TECHNICAL SPECIFICATION

ISO/TS 18234-3

Second edition
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Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format —

Part 3: Service and network information (TPEG1-SNI)

Systèmes intelligents de transport — Informations sur le trafic et le tourisme via les données de format binaire du groupe d'experts du protocole de transport, génération 1 (TPEG1) —

Partie 3: Informations relatives aux services et au réseau (TPEG1-SNI)

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Foreword

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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.

ISO/TS 18234-3 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 278, *Road transport and traffic telematics*, in collaboration with ISO Technical Committee TC 204, *Intelligent transport systems* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO/TS 18234-3:2006), which has been technically revised.

ISO/TS 18234 consists of the following parts, under the general title *Intelligent transport systems — Traffic and Travel Information (TTI) — TTI via Transport Protocol Expert Group (TPEG) data-streams*:

— *Part 1: Introduction, numbering and versions (TPEG1-INV)*

— *Part 2: Syntax, Semantics and Framing Structure (SSF)*

— *Part 3: Service and network information (TPEG1-SNI)*

— *Part 4: Road Traffic Message (RTM) application*

— *Part 5: Public Transport Information (PTI) application*

— *Part 6: Location referencing applications*

— *Part 7: Parking Information (TPEG-PKI)* [1)]

— *Part 8: Congestion and travel-time application (TPEC1-CTT)* [2)]

— *Part 9: Traffic event compact (TPEG1-TEC)* [3)]

— *Part 10: Conditional access information (TPEG1-CAI)* [4)]

— *Part 11: Location Referencing Container (TPEG1-LRC)*

1) To be published.

2) To be published.

3) To be published.

4) To be published.

Introduction

TPEG technology uses a byte-oriented data stream format, which may be carried on almost any digital bearer with an appropriate adaptation layer. TPEG messages are delivered from service providers to end-users and used to transfer information from the database of a service provider to an end-user's equipment.

The brief history of TPEG technology development dates back to the European Broadcasting Union (EBU) Broadcast Management Committee establishing the B/TPEG project group in autumn 1997 with the mandate 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 are 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.

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 is used for all TPEG applications. Part 4 (TPEG-RTM, which became ISO/TS 18234-4) described the first application, for Road Traffic Messages.

Subsequently, CEN/TC 278/WG 4, in conjunction with ISO/TC 204/WG 10, established a project group comprising the members of B/TPEG and they have continued the work concurrently since March 1999. Since then two further parts were developed to make the initial complete set of four parts, enabling the implementation of a consistent service. Part 3 (TPEG-SNI, ISO/TS 18234-3) describes the Service and Network Information Application, which should be used by all service implementations to ensure appropriate referencing from one service source to another. Part 1 (TPEG-INV, ISO/TS 18234-1), completes the series, by describing the other parts and their relationship; it also contains the application IDs used within the other parts. Additionally, Part 5, the Public Transport Information Application (TPEG-PTI, ISO/TS 18234-5), was developed.

A major step forward was to develop 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. The original issue of ISO/TS 18234-6 described the TPEG-LOC application in detail and was used in association with the other parts of ISO/TS 18234 series to provide location referencing.

This update to the first edition of ISO/TS 18234-3 provides additional specifications for the Service and Network Information Application.

During the development of the TPEG technology a number of versions have been documented and various trials implemented using various versions of the specifications. At the time of the publication of this Technical Specification, the original parts are fully inter-workable and no specific dependencies exist.

This Technical Specification has the technical version number TPEG-SNI/3.2/001.

Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format —

Part 3:
Service and network information (TPEG1-SNI)

1 Scope

This Technical Specification establishes the method of delivering service and network information within a TPEG service. The TPEG-SNI application is designed to allow the efficient and 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.

The term “application” is used in TPEG specifications to describe specific applications which are at the highest layer of the ISO/OSI protocol stack (ISO/IEC 7498-1). Each TPEG application (e.g. TPEG-RTM) is assigned a unique number that is called the Application IDentification (AID). An AID is defined whenever a new application is developed. The AID is used within the TPEG-Service and Network Information Application (this document) to indicate how to process TPEG content and allows routing of data to an appropriate application decoder.

AID = 0000 is assigned to the TPEG-SNI application described in this Technical Specification.

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

2 Normative references

The following referenced documents are indispensable for the application 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/TS 18234-1, *Traffic and Travel Information (TTI) — TTI via Transport Protocol Expert Group (TPEG) data-streams — Part 1: Introduction, numbering and versions*

ISO/TS 18234-2:2006, *Traffic and Travel Information (TTI) — TTI via Transport Protocol Expert Group (TPEG) data-streams — Part 2: Syntax, Semantics and Framing Structure (SSF)*

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

RFC 1738, *Uniform Resource Locators (URL)* [5)]

5) RFC 1738 can be found at http://www.ietf.org/rfc/rfc1738.txt.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
guide to the Service Tables
GST
guide that carries the basic service information

EXAMPLE Service structure, service timing and content description, etc.

3.1.1
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.

3.1.2
time schedule GST
TS-GST
optional table that indicates the operation times of selected service components

3.1.3
content description GST
CD-GST
optional table that gives the textual descriptions of selected service components

3.1.4
geographical coverage GST
GC-GST
optional table that defines the spatial range of selected service components

3.1.5
service component reset GST
SCR-GST
optional table that is used by the service provider to delete application specific data older than a certain moment

3.1.6
Conditional Access Information Reference GST
CAI-GST
optional table that is used by the service provider to indicate which service component carries the CAI application data required to decode encrypted service components

3.1.7
Versioning of TPEG Applications GST
VER-GST
mandatory table that is used by the service provider to indicate to which version of the application specification the service component complies

3.1.8
Number of Messages within a TPEG Service Component
NOM-SIT
optional table that is used to transmit the number of messages currently available for each service component

3.2
service
defined flow (from the service provider) of information meant for either the general public or a special target group

Note1 to entry: A service comprises one or more applications.

3.3
service provider
organisation that constructs a data service, by gathering data, processing data and supplying the data service

Note 1 to entry: The service provider also decides whether a service is encrypted or not.

— the service provider that generates the content of a service is called the originator;

— the service provider that carries content generated by another originator is called the carrier;

— there is only one originator of content but there may be more than one alternative carrier.

3.4
application
specific subset of the TPEG structure that defines a certain type of message

EXAMPLE Parking information or road traffic message information.

3.5
content
information inside an application

Note 1 to entry: A service may contain several instances of the same application type, each containing different content. Within an application, different content is labelled with a unique content ID (COID) specified by the originator of the content.

3.6
application instance
actual data stream containing content as defined by an application

3.7
content originator
original provider of an application instance

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
service component
“channel” within the multiplex of a TPEG stream with each stream comprising a number of these “channels” which are identified by the component identifier in ISO/TS 18234-2 (TPEG-SSF) and linked to the COID and AID in the TPEG-SNI application

Note 1 to entry: Each service component carries an application instance service identification.

3.9
SID-A, SID-B, SID-C
worldwide unique identifier for a service consisting of three elements called SID-A, SID-B, SID-C which are allocated as described in ISO/TS 18234-2

Note 1 to entry: There are two instances where service identification is used:

— originator SID (SID-A, SID-B, SID-C). This is the service identification of the service provider who generates the content;

— carrier SID (SID-A, SID-B, SID-C). This is the service identification of the service provider who is delivering the service at the service frame level.

Note 2 to entry: See ISO/TS 18234-2:2006, 7.3 and 7.3.2.1.

3.10
content identification
COID
identification that is used for labelling the content of a component

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

3.11
application and content identification
ACID
identification that uniquely identifies the content on a worldwide basis, composed of the originator service identification (SID-A, SID-B, SID-C), the content identification (COID) and the application identification (AID)

3.12
application identification
AID
identification that indicates how to process TPEG content and routes 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.

3.13
service component identification
CID
identification that uniquely identifies a service component within a service and is chosen by the carrier service provider

Note 1 to entry: It identifies a component which itself has an ACID comprising originator SID, COID and AID.

Note 2 to entry: 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.

4 Abbreviations

For the purposes of this document, the following abbreviations apply.

BPN	Broadcast, Production and Networks (an EBU document publishing number system)
B/TPEG	Broadcast/TPEG (the EBU project group name for the specification drafting group)
CEN	Comité Européen de Normalisation
DAB	Digital Audio Broadcasting
DARC	Data Radio Channel (an FM sub-carrier system for data transmission)
DVB	Digital Video Broadcasting
EBU	European Broadcasting Union
ETSI	European Telecommunications Standards Institute
GST	Guide to Service Tables
INV	Introduction, Numbering and Versions [ISO/TS 18234-1]
IPR	Intellectual Property Right(s)

ISO	International Organization for Standardization
OSI	Open Systems Interconnection
PTI	Public Transport Information [ISO/TS 18234-5]
RTM	Road Traffic Message application [ISO/TS 18234-4]
SCID	Service Component Identification
SID	Service Identification
SNI	Service and Network Information application (this Technical Specification)
SSF	Syntax, Semantics and Framing Structure [ISO/TS 18234-2]
STI	Status and Travel-Time Information (proposed TPEG application)
TBA	To Be Announced
TPEG	Transport Protocol Experts Group
TTI	Traffic and Travel Information
UTC	Coordinated Universal Time
WEA	Weather Information Application
CAI	Conditional Access Information
SIT	Service Information Table
LHW	Local Hazard Warning
TEC	Traffic Event Compact

5 Application identification

The word “application” is used in the TPEG specifications to describe specific applications, which are at the highest layer of the ISO/OSI model as defined in ISO/IEC 7498-1. Each TPEG application is assigned a unique number, called the Application IDentification (AID). An AID is defined whenever a new application is developed and these are all listed in ISO/TS 18234-1.

