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**ENERGY INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

NB/T 11645-2024

**Construction and management specification of 5G
communication system for coal mines**

煤矿用5G通信系统建设及管理规范

Issued on: September 24, 2024

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Table of Contents

- 1 Scope
- 2 Normative references
- 3 Equipment protected by increased safety "e"
- 4 Equipment protected by intrinsic safety type "i"
- 9 Equipment protected by encapsulation type "m"

1 Scope

NB/T 11645-2024 is the Chinese energy sector specification for building and running a 5G communication system in a coal mine. It exists because the intelligent mine that Chinese policy is pushing for - remote operation of the longwall face, video from the working section, continuous gas and equipment telemetry, workers located in real time - is a network problem before it is a mining problem, and the networks previously installed underground cannot carry it. A coal mine is close to the worst radio environment there is: kilometres of narrow steel-supported roadway that behave as lossy waveguides, machinery that moves the coverage requirement every shift, and an atmosphere in which methane makes every enclosure a potential ignition source. That last point is what separates this document from a general 5G engineering specification: every base station, baseband unit and terminal taken below ground has to be mine-use explosion-protected equipment certified under the GB/T 3836 series and carry the mine product safety mark, so the equipment is not the equipment a surface operator would install. The document defines the system as five parts - core network, transmission network, baseband unit, base station and terminal - and sets the basic requirements, including that the system should support standalone networking and keep operating safely and stably when the external network fails, and that data confidentiality and integrity meet the cybersecurity grading requirements of GB/T 22239. It then covers the system design, with separate architectures for underground and opencast mines, and goes on to installation and acceptance, use and maintenance, and the management system that has to be in place around the network. An informative annex gives the 5G network requirements of the typical coal mine business models, which is the part that tells an engineer what bandwidth and latency each application actually needs. It was issued on 24 September 2024 by the National Energy Administration and takes effect on 24 March 2025.

11. Inspection of the construction quality of communication projects MT/T 1115 General technical requirements for multi-base station mine mobile communication systems YD/T 3615 5G mobile communication network core network overall technical requirements YD/T 3618 5G digital cellular mobile communication network radio access network general

technical requirements (first phase) YD/T 3627 Technical requirements for 5G digital cellular mobile communication network enhanced mobile broadband terminal equipment (Phase I) YD/T 3929 Technical requirements for base station equipment in the frequency band below 6 GHz for 5G digital cellular mobile communication networks (Phase I) YD/T 5264 Digital cellular mobile communication network 5G wireless network engineering technical specification

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. document.

GB/T 3836.1 Explosive atmospheres Part

GB/T 22239 Information security technology Network security level protection basic requirements

GB/T 50374 Communication pipeline engineering construction and acceptance standard

GB 50968 Open-pit coal mine construction code

GB 51145 Code for construction and acceptance of coal mine electrical equipment installation projects

GB 51171 Communication line project acceptance specification DL/T 5161.11 Regulations for the inspection and assessment of the quality of electrical installation projects Part

3 Equipment protected by increased safety "e"

GB/T 3836.4 Explosive atmospheres Part

4 Equipment protected by intrinsic safety type "i"

GB/T 3836.9 Explosive atmospheres Part

9 Equipment protected by encapsulation type "m"

GB 4943.1 Audio, video, information technology and communication technology equipment Part