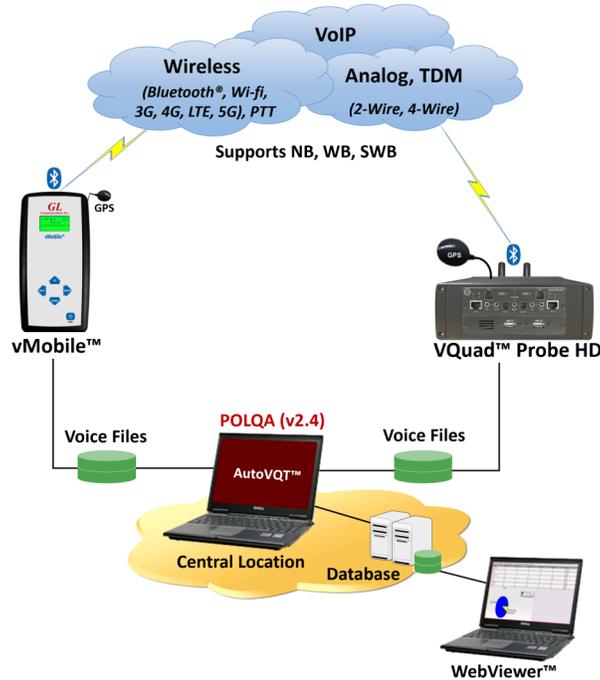


AutoVQT™

(Automated Voice Quality Testing with POLQA v2.4)



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Overview

GL's **AutoVQT™** is an advanced, automated solution that analyzes thousands of voice files in mere minutes, effectively evaluating the quality of voice communications across various networks, including VoIP, Mobile, and PSTN. This solution utilizes the Perceptual Objective Listening Quality Assessment (POLQA per ITU-T P.863 version 2.4) algorithm, which is widely acknowledged as the industry benchmark for assessing voice quality. The AutoVQT™ application works in conjunction with GL's [VQuad™](#), [vMobile™](#), [Voice Analysis Tool \(VAT™\)](#), [Message Automation and Protocol Simulation \(MAPS™\)](#), or [T1 E1 Analysis](#) platforms reducing analysis time and increasing efficiency.

The AutoVQT™ fully supports analysis using POLQA ITU version 2.4 algorithm for Narrowband (NB 8000 sampling), Wideband (WB 16000 sampling), and Super Wideband (SWB 48000 sampling) in automated testing. The tool offers a user friendly interface for automatic operation and generates comprehensive reports that provide detailed information on voice quality metrics such as Mean Opinion Score (MOS), Delay, Jitter and more. These reports help user to identify issues to improve voice quality. Supports raw audio captured over any interface including Analog, Mobile, T1 E1 and VoIP.

With the Voice Quality server software installed on Windows® PC and client software running on Windows®/Linux® platforms, users can analyze large quantities of PCM/WAV files obtained from any network as well as different sampling rates in minutes, significantly reducing the time required for analysis. The **Auto Test** feature enables the application to analyze files immediately based on the configured settings upon invocation of the application.

The AutoVQT™ application operates automatically by applying the POLQA algorithm to degraded (recorded) audio files located within a user-specified local directory. Once the application detects a PCM/WAV voice file in the configured directory, the application automatically applies the required algorithm against the reference and degraded voice files and generates the POLQA MOS. The analyzed POLQA results can be viewed through log files and on the centralized database system - [Webviewer™](#) which can filter, query, and generate custom reports .

For more details, refer to [AutoVQT™ - Automated Voice Quality Testing Software with POLQA v2.4](#) webpage.



