MODULATION ACCURACY OF TRANSMITTER AND ADVANTAGES AT 60GHZ

Garima Chaudhary, Naina Chauhan

Electronics and Communication, RKGITW/UPTU, (India)

ABSTRACT

In this paper we have shown the design and simulation of 60GHZ transmitter. The FCC (fedral communication) allocates 57-66GHZ for unlicensed operation. The basic tool used in the designing of 60GHZ transmitter is advanced design system (ADS). The special characteristic properties include immunity to noise, high security and frequency can also be re-used. It has a low noise figure.

Keywords: 60GHZ, Ads.

I INTODUCTION

The millimetre-wave band (58-63GHz) is seen as a perfect candidate for short-range gigabit wireless communications. These networks are envisaged to satisfy the demands of future data-rate hungry applications but few studies have analysed the potential of frequency reuse at 60GHz. The 60 GHz is used for high security communication .The advantage of oxygen absorption is that a 60 GHz signal is quickly reduced to a level that will not interfere with other 60 GHz links operating simultaneously in a close region. This enables easier frequency reuse. Every new generation of wireless network require more and more cell-sites that are closer and closer together combined with the fast growing demand for the capacity of transmission links. Millimetre wave (MMW) radio has recently attracted a great deal of interest from scientific world, industry, and global standardisation bodies due to a number of attractive features of MMW to provide multi-gigabit transmission rate. Mm-wave is concerned with that part of electromagnetic spectrum between 30 and 300 GHz. with this bandwidth we can get huge capacity and flexibility which makes 60GHZ to use in wireless communication Millimetre wave technology is next generation wireless technology that can provide up to multi-GB/s wireless connectivity for short distance between electronic devices. In this paper we proposed a transmitter which transfer the data rate more than 1Gbps. The most common architecture used in communication system is super heterodyne and here with the use of super heterodyne we are designing and simulating our system.

II ARCHITECTURE AND SYSTEM SPECIFICATIONS

The architecture uses heterodyne, generates new frequencies by mixing two or more signals in a nonlinear device such as a vacuum tube, transistor, or diode mixer. The nonlinear device executing the heterodyne process is called a frequency mixer or frequency converter. In the process of frequency translation it can be performed more than once that's why we can use it as multiple intermediate frequencies and can also have IF blocks. For transmitting bits, it uses QAM schemes in 60GHZ transmitter QAM (quadrature amplitude modulation) is a method of combining two amplitude-modulated (AM) signals into a single channel, thereby doubling the effective bandwidth. QAM is used with pulse amplitude modulation (PAM) in digital systems,

especially in wireless applications. In a QAM signal, there are two carriers, each having the same frequency but differing in phase by 90 degrees (one quarter of a cycle, from which the term quadrature arises). One signal is called the I signal, and the other is called the Q signal. Mathematically, one of the signals can be represented by a sine wave, and the other by a cosine wave. The two modulated carriers are combined at the source for transmission. At the destination, the carriers are separated, the data is extracted from each, and then the data is combined into the original modulating information. .QAM is used extremely as a modulation schemes, for digital telecommunication system.

