

ICS 17.160
CCS A 53

JJF

**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

JJF 1942-2021

**Calibration Specification for GNSS Receivers Working at
Navigation
(English Translation)**

Issued on: December 8, 2021

Implemented on: June 8, 2022

Issued by: State Administration for Market Regulation

Table of Contents

Introduction (II)	
1 Scope(1)	
2 References(1)	
3 Terms(1)	
4 Overview(1)	
5 Metrological characteristics(2)	
6 Calibration conditions(2)	
6.1 Environmental conditions (2)	
6.2 Measuring standards and other equipment (3)	
7 Calibration Items and Calibration Methods(5)	
7.1 Calibration items(5)	
7.2 Calibration method(5)	
8 Expression of Calibration Results(12)	
9 Recalibration interval(12)	
Appendix A Receiver Calibration Record Form (13)	
Appendix B Coordinate Transformation (14)	
Appendix C Rocket Skid Calibration Process and Standard Trajectory Establishment Method (16)	
Appendix D Calibration Uncertainty Evaluation Example (18)	

6 Calibration conditions(2)

6.1

Environmental conditions (2)

6.2

Measuring standards and other equipment (3)

7 Calibration Items and Calibration Methods(5)

7.1

Calibration items(5)

7.2

Calibration method(5)

9 Recalibration interval(12)

Appendix A Receiver Calibration Record Form (13)

Appendix B Coordinate Transformation (14)

Appendix C Rocket Skid Calibration Process and Standard Trajectory Establishment Method (16)

Appendix D Calibration Uncertainty Evaluation Example (18)

Introduction

There are four main calibration parameters for navigation satellite receivers: This specification adopts geodetic standard point method and simulation method to calibrate static Dynamic positioning error; use simulation method, circle method, slide rail method to calibrate dynamic positioning error, speed error and acceleration error:

The geodetic standard point method used in this specification mainly refers to JJF 1118-2004 "Global Positioning System (GPS) Receiver Calibration Specifications for Aircraft (Geodesic and Navigation Types), the elevation positioning error is added to the calibration results; the simulation method is used to carry out when performing positioning and velocity calibration, it is consistent with JJF 1403-2013 "Global Navigation Satellite System (GNSS) Receiver (Time the main difference of the "Measurement) Calibration Specification" is that the positioning error is divided into static positioning error and dynamic positioning error, and There are also differences in calibration methods and data processing methods:

In addition, this specification formulates the use of a circumference measurement system and a slide rail measurement system, using actual satellite signals to measure the receiver performs dynamic positioning, velocity and acceleration calibration (including calibration method and data processing):

This calibration specification is based on the rules and formats given in JJF 1071-2010 "Rules for Compilation of National Metrology Calibration Specifications" prepared by: The measurement uncertainty is based on the rules given in JJF 1059.1-2012 "Assessment and Expression of Measurement Uncertainty" Make an assessment:

This specification is published for the first time:

Calibration specifications for navigation satellite receivers

1 Scope

This specification applies to the calibration of navigation-type satellite receivers:

2 References

This specification references the following documents:

GB/T 18314-2009 Global Positioning System (GPS) measurement specification JJF 1118-2004 Global Positioning System (GPS) Receiver (Geodesic and Navigation) Calibration Specification JJF 1403-2013 Global Navigation Satellite System (GNSS) Receiver (Time Measuring) Calibration Specification GB/T 19391-2003 Global Positioning System (GPS) Terms and Definitions GJB5407-2005 General Specification for Navigation and Positioning Receivers GJB6564-2008 Verification Regulations for Global Positioning (GPS) Receivers for dated references, only the dated version applies to this specification; for undated references document, its latest version (including all amendments) applies to this specification:

3 terms

3:1 data update rate when the satellite receiver is working normally, the frequency of positioning, speed and other information output:

Note: The data update rate of the navigation satellite receiver is greater than 1Hz:

The difference between a satellite receiver and a known standard point is generally divided into horizontal positioning error and elevation positioning error:

The results are represented by root mean square error of horizontal positioning and root mean square error of elevation positioning respectively:

The difference between the position calculated by the receiver and the standard position at each moment when the satellite receiver is in motion: general score are the dynamic horizontal positioning error and the dynamic elevation positioning error, and the results are represented by dynamic horizontal positioning root mean square error and dynamic State height positioning root mean square error representation:

3.4 Velocity error velocity error the difference between the speed obtained by the satellite receiver based on the Doppler frequency shift method and the standard speed, and the result is expressed as the root mean square error of the speed:

Poor representation:

3.5 Acceleration error the difference between the acceleration obtained by the satellite receiver and the standard acceleration obtained by performing a differential on the basis of the measured velocity, the result is the result is expressed as the root mean square error of the acceleration:

4 Overview

A satellite navigation system consists of a space segment, a ground control segment and a

user segment: satellite receiver