

189 Secure Transmission of Power Core Data based on Quantum Communication

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Introduction

Quantum secure communication is based on the basic characteristics of quantum physics, such as quantum indivisibility, non cloning and non measurement. The transmission data of power grid business is encrypted to protect the operation safety of power grid. In order to ensure the security of power system information communication, it is essential to build a safe and reliable private communication network.

Methods

Quantum secure communication involves several aspects, such as quantum key distribution, quantum privacy sharing, quantum bit commitment. One of the most commonly used and gradually practical is quantum key distribution (QKD). Combined with the power business scenario, this paper presents a scheme base on QKD technology and applies it in anti-eavesdropping applications.

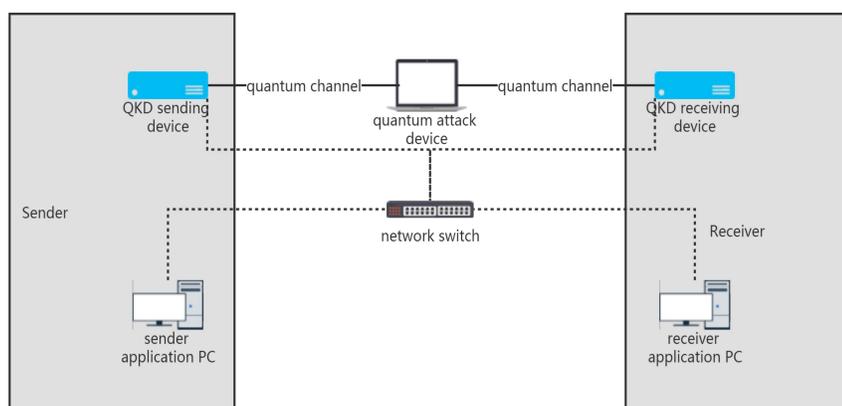


Fig.1 The design of system topology

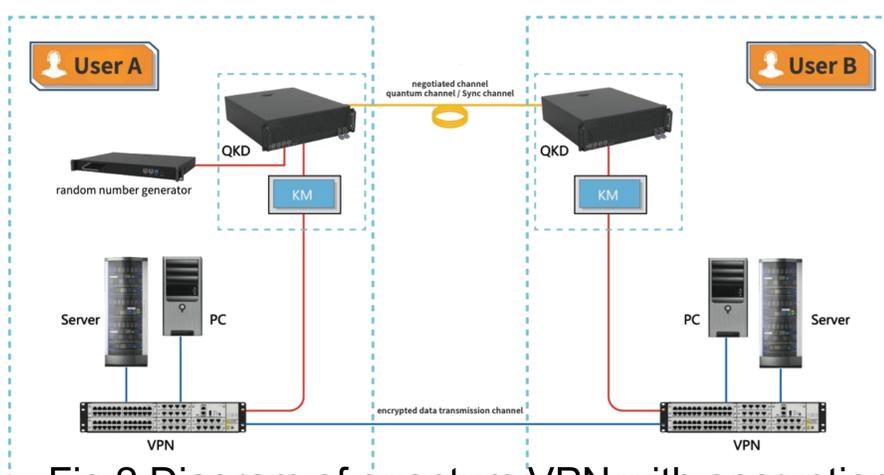


Fig.2 Diagram of quantum VPN with encryption and decryption quantum key

Results



Fig.3 Detection results when QKD is attacked

We have built a quantum communication system, which mainly includes quantum key distribution transmitter, attack simulation equipment, quantum key distribution receiver, switch for network communication, auxiliary equipment such as optical fiber, network cable, power cord.

- Real time detection of QKD attacked
- Video encryption and decryption based on QKD
- Power core data communication based on QKD

Conclusions

This paper presents the infrastructure and applications of the power industry with quantum security capabilities, which supports the seamless integration of quantum communication and quantum data encryption. The experimental results show that our proposed scheme can solve the problem of distribution equipment easy to be invaded under complex circumstance. Furthermore, it can protect the power core data while not being eavesdropped or cracked, which is important for power grid enterprises.

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