R&S®SMCVB-KS11
DAB+ Streams
User Manual

1179265402
Version 04

ROHDE&SCHWARZ
Make ideas real

This document describes the following software option:

- R&S®SMCVB-KS11 DAB+ Streams (1434.4938.xx)

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1179.2654.02 | Version 04 | R&S®SMCVB-KS11

Throughout this document, R&S® is indicated as R&S.

Contents

1 Welcome to the R&S SMCVB-KS11 option

The R&S SMCVB-KS11 is a stream library that provides stream files in accordance with the DAB+ digital standard.

This user manual contains a reference description of the functionality that the stream library provides. All functions not discussed in this manual are described in the R&S SMCV100B user manual. The latest version is available at:

www.rohde-schwarz.com/manual/SMCV100B

1.1 Key features

The R&S SMCVB-KS11 features:

- Numerous stream files in accordance with DAB+ digital standard
- Streaming of high-quality video contents
- Streaming of high-quality audio contents
- Efficient use with dedicated streams

1.2 Installation

Required options

The equipment layout for processing files of waveform libraries includes:

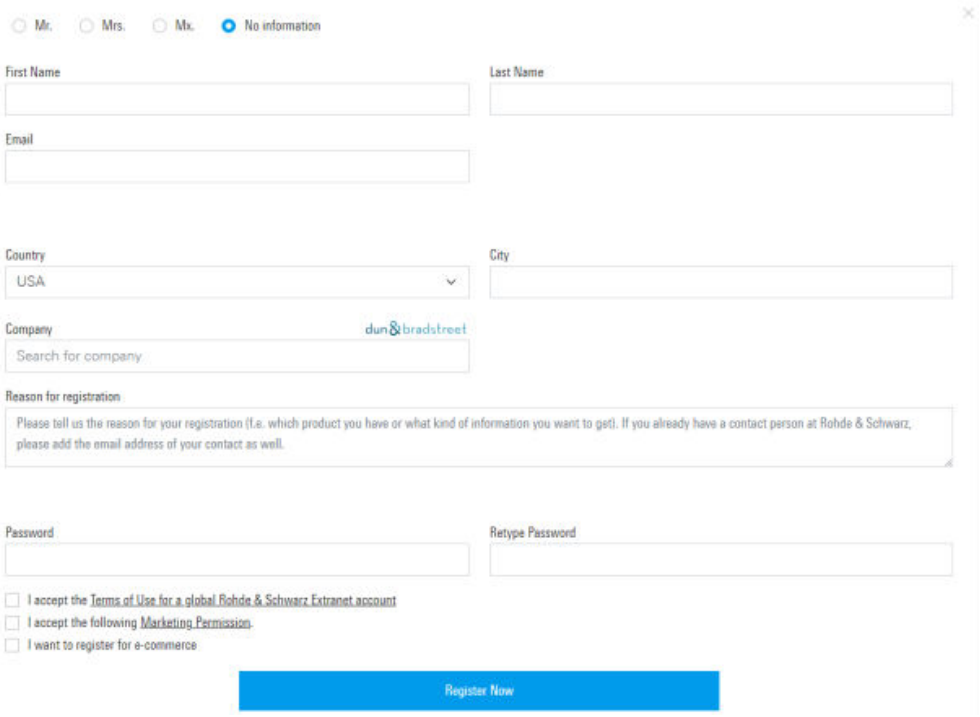
- R&S SMCV100B base unit (64 MSample ARB memory, 60 MHz RF bandwidth)
- Broadcast standard option for the "TS Player" application (R&S SMCVB-Kxxx)
- Enable Broadcast Standards option (R&S SMCVB-K519)
- Stream library option (R&S SMCVB-KSxx)

For more information on stream options, see chapter "TS Player section "Required options" in the broadcast standard option user manual of the R&S SMCV100B.

To register for access to the libraries

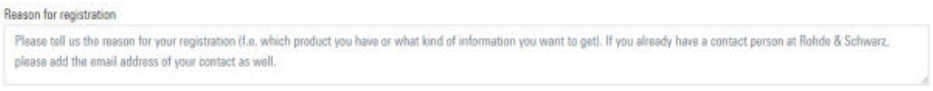
R&S SMCV100B stream and waveform libraries are available for download for registered users on the "Vector Signal Generator Customer Web" at the global Rohde & Schwarz information system (GLORIS).

1. For access, register at https://gloris.rohde-schwarz.com:
   In the section "How to register", follow the instructions provided in the introduction video "How to register for GLORIS".
2. Register to GLORIS with the creation of a personal account.

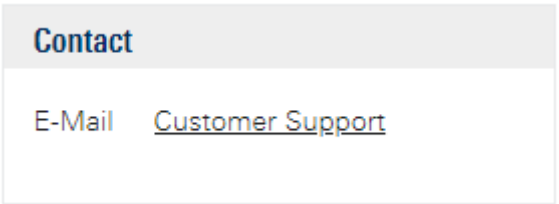


3. For access to the "Vector Signal Generator Customer Web", provide the following information:
   - Specify that you want access to the "Vector Signal Generator Customer Web".
   - Include the material number and serial number of your device.
     The label is located on the rear panel of the R&S SMCV100B.

   a) When using a new GLORIS account, fill the information in the "Reason for registration" field.

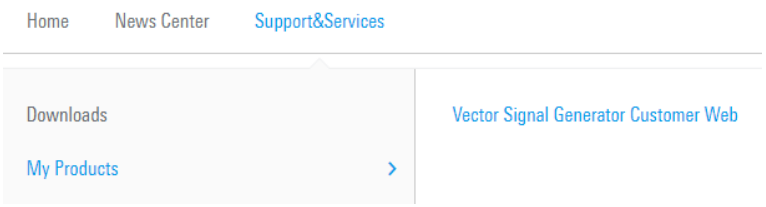


   b) When using an existing GLORIS account, click "Customer support" and fill in the information into an email.



To access "Product Related Documents"

1. Log in to GLORIS.
2. In the menu bar, select "Support&Services > My Products > Vector Signal Generator Customer Web".



The "R&S SMCV100B Customer Web" page opens.

3. In the selection field "Product Selection for VSG", select "R&S®SMCV100B".

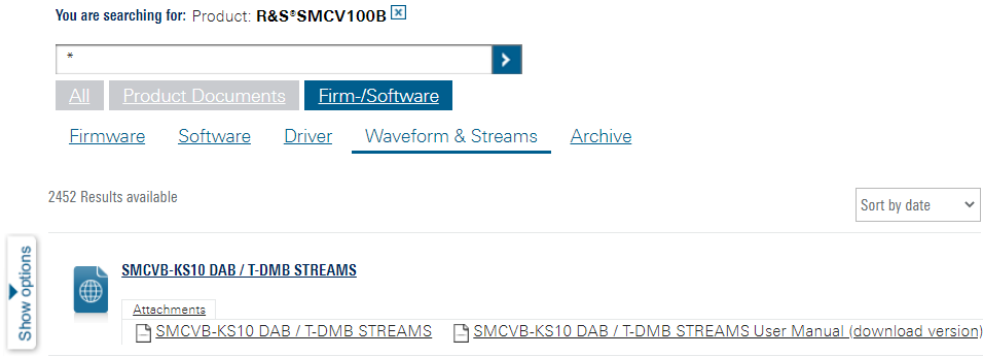
   A webpage opens and displays search results for products related to the R&S SMCV100B.

To download a library file

This procedure describes how to download library files. It provides a step-by-step description for download of a stream library file. The download of waveform library files is analogous.

1. Access the "Product Related Documents" webpage as described in "To access "Product Related Documents"" on page 8.
2. In the search navigation bar, select "Firm-/Software" > "Waveform & Streams".

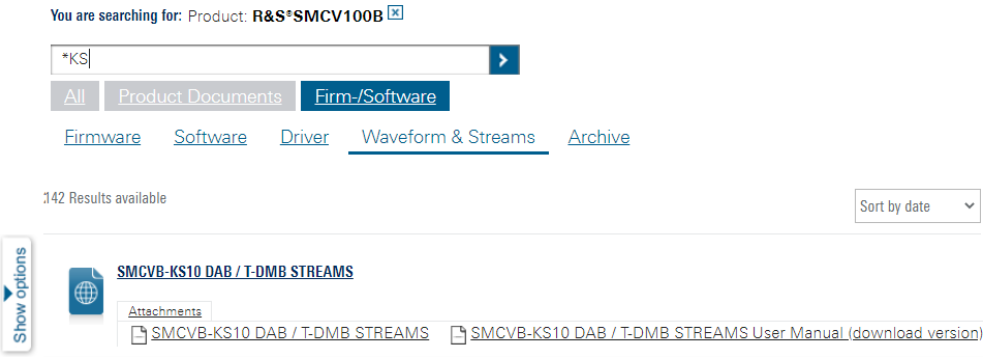
   The search lists all information related to stream and waveform libraries of the R&S SMCV100B:
   - R&S SMCVB-KSxx results relate to stream libraries.
   - R&S SMCVB-KVxx results relate to waveform libraries.



3. Optionally, deactivate the filtering to display all waveform and stream library content.

   a) On the left menu, select "Show options".
   b) Click "Filtering on. Reset all filters.".

4. Optionally, to filter for stream library content enter **KS* in the search input field.



5. In the search result list, navigate to the required library.
6. To download required library files, click the download link in the "Attachments" section of the library product page.
   For example, for DAB/T-DMB streams, click the download link "R&S SMCVB-KS10 DAB / T-DMB STREAMS".

   A download dialog opens to select and save files of the stream library.

To save a library file

► Save the library file to one of the following storage locations:
- External storage device (HDD, memory stick): Use an external USB storage device to save large files or complete libraries. Connect the storage device to one of the USB 3.0 connectors on the rear panel of the R&S SMCV100B. If detected correctly, you can access the files on the R&S SMCV100B in the `/usb/` directory in the file-select dialogs.

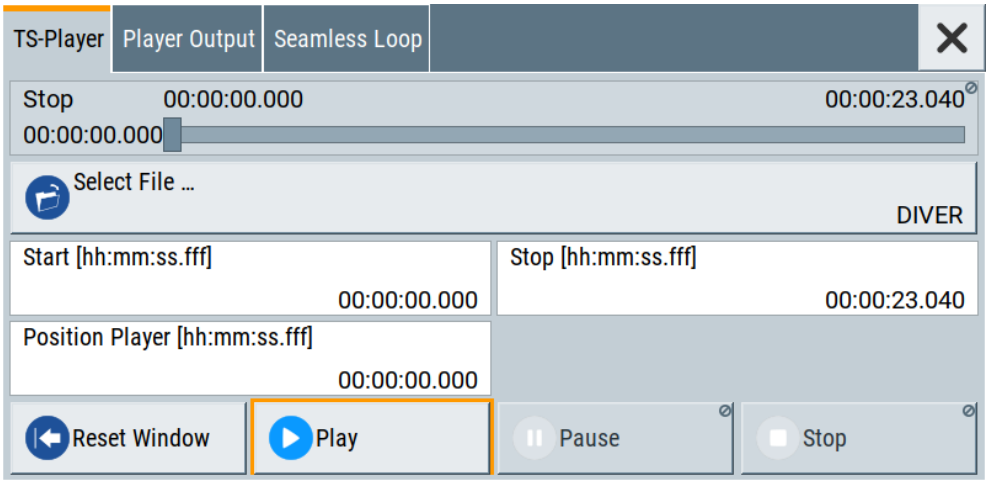
The R&S SMCV100B supports the following storage formats: ext2/ext3/ext4, FAT16/FAT32, NTFS (read-only), ISO9660, UDF

- Internal memory (SSD): Use the internal memory to save single files to the user directory `/var/user/` of the R&S SMCV100B, for example, using FTP via a LAN connection.

