COHERENT MICROWAVE POWERS SUMMATION OF NANOSECOND GUNN OSCILLATORS WITH INITIAL PHASES FIXED BY THE LEADING EDGES OF ELECTRICAL PULSES OF SINHRONIZED MODULATORS

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The results are presented of a four-channel system development based on X-band nanosecond Gunn oscillators like [*Gubanov V.P., Klimov A.I., Kova'lchyk O.B., et al. // Instrum. Exp. Tech.– 2010.–Vol. 53. –No5.–P. 710.*]. The system is intended for coherent summation of the oscillators microwave powers. The scheme of the system includes a modulator based on partial discharge of a capacitor, a triggering circuit, and two IXYS IXDN630YI chips that control two DE275X2-501N16A tandem transistors connected to the oscillators. Thus, all the oscillators are excited independently in the channels.

The standard deviations of the phase differences for different pairs of the oscillators are in the range of 16.6–24.0º that are higher than in the case of concurrent excitation the pair of the oscillators by a common modulator [*Konev V.Yu., Klimov A.I., Koval'chuk O.B., et al. // Tech. Phys. Lett.–2013.–Vol. 39. – No.11.–P. 957.*]. This can be explained by relative instability of the modulating pulses produced in different channels and by some instability of the oscillators carrier frequencies near 10 GHz.

Using a special waveguide circuit, the microwave powers of the oscillators were summarized. The maximum and average amplitudes of the total power were respectively 98 % and 95 % of the quadruple microwave power amplitude of a single oscillator.

Keywords: *four-channel system, Gunn oscillator, coherent summation of microwave powers.*