The application identification number is used within the TPEG-SNI application to indicate how to process TPEG content and facilitates the routing of information to the appropriate application decoder.

Since TPEG-SNI is itself classed as an application, it is assigned the AID = 0000.

6 Conceptual model

6.1 Scope

The Service and Network Information (SNI) application was developed to facilitate the navigation through several services distributed over different bearers. This enables the end-user to find a chosen service and information on it. It also allows the possibility of switching between similar and related services transmitted on the same or on several bearers. Information concerning the operation time, the content description, the availability or access conditions, is also provided by the SNI application. These features allow a quick and easy selection of a specific service.

From a technical viewpoint the TPEG-SNI application manages the tuning to, and the tracking of, a TPEG service automatically. By means of suitable decoder equipment, the only action for the end-user is the selection of his desired service from the many different services on different bearers.

In detail the following requirements are met:

— the SNI application enables a quick search for a specific service;

— the SNI application gives information about transmission times and repetition cycles of a service;

— the SNI application provides the tuning (identification) parameters for the underlying digital bearers;

— the SNI application supports the tracking of a service from one network or system to another;

— the SNI application enables the linkage of one service to another on the same bearer;

— the SNI application can also link services across different digital bearers;

— the SNI application manages the interaction of all other TPEG applications.

6.2 Multiplexed applications and services

Figure 1 illustrates the conceptual model of the SNI application.

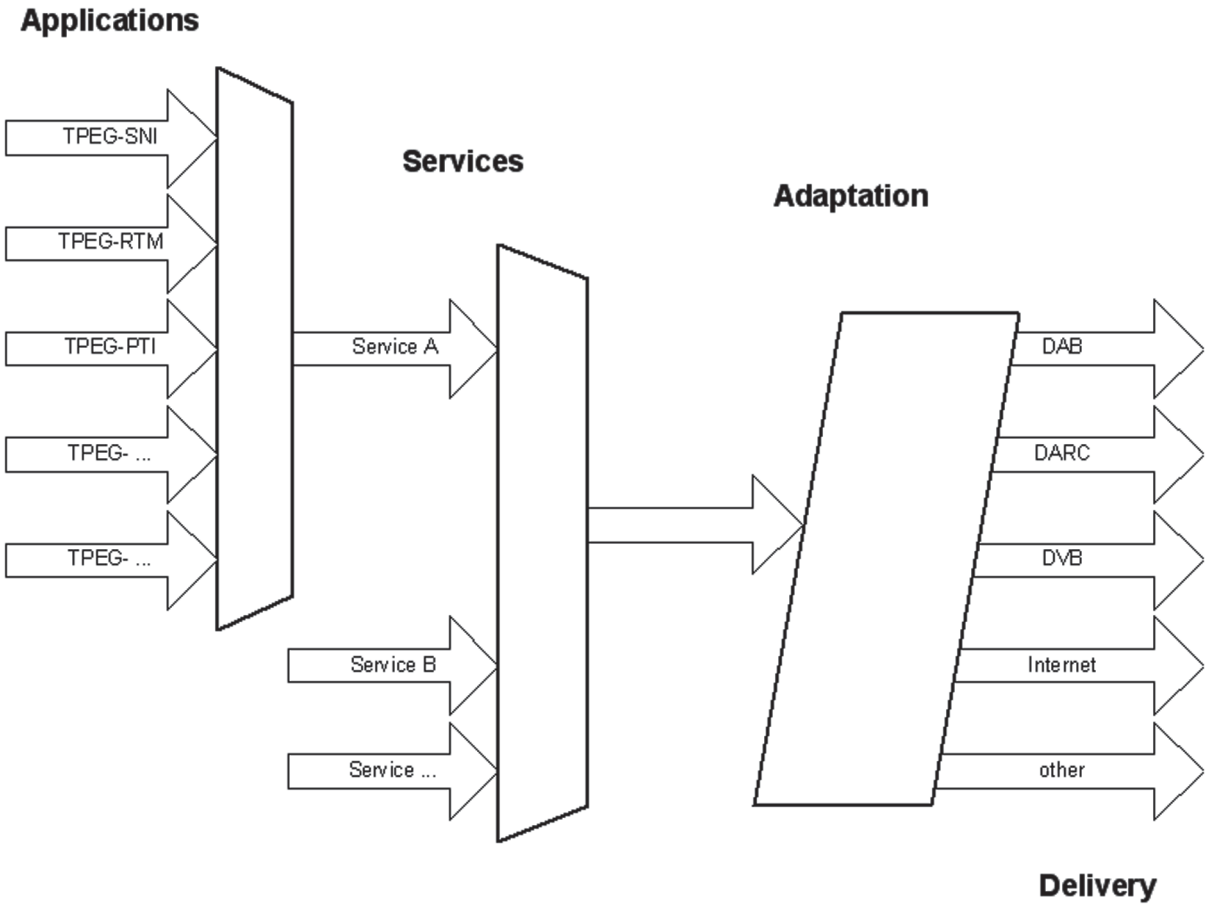


Figure 1 — Multiplexed applications and services

7 Design principle

7.1 Variable content referencing

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

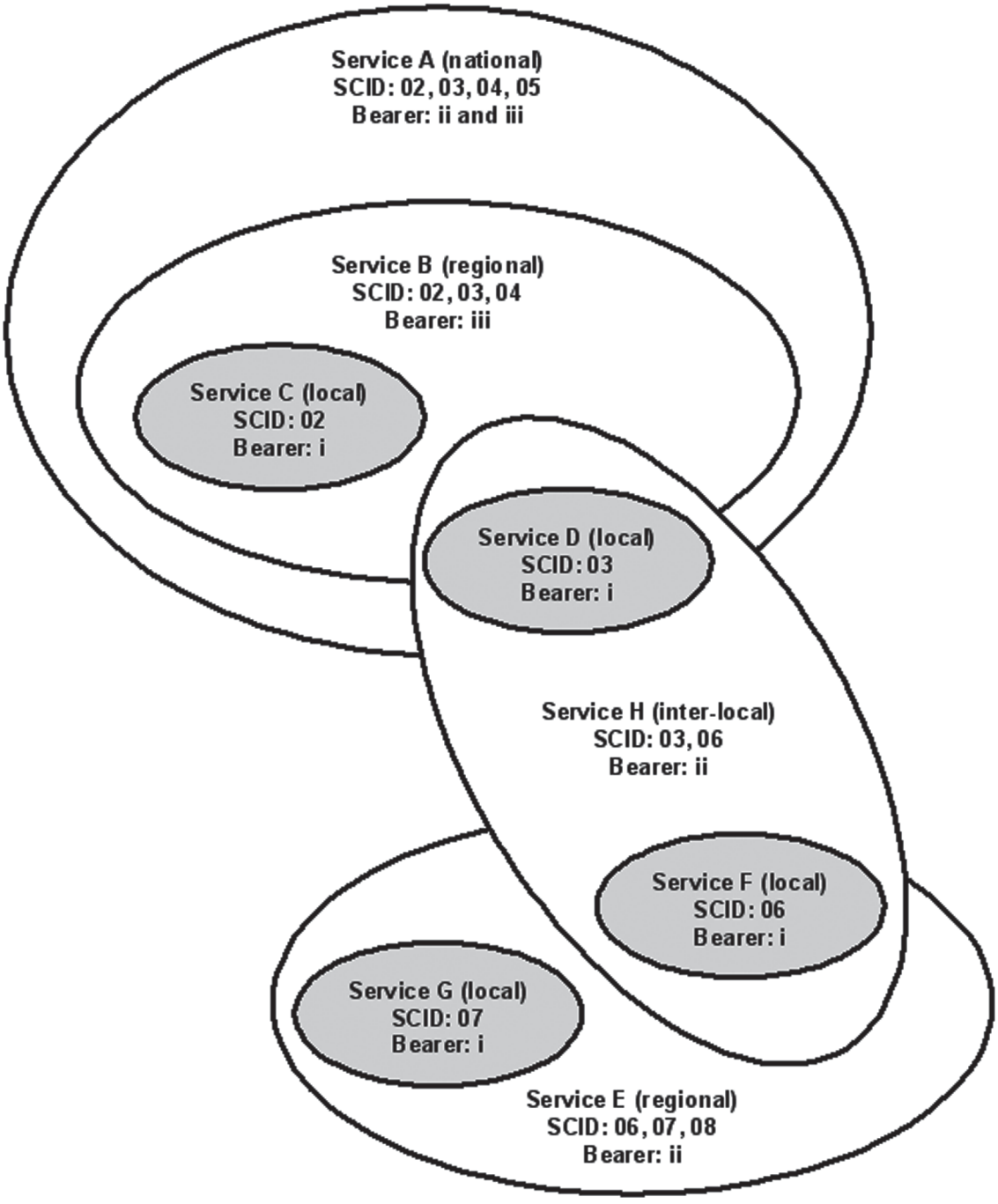
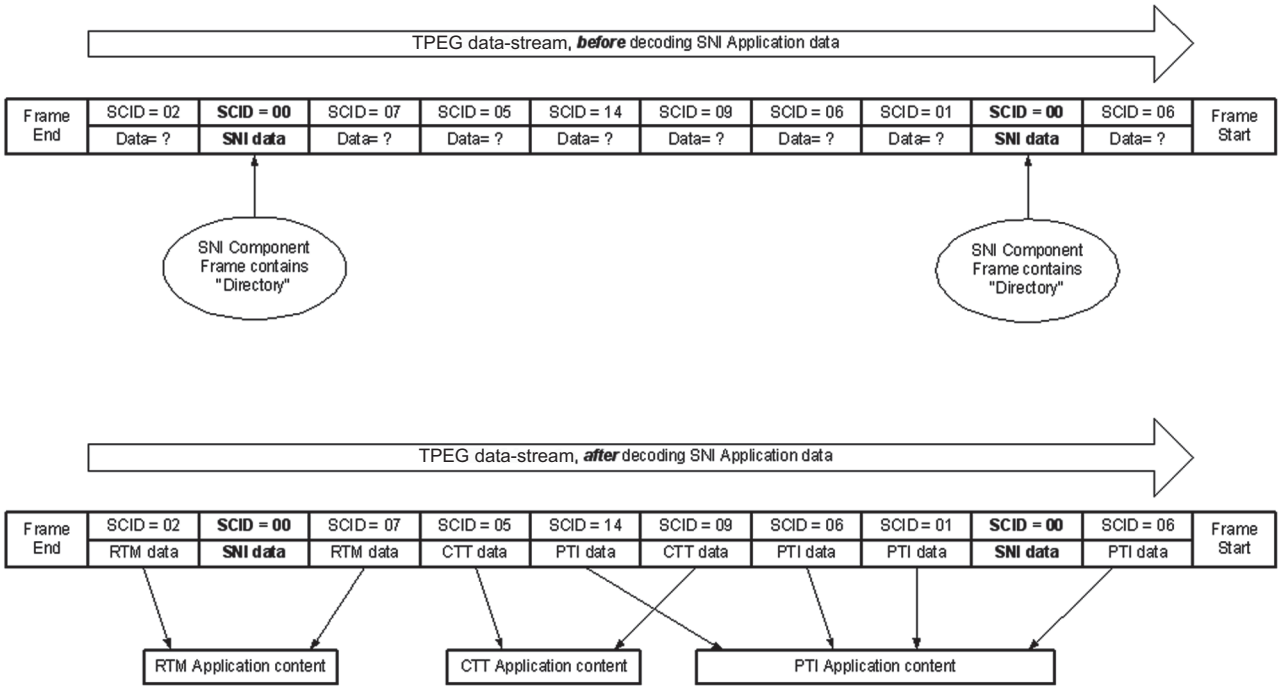


