MultiDSLA For Laboratory Applications:

"Know What Lies Behind The Score"

MultiDSLA is the essential test system for speech quality testing in R&D and QA laboratories. It ensures that engineers have the tools they need. It evaluates speech quality and helps to identify and correct the causes of impaired quality – this is the difference that Malden makes. MultiDSLA is the only system to provide all of these:

- Detailed analytics – see "What lies behind the score?", below
- Analogue, VoIP and TDM test interfaces – build the system to match requirements
- Ultra-flexible test design – see "Test design task by task", below
- A range of popular metrics for speech and audio
- ITU-T Rec. P.863 POLQA® with 48k sample rate support, for analysis up to super-wideband

The generic nature of MultiDSLA's test interfaces are equally well suited to measuring the speech quality of VoIP, 2G-4G and VoLTE Cellular and Analogue terminals and networks, or for that matter, hybrid networks. MultiDSLA is a "one stop shop" for speech quality test needs in all of these areas:

- Research And Development
- Pre-Deployment Testing
- QA
- Performance Testing
- Functionality Testing
- Competitive Analysis
- Vendor Selection

Use MultiDSLA to reduce development and test times by establishing the facts, faster.

Figure 1: Typical configuration with analogue test interfaces

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Controller GUI Functions

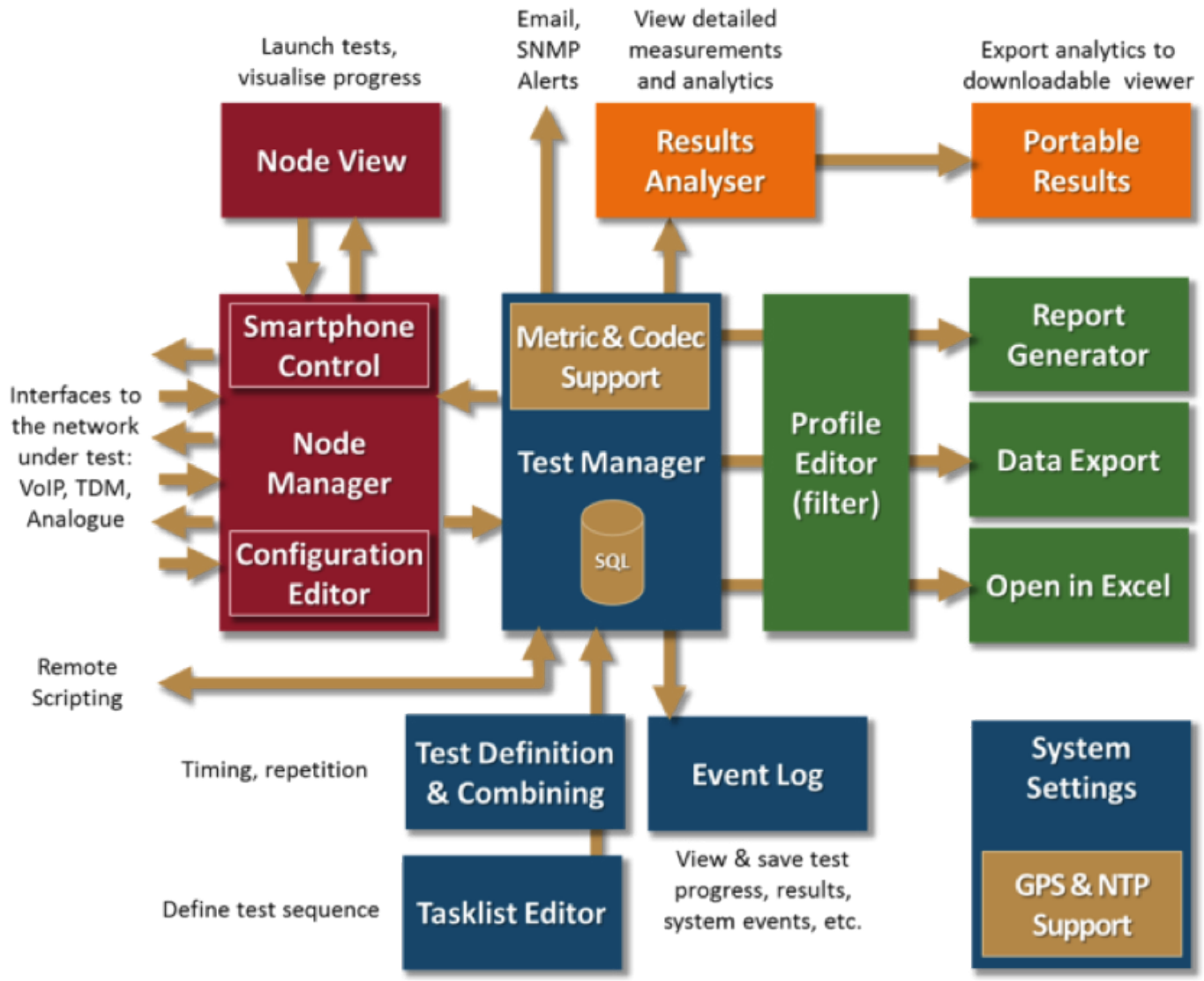
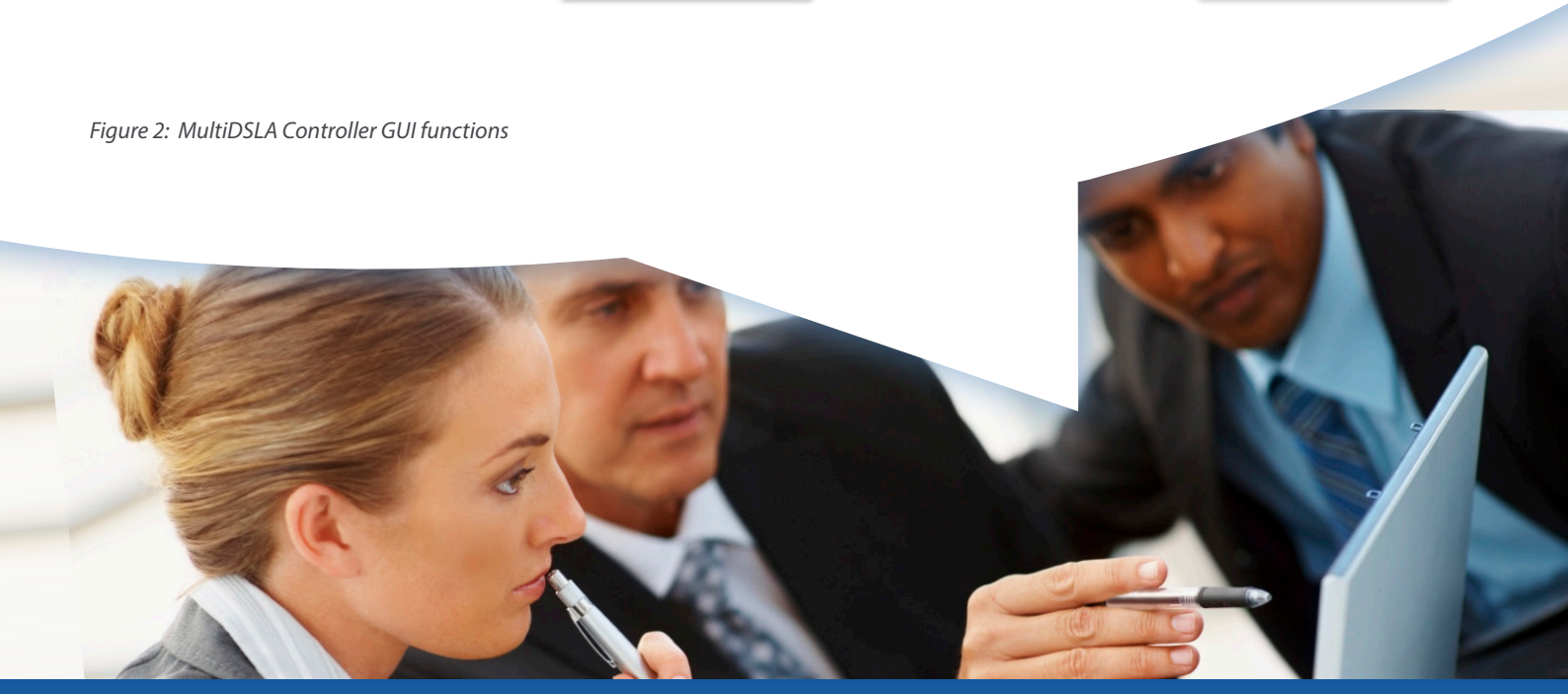


