Major Update of dB-Lab Version 212 and QC 7

Press Release July 2021

In July 2021 KLIPPEL released their new major software update. The main software platform *dB-Lab* 212 for both, *QC 7* and *R&D*, now provides a shared sensor management. The **Klippel Multi-Scanning Workbench** is now fully released bringing the near field holographic sound field scanning technology that provides directivity, sound power and room correction to a much smaller form factor. For comprehensive measurement of distortion using multi-tone stimuli, the MTON module is now released. Simulation tools are complemented by a new linear simulation module LSIM, dedicated to speaker and enclosure design. Klippel QC software has been upgraded with a new automation control interface and multi-channel support for any Windows or ASIO audio interface, as well as wave-file based open loop testing. It includes more flexible options for testing and synchronization and for smart or stand-alone audio devices. Many small but useful tools and updates in existing modules round up this new major release.

▷ **DOWNLOAD** The full information sheet about dB-Lab 212 – QC 7

COMPREHENSIVE SCANNING SOLUTIONS

A gap has been filled for **acoustic spatial measurements** using a smaller form factor than the well-known, large Near-Field Scanning System (NFS). Based on the popular vibration scanner hardware (SCN), the automated acoustic scanning and the full spatial characteristics of sound sources by holography is now available. A hardware add-on (SCN-NF) extends existing vibration scanners to a multi-scanning workbench for other useful sensors such as microphone, probes, and magnetic sensors. The main application is acoustic scanning in normal rooms. Thus, no anechoic room is required for accurate acoustic measurements. Typical devices under test are transducers and small audio devices (mobiles, smart speaker).

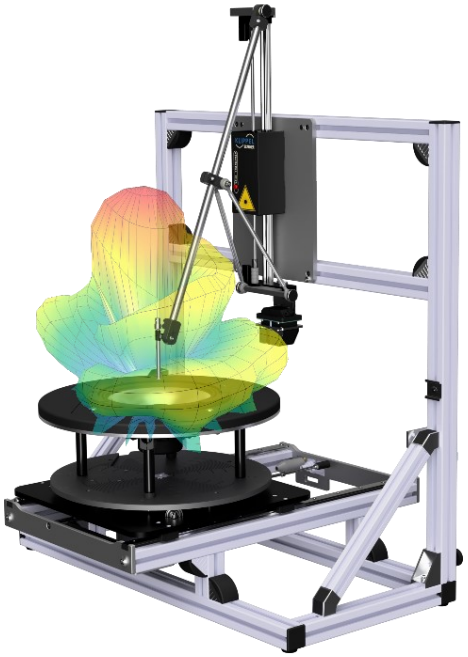

Figure 1: Woofer mounted on the SCN scanning workbench using new near field add-on (SCN-NF).

Advanced holographic analysis suppresses room reflections as well as modes. Based on far less points then required for a conventional directivity measurement on a fine acoustic grid in greater distance, a near field measurement reveals an analytical description of the source and therefore can provide spatial data at any distance outside the scanning surface and at any resolution. Important output results include directional characteristics such as balloon plots, directivity plots, sound power and many more. Whereas the large Near-Field Scanner allows full and half space measurements, the ***Multi-Scanning Workbench*** is focused on half space configuration (using a baffle).

The typical test time starts from as low as 5 minutes when assuming rotational symmetry. A full scan without any symmetry assumptions takes about 1 hour. The ***Multi-Scanning Workbench*** (formerly SCN hardware) now comes as complete hardware platform for vibration and sound pressure (or other domain) scans. Two separate software packages are available for mechanical and acoustical analysis.

▷ **DOWNLOAD** The general article about the Klippel Multi-Scanning Workbench!

The **vibration scanning** software now supports an automated laser calibration and verification. To position sensors at any location, a simple positioning frontend for the individual axis has been added. Based on vibration data, rocking modes can be detected reliably and the root cause of rocking can be identified. The Rocking Analysis Module (RMA) is released now and has received substantial improvements to guide the user effortlessly from measurement to analysis. A clear indication is given if the device under test has a critical rocking behavior which may result in reduced output, audible distortion (Rub&Buzz) and early failure (field rejects). The actual scanning time for a rocking analysis takes usually less than 10 minutes. This allows testing multiple devices of one batch to isolate systematic behavior from random effects. The graphical output and user interface of the NFS near field scanner **visualization software** was completely reworked and is now natively integrated in dB-Lab. Distance scaling is now available from the scanning surface to far field.

