
**Intelligent transport systems —
Traffic and travel information (TTI)
via transport protocol experts group,
generation 2 (TPEG2) —**

Part 9:

**Service and network information
(TPEG2-SNI)**

*Systèmes intelligents de transport — Informations sur le trafic et le
tourisme via le groupe expert du protocole de transport, génération 2
(TPEG2) — 19-9:2023*

Partie 9: Information de service et de réseau (TPEG2-SNI)



iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 21219-9:2023

<https://standards.iteh.ai/catalog/standards/sist/df58314-deb4-4645-acfe-060816d5b3e9/iso-21219-9-2023>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword.....	v
Introduction.....	vi
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	1
4 Abbreviated terms.....	3
5 Application specific constraints.....	4
5.1 Application identification.....	4
5.2 Version number signalling.....	4
5.3 TPEG 1 binary compatibility of SNI.....	4
5.4 TPEG service component frame.....	4
5.5 Conceptual model — Multiplexed applications and services.....	5
6 Design principle.....	5
6.1 Variable content referencing.....	5
6.2 Example of the TPEG-SNI application in a TPEG data-stream.....	6
6.3 General rules for the TPEG-SNI application.....	8
7 SNI Structure.....	9
8 SNI Message components.....	9
8.1 SNI1Template.....	9
8.1.1 General.....	9
8.1.2 Usage of the version number.....	10
8.2 CurrentServiceInformation.....	10
8.3 ServiceLogo.....	10
8.4 SubscriberInformation.....	10
8.5 FreeTextInformation.....	11
8.6 HelpInformation.....	11
8.7 GST_GuideToServiceTables.....	11
8.8 GST1_FastTuningTable.....	12
8.9 GST2_TimeScheduleTable.....	13
8.10 GST3_ContentDescription.....	13
8.11 GST4_GeographicalCoverage.....	14
8.12 GST5_ServiceComponentReset.....	14
8.13 GST6_ConditionalAccessInformationReference.....	14
8.14 GST7_Versioning.....	14
8.15 GST_ServiceTableAccelerator.....	15
8.16 LinkageToSameService.....	15
8.17 Same service definition.....	17
8.18 LinkageToRelatedService.....	17
8.19 Reserved for future use.....	17
8.20 BearerLinkageInfoDAB.....	17
8.21 BearerLinkageInfoDARC.....	17
8.22 BearerLinkageInfoDVB.....	18
8.23 BearerLinkageInfoURL.....	18
8.24 BearerLinkageInfoHDRadio.....	18
8.25 SIT_ServiceInformationTables.....	18
8.26 SIT1_NumberOfMessages.....	19
9 SNI datatypes.....	19
9.1 MaskedTime.....	19
9.2 DayMask.....	20
9.3 AppStartTime.....	20
9.4 TimeSlot.....	21

9.5	OpTime	21
9.6	GeographicCoverage	22
9.7	CoordinatePair	22
9.8	ByteField	22
9.9	GST1_Entry	22
9.10	GST2_Entry	23
9.11	GST3_Entry	24
9.12	GST4_Entry	24
9.13	GST5_Entry	24
9.14	GST6_Entry	25
9.15	GST7_Entry	25
9.16	RelatedServiceEntry	25
9.17	DABFrequency	26
9.18	DVBFrequency	26
9.19	FMFrequency	27
9.20	AMFrequency	27
9.21	SameServiceEntry	27
9.22	SIT1_Entry	28
9.23	HDRadioStationID	29
9.24	HDFMBearerInfo	29
9.25	HDAMBearerInfo	29
10	SNI tables	30
10.1	sni001:GraphicType	30
10.2	sni002:CharacterEncoding	30
Annex A (normative) TPEG SNI and TPEG-binary representation		31
Annex B (normative) TPEG SNI, tpegML representation		47
Bibliography		60

ISO 21219-9:2023

<https://standards.iteh.ai/catalog/standards/sist/df58314-deb4-4645-acfe-060816d5b3e9/iso-21219-9-2023>

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*.

