

# ETSI TS 102 602 V1.1.1 (2009-01)

---

*Technical Specification*

## **Satellite Earth Stations and Systems (SES); Broadband Satellite Multimedia; Connection Control Protocol (C2P) for DVB-RCS; Specifications**

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)  
Full standard:  
<https://standards.iteh.ai/catalog/standards/sist/28622901-1a03-48b4-965f-472221defe37/etsi-ts-102-602-v1.1.1-2009-01>



## Reference

DTS/SES-00275

## Keywords

broadband, control, DVB, multimedia, protocol,  
satellite**ETSI**650 Route des Lucioles  
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C  
Association à but non lucratif enregistrée à la  
Sous-Préfecture de Grasse (06) N° 7803/88**Important notice**

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

[http://portal.etsi.org/chaicor/ETSI\\_support.asp](http://portal.etsi.org/chaicor/ETSI_support.asp)**Copyright Notification**

No part may be reproduced except as authorized by written permission.  
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2009.  
All rights reserved.

**DECT™**, **PLUGTESTS™**, **UMTS™**, **TIPHON™**, the TIPHON logo and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.

**3GPP™** is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

**LTE™** is a Trade Mark of ETSI currently being registered for the benefit of its Members and of the 3GPP Organizational Partners.

# Contents

Intellectual Property Rights .....	7
Foreword.....	7
Introduction .....	7
1 Scope .....	8
2 References .....	9
2.1 Normative references .....	9
2.2 Informative references.....	9
3 Definitions and abbreviations.....	10
3.1 Definitions .....	10
3.2 Abbreviations .....	11
4 Connection Control Overview.....	14
4.1 Protocol High Level Functionality .....	14
4.2 DVB-RCS Network Reference Scenarios .....	15
4.3 Definition of C2P Elements.....	17
4.3.1 Connection.....	17
4.3.2 Stream.....	18
4.3.3 IP Flow .....	18
4.3.4 Channel and Channel_ID.....	19
4.3.5 Route and Route_ID .....	19
4.4 Connection Types.....	20
4.4.1 Star and mesh connections.....	20
4.4.2 Signalling and traffic connections .....	20
4.4.2.1 Signalling connections.....	20
4.4.2.2 Traffic connections.....	21
4.4.3 C2P connection profile .....	23
4.5 Overview of C2P messages .....	23
4.6 Data structures and dynamic connectivity support.....	24
4.6.1 C2P logon information.....	24
4.6.2 C2P functional flags.....	29
4.6.3 RCST data structures .....	29
4.6.3.1 Packet Classification Table.....	30
4.6.3.2 Connection Profile Mapping Table.....	31
4.6.3.3 Active Connections Table .....	32
4.6.3.4 PHB/CoS Mapping Table .....	35
4.6.3.5 Request Class (RC) Table .....	36
5 State Machines, counters and timers .....	37
5.1 Introduction .....	37
5.2 Timers .....	39
5.2.1 RCST/RSGW timers.....	40
5.2.2 NCC timers .....	41
5.3 Counters .....	42
5.3.1 RCST/RSGW counters .....	42
5.3.2 NCC counters.....	43
5.4 PER-Connection State machines .....	43
5.4.1 RCST state machine.....	43
5.4.2 NCC state machine .....	48
5.4.2.1 RCST/RSGW initiated unicast connections.....	49
5.4.2.2 NCC initiated unicast connections .....	58
6 Connection Control Procedures.....	67
6.1 Point-to-point connection establishment procedures.....	68
6.1.1 RCST/RSGW initiated connections.....	68
6.1.1.1 Successful set up .....	68