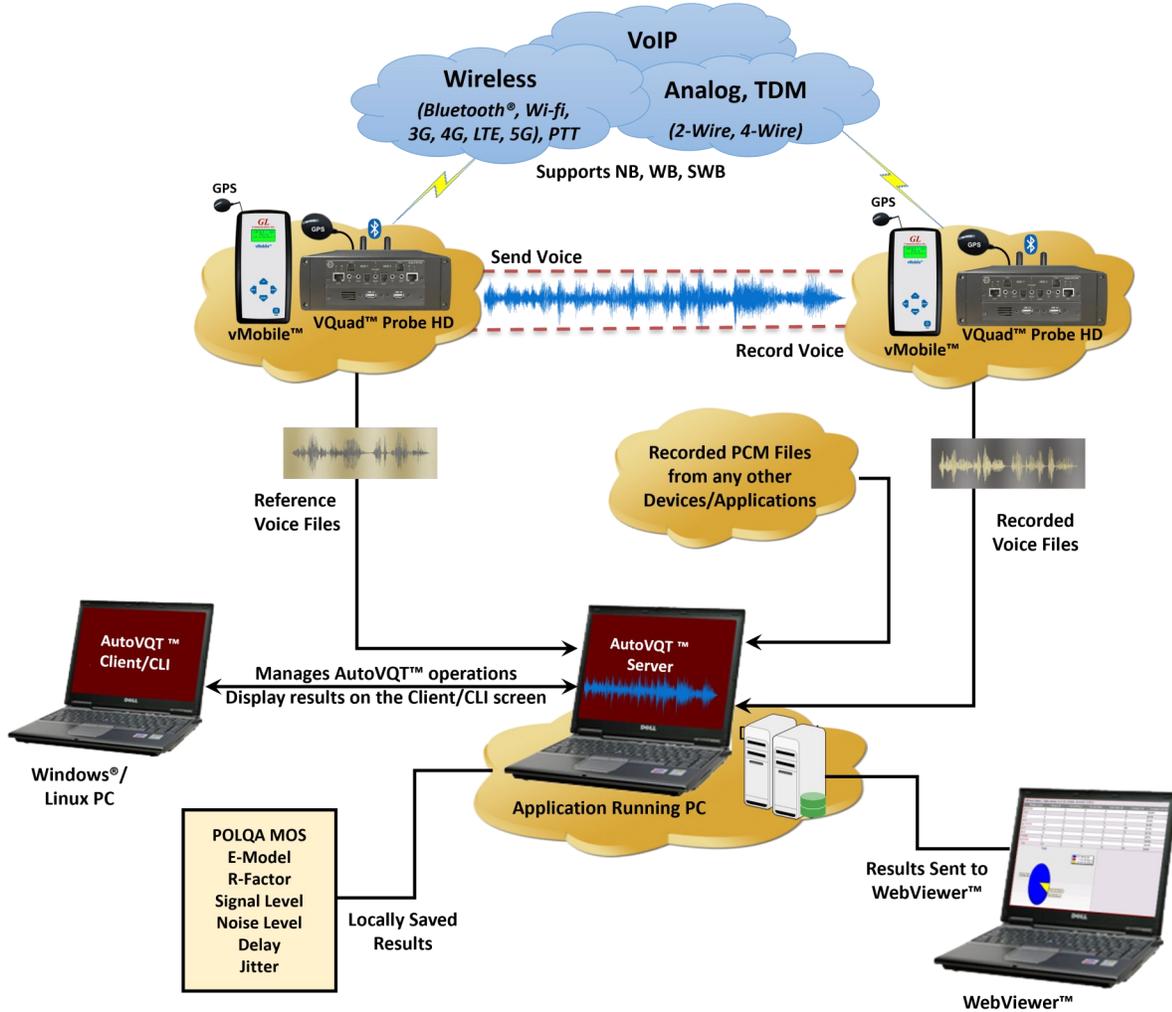
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Key Features

- Analyze thousands of bulk PCM/WAV voice files in mere minutes
- Supports multiple clients connecting to the server
- The Auto Test feature allows immediate analysis of files according to the configured settings upon invocation of the application
- Uses POLQA version 2.4 (ITU-T P.863) algorithm for voice quality testing supporting NB (8000) samples, WB (16000) samples and SWB (48000) samples
- Supports the installation of server software on Windows® PC and the client software on Windows®/Linux® platforms
- AutoVQT™ analysis results include:
 - POLQA MOS
 - E-Model R-Factor
 - Signal Level
 - Noise Level
 - Delay (requires simultaneous Send and Record of the voice files)
 - Jitter
 - Clipping
- Offers automatic mode of operation with centralized data access
- Supports voice quality testing over all types of telecom networks - Wireless, VoIP, TDM, and PSTN
- As part of the POLQA algorithm, the POLQA MOS is generated by utilizing the impact of Packet Jitter and Codec compression in VoIP and Wireless networks
- Provides remote monitoring with result query and real-time statistics using web based WebViewer™
- Enables real-time mapping of results directly on Google Maps when used in conjunction with VQuad™ or vMobile™ with GPS option and results sent to WebViewer™ central database
- Remote control of AutoVQT™ through Command Line Interface (CLI)

