EQUALIZATION ALGORITHM FOR COMMUNICATION SYSTEMS

This invention is an algorithm that provides a method for power –efficient data transmission in digital communication systems

INVENTION

This algorithm is based on the single-carrier frequency divion multiple access (SC-FDMA) scheme and has been designed with specifications for 5G LTE implementation. The proposed scheme offers comparable performance to the outgoing OFDMA with even lower peak power levels. Due to the single-carrier nature, this invention provides better performance in degraded channels, reduces computational complexity and ensures efficient frequency spectrum utilization.

MARKET SIZE AND GROWTH

The rising demand for highly reliable and ultra-low latency connectivity, an increasing trend of IoT devices and growing data traffic has stringent data demands. The global 5G services market is expected to grow at a CAGR of 18% with forcasted revenues reaching USD 123 Billion by 2025. US is one of the biggest markets with a CAGR of 21%[1].

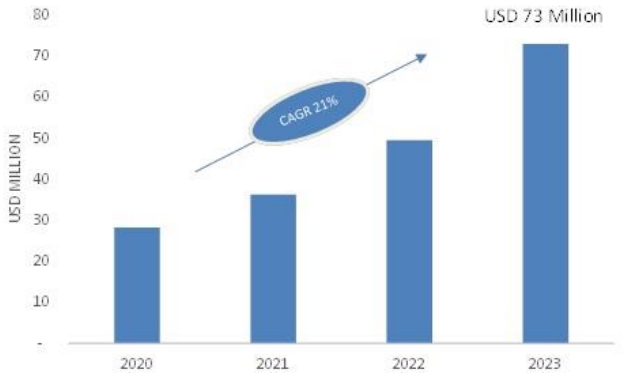

Fig. 1 US 5G system market – 2020-2023

Saudi Arabia has a mobile pentration of 130.4% in 2017 with 43 million users[2]. The telecom industry in the country is booming with annual revenues of 2017 reaching USD19.7 Billion. As the user demand increases, telco operators have invested heavily on providing highspeed data services to the users. In 2017 alone, STC spent USD50 Million in updating infrastructure to offer 5G services.

APPLICATIONS

The invention applies directly to the uplink (user to control tower) communication line in a 5G communication system implementation. Since this invention is an algorithm, it can be implemented in hand-held devices that operate in the 5G system.

ADVANTAGES

This algorithm has the following main advantages over the existing ones:

- The invention is based on the single-carrier scheme which offeres lower peak power values resulting in overall energy conservation which is crucial for longer operating life of the hand-held device
- The invention has been proven to offer better resiliance to highky degraded channels, enabling better connectivity even in highly faded channels.
- Simulation results have proven that this invention offers 14% better data throughput as compared to the existing OFDMA technique.

PROJECT STATUS

At present, the invention has been completely analyzed mathematically and validated using computer simulations.

LOOKING FOR A DEVELOPMENT PARTNER

Since the work has been validated on a software, in order for the algorithm to go commercial, it has to be implemented on hardware. Proper testbeds (FPGAs or ASICs) can be used to prove this concept on hardware and study the hardware requirements to develop the feasibility of implementing this algorithm in reality.

PATENT PROTECTION

A U.S. patent pending application: US15/365188.

ABOUT KFUPM

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1. 5G and virtual reality: Emerging technologies market forecast 2018-2023, CISION PR.
2. Saudi Arabia telecom market, Frost & Sullivan