

Accuracy assessment of a commercial cold Rb atom clock: a use case within the Qu-Test project

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In recent years, the technologies issued from the “second quantum revolution” start to be exploited in the domain of computing, communication and sensing. The Horizon Europe project “Qu-Test”, co-funded by the European Commission, aims to federate a network of testbeds and industrial users to support testing and validation services in the domain of quantum technologies.

The SYRTE laboratory of the Observatoire de Paris is a member of the Qu-Test network, offering testing facilities for quantum sensors in the domain of Time and Frequency Metrology and gravimetry. The Qu-Test activity includes, in the early stage of the project, some “use cases” to validate the testbeds with respect to the needs of industrial partners.

Both partners of Qu-Test network, SYRTE and Exail contribute to the project with a use case: the assessment of an accuracy budget for a commercial cold-atom Rb clock (called MuClock), developed by the Quantum System division of Exail,

A prototype of MuClock has been shipped to SYRTE, where its frequency is compared with respect to the local reference, allowing immediate and easy comparison with respect to absolute frequency standards (atomic fountains). The MuClock is expected to stay at SYRTE for several months, allowing extended periods of measurements.

The MuClock is now installed at SYRTE and different tests are ongoing, allowing experimental validation of accuracy models. At the moment of the conference, we expect to have a preliminary consistency verification of the accuracy budget with respect to SYRTE frequency reference.