To load and play a stream library file

1. Load the file from its storage location:
   - External storage device (HDD, memory stick): Load the file from the `/usb/` directory.
   - Internal memory (SSD): Load the file from the user directory `/var/user/`

   Note: Library files are encrypted files. Loading the library file at the R&S SMCV100B requires installation of the corresponding library option. See "Required options" on page 7.
2. To load the file at the R&S SMCV100B, open the "TS Player" application in digital broadcast standard ("<Broadcast_Standard>") dialogs:
   a) Select "Baseband" > "<Broadcast_Standard>" > "Input Signal".
   b) Select "Source" > "TS Player".
   c) Select "TS Player" button.
   d) Select "Select File".
3. To select the file, navigate to the storage location (1).
4. Select "TS-Player" > "Play".



The R&S SMCV100B processes the stream file.

5. Select "<Broadcast_Standard>" > "State" > "On", to activate the baseband signal.
6. In the block diagram, select "RF" > "On".

   The stream file is modulated onto the RF carrier and output at the "RF 50 Ω" connector.

For more information on loading stream files, see chapter "How to generate an internal TS sinal" in the broadcast standard option user manual of the R&S SMCV100B.

1.3 What's new

Compared to the previous version the documentation provides updated installation instructions to access, download and play waveform library files, see Chapter 1.2, "Installation", on page 7.

1.4 Documentation overview

This section provides an overview of the R&S SMCV100B user documentation. Unless specified otherwise, you find the documents at:

www.rohde-schwarz.com/manual/smcv100b

1.4.1 Getting started manual

Introduces the R&S SMCV100B and describes how to set up and start working with the product. Includes basic operations, typical measurement examples, and general information, e.g. safety instructions, etc. A printed version is delivered with the instrument.

1.4.2 User manuals and help

Separate manuals for the base unit and the software options are provided for download:

- Base unit manual
  Contains the description of all instrument modes and functions. It also provides an introduction to remote control, a complete description of the remote control commands with programming examples, and information on maintenance, instrument interfaces and error messages. Includes the contents of the getting started manual.
- Software option manual
  Contains the description of the specific functions of an option. Basic information on operating the R&S SMCV100B is not included.

The contents of the user manuals are available as help in the R&S SMCV100B. The help offers quick, context-sensitive access to the complete information for the base unit and the software options.

All user manuals are also available for download or for immediate display on the internet.

1.4.3 Service manual

Describes the performance test for checking compliance with rated specifications, firmware update, troubleshooting, adjustments, installing options and maintenance.

The service manual is available for registered users on the global Rohde & Schwarz information system (GLORIS):

https://gloris.rohde-schwarz.com

1.4.4 Instrument security procedures

Deals with security issues when working with the R&S SMCV100B in secure areas. It is available for download on the internet.

1.4.5 Printed safety instructions

Provides safety information in many languages. The printed document is delivered with the product.

1.4.6 Specifications and product brochures

The specifications document, also known as the data sheet, contains the technical specifications of the R&S SMCV100B. It also lists the firmware applications and their order numbers, and optional accessories.

The brochure provides an overview of the instrument and deals with the specific characteristics.

See www.rohde-schwarz.com/brochure-datasheet/smcv100b

1.4.7 Calibration certificate

The document is available on https://gloris.rohde-schwarz.com/calcert. You need the device ID of your instrument, which you can find on a label on the rear panel.

1.4.8 Release notes and open source acknowledgment

The release notes list new features, improvements and known issues of the current software version, and describe the software installation.

The software uses several valuable open source software packages. An open source acknowledgment document provides verbatim license texts of the used open source software.

www.rohde-schwarz.com/firmware/smcv100b

1.4.9 Application notes, application cards, white papers, etc.

These documents deal with special applications or background information on particular topics.

For some application sheets, see also:

www.rohde-schwarz.com/application/smcv100b

1.4.10 Videos

Find various videos on Rohde & Schwarz products and test and measurement topics on YouTube: https://www.youtube.com/@RohdeundSchwarz

2 Available stream files

This chapter contains a description of the available stream files.

2.1 DAB+ audio variety (eti1_file.dabp_c)

2.1.1 Purpose

This ETI file contains several DAB+ audio streams and program services that use these audio streams. Different protection levels (all EEP A) are used. DAB+ audio is used as primary service component or as a secondary audio service component. Some streams use MPEG Surround. One stream uses PAD.

These tests allow you to determine, if the following applies:

- The decoder is able to process DAB+ at different bit rates / protection levels.
- The decoder is able to evaluate and present DAB services correctly. DAB+ is the primary and/or secondary audio service component.
- MPEG Surround is supported.
- X-PAD data can be extracted from a DAB+ stream.

The "data service" ETI file also provides a data service with DAB+ audio as a secondary service component.

2.1.2 General ensemble information

Ensemble label	'DAB+·variety' (abbreviated label: 'DAB+·var'; flag field 0xff00; character set EBU basic core)
Ensemble identifier	0xdab1
Transmission mode	1
Ensemble country	Germany (D) (ecc and country code: e0d)
International table for PTy codes	All countries, except for North America
Ensemble time zone	Europe/Berlin
DAB time format (FIG0/10)	Long-form version

2.1.3 Service information

Table 2-1: Service 1 ('192kbps PL1 Surr')

Service label	'192kbps·PL1·Surr' (abbreviated label: '192PL1·S'; flag field 0xe0f8; character set EBU basic core)
Service identifier	0xd07b (audio service)
Program type (PTy)	Information (PTy code 3; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Speech (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 1
SCIDS	0 (automatically assigned)

Table 2-2: Service 2 ('192kbps PL3 Ster')

Service label	'192kbps·PL3·Ster' (abbreviated label: '192PL3··'; flag field 0xe0e0; character set EBU basic core)
Service identifier	0xd07c (audio service)
Program type (PTy)	Leisure (PTy code 23; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Park scene (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 2
SCIDS	0 (automatically assigned)

Table 2-3: Service 3 ('160kbps PL3 Ster')

Service label	'160kbps·PL3·Ster' (abbreviated label: '160PL3··'; flag field 0xe0e0; character set EBU basic core)
Service identifier	0xd07d (audio service)
Program type (PTy)	Serious Classical (PTy code 14; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Bach (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 3
SCIDS	0 (automatically assigned)

Table 2-4: Service 4 ('128kbps PL3 Surr')

Service label	'128kbps·PL3·Surr' (abbreviated label: '128PL3·S'; flag field 0xe0f8; character set EBU basic core)
Service identifier	0xd07e (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Frequency sweep (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 4
SCIDS	0 (automatically assigned)

Table 2-5: Service 5 ('96kbps PL4 Surr')

Service label	'·96kbps·PL4·Surr' (abbreviated label: '·96PL4·S'; flag field 0xe0f8; character set EBU basic core)
Service identifier	0xd07f (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Different sines on each channel (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 5
SCIDS	0 (automatically assigned)

Table 2-6: Service 6 ('96kbps PL3 Mono')

Service label	'·96kbps·PL3·Mono' (abbreviated label: '·96PL3·M'; flag field 0xe0f8; character set EBU basic core)
Service identifier	0xd080 (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	16 tone (mono) (audio: live source or play list)
Service component carried in	Stream 6
SCIDS	0 (automatically assigned)
PAD data	SLS PAD1 (Application: MOT Slideshow)DLS PAD1 (Application: Dynamic labels)Journaline PAD1 (Application: Journaline(R))

Table 2-7: Service 7 ('48kbps PL4 Ster')

Service label	'·48kbps·PL4·Ster' (abbreviated label: '·48PL4··'; flag field 0xe0e0; character set EBU basic core)
Service identifier	0xd081 (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Sine 10 kHz (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 7
SCIDS	0 (automatically assigned)

Table 2-8: Service 8 ('Secondary SCs')

Service label	'Secondary·SCs' (abbreviated label: 'Secondar'; flag field 0xff00; character set EBU basic core)
Service identifier	0xd082 (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Speech (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 1
SCIDS	0 (automatically assigned)
Service component label	'192kbps·PL1·Surr' (abbreviated label: '192PL1·S'; flag field 0xe0f8; character set EBU basic core)
Secondary service component 1	Park scene (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 2
SCIDS	1 (automatically assigned)
Service component label	'192kbps·PL3·Ster' (abbreviated label: '192PL3··'; flag field 0xe0e0; character set EBU basic core)
Secondary service component 2	Bach (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 3
SCIDS	2 (automatically assigned)

Service component label	'160kbps·PL3·Ster' (abbreviated label: '160PL3··'; flag field 0xe0e0; character set EBU basic core)
Secondary service component 3	Frequency sweep (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 4
SCIDS	3 (automatically assigned)
Service component label	'128kbps·PL3·Surr' (abbreviated label: '128PL3·S'; flag field 0xe0f8; character set EBU basic core)
Secondary service component 4	Different sines on each channel (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 5
SCIDS	4 (automatically assigned)
Service component label	'·96kbps·PL4·Surr' (abbreviated label: '·96PL4·S'; flag field 0xe0f8; character set EBU basic core)
Secondary service component 5	16 tone (mono) (audio: live source or play list)
Service component carried in	Stream 6
SCIDS	5 (automatically assigned)
PAD data	SLS PAD1 (Application: MOT Slideshow)DLS PAD1 (Application: Dynamic labels)Journaline PAD1 (Application: Journaline(R))
Service component label	'·96kbps·PL3·Mono' (abbreviated label: '·96PL3·M'; flag field 0xe0f8; character set EBU basic core)
Secondary service component 6	Sine 10 kHz (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 7
SCIDS	6 (automatically assigned)
Service component label	'·48kbps·PL4·Ster' (abbreviated label: '·48PL4··'; flag field 0xe0e0; character set EBU basic core)

2.1.4 Stream information

Table 2-9: Stream 1

Subchannel mode	Audio
Bit rate	192 kbps (288 CUs)
Protection level	EEP 1-A

Subchannel identifier	2 (automatically assigned)
Service component	Speech (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component used by	Audio (program) service '192kbps PL1 Surr' (primary service component)Audio (program) service 'Secondary SCs ' (primary service component '192kbps PL1 Surr')