Figure 2 — Diagrammatic representation of the use of SCIDs in related services

7.2 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.



Key

SCID Service Component Identification
SNI Service and Network Information Application
RTM Road Traffic Message Application
PTI Public Transport Information Application
CTT Congestion and Travel Time Information Application (notional future Application)

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

7.3 Concept of allocating services

Application names and AIDs:

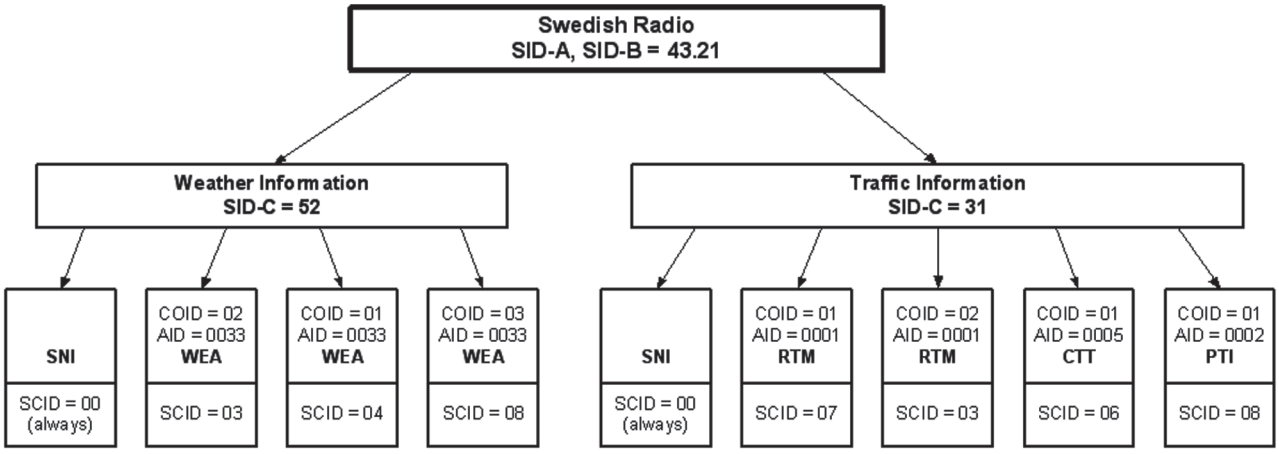
SNI = Service and Network Information Application AID = 0000

RTM= Road Traffic Message Application AID = 0001

PTI = Public Transport Information Application AID = 0002

CTT = Congestion and Travel Time Application AID = 0005 (notional future application code)

WEA = Weather Information Application AID = 0033 (notional future application code)



Key

SID Service Identification (with three parts: -A, -B, -C)
COID Content Identification
AID Application Identification
SCID Service Component Identification

Figure 4 — Example of service allocation on a wideband bearer

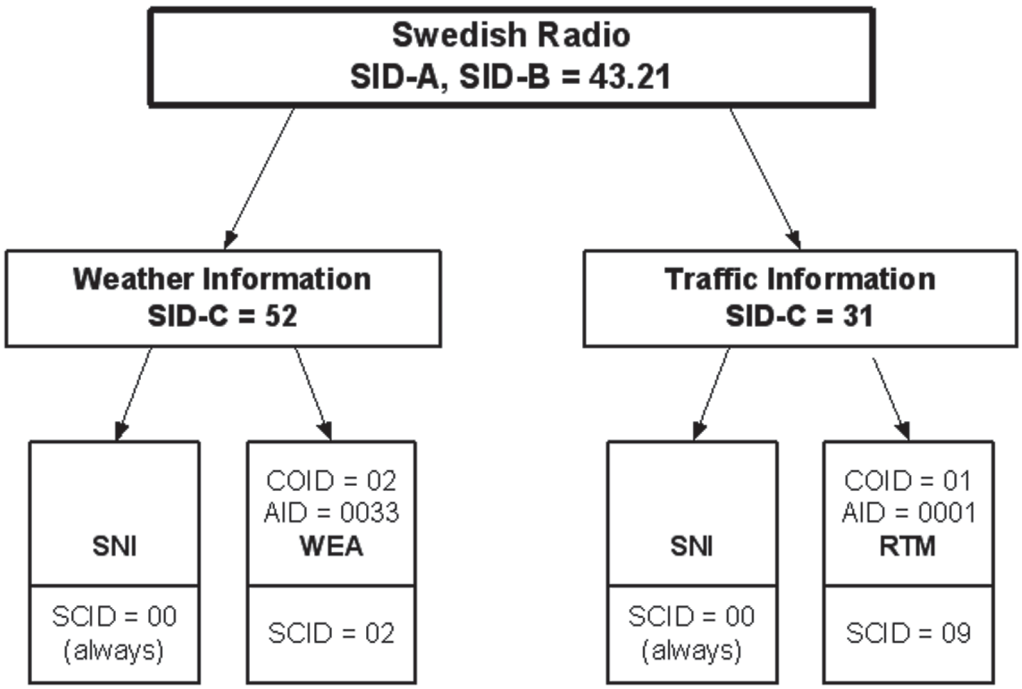
Application names and AIDs:

SNI = Service and Network Information Application AID = 0000

RTM= Road Traffic Message Application AID = 0001

PTI = Public Transport Information Application AID = 0002

WEA = Weather Information Application AID = 0033 (notional future application code)



Key

SID Service Identification (with three parts: -A, -B, -C)
COID Content Identification
AID Application Identification
SCID Service Component Identification

Figure 5 — Example of service allocation on a narrowband bearer

7.4 General rules for the TPEG-SNI application

The following are rules for the allocation of services by the service provider on one single bearer:

a) For every service the SNI is mandatory.

b) The SNI application shall only occur once within a service and has the reserved SCID of 00.

c) The fast tuning guide to the Service Table is mandatory within the SNI.

d) The service component identifier (SCID) identifies the combination of an application and its content within a service.

e) The application IDs are standardized by ISO/TS 18234-1.

f) The content identification (COID) is used for specifying the content of a component within a service.

g) The originator service identification (SID-A, SID-B, SID-C), content identification (COID) and application identification (AID) together form the application and content identification (ACID) which uniquely identifies the same content worldwide.

h) The application and content identification (ACID) is associated with the service component identification (SCID) within a service.

i) Some instances of a service are equivalent, but not necessarily identical. For example the same service may be distributed on different bearers with different service component identifications (SCIDs). In this case the services do not have an identical 'byte-stream', but carry equivalent data content.

j) Each SNI component (e.g. GST time schedule, linkage table), shall never occur more than once in each SNI component frame.