Figure 2: MultiDSLA Controller GUI functions



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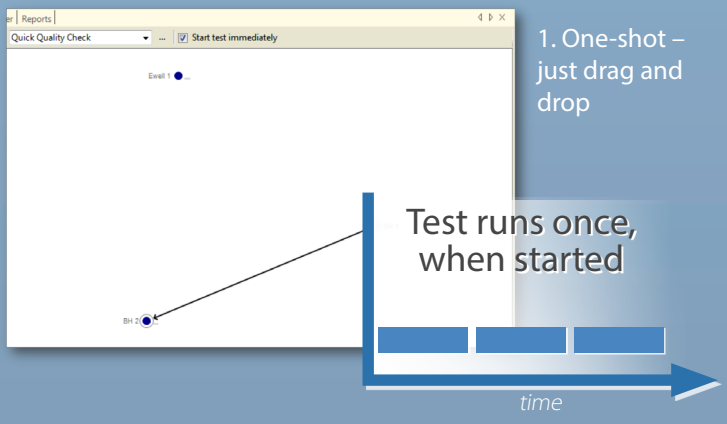
MultiDSLA Delivers:

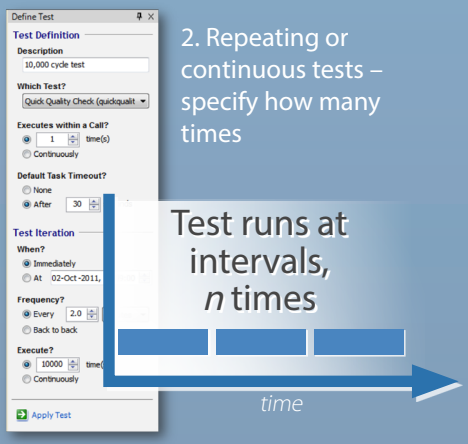
- Proven reliability and industry leading accuracy
- Quick repeatable tests with pass/fail criteria
- Automation APIs including TCL, PERL and PYTHON
- Call control automation for cellular handsets and soft phones
- Easy to use but flexible - the granularity you need when you need it
- Detailed graphical representations of PESQ, E-Model and POLQA® analyses
- Powerful drill-down and Root Cause Analysis
- Metrics include speech quality, latency/delay, delay variation, speech level, DTMF, echo, call statistics, packet statistics and SIP transactions
- POLQA® and PESQ support – comprehensive benchmarking capability
- Support for VoIP, Cellular, Analogue and TDM interfaces
- Customised reports and flexible data export
- Single stable platform with no "Forklift Upgrades"