Table 2-10: Stream 2

Subchannel mode	Audio
Bit rate	192 kbps (144 CUs)
Protection level	EEP 3-A
Subchannel identifier	1 (automatically assigned)
Service component	Park scene (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component used by	Audio (program) service '192kbps PL3 Ster' (primary service component)Audio (program) service 'Secondary SCs ' (secondary service component '192kbps PL3 Ster')

Table 2-11: Stream 3

Subchannel mode	Audio
Bit rate	160 kbps (120 CUs)
Protection level	EEP 3-A
Subchannel identifier	0 (automatically assigned)
Service component	Bach (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component used by	Audio (program) service '160kbps PL3 Ster' (primary service component)Audio (program) service 'Secondary SCs ' (secondary service component '160kbps PL3 Ster')

Table 2-12: Stream 4

Subchannel mode	Audio
Bit rate	128 kbps (96 CUs)
Protection level	EEP 3-A
Subchannel identifier	3 (automatically assigned)

Service component	Frequency sweep (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component used by	Audio (program) service '128kbps PL3 Surr' (primary service component)Audio (program) service 'Secondary SCs ' (secondary service component '128kbps PL3 Surr')

Table 2-13: Stream 5

Subchannel mode	Audio
Bit rate	96 kbps (48 CUs)
Protection level	EEP 4-A
Subchannel identifier	4 (automatically assigned)
Service component	Different sines on each channel (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component used by	Audio (program) service '96kbps PL4 Surr' (primary service component)Audio (program) service 'Secondary SCs ' (secondary service component '96kbps PL4 Surr')

Table 2-14: Stream 6

Subchannel mode	Audio
Bit rate	96 kbps (72 CUs)
Protection level	EEP 3-A
Subchannel identifier	5 (automatically assigned)
Service component	16 tone (mono) (audio: live source or play list)
Service component used by	Audio (program) service '96kbps PL3 Mono' (primary service component)Audio (program) service 'Secondary SCs ' (secondary service component '96kbps PL3 Mono')
X-PAD service component	SLS PAD1 (Application: MOT Slideshow)
Bit rate	8000 bps
X-PAD apptype	12 (automatically assigned)
X-PAD service component	DLS PAD1 (Application: Dynamic labels)
Bit rate	200 bps
X-PAD apptype	2 (automatically assigned)
X-PAD service component	Journaline PAD1 (Application: Journaline(R))

Bit rate	6000 bps
Content providers	Fraunhofer Research News PAD1: 6000 bps
X-PAD apptype	4 (automatically assigned)

Table 2-15: Stream 7

Subchannel mode	Audio
Bit rate	48 kbps (24 CUs)
Protection level	EEP 4-A
Subchannel identifier	13 (automatically assigned)
Service component	Sine 10 kHz (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component used by	Audio (program) service '48kbps PL4 Ster' (primary service component)Audio (program) service 'Secondary SCs ' (secondary service component '48kbps PL4 Ster')

2.1.5 Expected receiver behavior

The recording comprises 25000 DAB frame (10 minutes). If the ETI player loops around, a dropout occurs.

2.1.5.1 Audio service "192 kbps PL1 surr"

Every DAB+ decoder must be able to extract and play the stereo core of the signal.

Every DAB+ decoder including MPEG Surround must be able to extract and play the surround signal. The encoded speech starts in the center speaker, then moves to the front left, back left, back right and front right speaker. The recording also contains some background noise (e.g., shuffling of papers) coming from some sources.

The audio parameters are: DAB+, 192 kbps, stereo, 48 kHz, no SBR, 5.1 MPEG Surround with 5.1 output channels.

2.1.5.2 Audio service "192 kbps PL3 ster"

Every DAB+ decoder must be able to extract and play the stereo core of the signal (park scene).

The audio parameters are: DAB+, 192 kbps, stereo, 48 kHz, no SBR, no MPEG Surround.

2.1.5.3 Audio service "160 kbps PL3 ster"

Every DAB+ decoder must be able to extract and play the stereo core of the signal (classical music).

The audio parameters are: DAB+, 160 kbps, stereo, 48 kHz, no SBR, no MPEG Surround.

2.1.5.4 Audio service "128 kbps PL3 surr"

Every DAB+ decoder must be able to extract and play the stereo core of the signal (frequency sweep from 20 Hz to 20 kHz).

Every DAB+ decoder including MPEG Surround must be able to extract and play the surround signal.

The audio parameters are: DAB+, 128 kbps, stereo, 48 kHz, no SBR, MPEG Surround with 5.1 output channels.

2.1.5.5 Audio service "96 kbps PL3 surr"

Every DAB+ decoder must be able to extract and play the stereo core of the signal.

Every DAB+ decoder including MPEG Surround must be able to extract and play the surround signal. The audio comprises several sines: center speaker (440 Hz), front left (880 Hz), back left (1760 Hz), back right (3520 Hz), front right (7040 Hz); LFE (80 Hz)

The audio parameters are: DAB+, 96 kbps, stereo, 48 kHz, no SBR, MPEG Surround with 5.1 output channels.

2.1.5.6 Audio service "96 kbps PL3 mono"

This audio stream also contains PAD data: Dynamic Labels, Slideshow and Journaline®.

Every DAB+ decoder must be able to extract and play the mono core of the signal (16 tones).

Every Dynamic Label decoder must be able to extract and present the encoded Dynamic Labels.

Every Slideshow decoder must be able to extract and present the encoded slides.

Every Journaline®. decoder must be able to extract and present the encoded Journaline® data.

A more detailed test of the data services is covered by ETI file "Data services".

The audio parameters are: DAB+, 96 kbps, mono, 32 kHz, no SBR, no MPEG Surround.

2.1.5.7 Audio service "48 kbps PL4 ster"

Every DAB+ decoder must be able to extract and play the stereo core of the signal (10 kHz sine).

The audio parameters are: DAB+, 48 kbps, stereo, 48 kHz, SBR, no MPEG Surround.

Audio service "Secondary SCs"

This service has 7 secondary service components. The Service Components and their Service Component Labels are equal to the Services mentioned before.

Every DAB+ receiver must be able to select this service and then to select any of its Service Components. The user must get an indication which service and which service component is played.

2.2 DAB DAB+ audio mix (eti2_file.dabp_c)

2.2.1 Purpose

This ETI file contains several DAB+ and MPEG audio layer II audio streams and program services that use these audio streams.

These tests allow you to determine, if the following applies:

- The receiver is able to handle ensembles with both DAB+ and MPEG audio layer II.
- The decoder is able to decode DAB+ from 192 kbps (maximum) down to 24 kbps.

2.2.2 General ensemble information

Ensemble label	'DAB/DAB+·mix' (abbreviated label: 'DAB/DAB+'; flag field 0xff00; character set EBU basic core)
Ensemble identifier	0xdab2
Transmission mode	1
Ensemble country	Germany (D) (ecc and country code: e0d)
International table for PTy codes	All countries, except for North America
Ensemble time zone	Europe/Berlin
DAB time format (FIG0/10)	Long-form version

2.2.3 Service information

Table 2-16: Service 1 ('192kbps DAB+')

Service label	'192kbps·DAB+' (abbreviated label: '192·DAB+'; flag field 0xe1f0; character set EBU basic core)
Service identifier	0xd07e (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Frequency sweep stereo (audio: live source or play-list)
Service component carried in	Stream 1
SCIDS	0 (automatically assigned)

Table 2-17: Service 2 ('64kbps DAB+')

Service label	'64kbps·DAB+' (abbreviated label: '64·DAB+'; flag field 0xe1f0; character set EBU basic core)
Service identifier	0xd080 (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Sine 1 kHz/-6 dB (audio: live source or playlist)
Service component carried in	Stream 7
SCIDS	0 (automatically assigned)

Table 2-18: Service 3 ('40kbps DAB+')

Service label	'40kbps·DAB+' (abbreviated label: '40·DAB+'; flag field 0xe1f0; character set EBU basic core)
Service identifier	0xd081 (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Sines (stereo) (audio: live source or playlist)
Service component carried in	Stream 5
SCIDS	0 (automatically assigned)

Table 2-19: Service 4 ('96kbps DAB+')

Service label	'96kbps·DAB+' (abbreviated label: '96·DAB+'; flag field 0xe1f0; character set EBU basic core)
Service identifier	0xd07f (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Sine 10 kHz (audio: live source or playlist)
Service component carried in	Stream 6
SCIDS	0 (automatically assigned)

Table 2-20: Service 5 ('192kbps L II')

Service label	'192kbps·L·II' (abbreviated label: '192·L·II'; flag field 0xe1f0; character set EBU basic core)
Service identifier	0xd07b (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Synthetic audio 1 (audio: live source or playlist)
Service component carried in	Stream 2
SCIDS	0 (automatically assigned)

Table 2-21: Service 6 ('128kbps L II')

Service label	'128kbps·L·II' (abbreviated label: '128·L·II'; flag field 0xe1f0; character set EBU basic core)
Service identifier	0xd07d (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Synthetic audio 3 (audio: live source or playlist)
Service component carried in	Stream 4
SCIDS	0 (automatically assigned)

Table 2-22: Service 7 ('160kbps L II')

Service label	'160kbps·L·II' (abbreviated label: '160·L·II'; flag field 0xe1f0; character set EBU basic core)
Service identifier	0xd07c (audio service)

Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Synthetic audio 2 (audio: live source or playlist)
Service component carried in	Stream 3
SCIDS	0 (automatically assigned)

Table 2-23: Service 8 ('24kbps DAB+')

Service label	'24kbps·DAB+' (abbreviated label: '24·DAB+'; flag field 0xe1f0; character set EBU basic core)
Service identifier	0xd082 (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Sine 100 Hz (audio: live source or playlist)
Service component carried in	Stream 8
SCIDS	0 (automatically assigned)

2.2.4 Stream information

Table 2-24: Stream 1

Subchannel mode	Audio
Bit rate	192 kbps (144 CUs, starting at CU 0)
Protection level	EEP 3-A
Subchannel identifier	0 (automatically assigned)
Service component	Frequency sweep stereo (audio: live source or playlist)
Audio configuration	DAB+ (stereo, 48 kHz, SBR off, no MPEG Surround)
Service component used by	Audio (program) service '192kbps DAB+' (primary service component)

Table 2-25: Stream 2

Subchannel mode	Audio
Bit rate	192 kbps (140 CUs, starting at CU 144)
Protection level	UEP 3

Subchannel identifier	1 (automatically assigned)
Service component	Synthetic audio 1 (audio: live source or playlist)
Audio configuration	MPEG audio layer II (stereo, 48 kHz, no MPEG Surround)
Service component used by	Audio (program) service '192kbps L II' (primary service component)

