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GB/T 47423-2026

Interface specification for the forward link and return link of the BDS search and rescue service

北斗国际搜救服务前向链路和返向链路接口规范

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Table of Contents

Foreword

GB/T 47423-2026 | Interface specification for the forward link and return link of SAR/BDS service

GB/T 47423-2026 English version. Interface specification for the forward link and return link of SAR/BDS service ICS

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30 Implemented on August 1, 2026 State Administration for Market Regulation The State Administration for Standardization issued a statement.

1.Scope This document specifies the signal characteristics, frame structure, and cancellation parameters of the forward link space signals and return link space signals for the BeiDou International Search and Rescue Service. Information structure. This document applies to the design of satellite-ground equipment such as 406MHz beacons, satellite search and rescue payloads, and ground receiving stations for the BeiDou International Search and Rescue Service. Research and development and production.

4 Overview of the BeiDou System

4.1 Spatial Constellations The BeiDou-3 satellite constellation is nominally composed of 3 geostationary orbit (GEO) satellites, 3 IGSO satellites, and 24 MEO satellites. And, as needed, deploy backup satellites in orbit. The GEO satellites orbit at an altitude of 35,786 km, with geostationary points at 80°, 110.5°, and 140° East longitude; IGSO... The satellite orbits at an altitude of 35,786 km with an inclination of 55°; the MEO satellite orbits at an altitude of 21,528 km with an inclination of 55°. The BeiDou MEOSAR service is provided by six satellites carrying search and rescue payloads, evenly distributed across three orbital planes within the BeiDou-3 constellation. MEO satellites provide services globally; details

on the distribution of BeiDou search and rescue payloads are provided in Appendix A. BeiDou RLS services are provided by the BeiDou-3 nominal space-based system. It is provided by 24 MEO satellites and 3 IGSO satellites in the constellation.

4.2 Coordinate System The BeiDou system uses the BeiDou Coordinate System (BDCS). The definition of the BeiDou Coordinate System conforms to the IERS standard and is compatible with the.2000 China Geodetic Coordinate System. (CGCS2000) has the same definition (with exactly the same reference ellipsoid parameters), and the specific definition is as follows:

a) Definitions of origin, axis, and dimensions include. 1) The origin is located at the Earth's center of mass; 2) The Z-axis points in the direction of the reference pole (IRP) defined by IERS; 3) The X-axis is the intersection of the reference meridian plane (IRM) defined by IERS and the equatorial plane that passes through the origin and is orthogonal to the Z-axis; 4) The Y-axis, Z-axis, and X-axis form a right-handed rectangular coordinate system; 5) The unit of length is the International System of Units (SI) meter.

b) Definition of reference ellipsoid. The geometric center of the BDCS reference ellipsoid coincides with the Earth's center of mass, and the rotation axis of the reference ellipsoid coincides with the Z-axis. The fundamental constants for the definition of the BDCS reference ellipsoid are shown in Table 1.

4.3 Time System The time base for the BeiDou system is BeiDou Time (BDT). BDT uses the International System of Units (SI) second as its basic unit for continuous accumulation, without leap years. The second, with an epoch starting at

00.00.00 UTC on January 1,.2006.BDT communicates with the international community via UTC (NTSC). UTC establishes a connection, and the deviation between BDT and international UTC remains within 50 ns (mod 1 s). Leap second information between BDT and UTC is provided. The navigation message is broadcast. The BeiDou International Search and Rescue Service uses UTC time.

5 Forward Link Spatial Signal Interface

5.1 Overview The forward link space signal includes user uplink alarm signals and payload downlink signals, which are transmitted by a 406MHz beacon and carried on a medium orbit, respectively. The search and rescue payload is relayed by the BeiDou MEO satellite.

5.2 User Uplink Alarm Signal

5.2.1 Signal characteristics User uplink alarm signals are divided into two types. first-generation beacon signals and second-generation beacon signals. The main parameters of user uplink alarm signals should meet the following requirements. See Table

2.The structure of the first-generation beacon signal is shown in section

2.2 of C/ST.001-2025, and the structure of the second-generation beacon signal is shown in C/ST.018-2025. 2.2.

5.2.2 Frame Structure

5.2.2.1 First-generation beacon signal frame structure The first-generation beacon signal frame structure is divided into two types. short message and long message, as shown in Figure 1 and Figure 2, respectively.

5.2.2.2 Second-generation beacon signal frame structure The second-generation beacon signal frame structure is shown in Figure 3.

5.2.3 Message Structure The first-generation beacon message structure includes a positioning protocol and a user protocol, see Annex A in C/ST.001-2025. The second-generation beacon message structure includes the beacon type approval number, serial number, country/region code, and coded GNSS location information. For identification numbers, see Chapter 3 of C/ST.018-2025.

5.3 Load Downlink Signal

5.3.1 Signal characteristics The search and rescue payload carried by the BeiDou MEO satellite is designed in accordance with relevant C/S standards and is compatible with other MEOSAR systems. The main parameters of the downlink signal are shown in Table 3.

5.3.2 Frame Structure The structure of the load downlink signal frame is the same as that of the user uplink alarm signal frame, see 5.2.2.

5.3.3 Message Structure The structure of the load downlink signal message is the same as that of the user uplink alarm signal message, see 5.2.3.

6 Return Link Space Signal Interface

6.1 Signal characteristics The return link space signal is broadcast via the B2b signal I branch of the BeiDou MEO satellite and IGSO satellite. The B2b signal used should conform to... This meets the requirements of Chapter 5 of GB/T 39414.5-2024.The main parameters of the return link spatial signal are shown in Table 4.

6.2 Frame Structure Each return link frame consists of 1000 symbols and lasts for 1 second. The structure of the return link frame should conform to GB/T 39414.5- The requirements of section

7.2 in 2024 are shown in Figure 4. Figure

4 Backlink Frame Structure The main fields in the return link frame structure are defined as follows:

a) Frame synchronization header (Pre), 16 symbols, with a value of 0xEB90, i.e.,

1110101110010000, using the most significant bit first;

b) Satellite Number (PRN), 6 symbols, satellite navigation signal PRN number, valid range 1~63, unsigned integer;

c) Reserved, 6 symbols, meaningless;

d) The message data, initially 486 bits, is encoded using LDPC(162,81) in base-64 format, resulting in a length of 972 symbols. The coding scheme should comply with the requirements of

7.2.2 in GB/T 39414.5-2024;

e) MesType, 6 bits, with a value of 0x8 (001000), participates in cyclic redundancy check calculation;

f) Weekly Seconds Count (SOW), 20 bits, indicates the number of seconds within the current BeiDou time cycle and participates in cyclic redundancy check calculation;

g) Business information, 436 bits, used to package return link data, see 6.3, and participates in cyclic redundancy check calculation;

h) Cyclic Redundancy Check (CRC), the CRC encoding shall comply with the requirements of

7.1.2 in GB/T 39414.5-2024.