

Industrial 5G Terminal

1. Outline

There is a rapidly expanding market for industrial solutions to improve productivity and safety by transmitting all kinds of information in factories and cities to the cloud at high speed and with low latency through 5th generation mobile communication systems (hereinafter referred to as “5G”) and analyzing the information using AI.

We have developed an industrial 5G terminal that can be used in both public 5G networks, which are deployed by mobile carriers, and local 5G networks, which are built by companies and local governments within a limited area. This 5G terminal has an edge computing function*1 and ease of installation of applications that meet user requirements. The combination of edge computing in this 5G terminal and cloud computing in a cloud server makes it possible to realize optimal solutions that meet user requirements.

We are also developing a product line for traffic control system applications such as uses for traffic signal controllers.

2. Specifications

The appearance of the terminal and an example of system configuration are shown in Fig. 1, and equipment specifications are listed in Table 1.

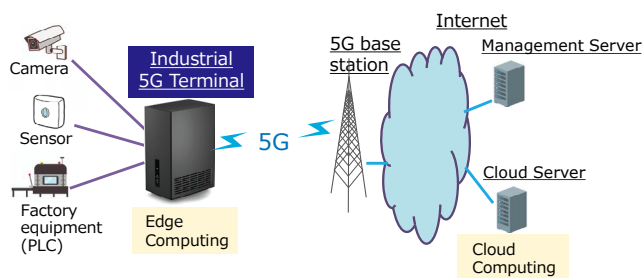


Fig. 1. Appearance of the terminal and an example of system configuration

Table 1. Equipment Specifications

| Item | Specifications |
|-----------------------|--|
| 5G | Based on 3GPP*2 Rel-15 FR1 (sub6) NSA mode, SA mode*3 |
| Wireless LAN | IEEE802.11 a/b/g/n/ac/ax |
| Wired LAN | 100/1000BASE-T × 3 |
| Other Interfaces | RS-485 × 1, Digital input output (DI × 1, DO × 1) |
| Size | 150 × 100 × 220 mm |
| Weight | 1.3 kg |
| Power supply | AC100 V (AC adapter) |
| Power consumption | Max. 35 W |
| Operating environment | Operating temperature: 0 to 40°C Operating humidity: 10 to 85% |
| Cooling method | Natural cooling (fanless) |
| Other functions | Router, VPN passthrough/client, NAPT, DHCP, Edge computing function |

3. Features

- Easy for users to install applications into 5G terminal
An edge computing function using a container virtualization platform*4 allows users to easily implement applications that meet the user’s needs.
- Directly connectable with factory equipment
This 5G terminal can be directly connected with existing equipment with serial (RS-485) or digital input/output interfaces (DI/DO) without any additional interface conversion devices, which helps simplify communication networks composed of equipment and sensors in the factories and cities.
- Supports both public and local 5G networks
This 5G terminal supports the sub6 frequency band (less than 6 GHz) and access to public and local 5G base stations in NSA and SA modes. It also supports the semi-synchronous of local 5G, which enables the adjustment of bandwidth allocation on uplink and downlink channels in 5G.
- Encryption for specific communication data
This 5G terminal can encrypt the selected confidential data using a VPN function in equipment data and video data, and transmit them to the cloud.
- Remote terminal management
The terminal management functions (e.g., TR-069*5) of the 5G terminal allows users to remotely perform 5G terminal management (e.g., status monitoring and the collection of log data) and firmware updates.

- *1 Edge computing function: A function to process and analyze acquired data near the end user.
- *2 3GPP: Standardization organization that creates specifications for mobile systems.
- *3 Non-standalone (NSA) mode, standalone (SA) mode: NSA mode for services using a combination of 4G and 5G, SA mode for services using only 5G.
- *4 Container virtualization platform: A mechanism for implementing software by combining software modules called containers.
- *5 TR-069: Terminal management specifications defined by the Broadband Forum.