Table 2-26: Stream 3

Subchannel mode	Audio
Bit rate	160 kbps (116 CUs, starting at CU 284)
Protection level	UEP 3
Subchannel identifier	2 (automatically assigned)
Service component	Synthetic audio 2 (audio: live source or playlist)
Audio configuration	MPEG audio layer II (stereo, 48 kHz, no MPEG Surround)
Service component used by	Audio (program) service '160kbps L II' (primary service component)

Table 2-27: Stream 4

Subchannel mode	Audio
Bit rate	128 kbps (96 CUs, starting at CU 400)
Protection level	UEP 3
Subchannel identifier	3 (automatically assigned)
Service component	Synthetic audio 3 (audio: live source or playlist)
Audio configuration	MPEG audio layer II (joint stereo (intensity stereo), 48 kHz, no MPEG Surround)
Service component used by	Audio (program) service '128kbps L II' (primary service component)

Table 2-28: Stream 5

Subchannel mode	Audio
Bit rate	40 kbps (30 CUs, starting at CU 496)
Protection level	EEP 3-A
Subchannel identifier	4 (automatically assigned)
Service component	Sines (stereo) (audio: live source or playlist)

Audio configuration	DAB+ (stereo, 48 kHz, SBR off, no MPEG Surround)
Service component used by	Audio (program) service '40kbps DAB+' (primary service component)

Table 2-29: Stream 6

Subchannel mode	Audio
Bit rate	96 kbps (72 CUs, starting at CU 526)
Protection level	EEP 3-A
Subchannel identifier	5 (automatically assigned)
Service component	Sine 10 kHz (audio: live source or playlist)
Audio configuration	DAB+ (stereo, 48 kHz, SBR off, no MPEG Surround)
Service component used by	Audio (program) service '96kbps DAB+' (primary service component)

Table 2-30: Stream 7

Subchannel mode	Audio
Bit rate	64 kbps (48 CUs, starting at CU 598)
Protection level	EEP 3-A
Subchannel identifier	6 (automatically assigned)
Service component	Sine 1 kHz/-6 dB (audio: live source or playlist)
Audio configuration	DAB+ (stereo, 48 kHz, SBR off, no MPEG Surround)
Service component used by	Audio (program) service '64kbps DAB+' (primary service component)

Table 2-31: Stream 8

Subchannel mode	Audio
Bit rate	24 kbps (18 CUs, starting at CU 646)
Protection level	EEP 3-A
Subchannel identifier	7 (automatically assigned)
Service component	Sine 100 Hz (audio: live source or playlist)

Audio configuration	DAB+ (stereo, 48 kHz, SBR on, no MPEG Surround)
Service component used by	Audio (program) service ' 24kbps DAB+' (primary service component)

2.2.5 Expected receiver behavior

Every DAB+ decoder must be able to extract and play the DAB+ services.

Every MPEG audio layer II decoder must be able to extract and play the MPEG audio layer II services.

The recording comprises 25000 DAB frame (10 minutes). If the ETI player loops around, a dropout occurs.

2.2.5.1 Audio service "192 kbps I II"

Every MPEG audio layer II decoder must be able to extract and play the signal (synthetic audio).

The audio parameters are: MPEG audio layer II, 192 kbps, stereo, 48 kHz, no MPEG Surround.

2.2.5.2 Audio service "160 kbps I II"

Every MPEG audio layer II decoder must be able to extract and play the signal (synthetic audio).

The audio parameters are: MPEG audio layer II, 160 kbps, stereo, 24 kHz, no MPEG Surround.

2.2.5.3 Audio service "128 kbps I II"

Every MPEG audio layer II decoder must be able to extract and play the signal (synthetic audio).

The audio parameters are: MPEG audio layer II, 128 kbps, stereo, 48 kHz, no MPEG Surround.

2.2.5.4 Audio service "192 kbps DAB+"

Every DAB+ decoder must be able to extract and play the stereo core of the signal.

The signal is a stereo frequency sweep from 20 Hz to 20 kHz.

The audio parameters are: DAB+, 192 kbps, stereo, 48 kHz, no SBR, no MPEG Surround.

2.2.5.5 Audio service "96 kbps DAB+"

Every DAB+ decoder must be able to extract and play the stereo core of the signal.

The signal is a 440 Hz sine on the left channel and an 880 Hz sine on the right channel.

The audio parameters are: DAB+, 96 kbps, stereo, 48 kHz, no SBR, no MPEG Surround.

2.2.5.6 Audio service "64 kbps DAB+"

Every DAB+ decoder must be able to extract and play the stereo core of the signal.

The signal is a 100 Hz sine on both channels.

The audio parameters are: DAB+, 64 kbps, stereo, 48 kHz, no SBR, no MPEG Surround.

2.2.5.7 Audio service "40 kbps DAB+"

Every DAB+ decoder must be able to extract and play the stereo core of the signal.

The signal is a 10 kHz sine on both channels.

The audio parameters are: DAB+, 40 kbps, stereo, 48 kHz, no SBR, no MPEG Surround.

2.2.5.8 Audio service "24 kbps DAB+"

Every DAB+ decoder must be able to extract and play the stereo core of the signal.

The signal is a 1 kHz sine (-6 dB) on both channels.

The audio parameters are: DAB+, 192 kbps, stereo, 48 kHz, SBR, no MPEG Surround.

2.3 DAB+ audio changes (eti3_file.dabp_c)

2.3.1 Purpose

This ETI file contains several DAB+ audio streams. The bit rate of these streams is fixed. The audio configuration within these streams changes every 12s.

The audio configuration (sample rate, SBR mode, channel mode, surround mode) is signaled at the beginning of a DAB+ audio super frame. As long as the bit rate of a DAB+ stream is not changed, the audio configuration can be changed without needing a DAB multiplex reconfiguration. In theory, the audio configuration could be changed every DAB+ super frame.

These tests allow you to determine, if the following applies:

- The decoder is able to handle changes of the audio configuration. The DAB+ standard does not require a seamless switch to a new configuration; the broadcast is urged to plan audio configurations changes carefully (e.g. during a period of silence).
- The MPEG Surround decoder is able to dynamically switch from and to surround mode.

2.3.2 General ensemble information

Ensemble label	'DAB+·audiochange' (abbreviated label: 'DAB+·chn'; flag field 0xf034; character set EBU basic core)
Ensemble identifier	0xdab3
Transmission mode	1
Ensemble country	Germany (D) (ecc and country code: e0d)
International table for PTy codes	All countries, except for North America
Ensemble time zone	Europe/Berlin
DAB time format (FIG0/10)	Long-form version

2.3.3 Service information

Table 2-32: Service 1 ('64kbps stereo 1')

Service label	'64kbps·stereo·1' (abbreviated label: '·64·str1'; flag field 0x61d1; character set EBU basic core)
Service identifier	0xd07b (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Audio reconfigs stereo1 (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 1
SCIDS	0 (automatically assigned)

Table 2-33: Service 2 ('64kbps stereo 2')

Service label	'64kbps·stereo·2' (abbreviated label: '·64·str2'; flag field 0x61d1; character set EBU basic core)
Service identifier	0xd07c (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)

Program language	German (language code 8)
Primary service component	Audio reconfigs stereo2 (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 2
SCIDS	0 (automatically assigned)

Table 2-34: Service 3 ('128kbps surround')

Service label	'128kbps·surround' (abbreviated label: '128·surr'; flag field 0xe0f0; character set EBU basic core)
Service identifier	0xd07d (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Audio reconfigs surround1 (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 3
SCIDS	0 (automatically assigned)

Table 2-35: Service 4 ('64kbps surround')

Service label	'64kbps·surround' (abbreviated label: '·64·surr'; flag field 0xe0f0; character set EBU basic core)
Service identifier	0xd07e (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Audio reconfigs surround2 (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 4
SCIDS	0 (automatically assigned)

Table 2-36: Service 5 ('128kbps mix')

Service label	'128kbps·mix' (abbreviated label: '128·mix·'; flag field 0xe0f0; character set EBU basic core)
Service identifier	0xd07f (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)

Primary service component	Audio reconfigs mix1 (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 5
SCIDS	0 (automatically assigned)

Table 2-37: Service 6 ('64kbps mix')

Service label	'64kbps·mix' (abbreviated label: '·64·mix·'; flag field 0xe0f0; character set EBU basic core)
Service identifier	0xd080 (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Audio reconfigs mix2 (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 6
SCIDS	0 (automatically assigned)

2.3.4 Stream information

Table 2-38: Stream 1

Subchannel mode	Audio
Bit rate	64 kbps (48 CUs)
Protection level	EEP 3-A
Subchannel identifier	6 (automatically assigned)
Service component	Audio reconfigs stereo1 (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component used by	Audio (program) service '64kbps stereo 1' (primary service component)

Table 2-39: Stream 2

Subchannel mode	Audio
Bit rate	64 kbps (48 CUs)
Protection level	EEP 3-A
Subchannel identifier	15 (automatically assigned)

Service component	Audio reconfigs stereo2 (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component used by	Audio (program) service '64kbps stereo 2' (primary service component)

Table 2-40: Stream 3

Subchannel mode	Audio
Bit rate	128 kbps (96 CUs)
Protection level	EEP 3-A
Subchannel identifier	16 (automatically assigned)
Service component	Audio reconfigs surround1 (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component used by	Audio (program) service '128kbps surround' (primary service component)

Table 2-41: Stream 4

Subchannel mode	Audio
Bit rate	64 kbps (48 CUs)
Protection level	EEP 3-A
Subchannel identifier	26 (automatically assigned)
Service component	Audio reconfigs surround2 (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component used by	Audio (program) service '64kbps surround' (primary service component)

Table 2-42: Stream 5

Subchannel mode	Audio
Bit rate	128 kbps (96 CUs)
Protection level	EEP 3-A
Subchannel identifier	27 (automatically assigned)
Service component	Audio reconfigs mix1 (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component used by	Audio (program) service '128kbps mix ' (primary service component)

Table 2-43: Stream 6

Subchannel mode	Audio
Bit rate	64 kbps (48 CUs)
Protection level	EEP 3-A
Subchannel identifier	28 (automatically assigned)
Service component	Audio reconfigs mix2 (Protocol: Audio subchannel insertion (Layer 2 or HE-AAC v2))
Service component used by	Audio (program) service '64kbps mix ' (primary service component)

2.3.5 Expected receiver behavior

Every DAB+ decoder must be able to extract and play the DAB+ services.

For all services, the signal is a 1 kHz, -6B sine.

The recording comprises 25000 DAB frame (10 minutes). If the ETI player loops around, a dropout occurs.

2.3.5.1 Audio service "64 kbps stereo1"

Every DAB+ decoder must be able to extract and play the signal.

