

Simulation Of Wireless Communications System Among Labview

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Abstract - Using the software package LabVIEW tools developed computer models of wireless communication channel with the possibility of their use in practical studies.

Keywords - Virtual tools, Environment LabVIEW, coefficient of BER, Spectrum analysis, Noise stability.

I. INTRODUCTION

An important area of computer technology, particularly in the analysis of telecommunication systems and networks are modeling of complex processes and radio systems to identify and evaluate their performance and parameters.

II. MAIN PART

With the content of computer models being developed a new device (technology) can be much faster and more cost effective to identify weaknesses and pursue correction of system than to create a real prototype. Computer simulation tools allow to carry out experimental studies of real devices in a virtual environment that leads to the evaluation of possible improvements of the proposed devices prior to their practical implementation.

Building a computer model is performed using specialized software packages, called a virtual environment modeling. The most powerful tools include virtual simulation software such as LabVIEW and MatLab/Simulink.

Using a virtual environment, you can quite easily measure and analyze the most important characteristics of communication systems, including wireless. The most common wireless networking technologies include: WiFi, WiMax, WiBro. Their main feature is a high-speed data and a wide frequency range signals. Modeling such systems requires an integrated approach: modeling the transmission channels of analog and digital signal processing techniques and transforming signals, distortion evaluation. These studies can be implemented using the software package LabVIEW [1].

In work done to develop models modulators (OFDM, PSK, FSK), demodulator, sampling devices, multiplexing, etc.. In addition, the application of selected models are calculated: the dynamic range, the level of nonlinear distortion, frequency range, uneven frequency response, the level of noise disturbance. In tracts that are designed to work with digital signals are examined: the behavior of the coefficient of BER (bit error number in the base package), jitter parameters - the relative value of fluctuations of the front pulse of charting system and eye-diagrams.

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Modeling in the field of wireless data transmission systems is closely linked to simulate random processes, and can be performed as a functional simulation devices (tracts involved in processing), and as algorithmic modeling of complex signals that are distributed through the test device [2].

As an example of using a model of the tract WiMax, the Fig.1 shows dependences of the coefficient of BER values of the ratio signal/noise in the communication channel in the modes of noise interference and multibeam propagation.

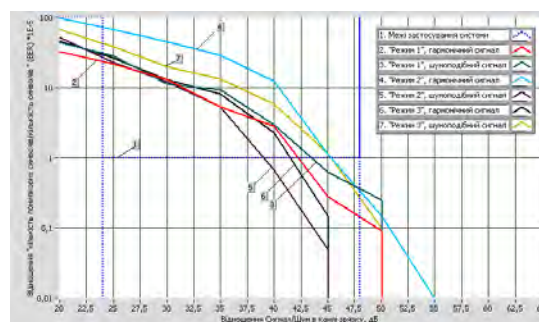


Fig.1 Modeling results

According to the virtual experiment found that: - allowable value ratio $BER \leq 10^{-6}$ - achieved levels of signal/noise in the communication channel mode noise interference (using multibeam propagation): the use of noise-like signal - 33 dB (31 dB), using the harmonic signal - 38 dB (41 dB);

- value of signal/noise level of 24 dB at the junction of the receiver equipment - achieved with the following values of the coefficient of BER mode noise interference (using multibeam propagation): the use of noise-like signal - $BER = 5 \times 10^{-5}$ (5×10^{-5}), using the harmonic signal - $BER = 2 \times 10^{-5}$ (3×10^{-5}).

Thus, in order to optimize and improve the process of study of complex telecommunication systems by computer simulation, achieved significant savings of hardware and material resources.

III. CONCLUSION

As a result, based on established programs that represent LabVIEW model of individual business units and channels of communication in general, determined the level of noise immunity WiMax technology in a noise and interference depending on the mode of distribution of the signal.

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