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NATIONAL METROLOGY TECHNICAL SPECIFICATION OF THE

PEOPLE'S REPUBLIC OF CHINA

JJF 1956-2021

Calibration Specification for Hydrogen Atomic Frequency Standards

氢原子频率标准校准规范

(English Translation)

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8 Recalibration interval (10)

Appendix A Raw Record Format (11)

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Introduction

This specification is based on JJF 1071-2010 "Rules for Compilation of National Metrology Calibration Specifications" and JJF 1059.1-2012 "Measurement Uncertainty Evaluation and Representation" written.

This specification is a revision of JJG1004-2005 "Hydrogen Atomic Frequency Standard". The revisions are as follows.

---According to JJG2007-2015 "Time and Frequency Measuring Instruments", the frequency accuracy is changed to relative frequency deviation;

--- Added frequency signal amplitude, harmonic and non-harmonic distortion, second pulse amplitude and width, when second pulse rises time, second pulse jitter, clock synchronization calibration items;

--- Delete the long-distance calibration method of frequency temperature characteristics and frequency value;

---Improved the measurement methods of frequency stability, frequency drift rate and relative frequency deviation.

Previous releases of this specification.

---JJG1004-2005.

Standard Calibration Specification for Hydrogen Atomic Frequency

1 Scope

This specification applies to the calibration of hydrogen atomic frequency standards.

2 Reference documents this specification references the following documents.

JJF 1001-2011 General Metrology Terms and Definitions JJF 1180 Terms and Definitions of Time and Frequency Measurement JJF 1206-2018 Specification for remote calibration of time and frequency standards JJG2007-2015 Time and frequency measuring instruments for dated references, only the dated version applies to this specification; for undated references the latest version (including all amendments) applies to this specification.

3 Overview

The hydrogen atomic frequency standard (hereinafter referred to as the hydrogen frequency standard) is divided into active type and passive type according to its working mechanism.

The difference lies in the way the transition frequency signal is generated. the atomic resonator of the active hydrogen frequency standard is a self-sustained oscillation it can continuously output atomic transition frequency signals without external excitation, as

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shown in Figure 1;

The resonator needs to generate atomic transition frequency signal under the excitation of external signal, as shown in Figure 2.Both are through a set of the servo control system locks the crystal oscillator on the atomic transition frequency, and the output frequency of the crystal oscillator has the same frequency as the atomic transition frequency.

The relative frequency deviation and long-term stability characteristics of the same level, after the distribution and other processing, the output signal of the hydrogen frequency standard is generated.

number for external use.

Fig.1 Basic working principle of active hydrogen atomic frequency standard

Figure 2 Basic working principle of passive hydrogen atomic frequency standard

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