8 Description of SNI Data Types

8.1 Types for periodic time functions

8.1.1 Masked time

This type expresses fixed date and time information.

Each byte can have a zero value meaning that the signalled event occurs periodically in this range. The value zero is reserved for indicating repetition, therefore 1 has to be added to the hours, minutes and seconds.

The start year is therefore the year 2000 (2000-1999 = 1).

The first usage of the year element in the masked time function will thus not be before the year 2000.

The next box shows the changed **<masked_ time>** type. The right hand column gives the formula to get the type element (e.g. hour) from the real value:

Two functions are available simultaneously: Pointing to a specific time and indicating a repeating event.

EXAMPLE 1 **<masked_time>** = 01 0C 00 0F 1F 01 hex - Meaning: The event starts **every day** in December 2000 at 14 hrs. 30 min. and 00 sec.

EXAMPLE 2 **<masked_time>** = 00 00 0B 00 2E 38 hex - Meaning: The event starts **every year, every month,** on the 11th day of the month, **every hour**, 45 min. and 55 sec. after the full hour.

<masked_time>:=	: Masked time	
<intunti>,	: Year,	0 : any; 1..255 : Year-1999
<intunti>,	: Month,	0 : any; 1..12 : Month
<intunti>,	: Day,	0 : any; 1..31 : Day
<intunti>,	: Hour,	0 : any; 1..24 : Hour+1
<intunti>,	: Min,	0 : any; 1..60 : Min+1
<intunti>;	: Sec,	0 : any; 1..60 : Sec+1

8.1.2 Start time

This type is a compound element and is helpful to indicate the start time and also the repeatability of an event at the same time.

IMPORTANT: All time information is absolute and always referenced to UTC. For example an event in China is repeated every Tuesday and Friday at 06.00 hrs. This leads automatically to a change of the <day_mask> value (see ISO/TS 18234-2:2006, 6.3.2.2), becoming Monday and Thursday. Also, the <masked_time> value must change according to the China time zone offset in relation to UTC. All receiving clients shall "know its local time offset", thus allowing it to convert all time information to the format that the end-user expects.

<app_start_time>:=	: Start time of an application
<masked_time>,	: At what time and date
<day_mask>;	: On which day of the week

NOTE The day in the masked time can be set along with the day mask. The resulting start time will be the first day of the day mask on or after the specified day in the masked time.

EXAMPLE Assume the 1st of July is a Thursday. If the masked time indicates the 2nd of July and the day mask is Monday and Tuesday, then the resulting start time is Monday the 5th of July. The next occurrence is then Tuesday the 6th.

8.1.3 Time slot

This compound type indicates start time, repetition and duration of an event in one function.

<time_slot>:=	: Time, repetition, duration of an application
<app_start_time>,	: At what time and date
<duration>;	: How long it lasts

8.2 Operating time function

8.2.1 Operating time

This time element consists of the start and stop time of a service component within a specific application. The start and stop time is transmitted as an absolute UTC value to be independent from any other vague time description (e.g. one hour after midday). The service provider may use this time information to announce the next occurrence of a component of a certain service.

The decoder can then tell the end-user what he might expect in the near future. To take full advantage of this function six cases are distinguished as shown in Table 1:

Table 1 — Operating time

#	Condition	Explanation	Meaning
1	$T_p <= T_s <= T_e$	Component of the service starts and ends in the future	Default situation
2	$T_s <= T_p <= T_e$	Component of the service has already started and ends in the future	Programme is running
3	$T_s <= T_e <= T_p$	Component of the service was transmitted, change to condition 1 expected	Programme is over
4	$T_p <= T_e <= T_s$	Same as condition 2, but next start time is already announced	Programme is running
5	$T_e < = T_p <= T_s$	This condition indicates that a new service will be established	New programme in the future
6	$T_e <= T_s <= T_p$	This condition indicates that a service has been abandoned	Old programme dropped

The time descriptors have the following meaning:

T_p: Present or current time, i.e. the actual time that changes continuously;

T_s: Start time of a component within an application, fixed by the service provider;

T_e: End (stop) time of a component within an application, fixed by the service provider.

<optime>:=	: Operating time
<time_t>,	: Next start date and time
<time_t>;	: Next stop date and time

8.3 Compound type for geographical coverage

This basic type is needed to define an area to which a specific service component is allocated. This feature only makes sense if the application that uses that service component has a relation to a certain coverage area.

Type definition:

<geo_cov_type>:=	: Definition of rectangular coverage area
<co_ordinate>,	: North-west corner of rectangle
<co_ordinate>;	: South-east corner of rectangle

NOTE Notional rectangle on a flat map.

<co_ordinate>:=	: Definition of the corner of rectangular
<intsili>,	: WGS 84 Longitude in units of 0,01 degrees
<intsili>;	: WGS 84 Latitude in units of 0,01 degrees

Table 2 — Numerical presentation of the coordinates

Range of Type	Min. value	Max. value	Resolution [deg]	Resolution [km]	Remarks
Decimal range of <intsili>:	−32 768	+32 767	N/A	N/A	
Decimal range for Longitude:	−18 000	+18 000	N/A	N/A	
Range of Longitude in degrees:	−180,00	+180,00	0,01	1,08	Resolution [km] constant
Decimal range for Latitude:	−9 000	+9 000	N/A	N/A	
Range of Latitude in degrees:	−90,00	+90,00	0,01	1,08	Resolution [km] variable

NOTE See ISO/TS 18234-4 for a full description on forming Spatial Descriptors.

9 Description of basic features

9.1 Service information

9.1.1 Service name and service description

Table 3 — Service name

1.	Name:	**Service name**
2.	Function:	Identifies the service by a label, comparable to PS in RDS
3.	Occurrence:	Mandatory, general
4.	Description:	Identifies the service to a human being
5.	Format:	Short string, maximum 255 characters (label)
6.	Example:	“BBC 2 – TPEG Service”

Table 4 — Service description

1.	Name:	**Service description**
2.	Function:	Describes in more detail the content of a service
3.	Occurrence:	Mandatory, general
4.	Description:	Identifies the applications and scope thereof within a service
5.	Format:	Short string, maximum 255 characters (label)
6.	Example:	“Local and interurban road traffic information combined with public transport information for South-East England”

9.1.2 Service logo

Table 5 — Service logo

1.	Name:	**Service logo**
2.	Function:	Promotes the service or provider
3.	Occurrence:	Optional, multiple
4.	Description:	Graphical identification of the service or the service provider
5.	Format:	Has to be defined as picture
6.	Example:	Bitmap or other format

9.1.3 Subscriber information

This section describes additional payment and encryption information delivered to the end-user. This information is not vital for the SNI application, but enhances information provided to the end-user. This mechanism will allow for tariffs to be announced to the end-user.

Table 6 — Subscriber information

1.	Name:	**Subscriber information**
2.	Function:	Gives information about payment and tariffs for restricted service components
3.	Occurrence:	In any encrypted or potentially encrypted service component
4.	Description:	Helps the end-user to choose or select between chargeable services
5.	Format:	Byte field defined by the service provider
6.	Example:	Will be added later

9.1.4 Free text information

In this section more textual information for the end-user is defined. This information is not mandatory.

Table 7 — Free text information

1.	Name:	**Free text information**
2.	Function:	Additional information that is not coded and therefore language dependent
3.	Occurrence:	Optional, selected by the service provider
4.	Description:	Possibility to transmit additional information for the end-user
5.	Format:	Short string, maximum 255 characters
6.	Example:	Announcement of service disruption, disclaim information, legal advice

9.1.5 Help information

In this section more textual information for the end-user is defined. This information is not mandatory.

Table 8 — Help information

1.	Name:	**Help information**
2.	Function:	Additional information that gives addresses to which the user can apply
3.	Occurrence:	Optional, selected by the service provider
4.	Description:	A link between the user and the service provider for feedback
5.	Format:	Short string, maximum 255 characters
6.	Example:	Internet address, Hotline number, Helpdesk

9.2 Component information

This section mainly describes the guide to the Service Tables.

The guide to the Service Table (GST) consists of seven parts that carry the basic service information being of different importance to the system and the user. Taking this into account, the repetition rate of these basic tables can be adjusted to the available channel capacity.

9.2.1 Guide to the Service Table 1 (fast tuning)

9.2.1.1 Description of table

Service Table 1 is mandatory. All service components need to be defined in this table. The same SCID may never occur more than once within this table.

