# Automated Voice Quality Testing - AutoVQT™

(POLQA v2.4)

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GL Automated VQT POLQA Testing Solution
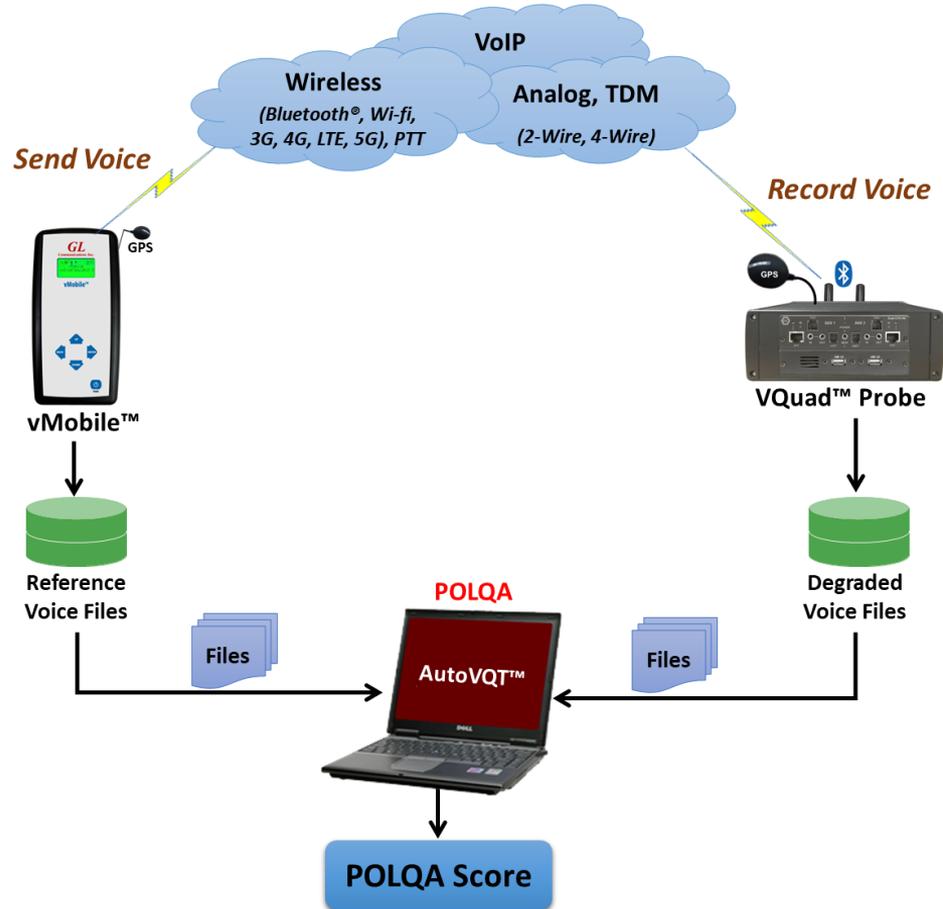
Fundamentals of Perceptual Modeling

Opinion Scale for Speech Quality Tests

Grade	Impairment	Quality of Speech
5	Excellent	Imperceptible
4	Good	Perceptible but not annoying
3	Fair	Slightly annoying
2	Poor	Annoying
1	Bad	Very annoying

- The common idea behind perceptual quality measures is to mimic the situation of a subjective test, where human beings would have to score the quality of sound samples in a listening laboratory environment

- Requires large number of subjects, very costly and time consuming; analysis based on human perception not accurate or repeatable

POLQA - Perceptual Objective Listening Quality Assessment

(POLQA v2.4)
Voice Quality Algorithm based on ITU-P.863

POLQA (introduced in 2011) produces very similar scores as PESQ for Narrowband (NB) codecs (uses similar mathematical techniques). However, POLQA was mainly introduced for Super Wideband (SWB) and Wideband (WB) support.

Operations Performed by POLQA

- Temporal alignment
- Sample rate estimation
- Resample
- Level alignment
- Frequency response and time alignment

Results Provided by POLQA

- MOS-LQO
- G.107 R-Factor / E-Model
- Attenuation
- Level and Background Noise Measurements
- Signal to Noise Ratio (SNR)
- Active Speech Ratio (ASR)

POLQA Algorithm

- POLQA is an objective model of subjective Listening Only Tests

- VQT POLQA supports analysis of 16-bit uncompressed PCM and WAV files, including NB (8000 sampling), WB (16000 sampling), SWB (48000 sampling)

