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

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

Voice Testing
- VoIP, Sip
- Bluetooth®, WiFi®, 5G, 4G, LTE, 3G, PTT
- Microcell
- Mobile Hotspot

Data Testing
- Smart Phones/Tablets w/ NetTest App
- Target Servers
- TCP/UDP, VoIP
- FTP Testing
- DNS Testing
- Route Testing
- HTTP Testing
- SMS Testing

Video Testing
- VAC Agent
- MOS-A
- MOS-V

WebViewer™
Complete VQT System
Hardware Platforms
Dual UTA HD Hardware Unit
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 Signalling - 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 Analyser Hardware (ISDN and CAS Signalling - 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, 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 Signalling - Does not require Dual UTA HD), 4-wire Balanced I/O, HSET Interfaces on Dual UTA HD

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

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

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

**Devices** – Digital Phones, PBX, Media Gateways
Test Types
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.
One Way Delay (OWD)

End points at same location

**ONE-WAY DELAY (OWD)**
- End Points at same location

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

**SIDE 2 PROCEDURE:**
1. START TIMER
   At exact time of SIDE 1 TX’s Audio
2. Rx (detect) PULSE and STOP TIMER
   Report delay
VQuad™ Functionalities

One Way Delay (OWD)

End points at separate location

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

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

2. Rx (detect) pulse and Stop Timer
   Report delay (12:00:00.000 delay)
Round Trip Delay Functionality

RTD on two systems (geographically separated)

VQuad™ Functionalities
Echo Measurements

Echo Identification

Network Interface

NETWORK with ECHO

Measure / ID
Echo’s (Levels, Delays, etc.)

SIDE 1
SIDE 2

DUAL UTA HD

Acoustic Echo Canceller Testing

NETWORK

Device Under Test

Network Interface

Network Interface With Acoustic Echo Canceller

Measure / ID
Echo’s (Levels, Delays, etc.)

SIDE 1
SIDE 2

DUAL UTA HD
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.
Automated Voice Quality Testing

VQuad Scripting
Place Call: TEL=5551212;
Do: Iterations=1;
Tx/Rx File Sync;
TxFile1=C:\testPolqa.pcm;
RxFile1=C:\testPolqa.pcm;

VQuad Scripting
If: Incoming Phone Call;
Pause Timer: Interval=4;
Answer Call;
Pause Timer: Interval=360;
Disconnect Call Device ID=7;
Disconnect Call
Automated Data Quality Testing

GL Test Devices
- LTE/3G
- Wi-Fi
- GL MDC (Mobile Device Controller)

Internet

GL Central QoS System
- Control, Analysis, Data Retrieval

GL Target Servers

Femtocell

Router
End-to-End SMS Testing

VQuad™ Probe HD

End-to-End SMS Testing

GSM Call

Wireless & Wired

GSM Call

Smartphone (GL's NetTestApp)

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

Target Server

HTTP, FTP, DNS Email, TCP, UDP

IP Network

NetTest Script based control

Results

Central Database System

WebViewer™
Automated Video Quality Testing

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

Interactive Video Clients

VAC SERVER
(Video Test Plans)

VIDEO APPLICATION CONTROLLER

MOBILE DEVICE CONTROLLER

Initiate Video Tests From Devices running GLNetTest App

Initiate Video Tests From Multiple VQuad™ Nodes

Control, Analysis, Data Retrieval

GL Central QoS System

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

GL Communications
Voice and Data Drive Testing

Voice Quality Testing
- Voice Quality (using POLOA)
- Call failures, call drops, delay and level measurements
- RSSI (Signal Strength)
- Email, and SMS metrics
- Network, and Phone information

Central System w/ Analysis Modules and Command center
- Web Server
- Database

Results and Call Control Info Plotted on Google Maps

WebViewer™

Drive Testing Voice Calls On the Go...

