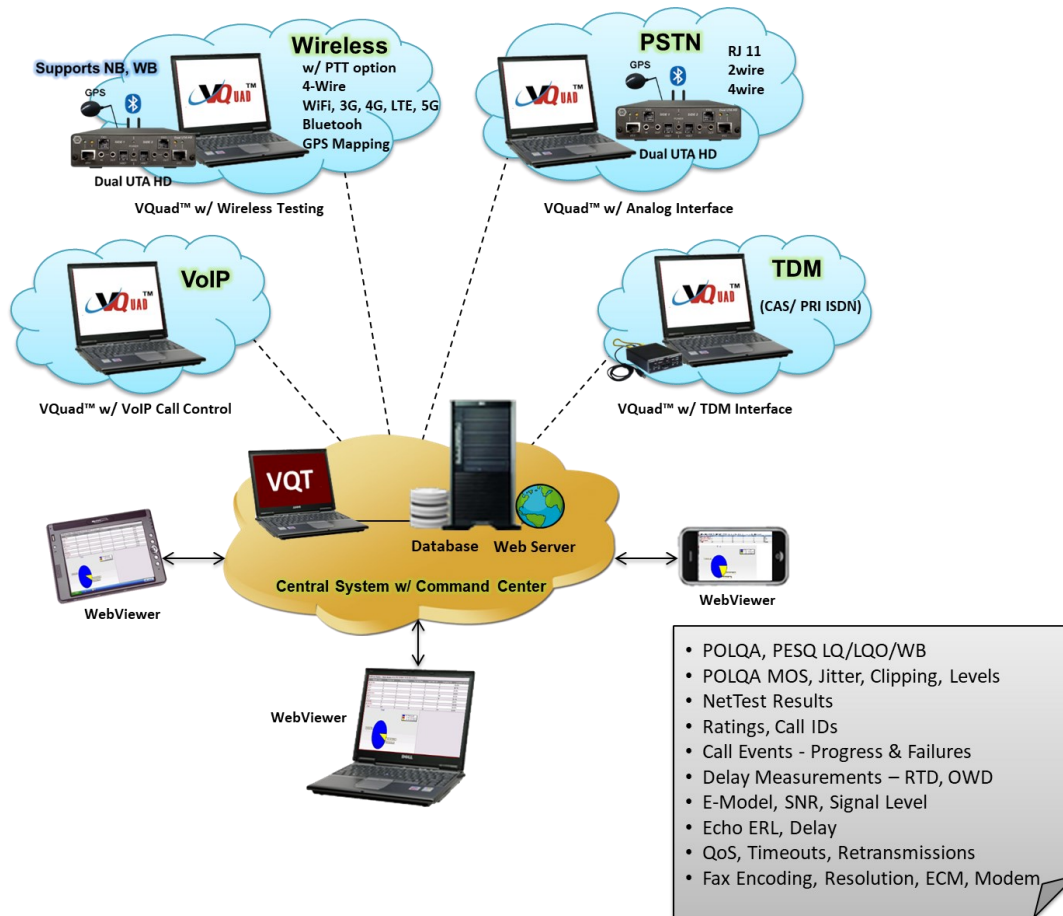


Intrusive Network Voice Quality Testing



Overview

The GL's **Network Monitor Voice Quality** testing solution provides a complete solution for the telecommunication operators to verify the quality of their service, therefore to provide a better service for the customer.

The solution consists of the following parts:

- **Distributed VQuad™ Nodes** - These nodes control individual or multiple wireless, landline or VoIP telephony terminals
- **Voice Quality Testing Software (VQT)** – provide PESQ LQ/LQO/WB (ITU-P.862.1/2) and POLQA (ITU-T P.863) results. Fully automated and remotely accessible. All results are automatically transferred to the Central Database for access via the WebViewer™. Included with the PESQ results are Jitter, Clipping, Signal and Noise Levels
- **WebViewer™** - remotely control any node within network, view status of entire network, and 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, Data Testing, Video Testing, Fax Events from PC or Mobile Device

For more details, refer to [Intrusive Network Voice Quality Testing](#) webpage.