This first edition cancels and replaces the first edition (ISO/TS 21219-9:2016), which has been technically revised.

The main changes are as follows:

- the document has been changed from a Technical Specification to an International Standard;
- outdated applications have been updated with current TPEG2 specifications (e.g. RTM to TEC, PTI to PTS, CTT to TFP);
- application identification numbers (AIDs) have been updated accordingly.

A list of all parts in the ISO 21219 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

0.1 History

TPEG technology was originally proposed by the European Broadcasting Union (EBU) Broadcast Management Committee, who established the B/TPEG project group in the autumn of 1997 with a brief to develop, as soon as possible, a new protocol for broadcasting traffic and travel-related information in the multimedia environment. TPEG technology, its applications and service features were designed to enable travel-related messages to be coded, decoded, filtered and understood by humans (visually and/or audibly in the user's language) and by agent systems. Originally, a byte-oriented data stream format, which can be carried on almost any digital bearer with an appropriate adaptation layer, was developed. Hierarchically structured TPEG messages from service providers to end-users were designed to transfer information from the service provider database to an end-user's equipment.

One year later, in December 1998, the B/TPEG group produced its first EBU specifications. Two documents were released. Part 2 (TPEG-SSF, which became ISO/TS 18234-2) described the syntax, semantics and framing structure which was used for all TPEG applications. Meanwhile, Part 4 (TPEG-RTM, which became ISO/TS 18234-4) described the first application for road traffic messages.

Subsequently, in March 1999, CEN/TC 278, in conjunction with ISO/TC 204, established a group comprising members of the former EBU B/TPEG and this working group continued development work. Further parts were developed to make the initial set of four parts, enabling the implementation of a consistent service. Part 3 (TPEG-SNI, later ISO/TS 18234-3) described the service and network information application used by all service implementations to ensure appropriate referencing from one service source to another.

Part 1 (TPEG-INV, later ISO/TS 18234-1) completed the series by describing the other parts and their relationship; it also contained the application IDs used within the other parts. Additionally, Part 5, the public transport information application (TPEG-PTI, later ISO/TS 18234-5), was developed. The so-called TPEG-LOC location referencing method, which enabled both map-based TPEG-decoders and non-map-based ones to deliver either map-based location referencing or human-readable text information, was issued as ISO/TS 18234-6 to be used in association with the other applications of parts of the ISO 18234 series to provide location referencing.

The ISO 18234 series has become known as TPEG Generation 1.

0.2 TPEG Generation 2

When the Traveller Information Services Association (TISA), derived from former forums, was inaugurated in December 2007, TPEG development was taken over by TISA and continued in the TPEG applications working group.

It was about this time that the (then) new Unified Modelling Language (UML) was seen as having major advantages for the development of new TPEG applications in communities who would not necessarily have the binary physical format skills required to extend the original TPEG TS work. It was also realized that the XML format for TPEG described within the ISO 24530 series (now superseded) had a greater significance than previously foreseen, especially in the content-generation segment, and that keeping two physical formats in synchronism, in different standards series, would be rather difficult.

As a result, TISA set about the development of a new TPEG structure that would be UML-based. This has subsequently become known as TPEG Generation 2 (TPEG2).

TPEG2 is embodied in the ISO 21219 series and it comprises many parts that cover an introduction, rules, toolkit and application components. TPEG2 is built around UML modelling and has a core of rules that contain the modelling strategy covered in ISO 21219-2, ISO 21219-3 and ISO 21219-4 and the conversion to two current physical formats: binary (see [Annex A](#)) and XML (see [Annex B](#)); others can be added in the future. TISA uses an automated tool to convert from the agreed UML model XMI file directly into an MS Word document file, to minimize drafting errors; this file forms the annex for each physical format.