The signal switches audio configuration every 12 seconds (i.e., 5 times per minute). The following configurations are used (all at 64kbps):

1	32 kHz, no SBR, mono
2	48 kHz, no SBR, mono
3	32 kHz, no SBR, stereo
4	48 kHz, no SBR, stereo
5	32 kHz, SBR, mono
6	48 kHz, SBR, mono
7	32 kHz, SBR, stereo
8	48 kHz, SBR, stereo
9	32 kHz, SBR, parametric stereo
10	48 kHz, SBR, parametric stereo

If SBR is off, the then AAC core runs at the indicated sample rate. If SBR is on, then the run runs at half the indicated sample rate.

Together with audio service "64kbps stereo2", this test contains all transitions from any of these configurations to any other configuration.

The stream iterate through these configurations the following way:

1 2 1 3 1 4 1 5 1 6 1 7 1 8 1 9 1 10 1

2 3 2 4 2 5 2 6 2 7 2 8 2 9 2 10 2

3 4 3 5 3 6 3 7 3 8 3 9 3 10

If the decoder produces an audible drop out when the configuration changes, this is no acceptable. However, the dropout should be as concealed as possible (no loud click or hissing). During the 12 seconds each configuration is used, no further dropouts must occur.

2.3.5.2 Audio service "64 kbps stereo2"

Every DAB+ decoder must be able to extract and play the signal.

The signal uses the same configurations as audio service "64 kbps stereo1", but iterates through the remaining configurations:

3

4 5 4 6 4 7 4 8 4 9 4 10 4

5 6 5 7 5 8 5 9 5 10 5

6 7 6 8 6 9 6 10 6

7 8 7 9 7 10 7

8 9 8 10 8

9 10 9

3

If the decoder produces an audible drop out when the configuration changes, this is no acceptable. However, the dropout should be as concealed as possible (no loud click or hissing). During the 12 seconds each configuration is used, no further dropouts must occur.

2.3.5.3 Audio service "128 kbps surround"

Every DAB+ decoder must be able to extract and play the stereo core of the signal.

Every DAB+ decoder including MPEG Surround must be able to extract and play the surround signal.

The signal switches audio configuration every 12 seconds (i.e., 5 times per minute). The following configurations are used (all at 128kbps):

1	32 kHz, no SBR, mono
2	48 kHz, no SBR, mono
3	32 kHz, no SBR, stereo
4	48 kHz, no SBR, stereo

5	32 kHz, SBR, stereo
6	48 kHz, SBR, stereo

If SBR is off, the then AAC core runs at the indicated sample rate. If SBR is on, then the run runs at half the indicated sample rate.

This test contains all transitions from any of these configurations to any other configuration.

The stream iterate through these configurations the following way:

1 2 1 3 1 4 1 5 1 6 1

2 3 2 4 2 5 2 6 2

3 4 3 5 3 6 3

4 5 4 6 4

5 6 5

Then the loop starts over again.

If the decoder produces an audible drop out when the configuration changes, this is no acceptable. However, the dropout should be as concealed as possible (no loud click or hissing). During the 12 seconds each configuration is used, no further dropouts must occur.

2.3.5.4 Audio service "64 kbps surround"

Every DAB+ decoder must be able to extract and play the stereo core of the signal.

Every DAB+ decoder including MPEG Surround must be able to extract and play the surround signal.

The signal switches audio configuration every 12 seconds (i.e., 5 times per minute). The following configurations are used (all at 64kbps):

1	32 kHz, SBR, mono
2	48 kHz, SBR, mono
3	32 kHz, SBR, stereo
4	48 kHz, SBR, stereo

If SBR is off, the then AAC core runs at the indicated sample rate. If SBR is on, then the run runs at half the indicated sample rate.

This test contains all transitions from any of these configurations to any other configuration.

The stream iterate through these configurations the following way:

1 2 1 3 1 4 1

2 3 2 4 2

3 4 3

Then the loop starts over again.

If the decoder produces an audible drop out when the configuration changes, this is no acceptable. However, the dropout should be as concealed as possible (no loud click or hissing). During the 12 seconds each configuration is used, no further dropouts must occur.

2.3.5.5 Audio service "128 kbps mix"

Every DAB+ decoder must be able to extract and play the stereo core of the signal.

Every DAB+ decoder including MPEG Surround must be able to extract and play the surround signal of the configurations using surround sound.

The signal iterates over the following configurations (all at 128kbps) and then the loop starts over again.

Mono, no SBR, 32 kHz
Mono, no SBR, 32 kHz, 5.1 MPEG Surround with 5.1 output channels
Mono, no SBR, 48 kHz
Mono, no SBR, 48 kHz, 5.1 MPEG Surround with 5.1 output channels
Stereo, no SBR, 32 kHz
Stereo, no SBR, 32 kHz, 5.1 MPEG Surround with 5.1 output channels
Stereo, no SBR, 48 kHz
Stereo, no SBR, 48 kHz, 5.1 MPEG Surround with 5.1 output channels
Stereo, SBR, 32 kHz, 5.1 MPEG Surround with 5.1 output channels
Stereo, SBR, 48 kHz, 5.1 MPEG Surround with 5.1 output channels

If the decoder produces an audible drop out when the configuration changes, this is no acceptable. However, the dropout should be as concealed as possible (no loud click or hissing). During the 12 seconds each configuration is used, no further dropouts must occur.

2.3.5.6 Audio service "64 kbps mix"

Every DAB+ decoder must be able to extract and play the stereo core of the signal.

Every DAB+ decoder including MPEG Surround must be able to extract and play the surround signal of the configurations using surround sound.

The signal iterates over the following configurations (all at 128kbps) and then the loop starts over again.

Mono, no SBR, 32 kHz
Mono, no SBR, 32 kHz, 5.1 MPEG Surround with 5.1 output channels

Mono, no SBR, 48 kHz
Mono, no SBR, 48 kHz, 5.1 MPEG Surround with 5.1 output channels
Stereo, no SBR, 32 kHz
Stereo, no SBR, 32 kHz, 5.1 MPEG Surround with 5.1 output channels
Stereo, no SBR, 48 kHz
Stereo, no SBR, 48 kHz, 5.1 MPEG Surround with 5.1 output channels
Stereo, SBR, 32 kHz, 5.1 MPEG Surround with 5.1 output channels
Stereo, SBR, 48 kHz, 5.1 MPEG Surround with 5.1 output channels

If the decoder produces an audible drop out when the configuration changes, this is no acceptable. However, the dropout should be as concealed as possible (no loud click or hissing). During the 12 seconds each configuration is used, no further dropouts must occur.

2.4 DAB+ surround signaling (surround_signaling.dabp_c)

2.4.1 Purpose

This ETI file carries MPEG Surround in DAB+ audio. It reflects the latest changes to the DAB+ standard ETSI TS 102 563 V1.2.1 (2010-05) with regard to MPEG surround.

These tests allow you to determine, if the following applies:

- A legacy receiver is able to discard the MPEG Surround data
- A surround capable receiver is able to decode and present MPEG Surround sound irrespective of the value of the "mpeg_surround_config" parameter

This file does *not* contain complete verification patterns for MPEG Surround sound.
Only use this ETI file to verify whether a mono/stereo DAB receiver correctly handles DAB+ streams with surround. This ETI file is not suitable to verify whether a surround capable DAB+ receiver is able to correctly decode DAB+ surround audio.

2.4.2 General ensemble information

Ensemble label	'DAB+ MPS' (abbreviated label: 'DAB+ MPS'; flag field 0xff00; character set EBU basic core)
Ensemble identifier	0xd111
Transmission mode	1

Ensemble country	Germany (D) (ecc and country code: e0d)
International table for PTy codes	All countries, except for North America
Ensemble time zone	Europe/Berlin
DAB time format (FIG0/10)	Long-form version

2.4.3 Service information

Table 2-44: Service 1 ('No MPS')

Service label	'No MPS' (abbreviated label: 'No MPS'; flag field 0xfc00; character set EBU basic core)
Service identifier	0xd111 (audio service)
Primary service component	Is there anybody out there? (audio: live source or playlist)
Service component carried in	Stream 2
SCIDS	0 (automatically assigned)

Table 2-45: Service 2 ('MPS 5.1')

Service label	'MPS 5.1' (abbreviated label: 'MPS 5.1'; flag field 0xfe00; character set EBU basic core)
Service identifier	0xd222 (audio service)
Primary service component	Is there anybody out there? 2 (audio: live source or playlist)
Service component carried in	Stream 1
SCIDS	0 (automatically assigned)

Table 2-46: Service 3 ('MPS 5.1 (other)')

Service label	'MPS 5.1 (other)' (abbreviated label: 'MPS 5.1o'; flag field 0xfe40; character set EBU basic core)
Service identifier	0xd333 (audio service)
Primary service component	Is there anybody out there? 3 (audio: live source or playlist)
Service component carried in	Stream 3
SCIDS	0 (automatically assigned)

2.4.4 Stream information

Table 2-47: Stream 1

Subchannel mode	Audio
Bit rate	96 kbps (72 CUs, starting at CU 0)
Protection level	EEP 3-A
Subchannel identifier	14 (automatically assigned)
Service component	Is there anybody out there? 2 (audio: live source or playlist)
Audio configuration	DAB+ (stereo, 48 kHz, SBR on, MPEG Surround with 5.1 output channels)
Service component used by	Audio (programme) service 'MPS 5.1' (primary service component)

Table 2-48: Stream 2

Subchannel mode	Audio
Bit rate	96 kbps (72 CUs, starting at CU 72)
Protection level	EEP 3-A
Subchannel identifier	15 (automatically assigned)
Service component	Is there anybody out there? (audio: live source or playlist)
Audio configuration	DAB+ (stereo, 32 kHz, SBR off, no MPEG Surround)
Service component used by	Audio (programme) service 'No MPS' (primary service component)

Table 2-49: Stream 3

Subchannel mode	Audio
Bit rate	96 kbps (72 CUs, starting at CU 144)
Protection level	EEP 3-A
Subchannel identifier	47 (automatically assigned)
Service component	Is there anybody out there? 3 (audio: live source or playlist)
Audio configuration	DAB+ (stereo, 48 kHz, SBR on)
Service component used by	Audio (programme) service 'MPS 5.1 (other)' (primary service component)

2.4.5 Expected receiver behavior

Every DAB+ capable receiver shall be able to decode all three services in stereo.

Every surround capable DAB+ receiver shall be able to play all three services. Services 'MPS 5.1' and 'MPS 5.1 (other)' carry 5.1 surround sound and shall be rendered accordingly.

The difference between 'MPS 5.1' and 'MPS 5.1 (other)' is the value of the "mpeg_surround_config" parameter in the DAB+ audio super frame header of the audio stream.

Service '5.1' uses an audio stream that signals "MPEG Surround with 5.1 output channels is used" (value decimal 1, binary 001).

Service '5.1 (other)' uses an audio stream that signals "other mode (the mode can be derived from the MPEG Surround SpatialSpecificConfig())" (value decimal 7, binary 111).

