3GPP LTE: The Future of Mobile Broadband

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Abstract The mobile broadband technologies are reaching a commonality in the air interface and networking architecture; they are being converged to an IP-based network architecture with Orthogonal Frequency Division Multiple Access (OFDMA) based air interface technology. From technical perspective, fundamental goal of mobile broadband is to offer higher data rates with reduced latency. The third Generation Partnership Project (3GPP) presents the Long-Term Evolution (LTE) project in order to accommodate increasing mobile data usage and new multimedia applications. In the near future, with the recent progress made by technical specifications and vendor technology demonstrations LTE will emerge as successor to cellular systems as a broadband wireless solution. This paper provides an overview of 3GPP LTE including its history, features, technology, architecture and future. The technology components include OFDMA air-interface, Multiple-Input and Multiple-Output (MIMO) antenna technology and higher order modulation. The architecture includes Evolved Packet Core (EPC) and Evolved UMTS Terrestrial Radio Access Network (E-UTRAN) components. This paper will concentrate to describe the main functions of the most important network elements. Also, the aim of this paper is to present the future potential of LTE which will make it an inevitable choice for wireless network operators around the globe.

Keywords 3GPP · LTE · EPS · UMTS · HSPA · Mobile broadband

Abbreviations
3GPP Third generation partnership project
CDMA Code division multiple access
DHCP Dynamic host configuration protocol

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1 Introduction

The last decades have seen uninterrupted growth in terms of telecommunication and ICT infrastructure development and service uptake. By the end of 2008, an important milestone in the Information and Communication Technologies (ICT) development race was achieved: over 4 billion mobile cellular subscriptions worldwide, translating into a penetration rate of 61