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## **MODERNIZATION OF THE CONTROL SYSTEM OF THE ELECTRIC DRIVE OF THE MAIN MOVEMENT OF THE LATHE WITH CNC**

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## **ANALYSIS OF THE STABILITY OF TELECOMMUNICATION EQUIPMENT TO THE INFLUENCE OF POWER WIDEBAND IMPULSE INTERFERENCE**

Means of broadband (ultra-broadband) influence generate single or sequences of ultra-short electromagnetic pulses, which generate ultra-broadband interference in space with a range from hundreds of MHz to units of GHz. The generation of such a spectrum occurs on the basis of an ultra-broadband transient process, which is an ultra-short electromagnetic pulse with a front duration of about hundreds of picoseconds [1-3]. The energy of such radiation is not concentrated at one frequency, but is distributed over the entire spectrum. The energy efficiency of such radiation, based on the concept of spectral energy density, is lower than that of narrow-band radiation, but taking into account the simultaneous generation in a wide spectrum band, we can talk about high efficiency of influence due to the possibility of penetration of the obstacle and, therefore, the introduction of voltages and currents through the vulnerability of filters and shielding.

The width of the generated spectrum depends on the transition process, the shorter the duration of the front, the wider the spectrum. Thus, when using an ultrashort pulse with a front duration of 150 ps, the spectrum width will be from units of MHz to units of GHz. It should be noted that under the influence of a narrow-band signal and a sequence of ultra-short electromagnetic pulses, it is possible to form signals of different duration and repeatability.

Currently, a large number of ultrashort pulse emitters have been created in various countries, the amplitude-time characteristics of which vary in a wide range. When solving a number of tasks regarding the assessment of the resistance of telecommunications equipment to their influence, it turned out to be convenient to use the typical form shown in fig. 1.

With narrow-band, broadband (ultra-broadband) power influence, it should also be noted the nature of failures in radio-electronic equipment and data processing equipment.

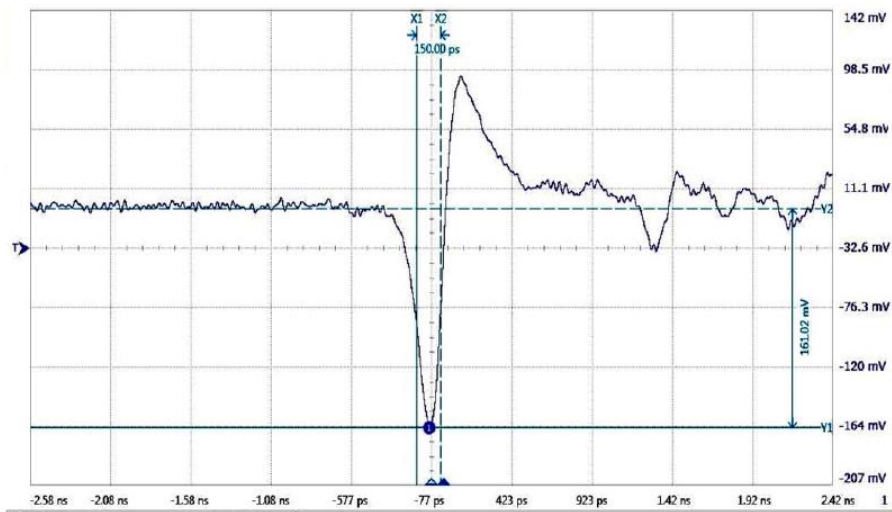


Fig. 1. A typical form of a super short electromagnetic pulse

At relatively low field strengths, which are not enough to damage the elemental base, but are sufficient to induce currents and voltages in the control and information processing circuits, comparable to the regulatory levels of the devices, false alarms may occur. For such an impact without damaging the hardware, the frequency of the narrowband electromagnetic field should be chosen based on the analysis of the information processing speed of the attacked devices. When the frequency of the field and the frequency of information processing of the attacked device are equal, the probability of failures increases.

#### LITERATURE:

3. Brauer F. *Susceptibility of IT network systems to interferences by HPEM, Electromagnetic Compatibility / F. Brauer, F.Sabath, J.Haseborg and at all. – EMC. – IEEE International Symposium. – 2009. – P. 237–242.*
4. Зіньковський Ю.Ф., Клименко В.Г. *Електромагнітна, інформаційна захищеність та сумісність електронних апаратів. – Житомир: ЖІТІ, 1999. – 376 с.*
5. Ott Henry W. *Electromagnetic Compatibility Engineering. – Wiley, 2009. – 880 p.*

#### АНАЛІЗ СТІЙКОСТІ ЗАСОБІВ ТЕЛЕКОМУНІКАЦІЇ ДО ВПЛИВУ СИЛОВОГО ШИРОКОПОЛОСНОГО ІМПУЛЬСУ ЗАВАДИ

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