

# ISO 22664:2016-11 (E)

## Space data and information transfer systems - TC (telecommand) space data link protocol

---

Contents	Page
<b>1 INTRODUCTION</b> .....	<b>1-1</b>
1.1 PURPOSE.....	1-1
1.2 SCOPE.....	1-1
1.3 APPLICABILITY .....	1-1
1.4 RATIONALE.....	1-2
1.5 DOCUMENT STRUCTURE .....	1-2
1.6 CONVENTIONS AND DEFINITIONS .....	1-2
1.7 REFERENCES .....	1-5
<b>2 OVERVIEW</b> .....	<b>2-1</b>
2.1 CONCEPT OF TC SPACE DATA LINK PROTOCOL .....	2-1
2.2 OVERVIEW OF SERVICES .....	2-5
2.3 OVERVIEW OF FUNCTIONS.....	2-12
2.4 SERVICES ASSUMED FROM LOWER LAYERS .....	2-16
<b>3 SERVICE DEFINITION</b> .....	<b>3-1</b>
3.1 OVERVIEW .....	3-1
3.2 SOURCE DATA.....	3-1
3.3 MAP PACKET SERVICE.....	3-3
3.4 VIRTUAL CHANNEL PACKET SERVICE .....	3-9
3.5 MAP ACCESS SERVICE.....	3-15
3.6 VIRTUAL CHANNEL ACCESS SERVICE .....	3-20
3.7 VIRTUAL CHANNEL FRAME SERVICE.....	3-25
3.8 MASTER CHANNEL FRAME SERVICE.....	3-28
3.9 COP MANAGEMENT SERVICE .....	3-31
<b>4 PROTOCOL SPECIFICATION WITHOUT SDLS OPTION</b> .....	<b>4-1</b>
4.1 PROTOCOL DATA UNIT (TC TRANSFER FRAME).....	4-1
4.2 PROTOCOL DATA UNIT (CLCW).....	4-12
4.3 PROTOCOL PROCEDURES AT THE SENDING END.....	4-18
4.4 PROTOCOL PROCEDURES AT THE RECEIVING END.....	4-28
<b>5 MANAGED PARAMETERS WITHOUT SDLS OPTION</b> .....	<b>5-1</b>
5.1 MANAGED PARAMETERS FOR A PHYSICAL CHANNEL .....	5-1
5.2 MANAGED PARAMETERS FOR A MASTER CHANNEL.....	5-2
5.3 MANAGED PARAMETERS FOR A VIRTUAL CHANNEL.....	5-2

<u>Section</u>	<u>Page</u>
5.4 MANAGED PARAMETERS FOR A MAP CHANNEL .....	5-4
5.5 MANAGED PARAMETERS FOR PACKET TRANSFER.....	5-4
<b>6 PROTOCOL SPECIFICATION WITH SDLS OPTION .....</b>	<b>6-1</b>
6.1 OVERVIEW .....	6-1
6.2 USE OF SDLS PROTOCOL.....	6-1
6.3 TC TRANSFER FRAME WITH SDLS .....	6-1
6.4 SENDING-END PROTOCOL PROCEDURES WITH SDLS .....	6-5
6.5 RECEIVING-END PROTOCOL PROCEDURES WITH SDLS .....	6-8
6.6 ADDITIONAL MANAGED PARAMETERS FOR SDLS .....	6-11
<b>ANNEX A ACRONYMS (INFORMATIVE) .....</b>	<b>A-1</b>
<b>ANNEX B INFORMATIVE REFERENCES (INFORMATIVE) .....</b>	<b>B-1</b>

Figure

1-1 Bit Numbering Convention.....	1-5
2-1 Relationship with OSI Layers .....	2-1
2-2 Relationships Between Channels.....	2-4
2-3 Internal Organization of Protocol Entity (Sending End).....	2-13
2-4 Internal Organization of Protocol Entity (Receiving End) .....	2-13
2-5 TC Space Data Link Protocol Channel Tree.....	2-14
4-1 TC Transfer Frame Structural Components.....	4-1
4-2 Transfer Frame Primary Header.....	4-2
4-3 Segment Header .....	4-7
4-4 Logic Diagram of the Encoder.....	4-11
4-5 Logic Diagram of the Decoder.....	4-12
4-6 Communications Link Control Word .....	4-13
4-7 Internal Organization of Protocol Entity (Sending End).....	4-18
4-8 Abstract Model of MAP Packet Processing Function .....	4-20
4-9 Example of MAP Packet Processing Procedures.....	4-20
4-10 Abstract Model of MAP Generation Function.....	4-21
4-11 Example of MAP Generation Procedures.....	4-21
4-12 Abstract Model of MAP Multiplexing Function .....	4-22
4-13 Abstract Model of VC Packet Processing Function .....	4-23
4-14 Example of VC Packet Processing Procedures.....	4-23
4-15 Abstract Model of Virtual Channel Generation Function.....	4-24
4-16 Abstract Model of Virtual Channel Multiplexing Function .....	4-25
4-17 Abstract Model of Master Channel Multiplexing Function.....	4-26

<u>Figure</u>	<u>Page</u>
4-18 Abstract Model of All Frames Generation Function .....	4-27
4-19 Internal Organization of Protocol Entity (Receiving End) .....	4-28
4-20 Abstract Model of MAP Packet Extraction Function .....	4-29
4-21 Abstract Model of MAP Reception Function .....	4-30
4-22 Abstract Model of MAP Demultiplexing Function .....	4-30
4-23 Abstract Model of VC Packet Extraction Function .....	4-31
4-24 Abstract Model of Virtual Channel Reception Function .....	4-32
4-25 Abstract Model of Virtual Channel Demultiplexing Function .....	4-33
4-26 Abstract Model of Master Channel Demultiplexing Function .....	4-34
4-27 Abstract Model of All Frames Reception Function .....	4-35
6-1 SDLS Fields in a Type-D Transfer Frame with a Segment Header .....	6-2
6-2 SDLS Fields in a Type-D Transfer Frame without a Segment Header .....	6-2
6-3 Order of Processing between TC, COP-1, and SDLS Functions .....	6-6

Table

2-1 Summary of Services Provided by TC Space Data Link Protocol .....	2-8
4-1 Interpretation of the Bypass and Control Command Flags .....	4-4
4-2 Interpretation of the Sequence Flags .....	4-8
5-1 Managed Parameters for a Physical Channel .....	5-1
5-2 Managed Parameters for a Master Channel .....	5-2
5-3 Managed Parameters for a Virtual Channel .....	5-3
5-4 Managed Parameters for a MAP Channel .....	5-4
5-5 Managed Parameters for Packet Transfer .....	5-4
6-1 Additional Managed Parameters for a Virtual Channel without Segment Headers When TC Space Data Link Protocol Supports SDLS .....	6-11
6-2 Additional Managed Parameters for a MAP When TC Space Data Link Protocol Supports SDLS .....	6-11