It is important that an MPEG surround capable receiver uses the "mpeg_surround_config" parameter just as an indication whether MPEG Surround is used at all. If the value is unequal to 0, MPEG Surround is available and an MPEG surround capable decoder should decode the MPEG Surround data. The actual value of the "mpeg_surround_config" parameter shall not have any impact on the actual decoding of the audio. For more details refer to the DAB+ standard ETSI TS 102 563 V1.2.1 (2010-05).

A receiver that is not MPEG Surround capable shall completely ignore the "mpeg_surround_config" parameter and decode the audio as usual.

2.5 DAB+ CISPR13/14 (eti4_file.dabp_c)

2.5.1 Purpose

This ETI file contains several DAB+ audio streams for EMC measurements.

2.5.2 General ensemble information

Ensemble label	'DAB+·CISPR13/14' (abbreviated label: 'DAB+·CIS'; flag field 0xff00; character set EBU basic core)
Ensemble identifier	0xdab4
Transmission mode	1
Ensemble country	Germany (D) (ecc and country code: e0d)
International table for PTy codes	All countries, except for North America
Ensemble time zone	Europe/Berlin
DAB time format (FIG0/10)	Long-form version

2.5.3 Service information

Table 2-50: Service 1 ('1k fullscale ')

Service label	'1k·fullscale' (abbreviated label: '1k·full'; flag field 0xfe00; character set EBU basic core)
Service identifier	0xd07b (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	1 kHz sine, full-scale CISPR13 (Protocol: Audio sub-channel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 1
SCIDS	0 (automatically assigned)

Table 2-51: Service 2 ('1k -6dB CISPR13 ')

Service label	'1k·-6dB·CISPR13' (abbreviated label: '1k·-6dB'; flag field 0xfe00; character set EBU basic core)
Service identifier	0xd07c (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	1 kHz sine, -6dB CISPR13 (Protocol: Audio sub-channel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 2
SCIDS	0 (automatically assigned)

Table 2-52: Service 3 ('1k -10dB CISPR13')

Service label	'1k·-10dB·CISPR13' (abbreviated label: '110·surr'; flag field 0xff00; character set EBU basic core)
Service identifier	0xd07d (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	1 kHz sine, -10dB CISPR13 (Protocol: Audio sub-channel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 3
SCIDS	0 (automatically assigned)

Table 2-53: Service 4 ('1k -60dB CISPR14')

Service label	'1k·-60dB·CISPR14' (abbreviated label: '110·surr'; flag field 0xff00; character set EBU basic core)
Service identifier	0xd07e (audio service)
Program type (PTy)	Education (PTy code 5; code for all countries except North America)
Program language	German (language code 8)
Primary service component	1 kHz sine, -60dB CISPR14 (Protocol: Audio sub-channel insertion (Layer 2 or HE-AAC v2))
Service component carried in	Stream 4
SCIDS	0 (automatically assigned)

2.5.4 Stream information

Table 2-54: Stream 1

Subchannel mode	Audio
Bit rate	192 kbps (144 CUs)
Protection level	EEP 3-A
Subchannel identifier	17 (automatically assigned)
Service component	1 kHz sine, full-scale CISPR13 (Protocol: Audio sub-channel insertion (Layer 2 or HE-AAC v2))
Audio configuration	MPEG audio layer II (,
Service component used by	Audio (program) service '1k fullscale ' (primary service component)

Table 2-55: Stream 2

Subchannel mode	Audio
Bit rate	192 kbps (144 CUs)
Protection level	EEP 3-A
Subchannel identifier	18 (automatically assigned)
Service component	1 kHz sine, -6dB CISPR13 (Protocol: Audio sub-channel insertion (Layer 2 or HE-AAC v2))
Audio configuration	MPEG audio layer II (,
Service component used by	Audio (program) service '1k -6dB CISPR13 ' (primary service component)

Table 2-56: Stream 3

Subchannel mode	Audio
Bit rate	192 kbps (144 CUs)
Protection level	EEP 3-A
Subchannel identifier	19 (automatically assigned)
Service component	1 kHz sine, -10dB CISPR13 (Protocol: Audio sub-channel insertion (Layer 2 or HE-AAC v2))
Audio configuration	MPEG audio layer II (,
Service component used by	Audio (program) service '1k -10dB CISPR13' (primary service component)

Table 2-57: Stream 4

Subchannel mode	Audio
Bit rate	192 kbps (144 CUs)
Protection level	EEP 3-A
Subchannel identifier	20 (automatically assigned)
Service component	1 kHz sine, -60dB CISPR14 (Protocol: Audio sub-channel insertion (Layer 2 or HE-AAC v2))
Audio configuration	MPEG audio layer II (,
Service component used by	Audio (program) service '1k -60dB CISPR14' (primary service component)

2.5.5 Expected receiver behavior

Every DAB+ decoder must be able to extract and play the DAB+ services.

The recording comprises 25000 DAB frame (10 minutes). If the ETI player loops around, a dropout occurs.

2.5.5.1 Audio service "1 k fullscale"

Every DAB+ decoder must be able to extract and play the stereo core of the signal.

The signal is a 1 kHz sine, full scale, CISPR 13.

The audio parameters are: DAB+, 192 kbps, stereo, 48 kHz, no SBR, no MPEG Surround.

2.5.5.2 Audio service "1 k -6dB CISPR13"

Every DAB+ decoder must be able to extract and play the stereo core of the signal.

The signal is a 1 kHz sine, -6dB, CISPR 13.

The audio parameters are: DAB+, 192 kbps, stereo, 48 kHz, no SBR, no MPEG Surround.

2.5.5.3 Audio service "1 k -10dB CISPR13"

Every DAB+ decoder must be able to extract and play the stereo core of the signal.

The signal is a 1 kHz sine, -10dB, CISPR 13.

The audio parameters are: DAB+, 192 kbps, stereo, 48 kHz, no SBR, no MPEG Surround.

2.5.5.4 Audio service "1 k -60dB CISPR14"

Every DAB+ decoder must be able to extract and play the stereo core of the signal.

The signal is a 1 kHz sine, -60dB, CISPR 14.

The audio parameters are: DAB+, 192 kbps, stereo, 48 kHz, no SBR, no MPEG Surround.

2.6 DATA services (eti5_file.dabp_c)

2.6.1 Purpose

This ETI file contains several data applications in PAD an packet mode. In addition this multiplex contains many secondary services (e.g. an audio service has a secondary data service component or a data service has a secondary audio service component).

These tests allow you to determine, if the following applies:

- The FIC decoder is able to process a complex multiplex.
- The receiver is able to decode and present several DAB data applications.

2.6.2 General ensemble information

Ensemble label	'Data services' (abbreviated label: 'Data'; flag field 0xf000; character set EBU basic core)
Ensemble identifier	0xd06c
Transmission mode	1
Ensemble country	Germany (D) (ecc and country code: e0d)
International table for PTy codes	All countries, except for North America

Ensemble time zone	Europe/Berlin
DAB time format (FIG0/10)	Long-form version

2.6.3 Service information

Table 2-58: Service 1 ('192kbps LII A')

Service label	'192kbps·LII·A' (abbreviated label: '192LII·A'; flag field 0xe0f8; character set EBU basic core)
Service identifier	0xd220 (audio service)
Program type (PTy)	Serious Classical (PTy code 14; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Bach (live coded) (audio: live source or play list)
Service component carried in	Stream 1
SCIDS	0 (automatically assigned)
PAD data	SLS PAD1 (Application: MOT Slideshow)DLS PAD1 (Application: Dynamic labels)Journaline PAD1 (Application: Journaline(R))

Table 2-59: Service 2 ('96kbps DAB+ A')

Service label	'96kbps·DAB+·A' (abbreviated label: '·96DAB+A'; flag field 0xe0f4; character set EBU basic core)
Service identifier	0xd210 (audio service)
Program type (PTy)	Pop Music (PTy code 10; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Herre (audio: live source or play list)
Service component carried in	Stream 2
SCIDS	0 (automatically assigned)
PAD data	SLS PAD2 (Application: MOT Slideshow)DLS PAD2 (Application: Dynamic labels)Journaline PAD2 (Application: Journaline(R))
Service component label	'Audio' (abbreviated label: 'Audio'; flag field 0xfc00; character set EBU basic core)

Table 2-60: Service 3 ('192kbps LII')

Service label	'192kbps·LII' (abbreviated label: '192·LII'; flag field 0xe1f0; character set EBU basic core)
Service identifier	0xd07b (audio service)

Program type (PTy)	Serious Classical (PTy code 14; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Bach (live coded) (audio: live source or play list)
Service component carried in	Stream 1
SCIDS	0 (automatically assigned)
PAD data	SLS PAD1 (Application: MOT Slideshow)DLS PAD1 (Application: Dynamic labels)Journaline PAD1 (Application: Journaline(R))
Service component label	'Audio1' (abbreviated label: 'Audio1'; flag field 0xfc00; character set EBU basic core)
Secondary service component 1	BWS Simple (Application: MOT Broadcast Web Site)
Service component carried in	Stream 4
SCIDS	1 (automatically assigned)
Service component label	'BWS·Simple' (abbreviated label: 'BWS·Simp'; flag field 0xff00; character set EBU basic core)

Table 2-61: Service 4 ('96kbps DAB+')

Service label	'96kbps·DAB+' (abbreviated label: '96·DAB+'; flag field 0xe1f0; character set EBU basic core)
Service identifier	0xd07c (audio service)
Program type (PTy)	Pop Music (PTy code 10; code for all countries except North America)
Program language	German (language code 8)
Primary service component	Herre (audio: live source or play list)
Service component carried in	Stream 2
SCIDS	0 (automatically assigned)
PAD data	SLS PAD2 (Application: MOT Slideshow)DLS PAD2 (Application: Dynamic labels)Journaline PAD2 (Application: Journaline(R))
Service component label	'Audio2' (abbreviated label: 'Audio2'; flag field 0xfc00; character set EBU basic core)
Secondary service component 1	BWS Full (Application: MOT Broadcast Web Site)
Service component carried in	Stream 4

SCIDS	1 (automatically assigned)
Service component label	'BWS·Full' (abbreviated label: 'BWS·Full'; flag field 0xff00; character set EBU basic core)

Table 2-62: Service 5 ('SLS Slide NOW')

Service label	'SLS·Slide·NOW' (abbreviated label: 'SL·NOW'; flag field 0xd038; character set EBU basic core)
Service identifier	0xe0dcafe1 (data service)
Primary service component	SLS SL NOW (Application: MOT Slideshow)
Service component carried in	Stream 3
SCIDS	0 (automatically assigned)

Table 2-63: Service 6 ('SLS Slide Abs')

Service label	'SLS·Slide·Abs' (abbreviated label: 'SL·Abs'; flag field 0xd038; character set EBU basic core)
Service identifier	0xe0dcafe2 (data service)
Primary service component	SLS SL ABS (Application: MOT Slideshow)
Service component carried in	Stream 3
SCIDS	0 (automatically assigned)

