

PEVQ™ — Perceptual Evaluation of Video Quality

**NEW:
VQEG approved for
standardization**

PEVQ is an accurate, reliable and fast video quality measure. It provides mean opinion score (MOS) estimates of the video quality degradation occurring through a network, e.g. in mobile and IP-based networks. PEVQ can be ideally applied to test video telephony, video conferencing, video streaming, and IPTV applications. The degraded video signal output from a network is analyzed by comparison to the undistorted reference video signal on a perceptual basis. Based on the approach to model the human visual system, PEVQ can detect anomalies in the video signal and quantify them by a multitude of key performance indicators (KPIs).

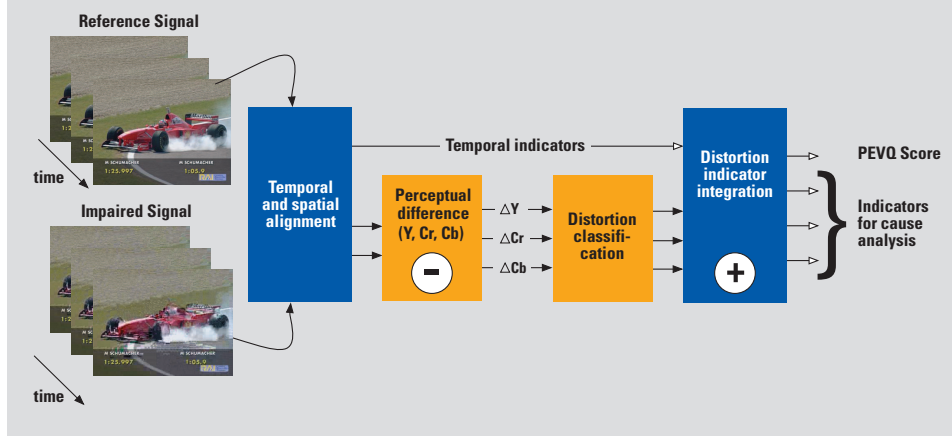
OPTICOM, the leading provider of signal based perceptual measurement technology for voice, audio and video, offers its new easy to use PEVQ testing technology as an OEM solution. Lab users can choose between the PEXQ software suite and the PEVQ analyzer hardware. PEVQ evaluates the quality of multimedia (QCIF, CIF, VGA), SD and HD video formats based on perceptual measurement, reliably, objectively and fast.

PEVQ is based on the earlier PVQM technology developed by KPN Research and new developments of OPTICOM.

OPTICOM Product Line:	
Voice Quality Testing	
PSQM	ITU-T P.861
PESQ	ITU-T P.862
3SQM	ITU-T P.563
ECHO	
Audio Quality Testing	
PEAQ	ITU-T BS.1387
Video Quality Testing	
PEVQ	
Network Quality Testing	
VQmon	

Principle

PEVQ is a full reference, intrusive measurement algorithm for video quality. Its basic structure is shown in the figure below.



The algorithm can be divided up into four separate blocks. The first block – pre-processing stage – is responsible for the spatial and temporal alignment of the reference and the impaired signal. This process ensures that only corresponding frames are compared to each other.

The second block calculates the perceptual difference of the aligned signals. Perceptual means that only those differences are taken into account which are actually perceived by a human viewer. Furthermore the activity of the motion in the reference signal provides another indicator representing the temporal information.

This indicator is important as it takes into account that in frame series with low activity the perception of details is much higher than in frame series with quick motion.

The third block in the figure classifies the previously calculated indicators and detects certain types of distortions.

Finally, in the fourth block all the appropriate indicators according to the detected distortions are aggregated, forming the final result - the mean opinion score (MOS). The MOS value describes the video quality on a range from 1 for very bad quality, to 5 for excellent quality.

Key Features:

- Accurate, reliable and fast objective analysis of perceived video quality
- Full reference based end-to-end quality analysis
- Outputs MOS score that correlates well with subjective MOS
- Additional KPIs for detailed analysis
- Measurement of multimedia (QCIF, CIF, VGA), SD and HD video quality
- Available as DLL/Library, Windows™ software and PEVQ analyzer hardware
- Applications: IPTV, streaming video, 3G, video telephony
- Performance verified and recommended for standardization by the Video Quality Experts Group (www.vqeg.org) 2008

Besides the final quality score additional indicators are provided at the output of the algorithm for further cause analysis.

This approach to video quality estimation includes the effects of both packet level impairments (loss, jitter) and signal related impairments such as blockiness, jerkiness, blur and distortions caused by coding processes.

Specifications

PEVQ - Perceptual Evaluation of Video Quality

Functionality

- Perceptual Evaluation of Video Quality-PEVQ, with mapping to MOS scale (1 bad, ... 5 excellent quality)
- Analysis of multimedia, SD and HD video formats

Output

PEVQ MOS

The PEVQ MOS value lies within a range from 1 (bad) to 5 (excellent). The PEVQ MOS is based on a multitude of perceptually motivated parameters.

Distortion indicators

For a more detailed analysis the perceptual level of distortion in the luminance, chrominance and temporal domain are provided.

Delay

The min, max and mean delay of each frame of the test signal related to the reference signal, as well as delay vs. time.

Brightness

The brightness of the reference and degraded signal.

Contrast

The contrast of the distorted and the reference sequence.

PSNR

To allow for a coarse analysis of distortions in different domains the PSNR is provided for the Y, Cb and Cr components separately.

Jerkiness

describes the smoothness of a video playback which is often impaired by down-sampling, coding processes and perturbed transmissions.

Complexity

- PEVQ is widely optimized and is capable of processing QCIF streams faster than real-time on a 3GHz Pentium 4 machine.

Future releases will be further optimized in computational performance and prediction accuracy for high definition video.

OPTICOM's PEVQ is one of the two top-ranked models in the 2008 Video Quality Experts Group (VQEG) multimedia evaluation and approved for standardization.

Input

- Raw YUV, AVI Files with RGB24, YUV444, YUV422 or YUV420 data, 25 and 30 fps
- 6 to 20 seconds in length

Blur

is a distortion characterized by reduced sharpness of contour edges and spatial detail.

Blockiness

is often the result of a low bit rate coding that uses a block matching algorithm for the motion estimation and a coarse quantization for the image blocks.

Frame Skips and Freezes

are temporal artefacts occurring in video transmissions caused by e.g. overloaded networks.

Effective Frame Rate

Down-sampling of a video signal on a frame by frame basis often results in loss of information which often leads to the degradation of the video signal. The effective frame rate is an indicator quantifying the severeness of such a process.

Temporal Activity and Spatial Complexity

Temporal activity and spatial complexity indicators quantify the amount of activity/movement and spatial detail in the video content. These indicators are derived from ITU-T recommendation P.910.

Platforms

- Windows
- Linux



About OPTICOM

OPTICOM GmbH is the leading vendor for voice, audio and video quality measurement technology and OEM products for mobile and IP based network testing. With PSQM, PESQ, PEAQ and P.563, the pioneers in perceptual quality testing have been providing by now four international world-class standards for voice and audio quality measurement since the foundation of OPTICOM as a spin-off from Fraunhofer's MP3 development team in 1995. After the great success with PESQ - the International Standard for voice quality testing, the experts from Germany now also source PEVQ, the new industry standard to measure a perceptual video quality KPI for streaming, conferencing and messaging applications. OPTICOM's proven OEM technology can be found in most state-of-the-art products of leading T&M vendors, see also www.pevq.org OPTICOM GmbH is a privately held company located in Erlangen, Germany.

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