Drive Testing Voice Calls In the lab...
FAX Testing

- 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
HD WB Audio Support
WB Bluetooth Testing

Test Bluetooth® Enabled Mobile Devices and Associated Network
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
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
VQuad™ – WB 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

VoIP

GL Communications
Data Testing
Automated Data Testing over Wired & Wireless (Bluetooth®, WiFi, 3G, 4G, LTE) Networks
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.
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)
Manual Video Testing using VQuad™
Manual Video Testing using VAC Server

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>Endpoint Name/Address</th>
<th>IP Address/Port</th>
<th>Relative MOS-V</th>
<th>Video Frame Rate (Frames per Second)</th>
<th>Impaired E Frames (%)</th>
<th>Improved B/F Frames (%)</th>
<th>Loss Rate Within B/F Frames (%)</th>
<th>Avg Bitrate (kbps)</th>
<th>Average Bandwidth (Hz)</th>
<th>Signal Level (dBm)</th>
<th>Noise Level (dBm)</th>
<th>Relative MOS-A</th>
<th>Audio Packet Loss Rate (%)</th>
<th>Video Packet Loss Rate (%)</th>
<th>Audio Packet Discard Rate (%)</th>
<th>Video Packet Discard Rate (%)</th>
<th>Mean Burst Length (Bytes)</th>
<th>Mean Gap Length (Bytes)</th>
<th>Image Resolution (Pixel)</th>
<th>Codec Type</th>
<th>Audio Sample Rate</th>
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</table>
Voice Quality Testing (VQT)
Centralized Analog Voice Quality Testing

VQuad™ Functionalities

- POLQA, PESQ, LQ, UGQ/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 - RTO, OWD
- E-Model, STIR, Signal Level
- Echo Measurements - ERL, Delay
- DoS, Timeouts, Retransmissions
- Google Mapping
Voice Quality Test Software
# PESQ Analysis

![PESQ Analysis Image]

## Metrics Scores

<table>
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<tr>
<th>Metric</th>
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<td>PSQM+MOS</td>
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**Rating:**
- **Good**
- **User ID:**
- **Speech Level Gain (dbv):**
  - -3.93
- **Noise Level Gain (dbv):**
  - -1.75

## Measurement Results

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**Rating Criteria:**
- **Excellent:** 35
- **Good:** 111
- **Fair:** 1
- **Poor:** 4
- **Disregard:** 0

**Total Measurements:** 191
• 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
Auto 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...
Manual 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 Criteria

- 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

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Measurement Results</th>
<th>Analysis</th>
<th>Rating Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>PESQA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PESQ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PESQ LQ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PESQ LDQ</td>
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</tr>
<tr>
<td>PESQ WB</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>PAMS LQ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAMS LE</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>PSQM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSQM+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSQM MOS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSQM+ MOS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masked Period (ms)</td>
<td>20 - 500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masked Percentage (%)</td>
<td>0 - 50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jitter Offset (ms)</td>
<td>0 - 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Jitter Offset (ms)</td>
<td>0 - 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Utterances</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise Level (dBm)</td>
<td>-60 - 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delay (ms)</td>
<td>0 - 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Clipping (All)</td>
<td>0 - 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration of Clipping (All)</td>
<td>0 - 0.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Clipping (Front)</td>
<td>0 - 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration of Clipping (Front)</td>
<td>0 - 0.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Clipping (Back)</td>
<td>0 - 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration of Clipping (Back)</td>
<td>0 - 0.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Analysis

<table>
<thead>
<tr>
<th>Measurement Results</th>
<th>Manual Measurement</th>
<th>Analysis</th>
<th>Rating Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jitter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clipping</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PESQ / Utterance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delay / Utterance</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Jitter
- Jitter is the variation in time offset between reference and degraded utterances.
- Calculates levels for the reference and degraded files.

#### Clipping
- Calculates levels for the reference and degraded files.

#### Level
- POLQA / PESQ / PESQ LQ / PESQ LQO / PESQ WB score is available on a per utterance basis.

- Organizes the results into five different categories – Jitter, Clipping, Level, PESQ / Utterance, and Delay / Utterance.

