



V O I C E



A U D I O

The Next Level of  
Perceptual Quality  
by OPTICOM

# PEXQ™

The new 'all-in-one' Quality  
Testing Suite for state-of-the-art  
Perceptual Measurement  
of Voice, Data and  
Audio-Visual Quality –  
**One Quad KPI set for  
all Quad-Play applications.**



V I D E O



D A T A

## Requirements for Quad KPIs

Fixed/Mobile Convergence and the new Broadband Home generate demand for new key performance indicators (KPIs) that tackle all dimensions of Quality of Experience (QoE), as perceived by customers. It's still a long way for mobile TV podcasts and IPTV to match the perceived quality standards of the incumbent TV broadcast. Various metrics, often passive tests based on protocol analysis, are available, but do say nothing about the payload's shape. No-Reference payload analysis produces at least some estimates of user experience, but still lacks core information about the basic quality it all started with. For instance, your VoIP backbone may work fine - still the far end party is unintelligible due to transmission distortions and noise caused at the source mobile terminal. Your passive video

stream analysis might indicate transmission artefacts, when the picture is fuzzy and blurred. How do you know what a Pop music video download should look like without a reference?

Experience of OPTICOM experts goes back to the launch of the first perceptual test tool almost 20 years ago. An experience which clearly shows that only intrusive, reference-comparison based testing, weighted by accurate models of human perception will produce accurate KPIs representing the user's perceived quality: This has been the core business development of OPTICOM. In this newsletter, you will find a stunning update on the use cases of partner products that rely on OPTICOM's proven OEM technology – it's well worth reading!



*"With the increasing number of PEVO OEM licensees, we have reason to believe from our customers' independent evaluations and their feedback that we currently offer the best algorithm for multimedia video quality testing in the market space. Combined with PESQ and PEAQ this is not only the most trusted A/V Quality Test Suite in the Industry, but in fact the one KPI set for all Quad-Play applications".*

**Michael Keyhl, CEO,  
OPTICOM GmbH**

VISIT US AT...



## Voice Quality testing for converging Fixed and Mobile Networks



- **PESQ** – Perceptual Evaluation of Speech Quality for MOS scoring of narrow and wide-band telephony voice signals (Listening Quality) according to ITU-T P.862/P.862.1 (narrow-band) and P.862.2 (wide-band)
- **PESQ-TQ** – Perceptual Evaluation of Speech Quality (Talking Quality) for MOS scoring of the talker's perception of his own voice (echo and sidetone)
- **3SQM** – Single-sided Speech Quality Measurement according to ITU-T P.563
- **ECHO** – OPTICOM's advanced Echo Evaluation

Voice telephony still being the core basis for wireless 3G and Quadruple-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 (The talker's own voice sounding distorted with significant echo) and con-

versational quality limits with two or more parties interacting. New subjective and objective metrics to tackle Talking and Conversational Quality are currently under development within the ITU-T, whereas for Listening Quality metrics are already well established:

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 builds on an advanced PSQM-like core. Advanced PESQ OEM versions for various platforms have been devised by OPTICOM since then. The latest complement is P.862.2, a recent extension for the assessment of wide-band speech transmissions. 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

## Video Quality testing for Multimedia and



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 on mobile devices. And IPTV is the key to the new Broadband Home. 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 key KPI figure for perceived picture quality, a number of traditional (unweighted) KPIs like e.g. Blur, Blockiness, Jerkiness, Delay and PSNR are

## Audio Quality testing for streaming MP3



value before, there is a high chance that it was processed by our code.

OPTICOM's advanced ECHO measurement is offered to adequately evaluate key aspects of talking quality, and it has not only become a most successful key feature of OPTICOM's OPERA voice/audio quality tester, but - besides PESQ - it is also serving as the second most important troubleshooting KPI when OPTICOM experts are hired by operators for consultancy projects. Within the new PEXQ Software Suite OPTICOM now also introduces PESQ-TQ, a new metrics for MOS scoring of Talking Quality.

In collaboration with two partners, in 2004 OPTICOM could finalize 3SQM (P.563) as a no reference 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 PEXQ QoS testing solution.

New non-voice business models finally have taken the center stage: Portable MP3 player 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.

