SOME SERVICES OF THE TIME AND FREQUENCY DIVISION
OF THE NATIONAL BUREAU OF STANDARDS

J. A. Barnes
National Bureau of Standards, Boulder

ABSTRACT

The Time and Frequency Division of the NBS provides several services to the
general public. The radio broadcasts of WWV, WWVH, and WWVB supply re-
liable, unambiguous time signals to many, many users, if at a modest level of
accuracy. Surprisingly, the NBS telephone time-of-day service also attracts
several hundreds of thousands of calls each year. Periodically, the NBS pro-
vides courses on specific topics relating to time and frequency technology. In
March 1974, the NBS will hold a general course on time and frequency. In ad-
dition to numerous technical papers published each year, the NBS has prepared
the first volume of a comprehensive monograph on time and frequency which is
at the printers now and is scheduled for delivery in January 1974.

The results of research in the Time and Frequency Division of the NBS have had
significant impact. An active TV time system capable of serving most of the
U.S. currently awaits a ruling by the FCC on a petition filed last year on behalf
of the NBS by the Department of Commerce. Three more recent developments
are: (1) a TV frequency comparator (patent applied for); (2) a method to perform
an independent (absolute) frequency evaluation of commercial cesium beam oscil-
lators; and (3) a method of removing one source of frequency drift in commercial
cesium beam oscillators.
DR. BARNES:

It is true, I believe, that we at the Bureau of Standards, in our work, do see frequency changes which are due to the microwave power level, depending on the excitation.

This is what one would expect, in fact, it is due to two effects. The power level will affect the velocity distribution that is important in the transition, and hence if there is any cavity phase shift in the cavity itself, this will manifest itself as a frequency dependence on the power level.

This is an important thing in evaluating a primary frequency standard, and if you are interested in pursuing that, I would say talk to Helmut Helwig, who can give you much more detail on the matter.