

ICS 47.020.70

CCS V 04



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

GB/T 44085.2-2024

**Technical specification for global maritime distress and safety
system service based on BDS regional short message
communication - Part 2: Ship earth station**

基于北斗区域短报文通信的全球海上遇险和安全系统服务技术规范 第2部分:船舶
地球站

Issued on: May 28, 2024

Implemented on: May 28, 2024

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

Table of Contents

1 Scope	1
2 Normative references	1
3 Terms, definitions and abbreviations	2
3.1 Terms and definitions	2
3.2 Abbreviations	2
4 Requirements	2
4.1 Basic requirements	2
4.2 Functions	3
4.3 Equipment interfaces	6
4.4 Positioning performance	7
4.5 Environmental adaptability	7
4.6 Electromagnetic compatibility	7
4.7 Other requirements	7
5 Test methods and required test results	7
5.1 Test conditions	7
5.2 Test items	8
5.3 Check of basic requirements	9
5.4 Function test	9
5.5 Equipment interface test	12
5.6 Positioning performance test	12
5.7 Environmental adaptability test	12
5.8 Electromagnetic compatibility test	12
5.9 Test of other requirements	12
Annex A (normative) Communication protocol between the ship earth station and the BDMSS gateway station	14

3 Terms, definitions and abbreviations

3.1 The terms defined in GB/T 44085.1-2024, GB/T 16162-2021 and GB/T 39267-2020 apply, together with two terms defined here. Emergency search and rescue command is the instruction code sent by a BDMSS gateway station to a ship earth station. Echo is the retransmission of an enhanced group call message a set interval after its first broadcast; a note states that in the enhanced group call service the echo interval is 6 min. The second

term is taken from GB/T 44085.1-2024, 3.1.17.

3.2 The abbreviations listed are BDMSS (BeiDou Message Service System), BDS, CAM (central alert management), EGC (enhanced group call), EUT (equipment under test), GMDSS, GNSS, GPS, IEC, IMO, IRA (international reference alphabet), METAREA, MMSI, MSI (maritime safety information), NAVAREA and UTC.

4 Requirements

4.1 A ship earth station shall include at least an antenna unit able to receive and transmit BDS regional short message signals, a BDS regional short message signal processing unit, a BDS positioning unit and a display and control unit. The positioning unit may be omitted where the station provides an interface to external BDS positioning equipment. The display and control unit may be omitted where the station is part of an approved shipborne integrated communication system, integrated navigation system or integrated bridge system and no failure of the station affects the normal working of those systems. The communication protocol between the station and the BDMSS gateway station shall meet Annex A. The product serial number shall serve as the unique identifier, shall be displayable on the display and control unit, and shall not be changed by any operation external to the station.

4.2 The station shall send and receive short messages over the BDS regional short message link, support sending codes, and display the service signal strength in real time. Traffic shall be handled in the priority order distress, urgency, safety, other. The display and control unit shall carry a dedicated distress alert button with no other function: a physical button, not a touch-screen button and not a key on a numeric pad or keyboard; red and clearly marked in Chinese and English with the words for distress and DISTRESS; fitted with a spring cover or a permanently attached hinged cover so that at least two independent actions are needed, the cover being red and bearing the same marking where it is not transparent. A remote button shall allow the alert to be triggered from the normal conning position. Pressing the button shall immediately give an intermittent audible signal and a flashing visual indication; holding it for 3 s or more shall trigger the alert, the indication turning steady and the sound stopping.

4.2 (continued) Distress alerts shall be retransmitted automatically as required by GB/T 44085.1-2024, 7.4; a newly triggered alert shall interrupt an alert being retransmitted but shall not interrupt an alert being sent for the first time. The station shall support subsequent distress-priority communication, manual sending of a cancellation message, and a distress alert test with an indication of the result. It shall receive enhanced group call messages broadcast to the current navigation area and to areas within 300 nautical miles, to the planned navigation area and to a fixed position, and shall filter maritime safety information by NAVAREA/METAREA, coastal warning area code and message class, without filtering navigational warnings, meteorological warnings and forecasts, search and rescue

information or shore-to-ship distress alert relays broadcast to the fixed or absolute geographic area in which the ship is working. A display device shall show at least 16 lines of 40 characters, its non-volatile memory shall hold at least 255 messages of 1 023 characters each, and corrupted characters shall be shown as an asterisk or an underscore; a printing device shall print at least the standard IRA character set and at least 40 characters per line.