Working Principle

GL's VQuad™, vMobile™, Message Automation and Protocol Simulation (MAPS™), or T1 E1 Analysis platforms send the recorded voice files to AutoVQT™ application PC's degraded file path. Once the application detects a PCM/WAV voice (degraded voice) file in the configured directory, it automatically applies the required algorithms against the reference and degraded PCM/WAV voice files and, if required, removes the PCM/WAV voice file from the source directory. The application then sends the results to the central system where the Webviewer™ application is deployed.



AutoVQT™ Operations

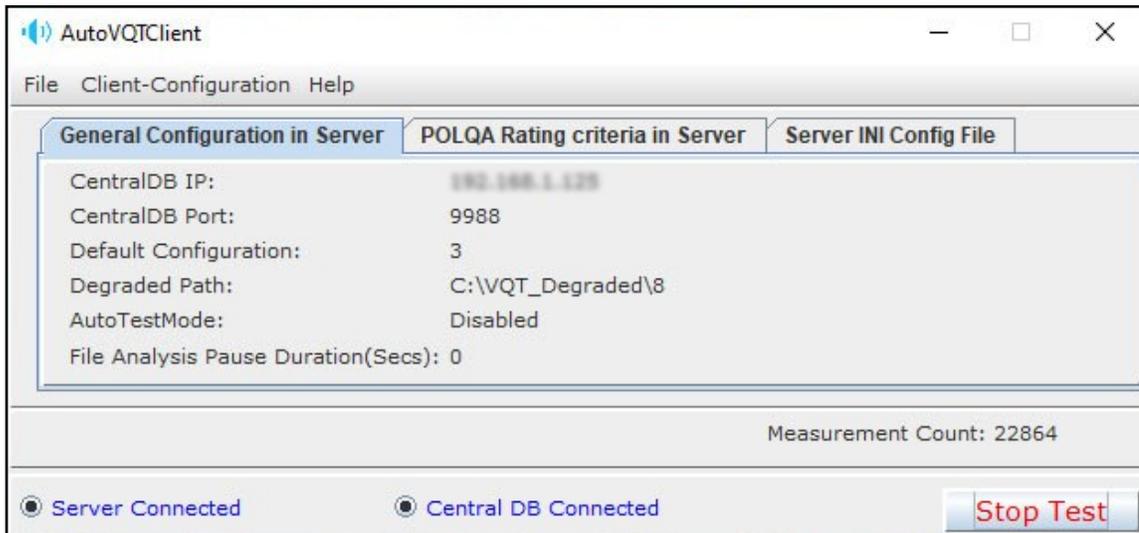
AutoVQT™ Server analyzes recorded/degraded files, providing POLQA MOS results using the POLQA V2 algorithm within minutes. All degraded files should be accessible on the server PC, which must run on Windows®. The server then transmits results to the central database or saves them locally. Upon AutoVQT™ Client invocation, it retrieves the current AutoVQT™ Server status, displaying the latest configuration and test status. The client allows modification of server operations and configuration for both automation and manual operations.

Users can launch multiple client instances; all clients will show the same server status. Changes made on a single client will be reflected in the server and other clients. The server can be on the same Windows® PC or on a different PC, including Linux.