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

## Telephony, Broadband

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

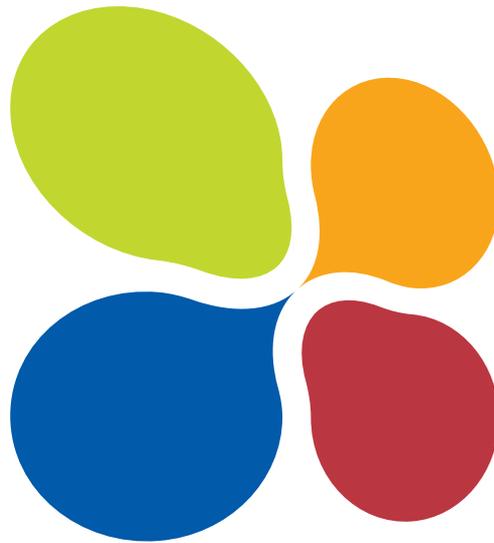
provided by the new PEVQ version V2.1 due to popular customer requests and for backward compatibility reasons. Future versions will also include optional J.144 support. And not to forget – of course we have an audio-visual KPI pair at our hands, based on combined PEAQ+PEVQ, which makes a great fit to 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. PEDQ will provide a MOS that copes with the user's perceived web browsing experience.

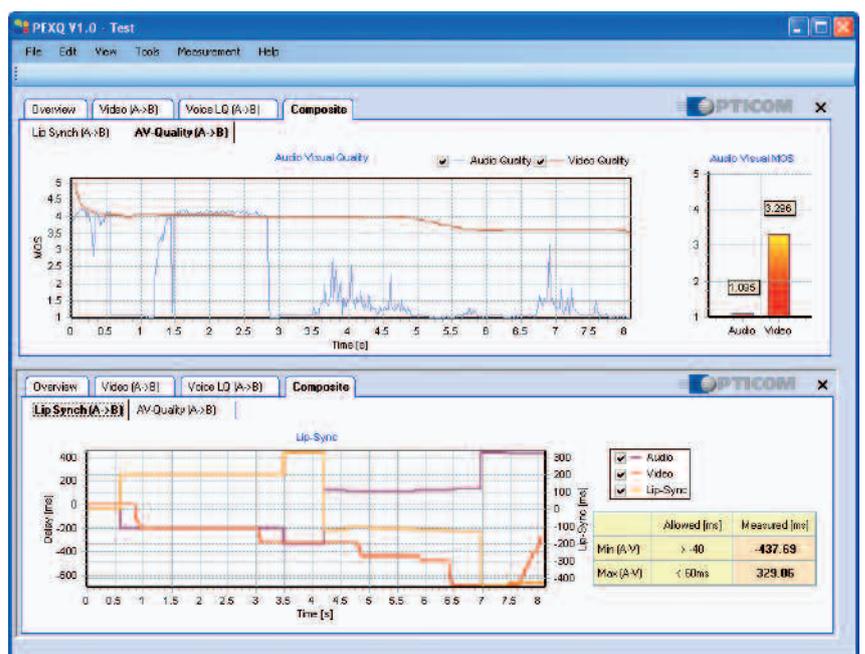




# PEXQ™

The Next Level of  
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PEXQ is OPTICOM's latest product for Windows offering a complete portfolio of quality measurement tools for voice, audio/visual and data payload analysis based on human perception. PEXQ provides mandatory features in the area of R&D for the development of new multimedia codecs as well as for multimedia equipment manufacturers. Besides lab testing PEXQ is also ideal for network operators and carriers to measure quality of service. PEXQ is founded on well established internationally standardized measurement algorithms such as PESQ (ITU-T Rec. P.862, P.862.1 (narrow band), P.862.2 (wide band); Perceptual Evaluation of Speech Quality) and completely new metrics for video quality testing like PEVQ (Perceptual Evaluation of Video Quality).



*New in PEXQ: Composite result view for Audio-Visual Quality testing reporting Audio and Video MOS KPIs (upper diagram) and detailed lip-sync analysis window (lower diagram)*

## The PEXQ feature overview:

**Employment of the latest standards for perceptual quality testing:** The current version offers measurement algorithms for voice signals (P.862.x, ECHO and PESQ-TQ) and for video signals (PEVQ). Measurement algorithms for data i.e. web-browsing (PEDQ) and for audio signals (PEAQ) will be available very soon, too.

**Audio-Visual quality testing:** Combined evaluation of audio and video information to form an overall multimedia quality estimate as well as metrics for lip-synchronicity and many more.

**Conversational quality testing:** Providing the complete quality picture of a real life telephony situation considering the aspects of listening and talking quality such as echoes.