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Main Features

- Complete voice quality testing solution for Wireless, PSTN, and VoIP networks while voice communications traverse between these networks
- Each VQuad™ node site is equipped with Wireless, FXO Analog, VoIP Ethernet, and T1 E1 interfaces. Remotely controls far-end Network Node
- Remote Client WebViewer™ facilitates real-time call control information, voice quality scores and statistical information display using a simple web browser
- VQuad™ includes voice quality test method POLQA (ITU-T P.863)
- VQT supports POLQA (ITU-T P.863) and other international standard voice quality test methods including PESQ (ITU-T P.862), PESQ LQ/LQO (P.862.1), PESQ WB (P.862.2)
- Full support for VQuad™ CLI and API (both Windows® and Linux)
- Supports multiple scripts execution during a single test over an established call

Distributed VQuad™ Node

The VQuad™/VQT software combination, along with the GL's Dual UTA HD hardware, provides Voice Quality, Data test, Video Conference, EC, and Fax Event results for Wireless, PSTN, and VoIP networks.

- Each VQuad™ Node remotely controls far-end Network Node
- Provides automated call control through scripting
- Simulates voice communications and collects degraded voice for each network node for voice quality testing
- VQT Auto Mode allows automatic execution of the VQT algorithms (PESQ LQ/LQO/WB, POLQA NB/WB/SWB)
- Echo Measurement and Analysis (using EMU)
- Data and Video testing available for Mobile devices (i.e. iPhone/Android) along with Ethernet connection (wired, WiFi, 3G/4G/5G Broadband card) associated with the PC
- Fax Emulation supporting up to 4 independent and simultaneous sessions with speeds up to 33600 baud (V.34)
- GPS and ITS location tracking with results overlay

The screenshot displays the GL VQuad(TM) software interface. The main window is titled "GL VQuad(TM) Script View" and shows a terminal window with an AT command input field and a "Send" button. Below the terminal is a "Device Name" dropdown menu set to "1". The "Scripts" tab is active, showing a script for bidirectional testing with comments and commands like "Fem1: transmit local to far-end" and "Fem1: transmit far-side to local". The "Events" tab shows a list of events including "Call Started", "Waiting 4 seconds", "Do...loop; Iteration=1 of 1", "Start Syncd Tx/Rx...local", "TxRxSync Done", and "Waiting 8 seconds". The bottom status bar shows "Paused: Count Down - 5 seconds" and "Do...loop; Iteration=1 of 1". The bottom-most status bar displays system information: "Central DB Connecting...", "No Error", "SIP Core", "TDM Driv", "Bluetooth", "MDNetTest", "GPS Status: Connecting...", "GPS Position: Unknown", "2/7/2014", and "04:30:41 PM".

Voice Quality Testing (VQT) - (PESQ, POLQA)

GL's Voice Quality Testing (VQT) software 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 fully supports analysis using POLQA ITU version 2.4 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).

Metrics Scores

POLQA	3.21
EMODEL	62.06
PESQ	2.9
PESQ LQ	2.59
PESQ LQO	2.68
PESQ WB	N/A
PESQ Ie	44.22
PAMS LE	3.9
PAMS LQ	3.43
PSQM MOS	3.53
PSQM+ MOS	3.49

Rating
Good

User ID

Speech Level Gain (dbv)
-3.93

Noise Level Gain (dbv)
-1.75

Metrics

Metrics	Max	Min	Avg.
POLQA	4.18	1.02	3.56
EMODEL	84.44	8.71	69.3
PESQ	3.5	0	2.96
PESQ LQ	3.51	0	2.82
PESQ LQO	3.56	0	2.9
PESQ WB	0	N/A	N/A
PESQ Ie	139.4	0	41.09
PAMS LE	4.22	1.33	3.61
PAMS LQ	3.83	1	3.17
PSQM M...	3.82	1	3.46
PSQM+ ...	3.81	1	3.36