AutoVQT™ Server (Windows®)



AutoVQT™ Client (Windows®/Linux)



AutoVQT™ CLI

AutoVQT™ CLI remotely controls VQT Auto™ Server nodes, supporting commands for conducting analysis with required configurations, utilizing **AutoVQTProfile.ini** settings for analysis, switching Auto Test Mode, saving and transferring captured events, and performing other operations.

```
C:\Users\GLIN68\Desktop>AutoVQTcli.exe 192.168.1.199 1122

AUTOVQTcli Client V1.0.1
Connection has been established with AutoVQTServer IP:192.168.1.199 PORT:1122

Enter the command or (h/Help)
Command:
h
Commands:
StartTest      - To start the AUTO POLQA calculation
StopTest       - To stop the POLQA calculation
EnableAuto     - To enable auto test mode
DisableAuto    - To disable auto test mode
ConnectionStatus - DataImport Server connectivity status
GetEventLog    - To download eventlogs from Server
                Usage: GetEventLog FileName.txt(with full path)
Exit           - Exit from CLI
RunPOLQA       - To start POLQA calculation(analysis)
                Usage: RunPOLQA degradedFileName(with full path) referenceFileName mode(POLQA_SWB(0/1))
                enableToneDetect(0/1) Encoding(Mu-Law(0),A-Law(1),Raw PCM(2)) BitsPerSample(16)
                ByteOrder(LSMS(0)) ChannelNum(1) SampleRate(8000/16000/48000) Version(2)
                EnableLevelAlignment(0/1) Reference16K(0) HAMode(0/1) bEnableWavHdr(0).
RunPOLQAwithINI - To start POLQA calculation(analysis) with INI File
                Usage: RunPOLQAwithINI configurationNumber(0-99) degradedFileName(with fullPath)
                Notes: Ensure that the configuration in the INI file corresponds to the provided
                configuration number before running RunPOLQAwithINI command.

Important Note: ***All commands are case-insensitive***.
```

AutoVQT™ Application Analysis Time

The following table summarizes the average time taken to analyze PCM files when they are provided at the same time using Windows® 11 Pro 64-bit operating system, equipped with a 12th generation Intel® Core™ i9-12900K processor at 3.20 GHz and on 32 GB of RAM.

PCM Type	Approximate Time Required to Process 1000 PCM Files Simultaneously (Min:Sec)	Approximate Time Required to Process 1 PCM File (Sec)
NB	02:01	0.12
WB	02:13	0.13
SWB	02:26	0.14

AutoVQT™ Results

GL's AutoVQT™ generate reports that provide detailed information on voice quality metrics such as:

- **Timestamp:** The time at which the AutoVQT™ application analyzes the PCM/WAV file
- **POLQA MOS:** The POLQA MOS score is generated using the POLQA V2 ITU algorithm
- **Rating:** The POLQA score ratings can be configured as:
 - Excellent
 - Good
 - Fair
 - Poor
- **Degraded File:** The path of the recorded degraded PCM/WAV files used for analysis. For example: C:\VQT_Degraded\1
- The analyzed POLQA results can be viewed through log files and on the centralized database system - [Webviewer™](#) which can filter, query, and generate custom reports

