## 8.1 WiFi

The general underground mine communication requirements are:

* Instant messaging service, including web browsing, sending/receiving photos/videos, audio communication etc.
* Surveillance video service, these videos are collected by surveillance cameras and sent to the control room
* Sensor data transmission service, for example, pressure, gas, temperature, sound, access control and power supply and other equipment data automatic collection and upload.

WiFi has been widely used in underground mines. The typical structure of underground mine WiFi network is shown in Figure ? This is a simple three level underground mine. The core switch is located at the control room on the surface. At each level, there is at least one switch. Access points are connected to the switch over twisted pair. For some areas only need temporary coverage, WiFi repeater can be used to extent the WiFi signal. Those repeaters can be powered by battery if power cable is not available. This makes the network very flexible and reduce the cost. WiFi has been used for remote control of machines in underground, sensors data collection, web browsing, instant messaging etc. However, to achieve the whole mine coverage using WiFi is expensive, only key areas are covered for most of the mines which have deployed WiFi network.

Redundancy must be considered for underground mine communication network, for instance, a redundant fibre to surface via ventilation raise. The redundant system is not shown in the figure.



Core switch

Control room

switch

AP

Repeater

Sensor

Optic fibre

Twisted pair