6.1.1.2	Successful set up - Resolved cross connection.....	70
6.1.2	NCC initiated connections .....	73
6.2	Point-to-multipoint connection establishment procedures .....	74
6.2.1	RCST/RSGW initiated connections.....	74
6.2.2	NCC initiated connections .....	75
6.3	Point-to-point Connection release procedures.....	76
6.3.1	RCST/RSGW initiated connections.....	77
6.3.1.1	Successful release by the RCST/RSGW .....	77
6.3.1.2	Successful release by the NCC.....	78
6.3.2	NCC initiated connections .....	79
6.4	Point-to-multipoint connection release procedures .....	80
6.4.1	RCST/RSGW initiated connections.....	80
6.4.2	NCC initiated connections .....	81
6.5	Point-to-point connection modify procedures (rate change) .....	82
6.5.1	RCST/RSGW initiated connections.....	83
6.5.2	NCC initiated connections .....	84
6.6	Point-to-multipoint connection modify procedures (rate change).....	84
6.6.1	RCST/RSGW initiated connections.....	85
6.6.2	NCC initiated connections .....	86
6.7	RC modify procedures.....	86
6.7.1	RCST/RSGW initiated RC modify.....	87
6.7.2	NCC initiated RC modify .....	88
6.8	RCST Capability request/response procedures .....	88
6.8.1	RCST/RSGW initiated RCST Capability request.....	89
6.8.2	NCC initiated RCST Capability request .....	89
7	Connection Control Messages Formatting.....	90
7.1	Overview .....	90
7.2	RCST to NCC messages (DULM) .....	90
7.2.1	DULM format.....	90
7.2.1.1	DULM with ATM formatting .....	90
7.2.1.2	DULM with MPEG formatting .....	92
7.2.2	Connection Control IE Types Description.....	94
7.2.2.1	Message Header IE .....	96
7.2.2.2	Cause IE.....	98
7.2.2.3	Channel_ID IE .....	99
7.2.2.4	Source/Destination Address IE .....	99
7.2.2.5	Forward/Return Stream Identifier IE .....	100
7.2.2.5.1	Applicability .....	100
7.2.2.5.2	MPEG2-TS stream .....	101
7.2.2.5.3	ATM stream .....	101
7.2.2.6	Connection Type IE .....	102
7.2.2.7	Forward/Return Profile IE.....	102
7.2.2.8	Route_ID IE .....	104
7.2.2.9	RC_Capacity_Parameters IE.....	104
7.2.2.10	Other_Group_and_Logon_ID IE .....	104
7.2.2.11	Other_Channel_ID IE .....	105
7.2.2.12	Other_Route_ID IE .....	105
7.2.2.13	IPv6_Source_Address/IPv6_Destination_Address IE .....	105
7.2.2.14	Connection_Inactivity_Timeout IE.....	106
7.2.2.15	Maximum_Packet_Size IE.....	106
7.2.2.16	Traffic_Spec_and_Policy_Data IE.....	106
7.2.2.17	RCST_Capability IE .....	106
7.2.2.18	MAC Destination Address IE .....	107
7.2.2.19	Connection_Status_Stats IE .....	107
7.3	NCC to RCST messages (TIMu).....	108
7.3.1	TIMu format .....	108
8	Connection Control Messages.....	110
8.1	Point-to-point connection establishment message.....	113
8.1.1	Connection Establishment Request (CnxEstReq).....	113
8.1.1.1	RCST/RSGW initiated unicast connection .....	113

