



QUANTUM
COMMUNICATIONS
HUB

Standards for Quantum Technologies

Industrial standards are essential for new technologies, services and markets. Standards provide end-user confidence in devices and systems, ensure the interoperability of equipment and protocols in complex systems, and stimulate supply chains for components, systems and applications, for example through the definition of common interfaces and platforms.

Conventional technologies such as fibre optic and mobile communications networks and low-cost consumer electronics already have wide-reaching industrial standards in place, hence their vast markets and uptake. There is now a growing range of commercial quantum communications products becoming available. However, at present the accompanying standards are few in number, thus limiting the confidence of end-users and potential uptake. In order for quantum communications technologies to continue to be commercialised and become fully integrated into current communications infrastructure, development of industry-wide standards is crucial.



The Quantum Communications Hub is at the forefront of this effort, working to support and develop documented standards for quantum communications technologies, through partners such as the National Physical Laboratory and Toshiba Europe Limited. Both are members of the European Telecommunications Standards Institute (ETSI) Industry Specification Group for Quantum Key Distribution (QKD). The group is working to establish standards, interfaces, specifications and component characteristics for QKD systems and related technologies. Once in place, these standards will help grow the markets for quantum communications technologies, stimulate component supply chains, and expand the markets for specialist devices such as photon sources and detectors.

Validation and assurance is very important, so a Hub goal for QKD is the creation of measurement protocols for each part of a system. These will then enable uniform validation of products, through a defined assurance process and a network of accredited testing facilities, which can provide the test and validation against agreed standards. All this will build end-user confidence in reliable system performance, growing markets and expanding uptake.

Standards are also being developed to ensure there are no design and implementation flaws which could be exploited by hackers. QKD security is built upon assumptions about the hardware performance, so any discrepancies between the assumed performance and the physical system could introduce vulnerabilities. Therefore it is critical that hardware operates as specified. Researchers are addressing the imperfections of real-world devices and analysing their potential vulnerabilities, to establish countermeasures against these threats or to eliminate them in next generation approaches. Beyond this, standards are also needed to ensure interoperability between different technologies and systems, whilst maintaining security.

The importance of standards is evidenced by the growth of activity, not just for quantum communications but also for other quantum technology sectors. Alongside ETSI, other bodies such as ANSI, ITU and IEEE are now contributing to this effort.

If you would like to hear more about the Hub's work to produce industry-wide standards for quantum communications technologies, please contact us via enquiries@quantumcommshub.net



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