<table>
<thead>
<tr>
<th>POLQA</th>
<th>PolQA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speech Activity (%)</td>
<td>62</td>
</tr>
<tr>
<td>Active Speech Level (dBov)</td>
<td>-36.23</td>
</tr>
<tr>
<td>Mean noise Level (dBov)</td>
<td>-70.25</td>
</tr>
<tr>
<td>SNR (dB)</td>
<td>34.02</td>
</tr>
<tr>
<td>ITU P.56 (POLQA)</td>
<td></td>
</tr>
<tr>
<td>Active Speech Level (dBov)</td>
<td>-34.4</td>
</tr>
<tr>
<td>PESQ</td>
<td></td>
</tr>
<tr>
<td>Speech Activity (%)</td>
<td>45</td>
</tr>
<tr>
<td>Mean DC Level (dBov)</td>
<td>-0.94</td>
</tr>
<tr>
<td>Active Speech Level (dBov)</td>
<td>-33.11</td>
</tr>
<tr>
<td>Mean Noise Level (dBov)</td>
<td>-66.22</td>
</tr>
<tr>
<td>RMS Level (dB)</td>
<td>-36.22</td>
</tr>
</tbody>
</table>

#### Rating Criteria
- **Speech Level Gain (dBm)**: -14.74 (POLQA) -14.64
- **Noise Level Gain (dBm)**: -2.76 (PESQ) -13.66

**ITU P.56 Note:**
The VQT always performs the ITU-P.56 algorithm (Method B) on the reference and degraded data and calculates mean active speech level, activity factor and peak value for each input.
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 Displaying statistics for an auto-measurement that has run for about 24 hours
• Filters results based on GPS Lat \ 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

VQuad™ Functionalities

Options for RTD Measurement
VQuad™ Functionalities

Push-To-Talk

End points at separate location
VQuad™ Functionalities

Push-to-Talk Support

- 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
Echo Measurement Utility

- 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)
VQT WebViewer™

- **VQuad™ Probes** - Voice files analyzed at central system for Voice Quality and Echo
- **VQuad™ Probes** - Events/Results are sent to Central System,
  - Receive remote commands from Central System

---

**Voice Testing**

- VoLTE
- Bluetooth®, WiFi, 3G, 4G, LTE, PTT
- Microcell
- Mobile Hotspot
- 3G, 4G, LTE Router

**Data Testing**

- Smart Phones/Tablets w/ NetTest App
- Target Servers
- TCP/UDP: VoIP Testing
- FTP Testing
- SMS Testing
- Email Testing
- DNS Testing
- Route Testing
- HTTP Testing
- Website Testing

**Video Testing**

- VQuad™ running NetTest
- VAC Agent
- GL’s WebViewer
- Network Diagnostics
- MOS-A
- MOS-V
- HTML5

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**Central System**

- **VQT, MDC, VAC, EMU, VBA & Fan**
- **VAC** (Video Application Controller with Analysis)
- **MDC** (Mobile Device Controller)
- **VQT** (PESQ and POLQA)
- **EMU** (Echo Measurement Utility)

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**GL’s WebViewer**

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VQT WebViewer™ Records

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

### GPS Location
- **Type location here**

### Start Date
- **2014/07/17 15:29:00**

### VQuad Location
- **Manual**

### VQuad PhoneID
- **Probe**

### VQuad CallID
- **597**

### Called Number
- **1000.2000**

### PESQ LQ Rating
- **Not Use**

### RTD/GWD Rating
- **Not Use**

### MOS-CQ (E-Model) Rating
- **Not Use**

### Search by Timzone
- **yes**

### Omit User-Failed Calls
- **yes**

### NetTest Type
- **TCP**

### Parameter Criteria
- **(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*, ‘*VQID=1*, etc**
• 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 Criteria
- User Privileges
- VQuad Auto Remote Configuration
- Customized Google Maps
- Console View Configuration

Change Password
- AdminName: admin
- DBType: Oracle 11g Enterprise
- ORACLE_Host: gldb
- ORACLE_Username: system
- ORACLE_Pin: gl
- ORACLE_Port: 1521
- ORACLE_IP: localhost
- DBPath: C:\Program Files\GL Communications Inc\DataImport\VQT.mdb
- LoginType: Require Login
- ByPassPin: OFF
- MenuHover: fail
- Fail Criteria: 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 / *.txt / *.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)
• 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</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>
</tr>
<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