8.1.1.1.1	From initiating RCST/RSGW to NCC (DULM).....	113
8.1.1.1.2	From NCC to peer RCST/RSGW (TIMu).....	114
8.1.1.2	NCC initiated unicast connection (TIMu).....	115
8.1.2	Connection Establishment Response (CnxEstResp).....	116
8.1.2.1	RCST/RSGW initiated unicast connection .....	116
8.1.2.1.1	From peer RCST/RSGW to NCC (DULM) .....	117
8.1.2.1.2	From NCC to initiating RCST/RSGW (TIM) .....	118
8.1.2.2	NCC initiated unicast connection.....	118
8.2	Point-to-multipoint connection establishment messages.....	120
8.2.1	Connection Establishment Request (CnxEstReq).....	121
8.2.1.1	RSGW initiated regenerative multicast connection .....	121
8.2.1.2	RCST initiated multicast connection.....	121
8.2.1.3	NCC initiated multicast connection .....	122
8.2.2	Connection Establishment Response (CnxEstResp).....	124
8.2.2.1	RSGW initiated regenerative multicast connection .....	124
8.2.2.2	RCST initiated multicast connection.....	125
8.2.2.3	NCC initiated multicast connection .....	126
8.3	Connection release messages .....	127
8.3.1	Connection Release Request (CnxRelReq).....	127
8.3.2	Connection Release Response (CnxRelResp).....	128
8.4	Connection modify messages .....	128
8.4.1	Connection Modify Request (CnxModReq) .....	129
8.4.2	Connection Modify Response (CnxModResp).....	130
8.5	RC Modify messages.....	131
8.5.1	RC Modify Request (RCModReq) .....	131
8.5.2	RC Modify Response (RCModResp) .....	132
8.6	RCST Capability messages .....	132
8.6.1	RCST Capability Request (RCSTCapReq).....	132
8.6.2	RCST Capability Response (RCSTCapResp).....	133
8.7	Connection Status Stats Messages .....	135
8.7.1	Connection Status Stats Request (CnxStatusStatsReq).....	135
8.7.2	Connection Status Stats Response (CnxStatusStatsResp).....	136
<b>Annex A (informative):</b>	<b>C2P state machines .....</b>	<b>137</b>
A.1	RCST PER-CONNECTION state machine.....	139
A.2	NCC PER-CONNECTION state machine .....	139
A.3	RCST PER-RC state machine.....	139
A.4	NCC PER-RC state machine.....	139
A.5	Example of the mapping between C2P UML, PER-ST and PER-CONNECTION state machines.....	139
<b>Annex B (informative):</b>	<b>C2P scenarios .....</b>	<b>141</b>
<b>Annex C (informative):</b>	<b>Examples of C2P exception procedures.....</b>	<b>146</b>
C.1	Point-to-point connection establishment procedures.....	146
C.1.1	RCST/RSGW initiated connections .....	146
C.1.1.1	Successful set up - Initiating RCST/RSGW retry .....	146
C.1.1.2	Successful set up - NCC retry .....	147
C.1.1.3	Unsuccessful set up - Peer RCST/RSGW responses lost.....	148
C.1.1.4	Unsuccessful set up - Peer RCST/RSGW does not get any NCC set up message.....	149
C.1.1.5	Unsuccessful set up - Initiating RCST/RSGW retry.....	150
C.1.1.6	Unsuccessful set up - NCC no answer.....	151
C.1.1.7	Unsuccessful set up - NCC reject .....	152
C.1.1.8	Unsuccessful set up - Peer RCST/RSGW reject.....	153
C.1.1.9	Unsuccessful set up - Initiating RCST/RSGW release .....	154
C.1.1.10	Unsuccessful set up - NCC release .....	155
C.1.1.11	Unsuccessful set up - Peer RCST/RSGW release.....	156
C.1.2	NCC initiated connections.....	157
C.1.2.1	Successful set up - NCC retry.....	157

