

# Simple Analysis on Common Interference Factors in Electronic Communication and Control Countermeasures

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**Abstract:** With the high-speed development of Chinese social economy, Chinese electronic communication technology has dramatically grown. However, the technology is not perfect enough. Compared to that in developed countries, the electronic communication technology in China still needs to be improved. In practical application, multiple factors cause serious interference to electronic communication, further threatens the safety and stability of electronic communication system. Hence, during the research and development of electronic communication, it is essential to conduct the in-depth analysis on factors influencing the safety and stability of electronic communication system, and take effective measures to reduce the interference by external factors and promote the safety and stability. In this paper, common interference factors and control countermeasures are analyzed and studied. Combining the actual development of Chinese electronic communication, scientific and reasonable recommendations are proposed to provide reference for the growth of electronic communication in China.

At present, Chinese electronic communication technology is widely applied in various fields and plays an important role in promoting the development and construction of Chinese social economy. In modern society, electronic communication has become an important component of social economy structure and significant strength for the development of social economy. In particular, it is central to wireless local area network, including bluetooth and WIFI in daily life. It can be seen that electronic communication is critical to improving people's life quality and guaranteeing the modern lifestyle. While constructing electronic communication, effective countermeasures taken for dealing with interference factors are conducive to improving the safety and stability, which is of great significance to promoting the growth of Chinese social economy and enhancing people's life quality.

## 1. Main Methods to Apply Key Technologies of Electronic Communication

### 1.1 Safety protection technologies of electronic communication network

Along with the great convenience of people's work and life by the high-speed development of electronic communication network, network information disclosure bring wide concern of the public. To solve this problem, to strengthen safety protection measures of electronic communication and improve safety protection become critical. In order to ensure the safe operation of electronic communication network, multiple safety protection technologies have been studied and applied at present to effectively guarantee the safety of electronic communication network.

First of all, firewall technology. As the core technology of network safety and essential link of safety protection measures, it is now applied in external interfaces of electronic communication network. The available data flow for computer can be analyzed by firewall technology to prevent the risky data flow into computer and hacker attack and ensure the safe electronic communication.

Secondly, authentication technologies. It mainly aims to effectively protect users' identity information and realize safe access to electronic communication system via authentication technology.

Thirdly, virtual private technology. It implements safe protection for users' access to electronic communication system. Its protection function shall be realized via Internet to establish safe link.

Fourthly, intrusion detection technology. It can perform not only safe protection on external data, but also comprehensive safe protection on internal data information, compensating for the failure of protecting internal data by firewall technology.

Finally, vulnerability scanning technology. Its main function is to conduct safe scanning on such information as users' system file and data, thus find out and solve safe vulnerabilities to guarantee the safety of information.

## **1.2 Key technology of satellite communication system**

The development of electronic communication generates various types of communication technologies, the most advanced one of which is satellite communication technology. The quality of satellite communication line is more stable, with larger capacity and higher flexibility. Due to its extraordinary advantages, in the high-speed development of information globalization, satellite communication technology is more widely applied in various fields <sup>[1]</sup>.

## **2. Interference Factors of Electronic Communication Hardware and Main Control Countermeasures**

Network failure is no stranger to people in daily life, and one of causes is hardware failure. When there is network failure, it is necessary to conduct systematic inspection on hardware. Network hardware failures generally include hardware device failure. When there is failure in network hardware, whether users can rapidly find out the client-side where there is failure or not is influenced by the number of wireless client-sides and access points. When the number is smaller, the location of failure can be rapidly determined and maintenance can be performed rapidly to recover the normal operation of network. When there are more wireless client-sides and access points in complicated network environment, especially large-scale wireless network, when a certain client-side cannot be connected, it is hard to find out the system failure. To this end, it is required to strengthen the regulatory control in using electronic communication, so as to ensure rapid troubleshooting and stable and safe operation.

## **3. Main Interference Factors of Electronic Communication Configuration and Control Countermeasures**

Hardware factors is the first factor to be considered when there is failure in network because the occurrence rate of failure in hardware is higher. Thus, in system check and troubleshooting of network failure, hardware factor is often considered first. Besides, among multiple reasons for network failure, configuration interference is also one of common causes and interference sources for failures in electronic communication system.

Configuration interference is a widely based factor consisting of multiple contents, in other words, there are multiple causes for configuration interference to electronic communication network failures. In maintenance, it is necessary to take targeted maintenance measures according to different causes. By virtue of network line access and relevant operations, after the troubleshooting of failure in hardware, the failure in configuration can be determined <sup>[2]</sup>.

To effectively control the impact caused by configuration interference, it is essential to guarantee no change in the correct location of device during daily maintenance. Further, specific location of failure and interference sources can be determined via wireless access channel or wireless terminal inspection signal. Besides, WEP protocol is also an important factor causing configuration interference, which shall be fully taken into account when checking configuration interference. In practice, IP address can also be adopted to prohibit the DHCP service of access point to accurately determine the configuration interference caused by error in server access.

#### **4. Main Interference Factors of Electronic Communication Co-channel and Control Countermeasures**

Surrounding environment has a large influence on wireless network. The narrow-band signal output power of wireless local network is not unchangeable and the board-band signals in different frequency spectrum are different. If the frequency is consistent, co-channel interference failure will occur. To solve the problem, it is necessary to implement interference shielding to spectral signal. Besides, to perform control on signal sources and adjust signal frequency is also an effective method to prevent co-channel interference.

