# Quell - X

Quell-X is a complete QKD system composed by 1 Alice unit and 1 Bob unit able to generate quantum secured keys for ultra-secure data communication.

The system is deployable on existing networks and can be complemented with trusted nodes in order to achieve long distance links.

Quell-X family products offer an ultra-versatile solution that can be used in any network configuration: point-to-point links, trusted nodes configuration and more advanced network topologies (i.e., ring or star networks).

Our systems (picture reported in Figure 1) are fully integrable in existing telecom networks thanks to the flexibility of our apparatuses operating both in the C-band or in the O-band configuration (i.e., the systems can work both in dark-fiber mode and in co-existence with classical communication data multiplexed into the same optical fiber).

**Applications:**

- Crypto keys distributor infrastructures
- Data center security
- Medical data protection
- National and cross-borders backbones
- Trusted nodes-based long-distance key distribution
- Key distribution across advanced reconfigurable networks (star, ring, software defined networks)
- Governmental and financial data security
- Critical infrastructure security: airports, harbours, gas-distribution and power-grids distribution


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## Quell-X family Technical Specifications:

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|---|---|---|
| **Quantum state preparation** | up to 600 MHz | |
| **QKD protocol** | Discrete-variable BB84 time-bin encoding | |
| **Decoy state** | 1-decoy state (2-decoy states custom) | |
| **Error correction protocol** | Cascade protocol / LDPC | |
| **Key security parameter** | $10^{-9}$ | |
| **Privacy amplification protocol** | Toeplitz matrix-based algorithm | |
| **Quantum state generation** | Proprietary-patent for phase-randomized optical pulse generation | |
| **Optical channel** | Polarization-independent optical communication protocol and system | |
| **Link budget** | Standard Internal Detectors | Up to 30 dB |
| | Superconducting Detectors | Up to 45 dB |
| **Secret key rate** | Standard Internal Detectors | 4 kb/s @ 10dB<br>2 kb/s @ 20dB<br>500 b/s @ 25 dB<br>150 b/s @ 30 dB |
| | Superconducting Detectors | 200 kb/s @10 dB<br>9 kb/s @30 dB<br>150 b/s @45 dB |
| **Key management protocol** | ETSI GS QKD 014<br>ETSI GS QKD 004<br>ETSI GS QKD 015<br>Cisco Secure Key Integration protocol Skip Compatibility with evolutionQ BaseJumpQDN | |
| **Key generated (type)** | AES-256 (other formats can be implemented if required) | |
| **Interfaces** | 2 x dark fiber (C-band system)<br>1 x dark fiber (upon request, O-band system)<br>2 x 1Gb Ethernet ports<br>Operating LEDs Outputs | |
| **WDM compatibility** | Operating with non-dark fibers upon request (C/O-band wavelengths and ITU channels customized). | |
| **Stability** | Automated calibration protocols | |
| **Operating temperature** | 10° to 35° C with no direct sunlight on the equipment | |

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| **Non operating temperature** | -10° to +60° C |
| **Operating humidity** | 0% to 85% relative humidity with 29° C maximum dew point |
| **Power supply** | 1+1 Redundant hot-swappable |
| **Operating Voltage** | 85-264 V AC, 47-63 Hz |
| **Maximum power Consumption** | Each 300W (peak) |
| **Dimensions** | Standard 19'' rack mount, height = 2U, 650 mm depth |
| **Raw data availability** | Quell-XR version |
| **External detectors** | Quell-XR version |