**Easy to use and comprehensive Graphical User Interface:** Only a few clicks are needed to run a measurement. Charts and diagrams help you to interpret your results quickly.

**Extended Video Quality Analysis Support:** Watch your video sequences with additional diagnostic information such as frame differences of degraded and original sequence after a temporal and color alignment.

**Automatic measurement algorithm selection:** Let your PEXQ suite do the work and have it configure your measurement setup automatically.

**Export/Import your measurement configuration settings:** Once you have configured your setup you can save your settings to a configuration file (XML) and repeat your measurement with the exact same settings without the need to reconfigure PEXQ again.

**Export/Import your measurement results:** Archive your measurements to an XML-file and if you want to reanalyze your data again simply import your results again to PEXQ.

**Reporting functionality:** Copy your measurement results to your documents via the MS Clipboard.

**Scalability and Flexibility:** The new PEXQ suite is available as a stand-alone software solution for lab testing under MS Windows as well as for OEM licensing for T&M manufacturers and system integrators.

**Command Line Functionality:** Evaluate hundreds of test files in batch mode by using PEXQ's command line functionality.

## Future versions of PEXQ will also include:

**Enhanced data acquisition features:** Acquire data streams, run the measurements and analyze the results all in one single tool!

**Inclusion of audio quality and data quality metrics:** PEXQ will provide you with a complete multimedia measurement solution.

**Extended audio/voice analyzing support:** For example you will be able to listen to your wav-files.

### Possible Application and Configuration Scenarios

	Voice Quality Testing	Conversational Quality Testing	Video Quality Testing	Audio Quality Testing	Audio-Visual Quality Testing	Data Quality Testing
Algorithms available in the current release						
PESQ-LQ (P.862.1, P.862.2)	★	★			★	
PESQ-TQ		★				
ECHO		★				
PEVQ			★		★	
Algorithms planned for future releases						
3SQM (P.563)	★					
PEAQ				★	★	
PEDQ						★

The table above provides you with an overview of the currently employed and future features of PEXQ.



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The following  
PEXQ product versions  
are available:

#### PEXQ Suite for Windows

- Graphical User Interface  
Single-User License
- Graphical User Interface  
Multi-User License

#### PEXQ Developer's Edition for Windows

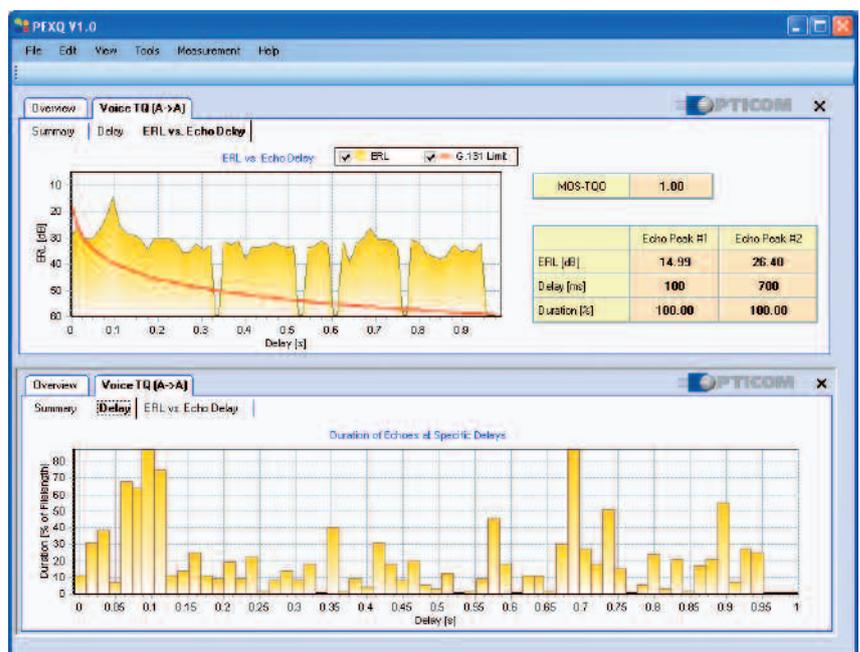
- Graphical User Interface including  
OPTICOM's Advanced  
OEM Developer Toolkit<sup>1</sup> for  
developers of T&M equipment  
and system integrators

<sup>1</sup> The OPTICOM Advanced OEM Developer Toolkit is a set of software libraries containing measurement and signal preprocessing algorithms. OPTICOM's OEM software libraries are available for Windows and Linux.

