Information Sheet on Testing the Software of Sound Level Meters

The Measures and Verification Ordinance (MessEV) in the version from 30 April 2019, on which the type examination of sound level meters is based, places essential demands on the software of a measuring instrument. In this way, protection against falsification, the suitability of the instrument or its verifiability should be guaranteed. The Rule Determination Committee (REA), which is responsible according to the Measures and Verification Act (MessEG), has laid down that the requirements of the WELMEC Software Guide 7.2 (2015) are to be applied to sound level meters. For that reason, sound level meters are subjected to software testing within the scope of type examination.

The basis for software testing is a documentation of the measuring instrument's software which must be provided by the manufacturer. It typically contains detailed descriptions of the software architecture, block diagrams and command lists. Based on this documentation, the measures are assessed which are applied to avoid software-related security risks. Usually, no source code is inspected. As an aid for the preparation of the documentation, a questionnaire is made available at the website of PTB's Working Group 1.63 "Noise Measuring Technology" which deals with the major points.

The requirements of the WELMEC Software Guide are of a general nature but may, for typical sound level meters, be made more precise in the following points:

1. The instrument must have a measured values memory which cannot be manipulated. The recording must be permanent and it must be appropriately protected against accidental or deliberate falsification (for example, by using a checksum).

   The recording must clearly and inseparably name at least the following for each measuring operation:

   - All relevant measurement data
   - A biunique ID for the measuring operation
   - The manufacturer, type and serial number of the measuring instrument used
   - The software version used for the measurement
   - The settings of all corrections that affect the measurement data
   - The absolute sensitivity of the sound level meter during measurement

   In the case where the measurement data are separated from the measuring instrument (while exporting data, for example), these requirements shall apply accordingly to the data package.
2. The instrument may only be operated with software that has been tested. The test comprises the complete software package consisting of the operating system, the measurement software, the drivers, etc.
3. Only the manufacturer or an authorized company is allowed to install software. Any changes made to the installation must lead to a breach of the verification seal regardless of the user or the manufacturer changes the software.
4. All hardware and software interfaces of the instrument need to be protected against external manipulation (protective interfaces).
5. An adjustment using the corresponding sound calibrator is permissible up to ±1.5 dB.

As long as the essential demands of the MessEV are fulfilled, exceptions to the named requirements may be possible in individual cases, i.e. if additional measures are taken and/or if the scope of application of the instrument is being restricted.

Further information and links to related sources are available at the website of PTB's Working Group 1.63, "Noise Measuring Technology." Detailed information, notices and recommendations can also be received from PTB's Software Test Center (Working Group 8.51) via its website or via e-mail (softwaretest(at)ptb.de).