



Experience Intelligence™ for Mobile and PSTN Networks

Ditech Platforms

Ditech's Experience Intelligence™ (EXi) solution for TDM networks is available on the following platforms:

- BVP Flex f600
- BVP Flex f400
- QVP E800
- QVP T800

Ditech Networks' Experience Intelligence (EXi) solution offers operators unprecedented insight into the voice quality that subscribers are experiencing by continuously and non-intrusively monitoring all calls and reporting voice quality metrics, reflecting the true subscriber experience.

As subscribers' expectations rise, operators must go beyond the ability of existing network performance tools to identify and address the real voice quality issues that their customers are experiencing. Ditech's EXi solution is a powerful tool that measures and reports a comprehensive set of voice quality statistics, including speech and noise levels, echo delay, return loss, and transmission quality scores.

The data are collected continuously and non-intrusively on all channels on a per-call basis, delivering the industry's most comprehensive assessment of call quality available. With Ditech's EXi solution, carriers now have the ability to proactively detect and eliminate sources of impairment in their networks, resulting in improved service quality and increased customer satisfaction.

SPEECH QUALITY MEASUREMENTS

EXi measures and reports the following voice quality statistics:

- Transmission Rating (R) Factors
 - Listening Quality (R-LQ)
 - Conversational Quality (R-CQ)
- Mean Opinion Scores (MOS)
 - Listening Quality (MOS-LQ)
 - Conversational Quality (MOS-CQ)
- Noise levels
- Speech levels
- Hybrid echo delay
- Hybrid echo return loss
- Acoustic echo delay
- Weighted acoustic echo path loss
- Echo Objection Rate per ITU-T G.131

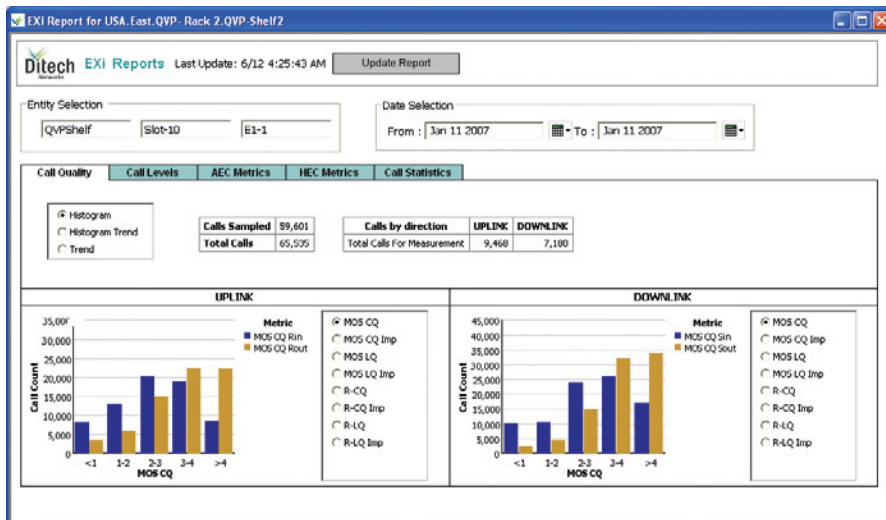


Figure 1 :: Display of EXi-Reporter Statistics

A Comprehensive View of Network Impairments

EXi leverages Ditech Networks' expertise in echo cancellation and voice enhancement by utilizing voice processing DSP resources to continuously and non-intrusively measure and record voice quality impairments that are traditionally ignored by RF-focused test tools. EXi provides an unparalleled approach to voice quality measurements by using live calls, as opposed to drive testing.

EXi-Agent – Live Call Measurement

The EXi-Agent resides on the BVP Flex or QVP and collects voice quality measurements on every call.

Noise and Speech Level

An increasing number of calls originate from noisy urban environments where call quality can be negatively affected by background noise. Ditech's EXi-Agent measures per-call speech level, noise level, and signal-to-noise ratio (SNR) in both directions to identify and report unwanted noise in a call.

Echo and Delay

The migration of voice networks from circuit to packet technologies is resulting in greater and more variable latency. The majority of legacy hybrid echo cancellers are unable to handle this added delay, leaving callers unprotected from annoying hybrid echo.

In addition, the proliferation of user choices in terminal equipment (handsets, headsets, and handsfree kits) continues to expand rapidly without necessarily providing adequate acoustic isolation, exposing more users to acoustic echo.

Ditech's EXi-Agent provides comprehensive statistics about echo delay and return loss for both hybrid (linear) echo and acoustic (non-linear) echo. It monitors from 0 to 400 ms in both directions, ensuring complete and accurate measurement of echo.

For a statistical understanding of how echo and delay combine to affect customer satisfaction, Ditech's EXi-Agent also provides Echo Objection Rates per ITU-T G.131.

Transmission Rating Factors and Mean Opinion Scores

Per-call listening and conversational R Factor and MOS values are computed continuously and non-intrusively based on the measured voice quality impairments (speech, noise, and echo) as well as codec type. EXi's objective scores follow the ITU-T G.107 E-Model standard and use a unique DSP-based approach to analyze live voice signal.

Ditech has partnered with Telchemy™, a leading provider of performance monitoring technology, and employs their VQmon™ computational model to provide R Factors and MOS scores for the following:

- **Listening Quality (LQ)** – This score includes speech quality, noise, and voice level. It does not include impairments that affect conversation, such as delay.
- **Conversational Quality (CQ)** – This score includes the impairments measured for the LQ score and adds echo and delay, which affect conversational quality.

EXi-Collector and EXi-Reporter – Networkwide Analysis

Ditech's EXi-Collector gathers voice quality statistics from Ditech network elements and the EXi-Reporter analyzes and summarizes networkwide statistics, including:

- Summary views of transmission quality at each network element
- Detailed views of voice quality impairments
- Historical data for trend analysis

When combined with Ditech's industry-leading Voice Quality Assurance (VQA™) solution, Ditech's EXi solution becomes a powerful tool to measure, monitor, and improve voice quality issues in wireline, wireless, and converged networks.

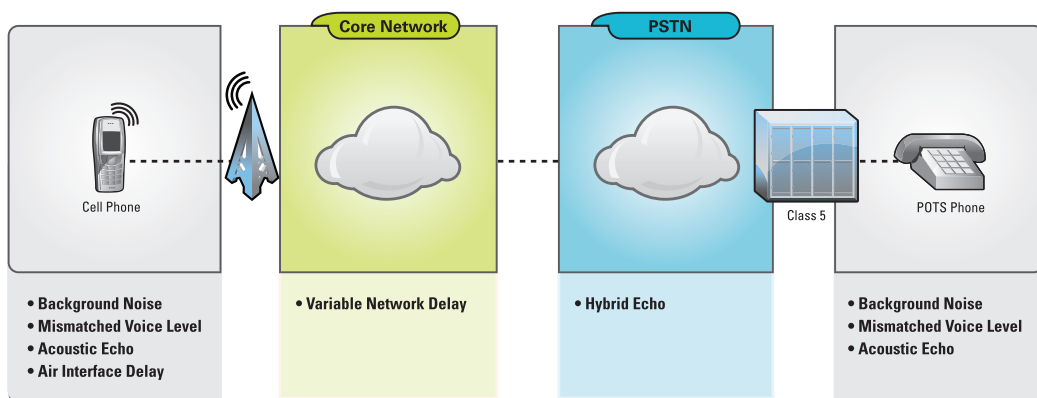


Figure 2 :: Voice Quality Impairments in a Network