PESQ Analysis of Listening Quality  
(upper diagram) with Spectrogram  
of test signal (lower diagram).

Note the easy configurable tab  
selection for multifaceted result  
views.

Comprehensive analysis of  
Talking Quality: Echo Return Loss  
analysis and PESQ-TQ MOS  
(upper diagram), Echo Delay  
Histogram (lower diagram)



## Committed to Standardization

In 2007 the telecom industry will see new technologies like IMS being rapidly deployed, while at the same time prices for fast Internet access on mobile devices are dropping at the same pace. These market realities put strong pressure on standardisation bodies like the ITU to develop new methods for the assessment of multimedia quality. As far as video quality is concerned, standardisation is expected to last at least until late 2008, and this is already an optimistic view.

The good news is that nobody has to wait that long, since OPTICOM is already there and offers PEVQ today. PEVQ does significantly exceed the VQEG requirements for a multimedia metric in many aspects which are important for real life applications.

At the same time, the ITU is reacting to the market needs and starts working on new recommendations for multimedia streaming (P.NAMS), conversational voice quality (P.CQO) and an extension for PESQ (P.OLQA). None of these will, however, be finalized within a short term. Needless to say, that OPTICOM is pushing the work by providing solutions for all of these applications already today.

While strongly being committed to the international standardisation, we also see the clear need of the industry to meet the challenge of the new mobile and broadcast environment. We therefore offer our full range of measurement algorithms just-in-time today – long before the standardization will be completed.

**Dipl.-Ing. Christian Schmidmer, CTO**

**OPTICOM GmbH**

## PEVQ complements IXIA's IxLoad portfolio

Aptixia IxLoad is widely used by network operators and equipment manufacturers to assess the performance and capacity of new triple play service offerings before they are deployed. By understanding subscriber Quality of Experience (QoE) before and during large scale deployments, Ixia can reduce risks and accelerate the adoption of services such as VoIP, Video over IP, Video on Demand, and high speed data over all common topologies. OPTICOM's PEVQ perceptual video quality measurement complements the multiple methods IxLoad provides to measure QoE ranging from the network layer through full-reference metrics.



Ixia's use of the OPTICOM PEVQ video evaluation algorithm will help complement the IxLoad portfolio for video testing by allowing users to obtain perceptual measurements on the video delivered by the network. The OPTICOM PEVQ referential method combined with IxLoad allows automated measurement of the QoE, which is ultimately the most important metric to have when designing a network.

*Please find out more at the 3GSM Congress 2007, booth 1A03, at the VON Spring show 2007, booth no. 736 or under [www.ixiacom.com](http://www.ixiacom.com).*

## Video MOS in Ascom's QVoice Video Telephony Test System

The cellular network measurement tool QVoice from the Swiss company Ascom is used by more than 170 cellular operators worldwide, in more than 60 countries. QVoice uses the video algorithm PEVQ from OPTICOM for its video telephony testing and the algorithm delivers very accurate video MOS and other results. PEVQ takes as input the video signal electronically captured by QVoice, and gives results online. This capability enables the cellular operators to access/benchmark their network and service performance, and pin-point all the relevant issues in loading, performance and subscriber experience.



drive tests and a very compact format of the measurement data. There is also the possibility of live recording the full video sequences of poor quality for further examination with the post-processing tools.

*Please find out more at the 3GSM Congress 2007, booth no. 1C05 or under [www.ascom.ch](http://www.ascom.ch).*

In addition to the Video MOS, some other video metrics like blockiness, jerkiness, blur, PSNR and so on are also delivered by PEVQ. Video quality results are evaluated on the Symphony equipment itself. This allows an online view of the results during



## Spire Technology incorporates OPTICOM's OEM technology



Spire Technology has decided for OPTICOM's PESQ as the MOS testing solution for mobile network voice quality in their Netimizer Series. The Netimizer Series has been adopted as the preferred choice by prominent wireless carriers of the Asia Pacific Rim. In respect of a customer satisfaction point of view, many carriers are nowadays focusing on MOS quality.