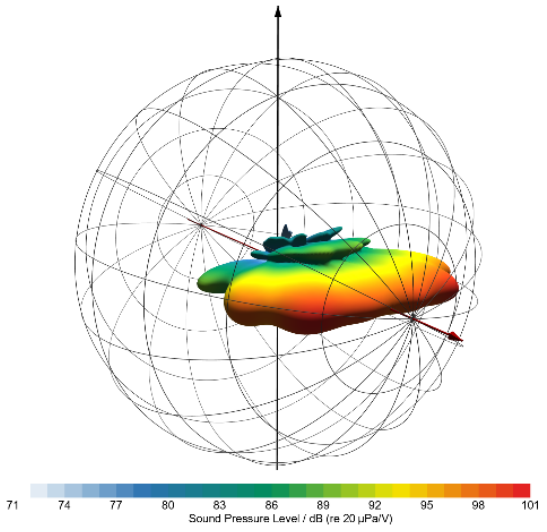

Figure 2: Balloon plot generated with the new NFS visualization in dB-Lab.

DISTORTION ANALYSIS

The Multi-Tone Measurement (MTON) is now full released. Multi-tone stimuli are quite useful test signals due to their music-like properties with the advantage of direct distortion measurement at the non-excited spectral bins. Therefore, multi-tone distortion provides a much more realistic picture than a pure sine tone measurement and the corresponding harmonic distortion analysis. MTON has a new option to specify the crest factor (impulsiveness - ratio of peak and rms value of the stimulus) which is important for high power tests and for accurate imitation of real-world music material.

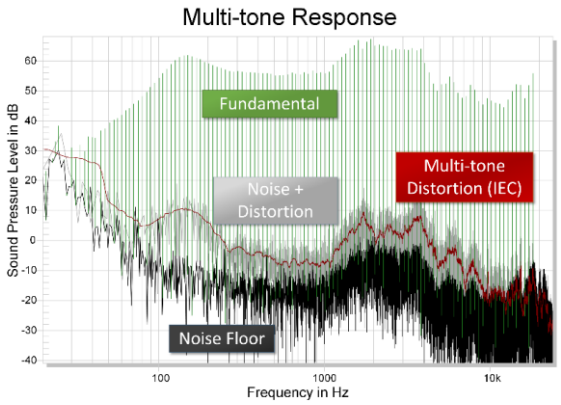

Figure 3: Main result plot of the MTON module.

Stepping and cycling tests allow automatic thermal and non-linear compression measurements. To protect the device under test, several limits can be defined to avoid damaging when increasing test levels automatically. For transducers or passive systems, electrical, mechanical and acoustical signals can be analyzed and conclusions can be drawn for distortion generating mechanisms. MTON supports testing of any active audio system with wireless connection (e.g., Bluetooth®) and compensates for potential frequency jitter.

SIMULATION

The well-known non-linear simulation modules SIM and SIM-AUR received a corresponding tool for linear simulation (LSIM). In contrast to many available tools, the LSIM targets the overall design for green speakers (efficient, light weight, small). Maximum peak voltage, voltage sensitivity and efficiency for a given program material can be tuned easily to application requirements. Automatic EQ-tuning is available and with just one click, the effects on peak displacement and spectral properties of the response are predicted. A full set of all relevant states is analyzed and the corresponding transfer behavior is plotted. LSIM is optimized to work with the Klippel Controlled Sound (KCS) solution. A simple user interface, interactive networks and enclosure configuration, as well as geometry-based parameter input, help considerably when starting to work with the module.

END OF LINE TESTING

A wider range of applications can now be tested with Klippel QC software. Complex test scenarios can be implemented and controlled using the new **Automation API** software interface. This API is the successor of the long existing IO-Monitor interface, which is still supported. It can be integrated easily in popular script languages such as *Python*. The above-mentioned sensor management routine is available for Klippel analyzers, soundcard-based interfaces, digital audio devices and wave file analysis. Sensor files can be shared with R&D software and result charts are correspondingly scaled and labeled.

Figure 4: Wave file-based testing a smart speaker's four microphone responses using KLIPPEL QC.

Especially for directivity-controlled devices (beam forming, speaker and microphone arrays) multi-channel capabilities are expanded. For any non-Klippel front-end, up to 15 channels are supported as well as 128 channels for wave file processing. Using the input signal sharing feature, one measurement can capture many signals that are automatically distributed to multiple analysis tasks. This considerably reduces test and setup time. Open loop testing was improved to analyze multiple wave files in one test sequence, as well as better support for mixed configurations of Klippel hardware and external audio devices. Typical examples are testing sound emitting devices and microphones without audio streaming access using wave file stimuli and responses.