TPEG2 has a three-container conceptual structure: message management (ISO 21219-6), application (several parts) and location referencing (ISO/TS 21219-7). This structure has flexible capability and can accommodate many differing use cases that have been proposed within the TTI sector and wider for hierarchical message content.

TPEG2 also has many location referencing options as required by the service provider community, any of which may be delivered by vectoring data included in the location referencing container.

The following classification provides a helpful grouping of the different TPEG2 parts according to their intended purpose. Note that the list below is potentially incomplete, as there is the possibility that new TPEG2 parts will be introduced after the publication of this document.

- Toolkit parts: TPEG2-INV (ISO 21219-1), TPEG2-UML (ISO 21219-2), TPEG2-UBCR (ISO 21219-3), TPEG2-UXCR (ISO 21219-4), TPEG2-SFW (ISO 21219-5), TPEG2-MMC (ISO 21219-6), TPEG2-LRC (ISO/TS 21219-7).
- Special applications: TPEG2-SNI (ISO 21219-9 - this document), TPEG2-CAI (ISO 21219-10), TPEG2-LTE (ISO/TS 21219-24).
- Location referencing: TPEG2-OLR (ISO/TS 21219-22), TPEG2-GLR (ISO/TS 21219-21), TPEG2-TLR (ISO 17572-2), TPEG2-DLR (ISO 17572-3).
- Applications: TPEG2-PKI (ISO 21219-14), TPEG2-TEC (ISO 21219-15), TPEG2-FPI (ISO 21219-16), TPEG2-SPI (ISO 21219-17), TPEG2-TFP (ISO 21219-18), TPEG2-WEA (ISO 21219-19), TPEG2-RMR (ISO/TS 21219-23), TPEG2-EMI (ISO/TS 21219-25), TPEG2-VLI (ISO/TS 21219-26).

TPEG2 has been developed to be broadly (but not totally) backward compatible with TPEG1 to assist in transitions from earlier implementations, while not hindering the TPEG2 innovative approach and being able to support many new features, such as dealing with applications with both long-term, unchanging content and highly dynamic content, such as parking information.

This document is based on the [ISTISA 21219-9:2023](https://www.iso.org/standard/758314-deb4-4645-acfe-060816d5b3e9/iso-21219-9-2023) specification technical/editorial version reference: SP20009_3.3_001. <https://www.iso.org/standard/758314-deb4-4645-acfe-060816d5b3e9/iso-21219-9-2023>

Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) —

Part 9: Service and network information (TPEG2-SNI)

1 Scope

This document specifies the method for delivering service and network information within a TPEG service. The TPEG-SNI application is designed to allow the efficient, language-independent delivery of information about the availability of the same service on another bearer channel, or similar service data from another service provider, directly from service provider to end-users.

A number of tables of information are described in this document which provide comprehensive options for describing services, their timing, content, geographical coverage, etc. In all TPEG streams, it is mandatory to deliver the so-called guide to the service table (GST). Additionally, it is possible to signal linkage of content between different bearers and services.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 21219-1, *Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 1: Introduction, numbering and versions (TPEG2-INV)*

ETSI EN 300-401, *Radio broadcasting systems; Digital Audio Broadcasting (DAB) to mobile, portable and fixed receivers*

ETSI/TS 101 759, *Digital Audio Broadcasting (DAB); Data Broadcasting — Transparent Data Channel*

IETF RFC 1738, *Uniform Resource Locators (URL)*

IEC 62106:2015, *Radio data system (RDS) - VHF/FM sound broadcasting in the frequency range from 64,0 MHz to 108,0 MHz*

ETSI EN 300-468, *Digital Video Broadcasting (DVB); Specification for Service Information (SI) in DVB systems*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 21219-1 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

**3.1
application identification
AID**

identifier that specifies how to process TPEG content and route information to the appropriate application decoder

Note 1 to entry: Each TPEG application has a unique number, which identifies the application according to [Clause 5](#). The application identification is part of the TPEG specification and is defined as and when new applications are developed.

