Industrial Engineering and Innovation Management (2023)
Clausius Scientific Press, Canada

DOI: 10.23977/ieim.2023.060404
ISSN 2522-6924 Vol. 6 Num. 4

Some Thoughts on the Standardization of Microwave Communication Enterprises in the Digital Economy

Yanhong Zhang

Cetc Shanghai Microwave Communication Co., Ltd, Shanghai 201802, China

Keywords: Microwave communication, enterprise standardization, problems, countermeasures, suggestions

Abstract: In the context of the digital economy, standardization is the foundation for enterprises to achieve scientific management. It is also a strategy and means to promote quality management. In order to improve the standardization management level of microwave communication enterprises and strengthen their product quality and market competitiveness, introduce the standardization status of microwave communication enterprises from three aspects: the standardization of microwave communication equipment, the standardization of quality management, and the existing problems in standardization. In view of the existing problems, propose countermeasures and suggestions for strengthening the standardization management of enterprises. Microwave communication enterprises should enhance their scientific management and quality management level by promoting efficient, scientific, and advanced standardized management from the perspective of strengthening internal management and meeting the needs of the market and customers.

1. Introduction

Microwave communication refers to a wireless communication technology that transmits information through ground line-of-sight in the 300MHz to 300GHz frequency band. It has the advantages of high communication capacity, stable signal, and convenient maintenance [1]. According to the difference in transmission methods, microwave communication mainly includes microwave relay communication and mobile communication. Compared to optical fiber communication and satellite communication, microwave communication technology is easy to build and has good application prospects [2]. In the context of the digital economy, China's microwave communication industry has a high degree of standardization, with relatively sound national, industrial, group, and enterprise standards, which regulate the product development, production, and application of microwave communication enterprises, and promote standardized quality management in enterprises.

2. Current Situation of Microwave Communication Enterprise Standardization

2.1. Standardization of Communication Equipment

According to the characteristics of microwave communication technology, communication equipment includes: transceiver, antenna, modulator, demodulator, multiplexing equipment, automatic control equipment, etc. [3]. At present, China's current product standards related to communication equipment are relatively sound, including international standards, national standards, industry standards, group standards, and enterprise standards, which are characterized by multi-level, all-field, and strong mutual recognition. According to statistics, since 1983, there have been 84 domestic and foreign standards related to the microwave communication industry, including 33 abolished and replaced standards, 50 existing standards, and 1 standard under review. The current standards are issued by the National Standardization Committee, the German Society for Standardization, the Russian Standardization Committee, the American Telecommunications Industry Association, the American Military Specifications and Standards Institute, and the European Standardization Committee, covering industries such as electricity, electronics, railways, posts, telecommunications, and other industries [4]. There are 12 current national standards in China, as shown in Table 1.

Table 1: Current National Standards for Microwave Communication Industry

order number	standard number	Standard name	CCS Classification number	CCS Category name
1	GB/T 13159-2008	Technical requirements for network access of digital microwave communication systems	M34	Microwave communication equipment
2	GB/T 16650-1996	General specification for TDM/FDMA point to multipoint microwave communication systems	M34	Microwave communication equipment
3	GB/T 15841-1995	Technical requirements for network access of digital microwave communication equipment 2-8 GHz digital microwave transceiver	M34	Microwave communication equipment
4	GB/T 13619-2009	Interference calculation method for digital microwave relay communication system	M04	Basic standards and general methods
5	GB/T 9404-1999	Technical requirements for microwave relay communication feeder systems	M34	Microwave communication equipment
6	GB/T 20609-2006	Traffic information collection Microwave traffic flow detector	R86	Traffic safety detection equipment
7	GB/T 13503-1992	General specification for digital microwave relay communication equipment	M34	Microwave communication equipment
8	GB/T 12640-1990	Methods of measurement for digital microwave relay communication equipment	M34	Microwave communication equipment

9	GB/T 14618-2012	Technical requirements for frequency sharing between line-of-sight microwave relay communication systems and space radio communication systems	M30	Communication equipment integration
10	GB/T 6361-1999	Parabolic antenna type spectrum series for microwave relay communication systems	M50	Radar, navigation, remote control, telemetry, antenna integration
11	GB/T 13620-2009	Determination of coordination zone between satellite communication earth station and ground microwave station and interference calculation method	M04	Basic standards and general methods
12	GB/T 14617.3-2012	Propagation characteristics of land mobile and fixed services - Part 3: Propagation characteristics of line-of-sight microwave relay communication systems	M30	Communication equipment integration

2.2. Standardization of Quality Management

Standardization is the work of simplifying, unifying, coordinating, and optimizing standardized objects to achieve the best order within a certain range [5]. It is also the key to improving the effectiveness of quality control. In the process of enterprise quality management, repetitive and regular activity objects should be standardized.