Ease of use with Flexibility

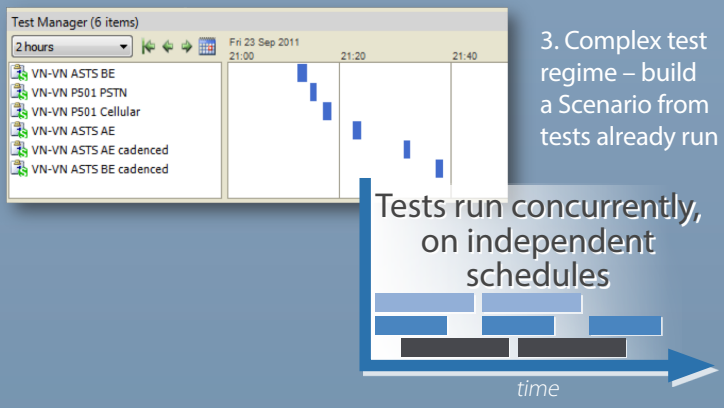
Less is more. Note the elegant simplicity without impacting flexibility. For example the graphics below show four ways to run a test:



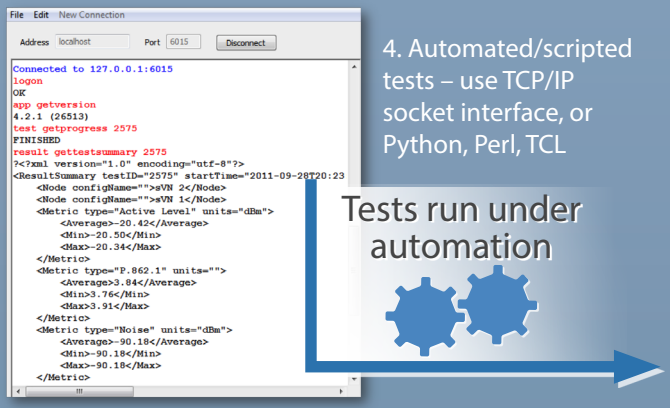
1. One-shot – just drag and drop



2. Repeating or continuous tests – specify how many times



3. Complex test regime – build a Scenario from tests already run



4. Automated/scripted tests – use TCP/IP socket interface, or Python, Perl, TCL

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Test Design, Task by Task

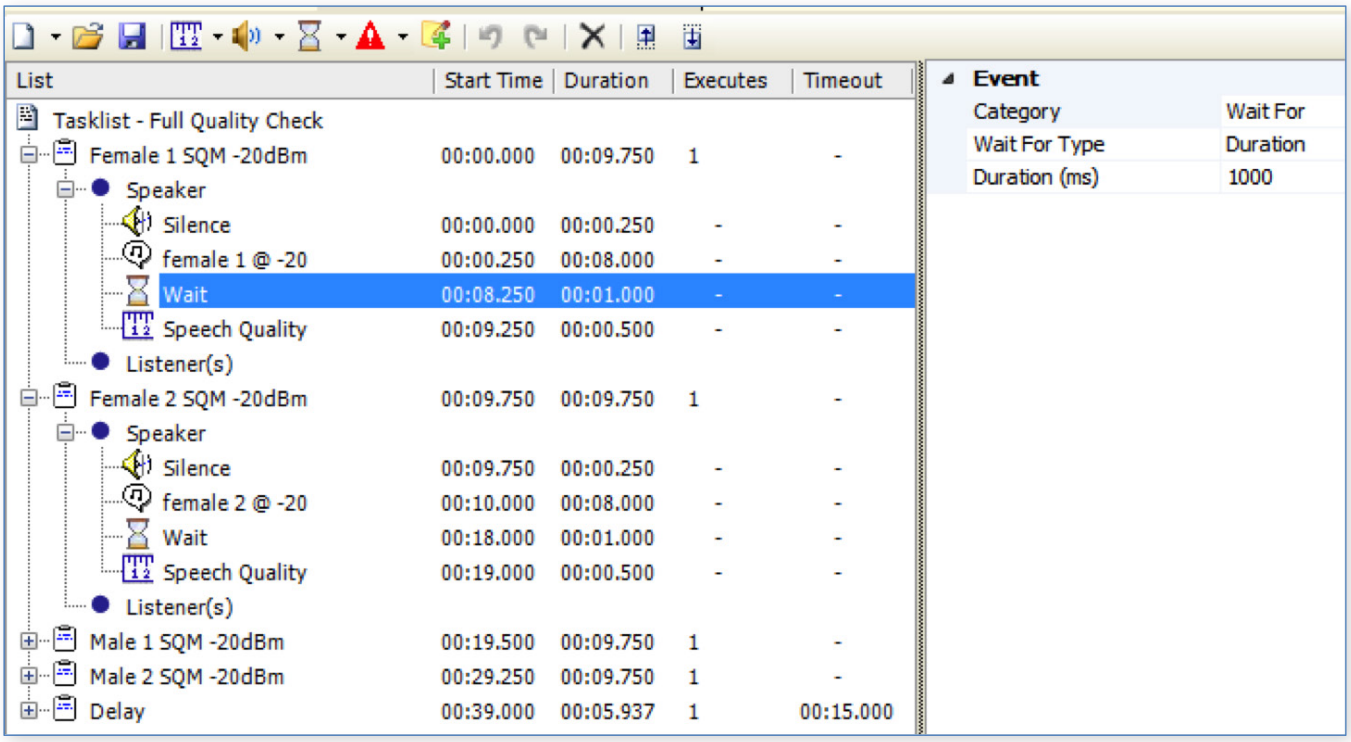

Figure 3: Tasklist Editor for test design

What Lies Behind The Score?

Algorithms such as POLQA and PESQ provide quite accurate estimations of subjective Mean Opinion Score when they are selected and used appropriately. MultiDSLA provides the tools to optimise and verify the validity of PESQ and POLQA scores. Test systems which offer little or no control over test conditions and give nothing more than a score are unlikely to provide an accurate MOS estimate. As one MultiDSLA user said:

> *"I didn't know much about MOS when I got my first Malden system, so I decided to do some tests. I quickly learned that MOS is not like Volts – you can't just clip on a meter and measure it. The choice of speech material, the speech power level, signal filtering and the performance stability of the system under test are all factors which must be taken into account in setting up the test process. MultiDSLA makes it simple to do this, and to document and store those settings to ensure accuracy and repeatability. It works."*