Rating Count

Excellent	35
Good	111
Fair	1
Poor	4
Disregard	0

Measurement Results

VQT Timestamp	POLQA	EModel	PESQ	PESQ LQ	PESQ LQO	PESQ WB	PAMS LE
2013/06/07 12:2...	4.07	81.28	3.48	3.47	3.53	N/A	4.06
2013/06/07 12:2...	3.92	77.33	3.36	3.3	3.36	N/A	3.77
2013/06/07 12:2...	3.87	76.2	3.24	3.11	3.18	N/A	3.88
2013/06/07 12:2...	2.86	55.41	2.76	2.37	2.48	N/A	3.39
2013/06/07 12:2...	3.62	70.6	3.13	2.94	3.01	N/A	3.62
2013/06/07 12:2...	4.09	81.83	3.35	3.27	3.34	N/A	4.14
2013/06/07 12:2...	1.47	26.56	2.07	1.39	1.69	N/A	1.33
2013/06/07 12:2...	3.91	77.06	3.27	3.16	3.22	N/A	4.08
2013/06/07 12:2...	3.98	78.81	3.21	3.07	3.14	N/A	3.79
2013/06/07 12:2...	3.62	70.42	2.76	2.36	2.47	N/A	3.52
2013/06/07 12:2...	3.93	77.66	3.16	2.99	3.06	N/A	4.03
2013/06/07 12:2...	3.51	68.19	3.13	2.95	3.02	N/A	3.77
2013/06/07 12:2...	3.21	62.06	2.9	2.59	2.68	N/A	3.9

graphical: always | degraded: raw | reference: raw | Excellent: 35 | Good: 111 | Fair: 1 | Poor: 4 | Total Measurements: 191

WebViewer™

GL's WebViewer™ facilitates VQT (PESQ, POLQA), Call Control, Voice Quality, Data Test Results, Video Conference Test Results, Echo Measurement, Fax Events, VQuad™, and other associated results display via a simple web browser. WebViewer™ is a simple, easy-to-use Web browser which can operate on both PC and Mac systems (including iPhone and iPad).

- VQuad™ and associated applications can be configured to send the results automatically to the centralized database
- WebViewer™ queries the 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 client
- WebViewer™ can search the database based on a variety of user-defined parameters and display all returned events per timestamp or per Call
- WebViewer™ also facilitates google mapping of the Results, Nodes, and Devices

