

PRODUCT BRIEF

PESQ Voice Quality Measurement Solution for Azimuth's FMC or VoWi-Fi Test Suites



Leverage the Power of the Azimuth Approach

DIRECTOR[™]

Test executive for automation

STUDIO[™]

Software for data management

Real2Real[™]

Architecture for interoperability

TestMAC[®]

Tool for emulation/protocol test

SmartMotion[™]

Technology for virtual motion

RadioProof[®]

Enclosures for repeatability

Azimuth PESQ Toolkit for FMC Voice Quality Measurement

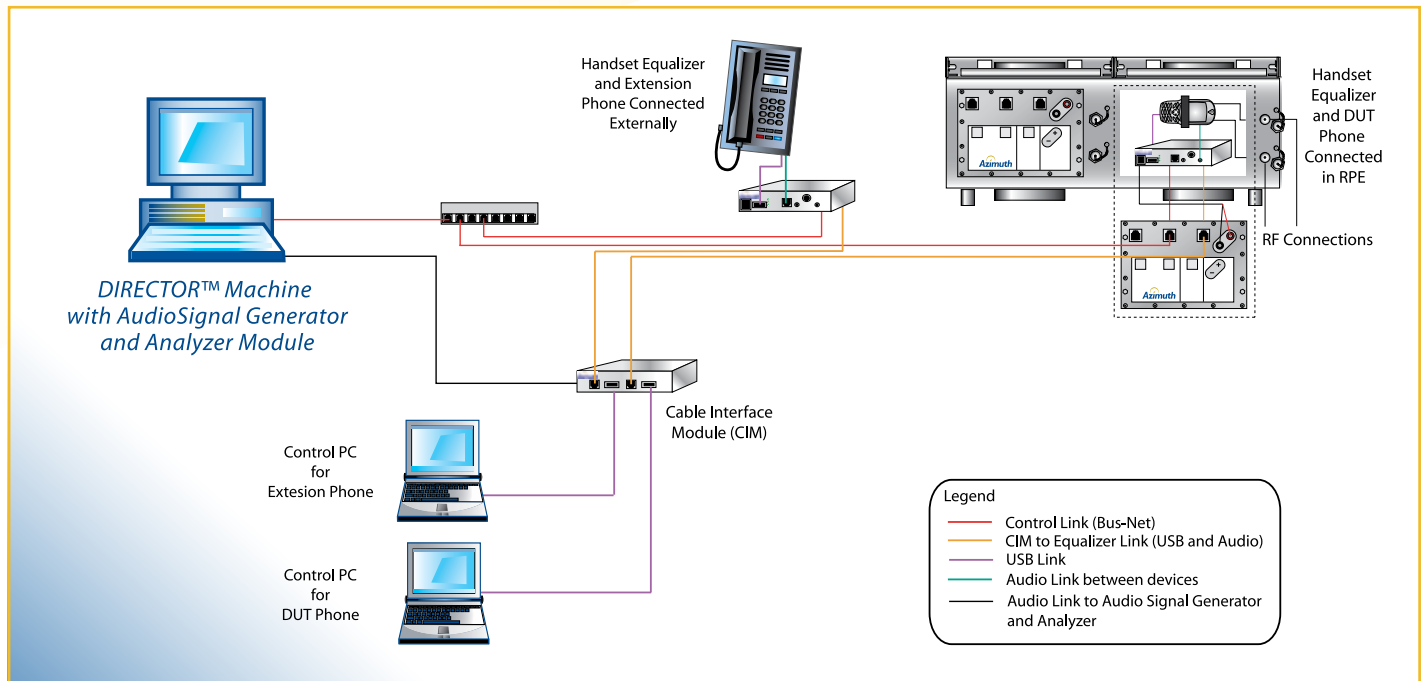
Voice quality measurement is vital to validate a call connection for speech fidelity, audibility and even the quality of the analog voice signal itself. Voice transmission over the network is much more demanding than data transmission because the voice protocol is not tolerant of any types of network interference such as delay, packet loss and jitter. In today's data centric networks, voice data traffic is mixed in with regular data traffic and typically undergoes considerable compression so that even the smallest amount of packet loss will greatly affect the user experience. Azimuth's PESQ toolkit is an optimized Voice Quality Measurement solution for use as a standalone tool or as part of an automated voice performance test solution like Azimuth's FMC Performance Test Suite.

Product Overview

As part of a comprehensive FMC and VoWi-Fi test solution, Azimuth has developed a cost effective and easy to automate PESQ Toolkit which allows users to make objective end-to-end voice quality measurements while providing a streamlined interface for easy configuration and results analysis.

Designed to be an integral component to the FMC Performance Test Solution, this toolkit is fully automated and can be directly controlled from any of the Azimuth voice benchmarks. It also includes an open TCL API that provides the toolkit with increased flexibility to be used for custom test development as well as integration into other automated test harnesses.

The PESQ Toolkit targets voice quality measurement with VoWi-Fi phones as well as converged handsets by providing automated signal calibration for the lower volume outputted by these devices. It also includes USB connections to these handsets for device control as well as power supply applications.



