

Development and Application of Digital Microwave Communication Technology

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Abstract

In the field of communications, communications in the 300MHz to 300GHz frequency band are microwave communications. Microwave communication is a relatively common technology, while digital microwave communication is the use of microwave technology to achieve the transmission of digital information, and then evolved a new type of technology with stable communication, high transmission capacity, and convenient maintenance. At present, the application of digital microwave communication technology is universal. Digital microwave communication technology must have bigger development space in the future. Based on this, in order to further accelerate the development of digital microwave communication technology and promote the deep application of digital microwave communication technology in the communications industry, this article mainly related to the development and application of digital microwave communication technology.

Keywords

Digital microwave, Microwave communication, Communication technology.

1. Introduction

The traditional communication method adopts the analog microwave. When analog microwave is used for signal transmission, transmission range is limited to the transmission of the analog television signal, and the image signal and the data signal cannot be transmitted efficiently, resulting in the traditional communication method being no longer suitable for the communication industry. Under the further development and improvement of the analog microwave communication method, the digital microwave communication technology based on microwaves has begun to be applied in signal transmission[1]. Digital microwave communication technology has great anti-jamming capability and confidentiality when it is used in practice, and it does not cause line noise during transmission, and digital microwave communication technology can be used to build a digital communication network in a short time. Therefore, digital microwave communication technology can meet the requirements for efficient signal transmission. If you want to ensure the development and application of digital microwave communication technology, you should deepen the relevant analysis of digital microwave communication technology[2].

2. Development of Digital Microwave Communication Technology

Since the digital microwave communication technology began to be researched and developed in China, it has gone through more than half a century. Under the improvement and research of long-term digital microwave communication technology, the system and content of digital microwave communication technology have been continuously improved. The predecessor of digital microwave communication technology is analog microwave technology, and analog microwave technology is mainly developed based on frequency division multiplexing technology. It is affected by limitations and poor stability of analog microwave technology. Analog microwave technology has begun to be applied to digital microwave technology. Development, and the development of digital microwave communication technology, also changed the transmission system based on frequency division multiplexing technology, began to use a time division multiplexing technology, a

multi-channel digital communication system for signal transmission[3]. When the digital microwave communication technology is just beginning to develop, the microwave communication system adopted is an analog system. This method and the coaxial cable carrier transmission system belong to a type of communication network long-distance transmission trunk, and at that time, the city television program basically adopted the microwave communication method. Signal transmission. In the mid-1970s, a digital microwave communication system with a capacity of several tens of megabits per second was developed, which marked the beginning of the transition from the analog phase to the digital phase in microwave communications technology, in the late 1980s. The application of the synchronous digital series (SDH) transmission system is becoming more and more common. The capacity of the digital microwave communication system has also reached the level of $N \times 155$ Mb/s. With the in-depth expansion and application of digital microwave communication technology, digital microwave communication technology has begun to be popularized in the field of fixed broadband access. The LMDS work for the 28GHz frequency band is also gradually applied in large quantities, which indicates that the market prospect of digital microwave communication technology is well.

3. Development Trends of Digital Microwave Communication Technology

3.1 Implementation of QAM Modulation Progression and Strict Band Limiting

Due to the demand for changes in the digital microwave communication technology market, digital microwave communication technology has begun to develop to achieve QAM (Quadrature Amplitude Modulation) modulation progression and strict banding direction. If you want to ensure a significant increase in spectrum utilization of digital microwave communication technology, you need to use the advantages of multi-level QAM modulation technology to effectively enhance and limit the digital microwave modulation series. At this stage of development, QAM modulation technology is mainly applied to the 256 and 512QAM technologies. Under further development and popularization, the future QAM modulation technology may realize the application of 1024 and 2048 modulation technologies[4]. Therefore, based on the QAM modulation technology, The rational design of the channel filter is very important for realizing the QAM and the effective improvement of the modulation technology.

3.2 Network coding modulation and Viterbi detection technology

If you want to reduce the bit error rate of the digital microwave communication system, you need to use complex error correction coding techniques to provide corresponding protection. However, affected by the special characteristics of error correction coding technology, error correction coding can easily lead to reduced bandwidth utilization. In view of this situation, only the development of a reasonable coded modulation technique can effectively avoid the problems caused by coding error correction. As a new technology development direction, network coding modulation (TCM) technology uses the advantages of TCM technology and Viterbi algorithm decoding to effectively reduce the error rate of network coding modulation in the transmission process of digital signals.

3.3 Adaptive Time Domain Equalization

Although digital microwave communication technology has practical applications, it has good anti-interference ability, but under the influence of various external factors and internal influence factors, it will inevitably reduce the quality of digital signal transmission. Therefore, high-performance anti-interference technology is used[5]. Branches are important. Adaptive time domain equalization technology has high-performance, all-digital significant characteristics, the rational use of adaptive time domain equalization technology to reduce the inter-code interference rate, can effectively prevent the occurrence of orthogonal interference and multipath fading problems.

3.4 Multi-carrier Parallel Transmission Technology

Since microwave communication is used as a carrier for digital microwave communication technology, the development of multi-carrier parallel transmission technology is very important.

Compared with other types of technological trends, the realization of multi-carrier parallel transmission technology can change the over-rate condition of the transmitting symbol so that the influence of propagation dispersion can be effectively controlled, and then the rate of separation of digital microwave communication technology can be continuously reduced.

4. Application of Digital Microwave Communication Technology

4.1 Realizing Broadband Wireless Access

Broadband wireless access technology, as a kind of fast communication technology, has a wide range of applications in the field of wireless communications. Even in the current situation where the communications market is increasingly competitively motivated, broadband wireless access technology also occupies very good competitiveness. Digital microwave communication technology has a great role in achieving broadband wireless access. Using the advantages of microwave communication technology, it can effectively realize the development goal of broadband wireless access. Under the further promotion of microwave communication technology, broadband wireless access has reached a relatively mature level of technological development, and broadband wireless and inbound technologies have a low cost of amplification, high transmission speeds, and low error rates, to some extent. Expanded the application of broadband wireless access.

4.2 Provide effective communication services for remote areas

The terrain environment in many areas of our country is relatively complex. When carrying out communications engineering construction and technology implementation, the implementation of communications and engineering is often hindered by the in-depth implementation of these projects, resulting in the existence of imperfect communication networks in some remote areas of China. Digital microwave communication technology, as a communication technology with strong anti-interference ability, high efficiency, free from terrain influence and easy to use, can effectively construct and popularize communication network systems in complex and remote areas of the environment, enabling remote areas to receive digital transmission signals.

5. Conclusion

In summary, under the in-depth development and popularization of communication engineering, the application field of digital microwave communication technology will inevitably be more extensive. Digital microwave communication technology can only meet the needs of the future development of communication engineering only by constantly optimizing the level of signal transmission. Therefore, intensifying the development and application of digital microwave communication technology will not only help promote further technological reforms in the communications industry, but also help improve the transmission efficiency and quality of digital signals, and at the same time ensure the stability of signal transmission in the communications industry. Many advantages.

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