When solving co-channel interference, it is required to pay attention to the different impacts and effects of co-channel interference in different network. Thus, specific objective environment shall be taken into account and targeted measures shall be adopted to solve co-channel interference. For instance, in CDMA network, co-channel interference can increase system capacity, whereas, it can seriously reduce network performance in TD-SCDMA system, influencing users' experience<sup>[3]</sup>.

In terms of co-channel interference, to increase the bandwidth of information can effectively solve the problem and promotes the anti-interference ability of information. Besides, the number and location of access points can be determined via network coverage, so as to reasonably plan frequency band and prevent co-channel interference.

#### **5. Interference of Bluetooth and Environment and Control Countermeasures**

Bluetooth is another important interference factor, only second to hardware factor and configuration interference, because bluetooth and wireless network are in same local area network. If its location or system is also same, it will cause interference. The greater interference can cause the disconnection of network. Whats' more, environmental factor also causes serious interference to devices surrounding local area network, the most common one of which is co-channel interference. Further, factors such as wave band interference and receiver also become important factors influencing the safe and stable operation of electronic communication system.

In terms of interference by bluetooth, main measure taken at present is frequency modulation and spreading spectrum, so as to reduce interference to each other in operation. The practice proves that both can reach better anti-interference effect.

As for interference by environmental factor, due to its complexity, the main measure adopted now is specific control measures according to specific interference sources.

#### **6. Interference Factors of Electronic Communication Receiver and Control Countermeasures**

In the operation of electronic communication system, in the environment above zero degree, circuit and system inside will generate thermal noise. The continuous superimposed thermal noise also brings interference to the normal operation of electronic communication system and affects its safety and stability. To this end, the systematic calculation, analysis and study found out that the mean square error of thermal noise is inversely proportional to load resistance. According to this objective rule, when design the receiver, the front end with higher resistance shall be selected to reduce the inference of thermal noise. Besides, its bandwidth shall also be restricted to further reduce the inference of thermal noise to electronic communication<sup>[4]</sup>.

In wireless local area network, devices such as commingler and antenna constitute receiver, which will cause noise in operation. All noises form thermal noise altogether, causing interference to electronic communication system. In order to reduce the thermal noise of receiver, it is required to start with its component devices, calculate and analyze the noise coefficient and gain of each part for in-depth understanding. Based on specific data information, effective control measures shall be adopted fundamentally to reduce thermal noise and guarantee the safe and stable operation of electronic communication system.

## **7. Interference in Local Area Electronic Communication and Control Countermeasures**

Interference in local area electronic communication mainly includes full-wave band and narrow-band interference, mainly because some electronic devices cause the interaction among some wave bands in the application, further affect the electronic communication environment and finally destroy the stability of electronic communication. Hence, targeted control countermeasures shall be adopted according to real causes for interference to electronic communication, so as to ensure the safe and stably operation of electronic communication system.

In terms of full-wave band interference, it is necessary to clarify its nature and characteristics, that applied frequency is covered by interference factor, resulting in the interference to electronic communication system. Based on this problem, the main measures adopted now to effectively remove full-wave band interference is to adjust emission frequency. Besides, the spread spectrum technology also can solve the full-wave band interference problem<sup>[5]</sup>.

The principle of interference caused by narrow-band signal is that the vulnerabilities of electronic communication transformation model interfere the spectral frequency, and further affect the safe and stable operation. To this end, interference sources shall be find out first and cleaned to ensure the normal operation. Besides, optimization configuration shall be conducted on the signal in this area to ensure the signal reasonableness, which is critical to enhancing the stability of electronic communication system.

## **8. Common Anti-interference Methods in Electronic Communication**

### **8.1 Intelligent antenna technology**

With the development of science and technology, electronic communication technology in China has achieved great accomplishments, with the large breakthrough in anti-interference of electronic communication engineering. In the operation, the key factor to ensure the normal operation is to perform scientific, reasonable and effective processing of digital signal. To guarantee the processing quality of digital signal, processing technology is critical to ensure the efficient operation of wireless communication engineering.

At present, the most leading anti-interference technology is intelligent antenna technology to conduct effective restriction on interference signal and further remove the interference. The application of intelligent antenna technology is the great advance of anti-interference technology of electronic communication. Besides, it can also enhance the transmission efficiency of signal and stability of electronic communication, and drive the development of electronic communication.

### **8.2 Radio technology**

As an important technology in electronic communication, radio technology can guarantee the normal operation of wireless communication system by reasonable and standardized application. During the process, it is necessary to conduct strict management control on various technological standards of radio technology and ensure the standardized nature to realize the safe and stable operation of electronic communication system.

Further, radio technology is also an important anti-interference technology with high anti-interference efficiency. The application of radio technology can analyze spectral environment to ensure the correct usage. On the one hand, it can ensure the order of electronic communication as well as its safe and stable operation; on the other hand, it can also appropriately expand the system, enhance communication frequency and further strengthen the anti-interference performance of electronic communication system<sup>[6]</sup>.

## **9. Conclusion**

Electronic communication, as the significant power for the development of modern social economy, plays an important role in the growth of various industries and fields, as well as modern society. To strengthen the stability and safety of electronic communication is critical to the stable

development of industries and fields, as well as social economy. Therefore, research and analysis shall be applied according to various interference factors in electronic communication, and effective strategies and technical measures shall be implemented to promote the stability and safety of electronic communication, and to drive the high-speed development of Chinese society to informationization.

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