Microwave communication enterprises need standardized quality management for the entire life cycle of their products during daily product production, research and development applications. Firstly, enterprises should prepare standardized outlines in accordance with current product standards, and formulate different management requirements at the stages of product scheme demonstration, development, design evaluation, etc. [6]. In addition, during the implementation of standardization management, special personnel should be assigned to carry out standardization supervision and inspection to ensure that the production and inspection of products comply with standards, and improve the function, performance, and quality of products [7]. Finally, the technical documents during the production process of the product should be standard, clear, and complete, and archived and stored after approval.

2.3. Problems in Standardization of Microwave Communication Enterprises

Currently, the standardization problems of microwave communication enterprises mainly include three aspects: First, the national and industrial standards for some communication equipment are not sound, and the enterprise standards are not unified. Such as: hard waveguide components, slotted waveguide antennas, intelligent data transmission systems for urban rail train garages, rail transit vehicle-ground communication antenna feeder systems, low loss phase stable cables, etc. Second, the implementation of some standards for microwave communication equipment in enterprises is not standardized, and the supervision and verification system for product quality standardization is not sound [8]. When implementing the current standards for products, enterprises have problems such as poor understanding of standard technical indicators, lax implementation, and formalized quality inspection, leading to a lack of product quality assurance and market competitiveness. In addition, some enterprises have inaccurate understanding of the adaptability and scientificity of

standards, such as confusion in the confirmation of the adaptability of group standards, resulting in non-standard standardized production of products; Some requirements in enterprise standards are unreasonable and lack of scientificity.

3. Countermeasures and Suggestions for Enterprise Standardization Management

3.1. Maintain the Integrity of the Enterprise Standard System

Microwave communication enterprises should have a complete standard system of their own, which should cover the entire process of their production and operation activities. If a certain link in the process is not within the scope of system management, quality management will encounter loopholes and weaknesses, which will lead to quality problems [9]. In addition, enterprises should adopt unified current standards. If the standard system is not sound, enterprises should develop enterprise standards and promptly track the release and replacement of national or industrial standards. Enterprise standardization management is a complex project and a complete system. Its composition is shown in Figure 1.