**3.2
application instance**
actual data stream containing content as defined by an application

**3.3
application and content identification
ACID**
worldwide unique identifier that defines the content of a service

Note 1 to entry: The ACID is composed of the originator *service identification* (SID-A, SID-B, SID-C) ([3.13](#)), the *content identification* ([3.5](#)) and the *application identification* ([3.1](#)).

**3.4
content description**
textual description of a selected *service component* ([3.11](#))

**3.5
content identification
COID**
identifier that is unique within a given application and used to specify its content

Note 1 to entry: The COID is defined by the originator of the content and is unique within a specific application. It is used for labelling the content of a component.

**3.6
data radio channel
DARC**
FM sub-carrier system for data transmission

**3.7
content originator**
original provider of an *application instance* ([3.2](#))

Note 1 to entry: The content originator may distribute the application data to different service providers. In some cases, the service provider generates its own application data and is therefore also the content originator.

**3.8
fast tuning GST
FT-GST**
directory of the applications and content of the service that indicates in which components the relevant information can be found

Note 1 to entry: This contains the minimum set of information required for the acquisition of application data.

**3.9
guide to the service table
GST**
basic service information such as service structure, service timing and *content description* ([3.4](#)), etc.

3.10**Reference-English “word”**

word which enables information to be transmitted as a concept, thereby letting the receiver device choose the best possible representation of the given concept in the context of the other parts of the message

Note 1 to entry: This approach means that devices can present concepts in any language or even as graphical icons, for example. For further explanation, see ISO 21219-2.

3.11**service component**

virtual channel for messages of a particular application

3.12**service component identification****SCID**

unique identifier that defines a *service component* (3.11) within a service

Note 1 to entry: The SCID is chosen by the carrier service provider and identifies a component, which itself has an ACID comprising originator SID, COID and AID. The same number may be used in a different service or, in the same service at a later time to identify a completely different combination of originator SID, COID and AID.

3.13**service identification**

worldwide unique identifier for a service

Note 1 to entry: It consists of three elements called SID A, SID-B, SID-C. These are allocated as described in ISO/TS 18234-2.

3.14**service table**

table containing basic service information, such as service structure, service timing and *content description* (3.4), etc.

3.15**time schedule GST****T-GST**

table indicating the operation times of selected *service components* (3.11)

4 Abbreviated terms

For the purposes of this document, the terms defined in ISO 21219-1 and the following apply.

DAB	digital audio broadcasting
DVB	digital video broadcasting
ECC	extended country code
EID	ensemble identification
ETSI	European Telecommunications Standards Institute
FM	frequency modulation
LHW	local hazard warning
PI	programme identification
RDS	radio data system

SCR	service component reset
SIS	station information service
SIT	service information table
STI	status and travel-time information (proposed TPEG application)
tba	to be announced
URL	uniform resource locator
UTC	coordinated universal time

5 Application specific constraints

5.1 Application identification

The word “application” is used in the TPEG specifications to describe specific subsets of the TPEG structure. An application defines a limited vocabulary for a certain type of messages, for example, parking information or road traffic information. Each TPEG application is assigned a unique number, called the application identity (AID). An AID number is defined in ISO 21219-1 whenever a new application is developed.

The AID number is used within the TPEG2-SNI application (this document) to indicate how to process TPEG content. It facilitates the routing of information to the appropriate application decoder.

5.2 Version number signalling

Version numbering is used to track the separate versions of an application through its development and deployment. The differences between these versions could have an impact on client devices.

The version numbering principle is defined in ISO 21219-1.

[Table 1](#) shows the current version numbers for signalling SNI within the SNI application.