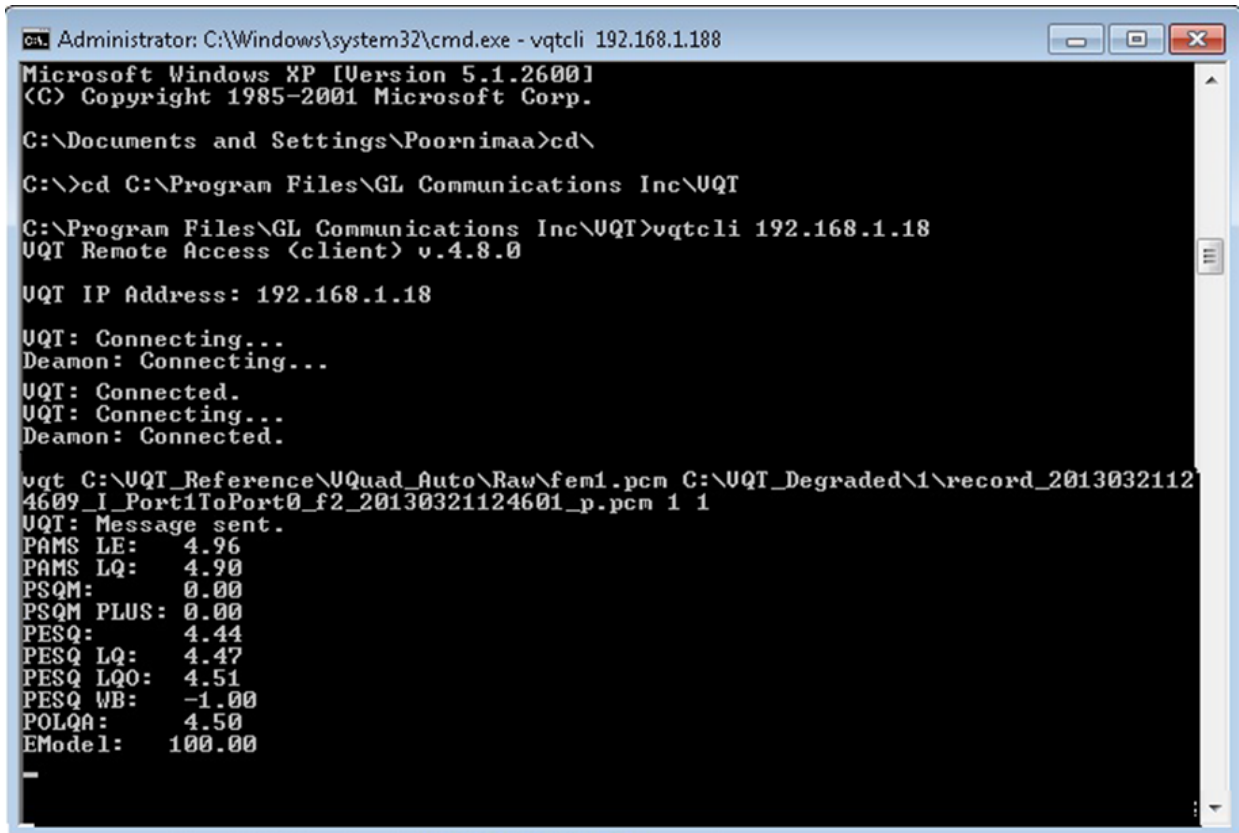
The screenshot displays the GL Webviewer interface with the following components:

- Header:** "GL Webviewer Version 6.1.3" and "admin" user.
- Navigation:** "Results", "Call Events", "Status & Statistics", "Reports".
- Filters:** "Load Filters: -PESQ", "Live Updates: 5 sec OFF".
- Statistics Section:**
 - Voice Quality Statistics between 08/06/2019 02:16:26 and 08/06/2019 03:26:26 (Custom range - Filter)
 - Date & Time: Standard, 10 Minutes, 1 Hour, 12 Hours, 24 Hours, Today, Yesterday, 7 Days, 1 Month, 6 Months
 - Timestamp Type: VQuad / vMobile Timestamp
 - Event ID Filter: Contains
 - Actions: Show Legends
 - Legend: POLQA v3 MOS Range (5-- Excellent, 4--- Good, 3--- Fair, 2--- Poor, 0--)
 - Legend: POLQA MOS Range (5-- Excellent, 4--- Good, 3--- Fair, 2--- Poor, 0--)
 - Legend: PESQ Range (5-- Excellent, 4--- Good, 3--- Fair, 2--- Poor, 0--)
 - Legend: VBA Range (5-- Excellent, 4--- Good, 3--- Fair, 2--- Poor, 0--)
- Data Table:**

