/ POLQA Server License</td>
</tr>
<tr>
<td>VQT002</td>
<td>Voice Quality Testing (PESQ only)</td>
</tr>
<tr>
<td>VQT241</td>
<td>VQuad™ Dual UTA with Balanced, Analog FXO, PTT, and Phone Handset Interfaces</td>
</tr>
<tr>
<td>VQT242</td>
<td>VQuad™ Dual UTA  Bluetooth option for controlling any Bluetooth® device (Call Control and Audio)</td>
</tr>
<tr>
<td>VQT010</td>
<td>VQuad™ Software (Stand Alone)</td>
</tr>
<tr>
<td>VQT270</td>
<td>VQuad™ Probe with Dual UTA</td>
</tr>
<tr>
<td>VQT018</td>
<td>VQuad™ Lite</td>
</tr>
<tr>
<td>VQT040</td>
<td>VQT Webviewer™</td>
</tr>
<tr>
<td>VQT041</td>
<td>VQT Web Viewer w/ Oracle Database</td>
</tr>
<tr>
<td>VQT030</td>
<td>Multi-Node Command and Control Center for VQuad™ Systems</td>
</tr>
<tr>
<td>VQT204, VQT204u, VQT204e</td>
<td>GPS for Dual UTA</td>
</tr>
<tr>
<td>EMU037</td>
<td>Echo Measurement Utility (EMU) Software</td>
</tr>
<tr>
<td>VBA032</td>
<td>Near Real-time Voice-band Analyzer</td>
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<tr>
<td>VQT601</td>
<td>Mobile Device Controller (MDC) Software</td>
</tr>
<tr>
<td>VQT650</td>
<td>VAC (includes VAC Server and VAC companion software)</td>
</tr>
<tr>
<td>VQT022</td>
<td>VQuad™ Fax Emulation (2 simultaneous ports)</td>
</tr>
<tr>
<td>VQT022a</td>
<td>VQuad™ Fax Emulation (8 simultaneous ports)</td>
</tr>
</tbody>
</table>
Thank You
Questions / Demo Period