

A. Lysiuk, Master student
O. Andreyev, PhD in Engr., Prof., research advisor
L. Mohelnytska, PhD in Phil., As. Prof., language advisor
Zhytomyr State Technological University

DEVELOPMENT OF A BROADBAND SHORT-WAVE RADIO COMMUNICATION DEVICE

Modern conditions of functioning of radio-electronic communication complexes put increased demands on their work. Quantitative and qualitative changes in the electronic warfare means are growing. As a result electronic warfare means become more effective than radio-electronic communication means. To improve the effectiveness of communication means it is necessary to increase their noise immunity and their work secretiveness.

The work suggests concealing communication device work by expanding the range using an LFM signal. It enables us to carry out the transfer of messages with the spectral density of signal lower than the noise level. In combination with the radio line work pulse mode it will allow us to create a communication system with a relatively high level of security.

A communication device consists of the codec and high-frequency modem. The language signal with the upper frequency of 4 kHz enters the input of a communication device. The analogue signal is sampled in the codec, where pulse-position modulation (PPM) is used. It changes the time position of the pulse. The encoder consists of the amplitude-time transformer, delay device and pulse generator. The decoder contains a time-amplitude transformer, pulse generator, a delay device, a trigger and a detector with low-frequency amplifier.

The encoder output signal enters the modem, which contains a radio pulse generator, a dispersion delay line and a high-frequency amplifier. The output signal is supplied to the antenna.

The signal is received by the communication device antenna. Then it arrives at the input of the demodulator high frequency amplifier and the dispersion delay line. The latter performs the function of the coherent filter processing a LFM signal. A generated response impulse goes from the modem output and arrives at the input of the decoder time-amplitude transformer. The analogue signal coming into the communication device speaker is generated through the use of a detector with a low frequency amplifier. LFM radio pulses possess the property of compression in time when passing through a consistent filter, which makes them widely used in different systems.

The article presents the basic principles of digital generation and processing of LFM signal, the characteristics of software and hardware means and algorithms of implementation of signal generation and processing in the communication device.

Thus, the most acceptable way for the expansion of the signal spectrum in the range of short waves is to use a LFM signal. It will boost noise immunity and communication secretiveness. This transfer of information is not associated with a change in the transmitter frequency. The interception of information by existing devices that use frequency modulation, is virtually impossible. The use of modern digital methods for signal processing and generation (based on modern microprocessors) instead of dispersion delay lines will create a compact and cheap enough communication device.

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