VQuad Call ID	Average Of POLQA v3 MOS	MAX Of POLQA v3 MOS	MIN Of POLQA v3 MOS	Average Of POLQA MOS	MAX Of POLQA MOS	MIN Of POLQA MOS	Average Of EModel (R-factor)	MAX Of EModel (R-factor)	MIN Of EModel (R-factor)	Average Of Speech Level Gain (dB)	MAX Of Speech Level Gain (dB)	MIN Of Speech Level Gain (dB)	Average Of Noise Level Gain (dB)	MAX Of Noise Level Gain (dB)	MIN Of Noise Level Gain (dB)	Average Of Noise Level (ms)	MAX Of Noise Level (ms)	MIN Of Noise Level (ms)	Average Of Active Speech Ratio - Deg(%)	MAX Of Active Speech Ratio - Deg(%)	MIN Of Active Speech Ratio - Deg(%)	Average Of Average Of Number of Utterance	Total Record
GLRobFaxVQTest	4.25	4.41	3.89	86.86	93.4	76.56	-13.86	-12.77	-14.96	-13.23	-12.35	-14.16	1.24			57	50	2					70
- Map:** A Google Map showing a route with colored markers (red, green, blue) representing different quality levels. A pop-up window shows details for a specific result:
 - RESULT: POLQA
 - VQuad Timestamp: 2022-05-25 11:51:54
 - THRESHOLD: 3.455
 - VQuad Device ID: vmobile2Galaxy
 - VQuad Call ID: vMobileBeltway
 - PARAMETERS: POLQA MOS: 3.32
 - Latitude: 39.029
 - Longitude: -77.141
 - LOCATION: 2VH5+HJ North Bethesda, MD, USA
- Display Options Panel:**
 - Use Predefined Config: ON
 - Define results to display: vMobile_DriveTest_Oct2722
 - Draw route line by Default: ON
 - Draw line as: Direct Path
 - Refine your search:
 - Types: Threshold Settings, VQuad Call ID, VQuad Device ID, Call Events
 - Results: VOT PESQ, VOT POLQA, VQuad Call Events, Audio and Delay Analysis, TCP, UDP, VOIP, ROUTE, HTPP, FTP, DNS, SMS, EMAIL, Phone Info, SIM, UE, EMU
- Pie Chart:** A circular gauge chart showing the distribution of results, with a legend for "Excellent" (blue) and "Good" (green).

VQT Command Line Interface

The VQT Command Line Interface (CLI) is designed to remotely access various application functionalities and thus controlling VQT nodes located at various destinations. The supporting commands helps the VQT users to run the application installed on remote PC, get the connection status, run the analysis, load Auto Measurement configuration, start/stop Auto Measurement, save events captured to file, transfer the events captured to client, get any file from server or even get latest log, and other operations. The VQT CLI is supported on Windows® and Linux systems .



```
Administrator: C:\Windows\system32\cmd.exe - vqtccli 192.168.1.188
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Poorninaa>cd\
C:\>cd C:\Program Files\GL Communications Inc\UQT
C:\Program Files\GL Communications Inc\UQT>vqtccli 192.168.1.18
UQT Remote Access (client) v.4.8.0
UQT IP Address: 192.168.1.18
UQT: Connecting...
Deamon: Connecting...
UQT: Connected.
UQT: Connecting...
Deamon: Connected.
vqt C:\UQT_Reference\UQuad_Auto\Raw\fem1.pcm C:\UQT_Degraded\1\record_2013032112
4609_I_Port1ToPort0_f2_20130321124601_p.pcm 1 1
UQT: Message sent.
PAMS LE: 4.96
PAMS LQ: 4.90
PSQM: 0.00
PSQM PLUS: 0.00
PESQ: 4.44
PESQ LQ: 4.47
PESQ LQ0: 4.51
PESQ WB: -1.00
POLQA: 4.50
EModel: 100.00
```

Buyer's Guide

Item No	Product Description
VQT010	VQuad™ Base Software
VQT280	VQuad™ Probe HD (with Dual UTA HD)
VQT002	Voice Quality Testing (PESQ only)
VQT006	Voice Quality Testing (POLQA)

Item No	Related Software
EMU037	Echo Measurement Utility (EMU) Software
VQT601	Mobile Device Controller (MDC) Software
VQT022	VQuad™ Fax Emulation (2 simultaneous ports)

For more information, please visit [Intrusive Network Voice Quality Testing](#) webpage.



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