



# FEASIBILITY STUDY ON APPLICATION OF WIMAX TECHNOLOGY TO UNDERGROUND CABLES DATA ACQUISITION



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## ABSTRACT

*This paper presents a feasibility study on WIMAX technology application to underground cables data acquisition. This feasibility study is based on a field data collection prototype system that is composed of field monitoring and host control platforms. The data transmission, communication, and control of these two platforms are accomplished using WIMAX technology. Based on the transmission characteristics of WIMAX, this paper proposes a WIMAX based communication architecture and then develops a specific data format that is suitable for monitoring the underground area and collecting cables data, such as temperature, humidity, partial discharge, leakage current. After establishing the prototype system, the authentication and performance tests were conducted. The authentication test shows that the underground cables data were transmitted correctly.*

## KEYWORDS

Underground cables, Wireless sensor networks, WIMAX

## INTRODUCTION

Combined with sensor technology, electronics technology, computer technology, and communication technology, the on line insulation monitoring system can fulfil the on line monitoring and diagnosing of the electrical equipments by signal acquisition, data processing, logical decision and data transmission. So in recent years, high voltage engineering researchers have paid more and more attention to the technology. But the current insulation on line monitoring system is found to have many disadvantages in practical usage, such as complexity in wire connection, difficulty in device installation, and liability to be interfered by other electrical equipment. In order to solve the problem, we introduce a new insulation monitoring system based on WIMAX technology and IEEE1451.2 standard.

## WIMAX

WIMAX is defined as World Interoperability for Micro Access by the WIMAX Forum, formed in June 2001 to promote conformance and interoperability of IEEE 802.16 standard, officially known as WirelessMAN. WIMAX aims to provide wireless data over long distances, in a variety of different ways, from point to point links to full mobile cellular type access.

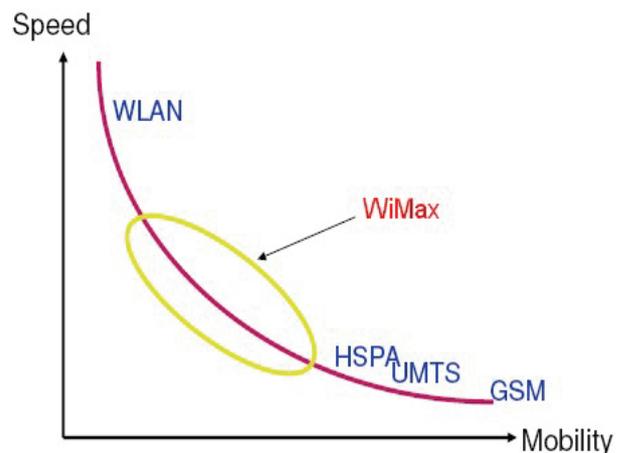
## WIMAX uses

The bandwidth and reach of WIMAX make it suitable for the following potential applications:

- Connecting WiFi hotspots with each other and to other parts of the Internet.
- Providing a wireless alternative to cable and DSL for last mile (last km) broadband access.
- Providing high speed data and telecommunications services.
- Providing a diverse source of Internet connectivity as part of a business continuity plan. That is, if a business has a fixed and a wireless internet connection, especially from unrelated providers, they are unlikely to be affected by the same service outage.
- Providing nomadic connectivity

## Competing technologies

Within the marketplace, WIMAX's main competition comes from widely deployed wireless systems with overlapping functionality such as UMTS and CDMA2000, as well as a number of Internet oriented systems such as HIPETMAN and WiBro. Fig. 2 shows the WIMAX's speed over the mobility.



## WIMAX APPLICATIONS

Fig. 2 shows an example of the cables and their surroundings in a 154 kV underground installation at S district, Seoul, Korea.