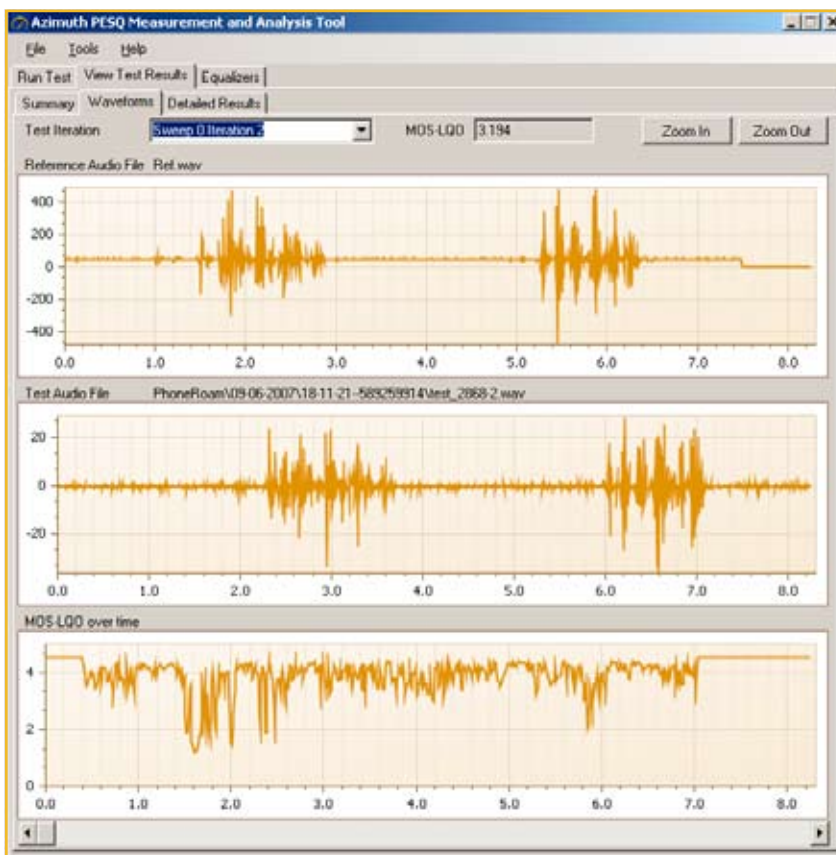
PESQ Toolkit Setup Diagram

The PESQ Toolkit consists of 3 components. The first component is an Audio Signal Generator/Analyzer Module, which is installed on the DIRECTOR PC. The second component is a Cable Interface Module which multiplexes the audio signals between the Audio Signal Generator Module to the handsets. It also provides USB connections for control and configuration of the handsets, usually through a Control PC. The third component is a pair of Handset Equalizer Modules that are attached to both handsets. The equalizers automatically match the input and output levels of the audio signals between the individual handsets for optimal audio fidelity during transmission. The Handset Equalizer Modules are designed to be small enough to easily fit into any Azimuth RadioProof® enclosures.

Features	Benefits
High fidelity audio interfaces	Accurate and realistic speech quality measurement
Highly integrated to Azimuth Benchmarks	Allows fully automated test execution and provides seamless integration with all other Azimuth hardware equipment
Open TCL API functions	Allows for creation of custom test solutions
Automated gain control calibration for audio signal to and from handsets	Reduce overall test time and ensures valid test results
Economical Voice Quality Measurement Solution	Reduce cost of testing and allows for voice quality measurements to be available throughout testing process
Simplified Interface	Reduce the learning curve and allows immediate usage of the tool to measure and analyze voice quality

Voice Quality Measurement

The Mean Opinion Score (MOS), specified by ITU-T recommendation P.800, provides a numerical indication of the perceived quality of received voice signal. A MOS score is generated by averaging the results of a set of standard subjective tests where a group of listeners rate the audio quality of test sentences read aloud by both male and female speakers over the communications medium being tested. The manual and subjective nature of MOS measurements makes it an impractical method for testing during the product development phases. One of most successful automated mechanisms that is in use today for measuring speech quality is PESQ, Perceptual Evaluation of Speech Quality, as standardized in ITU-T recommendation P.862. PESQ measurement provides an objective and automated method for end-to-end speech quality assessment. It does this by using an algorithm to compare a reference speech sample generated through the communications medium to the received signal at the endpoint and the results can be mapped to relevant MOS scores based on the degradation of the sample.



PESQ Measurement Results

The PESQ results allow the user to directly compare the measured audio waveform with the original reference waveform. The graphs can be zoomed in to millisecond resolutions (top graph is the reference signal, middle graph is the measured signal, bottom graph can be one of many analysis measurements with resolution down to 16ms samples).

Available Measurement Results

- Timesignal
- PESQ MOS (over reference sample), PESQ MOS vs. Time
- Minimum, maximum and average delay
- Front-end clipping (FEC)
- Hold-over time (HOT)
- Attenuation
- Background noise
- Signal-to-noise (SNR) measurement
- MOS of silent and speech portions
- Detailed analysis of silent and speech portions
- Utterances detection