Table 2-64: Service 7 ('SLS HdrUpd NOW')

Service label	'SLS·HdrUpd·NOW' (abbreviated label: 'HU·NOW'; flag field 0x093c; character set EBU basic core)
Service identifier	0xe0dcafe3 (data service)
Primary service component	SLS HU NOW (Application: MOT Slideshow)
Service component carried in	Stream 3
SCIDS	0 (automatically assigned)

Table 2-65: Service 8 ('SLS HdrUpd Abs')

Service label	'SLS·HdrUpd·Abs' (abbreviated label: 'HU·Abs'; flag field 0x093c; character set EBU basic core)
Service identifier	0xe0dcafe4 (data service)
Primary service component	SLS HU ABS (Application: MOT Slideshow)
Service component carried in	Stream 3
SCIDS	0 (automatically assigned)

Table 2-66: Service 9 ('BWS Simple')

Service label	'BWS·Simple' (abbreviated label: 'BWS·Simp'; flag field 0xff00; character set EBU basic core)
Service identifier	0xe0dcafe5 (data service)
Primary service component	BWS Simple (Application: MOT Broadcast Web Site)
Service component carried in	Stream 4
SCIDS	0 (automatically assigned)
Service component label	'BWS' (abbreviated label: 'BWS'; flag field 0xe000; character set EBU basic core)
Secondary service component 1	Bach (live coded) (audio: live source or play list)
Service component carried in	Stream 1
SCIDS	1 (automatically assigned)
PAD data	SLS PAD1 (Application: MOT Slideshow)DLS PAD1 (Application: Dynamic labels)Journaline PAD1 (Application: Journaline(R))
Service component label	'192kbps·LII' (abbreviated label: '192·LII'; flag field 0xe1f0; character set EBU basic core)

Table 2-67: Service 10 ('BWS Full')

Service label	'BWS·Full' (abbreviated label: 'BWS·Full'; flag field 0xff00; character set EBU basic core)
Service identifier	0xe0dcafe6 (data service)
Primary service component	BWS Full (Application: MOT Broadcast Web Site)
Service component carried in	Stream 4
SCIDS	0 (automatically assigned)
Service component label	'BWS' (abbreviated label: 'BWS'; flag field 0xe000; character set EBU basic core)
Secondary service component 1	Herre (audio: live source or play list)
Service component carried in	Stream 2
SCIDS	1 (automatically assigned)
PAD data	SLS PAD2 (Application: MOT Slideshow)DLS PAD2 (Application: Dynamic labels)Journaline PAD2 (Application: Journaline(R))
Service component label	'·96kbps·DAB+' (abbreviated label: '96·DAB+'; flag field 0xe1f0; character set EBU basic core)

Table 2-68: Service 11 ('EPG')

Service label	'EPG' (abbreviated label: 'EPG'; flag field 0xe000; character set EBU basic core)
Service identifier	0xe0dcafe7 (data service)
Primary service component	EPG (Application: Electronic Program Guide (EPG))
Service component carried in	Stream 5
SCIDS	0 (automatically assigned)

Table 2-69: Service 12 ('Journaline')

Service label	'Journaline' (abbreviated label: 'Journal'; flag field 0xfe00; character set EBU basic core)
Service identifier	0xe0dcafe9 (data service)
Primary service component	Journaline full (Application: Journaline(R))
Service component carried in	Stream 4
SCIDS	0 (automatically assigned)

Table 2-70: Service 13 ('TPEG Mobile.Info')

Service label	'TPEG·Mobile.Info' (abbreviated label: 'TPEG·M.I'; flag field 0xf418; character set EBU basic core)
Service identifier	0xe0dcafea (data service)
Primary service component	TPEG (Application: TPEG (traffic and travel information))
Service component carried in	Stream 5
SCIDS	0 (automatically assigned)

Table 2-71: Service 14 ('TPEG Encr/Journy')

Service label	'TPEG·Encr/Journy' (abbreviated label: 'TPEG·E/J'; flag field 0xf460; character set EBU basic core)
Service identifier	0xe0dcafeb (data service)
Primary service component	TPEG Encrypted Journaline (Application: TPEG (traffic and travel information))
Service component carried in	Stream 5
SCIDS	0 (automatically assigned)

2.6.4 Stream information

Table 2-72: Stream 1

Subchannel mode	Audio
Bit rate	192 kbps (140 CUs)
Protection level	UEP 3
Subchannel identifier	25 (automatically assigned)
Service component	Bach (live coded) (audio: live source or play list)
Audio configuration	MPEG audio layer II (stereo, 48 kHz, no MPEG Surround)
Service component used by	Audio (program) service '192kbps LII A ' (primary service component)Audio (program) service '192kbps LII ' (primary service component 'Audio1 ')Data service 'BWS Simple ' (secondary service component '192kbps LII ')
X-PAD service component	SLS PAD1 (Application: MOT Slideshow)
Bit rate	8000 bps
X-PAD apptype	12 (automatically assigned)
X-PAD service component	DLS PAD1 (Application: Dynamic labels)
Bit rate	200 bps
X-PAD apptype	2 (automatically assigned)
X-PAD service component	Journaline PAD1 (Application: Journaline(R))
Bit rate	6000 bps
Content providers	Fraunhofer Research News PAD1: 6000 bps
X-PAD apptype	4 (automatically assigned)

Table 2-73: Stream 2

Subchannel mode	Audio
Bit rate	96 kbps (72 CUs)
Protection level	EEP 3-A
Subchannel identifier	26 (automatically assigned)
Service component	Herre (audio: live source or play list)
Audio configuration	DAB+ (stereo, 48 kHz, SBR off, no MPEG Surround)

Service component used by	Audio (program) service '96kbps DAB+ A ' (primary service component 'Audio ')Audio (program) service '96kbps DAB+ ' (primary service component 'Audio2 ')Data service 'BWS Full ' (secondary service component '96kbps DAB+ ')
X-PAD service component	SLS PAD2 (Application: MOT Slideshow)
Bit rate	8000 bps
X-PAD apptype	12 (automatically assigned)
X-PAD service component	DLS PAD2 (Application: Dynamic labels)
Bit rate	200 bps
X-PAD apptype	2 (automatically assigned)
X-PAD service component	Journaline PAD2 (Application: Journaline(R))
Bit rate	6000 bps
Content providers	Fraunhofer Research News PAD2: 6000 bps
X-PAD apptype	4 (automatically assigned)

Table 2-74: Stream 3

Subchannel mode	Packet mode
Bit rate	64 kbps (48 CUs)
Protection level	EEP 3-A
Enhanced packet mode	no
Assigned bit rate	64000.0 bps
Subchannel identifier	27 (automatically assigned)
Service component	SLS SL NOW (Application: MOT Slideshow)
Service component used by	Data service 'SLS Slide NOW ' (primary service component)
Bit rate	16000 bps
Packet address	1 (automatically assigned)
SCID	0 (automatically assigned)
Service component	SLS SL ABS (Application: MOT Slideshow)
Service component used by	Data service 'SLS Slide Abs ' (primary service component)
Bit rate	16000 bps

Packet address	2 (automatically assigned)
SCID	1 (automatically assigned)
Service component	SLS HU NOW (Application: MOT Slideshow)
Service component used by	Data service 'SLS HdrUpd NOW ' (primary service component)
Bit rate	16000 bps
Packet address	3 (automatically assigned)
SCID	2 (automatically assigned)
Service component	SLS HU ABS (Application: MOT Slideshow)
Service component used by	Data service 'SLS HdrUpd Abs ' (primary service component)
Bit rate	16000 bps
Packet address	4 (automatically assigned)
SCID	3 (automatically assigned)

Table 2-75: Stream 4

Subchannel mode	Packet mode
Bit rate	96 kbps (72 CUs)
Protection level	EEP 3-A
Enhanced packet mode	no
Assigned bit rate	87100.0 bps
Subchannel identifier	28 (automatically assigned)
Service component	BWS Simple (Application: MOT Broadcast Web Site)
Service component used by	Audio (program) service '192kbps LII ' (secondary service component 'BWS Simple ')Data service 'BWS Simple ' (primary service component 'BWS ')
Bit rate	64000 bps
Content providers	BWS Simple (Journaline): 32000 bpsBWS Simple (Surround): 32000 bps
Packet address	5 (automatically assigned)
SCID	4 (automatically assigned)
Service component	BWS Full (Application: MOT Broadcast Web Site)

Service component used by	Audio (program) service '96kbps DAB+ ' (secondary service component 'BWS Full ')Data service 'BWS Full ' (primary service component 'BWS ')
Bit rate	16000 bps
Content providers	BWS Full: 16000 bps
Packet address	6 (automatically assigned)
SCID	5 (automatically assigned)
Service component	Journaline full (Application: Journaline(R))
Service component used by	Data service 'Journaline' (primary service component)
Bit rate	7100 bps
Content providers	Deutsche Welle Nachrichten: 1000 bpsDeutsche Welle News: 1000 bpsDeutsche Welle News (Hindi): 1000 bpsFraunhofer Research News: 4000 bpsJournaline Ticker: 100 bps
Packet address	7 (automatically assigned)
SCID	6 (automatically assigned)

Table 2-76: Stream 5

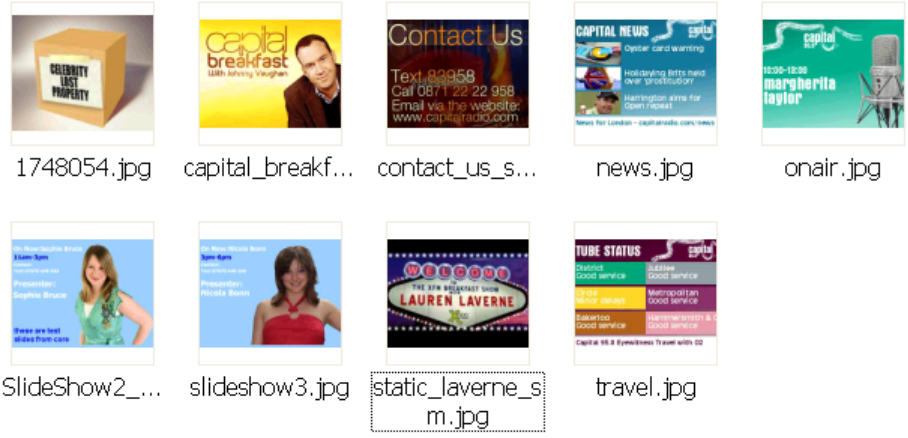
Subchannel mode	Packet mode
Bit rate	24 kbps (18 CUs)
Protection level	EEP 3-A
Enhanced packet mode	no
Assigned bit rate	24000.0 bps
Subchannel identifier	29 (automatically assigned)
Service component	EPG (Application: Electronic Program Guide (EPG))
Service component used by	Data service 'EPG' (primary service component)
Bit rate	21000 bps
Content providers	EPG: 17000 bpsEPG test files: 4000 bps
Packet address	8 (automatically assigned)
SCID	7 (automatically assigned)
Service component	TPEG (Application: TPEG (traffic and travel information))
Service component used by	Data service 'TPEG Mobile.Info' (primary service component)
Bit rate	2000 bps

Packet address	9 (automatically assigned)
SCID	8 (automatically assigned)
Service component	TPEG Encrypted Journaline (Application: TPEG (traffic and travel information))
Service component used by	Data service 'TPEG Encr/Journy' (primary service component)
Bit rate	1000 bps
Packet address	10 (automatically assigned)
SCID	9 (automatically assigned)

2.6.5 Description of data service components

2.6.5.1 Service component "SLS PAD"

A sequence of real-world slides provided by GCap media plc. The slides are broadcast without a gap between two slides. The presentation time of a slide depends on the transmission time of the next slide.