Table 9 — Guide to the Service Table 1 (fast tuning)

Table 1	**Fast tuning GST (Guide to the Service Table)** Version Number: Range: 0...255, Incremented, if any of the entries is changed, Type: **<intunti>** **Character table identifier:** Default character table for the current service, Type: **<chartab>**						
#	**1**	**2**			**3**	**4**	**5**
Name:	Service Component Identification (SCID):	Application and Content Identifier (ACID):			Next operating time:	Encryption Indicator:	Safety flag:
		Originator Service Identification: (SID-A, SID-B, SID-C)	Content Identification: (COID)	Application Identification: (AID)			
Transmission:	Mandatory	Optional	Mandatory	Mandatory	Optional	Optional	Optional
Default:		Carrier Service Identification, because the content originates from the carrier			From the year 1970 to 2106	0 = Non encrypted	Absent = Safety flag not set
Element Structure:	**<intunti>** 1 Byte	**3 * <intunti>** 3 Bytes	**<intunti>** 1 Byte	**<intunli>** 2 Bytes	**<optime>** 8 Bytes	**<intunti>** 1 Byte	**<bit_switch>** 1 Bit

9.2.1.2 Character table identifier

The character table identifier is valid for the whole service including the SNI application itself. The character table identifier belongs to the basic service features and is therefore integrated into the guide to the Service Table.

If the **<chartab>** is invalid or unknown to the receiver, it should assume that the **<chartab>** equals 1.

9.2.1.3 Originator service identification

The originator service identification needs to be specified when the carrier service provider is not the originator of the content of the related service component.

If the carrier service provider is also the originator of the content of the related service component then it is not necessary to indicate the service identification in this column. In this case, the default is the carrier service provider.

9.2.1.4 Encryption indicator

In the service frame of the TPEG frame structure, an encryption indicator is already defined for encrypting at the service frame level. If this mechanism is used, all underlying levels including the SNI data is “hidden”.

There is another encryption possibility in the SNI application at the service component level. Individual service components may or may not be encrypted. This is indicated in the fast tuning GST. The SNI service component (00) cannot be encrypted at this level. Where encryption is applied to a service component then encryption shall not be applied to its SCID, field length and the header CRC of the service component frame.

The encryption indicator in the fast tuning GST is of the same type as defined in ISO/TS 18234-2:2006, 7.3.2.1.

9.2.1.5 Safety flag

A stream of service components is marked with the safety flag if it contains safety related (LHW) messages only, since some end-user devices may be able to decode LHW messages only:

— Messages can be used in devices without a map, but they should have the position and (driving) direction available.

— Messages can be presented in short text or spoken form, e.g. “attention, in 500 metres on the M6, slippery road due to oil spillage”.

9.2.1.6 Use of the version number

There is only **one** version number within the SNI application. It is used to synchronize the various tables. If in any table within the SNI, a version number exists, then the version number shall always be the same in all of the tables. If any of the tables changes, the version number in all tables shall be incremented.

Table 10 shows a very simple example of a GST fast tuning table, having only one entry (05) of one application (0001). This application has only one content identification (03). This information itself is carried in a component frame identified by 00, which is the default value for the SNI application.

Table 10 — Simple example of a GST tuning table

Version Number:	Character Table Identifier:	Service Component Identification (SCID):	Content Identification: (COID):	Application Identification: (AID):
Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
<intunti> 1 Byte	**<chartab>** 1 Byte	**<intunti>** 1 Byte	**<intunti>** 1 Byte	**<intunli>** 2 Bytes
7B	**10**	**05**	**03**	**0001**

9.2.2 Guide to the Service Table 2 (time schedule)

Service Table 2 is optional. The same SCID may never occur more than once within this table.

Table 11 — Guide to the Service Table 2 (time schedule)

Table 2	**Time Schedule GST (Guide to the Service Table)** **Version Number:** Range: 0...255, Incremented, if any of the entries is changed,Type: **<intunti>**	
#	**1**	**2**
Name:	Service Component Identification (SCID):	Operating Time:
Transmission:	Mandatory (if operating time exists)	Mandatory (if operating time exists)
Element Structure:	**<intunti>** 1 Byte	**<time_slot>:=** **<app_start_time>,** **<duration>;** 11 Bytes Explanation: Indicates the start time, the repetition and the duration of any SCID

NOTE The time information field is present in both tables. If there is a contradiction between the time information in the fast tuning GST and the Time Schedule GST, the fast tuning table gives the master time.

If the SCID of a specific service component is not present in the time schedule GST, then the specific service is operating permanently or will start in the future as specified in the fast tuning table.

9.2.3 Guide to the Service Table 3 (content description)

Service Table 3 is optional. The same SCID may never occur more than once within this table.

Table 12 — Guide to the Service Table 3 (content description)

Table 3	**Content Description GST (Guide to the Service Table)** **Version Number:** Range: 0...255, Incremented, if any of the entries is changed, Type: **<intunti>**	
#	**1**	**2**
Name:	Service Component Identification (SCID):	Content Description: Gives further information related to a service component. The general description of a service is signalled by the **<sni_component(01)>**.
Transmission:	Mandatory (if content description exists)	Mandatory (if content description exists)
Element Structure:	**<intunti>** 1 Byte	**<short_string>**

NOTE If there is no additional content in Service Table 2 and/or Service Table 3 related to a specific service component, it is not necessary to put this SCID into the table(s). Therefore, the total number of SCID entries in this table will be less than or equal to the number of SCID entries in the fast tuning table (Service Table 1).

9.2.4 Guide to the Service Table 4 (geographical coverage)

Service Table 4 is optional. The same SCID may never occur more than once within this table.

Table 13 — Guide to the Service Table 4 (geographical coverage)

Table 4	**Geographical Coverage GST (Guide to the Service Table)** **Version Number:** Range: 0...255, Incremented, if any of the entries is changed, Type: **<intunti>**	
#	**1**	**2**
Name:	Service Component Identification (SCID):	Geographical Co-ordinates:
Transmission:	Mandatory (if geographical coverage definition for this service component exists)	Mandatory (if geographical coverage definition for this service component exists)
Element Structure:	**<intunti>** 1 Byte	**<geo_cov_type>** 8 bytes

9.2.5 Guide to the Service Table 5 (service component reset)

Service Table 5 is optional. The same SCID may never occur more than once within this table.

Table 14 — Guide to the Service Table 5 (service component reset)

Table 5	**Service Component Reset GST (Guide to the Service Table)** **Version Number:** Range: 0...255, Incremented, if any of the entries is changed, Type: **<intunti>**		
#	**1**	**2**	**3**
Name:	Service Component Identification (SCID):	Service Component Reset Time Stamp	Application Specific Information for SCR
Transmission:	Mandatory (if SCR for this service component exists)	Mandatory (if SCR for this service component exists)	Optional
Element Structure:	**<intunti>** 1 Byte	**<time_t>;** 4 Bytes	**k * <byte>**
Explanation:		The SCR can be used as a tool by a service provider to clear previously received data for a particular service component	Needs to be defined in each application

9.2.6 Service Table accelerator

This component (Service Table accelerator) for the shortcut version number is repeated more often than the normal guide to the Service Tables. But this shall not reduce the repetition rate of all the other GSTs. The benefit is that the receiver saves time while checking the change of the guide to the Service Table.

The Service Table accelerator is an optional feature.

9.2.6.1 Repetition rate of the guide to the Service Tables

— A receiver cannot decode a service component until it has received the current fast tuning GST. It is therefore important that the fast tuning GST is repeated at a high repetition rate such that a receiver has a low set-up time for identification of a service component.

— The scanning time of the receiver for finding a service component will be greatly affected by the repetition rate of the fast tuning GST.

— The repetition rate for the GST should by fixed according to the needs of the service provider and the end-user. It also should take into account the bandwidth and capacity of the bearer system.

— All other tables are dependent on the fast tuning GST. Therefore their repetition rate should be set in relation to the repetition rate of the GST.

— The repetition rate of the GST is dependent on the types of application within the service. Some applications may require a higher rate of repetition than others.

EXAMPLE For an RTM application on a wide band bearer, the fast tuning GST may be repeated every second to allow for optimal receiver scanning functionality.

9.2.7 Guide to the Service Table 6 (Conditional Access Information Reference)

Service Table 6 is optional. The same SCID may never occur more than once within column 1 of this table.

Table 15 — Guide to Service Table 6 (Conditional Access Information Reference)

Table 6	**Conditional Access Information Reference GST (Guide to the Service Table)** **Version Number:** Range: 0..255, Incremented, if any of the entries is changed, Type: **<intunti>**	
#	**1**	**2**
Name:	Service Component Identification (SCID)	Reference to Service Component Identification (SCID) of CAI-Component (CAI-SCID)
Transmission:	Mandatory (if CAI-Reference is used)	Mandatory (if CAI-Reference is used)
Element Structure:	**<intunti>** 1 Byte	**<intunti>** 1 Byte

NOTE 1 If a CAI component is needed by all encrypted service components within a service, the SNI service component with an SCID of 0 is used in column one with the common CAI SCID in the second column.

NOTE 2 If there is no additional content in Table 6 related to a specific service component, it is not necessary to put this SCID into the table. Therefore, the total number of SCID entries in this table will be less than or equal to the number of SCID entries in the fast tuning Table.

9.2.8 Guide to the Service Table 7 (Versioning)

Service Table 7 is mandatory. The same SCID may never occur more than once within this table.