4.2 (continued) Further functional requirements cover position update from the internal positioning unit or from external BDS positioning equipment over an IEC 61162-1 interface, with alerts when automatic position data have not been updated for more than 10 min and when a manually entered position has not been updated for more than 4 h, and clear marking of the fix time when the position is more than 24 h old; position reporting that can be switched on and off with a settable interval; a power-on self-test that checks at least the short message signal access and the connection of the remote button; and automatic response to four classes of emergency search and rescue command, namely search and rescue acknowledgement, inbound transmission control, reverse identity authentication and search and rescue wake-up.

4.3 The station shall provide at least the interfaces to the central alert management, to the navigational display system and to external BDS positioning equipment shown in Figure 1, meeting IEC 61162-1, IEC 61162-2 and IEC 61162-450. Towards the central alert management it shall send ALC, ALF, ARC and HBT sentences and receive ACN and HBT sentences, the alert identifiers being those of Table 1. Towards the navigational display system it shall send the SM1, SM2, SM3 and SM4 sentences carrying enhanced group call information and the SMB sentence carrying the message text, and shall not send them where the position data are absent or invalid. From external BDS positioning equipment it shall accept GLL, GGA, GNS and RMC sentences.

4.4 to 4.7 Where a BDS positioning unit is fitted, it shall meet the accuracy, acquisition, sensitivity and dynamic range, interference, position update and typical interference requirements of IEC 61108-5. Environmental adaptability shall meet IEC 60945:2002, 4.4 and electromagnetic compatibility shall meet IEC 60945:2002, 4.5.1. Where the supply is restored within 60 s of an interruption, manual reinitialization shall not be required, received messages held in memory shall not be lost and the equipment shall not be left inoperative. The manual shall state the separation needed between the antenna and the ship's radar, and the distances at which the radiation level is 100 W per square metre, 25 W per square metre and 10 W per square metre, which shall also be marked on the radome or on the outside of the antenna; the magnetic compass safe distance shall likewise be stated. Enclosure protection shall be not lower than IP22 for the inboard part and not lower than IP56 for the outboard part.

5 Test methods and required test results

5.1 Unless otherwise specified, tests are run under standard atmospheric conditions: temperature 15 °C to 35 °C, relative humidity 25 % to 75 %, air pressure 86 kPa to 106 kPa. Test sites are of two kinds, an outdoor site with real satellite navigation signals, open and unobstructed and away from strong sources of electromagnetic interference such as base stations or radars, and an indoor microwave anechoic simulation site. Functional testing may use the real BDMSS gateway station or a test system; unless otherwise specified the test system accuracy shall be at least one third of an order better than the accuracy of the indicator being measured, and the system shall be able to communicate with the equipment under test in the priority order of 4.2.2, send maritime safety information as required by GB/T 44085.1-2024, Clause 8, generate invalid data, simulate satellite loss, coverage-edge and poor signal conditions, and monitor the state of the equipment under test. Before testing, the manufacturer sets the equipment to normal working condition and identifies its outboard and inboard parts; where no display and control unit is fitted, one is provided temporarily for the test.

5.2 Table 3 maps each test item to its requirement clause, its test method clause and the communication protocol tables that apply. The table has four data columns after the item number and covers seven groups of items: basic requirements (composition, communication protocol, identification), functions (short message communication, communication priority, distress alert transmission, enhanced group call reception and display, position update, position reporting, self-test, response to emergency search and rescue commands, audible and visual indications), equipment interfaces, positioning performance, environmental adaptability, electromagnetic compatibility and other requirements.

5.4 The communication priority test masks the signal so the equipment loses lock, buffers one message at the initial priority and one at the subsequent priority, restores the signal and compares the pre-emption observed with Table 4. Table 4 has three data columns, initial communication priority, subsequent communication priority and whether pre-emption occurs, and covers all sixteen combinations of the four priorities; every case in which the subsequent message is of higher priority than the initial one is marked as pre-empting, and every other case is marked as not pre-empting. The distress alert transmission test checks triggering from the dedicated button and from a remote button at least 10 m from the display and control unit, retransmission behaviour, the message content received by the real or test system, subsequent distress communication, cancellation after a power interruption and manual shutdown, and the test mode, which sends a safety-priority distress alert test message and indicates success or failure. A note states that the distress alert test corresponds to the performance test of IEC 60945:2002 and that the equipment self-test corresponds to its functional test.

A Annex A (normative) Communication protocol between the ship earth station and the BDMSS gateway station