Research of Efficiency of the Data Transmission Telecommunication Systems with Limited by the Frequency Stripe and Power

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Abstract – **the efficiency of the data transmission telecommunication systems with limited by frequency stripe of telecommunication channel and signal power in channel with the use of modern kinds of signal modulation was explored. The results of efficiency of the systems at the concrete kinds of modulation were got. Recommendations in relation to application of definite kinds of modulation in the data transmission telecommunication systems were given.**

Keywords – **the data transmission telecommunication systems, informative efficiency.**

I. INTRODUCTION

The modern methods of signal modulation described in the scientific literature [1-4], however, expediently to analyse an informative efficiency of the system in case of use of different kinds of signal modulation. Aim of this work there is a research of efficiency of the data transmission telecommunication systems with limited by frequency stripe of telecommunication channel and signal power in channel with the use of modern kinds of signal modulation and making on his basis the recommendations in relation to planning such systems.

II. THEORETICAL RESEARCHES OF EFFICIENCY OF THE TELECOMMUNICATION SYSTEMS

The efficiency of the telecommunication systems estimate by means the coefficient of use of telecommunication channel by power β, coefficient of use of telecommunication channel by frequency stripe γ and coefficient of use of telecommunication channel by transmission throughput η.

III. MODERN KINDS OF SIGNAL MODULATION IN THE TELECOMMUNICATION SYSTEMS

In the modern telecommunication systems mainly use radio signals with a binary phase shift keying (BPSK), quadrature phase shift keying (QPSK), multiple phase-shift keying (MPSK) and QAM [1].

In case of use the new offered by author amplitude modulation of many components – (AMMC) the modulated signal has a kind [4]:

$$u_{AMMC}(t) = \sum_{n=1}^{N} U_0 a_n u_{M_n}(t)\cos(\omega_0 t + \varphi_0 + \varphi_n),$$

there N - quantity of components; U_0, ω_0, φ_0 - amplitude, circle frequency and initial phase of carrier accordingly; a_n - proportion coefficients; $u_{m_n}(t)$ - modulating signals on the

n -s inputs of modulator; φ_n - initial phases of signals on the n -s inputs of modulator.

As a result of calculations on Fig. 1 the dependences between β and γ for signals PSK, QAM, and AMMC at symbol error probability $P_{sym} = 10^{-5}$ and different M is represent.
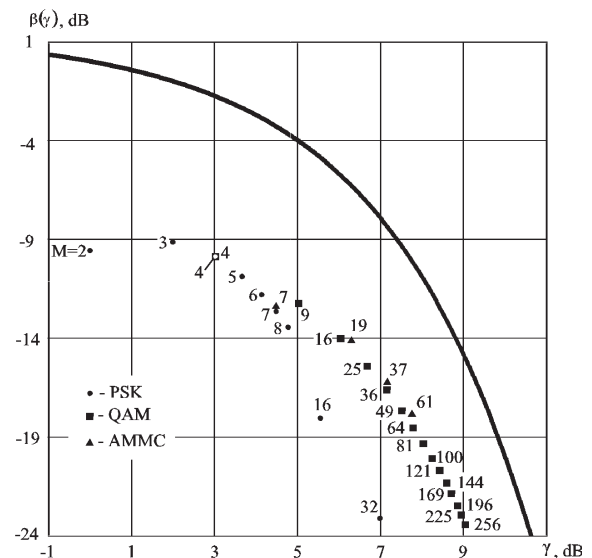

Fig. 1. Efficiency of the telecommunication systems in case of use of explored kinds of modulation

IV. CONCLUSION

An efficiency of the data transmission telecommunication systems with limited by frequency stripe of telecommunication channel and signal power in channel is higher with the use of AMMC by comparison to PSK and QAM, in particular, informative efficiency η AMMC-37 larger by comparison to QAM-36 on 7,7%.

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