Table 16 — Guide to Service Table 7 (Versioning)

Table 7	**Versioning of TPEG Applications GST (Guide to the Service Table)** **Version Number:** Range: 0..255, Incremented, if any of the entries is changed, Type: **<intunti>**		
	1	**2**	**3**
Name:	Service Component Identification (SCID):	Major Version Number	Minor Version Number
Transmission:	Mandatory	Mandatory	Mandatory
Default:			
Element Structure:	**<intunti>** 1 Byte	**<intunti>** 1 Byte	**<intunti>** 1 Byte

This table lists IDs of all components which are contained in the TPEG Service. For each component the version number of the used TPEG Application is given in 2 bytes. The first byte shall signal the major version number whereas the second byte describes the minor version number. All backward compatible changes to the protocol shall result in the increment of the minor version number. All other changes will lead to an increment of the major version number.

9.3 Linkage information

9.3.1 Linkage information to the components of the same service

Table 17 — Linkage information to the components of the same service

1.	Name:	**Linkage information to the components of the same service**
2.	Function:	Gives information to find the same service components on the same or on another bearer
3.	Occurrence:	Optional, depends on the service provider
4.	Description:	Helps to find the same service components on the same bearer in the same network or on other bearers on other networks
5.	Format:	See coding section

Table	**Linkage Information to the Components of the same Service within the same Bearer and/or other Bearers** **Version Number:** Range: 0...255, Incremented, if any of the entries is changed, Type: **<intunti>**			
#	**1**	**2**	**3**	**4:**
Name:	Service Component Identifier (SCID): of the current service	Carrier Service Identification: (SID-A, SID-B, SID-C) of the linked service	Bearer and Linkage Info	Regionalisation flag:
Examples:	00	43.51.52	Internet: URL DVB: tba DARC: ECC SI m * fc DAB: ECC EID m * fc HD Radio: SIS m1 * (SIS, fm) m2 * (SIS, am)	
Transmission:	Mandatory	Mandatory	Optional	Optional
Default:			Current Bearer	Absent = Regionalisation flag not set Present = Regionalisation flag is set
Element Structure:	**<intunti>** 1 Byte	**3 * <intunti>** 3 Bytes	**<bearer_linkage_info>**	**<bit_switch>** 1 Bit

In general there are three instances where linkage will be used:

a) the same carrier service provider SID on a different bearer;

b) a different carrier service provider SID on the same bearer;

c) a different carrier service provider SID on a different bearer.

If the optional “bearer and linkage info” is not specified then the linked service is on the same bearer.

The carrier service identification of the linked service may be the same as that of the current service, in which case the “bearer and linkage info” will be used to specify an alternative bearer.

It is not recommended to use the current carrier service provider SID in this linkage function without a “bearer and linkage info” specified, since this would lead to linking to itself.

The following rules shall be applied:

— The same SCID may occur more than once within this table to indicate more than one alternative linkage on other services.

— Once a link to an alternative service is established, the ACID within the SNI of the linked service has to be compared to the ACID of the current service. If the ACIDs are identical, then the application's content is identical.

— The SCID of the current service and the SCID of the linked service are not necessarily the same. Once the ACID of the linked service has been confirmed as being the same as the current service, then the SCID of the linked service is found from the linked service's fast tuning guide to the Service Table.

Linkage of all service components at once is possible in two cases as follows:

i. Exactly the same service:

— If all components of the current service exist as a whole within another service, then the SCID 00 (SNI application) is used to link to the other service with the same content. The regionalisation flag shall be unset in this case.

— It is possible that the linked service has more components than the current service. What is important is that the linked service contains all components of the current service.

— Even though the components are present in both services, they may have different SCIDs.

ii. Regionalised service:

— If all applications of the current service exist as a whole within another service, but their contents are carried with suitably regionalised components, then the SCID 00 (SNI application) is used to link to the other service with the same content. The regionalisation flag shall be set in this case.

— It is possible that the linked service has more components than the current service. What is important is that the linked service contains all applications of the current service with suitably regionalised components.

— Even though the components are present in both services, they may have different SCIDs.

Linkage to an application component distributed by alternative carriers:

— The GST always gives the SID (A-B-C) of the originator of the service (explicit or implicit).

— The linkage table gives the SIDs (A-B-C) of the alternative carriers.

— The alternative carriers will signal the SIDs (A-B-C) of the originator in their GSTs, to allow the link to be confirmed.

9.3.1.1 Same service definition

TPEG, unlike other systems, allows splitting up a service into smaller packets, called service components so that the same service can be transmitted simultaneously on narrow band and on broadband bearers. As a result, a user may get *more, exactly the same* or *fewer* service components when switching from one channel to another. This increases the flexibility of the service provider, but at the same time makes the linkage procedure more complicated.

The definition of a *service* that is referenced with the linkage information table using the service component IDs:

— Exactly the same service:

  An SCID entry of 00*, with the regionalisation flag unset*, indicates that *exactly* the same service containing **exactly** the same components exists elsewhere, e.g. on another bearer.

— Regionalised service:

  An SCID entry of 00, *with the regionalisation flag set*, indicates that the *same* service containing **exactly** the same applications with a suitably **regionalised** set of components exists elsewhere, e.g. on another bearer.

— Superset of the same service:

  An SCID entry other than 00 indicates that the same service containing ***more*** components exists elsewhere, e.g. on another bearer.

— Subset of the same service:

  An SCID entry other than 00 indicates that the same service containing ***fewer*** components exists elsewhere, e.g. on another bearer.

All of this allows any linkage within the same bearer or to another bearer. The linkage is technically done by simply connecting the SCIDs of the current service with the SCIDs of the service that is linked to the current service.

9.3.2 Linkage information to the components of related services

Table 18 — Linkage information to the components of related services

1.	Name:	**Linkage information to the components of related services**
2.	Function:	Gives information to find related service components on the same or on another bearer
3.	Occurrence:	Optional, depends on the service provider
4.	Description:	Helps to find similar service components on the same bearer in the same network
5.	Format:	See coding section

Table	**Linkage information to the components of the related service within the same bearer and/or other bearers** **Version Number:** Range: 0...255, Incremented, if any of the entries is changed, Type: **<intunti>**							
#	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Name:	Service Component Ident. (SCID) of the current service	Carrier Service Ident. (SID-A, SID-B, SID-C) of the linked service	Originator Service Ident. (SID-A, SID-B, SID-C) of the linked application	Content ID of the linked application	Application ID of the linked application	Bearer and Linkage Info	Name of the related Service	Description of the related Application
Examples:	08	43.51.252	34.45.124	34	0014	Internet: URL DVB: tba DARC: ECC SI m * fc DAB: ECC EID m * fc HD Radio: SIS m1 * (SIS, fm) m2 * (SIS, am)	Swedish Radio	National Traffic Information
Trans-mission:	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Optional	Optional	Optional
Default:			Carrier Service Identif.			Current Bearer		
Element Structure:	**<intunti>** 1 Byte	**3 * <intunti>** 3 Bytes	**3 * <intunti>** 3 Bytes	**<intunti>** 1 Byte	**<intunli>** 2 Bytes	**<bearer_ linkage_info>**	**<short_ string>**	**<short_ string>**

NOTE The applications in the related services are not necessarily the same as those in the current service. The same SCID may occur more than once within this table to indicate more than one component of a related service. SCID = 00 is not allowed to be used here. It is only possible in the case for linkage to the components of the same service SCID = 00.

EXAMPLE A service provider may reference a weather application from a traffic application. There may be multiple references from any one SCID to related services.

9.4 Service Information Tables

This section describes the Service Information Tables.

The tables in this section have the same structure as the Guide to the Service Tables (every line in the table is identified by a SCID). The major difference with Guide to the Service Tables is the definition and usage of the version number.

9.4.1 Service Information Table 1 (Number of Messages)

Service Information Table 1 is optional. The same SCID may never occur more than once within this table.

Table 19 — Service Information Table 1 (Number of Messages)

SI Table 1	**Number of Messages (Service Information Table) SIT 1 Version Number:** Range: 0..255, Current GST 1 version number, Type: **<intunti>**	
	1	2
Name:	Service Component Identification (SCID):	Total number of messages:
Transmission:	Mandatory	Mandatory
Default:		
Element Structure:	**<intunti>** 1 Byte	**<intunlo>** 4 Bytes

9.4.1.1 Usage of GST 1 version number

The version in this table shall equal the version number in the corresponding GST 1 table. Consequently the version number will only change when the version number in the GST 1 table changes, either directly (change in GST 1 table) or indirectly (change in another GST table).

The version number in this Service Information Table shall therefore NOT change when any of the contained total number of messages changes.

10 Coding structure of basic features

10.1 Component frame

<component_frame>:=	: Service and network information application
<intunti>(scid)**,**	: Service component identifier (scid = 00)
<intunli>,	: Length of application data in bytes
<crc>,	: CRC, as defined in TPEG-SSF
	: Component data
<intunti>(n)**,**	: Number of components
n * <sni_component()>,	: SNI component
<crc>;	: SNI component CRC

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

The SNI component CRC is two bytes long, and is based on the ITU-T polynomial $x^{16} + x^{12} + x^5 + 1$. The SNI component CRC is calculated from all the bytes of the SNI component data (i.e. n*<sni_component>), including the “number of components” field.

The calculation of the CRC is described in Annex C of ISO/TS 18234-2:2006.