Subjective MOS is the result of a listening test which takes into account all the factors influencing listening quality. Once reduced to a single number though, the details of those factors are lost. A score of 3.2 against an expectation of 3.9 suggests that something is wrong, but not what. MultiDSLA's detailed analytical data and graphs help the user to identify the cause from amongst the many candidates – for example noise, packet loss, radio fading, codec selection, amplitude clipping, temporal clipping, jitter buffer re-sizing in active speech and so on.

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Figure 4: A range of tools to help determine the causes of quality impairment

The Test Process

- A clean, high quality "reference" speech file is transmitted from one end point to the other.
- The received "degraded" speech file is recorded and analysed.
- Three surfaces are presented graphically. The Reference Surface, the Degraded Surface and the delta of the two, the Error Surface.
- By interpreting these three surfaces, and the other analytical views, a great deal can be understood about the reasons behind the MOS predicted by the test.

PESQ and POLQA

MultiDSLA utilises the PESQ and POLQA metrics to predict mean opinion score. PESQ was designed for legacy codecs such as G.711, G.729 and GSM. POLQA was designed around ten years later for both legacy and newer codecs, including AMR, EVRC, iLBC, iSAC and SILK. POLQA is more accurate than PESQ with time warping and variable rate codecs. Also, PESQ uses different scales for Narrowband (NB) and Wideband (WB) speech. For example a score of 3.5 from a PESQ NB test is not the same as 3.5 from a PESQ WB test, reflecting the different methods used for NB and WB subjective tests. POLQA has a Super-wideband (SWB) scale of 1-5, defined in such a way that it can be used to measure NB, WB and SWB speech and return scores which 'fit' with intuitive expectations when comparisons are made between them.

