

If you want
the best
video quality...

...you need
the best algorithm
for multimedia
video quality
testing¹!

PEVQ 2.0

¹ A customer survey among our OEM licensees who evaluated PEVQ 2.0 versus other proposed intrusive and non-intrusive Video Quality Test tools clearly came to the conclusion that OPTICOM currently

offers the best algorithm for multimedia video quality testing in the market. As a result, a number of new products will be launched in Q4/2006 and Q1/2007 with PEVQ, covering all areas from universal

A/V test equipment to drive test tool applications and measurement equipment for IP based Triple-Play applications. As one reference, read more about Shenick on the back page.

Requirements for new KPIs

The transformation of mobile phones into powerful wireless multimedia terminals today generates a demand for new key performance indicators (KPIs) that describe all dimensions of QoS as perceived by subscribers. Various proposals, like passive tests based on protocol analysis do say nothing about the payload's shape. Non-intrusive payload analysis produces better estimates of user experience, but is still lacking core information about the base signal quality it all started with: Your VoIP backbone works fine, still the voice quality is poor due to transmission distortions and noise caused from a

mobile terminal. Passive video stream analysis shows poor QoS, because the picture is fuzzy and blurred – but without a reference, how do you know what a Pop music video download should look like?

OPTICOM's technical expertise goes back to the launch of the first perceptual test tool 1988. An experience which clearly shows that only intrusive, reference-comparison based testing, weighted by models of human perception will produce accurate KPIs representing the user's perceived quality: This has been our core business development at OPTICOM.



"We have gathered several OEM licences now for PEVQ 2.0, and we have more than reason to believe from the independent evaluations that we offer the best algorithm for multimedia video quality testing in the market space. Combined with PESQ and PEAQ this is the most trusted A/V Quality Test Suite in the Industry."

Michael Keyhl, CEO, OPTICOM GmbH

Win an iPod!



Win an iPod with Video support!

Just visit www.opticom.de and qualify for OPTICOM's Triple-SQM online lottery in October/November.

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TRIPLE PLAY



AUDIO & VIDEO QoS

PEAQ

Perceptual Evaluation of Audio Quality for MOS scoring of stereo sound accompanying video streams according to ITU-R BS.1387

PEVQ

Perceptual Evaluation of Video Quality for MOS scoring of video-telephony, -streaming and -messaging as proposed within VQEG, including 3G and IPTV



DATA QoS

PEDQ

Perceptual Evaluation of Data-Link Quality for MOS scoring of perceived data download and browsing QoS

Our Triple-Play Suite for Quality Measurement is both available for lab users running Windows as well as OEM versions for licensing to T&M manufacturers, system integrators and operators.



VOICE QoS

PESQ

Perceptual Evaluation of Speech Quality for MOS scoring of narrow and wide-band telephony voice signals according to ITU-T P.862, P.862.2

P.563

P.563 – Single-sided Voice Quality Measurement according to ITU-T P.563

ECHO

ECHO – OPTICOM's advanced Talking Quality Evaluation

Telephony Voice Quality testing

- **PESQ** – Perceptual Evaluation of Speech Quality for MOS scoring of narrow and wide-band telephony voice signals according to ITU-T P.862, P.862.2
- **P.563** – Single-sided Voice Quality Measurement according to ITU-T P.563
- **ECHO** – OPTICOM's advanced Talking Quality Evaluation

Voice telephony still being the core basis for wireless 3G and Triple-Play services, the range today includes voice-conferencing, -messaging and PTT services. The issue of listening quality ('How do I perceive the other party's voice') is complemented more and more by talking quality aspects (echo artefacts of talker's own voice) and conversational quality limits with two or more parties interacting.

OPTICOM, as the sole vendor in 1996 originally introduced PSQM, the first objective listening quality MOS measurement recommended by the ITU as P.861. PESQ - today's state-of-the-art MOS scoring algorithm is available since 2001 from OPTICOM and still builds on an advanced, but PSQM-like core. PESQ OEM versions for various platforms have been devised by OPTICOM, the latest one is complemented by P.862.2, a recent extension for the assessment of wide-band speech codecs, too. Besides the MOS value, a number of supplementing KPIs are provided, like measurement of (variable) delay and separately calculated values for speech active and silence parts, thus giving useful indications for cause analysis on an expert level. The who-is-who of the Telecom's industry has licensed OPTICOM's PESQ core, so if you came across some MOS value before, there is a high chance that it was processed by our code.