C.1.2.2	Unsuccessful set-up - One of the peer parties does not answer the NCC's setup requests.....	158
C.1.2.3	Unsuccessful set-up - One of the peer parties does not answer the NCC's setup requests nor the NCC's release requests.....	159
C.1.2.4	Unsuccessful set-up - One of the peer parties rejects the connection .....	160
C.1.2.5	Unsuccessful set-up - NCC release.....	161
C.2	Point-to-multipoint connection establishment procedures .....	162
C.2.1	RCST/RSGW initiated connections .....	162
C.2.1.1	Successful set-up: RCST/RSGW multicast source retry .....	162
C.2.1.2	Unsuccessful set-up: NCC reject .....	163
C.2.1.3	Unsuccessful set-up: RCST/RSGW multicast source release.....	163
C.2.1.4	Unsuccessful set-up: NCC release .....	164
C.2.1.5	Unsuccessful set-up: Multicast source retry .....	165
C.2.2	NCC initiated connections.....	166
C.2.2.1	Successful set-up: NCC retry.....	166
C.2.2.2	Unsuccessful set-up: Multicast source reject.....	167
C.2.2.3	Unsuccessful set-up: NCC release .....	167
C.2.2.4	Unsuccessful set-up: Multicast source no answer.....	168
C.2.2.5	Unsuccessful set-up: Logoff multicast source .....	169
C.3	Point-to-point Connection release procedures.....	170
C.3.1	RCST/RSGW initiated connections .....	170
C.3.1.1	Successful release by the RCST/RSGW: RCST/RSGW retry or NCC no answer .....	170
C.3.1.2	Successful release initiated by the RCST/RSGW: RCST/RSGW no answer .....	171
C.3.1.3	Successful release initiated by the NCC: NCC retry .....	172
C.3.1.4	Successful release by the NCC: Peer RCST/RSGW logoff.....	173
C.3.1.5	Successful release by the RCST/RSGW: NCC busy .....	173
C.4	Point-to-multipoint connection release procedures .....	175
C.4.1	RCST/RSGW initiated connections .....	175
C.4.1.1	Successful release by the multicast source: NCC's responses get lost.....	175
C.4.1.2	Successful release by the multicast source: Multicast source's requests get lost .....	176
C.4.1.3	Successful release: NCC busy .....	177
C.4.1.4	Unsuccessful release by the NCC (of an RCST/RSGW initiated connection): Multicast source no answer.....	179
C.5	Point-to-point connection modify procedures (rate change).....	180
C.5.1	RCST/RSGW initiated connections .....	180
C.5.1.1	Unsuccessful connection modify profile - NCC's responses get lost.....	180
C.5.2	NCC initiated connections.....	182
C.5.2.1	Unsuccessful connection modify: RCST A's responses get lost .....	182
C.6	Point-to-multipoint connection modify procedures (rate change).....	184
C.6.1	RCST/RSGW initiated connections .....	184
C.6.1.1	Unsuccessful connection modify profile - NCC's responses lost.....	184
C.6.2	NCC initiated connections.....	186
C.6.2.1	Unsuccessful connection modify: RCST/RSGW connection modify responses lost.....	186
C.7	RC modify procedures.....	187
C.7.1	RCST/RSGW initiated RC modify .....	187
C.7.1.1	Unsuccessful RC modify - NCC no answer.....	187
C.7.2	NCC initiated RC modify.....	189
C.7.2.1	Unsuccessful RC modify - RCST/RSGW no answer .....	189
C.8	RCST Capability procedures.....	192
C.8.1	RCST/RSGW initiated RCST Capability notify .....	192
C.8.1.1	Unsuccessful RCST/RSGW initiated RCST Capability notify.....	192
C.8.2	NCC initiated Capability Notify.....	193
C.8.2.1	Unsuccessful NCC initiated RCST Capability Notify .....	193
History	.....	194

---

## Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://webapp.etsi.org/IPR/home.asp>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

---

## Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Satellite Earth Stations and Systems (SES).

---

## Introduction

The present document is the first published version of a converged C2P specification for DVB-RCS systems, bringing together requirements for a range of different system scenarios. The present document is based on existing C2P implementation but with several important extensions and changes.

Readers of the present document are therefore advised that the present document may be subject to changes in order to incorporate any possible corrections that may result from the testing and verification of the first implementations of the present document.

---

# 1 Scope

The present BSM document defines and specifies a Connection Control Protocol (C2P) for DVB-RCS satellite networks, relying on specific DVB-RCS layer 2 signalling (DULM on the return link, unicast TIM on the forward link).

C2P is part of the control plane layer 2 functionality and is generally used for the dynamic establishment and management of connections between the ground elements of DVB-RCS networks (RCSTs, Gateways, NCC), regardless of their architectures and topologies (single-beam/multiple-beam architectures, transparent/regenerative satellite payloads, star/mesh topologies). In this context C2P can be seen as a complement to the functionality of the interfaces already defined in the DVB-RCS and DVB-S/S2 standards [1] and [i.1].

The present document is organized as follows:

- Clause 4 contains the description of the network reference scenarios (clause 4.2), of the C2P core elements (clause 4.3), of the connection types (clause 4.4) and of various data structures for dynamic connectivity support (clause 4.6).
- Clause 5 describes the state machines, including the timer and counter definitions and examples of state machines diagrams.
- Clause 6 describes the normal procedures and a few examples of exception procedures.
- Clause 7 describes the C2P Information Elements (IEs).
- Clause 8 defines the C2P messages.
- Annex A includes the description of C2P State Machines in UML format.
- Annex B includes examples of C2P scenarios.
- Annex C provides additional examples of exception procedures.
- Annex D includes examples of the formatting of C2P messages.