[www.spiretech.co.kr](http://www.spiretech.co.kr)

**Jeffrey Chun, Managing Director,  
Spire Technology Inc.:**

*"We have evaluated a few leading PESQ solutions available from vendors. OPTICOM PESQ was the choice of us to meet the customer and our technical requirements. We come to know this decision was the right from our achievements."*

## JDSU's NetComplete portfolio now incorporates OPTICOM's PESQ and ECHO



The NetComplete portfolio, a JDSU Service Assurance Solution, combines the QT-200 xDSL & Triple-Play Probe and NetAnalyst Test Management Software, providing an unsurpassed ability to pre-qualify, provision, maintain, monitor, and troubleshoot DSL triple-play services as well as copper loop and POTS lines.

Tests can be performed toward the customer premises and also toward the DSL network (DSLAM, ATM backbone, BAS, Radius Server, ISPs, and other IP services, such as IP Video and VoIP). The QT 200 probe also provides VoIP and Analog POTS voice testing to ensure the transition from

legacy POTS switch to full IP network. Voice testing toward the network/ISP employs PESQ provided in combination with the advanced talker ECHO measurement from OPTICOM.

The NetComplete SAS provides a very cost-effective solution for optimizing DSL service providers' call management capabilities, reducing MTTR (Mean Time to Recover) and thus customer churn and eliminating the need for visits to the customer premises for fault finding.

*Learn more about this product at the 3GSM Congress, booth no. 2A78 or under [www.jdsu.com](http://www.jdsu.com).*

## InnoWireless' Network Optimization Tools rely on PESQ MOS



OPTis-M is a real time, multiple Mobile/PCMCIA phone-based data collection tool supporting a variety of wireless technologies (IS-95 A/B, 1xRTT, EVDO, DO-Rev A, iDEN, GSM, GPRS, EDGE, UMTS, HSDPA and WiMAX/Wibro). OPTis-M enables users like Service providers, System or Cell phone vendors and Application providers to troubleshoot, maintain, optimize and benchmark wireless voice/data systems and networks with one single tool. OPTICOM's PESQ voice testing technology is embedded in both, OPTis-M and OPTis-Auto Network Optimization Tools.

Together with WirelessLogix, USA, InnoWireless has been recognized as a

leader in the highly progressive wireless test and measurement market in Asia, Europe, and North America supplying their cutting edge test and measurement solutions to some of the world's largest wireless carriers. With this proven success record, WirelessLogix/InnoWireless are continuing to invest heavily on next generation technologies. WirelessLogix/InnoWireless have combined their portfolio of advanced testing and network enhancement solutions with value oriented pricing and offer their solutions globally.

*Please learn more about these solutions under [www.innowireless.co.kr](http://www.innowireless.co.kr) and [www.wirelesslogix.com](http://www.wirelesslogix.com).*

## ATIO implements OPTICOM P.862 voice quality in its QoS Product range



South African based ATIO Corporation, a leading provider of service quality testing for mobile operators and service providers, has announced the implementation of OPTICOM's P.862 license solution in its QoS product range. This includes the ATIO Universal Autonomous Network Tester ("UANT") and the ATIOScript network test solution. Both products are designed to provide comprehensive multi-service testing capabilities to operators, but the voice quality testing solution is a cornerstone feature.

The UANT is an automated test event generator platform designed for use in network service quality testing and revenue assurance applications. The device allows repetitive and highly flexible test call campaigns to be conducted in a mobile or static environment. Covering 2G to 3G technologies and beyond, test call campaigns can be created to test voice, video, messaging and data services. Apart from the P.862 voice capability, the UANT also allows testing of mobile portal content through automated content downloads

**Tim Courtenay, MD ATIO Telecom Services,** says "We decided to go with OPTICOM's P.862 license following a successful trial integration conducted by our engineers. We have utilised it both in our automated test platform (the UANT) and in our ATIOScript solution, a manned drive test solution. OPTICOM is a leader in perceptual voice quality testing, and with their developments in streaming audio and video quality testing they were the natural choice for us. We have also found their support levels to be excellent."



Tim Courtenay, Managing Director ATIO and Dr. Werner van der Walt, Manager Technology with the UANT Network Tester

such as full track music downloads, video clips, games, ring tones and more.

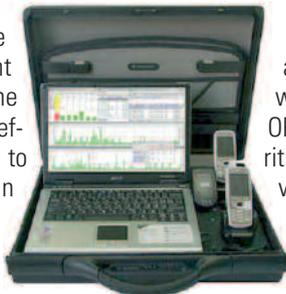
The ATIOScript tool is a manned drive test system allowing the connection of up to 8 mobile phones for simultaneous network quality testing and engineering data logging. Utilizing the latest Nokia test mobiles such as the 6680, N80, N92 and N95, the ATIOScript logs voice, video and data service engineering test data files for interfacing to ATIO and third party network analysis and optimisation tools.