10.2 Service and network information component template

<sni_component(x)>:=	: SNI component template
<intunti>(id)**,**	: Component identifier (id)
<intunli>(n)**,**	: Length, n, of component data in bytes
n ***** **<byte>;**	: Component data

10.3 Definition of service information

10.3.1 Definition of service name and service description

<sni_component(00)>:=	: Current service information
<intunti>(id)**,**	: Component identifier (id = 00hex)
<intunli>(n)**,**	: Length, n, of component data in bytes
<short_string>,	: Service name
<short_string>;	: Service description

10.3.2 Coding of the service logo

The boxes below illustrate the proposed coding for the service logo. The **<graph_type>** is defined as a byte type that has the value defined by the graphic type selection table. The logo itself is transmitted as a certain amount of bytes and might be regarded as a data file. The maximum length is restricted by the length indicator **<intunli>**(n). In total the length of the **<sni_component(07)>** is the length of the graphic file plus four bytes.

<sni_component(07)>:=	: Service logo
<intunti>(id)**,**	: Component identifier (id = 07hex)
<intunli>(n)**,**	: Length, n, of component data in bytes
<graph_type>,	: Description of graphic type
n *<byte>;	: Content of graphic file

<graph_type>:=	: Graphic type
<intunti>;	: Entry number in graphics type selection table

Table 20 — Graphics type selection table

#	Type:	Description:
0	BMP	Windows Bitmap Format, defined by Microsoft
1	PNG	Portable Network Graphic Format, defined in ISO/IEC 15948
2	JPG	Joint Photographic Experts Group Format, defined in ISO/IEC 10918-1:1994
3	....	
...	...	
...	...	

NOTE Table 20 only contains three entries at present (regarded as the most useful formats by the drafting group). Nevertheless, this table can easily be enlarged in the future.

10.3.3 Subscriber information

<sni_component(0A)>:=	: Subscriber information
<intunti>(id)**,**	: Component identifier (id = 0Ahex))
<intunli>(n)**,**	: Length, n, of component data in bytes
n * **<byte>;**	: Byte field, information about tariffs and payments

10.3.4 Free text information

<sni_component(0B)>:=	: Free text information
<intunti>(id)**,**	: Component identifier (id = 0Bhex)
<intunli>(n)**,**	: Length, n, of component data in bytes
<short_string>;	: Additional information from the service provider

10.3.5 Help information

<sni_component(0C)>:=	: Help information
<intunti>(id)**,**	: Component identifier (id =0Chex)
<intunli>(n)**,**	: Length, n, of component data in bytes
<short_string>;	: Additional information from the service provider

10.4 Definition of the guide to the Service Tables

10.4.1 Guide to the Service Table 1 (fast tuning)

<sni_component(01)>:=	: Guide to Service Table 1
<intunti>(id)**,**	: Component identifier (id = 01hex)
<intunli>(n)**,**	: Length, n, of component data in bytes
<intunti>,	: Table incremental version number
<chartab>,	: Character table identifier
m ***** **<line_of_table_1>;**	: All, m, lines of the guide to Service Table 1

<line_of_table_1>:=		: One line of guide to the Service Table 1
<intunti>,		: Service component ID
<bit_switch>(selector)**,**		: Component elements supplied
		: Application and content ID (ACID)
if (selector = xxxxxxx1)		: Present only, when different from Carrier ServiceID
[		
<intunti>,		: Originator service ID-A
<intunti>,		: Originator service ID-B
<intunti>,		: Originator service ID-C
]		
<intunti>,		: Content ID
<intunli>,		: Application ID
if (selector = xxxxx1xx)	**<optime>,**	: Operating time
if (selector = xxxx1xxx)	**<intunti>,**	: Encryption indicator
if (selector = xxx1xxxx)	**<>;**	: Safety flag is set

10.4.2 Guide to the Service Table 2 (time schedule)

<sni_component(02)>:=	: Guide to Service Table 2
<intunti>(id)**,**	: Component identifier (id = 02hex)
<intunli>(n)**,**	: Length, n, of component data in bytes
<intunti>,	: Table incremental version number
m ***** **<line_of_table_2>;**	: All, m, lines of the guide to Service Table 2

<line_of_table_2>:=	: One line of guide to the Service Table 2
<intunti>,	: Service component ID
<time_slot>;	: Periodic time information

NOTE Although the periodic time information is optional, it is not necessary to use a bit switch function. If no time information exists, no line will be present.

10.4.3 Guide to the Service Table 3 (content description)

<sni_component(03)>:=	: Guide to Service Table 3
<intunti>(id)**,**	: Component identifier (id = 03hex)
<intunli>(n)**,**	: Length, n, of component data in bytes
<intunti>,	: Table incremental version number
m * **<line_of_table_3>;**	: All, m, lines of the guide to Service Table 3

<line_of_table_3>:=	: One line of guide to the Service Table 3
<intunti>,	: Service component ID
<short_string>;	: Content description

NOTE Although the content description is optional, it is not necessary to use a bit switch function. If no content description exists, no line will be present.

10.4.4 Guide to the Service Table 4 (geographical coverage)

<sni_component(04)>:=	: Guide to Service Table 4
<intunti>(id)**,**	: Component identifier (id = 04hex)
<intunli>(n)**,**	: Length, n, of component data in bytes
<intunti>,	: Table incremental version number
m * **<line_of_table_4>;**	: All, m, lines of the guide to Service Table 4

<line_of_table_4>:=	: One line of guide to the Service Table 4
<intunti>,	: Service component ID
<geo_cov_type>;	: Geographical coordinates

NOTE 1 The compound type **<geo_cov_type>** is defined in Clause 8 of this Technical Specification.

NOTE 2 Although the geographical coordinates are optional, it is not necessary to use a bit switch function. If no geographical coordinates exist, no line will be present.

10.4.5 Guide to the Service Table 5 (service component reset)

<sni_component(05)>:=	: Guide to Service Table 5
<intunti>(id)**,**	: Component identifier (id = 05hex)
<intunli>(n)**,**	: Length, n, of component data in bytes
<intunti>,	: Table incremental version number
m * **<line_of_table_5>;**	: All, m, lines of the guide to Service Table 5

<line_of_table_5>:=	: One line of guide to the Service Table 5
<intunti>,	: Service component ID
<time_t>,	: Time indicator, all data received before is invalid
<intunti>(k)**,**	: Number, k, counting the amount of bytes following
k * **<byte>;**	: Byte field defined by the specific application

NOTE 1 If k = 0, nothing follows. Then k is used as a terminator.

NOTE 2 Although the service component reset is optional, it is not necessary to use a bit switch function. If no service component reset exists, no line will be present.

10.4.6 Service Table accelerator

The coding for the Service Table accelerator is illustrated next:

<sni_component(06)>:=	: Service Table accelerator
<intunti>(id)**,**	: (Shortcut for table version number)
<intunli>(n)**,**	: Component identifier (id = 06hex) : Length, n, of component data = 1 byte (always)
<intunti>;	: Table incremental version number

10.4.7 Guide to the Service Table 6 (Conditional Access Information)

<sni_component(0D)>:=	: Guide to Service Table 6
<intunti>(id)**,**	: Component identifier (id = 0D hex)
<intunli>(n)**,**	: Length, n, of component data in bytes
<intunti>,	: Table incremental version number
m * **<line_of_table_6>;**	: All, m, lines of the Guide to Service Table 6

<line_of_table_6>:=	: One line of Guide to the Service Table 6
<intunti>,	: Service Component ID
<intunti>;	: Reference to CAI Service Component ID

NOTE Although the content description is optional, it is not necessary to use a bit switch function. If no content description exists, no line will be present.

10.4.8 Guide to the Service Table 7 (Versioning)

<sni_component(0E)>:=	: Guide to the Service Table 7
<intunti>(id)**,**	: Component identifier (id = 0E hex)
<intunli>(n)**,**	: Length, n, of component data in bytes
<intunti>,	: Table incremental version number
m * **<line_of_table_7>;**	: All, m, lines of the Guide to the Service Table 7

<line_of_table_7>:=	: One line of Guide to the Service Table 7
<intunti>,	: Service Component ID
<intunti>,	: Major Version Number
<intunti>;	: Minor Version Number

10.5 Definition of the linkage table to the same service components

<sni_component(08)>:=	: Linkage table to the same service components
<intunti>(id)**,**	: Component identifier (id = 08hex)
<intunli>(n)**,**	: Length, n, of component data in bytes
<intunti>,	: Table incremental version number
m * **<line_of_table_8>;**	: All, m, lines of the linkage table to the same service

<line_of_table_8>:=	: One line of linkage table to the same service
<intunti>,	: Service component ID
<bit_switch>(selector)**,**	: Component elements supplied
<intunti>,	: Carrier service ID-A
<intunti>,	: Carrier service ID-B
<intunti>,	: Carrier service ID-C
if (selector = xxxxxxx1)	
<bearer_linkage_info>,	: Bearer information
if (selector = xxxxxx1x) **<>;**	: Regionalisation flag is set

Bearer linkage and information type template

<bearer_linkage_info(x)>:=	: Bearer type and linkage info
<intunti>(id)**,**	: Bearer type identifier (id= x)
<intunli>(n)**,**	: Length, n, of data in bytes
n ***<byte>;**	

DAB bearer and linkage information

<bearer_linkage_info(00)>:=	: Bearer type and linkage info for DAB
<intunti>(id)**,**	: Bearer type identifier (id= 00hex)
<intunli>(n)**,**	: Length, n, of data in bytes
<intunti>,	: ECC (extended country code)
<intunli>,	: EID (ensemble Identification)
m* **<dab_frequency>;**	: m times frequency information

<dab_frequency>:=	: DAB frequency
<centre_freq>;	: Definition of the centre frequency

NOTE While being in a DAB ensemble, the TPEG service can be found by evaluating the FIC.