- Revised Psycho-Acoustic and Cognitive Model

- Supports:
  - ➢ EVRC type codecs
  - ➢ Noise Reduction
  - ➢ Time-warping
  - ➢ VoIP
  - ➢ Non-optimal presentation levels
  - ➢ Filtering and spectral shaping
  - ➢ Recordings made at an ear simulator

POLQA WB and SWB
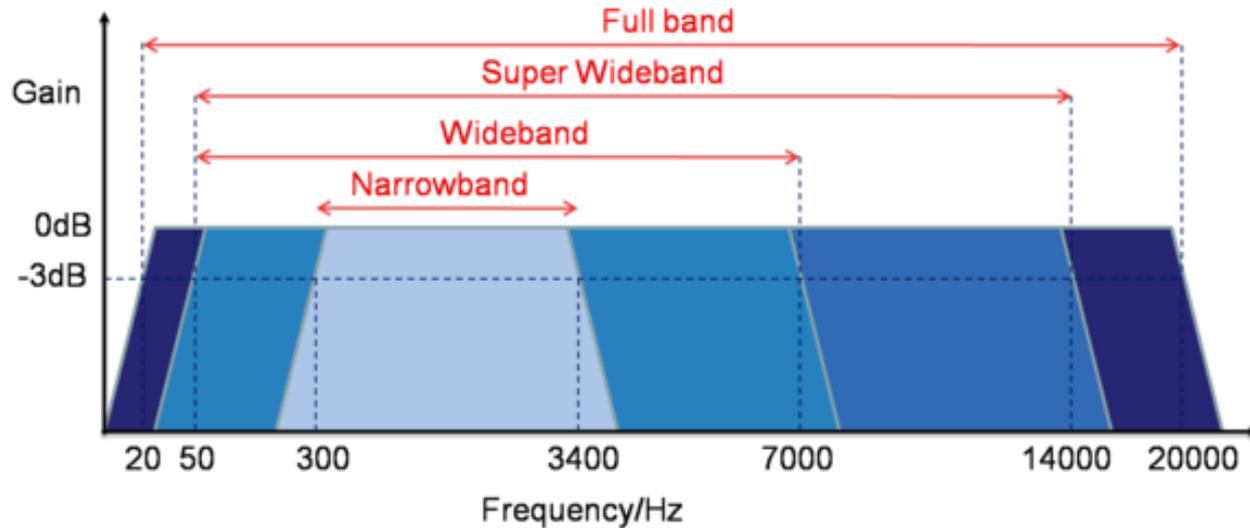
- Support for WB (7kHz) and SWB (14kHz) codecs/networks
- Support for networks delivering HD-quality voice services including VoIP and Mobile
- Supports networks with variable delay and time scaling

Working Principle
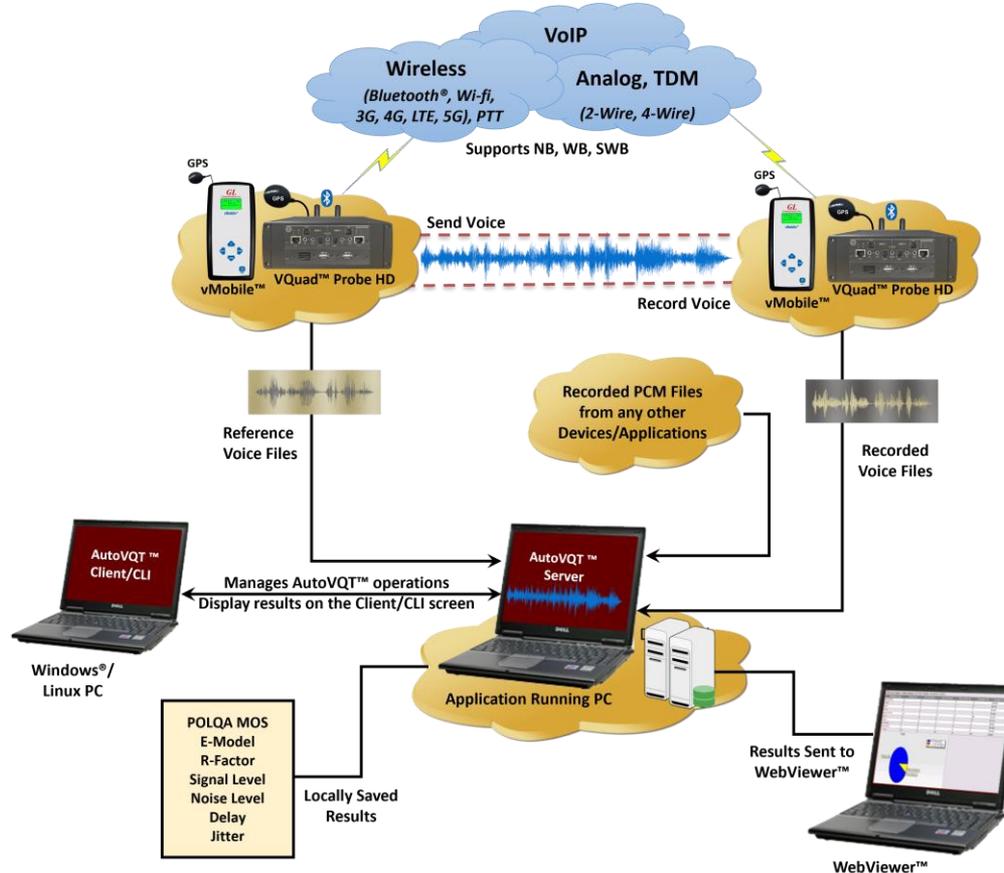
GL AutoVQT™ Highlights