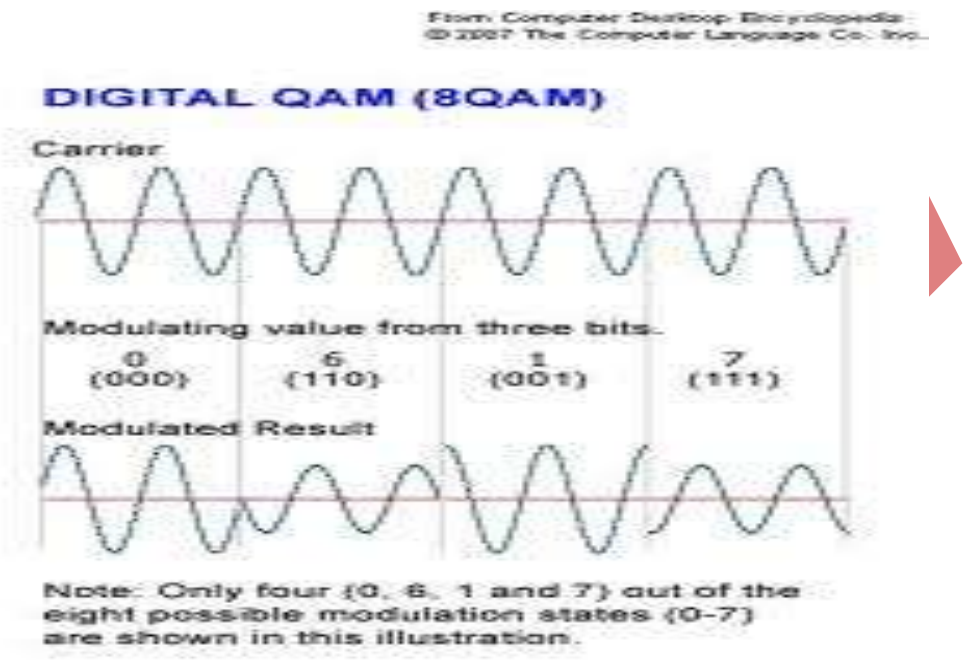

Figure 1. QAM Modulation

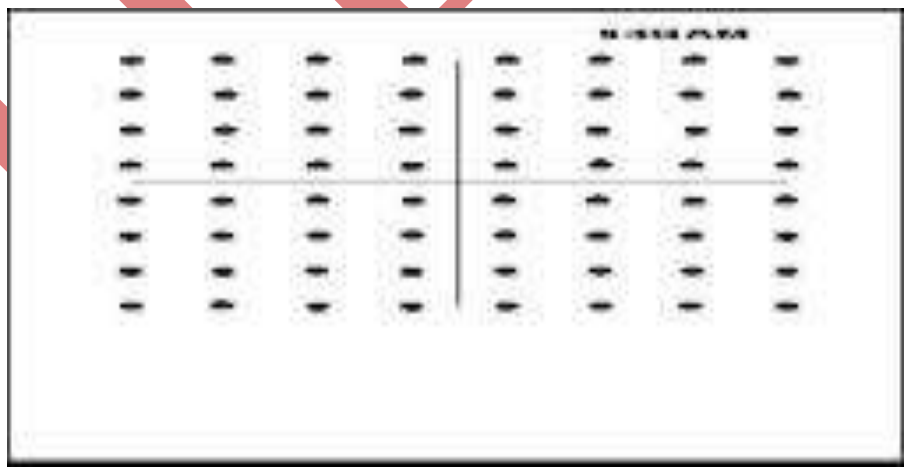

Figure2. QAM Constellation Diagram

III 60 GHZ STANDARDISATION ACTIVITIES

Due to numerous advantagess and vast potential of 60ghz, some standardisation activities have been initiated to develop and promote 60ghz. One of the main standardization activities undertaken by the IEEE for the 60 GHz

communications band falls under the umbrella of IEEE 802.15.3c[5].This activity has been ongoing for about half a decade. An initial proposal was released in October 2009. This standard outlines the physical (PHY) layer and medium access control (MAC) layer specifications for 60 GHz radios to establish reliable communications over short range. The second significant standardization effort after the IEEE 802.15.3c is the ECMA-387. The ECMA-387 standardization activity started about 4 years ago with the first edition of the standard released in December 2008. Like the IEEE 802.15.3c, it too describes the operating conditions for PHY and MAC layers. Two other notable standards for the 60 GHz communication band are the Wireless HD and Wireless Gigabit (WiGiG) standards [29, 30]. These are specifically tailored for high data rate audio/visual transmission such as that required by HDTV signals. These standardization activities are joint ventures of many companies including Broadcom, Intel, Dell, Nokia, LG and NEC. The standard details, however, are restricted and only available to the adaptors and partners.

IV ADVANTAGES OF 60 GHZ BAND

Wireless communications in the 60 GHz band entails certain advantages. The main advantages are:

Small Antenna Size: The antenna size is directly proportional to the wavelength of transmission frequency. Thus as the frequency increases, the wavelength decreases. This means that 60ghz with a wavelength of 5mm offers the possibility of constructing miniaturized antenna elements. This carries significant benifits such as fabricating a large number of antenna elements within a small unit area and on chip area integration. Thus the 6oghz offers the potential to integrate a large number of antenna modules in small portable wireless terminals. Some potential envisaged applications for the 60 GHz band are listed below:

- Fixed wireless access.
- Wireless local area networks.
- Personal area networks.
- Wireless multimedia streaming.
- Vehicular communication.

V TRANSMITTER DESIGN

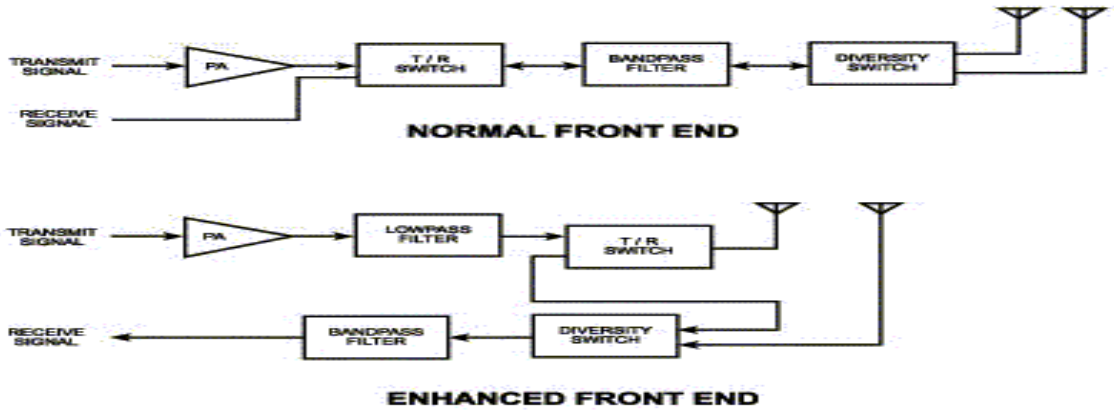

Figure 3. Transmitter Front End Diagram

A superhertrodyne architecture based transmitter is introduced using a LO (local oscillator) is up converted to get the RF frequency and QAM modulation has been used in the transmitter. Chebyshev filter is used at the transmitter side for filtering out the required frequencies. To amplify the low power radio frequency tolarge signals of significant power, a power amplifier is used.

VI CONCLUSSION

In this paper using QAM and ADS the design and simulation of 60 Ghz radio transmitter is shown and some advantages of 60ghz mode are also introduced**.**

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