Further and more detailed background information for C2P definition and specification is provided in the C2P TR Background Information document [i.5].

The specifications in the present document apply to DVB-RCS network elements that are part of the same Interactive Network (IN). The RCSTs in the IN are Type A RCSTs (clause 8.1.1 in [1]). All RCSTs are capable of transmitting in ATM or MPEG2-TS formats and of receiving in MPEG2-TS format.

The present document defines Version 01 of the C2P Specifications. This is the first release of the C2P Specifications.



## 2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
  - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
  - for informative references.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

### 2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- [1] ETSI EN 301 790 (v1.5.1): "Digital Video Broadcasting (DVB); Interaction channel for satellite distribution systems".
- [2] ITU-T Recommendation I.363-5: "B-ISDN ATM Adaptation Layer specification : Type 5 AAL".
- [3] ITU-T Recommendation H.222.0: "Information technology - Generic coding of moving pictures and associated audio information: Systems".
- [4] ITU-T Recommendation I.361: "B-ISDN ATM layer specification".

### 2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area. For non-specific references, the latest version of the referenced document (including any amendments) applies.

- [i.1] ETSI EN 302 307: "Digital Video Broadcasting (DVB); Second generation framing structure, channel coding and modulation systems for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications".
- [i.2] ETSI TS 102 462: "Satellite Earth Stations and Systems (SES); Broadband Satellite Multimedia (BSM); QoS Functional Architecture".
- [i.3] SatLabs System Recommendations (v1): "Quality of Service Specifications".

NOTE: Available at <http://satlabs.org>.

- [i.4] SatLabs System Recommendations (v1): "Management and Control Planes Specifications".

NOTE: Available at <http://satlabs.org>.

- [i.5] ETSI TR 102 603: "Satellite Earth Stations and Systems (SES); Broadband Satellite Multimedia (BSM); Connection Control Protocol (C2P) for DVB-RCS; Background Information".
- [i.6] ETSI TR 101 790: "Digital Video Broadcasting (DVB); Interaction channel for Satellite Distribution Systems; Guidelines for the use of EN 301 790".

- [i.7] ETSI TS 102 429-2: "Satellite Earth Stations and Systems (SES); Broadband Satellite Multimedia (BSM); Regenerative Satellite Mesh - B (RSM-B); DVB-S/DVB-RCS family for regenerative satellites; Part 2: Satellite Link Control layer".
- [i.8] UML Specification v. 1.1 (OMG document ad/97-08-11).
- NOTE: Available at <http://www.omg.org>.
- [i.9] IETF RFC 1112: "Host Extensions for IP Multicasting".
- [i.10] SatLabs System Recommendations (v2.1).
- NOTE: Available at <http://satlabs.org>.
- [i.11] AmerHis System, Interactive Broadband DVB-RCS/S OBP Communication System.
- NOTE: Available at <http://telecom.esa.int>.
- [i.12] IETF draft-combes-ipdvb-mib-rs-04.doc: "The DVB-RCS MIB".
- [i.13] IETF RFC 1901: "Introduction to Community-based SNMPv2".
- [i.14] IETF RFC 3416: "Version 2 of the Protocol Operations for the Simple Network Management Protocol (SNMP)".
- [i.15] IETF RFC 1518: "An Architecture for IP Address Allocation with CIDR".
- [i.16] IETF RFC 4632: "Classless Inter-domain Routing (CIDR): The Internet Address Assignment and Aggregation Plan".

---

## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

**Class of Service (CoS):** defines a specific behaviour regarding traffic handling/forwarding; can be used to categorize the traffic into different classes

**connection:** Layer 2 logical association between two or more network entities characterized by a C2P Class of Service (C2P CoS)

**Connection Control Protocol (C2P):** protocol that provides the interaction between RCSTs and NCC to support the set-up, modification and release of connections

**control plane:** part of a layered protocol architecture that, among other functions, is concerned with connection control functions, including the signalling necessary to set up, supervise and release connections

**Digital Video Broadcasting Return Channel by Satellite (DVB-RCS):** protocol for an interaction (or return) channel in satellite links

**Digital Video Broadcasting via Satellite (DVB-S):** protocol for broadcasting TV signals and, by extension, data over satellite

**gateway:** general term to identify both the TSGW and the RSGW

**Interactive Network (IN):** group of terminals serviced by an NCC

**IP flow:** sequence of IP packets from an IP source to an IP destination

NOTE: An IP flow may be identified based on the following attributes: IP source and destination address, protocol type, source and destination ports, class of service.