Table 1 — Current version numbers for signalling of SNI

Major version number	3
Minor version number	3

5.3 TPEG 1 binary compatibility of SNI

The UML model for this application has been modelled according to TPEG2-UBR. The XML physical format conforms with the UXCR Specification ISO 21219-4 and is hence fully TPEG2 conformant. For the binary physical format, the TPEG1 conformance was mandatory to allow the coexistence of TPEG1 and TPEG2 level applications within a single service. So, it was not possible to completely follow the binary conversion rules specified in ISO 21219-3. Details are stated in [Annex A](#).

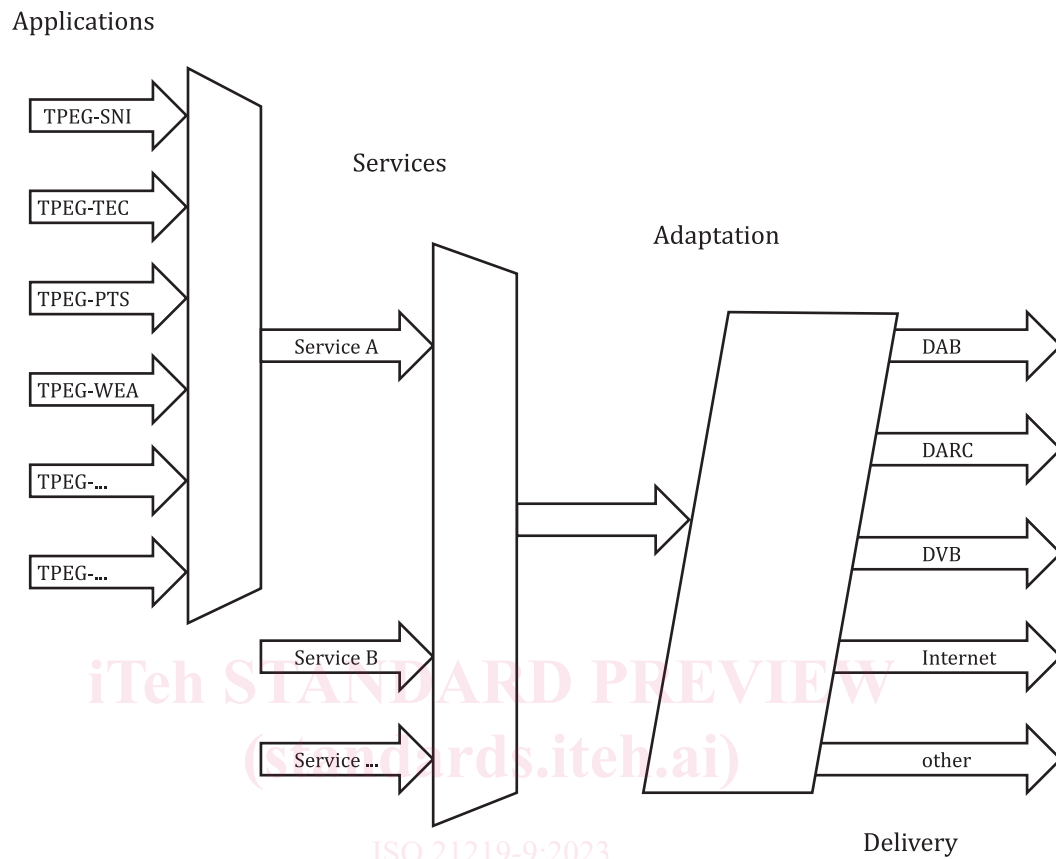
5.4 TPEG service component frame

SNI makes use of the “service component frame with dataCRC and messageCount” according to this document.

Each SNI component shall appear only once at most in the SNI component frame.

5.5 Conceptual model — Multiplexed applications and services

Figure 1 illustrates the conceptual model of the SNI application.