- Thousands of voice files analyzed in mere minutes

- Supports Command Line Interface (CLI) for Windows® and Linux

- Any application that can send POLQA Reference audio and record it to PCM or WAV is acceptable

- Supports ITU Standards (POLQA v2.4)

- Detailed Results / Statistics

- POLQA MOS

  - E-Model R-Factor

  - Signal Level

  - Noise Level

  - Delay

  - Jitter

  - Clipping

- Criteria Rating System
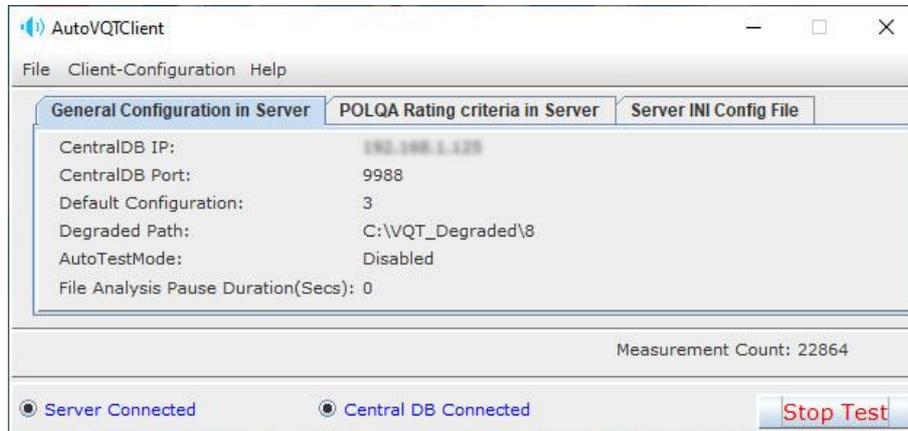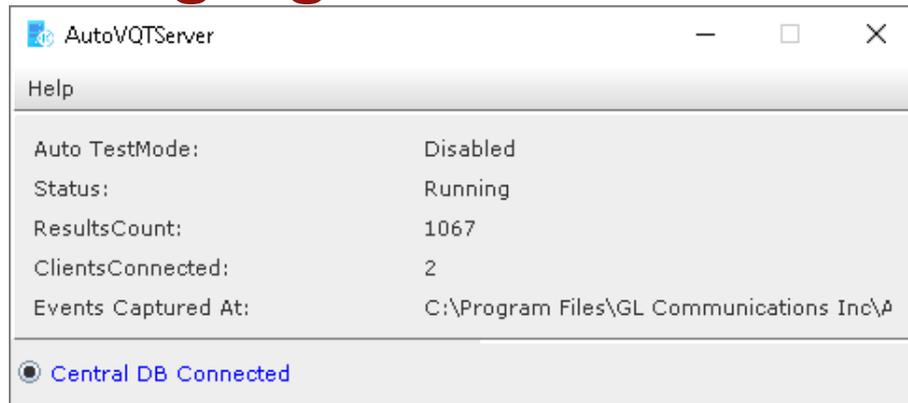
Application Analysis Time

- 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)
Narrowband (NB)	02:01	0.12
Wideband (WB)	02:13	0.13
Super wideband (SWB)	02:26	0.14

- On average, when the application is required to analyze multiple PCM files with different sampling rates (300 NB, 300 WB, and 400 SWB files), the total time taken to analyze all the 1000 PCM files at the same time is approximately **02 minutes and 31 seconds**

General Configuration

View Auto Measurement Profile

Results Summary

AutoVQT™ CLI

CLI for Windows®

CLI for Linux

POLQA Test Results in WebViewer™

Google Map Plotting

Thank you