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**Industrial wireless communication specification based on
cellular networks - Part 5: Application requirements**

基于蜂窝网络的工业无线通信规范 第5部分：应用要求

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Foreword

This document is in accordance with the provisions of GB/T 1:1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting: This document is part 5 of GB/T 42126 "Industrial wireless communication specifications based on cellular networks": GB/T 42126 has been published The following parts:

--- Part 1: General technical requirements;

--- Part 5: Application requirements: Please note that some of the contents of this document may involve patents: The issuing organization of this document does not assume the responsibility for identifying patents: This document was proposed by the China Machinery Industry Federation: This document is under the jurisdiction of the National Industrial Process Measurement, Control and Automation Standardization Technical Committee (SAC/TC124): This document was drafted by: Mechanical Industry Instrumentation Comprehensive Technical and Economic Research Institute, Huawei Technologies Co., Ltd., China Mobile Communications Group Co., Ltd., Shaanxi Coal Group Yulin Chemical Co., Ltd., Shanghai Automation Instrument Co., Ltd., Shenyang University of Technology, Shenyang Automation Instrument Co., Ltd., Chinese Academy of Sciences Institute of Chemistry, Beijing Institute of Computer Technology and Applications, Chongqing University of Posts and Telecommunications, Wuhan Dongyan Smart Design Research Institute Co., Ltd., China Information Communications Research Institute, Zhijiang Laboratory, China Unicom, China Telecom, Zhejiang University, Zhejiang University Control Technology Co., Ltd., Foxconn Industrial Internet Co., Ltd., Zhongshan Xingao Electronic Materials Co., Ltd., Xiamen Sixintong Xin Technology Co., Ltd: The main drafters of this document are: Wang Zhen, Zhao Yanling, Pang Lingli, Li Ying, Liu Dan, Tan Bin, Cheng Jinxia, Diao Lan, Zeng Kaiyue, Xing Yuanri, Han Dantao, Gong Yanjie, Zhang Xiaoling, Bao Weihua, Li Dong, Feng

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Cellular network wireless communication technology (referred to as cellular network) has been continuously evolving and has now reached the fifth generation: Communication systems (abbreviated as: industrial cellular networks) are gradually meeting the application requirements of low latency, large bandwidth, wide connection and flexible networking in industrial scenarios: For example, manufacturers can use industrial cellular networks to connect assets such as manufacturing equipment sensors, controllers, tools, and materials, and can also transmit information The system is connected with the equipment to provide relevant parties with more abundant operational, traceable and locatable information, helping the industry to move towards digitalization and informatization: With the continuous evolution of cellular network wireless communication technology, industrial cellular networks have become more and more advanced in terms of bandwidth, latency and availability:

Continue to improve and enable more industrial application scenarios: GB/T 42126

"Industrial Wireless Communication Specifications Based on Cellular Networks" is a basic standard for guiding the application of cellular networks in industrial sites: To ensure that the industrial cellular network can adapt to the application needs of industrial scenarios, it is planned to consist of 6 parts:

--- Part 1: General technical requirements: The purpose is to establish the overall technical requirements that need to be followed for various industrial sites:

--- Part 2: Protocol profile: The purpose is to establish communication profile requirements applicable to industrial sites:

--- Part 3: Test specifications: The purpose is to establish communication industry-compliant test specifications:

--- Part 4: Security requirements: The purpose is to enable the cellular network to operate and manage safely:

--- Part 5: Application requirements: The purpose is to better apply cellular networks in industrial sites and facilitate widespread use by all relevant parties:

--- Part 6: Acceptance requirements: The purpose is to ensure that the cellular network meets the requirements of GB/T 42126 Parts 1 to 5 after it is established: The actual requirements of the relevant parties: Industrial wireless communication specifications based on cellular networks Part

1 Scope

GB/T 42126.5-2024 sets the application requirements for industrial wireless communication

over cellular networks. Private 5G in factories is one of the most heavily promoted industrial technologies in China, and the gap it has to close is real: cellular networks were engineered for human traffic, best-effort and tolerant of variable latency, while a motion control loop or a safety function needs bounded latency and a defined failure behaviour. This part states what the industrial applications actually require, so that a network can be engineered and accepted against it. It covers the classes of industrial application and their characteristics, the requirements each places on latency, jitter, reliability, availability, determinism, data rate, device density and mobility, the requirements on time synchronisation, on positioning where the application needs it, on security and isolation, and on the coexistence with the wired industrial networks and with the existing wireless systems in the plant, together with the verification of those requirements. It takes effect on 1 November 2024.

This document provides the application process of industrial cellular networks and specifies the requirements analysis, design and construction of industrial cellular networks: The requirements of various stages such as industrial cellular network design, industrial cellular network integrated application and industrial cellular network application scenario acceptance: This document is applicable to industrial cellular network providers, integrators, third-party service agencies and industrial users who are engaged in the development of industrial cellular networks: application:

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document: For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document:

GB/T 42126:1-2022 Industrial wireless communication specifications based on cellular networks Part 1: General technical requirements

3 Terms and definitions

The following terms and definitions apply to this document: 3:

1 Cellular network A communication network that divides the service area into many cells (using a cellular structure), each of which is allocated one or several groups of frequencies:

Note: Industrial cellular network is an industrial wireless communication network based on cellular network: [Source: GB/T 42126:1-2022, 3:5] 3:

2 Cellular terminal equipment celularend-station Wireless access to cellular networks is the initial source or final destination of data:

Note: Industrial cellular terminal equipment can be field equipment, programmable control

equipment, monitoring equipment, etc: that use integrated cellular modules or external industrial gateways, CPEs: [Source: GB/T 42126:1-2022, 3:6] 3:

3 Digital, two-way, multi-node communication system for industrial production environments:

Note: Typical industrial communication networks mainly include fieldbus networks, industrial Ethernet, industrial wireless networks, etc: 3:

4 Network slicing networkslice Provide specific network capabilities and network features (such as resource isolation, SLA service level agreement guarantee features, etc:), and provide customers with a variety of business A logical network with service attributes: [Source: YD/T 3973-2021, 3:1:1]