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Short Communication

An Adaptive Security Measurement Control Scheme over LTE Networks

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DESCRIPTION

The growing trend of wireless communications requires compact and intelligent antenna designs. Antennas that operate on multiple frequencies can be used for many new wireless applications. Long Term Evolution (LTE) is an upgrade path for network operator using both Global System for Mobile Communication (GSM)/ Universal Mobile Telecommunications System (UMTS) and Code Devision Multiple Access 2000 networks. LTE frequencies and bands vary by country, so only multiband phones can use LTE in all supported countries. The goal of LTE was to increase the capacity and speed of wireless data networks through new DSP (Digital Signal Processing) technology and modulation developed around the year 2000. LTE services are also being rolled out by major operators in North America, with the Samsung SCH-r900 being the world's first LTE handset. LTE is a broadband wireless communication technology for mobile devices, used by phone providers to deliver wireless data to consumers' phones. In previous iterations of 3G, LTE offered high speeds, good efficiency, peak data rates, and bandwidth and frequency flexibility.

Demand for mobile data has continued to grow exponentially over the last two decades, primarily due to the rapid adoption of smart devices and high-quality video applications. Traditional voice-centric networks (such as 2G networks) are obsolete. Fourth Generation (4G) Long Term Evolution (LTE) offers many improvements over Third Generation (3G) High-Speed Packet Access (HSPA). By the end of 2021, 4G LTE had the largest population coverage of any other mobile network technology in the world. However, there are still a significant number of countries with less than 60% 4G LTE coverage. Network sizing is an important first step in the wireless network planning process. Sizing for LTE-A networks is more challenging and challenging than for traditional networks as they offer different types of services with different Quality of Service (QoS) requirements. With the surge in mobile data usage and the emergence of new applications such as MMOG (Multimedia Online Gaming), Mobile TV, Web 2.0, and streaming content, the 3rd Generation Partnership Project (3GPP) is committed to Long Term Evolution (LTE).

The most complex node in LTE-A is the base station known as eNodeB. The eNodeB consists of two components, the Remote Radio Head (RRH), which consists of antennas, and the Base Band Unit (BBU), which consists of digital modules that process and interface with all signals sent and received over the air interface [1]. The remote radio head converts the digital baseband signal from the baseband unit to an Radio Frequency (RF) signal and uses uses protocol-specific processing to improve transmit power to the user equipment. There is a constant need for efficient and adaptable algorithms that can handle both peak and off-peak loads [2].

LTE is commonly called 4G-LTE, but LTE is technically slower than 4G but faster than regular 3G. For this reason, LTE is also called 3.95G. LTE speeds reach 100Mbps, while true 4G offers speeds up to 1,000Mbps [3]. However, various versions of LTE support 4G speeds. B. LTE-A. LTE networks use a multi-user variant of the Orthogonal Frequency Division Multiplexing (OFDM) modulation scheme known as Orthogonal Frequency Division Multiple Access (OFDMA) for downlink signals. The upper layers of LTE are based on Transmission Control Protocol/Internet Protocol, thus enabling a pure Internet Protocol network similar to wired communication. LTE supports data transmission such as mixed data, voice, video, and message traffic. LTE-M can support up to 10 years of battery life using two AA batteries, but only if the device is static and transmitting for a few seconds each day [4]. If a device is, roaming on an LTE network, and using voice features with LTE-M support, battery life will be reduced.

Mobile network operators typically strive to adapt to new technologies as quickly as possible, but have limited investment capacity and are very focused on maximizing the use of their resources with a high Return on Investment (ROI) [5]. On the other hand, smaller networks may not be able to meet the needs of users. Therefore, it is imperative to have the correct one. Remote radio heads require efficient scheduling algorithms to react and manage these network changes without impacting network performance or network quality.

As 4G evolved from its 3G predecessor, the actual network architecture involved small incremental changes. With 4G LTE, User Equipment (UE) such as smartphones and cellular devices

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connect over the LTE radio access network (E-UTRAN) to the Evolved Packet Core (EPC) and to external networks such as the Internet. The Evolved NodeB (eNodeB) separates the user data traffic (user plane) from the network's management data traffic (control plane) and feeds both separately to the EPC [6]. About every decade, the Radio communications Division of the International Telecommunications Union (ITU-R) and its partners define a new generation of speed, connectivity, and spectrum requirements for the world's mobile communications systems.

CONCLUSION

A new and improved proportional fair algorithm is proposed to evaluate LTE-based networks with respect to parameters such as peak throughput, average throughput, edge UE throughput, average cell throughput, average UE throughput, and spectral efficiency. Older generation technologies are regularly being phased out, allowing more data to be sent over the same spectrum, allowing more devices to share the available spectrum.

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