<centre_freq>:=	: Definition of the centre frequency
3 * **<intunti>;**	: 19 bits (b0 to b18) as defined in EN 300 401,
	: b19 to b23 filled with zeros
	: Carrier frequency = 0 Hz + (centre_freq * 16 kHz)

Internet bearer and linkage information

<bearer_linkage_info(01)>:=	: Bearer type and linkage info for Internet
<intunti>(id)**,**	: Bearer type identifier (id= 01hex)
<intunli>(n)**,**	: Length, n, of data in bytes
<long_string>;	: URL (Uniform Resource Locator) as defined in RFC 1738

DARC (Data Radio Channel) bearer and linkage information

<bearer_linkage_info(02)>:=	: Bearer type and linkage info for DARC
<intunti>(id)**,**	: Bearer type identifier (id= 02hex)
<intunli>(n)**,**	: Length, n, of data in bytes
<intunti>,	: ECC (extended country code)
<intunli>,	: DARC service identification
m ***** **<fm_frequency>;**	: m times frequency information

<fm_frequency>:=	: Frequency of the FM bearer carrying DARC
<intunti>;	: Definition of the frequency, same as in the RDS Standard : IEC 60106, 3.2.1.6, Table 10

DVB bearer and linkage information

<bearer_linkage_info(03)>:=	: Bearer type and linkage info for DVB
<intunti>(id)**,**	: Bearer type identifier (id= 03hex)
<intunli>(n)**,**	: Length, n, of data in bytes
tbd	: Frequency information
tbd	: Other information to be added according to the ETSI Standard.

HD Radio System bearer and linkage information

<bearer_linkage_info(0F)>:=	: Bearer type and linkage info for HD Radio broadcast
<intunti>(id)**,**	: Bearer type identifier (id= 0Fhex)
<intunli>(n)**,**	: Length, n, of data in bytes
<HD_Radio_Station_ID>,	: Transmitter HD Radio station for which a list of applicable alternate stations is given by the following lists of HD_FM_bearer _info and HD_AM_bearer_info entries
<intunti>(m1)**,**	: Number of HD_FM_bearer info fields that follow (may be 0)
m1 ***** **<HD_FM_bearer_info>,**	: m1 times HD FM bearer information
<intunti>(m2)**,**	: Number of HD_AM_bearer info fields that follow (may be 0)
m2 ***** **<HD_AM_bearer_info>;**	: m2 times HD AM bearer information

The HD_Radio_Station_ID datatype is defined as below by the HD Radio SIS message “Station ID number”. This SIS message with MSG ID 0000 is the HD Radio system equivalent of the DARC service identification [see iBiquity Digital Corporation, “HD Radio™ Air Interface Design Description Station Information Service Transport”, Doc. No. SY_IDD_1020s, Rev G (NRSC 5-B standard, available from http://www.nrscstandards.org/)].

<HD_Radio_station_ID>:=	: HD Radio Station Identification
<intunlo>	: HD Radio 32 bit SIS message “Station ID number” (SIS MSG ID 0000)

The HD_FM_bearer_info and HD_AM_bearer_info datatypes provide information on possible alternate HD Radio Stations on FM or AM frequencies respectively. These datatypes are defined as follows:

<HD_FM_bearer_info>:=	: Bearer type and linkage info for HD Radio broadcast
<HD_Radio_station_ID>,	: Station ID of alternate HD Radio Station
<fm_frequency>;	: FM frequency of alternate HD Radio station

<HD_AM_bearer_info>:=	: Bearer type and linkage info for HD Radio broadcast
<HD_Radio_station_ID>,	: Station ID of alternate HD Radio Station
<am_frequency>;	: AM frequency of alternate HD Radio station

The <HD_FM_bearer_info> consists of an HD Radio station ID number and an FM frequency code as defined in the RDS standard (see specification of **<fm_frequency>** below the DARC bearer_linkage_info section). The <HD_AM_bearer_info> consists of an HD Radio station ID number and now an AM frequency code as defined below.

The coding of the <am_frequency> field is defined as follows.

<am_frequency>:=	: Frequency code for HD Radio broadcast
<intunti>(n)**;**	:.Integer value in the range of 0-122 or 128-246, where: range 0-122 encodes AM frequencies for ITU region 1 and 3 as follows: f = n * 9kHz + 522kHz, *and*, range 128-246 encodes AM frequencies for ITU region 2 as follows: f = (n-128) * 10kHz + 530kHz

The HD Radio SIS message “Station ID number” (SIS MSG ID 0000) is the HD Radio identification of a Transmitter facility/frequency allocation, and as such more specific than e.g. the DARC service identification (or an RDS PI code) which can be the same on different (alternative) frequencies. A receiver, having obtained this information, can inspect the given frequencies, and compare the station identification parameter as provided with the HD_FM_bearer_info or HD_AM_bearer_info with the actually transmitted station ID number on this other FM or AM frequency. If they are the same, then the receiver can look for the invariably more slowly transmitted TPEG service parameters.

Multiple <HD_FM_bearer_info> and/or <HD_AM_bearer_info> fields within one <bearer_linkage_info(0F)> component allow for coding of service following information to all adjacent stations of the station ID given by the transmitter field. Multiple of such <bearer_linkage_info(0F)> components may be used to allow for fast service following within a dense network of TPEG services. For any transmitter as given by the HD Radio station ID field, only one <bearer_linkage_info(0F)> is allowed with a single SNI service component.

10.6 Definition of the linkage table to related service components

<sni_component(09)>:=	: Linkage table to the related service components
<intunti>(id)**,**	: Component identifier (id = 09hex)
<intunli>(n)**,**	: Length, n, of component data in bytes
<intunti>,	: Table incremental version number
m * **<line_of_table_9>;**	: All, m, lines of the linkage table to the related service : components

<line_of_table_9>:=	: One line of linkage table to the related service : components
<intunti>,	: Service component ID
<bit_switch>(selector)**,**	: Component elements supplied
<intunti>,	: Carrier service ID-A of the linked service
<intunti>,	: Carrier service ID-B of the linked service
<intunti>,	: Carrier service ID-C of the linked service
<intunti>,	: Originator service ID-A of the linked service
<intunti>,	: Originator service ID-B of the linked service
<intunti>,	: Originator service ID-C of the linked service
<intunti>,	: Content ID of the linked application
<intunli>,	: Application ID of the linked application
if (selector = xxxxxxx1)	
<bearer_linkage_info>,	: Bearer information
if (selector = xxxxxx1x)	
<short_string>,	: Name of the related service
if (selector = xxxxx1xx)	
<short_string>;	: Description of the related service

NOTE The **<bearer_linkage_info>** type is defined in 10.5.

10.7 Service Information Table 1 (Number of Messages)

<sni_component(21)>:=	: Service Information Table 1
<intunti>(id)**,**	: Component identifier (id = 21 hex)
<intunli>(n)**,**	: Length, n, of component data in bytes
<intunti>,	: Guide to the Service Table 1 version number
m * **<line_of_si_table_1>;**	: All, m, lines of the Service Information Table 1

<line_of_si_table_1>:=	: One line of Service Information Table 1
<intunti>,	: Service Component ID
<intunlo>;	: Total number of messages in service component (including cancellations)

The total number of messages in the service component shall be the total that is currently in the notional carousel being transmitted in the service component stream, which a client device can be expected to receive before the service provider changes the carousel.

Bibliography

[1] ISO/IEC 7498-1, *Information technology — Open Systems Interconnection — Basic Reference Model: The Basic Model*

[2] ISO 10918-1:1994, *Information technology — Digital compression and coding of continuous-tone still images: Requirements and guidelines*

[3] ISO/IEC 15948, *Information technology — Computer graphics and image processing — Portable Network Graphics (PNG): Functional specification*

[4] ISO/TS 18234-4, *Traffic and Travel Information (TTI) — TTI via Transport Protocol Expert Group (TPEG) data-streams — Part 4: Road Traffic Message (RTM) application*

[5] IEC 60106, Ed. 2.0, *Recommended methods of measurement of radiated and conducted interference from receivers for amplitude modulation, frequency-modulation and television broadcast transmissions*

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

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

[8] ETSI EN 300 751, *Radio broadcasting systems; System for Wireless Infotainment Forwarding and Teledistribution (SWIFT)*

[9] IEC 62106, *Specification of the radio data system (RDS) for VHF/FM sound broadcasting in the frequency range from 87,5 to 108,0 MHz*

[10] iBiquity Digital Corporation, *HD Radio™ Air Interface Design Description Station Information Service Transport,* Doc. No. SY_IDD_1020s, Rev G, February 28, 2008 (NRSC 5-B standard, available from: http://www.nrscstandards.org/) [6)]

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