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A survey paper titled "Uplink Improvement of Long-Term Evolution Advance"

[1]Pradeep Sahu
Gandhi Institute of Excellent Technocrats, Bhubaneswar, India
[2]Subhankar Panda
Vikash Institute of Technology, Bargarh, Odisha, India

Abstract

The User Equipment's (UE) now days are able to provide different internet applications and services that raise the demand or requirement for high speed data transfer and Quality of Service (QoS). According to that, the next generation of mobile communication systems determined by these demands is expected to provide higher data rates and better link quality compared to the existing systems. In the last ten years, it has seen that significant advances of multiuser MIMO (MUMIMO) in wireless communication. MU-MIMO is now introduced in different standards or known to be as new generation wireless standards for example LTE-Advanced and 802.16m. The number of users is increasing day by day with a large number of applications and at the same time data rates with high transmission and reliability of communication are required. Additionally, growing concern is also there about the green communication which relates to the special effects of the radiation emitted from wireless devices on the human body. We introduce the basic concepts of LTE Advance uplink as well as MIMO communication and some of the literatures are introduced in this paper.

Key words: LTE Advance, MIMO, Coordinated Multi-Point, 3GPP, Wireless Network, Communication.

1. INTRODUCTION

Transmitted power in Long Term Evolution known as Advanced (LTE-A) uplink (UL) which is strongly linked to the number of physical resource blocks (PRBs) allocated LTE-A. It allows the use of non-contiguous resource allocation in the UL together with the simultaneous transmission along with the multiple component carriers named as carrier aggregation. These features lead to an increase in the spectral efficiency and also link the gain in the performance obtained from frequency diversity. Long Term Evolution known as Advanced (LTE-A) is the solution presented by the 3rd Generation Partnership Project (3GPP) acknowledged as the fourth generation mobile communications technology [1].

LTE-A aims at the ambitious data rates of 1 GB/s in the downlink (DL) and 500 Mb/s in the uplink (UL). In this sense, as a means to increase UL spectral efficiency LTE-A introduces new approaches. Among all of them the allocation of non-contiguous resources and the use of multiple Component Carriers (CC), also

denoted as Carrier Aggregation (CA) in the 3GPP arena, are included. Both technologies bring the benefit of additional frequency diversity gain, but do not preserve the single carrier property [1].

Long Term Evolution-Advanced (LTE-Advanced) is a standard of cellular networking that offers higher throughput when it is compared with its predecessor which is known as Long Term Evolution (LTE). Long Term Evolution-Advanced networks can transmit data with a speed of 1 GB per second which is comparatively higher when it compared with LTE networks having a maximum data transmission of 300 MB per second. Accordingly, the high demand of the cellular bandwidth shows that carriers may have to use LTE-Advanced which results with the increase in their capacity and it is not necessary to deliver significantly higher speeds. LTE-Advanced network uses MIMO technology known as multiple-input and multiple-output to deliver or make the data transmission faster via more than one signal. MIMO requires multiple antennas to take input or to receive those signals, which can limit its use in compact devices such as mobiles, smart phones and tablets [2].

1.1. LTE-Advanced requirements

Based on the requirements of ITU for IMT-Advanced systems, 3GPP created a technical report summarizing LTE-Advanced requirements in [3]. The IMT-Advanced key features delineated in the circular letter inviting candidate radio interface technologies are given below:

- A high degree of commonality of functionality worldwide while retaining the flexibility to support a broad range of services and applications in a cost efficient manner;
- Compatibility of services with fixed networks and within IMT;
- Interworking Capability with other radio access systems;
- High quality mobile services;
- User equipment which is suitable for worldwide use;
- User-friendly applications, services and equipment;
- Worldwide roaming capability; and
- Enhanced instantaneous peak data rates to support advanced services and
- Applications (100 Mbps and 1 Gbps for higher mobility and lower mobility respectively were established as targets for research).

2. CONCLUSION

This paper summarizes the LTE-Advanced improvements that have been evaluated and specified throughout the respective study and work item phase within 3GPP. The different features deliver varying performance gains and will have certain impacts on the system complexity and cost. LTE-Advanced is an evolution of LTE and was finalized about three years after LTE Release 8 in 3GPP standardization. This paper presents a basic introduction to the fundamentals of Uplink LTE-A techniques communication. Uplink LTE- A is a radio communications technology or RF technology that is being mentioned and used in various latest technologies these days. Basically we surveyed different technologies of Uplink LTE advanced where communication strategies are distributed to the end user for better uplink high speed.

