LTE network structure and capabilities

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ABSTRACT: Today, technologies are developing very rapidly, among them, of course, the LTE network. Its capabilities are evolving day by day, and it offers many conveniences to its users. The LTE network has recently been approved by 3GP. It is possible to obtain unprecedented operational parameters for the maximum data transfer rate, for example, a network air interface, packet transmission delay, as well as spectrum efficiency. The authors say that the launch of the LTE network, channel matching will provide more flexible planning mechanisms, the use of technology, information, re-arrangement of the location and power control of the radio frequency spectrum.

Key words: LTE network, HSPA,SAE network, E-UTRAN, UMTS system.

INTRODUCTION: In this article, we will talk about the LTE network, its capabilities and advantages. It would be helpful for everyone to know a little about the structure and operation of this network. The LTE network has evolved over the years and enhanced its services as it provides convenience to its users. Based on the high-speed packet data transmission technology of the HSPA standard, mobile broadband has been adopted by wide-area network users. However, we should, for example, improve our services by using the increase in the speed of data translation, reduce without delay and continue to increase the overall network capacity for such communication services as well as the user's requirements. For this purpose, the radio interface was developed by HSPA Evolution and LTE 3GP consortium.

MATERIALS AND DISCUSSION: The main requirement of the 3GPP project for the SAE network is to simplify the network structure as much as possible and to exclude the duplication of network protocol functions characteristic of the

UMTS system. The E-UTRAN radio access network is considered as a technical classification consisting of eNB (evolved Node V) base stations only. The base station eNB is an element of the E-UTRAN fully connected network, and it communicates through the X2 interface in a "one-to-one" manner. The X2 interface applies handover to the mobile terminal in the LTE_ACTIVE state. Each base station has a Sic interface built on the packet switching method of the SAE base network.

The SAE core network, sometimes called the EPC (Evolved Packet Core) network, contains MME/UPE nodes composed of MME and UPE logical elements. The logical element MME (Mobility Management Entity) is responsible for solving the tasks of managing the mobility of the subscriber terminal and communicates with the eNB base station of the E-UTRAN network using C-plane (interface Sl-S) control plane protocols. The UPE (User Plane Entity) logical element responds to user data transmission in accordance with the U-plane user plane protocol and communicates with the eNB through the S1-U interface.

Thanks to the S1 interface, base stations are connected to several MME/UPE nodes. This allows for rational use of network resources. Such an interface is called Sl-flex. The LTE network has the following functional differences from the UMTS network.

1. radio resource management of eNB base stations (Radio Resource Management — RRM); radio channel control (Radio Bearer Control), connection access control (Radio Admission Control), mobility control (Connection Mobility Control), dynamic resource allocation (Dynamic Resource Allocation). Similarly, in the E-UTRAN radio access network, the eNB base stations manage the radio interface protocols, adding the functions of the Node V base station in the UMTS network and, in most cases, the RNC controller.

2. The mobility management network element MME responds to the distribution of a paging message to the eNB base station. In addition, the MME manages management plane protocols: provides subscriber terminals with an identity, ensures network security, verifies the correctness of subscriber messages, and manages roaming.

3. The user plane network element performs the function of compressing the beginning of the packet in the UPE IP protocols, encrypts the data flow, terminates the user plane data packets, switches data packets to ensure user mobility.

In addition, the UPE manages user-level protocols, such as maintaining the current state of the subscriber terminal (AT), suspending the LET_IDLE state at the subscriber terminal level.

The main protocols of the S1 interface of the C-plane and U-plane planes of the LTE network are presented in Fig. 2.

One of the most important tasks of management in the LTE network is the maximum effective use of radio resources. This task is solved using a set of radio resource management functions RRM (E-UTRAN network radio resource management, radio channel data transmission service management, mobility management, connection access management, dynamic resource allocation) and radio resource management protocols RRC. E-UTRAN (Inter Cell RRM) network

radio resource management provides management of cell group resources in order to increase the efficiency of using the frequency spectrum and minimize the mutual interference of the subscriber terminal and the base station, as well as to support mobility.

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Radio channel data transmission service control (RB Control) is implemented in the E-UTRAN eNB base station and ensures the establishment, maintenance and release of data transmission radio channels in the E-UTRAN network with given parameters. . Monitoring and management of all active data transmission sessions, allocation of resources for reactivated sessions, taking into account Quality of Service (QoS) parameters are the main tasks.

CONCLUSION: In conclusion, LTE and SAE networks are very different from each other and between them LTE network can be much easier and hassle free to use. The LTE network is considered to be a network that meets international standards and is widely used. Through this article, people can get information about the network, understand its differences and advantages from other networks.

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