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# NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA



# GB/T 47426-2026

## General specification for BeiDou/GNSS receivers on board high earth orbit satellites

高轨星载北斗/GNSS接收机通用规范

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## 4 Requirements

4.1 Composition A receiver generally includes the following components.

b) Low-noise amplifier;

c) Receiver main unit;

d) Accessories, including cables, connectors, protective caps, etc.

4.2 Appearance The receiver's appearance must meet the following requirements.

a) The antenna surface should be coated with a thermal control coating, and the antenna mounting surface and the inner wall of the mounting hole should not have a thermal control coating or meet specific requirements;

b) The receiver main unit and low-noise amplifier should have sufficient rigidity and mechanical strength;

c) The outer surfaces of all components should be free from defects such as dents, scratches, cracks, and deformation;

d) The coating (plating) should not blister, crack, or peel off;

e) Metal parts should be free from rust and other mechanical damage;

f) Fasteners should not be loose.

4.3 Identification The receiver identification requirements are as follows:

a) Text and symbols should be clear;

b) Connector markings should be unambiguous.

### 4.4 Components and Raw Materials

4.4.1 Component Selection The selection of receiver components should meet the requirements for high-performance electronic components for application fields as defined in GB/T 37312.1 and GB/T 41041. The selection of prohibited or restricted aerospace components must comply with the requirements specified in the dedicated technical documents.

4.4.2 Raw Material Selection All components of the receiver should be made of materials that meet the material selection standards, with priority given to materials with successful flight experience and that meet satellite life requirements. The materials requested.

### 4.5 Electromechanical Heating Interface

4.5.1 Mechanical Interface The receiver's mechanical interface requirements are as follows:

a) The receiver's geometry, mass, and structural design should conform to the mechanical interface requirements specified in the dedicated technical documents;

b) The receiver's fundamental frequency should avoid the spacecraft's structural fundamental frequency or comply with the requirements of the dedicated technical documents;

c) The antenna mounting flange or bracket is typically connected to the spacecraft bulkhead;

d) Under the condition that the electrical performance and interface requirements are met, the mechanical performance of the receiver should not change after environmental testing. It exhibits minimal plastic deformation, and is characterized by its simple structure, small size, light weight, and good processability and maintainability.

e) The flatness of the receiver should not exceed

0.1 mm/(100 mm x 100 mm);

f) The surface roughness of the receiver should not exceed 3.2 μm;

g) If the receiver's non-sealed structure forms a sealed cavity, the housing should have one or more vent holes not exceeding phi2mm.

4.5.2 Electrical Interface The receiver's electromechanical interface requirements are as follows:

a) The antenna, low-noise amplifier, and receiver main unit RF interface are connected via a coaxial 50Omega electrical connector;

b) The receiver's 1PPS interface circuit adopts either LVDS signal form or RS422 interface form;

c) The receiver reverse ripple requirements shall meet the specifications outlined in the dedicated technical documentation;

d) The overall overlap resistance is generally less than 10mOmega;

### 4.6 Functions

4.6.1 Positioning and Speed Measurement The receiver should possess one or more signal processing capabilities under BDS (B1I, B1C, B2a). The receiver should provide real-time single-signal processing under BDCS. The program calculates position and velocity information and outputs filtered position and velocity information based on the orbital dynamics model as required. The output position and velocity... The degree information corresponds to the path time information.

4.6.2 Time synchronization The receiver should have 1PPS output and time information output functions, with the output time in BDT. It can be converted to [other formats] as needed. UTC or GPST.

4.6.3 Multi-constellation compatibility The receiver should have continuous independent positioning and timing functions based on BDS, and be compatible with GPS, Galileo, GLONASS and other systems as needed. The system achieves fusion processing and coordinate transformation as needed.

4.6.4 Fault Tolerance The receiver should have fault-tolerant capabilities, including.

a) Software anomalies such as receiver autonomous monitoring signal tracking anomalies, pseudorange measurement anomalies, message demodulation anomalies, and receiver positioning anomalies. Hardware malfunction, and autonomously recovers from the abnormal state;

b) It has single-event protection and single-event fault recovery capabilities;

c) Perform redundancy processing on critical data;

d) Strengthen the program's hardened storage area and implement load fault tolerance.

4.6.5 Output The receiver should have the function of outputting positioning information, speed measurement information, time synchronization information, and operating status, generally including.

a) Location, velocity, and corresponding time stamp for single-point positioning;

b) Position, velocity, and corresponding time stamps after track filtering;

c) The standard time corresponding to a 1PPS signal;

d) Receiver power supply voltage;

e) Receiver continuous operating time;

### 4.7.1 Antenna Performance

4.7.1.1 Antenna operating frequency and bandwidth The antenna's operating frequency and bandwidth should ideally cover BDS signals such as B1I, B1C, and B2a; the signal operating frequency bands are detailed in Appendix A. This can be determined based on the specific application. User needs must be met to cover signals from GPS, Galileo, GLONASS, and other systems. The frequency coverage requirements and specific bandwidths for each frequency point should meet [the requirements]. Specific technical documentation requirements.

4.7.1.2 Antenna Gain Depending on the orbital altitude, the antenna gain characteristics should meet the values given in Table 1. The simulation results of the antenna gain under satellite mounting conditions and the individual antenna test results should both meet the requirements.

4.7.1.3 Antenna Voltage Standing Wave Ratio Within each receiving frequency range, the antenna voltage standing wave ratio should not exceed 1.5.

4.7.2 Low-noise amplifier performance The low-noise amplifier should ideally cover the BDS signals B1I, B1C, and B2a, and can also cover GPS signals according to user needs. Signals from systems such as Galileo and GLONASS. The gain of the low-noise amplifier should not be less than 30dB, the noise figure should not be greater than 2.0dB, and the voltage standing wave ratio should be less than 1.5. The out-of-band signal suppression of the low-noise amplifier should meet the user's specific requirements.

4.7.3 Precision Accuracy encompasses five aspects. time synchronization accuracy, positioning accuracy, speed measurement accuracy, filtered positioning accuracy, and filtered speed measurement accuracy. (Accuracy technology) The characteristics should meet the characteristic values given in Table 2. The timing accuracy is the standard deviation (STD) of the deviation between the output 1PPS signal and the standard time signal. Positioning accuracy, speed measurement accuracy, and filtered positioning are also included. Accuracy and filtered speed measurement accuracy are the three-dimensional root mean square error (RMS) of the deviation from the reference value.

### 4.7.4 Signal Reception Performance

4.7.4.1 Signal Tracking Channel Each signal in the receiver should ideally have 12