ATIO can be contacted at: [www.atio.com](http://www.atio.com)

## R&D adopts OPTICOM's OEM technology for mobile network testing in Russia



As one of the most recent entries to the portfolio of OEM customer references, OPTICOM is proud to report that with Russian T&M vendor R&D, Moscow, one more potential and innovative player in the portable and drive test tool arena could just be welcomed. In their 'Sound' system, R&D is using OPTICOM's proven PESQ voice quality algorithm on a portable and flexible system configuration



by employing a Laptop based analysis toolkit in connection with SAGEM test mobiles. OPTICOM's advanced OEM algorithm toolkits have not only provided R&D with a fast time-to-market, but also guarantee for accurate and Standards-conforming measurements, including the very latest advancements and amendments to the series of ITU recommendations P.862.x.

Learn more about R&D's products at the 3GSM Congress 2007, Sagem booth no. 8B94.



*R&S High Performance Drive Test System: GSM/UMTS/CDMA2000 Scanner, 4x mobiles, QoS (Network-Qual., Data Qual., Speech Qual. PESQ-MOS), Interference, missing neighbours, Handover analyzer, etc. Based on industrial PC with 12Vdc supply.*



*R&S Suitcase: GSM/UMTS/CDMA2000 Scanner, 4x mobiles, GPS, QoS (Network-Qual., Data Qual., Speech Qual. PESQ-MOS)*

## Drive Test Solutions by Rohde & Schwarz – complete systems for QoS measurements

The complexity of mobile communication networks is increasing drastically.



available in various mechanical designs, always tailored for the needs and best benefit of the user.

Beside the classic GSM operation used since the early 90ties a lot of extensions have been implemented into the networks. There are in operation new technologies such as GPRS, EDGE, UMTS (WCDMA), HSDPA, HSUPA, which mainly have been used for the provision of high data throughput.

Besides still the speech quality of the communication is an important factor.

Lots of mobile networks are in operation, competition is increasing in every European country. Consequently the classical drive test tools are used today for a parallel, simultaneous measurement of coverage and QoS data. Besides also benchmarking tests between the various networks need to be performed.

Rohde & Schwarz Drive Test Systems are

Due to the complexity of the networks nowadays drive tests are becoming quite expensive. Consequently in a single measurement tour everything that could be measured has to be measured. So, practically all the measurement data are available for evaluation in a post process, without any lack of field data.

For all the QoS measurements Rohde & Schwarz algorithms are based on ETSI standards and ITU recommendations. For the Speech Quality test the Rohde & Schwarz drive test solutions are based on OPTICOM's PESQ algorithm with a MOS presentation.

*Please find out more about these solutions at the 3GSM Congress 2007, booth no. 1C50 or under [www.rohde-schwarz.com](http://www.rohde-schwarz.com).*

## Shenick taking advantage of PEVQ video analysis for IPTV/Triple Play testing



Quality of customer experience is one of the primary areas of concern within today's IPTV services environment and is a serious challenge for both service providers and infrastructure vendors. With competition from satellite and cable TV offerings, there is zero tolerance for issues such as IP Video quality and poor channel change rates.

Additional quality challenges are ahead with the average IPTV subscriber base set to grow from hundreds of thousands to millions of viewers, coupled with the introduction of bandwidth and quality sensitive HDTV services and the requirement to offer a full suite of triple play video, VoIP and data applications.

Shenick is an award winning provider of IPTV/Triple Play test systems to the world's most progressive network operators and communications equipment vendors. Leading companies rely on Shenick's diversifEye to help deliver the best IPTV quality of service and guaranteed individual experience.

*More information: [www.shenick.com](http://www.shenick.com)*

*Robert Winters, CMO, Shenick: '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.'*



## P3 Solutions adds PEVQ to Distributed Sensor Quality Monitoring

P3 Solutions' DSQM stands for Distributed Sensor Quality Monitoring and allows for distributed Quality of Service measurements consisting of an unlimited number of clients. These clients are standard smart phones based on the Symbian operating system. Running the DSQM client software the smart phones are centrally administered and configured to for example monitor normal user behaviour, question users about perceived quality or autonomously perform quality measurements of voice, messaging or data services.