OPTICOM's advanced 'Echo' measurement is offered to adequately evaluate talking quality, and not only has become a most successful key feature of OPTICOM's OPERA voice/audio quality tester, but - besides PESQ - is also serving as the second most important troubleshooting KPI when OPTICOM experts are hired by operators for consultancy projects.

In collaboration with two partners, in 2004 OPTICOM could finalize P.563 as a non-intrusive complement to P.862, thus building the 4th International Perceptual Measurement Standard in OPTICOM's stunning business development.

And last but not least, due to OPTICOM's strategic collaboration with Telchemy, the IP based QoS company, we will be able to support VQmon analysis in our Triple-play QoS testing solution.

MP3 Music Quality testing

- **PEAQ** - Perceptual Evaluation of Audio Quality for MOS scoring of stereo sound accompanying video streams according to ITU-R BS.1387

New non-voice business models finally take the center stage: Portable MP3 play-

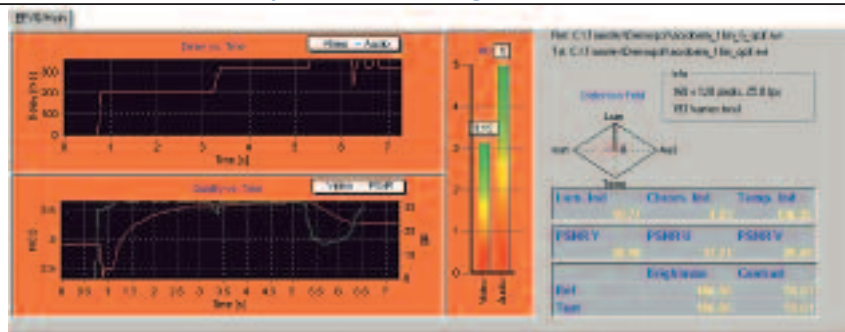
er with integrated mobile phone, or vice versa? Even business phones cannot do without MP3, AAC+//+ support today - there are growing business models behind music-on-demand services, still you have no KPI to monitor that? Again, OPTICOM provides the answer: PEAQ, the ITU standard for perceptual evaluation of audio

quality, authored by OPTICOM in 1998 and developed during a four years cooperation with leading experts is the proper tool for sound quality testing of music streams. PEAQ can handle stereo signals with CD-like sampling frequencies up to 48kHz and report the proper MOS in the context of ITU-R listening test standards.

Video Quality testing

- **PEVQ** - Perceptual Evaluation of Video Quality for MOS scoring of video-telephony, -streaming and -messaging as proposed within VQEG, including 3G and IPTV

Video-telephony is the entrance card to 3G, and there is Video-conferencing, -messaging and -streaming. With 3.5G and HSDPA high quality movie and TV streaming becomes reality. Again, we are talking content based business models. And this time customer's QoS expectations have been adjusted higher-than-average by stable TV reception and DVD home cinema standards. OPTICOM's family of testing algorithms provides PEVQ, the perceptual evaluation of video quality. First premiered at the 3GSM 2005 congress in Cannes, OPTICOM just released a major technology update to PEVQ™, the industry counterpart for video testing complementing PESQ and PEAQ. PEVQ builds on earlier



developments of KPN Research, the developers behind PSQM and PESQ, and has been further advanced by OPTICOM for low bit-rate 3G formats (CIF and QCIF) together with leading industry and university partners. PEVQ is OPTICOM's proposed candidate for standardization of a FR (full reference) video model within VQEG (the Video Quality Experts Group), which is in the process of starting verification tests for future standardization. While MOS undoubtedly is again the major KPI figure for perceived picture quality, a num-

ber of traditional KPIs like e.g. Blur, Blockiness, Jerkiness, Delay and PSNR are provided by the new PEVQ version 2.0 due to popular customer requests and for backward compatibility reasons. Future versions will also include optional J.144 support. And not to forget - of course we have an audio-visual KPI pair at our hands, based on combined PEAQ+PEVQ, which makes a great fit to detect one of the most prominent and nasty artefacts of video transmissions: Lip-sync problems.

