

THE NEW STATE TIME AND FREQUENCY STANDARD
OF THE USSR AND THE DEVELOPMENT OF THE SYSTEM OF
STANDARD FREQUENCY AND TIME SIGNAL EMISSION

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ABSTRACT

The new state time and frequency standard of the USSR includes the primary cesium beam frequency standard with a transition distance of 75 cm. Frequency reproducibility from switching to switching is $\leq \pm 5 \cdot 10^{-13}$. This standard is used as a base one for producing the units of frequency and time intervals in the SI system. The hydrogen masers with reproducibility not less than $\pm 1 \cdot 10^{-13}$ are the standby clocks providing a clock on the units of frequency intervals. The state time and frequency standard is preserved by hydrogen masers and cesium atomic beam standards. The comparison between the state standard of the USSR and the BIH standards in 1975-1977 showed that frequency and time units producing by the above standards coincided better than $1 \cdot 10^{-13}$ with almost constant difference of $5 \cdot 10^{-14}$. The secondary time and frequency standard at the Siberian branch of VNIIFTRI (All-Union Research Institute for Physics and Radio Engineering Measurements) has close metrological parameters with somewhat different standard structure.

For comparison of the USSR state standard with the secondary standards of the USSR and standards of the foreign countries we use portable atomic clock, lines of meteor communication, radiostation transmission in the LF- and VLF- range as well as by means of meteor lines.

Time scale and standard frequency transmission from the standards to the users is effected by means of meteor radio-lines (accuracy is not worse than 100 ns), television channels (accuracy from 0.5 μ s to 1-2 μ s), navigation radio-stations of LF- range, carrier frequencies of VLF- radio stations as well as by means of radio stations in LF- and HF- range. In the above channels there are shown the achieved results and also the trends of further development of the transmission system.

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