Research on Interference Factors and Anti-interference Measures in Computer Electronic Information Communication Engineering

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Abstract. With the rapid development of electronic communication engineering technology, people's living standard has been gradually improved, and people's attention to electronic communication equipment has been greatly improved. In the process of electronic equipment operation, the connection mode plays an important role, which not only relates to the safety of the whole equipment, but also affects the smoothness of the equipment. The equipment pressure of power system is 220 V, which is formed by its own action relationship. Therefore, once the equipment leakage occurs, the electronic information communication equipment (hereinafter referred to as EICE) will have a bad impact on the human body and the ground. Therefore, electronic communication equipment must be effectively grounded, which will achieve normal and stable operation. However, the anti-interference performance of equipment will be affected by grounding, which requires us to take a variety of measures to avoid interference. Firstly, this paper analyzes the necessity of strengthening anti-jamming methods. Then, the interference factors are proposed. Finally, some interference measures are proposed.

Keywords: Interference Factors, Anti-interference Measures, Electronic Information Communication Engineering

1. Introduction

Electronic information and communication engineering equipment is a kind of infrastructure. When it is interfered, it will cause great influence[1]. Therefore, we must guarantee the anti-interference ability of EICE engineering equipment, which will avoid excessive interference of electronic equipment. In the grounding treatment, we need to make grounding measures according to the operation requirements and the actual situation, which will effectively reduce the interference of external factors. By optimizing the use level of EICE, electronic equipment will adopt better connection mode, which not only relates to the safety of the whole equipment, but also affects the smoothness of the equipment. Therefore, we must pay attention to the connection mode of electronic equipment is very important. In the case of no voltage, the EICE will reach the safe state. In the actual operation process, the signal source is returned through
the ground wire, which will produce potential difference due to the impedance of the ground wire. By reducing the interference, we can ensure the normal operation of electronic equipment. However, in the actual operation process, potential difference is inevitable, which will cause interference and affect the normal operation of electronic communication equipment. Therefore, we need to take a series of measures to reduce the interference, which will ensure the normal operation of electronic communication equipment. In the anti-interference process of electronic communication equipment, we need to follow certain principles. First, pay attention to the standardization and rationality of signal source and measuring device, which will improve the anti-interference level of the whole electronic communication system. Second, pay attention to electrical insulation. By separating the noise ground wire, load ground wire and other ground wires, we can reduce the interference. Third, set familiar signal ground wire and analog signal ground wire, which will ensure the standardization and rationality of their wiring[2].

2. Analysis on interference factors in electronic communication engineering

In the process of operation, the electronic communication engineering will be disturbed by many factors, as shown in Figure 1.

![Figure 1. Interference factors in electronic communication engineering](image1)

2.1. Equipment clutter interference

Due to the limitation of production conditions, some quality problems will inevitably exist in the process of equipment manufacturing. For example, in the use process, some operating parameters may not meet the requirements of theoretical calculation, which will lead to a certain amount of harmonic in the equipment carrier. In addition, improper placement of electronic equipment will also have a certain impact, and these clutter will produce certain interference to the equipment. The schematic diagram of harmonic interference to electronic equipment is shown in Figure 2[3].

![Figure 2. Interference of harmonic voltage on electronic equipment](image2)

2.2. Electromagnetic interference
The information transmission between EICE depends on the specific communication channel. The transmission form of information in the communication channel is electromagnetic wave. The equipment commonly used as communication channel includes cable, antenna, etc. In the process of information transmission, electronic equipment may encounter the influence of various electromagnetic interference sources, such as lightning. With the development of electronic communication engineering, there are more and more electromagnetic interference sources, such as microwave, radio, radar, wireless television and so on. Electromagnetic interference source will send out various electromagnetic waves in the working process. If electromagnetic wave is received by EICE, it will affect the normal operation of these equipment[4]. The principle and solution of electromagnetic interference in electronic communication engineering are shown in Figure 3.

![Electromagnetic interference source](image)

Control reflection
- Reduce noise sources
- Reduce electromagnetic radiation

Control susceptibility
- Increase the anti-interference ability
- Reduce electromagnetic radiation

**Figure 3. Principle of electromagnetic interference**

2.3. Human interference

Human interference has human purpose, which is the most common application in military. We made interference is the most common means of communication interference applied in war. The common ways include single frequency, multi frequency, full band, part frequency band interference and so on.