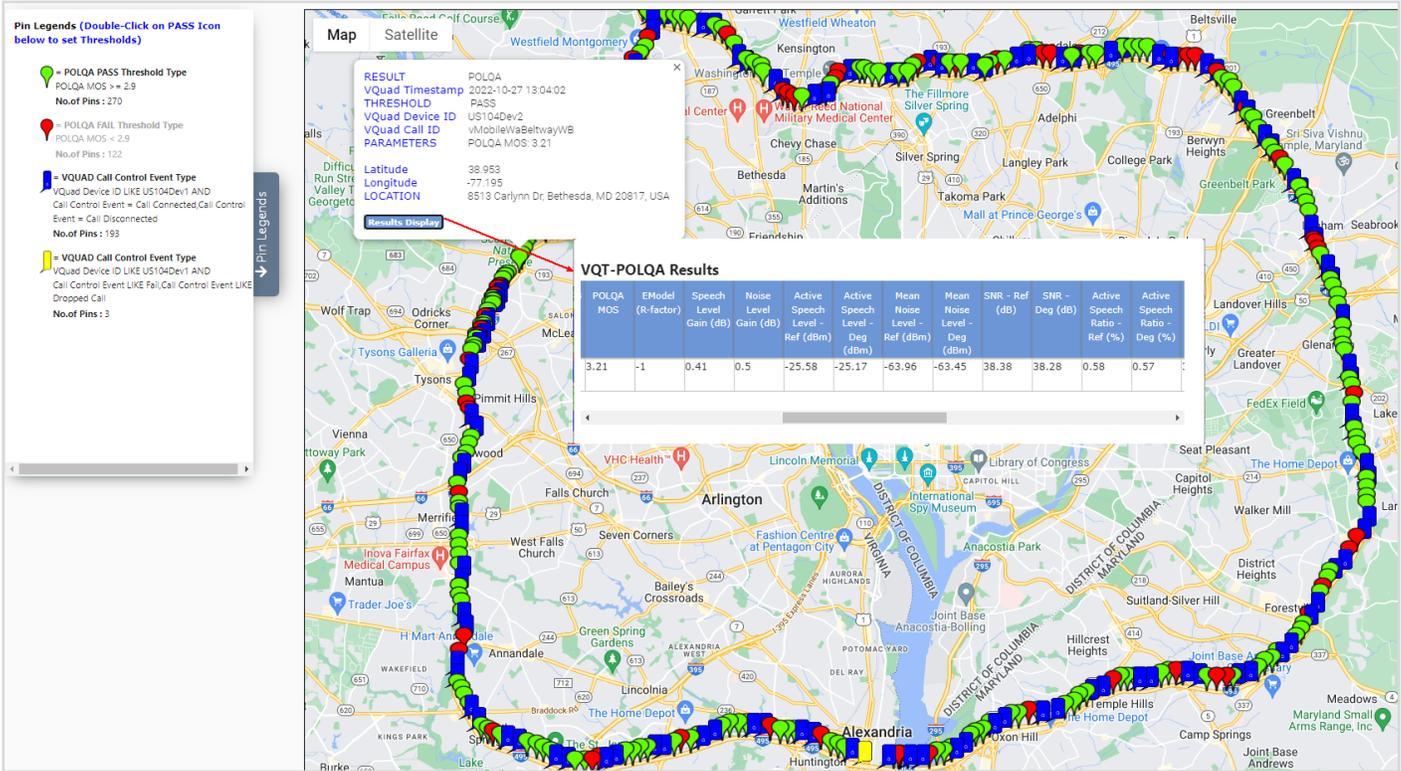
```

AutoVQTServerEventLog.txt - Notepad
Edit Format View Help
Timestamp;DegFile;POLQA Score;EModel;Rating;Speech level gain;Noise level gain;Avg Jitter;Min Jitter;Max Jitter;ActiveSpeechRatioRef;Active
3/11/03 09:54:34 AM;male1PolqawB_20230207105229_N12°55'35''_E077°36'04''_000000_I_FXOPOLQATest_FX02_20230207104832_4.pcm;4.22;-1.0;Excellent
3/11/03 09:54:35 AM;male1PolqawB_20230207105655_N12°55'35''_E077°36'05''_000000_O_FXOPOLQATest_FX01_20230207105317_4.pcm;4.2;-1.0;Excellent;
3/11/03 09:54:35 AM;male1PolqawB_20230207105713_N12°55'35''_E077°36'05''_000000_I_FXOPOLQATest_FX02_20230207105317_4.pcm;4.2;-1.0;Excellent;
3/11/03 09:54:35 AM;male1PolqawB_20230207110140_N12°55'35''_E077°36'04''_000000_O_FXOPOLQATest_FX01_20230207105801_4.pcm;4.2;-1.0;Excellent;
3/11/03 09:54:35 AM;male1PolqawB_20230207105211_N12°55'35''_E077°36'04''_000000_O_FXOPOLQATest_FX01_20230207104832_4.pcm;4.22;-1.0;Excellent
3/11/03 09:54:39 AM;male1PolqawB_20230207110158_N12°55'35''_E077°36'04''_000000_I_FXOPOLQATest_FX02_20230207105801_4.pcm;4.21;-1.0;Excellent
3/11/03 09:54:39 AM;male1PolqawB_20230207132313_N12°55'35''_E077°36'04''_000000_O_FXOPOLQATest_FX01_20230207131934_4.pcm;4.23;-1.0;Excellent
3/11/03 09:54:39 AM;male1PolqawB_20230207132331_N12°55'35''_E077°36'04''_000000_I_FXOPOLQATest_FX02_20230207131934_4.pcm;4.24;-1.0;Excellent
3/11/03 09:54:39 AM;male1PolqawB_20230207132757_N12°55'35''_E077°36'04''_000000_O_FXOPOLQATest_FX01_20230207132419_4.pcm;4.11;-1.0;Excellent
3/11/03 09:54:41 AM;male1PolqawB_20230207132816_N12°55'35''_E077°36'04''_000000_I_FXOPOLQATest_FX02_20230207132419_4.pcm;4.24;-1.0;Excellent
3/11/03 09:54:42 AM;male1PolqawB_20230207133243_N12°55'35''_E077°36'04''_000000_O_FXOPOLQATest_FX01_20230207132904_4.pcm;4.21;-1.0;Excellent
3/11/03 09:54:43 AM;male1PolqawB_20230207133301_N12°55'35''_E077°36'04''_000000_I_FXOPOLQATest_FX02_20230207132904_4.pcm;4.23;-1.0;Excellent
3/11/03 09:54:43 AM;male1PolqawB_20230207133729_N12°55'35''_E077°36'04''_000000_O_FXOPOLQATest_FX01_20230207133350_4.pcm;4.22;-1.0;Excellent