Testing Web-browsing and Data services

- **PEDQ** - Perceptual Evaluation of Data-Services Quality for MOS scoring of perceived data download and browsing QoS

Sure you can characterize packet arrival time in milliseconds and throughput bit rate in kbit/s - but what does it say? Again, you need a KPI that copes with user's perceived experience. And again, OPTICOM is working at the forefront of standardization

and expects to release PEDQ, the perceptual evaluation of data-services quality very soon. Like all the other PEXQ family members of OPTICOM, PEDQ will provide a MOS that copes with the user's perceived web browsing experience.

3SQM

The Triple-Play Solution for QoS Testing

OPTICOM offers the full portfolio of perceptual quality measurement for voice, audio/visual and data payload analysis

+ PESQ
+ PEAQ/PEVQ
+ PEDQ
= 3SQM

The new 3SQM suite will be available as a stand-alone software solution for lab testing use under MS Windows as well as OEM versions available under license to T&M manufacturers and system integrators.

What's new in PEVQ 2.0



With the release of PEVQ 2.0 a new enhanced time alignment is now available improving PEVQ's quality prediction effectively without trading any computational performance relevantly. This plus additional readable input file content formats for AVI and RAW file containers as well as the automatic up- and down-sampling of the video input content increase PEVQ's useability and flexibility further.

In terms of cause analysis a number of new indicators were added to PEVQ 2.0. They estimate the temporal and spatial activity in the reference and the test file according to the ITU-T recommendation

P.910. Other new indicators quantify the amount of frame skips and frame freezes as well as the effective frame rate of a distorted signal is now determined. The effective frame rate helps identifying if a signal was down-sampled in the coding process and up-sampled for displaying purposes. Such a process often leads to a degradation of a video signal due to information loss.

All in all the prediction accuracy of PEVQ was remarkably improved for version 2.0, a continued progress which will be ongoing with new releases in the future.



View into OPTICOM's lab: Senior engineer Roland Bitto testing the new features of PEVQ 2.0

Shenick taking advantage of Opticom's technology

Shenick is an award winning provider of converged IP communications test systems. Shenick diversifEye™ offers network equipment manufacturers, service providers, large enterprises and governments a highly flexible and scalable emulation platform to assess performance, quality of service (QoS) and quality of experience (QoE), all within a single test platform.

Shenick diversifEye™ will now support state-of-the-art intrusive voice and video quality testing based on PESQ and PEVQ.

"Shenick has seen increased interest in full reference IP video and VoIP quality assessment. Opticom offers Shenick a reliable and trusted industry standard suite of algorithms providing all necessary quality metrics."

Robert Winters, CMO, Shenick



About OPTICOM

With PSQM, PESQ and PEAQ, OPTICOM GmbH, the pioneer in perceptual quality testing has been providing four international world-class standards for voice and audio quality measurement since its foundation in 1995.

With the new single-sided speech quality measure P.563, a joint development with partners, the perceptual experts from Germany presented their latest ITU standard. The presentation of the new PEVQ™ video measure leveraged the company's huge experience towards the multimedia testing domain. Recognized an industry reference, OPTICOM's OPERA voice/audio quality test tools are available to users world wide. And while specialized on OEM customers in particular, the directory of OEM licensees today reads like the 'Who-is-Who' of the Telecoms industry. OPTICOM is a privately held company located in Erlangen, Germany.

Sales Contacts:



OPTICOM GmbH

Nägelsbachstraße 38
91052 Erlangen, GERMANY
Phone: +49-91 31 / 530 20 - 0
Fax: +49-91 31 / 530 20 - 20
info@opticom.de
www.opticom.de

North America:



Telchemy Inc.

Phone +1-770-614-6944



JDSU - Acterna U.S.

Phone +1-301 353 1560 2850

**Europe, Latin America,
Middle East & Africa,
Asia Pacific, CIS Countries:**

JDSU - Acterna Germany GmbH

Phone: +49-7121 86 2222

Through our distributor network, we are represented in more than 80 countries. To find your local sales office, please contact info@opticom.de

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