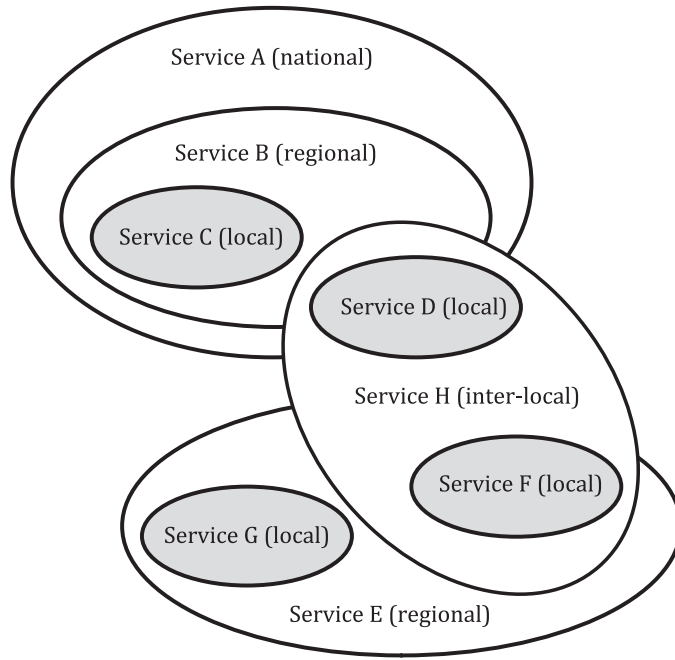
ISO 21219-9:2023
<https://standards.iteh.ai/catalog/standards/sist/df58314-deb4-4645-acfe-060816d5b3e9/iso-21219-9-2023>

Figure 1 — Multiplexed applications and services

6 Design principle

6.1 Variable content referencing

Figure 2 contains a diagrammatic representation of the use of SCIDs in related services.



Key

Service A (national):	SCID: 02, 03, 04, 05	Bearer: ii and iii
Service B (regional):	SCID: 02, 03, 04	Bearer: iii
Service C (local):	SCID: 02	Bearer: i
Service D (local):	SCID: 03	Bearer: i
Service E (regional):	SCID: 06, 07, 08	Bearer: ii
Service F (local):	SCID: 06	Bearer: i
Service G (local):	SCID: 07	Bearer: i
Service H (inter-local):	SCID: 03, 06	Bearer: ii

Figure 2 — Diagrammatic representation of the use of SCIDs in related services

6.2 Example of the TPEG-SNI application in a TPEG data-stream

[Figure 3](#) gives an example of the TPEG-SNI application in a TPEG data-stream.