3/11/03 09:54:43 AM;male1PolqawB_20230207133747_N12°55'35''_E077°36'04''_000000_I_FXOPOLQATest_FX02_20230207133350_4.pcm;4.2;-1.0;Excellent;
3/11/03 09:54:44 AM;male1PolqawB_20230207134215_N12°55'35''_E077°36'04''_000000_O_FXOPOLQATest_FX01_20230207133836_4.pcm;4.2;-1.0;Excellent;
3/11/03 09:54:45 AM;male1PolqawB_20230207134233_N12°55'35''_E077°36'04''_000000_I_FXOPOLQATest_FX02_20230207133836_4.pcm;4.22;-1.0;Excellent
3/11/03 09:54:46 AM;male1PolqawB_20230207134700_N12°55'35''_E077°36'04''_000000_O_FXOPOLQATest_FX01_20230207134321_4.pcm;4.21;-1.0;Excellent
3/11/03 09:54:46 AM;male1PolqawB_20230207134718_N12°55'35''_E077°36'04''_000000_I_FXOPOLQATest_FX02_20230207134321_4.pcm;4.21;-1.0;Excellent
3/11/03 09:54:47 AM;male1PolqawB_20230207135145_N12°55'34''_E077°36'04''_000000_O_FXOPOLQATest_FX01_20230207134806_4.pcm;4.2;-1.0;Excellent;
3/11/03 09:54:47 AM;male1PolqawB_20230207135203_N12°55'34''_E077°36'04''_000000_I_FXOPOLQATest_FX02_20230207134806_4.pcm;4.23;-1.0;Excellent
Ln 6, Col 398      100%      Unix (LF)      UTF-8

```

WebViewer™

The results/events sent from AutoVQT™ application to the central database, can be queried using the GL WebViewer™ (web browser). Outputs of the query can be displayed in tabular or graphical format while also output to Excel or PDF. Results can also be plotted on Google Maps (GPS connectivity is required). The below screenshot shows AutoVQT™ results plotted on Google Map. For more details, refer to [Web Based Client for Voice and Data Quality Testing -WebViewer™](#) webpage.



Buyer's Guide

Item No	Product Description
VQT014	AutoVQT™
VQT014U	Upgrade from VQT POLQA to AutoVQT™

Item No	Related Hardware
VQT251	Dual UTA HD Next generation Dual UTA with FXO Wideband support
VQT252	Dual UTA HD – Bluetooth Option
VQT280	VQuad™ Probe HD (with Dual UTA HD)
VQT291	vMobile™ - Portable VQT Test Solution

Item No	Related Software
VQT010	VQuad™ Software
VBA032	Near Real-time Voice-band Analyzer
EMU037	Echo Measurement Utility (EMU) Software
VQT040	VQT WebViewer™

For more details, refer to [AutoVQT™ - Automated Voice Quality Testing Software with POLQA v2.4](#) webpage.



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