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Toshiba Corporation
Toshiba Digital Solutions Corporation
KT Corporation

Toshiba Group and KT Collaborate on Quantum Key Distribution Pilot Projects in South Korea

Covering world's first application of ITU standard to evaluation of a long-distance hybrid QKD network, and a QKD service testbed that will expand the quantum industry ecosystem

TOKYO – Toshiba Corporation (TOKYO: 6502) (Toshiba), Toshiba Digital Solutions Corporation (TDSL) and KT Corporation (KT) will collaborate in two pilot projects in South Korea using Quantum Key Distribution (QKD).

Toshiba Group has researched QKD technologies for over two decades. It ranks number one in the world*¹ for QKD-related patents, and has demonstrated QKD technologies and use cases with partners in Japan, the US and Europe. KT, the holder of the most QKD-network-related international standard approvals*², has promoted the development of Korea's QKD ecosystem by transferring technologies to small and medium businesses in South Korea, and has led the creation of next-generation quantum secure communications services for emerging applications such as drone communications, autonomous vehicles and data centers.

The first project is to evaluate quality of service (QoS) on a long-distance hybrid QKD network built with different QKD systems, over an approximately 490km long optical fiber network between Seoul and Busan. It is the longest*³ QKD network yet built and demonstrated in South Korea, and is expected to demonstrate capabilities that will support deployment of QKD services throughout the country. The network is configured with a combination of QKD systems from Coweaver, WooriNet and Alian developed with technologies transferred from KT, and TDSL's long distance QKD systems with quantum key management system (KMS).

The evaluation criteria applied to the QKD network QoS were devised by KT and first approved as an international standard by the International Telecommunication Union Telecommunication Standardization Sector (ITU-T) in February 2022. This is the first ever application of the standard to QoS evaluation in a hybrid QKD network with QKD systems from multiple vendors. The evaluation will take place for 19 days, from March 28 to April 15.

The second project covers the testbed for an open QKD service (QKD-as-a-Service; QKDaaS*⁴) that aims to expand the quantum industry ecosystem in South Korea and abroad. This testbed will be operational between Seoul and Daejeon for approximately two years from the summer of 2022, and used by various companies to support the development of next-generation services utilizing quantum technologies. The testbed will be operated as an open platform, and Toshiba Group and KT will use knowledge gained from operation and user feedback to improve QKDaaS.

In addition to those projects, KT, the chair of SG13 WP1 at ITU-T, and Toshiba Group, the chair of the QKD Industry Specification Group (ISG) at the European Telecommunications Standards Institute (ETSI), will cooperate in promoting international standardization of QKD technologies. KT and Toshiba Group will also cooperate the development of next-generation QKD services and business models based on their respective experience in technology developments and testing pilot services.

Shunsuke Okada, an Executive Officer, Corporate Senior Vice President and Chief Digital Officer of Toshiba and President and CEO of TDSL said, "Toshiba Group has established industry partnerships in Japan, the US, the UK and Singapore to drive the early deployment of quantum secure communication by industrial sectors. We are excited to collaborate with KT in South Korea, and accelerate the global expansion of our QKD business."

Kim Ye-Han, Executive Vice President and Fusion Technology Institute Director of KT, said, "This QoS evaluation is significant for verifying the potential of commercial QKD services based on QKD systems from multiple vendors. KT will continue to invest in R&D not limited to QKD but also to core technologies for realizing the Quantum Internet. "

About KT

KT is Korea's largest telecommunications company with a history of 137 years, and operates omnidirectional businesses in domain of telecommunications such as mobile communications, ultra-high-speed Internet, IPTV, Cloud, and enterprise solutions. KT has contributed greatly to the revitalization of the global market for the latest technology, such as commercializing 5G mobile communication for the first time in the world and developing the world's first international standard for QKD network. Recently KT has declared the evolution from traditional Telco to DIGICO*⁵ and now focuses on shifting to digital such as AI, robots, UAM.

About QKD

Quantum Key Distribution (QKD) is a secure cryptographic communications protocol that is used by two parties to encrypt and decrypt messages and generate a shared secret key known only to the two parties. QKD is the only solution theoretically proven to be secure against quantum computing attacks.

1: Based on EU Joint Research Center Technical Report, 2019, EUR29164 EN

2: Based on patent data from International Telecommunication Union (ITU)

3: According to research by Toshiba, TDSL and KT as of March 2022.

4: A subscription type of quantum secure communication service where quantum crypto keys are delivered and exchanged between end users over QKD network by communication service provider

5: Digital Platform Company. KT aims to be a digital platform company that leads the ways to change the lives of customers and innovate other industries based on AI, Big Data and Cloud,