

ICS 49.140
CCS V 75



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

GB/T 39349-2020

**Space data and information transfer systems. TC
(telecommand) synchronization and channel coding**

空间数据与信息传输系统 遥控同步与信道编码

(English Translation)

Issued on: November 19, 2020

Implemented on: June 1, 2021

Issued by: State Administration for Market Regulation

Table of Contents

Preface	
1 Scope	
2 Normative references	
3 Terms and definitions, abbreviations	
3.1 Terms and definitions	
3.2 Abbreviations	
4 Overview	
4.1 Architecture	
4.2 Bit number convention	
4.3 Function Introduction	
4.4 Internal structure of sub-layer	
5 BCH code	
5.1 Overview	
5.2 BCH code word format	
5.3 Coding method	
5.4 Data filling	
5.5 Decoding process	
6 LDPC coding	
6.1 Overview	
6.2 Check matrix	
6.3 Coding method	
6.4 Data filling	
6.5 Decoding method	
7 Communication Link Transfer Unit (CLTU)	
7.1 Overview	
7.2 CLTU unit format	
7.3 CLTU receiving logic	
8 Pseudo-randomization	
8.1 Overview	
8.2 Pseudo-randomization method	
8.3 Applications of pseudo-randomization	
9 Physical layer operating procedures	

9.1 Overview	
9.2 Data format	
9.3 Carrier modulation mode	
9.4 Physical layer operating procedures-1 (PLOP-1)	
9.5 Physical Layer Operating Procedure-2 (PLOP-2)	
10 Management parameters	
10.1 Overview	
10.2 BCH coding and LDPC coding parameters	
Appendix A (informative appendix) The structural changes of this standard compared with ISO 22642:2015	
Appendix B (informative appendix) The technical differences between this standard and ISO 22642:2015 and the reasons	
Appendix C (Normative Appendix) Service Definition	
Figure 1 Correspondence between remote control synchronization and channel coding and OSI model	
Figure 2 Convention of bit number	
Figure 3 Information flow of the synchronization and channel coding sublayer at the transmitter Figure	
Figure 4 Information flow of the synchronization and channel coding sublayer at the receiving end Figure	
Figure 5 BCH code word format	
Figure 6 (63,56) Improved BCH encoder	
Figure 7.CLTU structure using BCH coding	
Figure 8.CLTU structure using LDPC encoding	
Figure 9 CLTU receiving state machine (receiving end)	
Figure 10 Block diagram of pseudo-random generator	
Figure 11 PLOP-1 carrier modulation process	
Figure 12 PLOP-2 carrier modulation process	
Table 1 (n=128, k=64) LDPC code production matrix	
Table 2 (n=512,k=256) LDPC code production matrix	
Table 3 Definition of CLTU receiving state (receiving end)	
Table 4 CLTU receiving event definition (receiving end)	
Table 5 Carrier modulation mode	
Table 6 Management parameters of BCH coding and LDPC coding Table	
Table 7 Other management parameters of BCH encoding Table	
Table 8 Other management parameters of LDPC codes Table	
Table A.1 The comparison between this standard and ISO 22642:2015 chapter number	

Table B.1 Technical differences between this standard and ISO 22642:2015 and their reasons

Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard uses the redrafting method to amend and adopt ISO 22642:2015 "Space Data and Information Transmission System Remote Synchronization and Channel Code code".

Compared with ISO 22642:2015, this standard has many adjustments in structure. Appendix A lists this standard and ISO 22642:2015 A list of chapter number comparisons.

Compared with ISO 22642:2015, this standard has technical differences, and the clauses involved in these differences have been the set vertical single line (|) is marked, and a list of the corresponding technical differences and their reasons is given in Appendix B.

This standard also made the following editorial changes.

---Deleted part of the definition of document structure and references in Chapter 1 of ISO 22642:2015;

--- Changed Appendix C "Abbreviations" in ISO 22642:2015 to 3.2;

--- Deleted the informative appendix B "Security, Space Allocation Numbers and Patent Factors" of ISO 22642:2015;

---The informative appendix D "References" of ISO 22642:2015 is deleted.

This standard was proposed and managed by the National Aerospace Technology and Application Standardization Technical Committee (SAC/TC425).

Drafting organizations of this standard. China Aerospace Standardization Institute, Beijing Space Vehicle General Design Department, Anhui Longyun Intelligent Technology Co., Ltd.

Division, Beijing University of Aeronautics and Astronautics, Xi'an Institute of Space Radio Technology, Nanjing University.

1 Scope

This standard specifies the BCH coding, LDPC coding, and communication related to remote control synchronization and channel coding in spatial data and information transmission systems.

Communication link transfer unit (CLTU), pseudo-randomization technical requirements.

This standard is used in conjunction with GB/T 39350 and is suitable for remote control

synchronization and channel coding design between air-to-ground links and air-to-air links.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this document.

For undated references, the latest version (including all amendments) applies to this document.

GB/T 39350 Spatial Data and Information Transmission System Remote Control Spatial Data Link Protocol (GB/T 39350-2020, ISO 22664:2016, MOD) GB/T 39344 Spatial data and information transmission system communication operating procedures-1 (GB/T 39344-2020, ISO 22667:2013, MOD)

3.1 Terms and definitions

The following terms and definitions apply to this document.

3.1.1

Communication link transmission unit A data structure of the synchronization and channel coding sublayer, consisting of a starting sequence, one or more codewords encoded by the transmission frame, and an ending sequence (optional).

3.1.2

Transmit frame

The variable data length transmission unit specified in the remote control space data link protocol.

3.1.3

Starting sequence

A set of specific binary codes, indicating the beginning of the CLTU frame header.

3.1.4

Ending sequence

A set of specific binary codes, representing the end of the CLTU frame.

3.1.5

Idle sequence

The padding bytes between the remote control frame sequences are filled with alternate codes of "0" and "1", and the length is optional by the user, used when the remote control frame is not sent