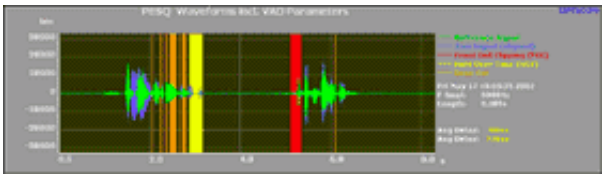
OPERA™ Voice Quality Analysis - Your Digital Ear.

OPERA™ Voice Quality Testing employs the latest international state-of-the-art standards like PESQ and PSQM. Intrusive testing based on natural voice signals ensures high accuracy, while it directly relates to the customer's perception of quality. OPTICOM's advanced algorithms and graphical analysis capabilities not only report the standardized result values, but a lot of views and details for problem analysis. The comprehensive algorithm set for voice quality testing includes:

> Voice Quality Measures (optionally available for the software-only and all hardware configurations)

- **PESQ**, the new industry standard for perceptual voice quality testing according to **ITU-T rec. P.862** [2001], combines PSQM with PAMS, optimized for VoIP and hybrid end-to-end applications, MOS and MOS-LQ calculations



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- **PSQM/IP**, perceptual speech quality measure based on **ITU-T rec. P.861** [1996] and **PSQM+**, incl. advanced delay compensation for end-to-end measurements, developed by OPTICOM
- **PSQM+**, advanced perceptual speech quality measure according to ITU-T COM 12-20 [1998]
- **Echo** measurement based on real voice signals, developed by OPTICOM, measures Echo Return Loss ERLpeak, ERL vs. delay
- **E-Model Transmission Rating Factor R** according to ITU-T G.107, derived from PESQ [available with PESQ only]

> Competitive Strength for future Standards

Due to OPERA's flexible design, user defined algorithms and advances in measurement standards can easily be provided as software plug-ins, ensuring OPTICOM's very competitive and short time-to-market.

> Common Features for Voice Quality Analysis

- **One way delay measurement**, with PESQ also **delay jitter vs. time** and delay distribution
- Measurement under **double talk** conditions
- One way and two way measurements
- **Bulk call** generation to stress the device/ network under test
- **VAD analysis**, Front-end clipping **FEC**, hold-

over time **HOT**
and and dropout measurement (e.g. for packet loss analysis, burst error concealment) [available with PESQ only]

- **Background noise** measurement
- Signal-to-noise **SNR** measurement of speech and silent parts of a test signal
- **Multi-lingual voice reference** stimuli available, incl. male and female speakers

> Telecom Applications and Features

- True end-to-end voice quality testing of current and next generation networks, such as VoIP, VoDSL, VoATM, ISDN, GSM, POTS, based on real world voice signals
- Analyze Speech Codecs, VAD behaviour, echo cancellers and signal enhancers with any voice signal
- Include the acoustical path of handsets and mobile phones in the analysis using OPERA™ with an optional head and torso simulator (HATS) [OPERA software update available Q1/ 2003]
- Monitor the QoS of any corporate, public or long distance network (surveillance)
- Stress your network in order to observe the effects on the
transmission quality (bulk call generation)

> Specific Telecom Features

- Plenty of detailed views and graphs provided for further fault analysis, incl. voice or wide band audio quality, time signals, spectra, echo, delay, jitter, VAD behaviour and call timing
- Interactive or automated unattended measurements
- Immediate overview of the QoS of your network based on standardized metrics
- Remote control a single or numerous OPERA™ analyzers via an IP connection. Share a pool of OPERA™ systems in your test lab with other developers. Conveniently control the pool from your office PC
- Freely combine various interface types in every measure-ment (e.g. VoIP calls from POTS to a VoIP terminal)

> Downloads

-> Download **White Paper 'Voice Quality Testing'** [as PDF / 1,9 MB]

-> Download **OPERA Application notes** [as PDF / 540 kb]

-> Download **OPERA brochure** [as PDF / 1,1 MB]

-> Download **OPERA data sheet** [as PDF/ 823 kb]

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> More details

For more details on the technology of Voice Quality Testing refer to our Technology section

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