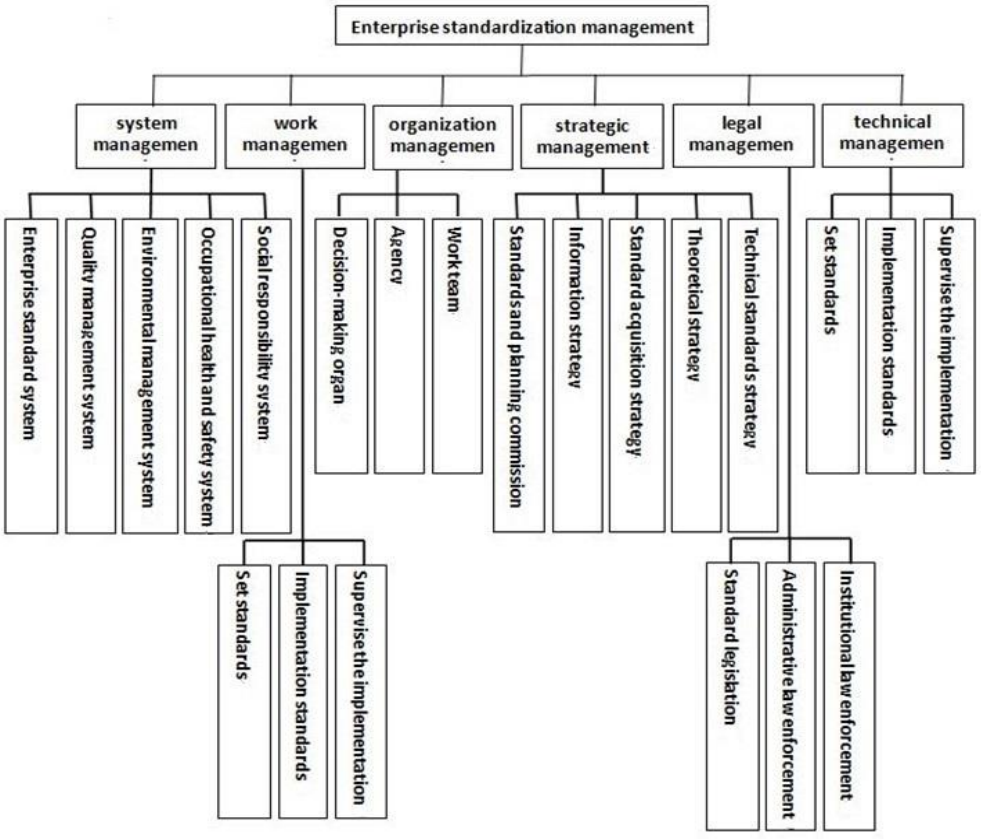

Figure 1: Enterprise standardized management system

3.2. Maintaining the Suitability of Enterprise Standards

The suitability of standards is mainly reflected in their operability and supervision. Work standards are guidelines and operational norms for employees. When formulating standards, they must have a clear purpose, scope, and responsibility authority, be easy to understand and operate, and ensure that the process can be controlled and monitored.

The internal and external environment in which an enterprise is located is constantly changing. Enterprise standards should be revised in a timely manner based on the enterprise's own development level, production processes, raw materials, equipment level, product structure, and other changes, in combination with national industrial policies, market development direction, user needs, and other changes, to ensure the suitability of enterprise standards [10].

3.3. Maintain the Scientificity and Rationality of Enterprise Standards

Maintaining the scientificity and rationality of enterprise standards is very important for product production and market competition. Enterprise standards are too high and it is difficult to improve production, resulting in excessive product quality and high production costs. Low enterprise standards can reduce production difficulties and costs, but product quality cannot meet market and user requirements, thereby weakening the market competitiveness of products. If enterprise management standards and work standards are not scientific and reasonable, they will inevitably lead to management confusion and quality problems, and become a burden for enterprise development [11]. Therefore, enterprises should strengthen standard management in research and development, inspection and assessment, modification and improvement, to ensure the scientific and reasonable nature of enterprise standards.

4. Conclusion

Standardization is the foundation for enterprises to achieve scientific management, and is also a strategy and means to promote quality management. This paper introduces the standardization status of microwave communication enterprises from two aspects: standardization of microwave communication equipment and standardization of quality management. It points out some problems in enterprise standardization management, and some countermeasures and suggestions in enterprise quality management, which has guidance and reference significance for enterprise standardization construction. With the rapid development of the digital economy and increasingly fierce competition, the quality of microwave communication products will become a magic weapon for enterprises to win. In order to become bigger and stronger, microwave communication enterprises should strengthen their internal management and meet the needs of the market and customers, and promote efficient, scientific, and advanced quality management through standardization, so as to advance their business quality towards the goal of pursuing excellence.

References

[1] Li B. Development and Prospect of Microwave Communication Technology. Power System Communications, 2011, 32 (12): 4.

[2] Zhu H X. Development and Prospect of Microwave Communication Technology. Electronic Technology and Software Engineering, 2016 (12): 1.

[3] Zhong Z M. Current Status and Development Prospect of Digital Microwave Communication Technology. Digital Technology and Applications, 2018 (5): 2.

[4] Zhao Y. Discussion on Enterprise Standardization Management Innovation and Economic Benefits. Volkswagen Standardization, 2022 (24): 3.

[5] Zhao Z, Zhu Y. Research on the collaborative promotion path of enterprise standardization and quality management. Value Engineering, 2022, 41 (25): 3.

[6] Zhang M. Research on Quality Control of Enterprise Standardization Work. Management Observation, 2017 (35): 3.

[7] Jiang L. The Relationship between Enterprise Standardization System and Quality System. China Standardization, 2003, (9): 29-30.

[8] Zhang L X. Explore the development and prospects of digital microwave communication technology. Communication Power Supply Technology, 2019.

[9] Yang H. Several issues that should be paid attention to when integrating enterprise standard systems and quality management systems. Enterprise Standardization, 2006:22-23.
[10] Zhou M. Current situation and improvement strategy of enterprise standardization management. Volkswagen Standardization, 2022 (3): 3.
[11] Yang X Y. Research on Enterprise Standardization Management in the New Economy. Economist, 2012 (3): 256-257.