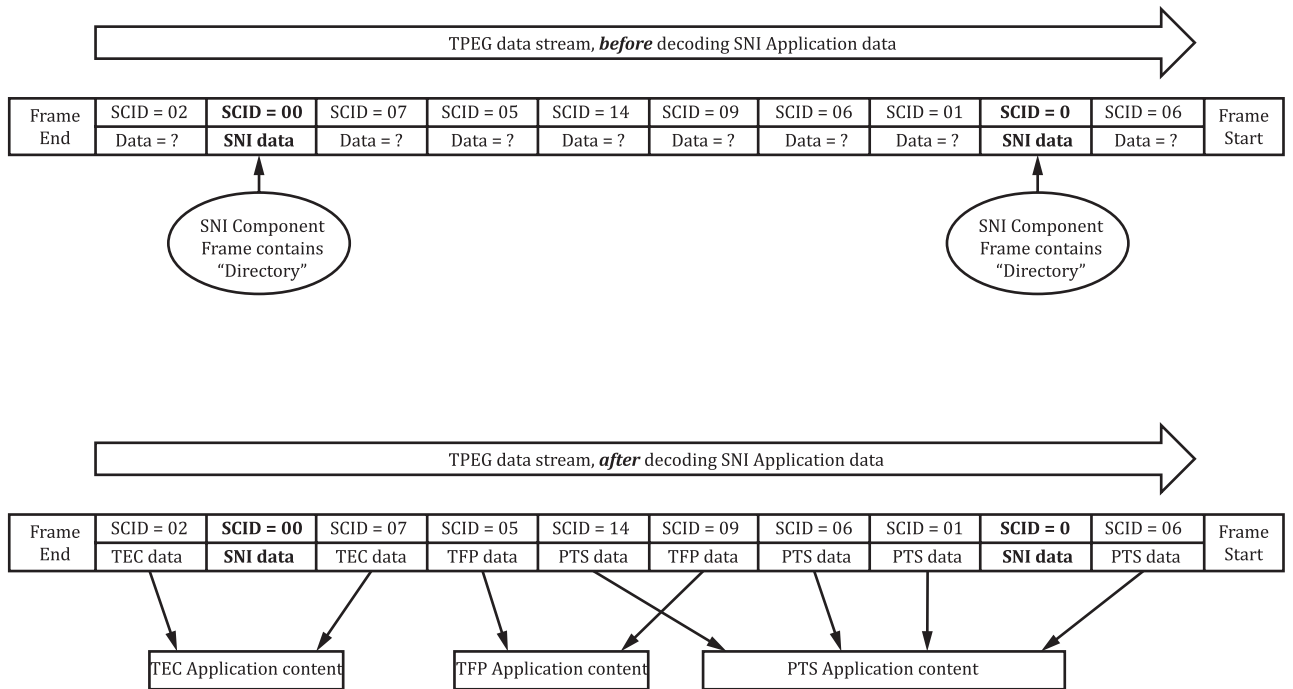


Figure 3 — Example of the TPEG-SNI application in a TPEG data-stream Concept of allocating services

Figure 4 shows the use of TPEG application names and AIDs.

TPEG application	AID	Comment
SNI	0000	
TEC	0005	
PTS	0013	Notional future application code.
TFP	0007	
WEA	0010	

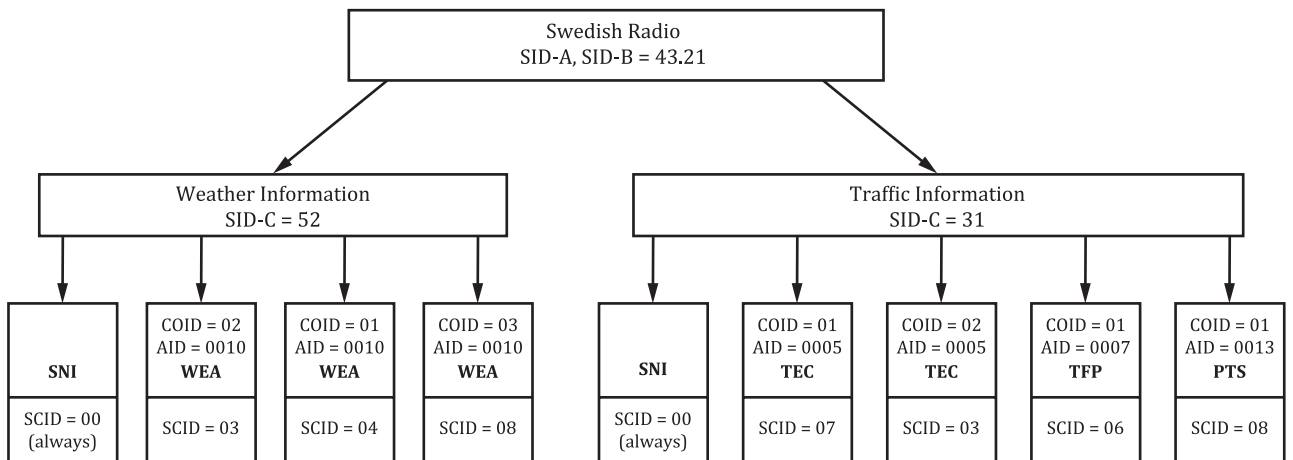


Figure 4 — Example of service allocation on a wideband bearer