REFERENCES

[1] Maria A. Lema and Mario Garcia-Lozano, Improved Scheduling Techniques for Efficient Uplink Communications with Carrier Aggregation.

[2] Margaret Rouse, LTE-Advanced (Long Term Evolution-Advanced)

[3] 3GPP TR 36.913 V 10.0.0, March 2011; Technical Specification Group Radio Access Network; Requirements for further advancements for Evolved Universal Terrestrial Radio Access (E-UTRA) LTE-Advanced, Release 10.

[4] Study Paper on Multiple-Input Multiple-Output (MIMO) Technology, Online Available at: http://tec.gov.in/pdf/Studypaper/Test%20Procedure%20EM%20Fields%20From%20BTS%20Antennae.pdf

[5] "802.11ac MU-MIMO: Bridging the MIMO Gap in Wi-Fi", Qualcomm Atheros, Inc.

[6] Gilberto Berardinelli , TroelsB.Sørensen, Open Loop Transmit Diversity Solutions For Lte-A Uplink, 18th European Signal Processing Conference (EUSIPCO), PP. 387- 391, Aalborg, Denmark, August 23-27, 2010.

[7] S. Caban, and M. Wriliich. 2012. Evolution of HSDPA and LTE. Ltd. Published by John Wiley & Sons.

[8] Patteti Krishna and KalithkarKishanRao, Multi-User Mimo Transmission Modes For Transmit Diversity and Spatial Multiplexing In Long Term Evolution, ARPN Journal of Engineering and Applied Sciences, 10(5) March 2015.

[9] R. Irmer et al, Coordinated Multipoint: Concepts, Performance, and Field Trial Results, IEEE Communication Magazine, 49(2), pp. 102-111, Feb 2011.

[10] Sheng qian Han, Chenyang Yang, Mats Bengtsson, Channel Norm-Based User Scheduler in Coordinated Multi-Point Systems, GLOBECOM 2009: 1-5, 2009.

[11] Lei Zhou and Wei Yu, Uplink Multicell Processing with Limited Backhaul via Per-Base-Station Successive Interference Cancellation, *IEEE Global Communications Conference (Globecom)*, Anaheim, CA, U.S.A., Dec 2012.

[12] Ankit Bhamri and Florian Kaltenberger, Improving MU-MIMO Performance in LTE-(Advanced) by Efficiently Exploiting Feedback Resources and through Dynamic Scheduling"

[13] Zijian Bai and Stanislaus Iwelski, On the Receiver Performance in MU-MIMO Transmission in LTE, ICWMC 2011: The Seventh International Conference on Wireless and Mobile Communications

[14] Daewon Lee and HanbyulSeo, Coordinated Multipoint Transmission and Reception in LTE-Advanced: Deployment Scenarios and Operational Challenges, IEEE Communications Magazine February 2012.

[15] Sivarama Venkatesan and Reinaldo Valenzuela, Network MIMO: Overcoming Inter-cell Interference in Indoor Wireless Systems.

[16] Julius Ngonga Muga, Raynitchka Tzoneva and Senthil, Krishnamurthy, Design, Implementation, and Real-Time Simulation of A Controller-Based Decoupled CSTR MIMO Closed Loop System. International Journal of Electrical Engineering & Technology, 7(3), 2016, pp. 126–144.

[17] Koiloth S R S Jyothsna and Tummala Aravinda Babu. Performance Analysis of Clipped STBC Coded MIMO OFDM System. International Journal of Electronics and Communication Engineering & Technology, 7(1), 2016, pp. 28-44.

[18] Dr. H.V. Kumaraswamy and Vijay B.T, Efficient Beamforming Algorithm for Mimo Multicast with Application Layer Coding. International Journal of Electronics and Communication Engineering & Technology, 4(2), 2013, pp. 116–128.

[19] Xuanli Wu and MingxinLuo, A Sphere Detection Based Adaptive MIMO Detection Algorithm for LTE-A System, Communications and Network, 2013, PP. 25–29.