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# FOCUS AREA OF R&D IN INDIA



ISO 9001 : 2015

•Quantum Key Distribution Solution

•Quantum Enabled NextGen Enterprise Messaging Platform

•Post Quantum Cryptography Encryptor

•Quantum Random Number Generator- Hardware based RNG

•Quantum Random Number Generator- Cloud based RNG

•Trusted Relay Node

•Hub & Spoke QKD

•Quantum Network Simulator

•Quantum Solutions in different vertical sector

•Quantum Secure Direct Communication solution

•Quantum Memory Simulator

•Portfolio Optimization Solution by QML

•Room Temperature Telecom Wavelength Quantum Memory

•Quantum Secret Sharing Solutions

•Quantum Internet Simulator / Quantum Network Simulator

•Quantum secure Video Conferencing

•Single photon detector based on High-temperature Superconductors (HTS)

•Single photon detector based on Low- temperature Superconductors (LTS)

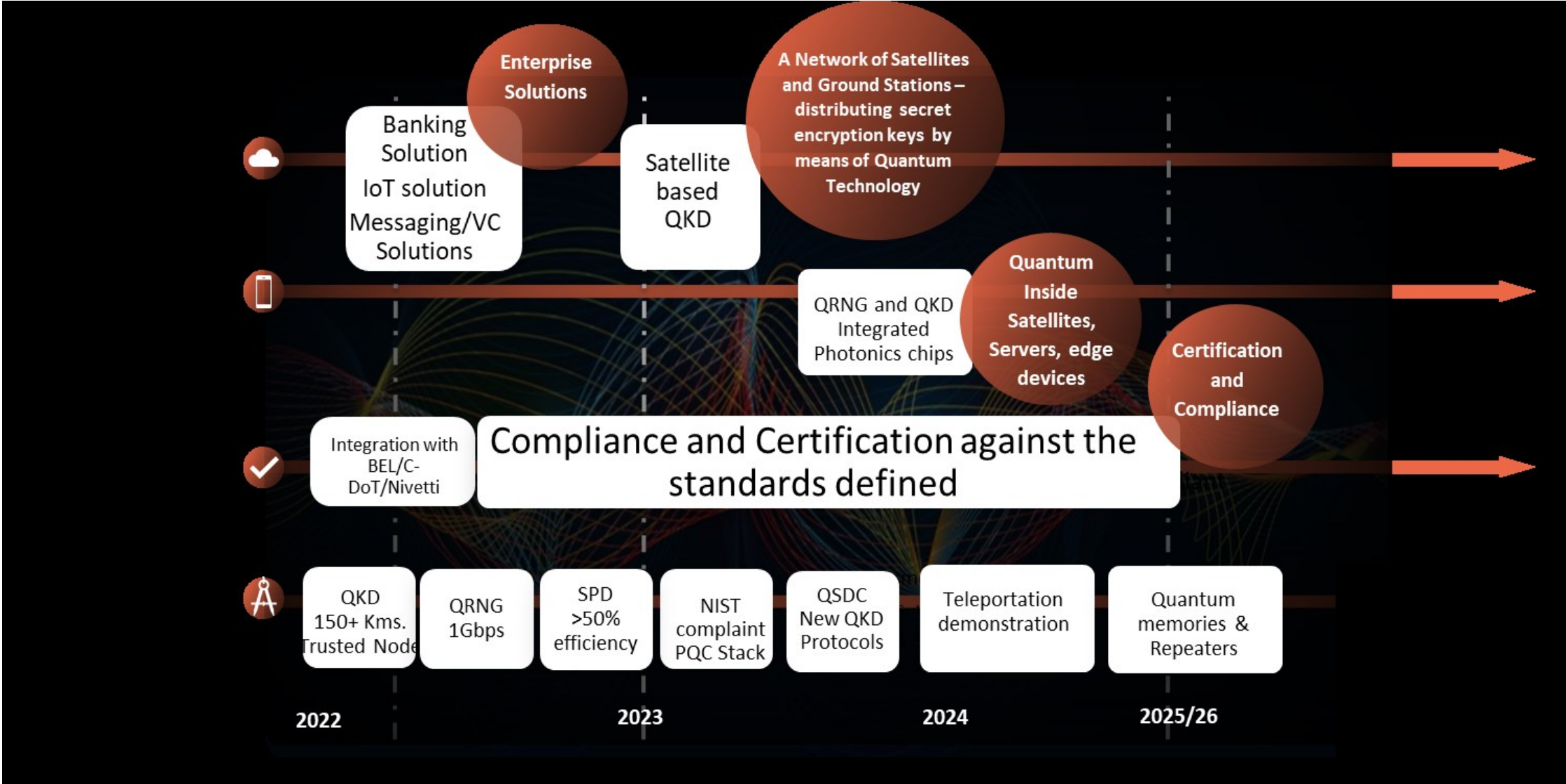
•Quantum chipset

•Integrated quantum control & readout system



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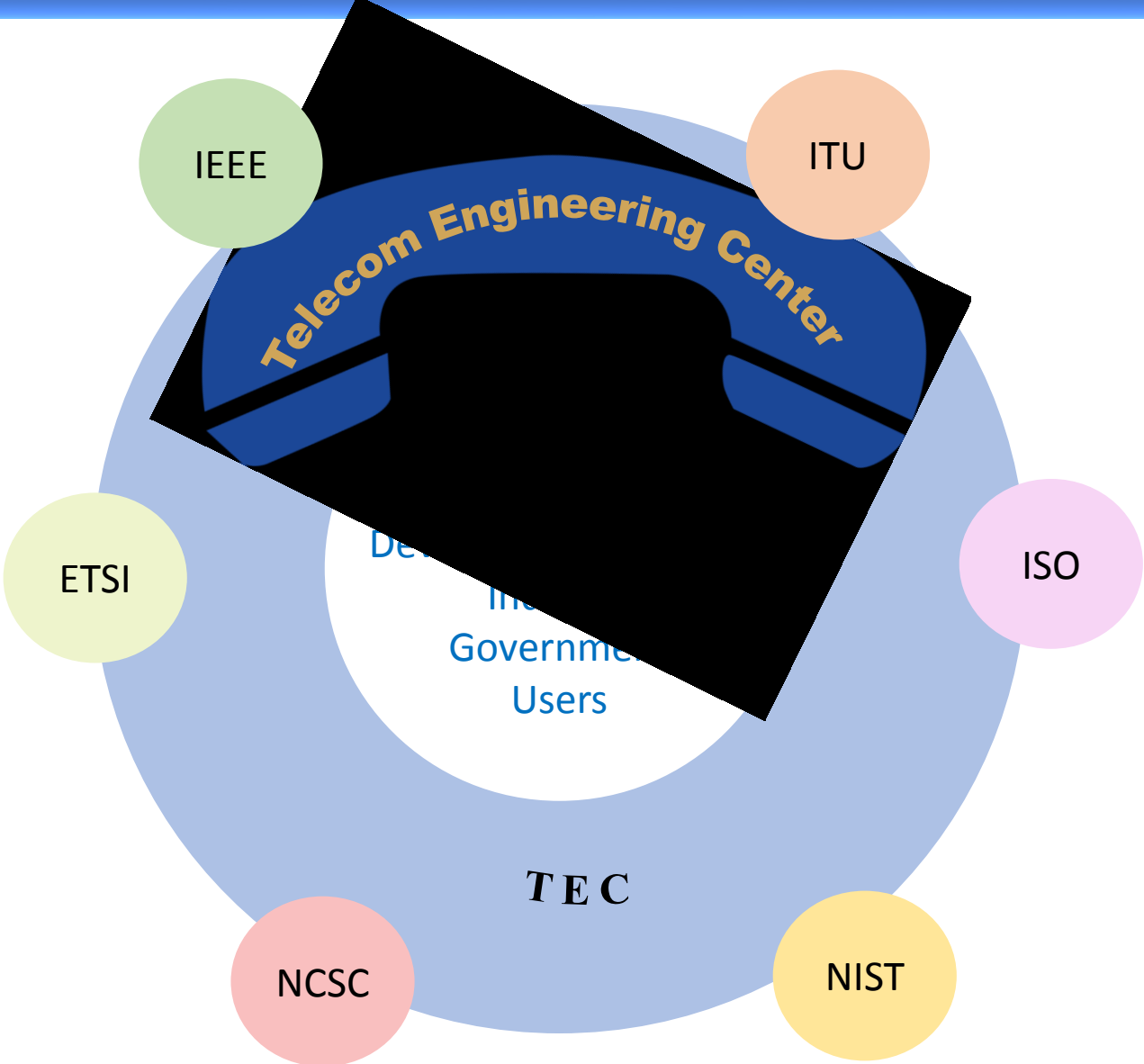
# QUANTUM COMMUNICATION ROADMAP





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# TEC STAKEHOLDERS





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# TEC STANDARDS ON QUANTUM COMMUNICATION



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वर्गीय आवश्यकताओं के लिए मानक  
दस्तावेज़ सं: टी.ई.सी. 91000:2022  
STANDARD FOR GENERIC REQUIREMENTS  
No. TEC 91000:2022