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Graphical Representations Derived From PESQ & POLQA

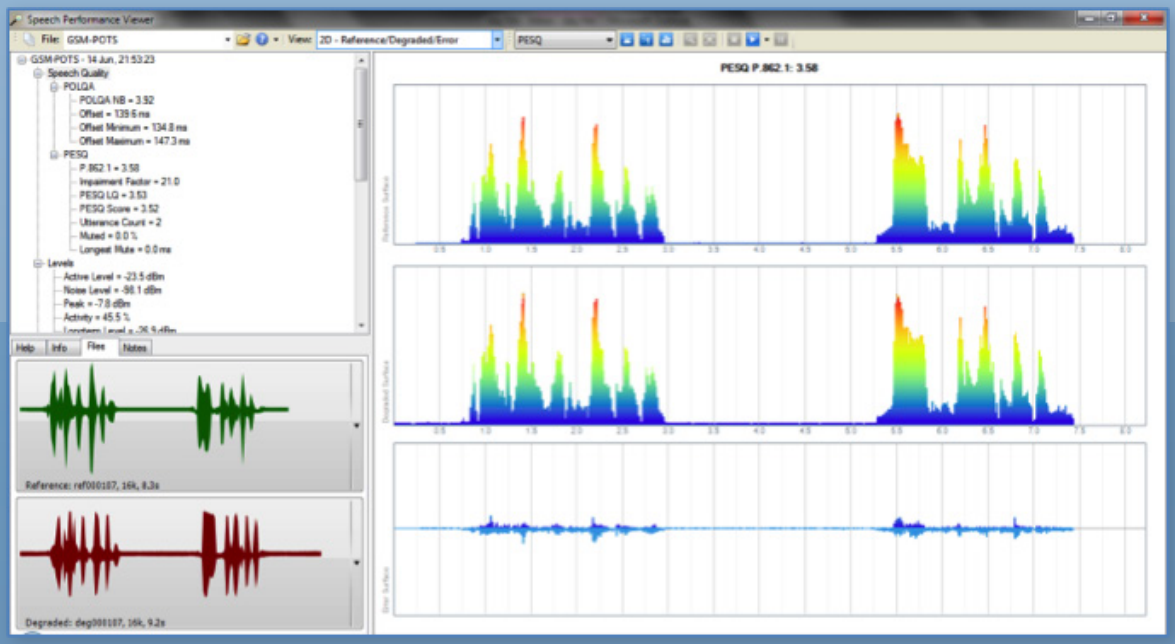

Figure 5: Results tree and Speech Quality analysis

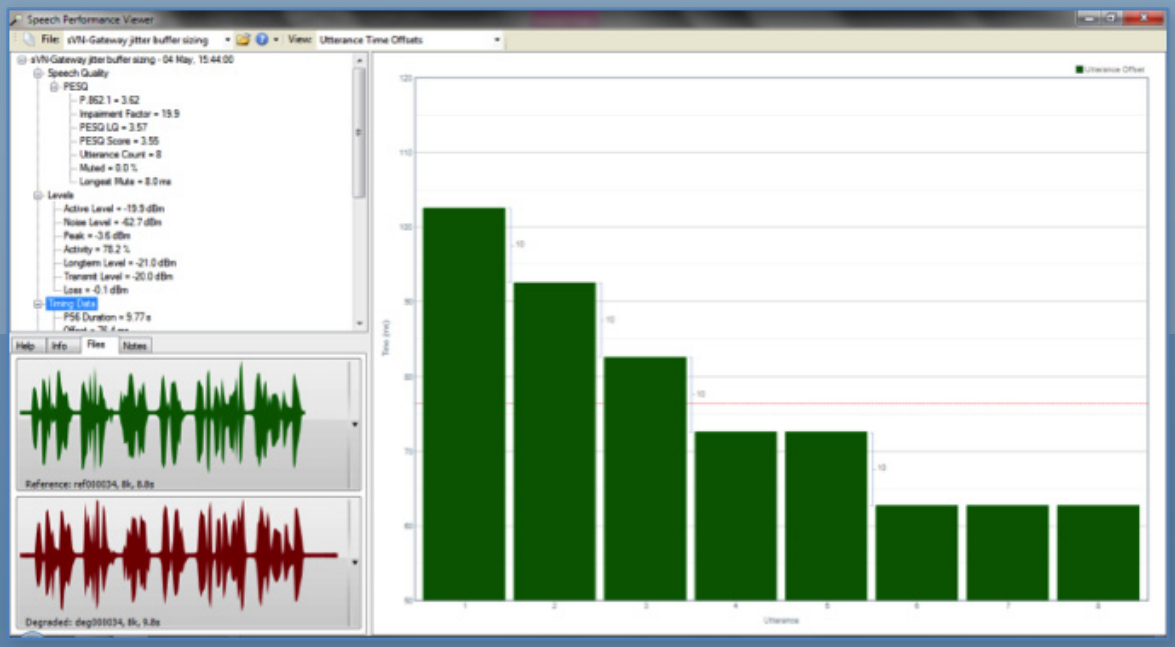

Figure 6: Jitter buffer re-sizing analysis

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And Not Just Speech Quality....

MultiDSLA evaluates many other transmission and telephony performance parameters. Echo level and delay, noise, frequency response, DTMF twist and frequencies, toneburst levels are just some of the parameters that can be measured.

