

Voice Quality Assurance

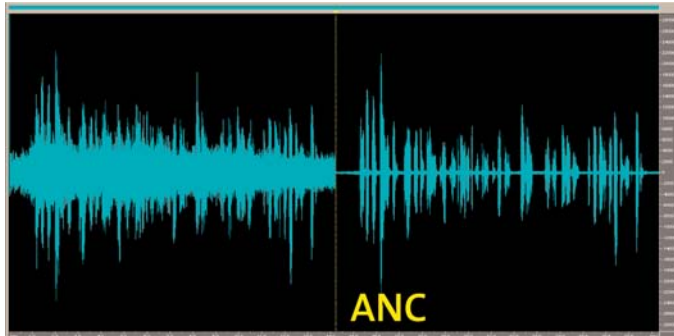
INTRODUCTION

Ditech Communications' Voice Quality Assurance (VQA) provides innovative solutions for improving the end-user listening experience on wireless and wireline voice networks. As more and more calls originate or end in noisy environments through a greater variety of handsets and headsets, speech quality improvement becomes essential to ensuring customer satisfaction. Voice quality is increasingly important as networks become more complex through the deployment of wireless, wireline, satellite, and voice-over-packet technologies.

Ditech's VQA addresses these issues. VQA is optimized for all voice network technologies including CDMA, TDMA, and GSM architectures using Enhanced Full Rate, Full Rate, Adaptive Multi-Rate, or Half-Rate codecs. VQA provides solutions for background noise reduction, speech enhancement, background noise compensation, acoustic echo control, hybrid echo control, network voice level adjustment, and voice network monitoring. These features are designed for compliance with ITU-T standards G.160, G.164, G.165, G.168-2002, and G.169. The VQA solution allows carriers to significantly improve, measure, and manage voice quality in their networks.

BACKGROUND NOISE REDUCTION

Of particular concern to wireless callers is the ability to carry out conversations in noisy environments. Ditech's Adaptive Noise Cancellation (ANC) technology features a high-precision noise reduction algorithm that removes noise components on a call. This algorithm effectively suppresses noise by up to 21dB to improve the perceived quality of a call, resulting in greater customer satisfaction and increased subscriber minutes.

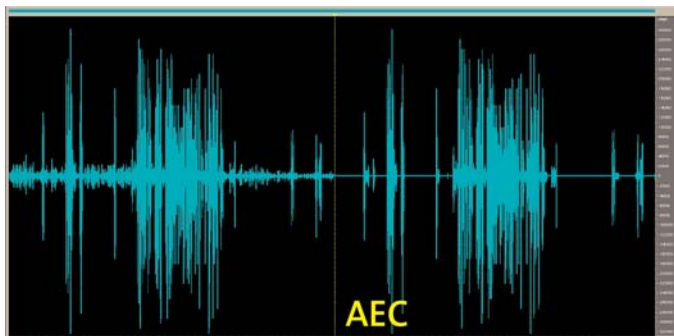


SPEECH ENHANCEMENT AND BACKGROUND NOISE COMPENSATION

Another technology for improving the perception of voice quality in noisy environments is Ditech's Enhanced Voice Intelligibility (EVI). Without distorting or amplifying the signal, it emphasizes certain "speech formants" (consonants and vowels) in a manner that allows the user to more easily distinguish and understand a voice in loud ambient environments. In addition, Ditech also provides an Adaptive Listener Enhancement (ALE) feature, which detects high background noise on the speaker's side of a call and boosts the received voice energy by up to 9dB, increasing the ability to hear the speech.

ACOUSTIC ECHO CONTROL

Ditech's Acoustic Echo Control (AEC) technology specifically addresses the echo non-linearities that are common in wireless networks due to inadequate acoustic isolation in poorly designed handsets and the use of handsfree kits. AEC attenuate a wide range of echo variances using algorithms based on talker energy levels, bulk delay, and Weighted Acoustic Echo Path Loss (WAEPL) to effectively eliminate acoustic echo, significantly improving quality as perceived by the talker.



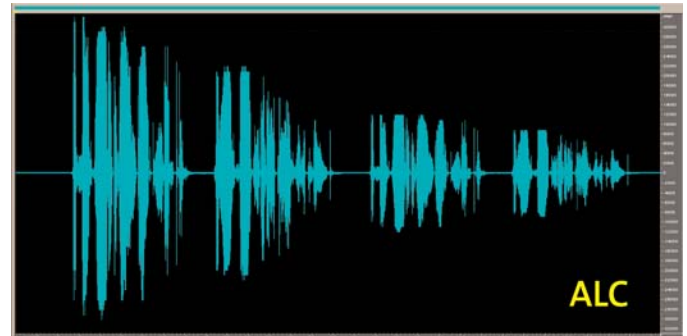
HYBRID ECHO CONTROL

Hybrid echo occurs linearly at the 2-wire to 4-wire conversion point in a wireline/satellite PSTN network. Ditech's Hybrid Echo Cancellation (HEC) feature completely eliminates hybrid echo with an industry-leading tail delay of up to 192ms.

NETWORK VOICE LEVEL ADJUSTMENT

When voice calls are routed between networks of different service providers, the volume level of the talker is often too high or too low for comfortable listening. This effect is especially common with wireless and international calls. Ditech's Automatic Level Control (ALC) technology dynamically detects level imbalances and automatically adds or subtracts volume to bring the voice to a specified target level.

In environments where only high voice levels are a problem, Ditech provides High Level Compensation (HLC) technology, which automatically attenuates high voice levels to a comfortable level. In environments where the voice level discrepancy is consistent, a Fixed Gain/Loss (FGL) setting can be used to raise or lower voice levels by a pre-defined amount set by the service provider.



VOICE NETWORK MONITORING

A real-time view of a network's voice quality performance is required to manage network status and troubleshoot customer issues. Ditech offers a number of software applications to measure and report voice quality and echo cancellation performance on a per-DSO basis, helping deliver superior voice quality across the network.

Ditech products combine technical leadership with industry-leading service and support to provide telecommunications carriers with world-class solutions that meet business and end-user needs.