Via web, bluetooth or memory card an installer is once distributed onto the participating clients to automatically install the needed software modules depending on the requested feature set. The DSQM client software running on the terminal operates in the background largely unnoticeable to the user and can centrally be configured and updated.

The software continuously contacts the DSQM server via GPRS/UMTS to upload measurement data or to download new measurement profiles and software

updates. The actual measurements can functionally be divided into different operating modes.

On the one hand the user behavior can be evaluated through logging the kind of services used (speech, messaging and data) supplemented by time and position information (MONITORING MODE). This can be extended through evaluating the perceived quality of service (PQoS) in presenting a context specific questionnaire about the used service on the terminal display (QUESTIONNAIRE MODE). Alternatively or in addition, voice and data services can be measured according to predefined Key Performance Indicators (KPI) during the regular service usage, e.g. OPTICOM's PESQ [ITU-T P.862] voice quality or data rate. Furthermore, autonomous measurements of voice, messaging or data services with a highly sophisticated campaign scheduling with queue are possible as well (AUTONOMOUS MODE).

Upcoming in 2007 is the measurement of streaming video based on OPTICOM's PEVQ as well as an update to Symbian 9.1 (Series 60 3rd Edition)≤



*"We utilize OPTICOM's algorithms for automated perceptual speech and video quality evaluation in our distributed measurement systems for the quality engineering in mobile radio networks. Hence we derive huge amounts of highly reliable data with a real statistical significance within a short time."*

*Marc Peter Althoff, Managing Director of P3 Solutions*



Further information: [www.p3-solutions.de](http://www.p3-solutions.de)

## KEYNOTE SIGOS SITE Test System embeds PESQ and PEVQ MOS testing

The Keynote SIGOS SITE (SITE Integrated Test Environment) Test System is a most comprehensive solution for testing and measuring entire mobile network operations – all from one company. SITE allows you to conduct protocol level testing and monitoring that supports a wide variety of networks and mobile services.

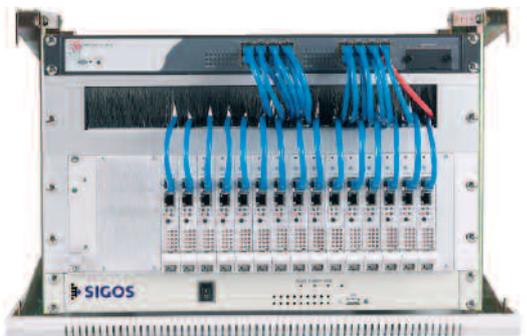
In addition, SITE utilizes SIM card multiplexing that can handle thousands of SIM profiles to offer maximum flexibility and the ability to rapidly execute tests and measurements.

With the SITE Test System, one has a complete system comprised of test probes and software to test and measure the quality and reliability of network applications and services. Mobile operators the world over rely on SITE to deliver the highest subscriber satisfaction.



The Keynote SIGOS SITE Test System models real subscriber behavior by simulating end-user behavior. For Voice Quality testing the SITE Test System embeds OPTICOM's PESQ, along with PEVQ for Video Quality testing. Comprehensive core network testing is further provided by testing every type of communication protocol and service, while of course technologies such as GSM, GPRS, EDGE, CDMA2000, UMTS and HSDPA are well supported. The detailed measurement activity provides activity logs for deep test analysis, while the modular structure guarantees for maximum flexibility in service, protocol, and end-to-end testing. A powerful scripting language and test design tools allow high flexibility and customization.

Please find out more at the 3GSM Congress 2007, booth no.1F70 or under [www.keynote-sigos.com](http://www.keynote-sigos.com).



*SIM Multiplexer, one of the key elements of the SITE Test System*

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## 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.

PEXQ, the next level of Perceptual Quality Measurement, is the ideal 'all-in-one' test suite for developers, manufacturers and operators, while the 'X' just symbolizes the ongoing evolution of perceptual QoE metrics: Based on PESQ, PEAQ, PEVQ and PEDQ the software provides the most comprehensive standards-based MOS-KPI set to score voice, audio/visual and data quality as experienced by subscribers. OPTICOM's proven OEM technology can be found in most state-of-the-art products of leading T&M vendors, see also [www.opticom.de/company/customers-licensing.html](http://www.opticom.de/company/customers-licensing.html).

OPTICOM GmbH is a privately held company located in Erlangen, Germany.