Quantum Technologies

ACTIVITIES RELATED TO QUANTUM TECHNOLGIES STANDARDIZATION

- National level -

ILNAS/NSC 03 – Quantum Technologies

Abstract	NSC 03 is a national standardization commission that offers Luxembourgish market players a unique platform to follow and participate in standardization work in the field of quantum technologies. Through the Commission, national organizations are able to access and participate in the work of ISO/IEC JTC 3, ISO/IEC JTC 1/WG 14 and CEN/CLC/JTC 22.

- International level -

ISO/IEC JTC 3 – Quantum technologies

Scope	Standardization in the field of quantum technologies. The scope includes standardization in the field of quantum technologies, including quantum information technologies (quantum computing and quantum simulation), quantum metrology, quantum sources, quantum detectors, quantum communications, and fundamental quantum technologies. The JTC will coordinate the results of these efforts with relevant committees and subcommittees that have within their scopes the development of specific sector-based applications of quantum technologies.

ISO/IEC JTC 1/WG 14 – Quantum Information Technology

Scope	ISO/IEC JTC 1/WG 14 serves as a systems integration entity to focus on JTC 1's standardization program on Quantum Computing and maintain relationships with other related ISO and IEC/TCs and other organizations. It was established with following Terms of reference. 1) Serve as a focus of and proponent for JTC 1's standardization program on Quantum Computing. Identify gaps and opportunities in Quantum Computing standardization. 2) Develop and maintain a list of existing Quantum Computing standards produced and standards development projects underway in ISO/TCs, IEC/TCs and JTC 1.

- European level -

CEN/CLC/JTC 22 – Quantum Technologies

Scope	The JTC shall produce standardization deliverables in the field of Quantum Technologies including quantum enabling technologies, quantum sub-systems, quantum platforms & systems, quantum composite systems as well as quantum applications covering the following areas: Quantum metrology, sensing and enhanced imaging, Quantum computing and simulation; Quantum communication and cryptography, as well as provide guidance to other technical committees concerned with Quantum Technologies.

ETSI/ISG QKD – Quantum Key Distribution

Scope	To develop GSs (ETSI Group Specifications) describing quantum cryptography for ICT networks. Quantum Key Distribution is the essential credential in order to use quantum cryptography on a broad basis. It is the main task of the QKD ISG to specify a system for Quantum Key Distribution and its environment. The activities of the QKD ISG will be performed in close co-operation with relevant standards activities within and outside ETSI. External relationships will be established where and when ever needed, Formal relationships will be established using the normal ETSI processes via the ETSI Secretariat.

ETSI/TC CYBER/WG QSC – Quantum-Safe Cryptography

Scope

The primary responsibilities of this working group are to make assessments and recommendations on the various proposals from industry and academia regarding real-world deployments of quantum-safe cryptography, including practical properties, (such as efficiency, functionality, agility, etc.), security properties, appropriateness of certain quantum-safe cryptographic primitives to various application domains (Internet protocols, wireless systems, resource constrained environments, cloud deployments, big data, etc.).

EXAMPLES OF PUBLISHED STANDARDS ON QUANTUM TECHNOLOGIES

ETSI/ISG QKD – Quantum Key Distribution

ETSI GS QKD 016 V2.1.1 (2024-01)	Quantum Key Distribution (QKD); Common Criteria Protection Profile - Pair of Prepare and Measure Quantum Key Distribution Modules
ETSI GS QKD 018 V1.1.1 (2022-04)	Quantum Key Distribution (QKD); Orchestration Interface for Software Defined Networks
ETSI GS QKD 015 V2.1.1 (2022-04)	Quantum Key Distribution (QKD); Control Interface for Software Defined Networks

ETSI/TC CYBER/WG QSC – Quantum-Safe Cryptography

ETSI TR 103 949 V1.1.1 (2023-05)	Quantum-Safe Cryptography (QSC) Migration; ITS and C-ITS migration study
ETSI TR 103 823 V1.1.2 (2021-10)	Quantum-Safe Public-Key Encryption and Key Encapsulation
ETSI TR 103 616 V1.1.1 (2021-09)	Quantum-Safe Signatures
ETSI TR 103 619 V1.1.1 (2020-07)	Migration strategies and recommendations to Quantum Safe schemes

EXAMPLES OF ONGOING PROJECTS ON QUANTUM TECHNOLOGIES

ISO/IEC JTC 1/WG 14 – Quantum Information Technology

ISO/IEC 4879	Quantum computing — Terminology and vocabulary
ISO/IEC TR 18157	Information technology — Introduction to quantum computing

CEN/CLC/JTC 22 – Quantum Technologies

prCEN/CLC/TR	Quantum network best practices
prCEN/CLC/TR	QKD and PQC; An equitable analysis and comparison of both technologies
prCEN/CLC/TR	Gap analysis of current quantum communication and quantum cryptography standards
prCEN/CLC/TR	Layer model of Quantum Computing
prCEN/CLC/TR	Performance benchmarks of quantum computing applications
prCEN/CLC/TR	Hybridization of Quantum Computing
prCEN/CLC/TR	Cryogenic Solid-State Quantum Computing - Part 1: Descriptions and functional requirements of modules
prEN	Quantum technologies; Characterization of quantum technologies - Metrics and terminology

ETSI/ISG QKD – Quantum Key Distribution

ETSI GS QKD 023	Quantum Key Distribution (QKD); Monitoring Interface and Data Model
ETSI GS QKD 022	Quantum Key Distribution (QKD); Network architectures
ETSI GS QKD 020	Quantum Key Distribution (QKD); Protocol and data format of REST-based Interoperable Key Management System API
ETSI GS QKD 021	Quantum Key Distribution (QKD); Orchestration Interface of Software Defined Networks for Interoperable key management system

ETSI/TC CYBER/WG QSC – Quantum-Safe Cryptography

DTR/CYBER-QSC-0024	A Repeatable Framework for Quantum-safe Migrations
RTS/CYBER-QSC-0019	Quantum-Safe Hybrid Key Exchanges
DTR/CYBER-QSC-0020	Impact of Quantum Computing on Cryptographic Security Proofs