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LTE-ADVANCED OVERVIEW

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33.1 INTRODUCTION

LTE-Advanced (LTE-A) is an extension of LTE which has been encapsulated in 3GPP (3rd Generation project partner) Release 10 in 2011.A significant requirement of LTE-A system is to achieve the highly spectral efficiency for both cell-edge and cell-center users. This can make the road for 4G easy for LTE-advance by adding some features to LTE Release 8 such as multicarrier aggregation, advanced MIMO schemes and CoMP system.

Carrier aggregation represents the significant key part of the LTE-advanced. It enables bandwidth extension to support deployment bandwidth up to 100MHz to provide a larger system Bandwidth. Therefore, it has advantage of limiting the cost of equipment and enabling much of the technology developed for LTE Release 8 to be reused. Each component carrier within an aggregation is designed to be basically similar to LTE release 8 carriers so they can configured in a backward- compatible way and used by legacy UEs if desired. Up to five component carrier with a Bandwidth of up to 20 MHz each can be aggregating in LTE-A to make efficient use of the available spectrum and achieve the desired total Bandwidth and peak data rates. It will also allow LTE_A target peak data rates in excess of 1 Gbps in the downlink and 500 Mbps in the uplink to be achieved.

Multi-antenna or MIMO (multiple inputs, multiple outputs) is one of the feature technologies which enhanced LTE to become LTE-A Release 10. It is based on transmitting and receiving with multiple antennas and utilizing uncorrelated communication channels when radio signals propagate through the physical environment. LTE Release 8 and 9 support multi antenna (MIMO) technology with up to four transmitter and receiver antennas in downlink, but only single antenna transmission in uplink. Release 10 extends the MIMO support for eight transmitter and receiver antennas in downlink and introduces uplink MIMO by supporting up to four transmit and eight receiver antennas. There are two types of MIMO (Single-User and Multi-User). We distinguish between them, although a common set of concepts captured the essential MIMO benefits in both cases. Single- User MIMO techniques dominated the algorithms selected for the first version of LTE, while Multi-User MIMO becomes more established in Release 10. Downlink (Multi-User MIMO) implies downlink transmitting to different terminal using the same time-frequency resource and relying on the