क्वांटम कुंजी वितरण प्रणाली  
Quantum Key Distribution System



ISO 9001:2015

दूरसंचार अभियांत्रिकी केंद्र  
खुरशीदलाल भवन, जनपथ, नई दिल्ली-110001, भारत  
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www.tec.gov.in



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टेस्ट गाइड  
दस्तावेज़ सं: टीईसी 91001:2023  
TEST GUIDE  
No. TEC 91001:2023

क्वांटम कुंजी वितरण प्रणाली  
Quantum Key Distribution System  
(GR No.: TEC 91000:2022)



ISO 9001:2015

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वर्गीय आवश्यकताओं के लिए मानक  
दस्तावेज़ सं: टी.ई.सी. 91010:2023  
STANDARD FOR GENERIC REQUIREMENTS  
No. TEC 91010:2023

QUANTUM-SAFE AND CLASSICAL CRYPTOGRAPHIC  
SYSTEMS



ISO 9001:2015

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# NEXT YEAR WORK ON QUANTUM




ISO 9001 : 2015

  
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 दस्तावेज़ सं: टीईसी 91011:2023  
 TEST GUIDE  
 No. TEC 91011:2023


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Quantum-safe and classical Cryptographic Systems  
 (GR No.: TEC 91010:2023)

  
 ISO 9001:2015


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Quantum Computing Platforms- Hardware Subsystems, Control Software and Quantum Software

  
 ISO 9001:2015

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 No. TEC 91030:2024

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QUANTUM RANDOM NUMBER GENERATOR

  
 ISO 9001:2015

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QUANTUM RANDOM NUMBER GENERATOR  
 (GR No.: TEC 91030:2024)

  
 ISO 9001:2015


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Quantum Computing Platforms- Hardware Subsystems, Control Software and Quantum Software  
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 ISO 9001:2015

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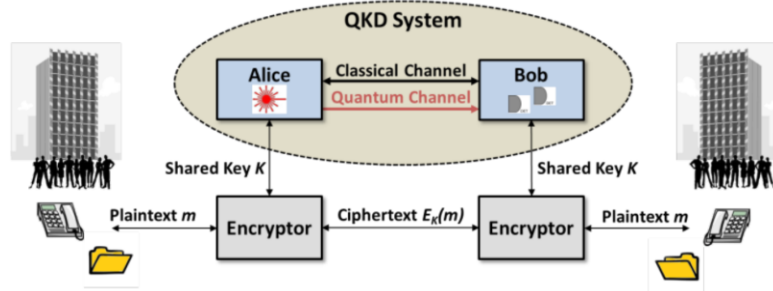
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# CONFORMITY ASSESSMENT AND TRIALS



## QNU Lab

- QKD Point to Point
- QKD Point to Multi-Point



## CDOT

- QKD Point to Point
- PQC Encryptor
- Secured VC





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# INTERNATIONAL STANDARDS



ISO 9001 : 2015

**SDN**

**Channel**

**Network**

**Protocols**

**QoS**

**Terminologies**

**Interfaces**

**Characterization**

**Test  
&  
Evaluation**

**Benchmarking**

**Use cases**



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# FUTURE STANDARDISATION AREAS



ISO 9001 : 2015

•Quantum Homomorphic encryption

•Quantum Secure Direct Communication

•Quantum Secret Sharing

•Quantum Repeaters

•Quantum Memories

•Quantum Router, Switches, Multiplexers, Demultiplexers

•Quantum Key Distribution using Satellite

•Quantum Networking/Internetwork/Cloud

•Use of same media (fiber) for data communication, Quantum Key

•Transmission And Quantum Direct Messaging

•Interfaces among layers

Interoperability



Thank you



# Technical Requirements and Specifications



The standards provides the specifications for

- Point to Point QKD System
- Point to Point QKD System with Relay Node
- Multi-point QKD System
- Single photon detector for Qubit detection.
- Wavelength for operation
- Quantum Random Number Generator
- QKD Modules Authentication
- Fiber Media
- Key Manager
- Key Transfer Interface, etc.





# Technical Requirements and Specifications



The standards provide the specifications for

- Functional requirements of a cryptographic system
- Operational requirements of a cryptographic system
- Interface requirements of a cryptographic system
- Interoperable requirements of a cryptographic system
- Quality requirements of a cryptographic system
- EMI/EMC Requirements of a cryptographic system
- Safety Requirements of a cryptographic system
- Security services requirements of a cryptographic system
- Security service level classification

