IMPROVING THE QUALITY OF THE WIFI MIMO COMMUNICATION CHANNEL BASED ON DUAL POLARIZATION ANTENNAS

Ikeza Obasi A. D.
Scientific Supervisor – Prof. Martynchuk A.A.
Kharkov National University of Radio Electronics,
Infocommunications Department,
Nauky Ave. 14, Kharkiv, 61166, Ukraine

This paper work provides the basics of MIMO technology, standard of configuration, Antenna polarization choices, benefits of communication channel. Types of channels and the dual polarization Antenna for MIMO and how the dual polarization signal improves the communication quality.

MIMO (multiple-in, multiple-out) technology have become increasingly common over the past several decades, with notable examples being Wi-Fi networks and cellular 3G / 4G LTE.

As a result of the use of multiple antennas, MIMO wireless technology is able to considerably increase the capacity of a given channel, the more antennas a system has the more simultaneous data streams can be transmitted at once, improving the radio link.

A broadband V/H dual-polarized antenna is proposed for mobile communication base stations. The dual-polarized antenna achieves a HPBW (half power beam width) of ° for both VP and HP elements, a bandwidth of about 48% (1.7–2.75 GHz) for RL > 15 dB, and an isolation of 30 dB. The antenna gain is about 9 dB for both vertical and horizontal polarization. An eight-element V/H dual-polarized antenna array is also developed. The antenna array has a bandwidth of 45% (1.7–2.7 GHz) and an antenna gain of 16 dB for both VP and HP, which may find potential applications in GSM/UMTS/LTE base stations.

Nowadays, radio communication systems demands more and more spectral bandwidth for channels, and to achieve effectiveness of data transmission through these channels, certain techniques are required to utilize the available bandwidth well. MIMO is a favorable technique. Note that 2x2 represents antennas which are MIMO and dual-polarity at the same time. The possibility of increasing the capacity of radio channels is an important task [1-3]. One of the possible methods of increasing capacity is the use of dual polarization antenna transmitting and receiving (Fig. 1). Such antennas may be substantially, MIMO antenna. The example of such a MIMO radio channel is shown in Fig. 1.

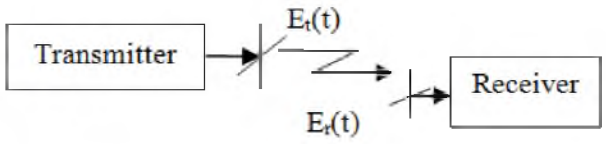

Fig.1. MIMO channel with dual polarization antenna

Dual-polarization is the ability for an antenna to function in two modes, known as vertical and horizontal polarization. A narrowband flat fading MIMO system is modeled as

$$Y = H \cdot X + n, \quad (1)$$

where – Y and X the receive and transmit vectors, respectively; H and n – the channel matrix and the noise vector, respectively.

Therefore, the use of principal component will find the transforming matrix to highlight the components of the information flow in the form

$$S(t) \Rightarrow \begin{pmatrix} S_1(t) \\ S_2(t) \end{pmatrix} = \vec{z}_{s\_out_r}(t_i) = \begin{pmatrix} \vec{b}_1 & \vec{b}_2 \end{pmatrix}^{T*} \cdot \vec{z}_{s\_out}(t). \quad (2)$$

The main contribution of this work can be summarized in the following aspects, the proposed antenna focuses on the 5G, especially the special designed feeding structures allow the proposed antenna to out-perform other existing antenna on the whole compared with other designs, the proposed antenna satisfies the common requirement of mobile communication well and is more suitable for 5G application over the sub band .A large number of transmit antenna at a base station (BS) can remarkably improve performance Via increasing the multiplexing order to various human care IoT devices by higher degree of freedom and this performance analysis is achieved when various human care IoT devices are connected to network via a dual polarized massive MIMO.

So, the proposed method to increase system capacity includes the following: business division of the transmitted information flow; transmitting of each of the sub-streams on orthogonal polarizations compensated polarization distortion of antennas; organization receiving the full polarization orthogonal polarization antennas with the ability to compensate for polarization distortion; estimate of the time taken by the correlation of radio waves; adaptive assessment matrix received vector signal; finding the spectrum and eigenvectors of matrix and their analysis; preparation of the transformation matrix of the first two eigenvectors of matrix; converting the received vector signal into its major components; restore the flow of information through the use of principal component vector signal received.

References:

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