2.4. Configure interference

China's various electronic products have been very popular, which not only brings the convenience of life, but also causes the transmission and acceptance of a variety of electronic signals. In the process of using electronic products, different electronic signal interaction will produce certain interference to the transmission and acceptance of products, which can be called configuration interference. Configuration interference will not only cause interference in communication network transmission, but also weaken the strength of signal transmission, which will reduce the transmission efficiency of electronic signals. When the configuration interference is strong, the electronic signal may disappear, which often occurs in wireless network signal transmission. Among them, the most common form of realization is configuration error or signal cannot be connected, which will directly affect the quality of eice. Therefore, configuration interference is also the most common interference mode.

2.5. Co frequency interference

In WLAN, signal transmission will carry certain power, which will lead to signal transmission. At the same time, different electronic products may have the same or similar frequency, a variety of such electronic signals will produce interactive phenomenon, which is the same frequency interference. Different frequency signals carry different widths, which will interfere with each other, which will affect the quality of electronic communication signal transmission. Therefore, CO frequency interference is a common interference factor.
3. Common anti-interference measures in electronic communication

3.1. Multi antenna beam technology

Multi antenna beam technology is one of the most widely used technologies in electronic communication engineering. It is the first technology that uses the spatial location information of physical layer characteristics for secure transmission. Under the ideal channel conditions, we can improve the anti-jamming ability of the equipment through the physical layer security wave formation method. At present, there are three beamforming methods which are suitable for different wireless environments. This technology can ensure the stability and security of information transmission, which plays an important role in the anti-interference ability of equipment in electronic communication engineering[5].

3.2. Frequency hopping technology

In communication, the radio transmitting frequency of the traditional electronic equipment is often fixed, which will lead to the weak anti-interference ability of the equipment as a whole. Frequency hopping technology is to change the traditional fixed radio transmission frequency into the constantly changing transmission frequency. In communication, we can change between preset frequency values according to a certain frequency hopping speed. Frequency hopping technology can make EICE have strong anti-interference ability, which is a way to expand carrier spectrum effect by constantly changing frequency. Therefore, the faster the frequency hopping speed and the wider the frequency modulation bandwidth, the stronger the anti-interference ability of the equipment.

3.3. Artificial noise technology

Artificial noise technology is a common anti-interference technology in electronic communication engineering, which can effectively ensure the normal communication of legitimate users. The method of artificial noise can be applied to a variety of physical scenarios, such as miso system, MIMO system, relay system, cooperative system and so on. Artificial noise technology is a random weighting method to transmit antenna array, which can send secure signals. Artificial noise technology can make the phase and power of transmitted signal have strong randomness, which will ensure the safety and reliability of EICE.

3.4. Spread spectrum technology

In the traditional communication channel, the bandwidth used to transmit information is equal to the bandwidth of information itself, which can save the bandwidth cost. At the same time, spread spectrum technology reduces the anti-interference ability of information transmission process. Spread spectrum technology is to expand the bandwidth used to transmit information, which only accounts for a part of the total bandwidth. Through spread spectrum technology, we can effectively hide the communication information in the surrounding noise, which will reduce the interference in the process of information transmission.

3.5. Equipment grounding technology

Effective grounding of EICE is a good anti-interference measure. In China, there are many kinds of grounding technologies in each field. In the actual operation, we should select the appropriate grounding
mode according to the actual situation of EICE. For example, in the analysis of grounding operating system, we can focus on the compatibility of grounding equipment and electronic communication engineering system. By ensuring the fit of the two, we can prevent grounding device failure. After the analysis of the grounding system, we can arrange the grounding device on site, which should focus on the investigation of various spatial position relationships. Therefore, according to the characteristics of the transmission signal, we can calculate the parameters of the grounding device\textsuperscript{[6]}.

4. Conclusion

EICE is a combination of electronic technology and information processing technology. By processing electronic information, electronic information will be transmitted in the form of electromagnetic wave, which will be affected by many aspects. Therefore, electronic communication will be interfered by many factors. We should put forward corresponding measures for the influencing factors of each process, which will minimize the clutter in the transmission and improve the transmission efficiency of electronic information. Through a variety of technologies, such as multi antenna beam technology, frequency hopping technology, artificial noise technology and so on, we can ensure the efficient transmission of electronic signals, which will promote the future development of EICE.

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