

ISO 22645:2016-11 (E)

Space data and information transfer systems - TM (telemetry) space data link protocol

Contents

Page

1 INTRODUCTION	1-1
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.....	1-6
2 OVERVIEW	2-1
2.1 CONCEPT OF TM SPACE DATA LINK PROTOCOL.....	2-1
2.2 OVERVIEW OF SERVICES.....	2-4
2.3 OVERVIEW OF FUNCTIONS.....	2-12
2.4 SERVICES ASSUMED FROM LOWER LAYERS.....	2-14
3 SERVICE DEFINITION	3-1
3.1 OVERVIEW.....	3-1
3.2 SOURCE DATA.....	3-1
3.3 VIRTUAL CHANNEL PACKET (VCP) SERVICE.....	3-4
3.4 VIRTUAL CHANNEL ACCESS (VCA) SERVICE.....	3-8
3.5 VIRTUAL CHANNEL FRAME SECONDARY HEADER (VC_FSH) SERVICE.....	3-12
3.6 VIRTUAL CHANNEL OPERATIONAL CONTROL FIELD (VC_OCF) SERVICE.....	3-15
3.7 VIRTUAL CHANNEL FRAME (VCF) SERVICE.....	3-18
3.8 MASTER CHANNEL FRAME SECONDARY HEADER (MC_FSH) SERVICE.....	3-21
3.9 MASTER CHANNEL OPERATIONAL CONTROL FIELD (MC_OCF) SERVICE.....	3-24
3.10 MASTER CHANNEL FRAME (MCF) SERVICE.....	3-27
4 PROTOCOL SPECIFICATION WITHOUT SDLS OPTION	4-1
4.1 PROTOCOL DATA UNIT.....	4-1
4.2 PROTOCOL PROCEDURES AT THE SENDING END.....	4-15
4.3 PROTOCOL PROCEDURES AT THE RECEIVING END.....	4-22

<u>Section</u>	<u>Page</u>
5 MANAGED PARAMETERS WITHOUT SDLS OPTION	5-1
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
5.4 MANAGED PARAMETERS FOR PACKET TRANSFER.....	5-3
6 PROTOCOL SPECIFICATION WITH SDLS OPTION	6-1
6.1 OVERVIEW	6-1
6.2 USE OF SDLS PROTOCOL.....	6-1
6.3 TM TRANSFER FRAME WITH SDLS	6-1
6.4 SENDING END PROTOCOL PROCEDURES WITH SDLS.....	6-4
6.5 RECEIVING END PROTOCOL PROCEDURES WITH SDLS.....	6-7
6.6 MANAGED PARAMETERS WITH SDLS	6-9
ANNEX A ACRONYMS (INFORMATIVE)	A-1
ANNEX B INFORMATIVE REFERENCES (INFORMATIVE)	B-1

Figure

1-1 Bit Numbering Convention.....	1-5
2-1 Relationship with OSI Layers	2-1
2-2 Relationships Between Channels.....	2-3
2-3 Asynchronous Service Model.....	2-5
2-4 Synchronous Service Model	2-6
2-5 Internal Organization of Protocol Entity (Sending End).....	2-13
2-6 Internal Organization of Protocol Entity (Receiving End)	2-13
2-7 TM Space Data Link Protocol Channel Tree.....	2-14
4-1 TM Transfer Frame Structural Components.....	4-2
4-2 Transfer Frame Primary Header.....	4-2
4-3 Transfer Frame Data Field Status	4-5
4-4 Transfer Frame Secondary Header.....	4-8
4-5 Logic Diagram of the Encoder.....	4-13
4-6 Logic Diagram of the Decoder.....	4-14
4-7 Internal Organization of Protocol Entity (Sending End).....	4-15
4-8 Abstract Model of Packet Processing Function	4-16
4-9 Abstract Model of Virtual Channel Generation Function.....	4-18
4-10 Abstract Model of Virtual Channel Multiplexing Function	4-19
4-11 Abstract Model of Master Channel Generation Function.....	4-20

<u>Figure</u>	<u>Page</u>
4-12 Abstract Model of Master Channel Multiplexing Function.....	4-21
4-13 Abstract Model of All Frames Generation Function	4-22
4-14 Internal Organization of Protocol Entity (Receiving End)	4-22
4-15 Abstract Model of Packet Extraction Function.....	4-24
4-16 Abstract Model of Virtual Channel Reception Function	4-25
4-17 Abstract Model of Virtual Channel Demultiplexing Function	4-26
4-18 Abstract Model of Master Channel Reception Function	4-27
4-19 Abstract Model of Master Channel Demultiplexing Function	4-28
4-20 Abstract Model of All Frames Reception Function.....	4-28
6-1 Frame without SDLS Compared to Frame with SDLS.....	6-2

Table

2-1 Summary of Services Provided by TM Space Data Link Protocol.....	2-7
2-2 Summary of TM Services Supported by the Space Data Link Security Protocol.....	2-8
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.....	5-2
5-4 Managed Parameters for Packet Transfer	5-3
6-1 Additional Managed Parameters for a Virtual Channel when TM Space Data Link Protocol Supports SDLS	6-9