



Ultra range, high key rate QKD solution

Optimised systems for superior QKD performance

To meet the growing requirements for ultra long haul, high key rate and enhanced security QKD deployments, Toshiba has partnered with Single Quantum. The integrated solution leverages Toshiba’s proprietary QKD technology and Single Quantum’s highly efficient Superconducting Nanowire Single Photon Detectors (SNSPD’s) resulting in QKD deployments beyond 50 dB loss extending the reach to over 300km in a single fibre link.

The solution is ideal for challenging, ultra range deployment requirements where physical access to fibres is difficult (such as aerial or marine systems), or where security is paramount and trusted node deployment must be minimised.

Toshiba and Single Quantum’s systems are 19 inch rack mountable, plug and play, remotely manageable and provide optimised performance for continuous operation.



Secure cross border links

European Union initiatives such as the Connecting Europe Facility (CEF-DIG-2024- EUROQCI) call for new and/or existing fibre communication networks linking strategic sites at national and cross-border levels.



Minimize trusted node requirement

Enhanced security requirements may dictate a requirement for zero intermediate trusted nodes. Fibre links may not permit the addition of trusted nodes due to location, cost, and maintaining secure access.



Marine and aerial links

Quantum safe, secure connectivity to strategic operational sites may require extended long-haul fibre transmission over marine or aerial networks where fibres are limited and there is little or no option of building or obtaining secure trusted nodes.

Toshiba QKD system

- Best in class high key rates
- Active stabilised C-band quantum channel
- Simple and rapid installation
- Remote management



Specifications

Parameter	Standard recommended spec
Wavelength	1550 nm
Key Exchange Protocol	Toshiba T12 protocol (efficient BB84 protocol with decoy states and phase encoding)
Secure Key Rate with SNSPD	900 kbit/s at 10 dB channel loss 30 kbit/s at 20 dB channel loss 400 bit/s at 50 dB channel loss
Max. loss with SNSPD	> 50 dB
Security Parameter	Key failure probability $< 1 \times 10^{-10}$, corresponding to less than once in 30,000 years
Monitoring Functions	SNMP v2 & v3, GUI, CLI
Key Management	Key Delivery System supporting ETSI GS QKD 014 industry standard key delivery API

Single Quantum SNSPD system

- compact (3U cryostat + 2U driver)
- plug-and-play
- continuous operation
- automatic cooldown
- scalable



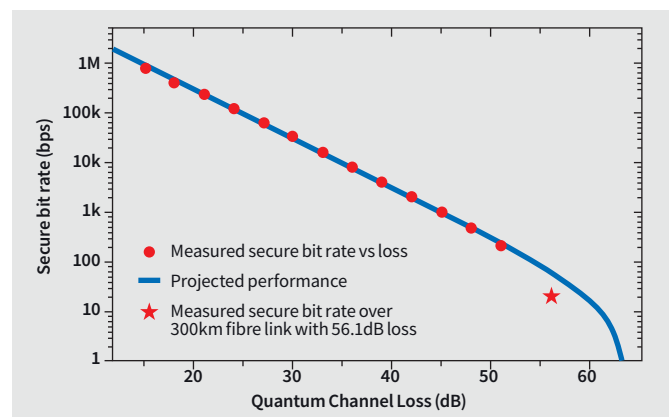
Specifications

Parameter	Standard recommended spec
Wavelength	1550 nm
Detection Efficiency	75% to >90%
Dark counts	10 - 100 cps
Jitter	25 ps
Count rate	20 MHz

Market leading performance

Single Quantum low noise, high efficiency SNSPD's combined with Toshiba's QKD systems provide superior secure bit rates over high loss fibre links.

The graph shows the measured (solid circles) and calculated (solid line) secure bit rate as a function of the fibre loss. A secure key rate of ~20 bit/s was measured for a 300km fibre with total loss of 56.1dB (star).



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