

Title: Digitalising processes in legal metrology - certificates of conformity for weighing instruments and their modules

Abstract

Legal metrology is vital for European industry but, in a more and more digitised world it is currently lagging far behind. The development of digital formats for documents such as certificates of conformity and test reports would provide the corner stone for the digitalisation of legal metrology. In particular, it is important to establish such digital certificates of conformity for weighing instruments as they are widely used in industry and represent a wide variety of different instrument categories. Currently, type examination certificates for weighing instruments are issued based on Directive 2014/31/EU Non-automatic weighing instruments (NAWI) and Directive 2014/32/EU Measuring instruments (MID) and WELMEC Guide 8.8. Therefore, these requirements must be taken into account when developing a digitalisation process for legal metrology, as well as those associated with the security of data; EU regulation 910/2014 Electronic Identification, Authentication and Trust Services (eIDAS).

Keywords

Digitalisation, conformity testing, weighing instruments, electronic signature

Background to the Metrological Challenges

The European Union issued eGovernment Action Plans in 2011-2015 to 'support the provision of a new generation of eGovernment services' and 2016-202 'to modernise digital public services and make the EU a better place to work, live and invest'. Both action plans were developed to support digitisation and machine-readable processes. But unfortunately, in the very complex world of legal metrology both analogue and digital processes still coexist. Currently, there are some on-going digitisation projects in the field of reverification, but the centre piece of the legal metrology system, the certificate of conformity has yet to be digitally transformed.

A similar situation exists for test reports which are shared as hard copy versions e.g. from the manufacturer laboratory to the notified body. Thus, requiring a manual examination of the report even though the tests are based on normative documents and an automated check could be possible.

Currently, type examination certificates (and their associated supporting documents) for weighing instruments are issued by notified bodies based on Directive 2014/31/EU NAWI and Directive 2014/32/EU MID. Further guidance is also given in WELMEC Guide 8.8 'Guide on the General and Administrative Aspects of the Voluntary System of Modular Evaluation of Measuring instruments'. However, there is currently no standardised data structure for the provision of type examination, part or full evaluation certificates that is machine-readable and hence no standardised process for the digital security for such documents.

The EMPIR project 17IND02 SmartCom is currently developing the infrastructure for digital calibration certificates. But it does not cover the provision of digital certificates of conformity or test reports. Test reports, which are supporting documents to an examination certificate, are also bound by ISO/IEC 17025 'Testing and Calibration Laboratories' therefore they have some similarities with DCCs. However, tests for the type examination of weighing instruments and their modules are different to typical calibration processes (e.g. the use of maximum permissible errors and not measurement uncertainties). Furthermore, the 17IND02 project is not focussed on the requirements of legal metrology.

Another related project is the 'European Metrology Cloud'. This project was initiated by PTB in order to support the digital transformation in Legal Metrology, by developing a coordinated European digital quality infrastructure. The project aims to support and streamline regulatory processes by joining existing infrastructures and databases, and to provide a single-point-of-contact for stakeholders. However, methods

for incorporating certificates of conformity in the 'European Metrology Cloud' need addressing as well as methods for the securing of data, in accordance with EU regulation 910/2014 eIDAS.

Objectives

Proposers should address the objectives stated below, which are based on the PRT submissions. Proposers may identify amendments to the objectives or choose to address a subset of them in order to maximise the overall impact, or address budgetary or scientific / technical constraints, but the reasons for this should be clearly stated in the protocol.

The JRP shall focus on metrology research necessary to support standardisation in the development of digital certificates of conformity for weighing instruments and their modules.

The specific objectives are

1. To develop a machine-readable data structure for digital certificates of conformity, suitable for type examination, part or full evaluations of all types of weighing instruments and their associated modules. The digital certificate of conformity should (i) include all associated relevant data, (ii) be in a format that supports the requirements for the data structure and (iii) align with the requirements of Directive 2014/31/EU NAWI, Directive 2014/32/EU MID and WELMEC Guide 8.8.
2. To develop a machine-readable data structure for the supporting documents necessary for digital certificates of conformity as developed in Objective 1.
3. To determine a secure and suitable method for electronically signing digital certificates of conformity and their necessary supporting documents. The method should include authenticity checks and integrity checks of the document(s) and meet the requirements of EU regulation 910/2014 eIDAS.
4. To develop the software tools necessary for the provision of secure electronically signed digital certificates of conformity and their supporting documents as per Objectives 1-3. The software tools should allow the export of data to conventional data formats (e.g. pdf).
5. To contribute to the standards development work of the technical committees associate with Directive 2014/31/EU NAWI, Directive 2014/32/EU MID, WELMEC Guide 8.8 and EURAMET TC-IM 1448 to ensure that the outputs of the project are aligned with their needs, communicated quickly to those developing the standards and to those who will use them, and in a form that can be incorporated into the standards at the earliest opportunity.

The proposed research shall be justified by clear reference to the measurement needs within strategic documents published by the relevant Regulatory body or Standards Developing Organisation or by a letter signed by the convenor of the respective TC/WG. EURAMET encourages proposals that include representatives from industry, regulators and standardisation bodies actively participating in the projects. The proposal must name a "Chief Stakeholder", not a member of the consortium, but a representative of the user community that will benefit from the proposed work. The "Chief Stakeholder" should write a letter of support explaining how their organisation will make use of the outcomes from the research, be consulted regularly by the consortium during the project to ensure that the planned outcomes are still relevant, and be prepared to report to EURAMET on the benefits they have gained from the project.

Proposers should establish the current state of the art, and explain how their proposed research goes beyond this. In particular, proposers should outline the achievements of the EMPIR project 17IND02 SmartCom and the 'European Metrology Cloud' project and how their proposal will build on these.

EURAMET expects the average EU Contribution for the selected JRPs in this TP to be 0.8 M€, and has defined an upper limit of 1.0 M€ for this project.

EURAMET also expects the EU Contribution to the external funded partners to not exceed 30 % of the total EU Contribution across all selected projects in this TP.

Any industrial partners that will receive significant benefit from the results of the proposed project are expected to be unfunded partners.

Potential Impact

Proposals must demonstrate adequate and appropriate participation/links to the "end user" community, describing how the project partners will engage with relevant communities during the project to facilitate knowledge transfer and accelerate the uptake of project outputs. Evidence of support from the "end user" community (e.g. letters of support) is also encouraged.

You should detail how your JRP results are going to:

- Address the SRT objectives and deliver solutions to the documented needs,
- Feed into the development of urgent documentary standards through appropriate standards bodies,
- Transfer knowledge to the industrial and legal metrology sectors.

You should detail other impacts of your proposed JRP as specified in the document “Guide 4: Writing Joint Research Projects (JRPs)”

You should also detail how your approach to realising the objectives will further the aim of EMPIR to develop a coherent approach at the European level in the field of metrology and include the best available contributions from across the metrology community. Specifically, the opportunities for:

- improvement of the efficiency of use of available resources to better meet metrological needs and to assure the traceability of national standards
- the metrology capacity of EURAMET Member States whose metrology programmes are at an early stage of development to be increased
- organisations other than NMIs and DIs to be involved in the work.

Time-scale

The project should be of up to 3 years duration.