**management plane:** part of a layered protocol architecture that provides two types of functions, namely layer management and plane management functions

**Management Station (MS):** network element that manages all the elements of the system of one satellite interactive network (IN); it also controls the sessions, resources and connections of the ground terminals; it is composed of the NMC and the NCC

**mesh connection:** direct connection established between two RCSTs

**multicast:** communication capability, which denotes unidirectional distribution from a single source access point to a number of specified destination access points

**Network Control Centre (NCC):** network element that provide real time control of the IN (e.g. session control, connection control, routing, terminals' access control to satellite resources, etc.)

**Network Management Centre (NMC):** network element in charge of the management of all the system elements in the IN

**Network Operation Centre (NOC):** responsible for the centralized management and control functions in systems supporting multiple interactive networks, each controlled by its own NCC; NOC provides service and network (bandwidth) provisioning to the interactive network, co-ordination between NCCs, etc.

NOTE: In the case of a single interactive network the NOC and NCC functionality are merged.

**On-Board Processor (OBP):** router or switch or multiplexer in the sky; it can decouple the uplink and downlink air interface formats (modulation, coding, framing, etc.)

**Quality of Service (QoS):** network ability to provide service differentiation/guarantees and thus influence the perceived quality of communications with regard to a number of parameters (including delay, jitter, packet loss) that packets sent by the application experience when being transferred by the network

**Return Channel Satellite Terminal (RCST):** network element that provides the interface between the satellite system and external users

**Regenerative Satellite Gateway (RSGW):** network element in a regenerative satellite system that provides interconnection with terrestrial networks (Internet, ISDN/POTS and Intranet)

**star connections:** connections involving a gateway (TSGW in a transparent system or RSGW in a regenerative system)

NOTE: Star connections can involve one hop or double hop.

**stream:** logical flow of layer 2 data from one network reference point into the satellite network, resulting from the encapsulation of IP datagrams into MAC packets

**Transparent Satellite Gateway (GW/TSGW):** network element in a transparent satellite system that provides interfaces with terrestrial networks (Internet, ISDN/POTS and Intranet)

NOTE: The GW is typically integrated with the NCC in a single network element denoted as Hub.

**user plane:** user plane in a layered protocol architecture that provides the transfer of user data, along with associated controls (e.g. flow control, recovery from errors, etc.)

## 3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AF	Assured Forwarding (DiffServ PHB)
ATM	Asynchronous Transfer Mode
AVBDC	Absolute Volume Based Dynamic Capacity
AVBDCRepTime	AVBC Repetition Time
ADR	Average Data Rate
BE	Best Effort (DiffServ PHB)
BoD	Bandwidth on Demand
BSM	Broadband Satellite Multimedia
C2P	Connection Control Protocol