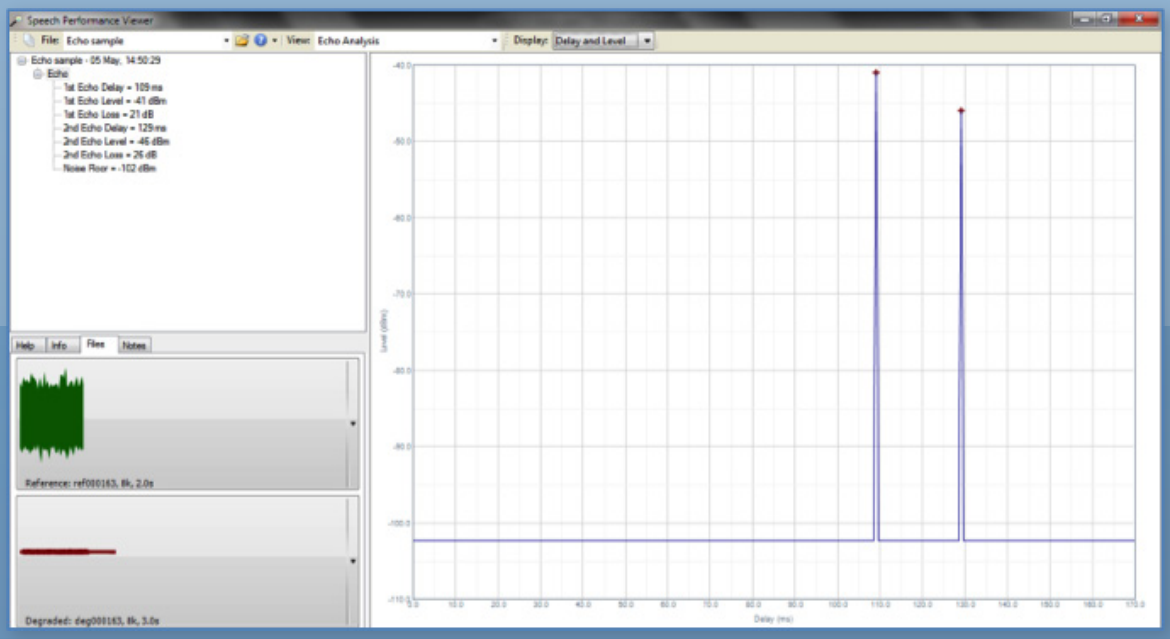

Figure 7: Echo Level and Delay

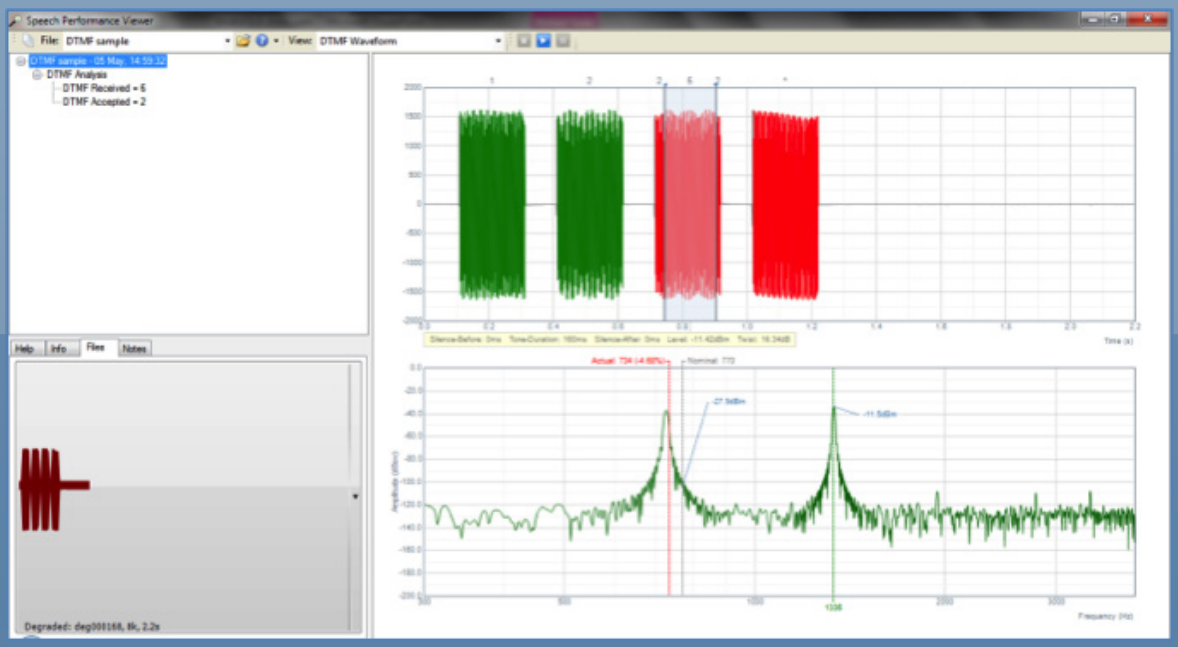

Figure 8: DTMF analysis

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Multiple Interface Type Support:

Analogue	VoIP	TDM
• Desk phones – all technologies • Mobile handsets – all types • Soft phones via PC sound card and USB interface • PBX and exchange lines, with full dial structure support • Other test interfaces, e.g. Head & Torso Simulator, Base Station Emulator	• SIP, H.323 • G.711A/μ, G.729A/B, G.723.1, G.726, iLBC, PCM, G.722, AMR • In-band and out-of-band (RFC2833) DTMF • Packet statistics and SIP transaction analysis	• Basic Rate (BRI) with PCI and PCMCIA form factor • Primary Rate (PRI, T1/E1) with PCI form factor
		

The MultiDSLA test system can be configured to meet virtually any speech assessment application. Based on Malden's 20+ years of experience in the measurement of speech signals, MultiDSLA offers the most powerful, flexible and informative solution available. Build your ideal test system by specifying a MultiDSLA Controller plus any quantity and any combination of the network interface devices: analogue, VoIP and TDM. Protect your investment: adapt your test system to changing demands by adding test capacity or alternative test interfaces.

Choose MultiDSLA with confidence that it will work for you and that Malden's experience will deliver the technical support when it is needed. Join the ever-growing number of 'A' brand users in R&D and QA laboratories around the world who trust Malden test systems to deliver reference measurements.

Also available:

- MultiDSLA brochure (generic)
- MultiDSLA Datasheet
- POLQA brochure
- MultiDSLA Drive Test Brochure
- Speech Quality
- MultiDSLA Enterprise Brochure
- MultiDSLA Networks Brochure

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