C2P CoS	C2P Class of Service
C2P PDR	C2P Peak Data Rate (used in C2P request messages)
C2P SDR	C2P Sustainable Data Rate (used in C2P request messages)
Channel_ID	Channel Identifier
Channel_ID_NCC	Channel Identifier at NCC
Channel_IDxy	Channel identifier for MAC CoS y in the connectivity channel x
CL	Controlled Load (IntServ Class of Service)
Cnx	Connection
Cnx PDR'	(Admitted) Connection Peak Data Rate (used in C2P response messages)
Cnx SDR'	(Admitted) Connection Sustainable Data Rate (used in C2P response messages)
CnxProfile Entry	Connection Profile (Mapping Table) Entry
CnxProfile Index	Connection Profile (Mapping Table) Index
CnxRef ID	Connection Reference Identifier (used in the Active Connection Table)
CnxEstReq	Connection Establishment Request
CnxEstResp	Connection Establishment Response
CnxRelReq	Connection Release Request
CnxRelResp	Connection Release Response
CnxModReq	Connection Modify Request
CnxModResp	Connection Modify Response
CoS	Class of Service
CR	Capacity Request
CRA	Constant Rate Assignment
CSC	Common Signalling Channel
DAMA	Demand Assignment Multiple Access
DiffServ	Differentiated Services
DL	Down Link
DSCP	Differentiated Service Code Point
DSM-CC	Digital Storage Medium - Command and Control
DULM	Data Unit Label Method
DVB	Digital Video Broadcasting
DVB-RCS	Digital Video Broadcasting Return Channel Satellite
DVB-S	Digital Video Broadcasting by Satellite
DVB-S2	Digital Video Broadcasting by Satellite Transmission 2nd Generation
EF	Expedited Forwarding (DiffServ PHB)
ETSI	European Telecommunications Standards Institute
FCA	Free Capacity Assignment
FL	Forward Link
GW	GateWay
GRD	Guaranteed Rate & Delay
Group_ID	Group Identifier
GS	Guaranteed Service (IntServ Class of Service)
ID	Identifier
IE	Information Element
IETF	Internet Engineering Task Force
IN	Interactive Network
IntServ	Integrated Services
IP	Internet Protocol
IP@	IP address
IP CoS	IP Class of Service
IP PDR	IP Peak Data Rate (of an IP flow/flow aggregate)
IP SDR	IP Sustainable Data Rate (of an IP flow/flow aggregate)
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
ITU	International Telecommunications Union
Kbps	Kilo bits per second (thousands of bits per second)
LAN	Local Area Network
LNM	Local Network Management
Logon_ID	Logon Identifier
MAC	Medium Access Control
MAC@	MAC address

MAC@src	MAC address of the source
MAC@dst	MAC address of the destination
MAC CoS	MAC Class of Service
Mbps	Mega bits per second (millions of bits per second)
MCD	Multi-Carrier Demodulator
MDR	Minimum Data Rate
MF-TDMA	Multiple-Frequency Time-Division Multiple Access
MIB	Management Information Base
MLD	Multicast Listener Discovery
MMT	Multicast Map Table
MPE	Multi-Protocol Encapsulation
MPEG	Moving Picture Experts Group
MS	Management Station
NCC	Network Control Centre
NMC	Network Management Centre
NOC	Network Operation Centre
OAM	Operation, Administration and Maintenance
OBP	On Board Processor
OSI	Open System Interconnection
PDR	Peak Data Rate
PHB	Per Hop Behaviour
Phb Entry	PHB (Mapping Table) Entry
Phb Index	PHB (Mapping Table) Index
Phb PDR'	PHB Peak Data Rate (admitted rate; used for the configuration of IP mechanisms)
Phb SDR'	PHB Sustainable Data Rate (admitted rate; used for the configuration of IP mechanisms)
PID	Program Identifier
PktClass Entry	Packet Classification (Table) Entry
PktClassIndex	Packet Classification (Table) Index
PSTN	Public Switched Telephone Network
PTM	Point-To-Multipoint
PTP	Point-To-Point
PVC	Permanent Virtual Circuit
QoS	Quality of Service
R1	First Rate (of a token bucket)
R2	Second rate (of a token bucket)
RBDC	Rate Based Dynamic Capacity
RBDCMax	RBDC Maximum (parameter)
RBDCTimeout	RBDC Timeout (parameter)
RC	Request Class
RC Entry	Request Class (Table) Entry
RC Index	Request Class (Table) Index
RCModReq	Request Class Modify Request
RCModResp	Request Class Modify Response
RCST	Return Channel Satellite Terminal
RF	Radio Frequency
RFC	(IETF) Request For Comments
RL	Return Link
RSAT	Regenerative SATellite
RSGW	Regenerative Satellite GateWay
RSVP	Resource ReSerVation Protocol
Route_ID	Route IDentifier
Rx	Receive
SCD	Single Carrier Demodulator
SCPC	Single Channel Per Carrier
SDP	Session Description Protocol
SDR	Sustainable Data Rate
SIP	Session Initiation Protocol
SLA	Service Level Agreements
SNMP	Simple Network Management Protocol
SSR	SatLabs Systems Recommendations
ST	Satellite Terminal
Stream_ID	Stream IDentifier