The file lengths are as follows:

File name	Length of MOT body (JPG file)
1748054.jpg	7593
capital_breakfast_nosunsilk_sm.jpg	10339
contact_us_sm.jpg	12837
news.jpg	12889
onair.jpg	13112

File name	Length of MOT body (JPG file)
SlideShow2_mid.jpg	10204
slideshow3.jpg	9450
static_laverne_sm.jpg	12110
travel.jpg	13280

Note that the filenames are not used as ContentNames. However, the files are broadcast in the sequence shown above.

2.6.5.2 Service component "DLS PAD"

A sequence of Dynamic Labels. Each Dynamic Labels is presented for 10 seconds.

There are three different sources for the sequence of Dynamic Labels (DL). The sequence starts with a message of group 1, followed by a message of group 2, followed by a message of group 3 and then again of group 1 and so on. The prefix of the DL indicates the used source.

Group	Prefix	Description
Test messages	1/3:	The following DLs: short a bit longer DLS this is an extremely long dynamic label that easily exceeds the maximum of 128 characters per message, and this is a test. Special characters: äöüàèùòáéúóÄÖÜß
German news (DW online)	2/3:	A sequence of German news headlines
English news (DW online)	3/3:	A sequence of English news headlines

2.6.5.3 Service component "Journaline PAD"

Carries a Journaline® data application. The content shows Fraunhofer Research news (English). The entry page is a menu starting with the following entries:

2.6.5.4 Service component "SLS"

A sequence of numbered slides. All slides are presented for 20 seconds.

The file lengths are as follows:

File name	Length of MOT body (JPG file)
001_SFU_small_1.png	17145
002_SFE_small_2.jpg	7105
003_SFE100_smal_3.png	17290
004_DVSG_small_4.jpg	8728
005_ETL_small_5.png	15904
006_DVM400_small_6.jpg	8048
End_small.jpg	991

Note that the filenames are not used as content names. However, the files are broadcast in the sequence shown above.

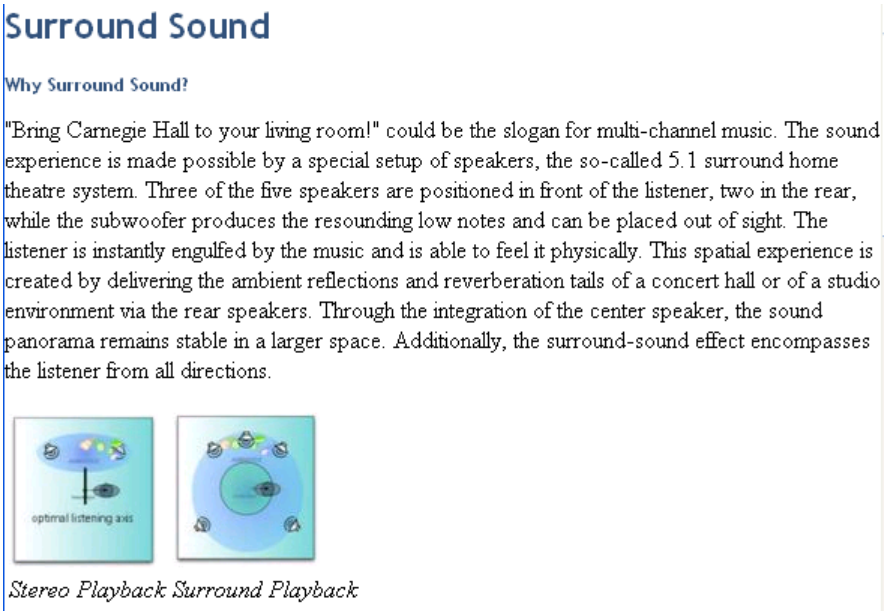
Note that the 4 services in packet mode will display the slides at different instances in time.

- Service "SLS Slide NOW" tells the Slideshow decoder to preset the slide as soon as it is receiver. Slower receivers (or receivers that because of some reception problem during the first transmission need a slide repetition) might thus show the slide slightly later than fast receivers (or receiver that get the slide at the first transmission).
- Service "SLS Slide ABS" tells the Slideshow decoder to preset the slide at the end of the transmission (and possibly repetition) of the slide. All receivers should present the slide at the same time.
- Service "SLS HDR NOW" first broadcasts (and possibly repeats) a slide and then uses a HeaderUpdate telling the Slideshow decoder to preset the slide as soon as it is receiver. Slower receivers might thus show the slide slightly later than fast receivers.
- Service "SLS HDR ABS" first broadcasts (and possibly repeats) a slide and then uses a HeaderUpdate telling the Slideshow decoder to preset the slide some time in the future. All receivers should present the slide at the same time.

2.6.5.5 Service component "BWS simple"

A BWS data application describing both Journaline® and MPEG Surround for DAB. The entry page is:

The link "Surround Sound" leads to (only the beginning is shown):



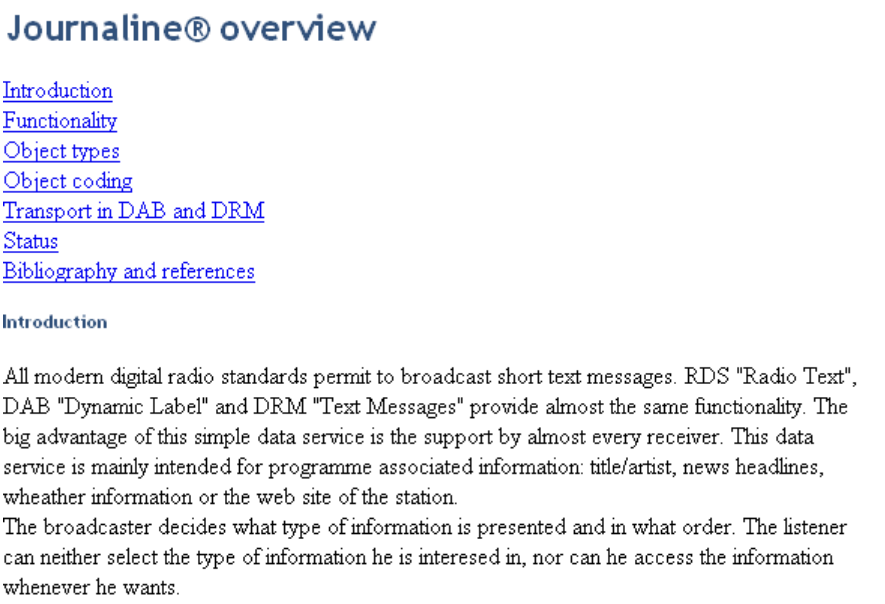
Surround Sound

Why Surround Sound?

"Bring Carnegie Hall to your living room!" could be the slogan for multi-channel music. The sound experience is made possible by a special setup of speakers, the so-called 5.1 surround home theatre system. Three of the five speakers are positioned in front of the listener, two in the rear, while the subwoofer produces the resounding low notes and can be placed out of sight. The listener is instantly engulfed by the music and is able to feel it physically. This spatial experience is created by delivering the ambient reflections and reverberation tails of a concert hall or of a studio environment via the rear speakers. Through the integration of the center speaker, the sound panorama remains stable in a larger space. Additionally, the surround-sound effect encompasses the listener from all directions.

Stereo Playback Surround Playback

The link "Journaline(R)" leads to (only the beginning is shown):



Journaline® overview

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Introduction

All modern digital radio standards permit to broadcast short text messages. RDS "Radio Text", DAB "Dynamic Label" and DRM "Text Messages" provide almost the same functionality. The big advantage of this simple data service is the support by almost every receiver. This data service is mainly intended for programme associated information: title/artist, news headlines, wheather information or the web site of the station.
The broadcaster decides what type of information is presented and in what order. The listener can neither select the type of information he is interesed in, nor can he access the information whenever he wants.

2.6.5.6 Service component "BWS full"

This BWS contains links to test whether the BWS engine is able to correctly process absolute links (e.g. "/images/logo.jpg") and links to directories. If a link to a directory is selected (e.g. to "/traffic/"), then the receiver should retrieve a file within this directory that depends on its profile. If the DirectoryIndex parameter within the MOT directory signals "index_255.html" for the "Unrestricted (PC) profile", then such a receiver should thus retrieve file "/traffic/index_255.html".

Several links within the HTML pages indicate the encoded HTML link and the supposed behavior of the BWS engine.

There is also a file of length 0. There will be no MOT body broadcast for this MOT object.

The entry page for the "Unrestricted (PC) profile" (ContentName "index_255.htm") starts with:

Entry page of profile 255

Filename of this file: "index_255.htm"

2.6.5.7 Service component "EPG"

It contains data for 2 services:

- d210 (Deutschlandfunk; in this ETI file service "96kbps DAB+ A")
- d220 (DKultur; in this ETI file service "192kbps LII A")
- d230 (Test)

An EPG decoder must be able to decode and present the EPG for both audio services "96kbps DAB+ A" and "192kbps LII A".

The test EPG files use all elements/attributes the EPG specification permits. The content is nonsense, but the EPG decoder must be able to parse these files. For example files refer to the documentation directory.

The beginning of file "w20081010wdD210C0.EHB" is:

```
- <epg>
  - <schedule version="1">
      <scope stopTime="2008-10-11T00:00:00+02:00" startTime="2008-10-10T00:00:00+02:00"/>
    - <programme shortId="50001">
      - <epg:location>
          <epg:time time="2008-10-10T00:00:00+02:00" duration="PT0H5M0S"/>
          <epg:bearer id="e0.d06c.d210.0"/>
        </epg:location>
        <epg:mediumName>Nachrichten</epg:mediumName>
      </programme>
    - <programme shortId="50002">
      - <epg:mediaDescription>
          <epg:shortDescription>Kultur vom Tage</epg:shortDescription>
        </epg:mediaDescription>
      - <epg:location>
          <epg:time time="2008-10-10T00:05:00+02:00" duration="PT0H55M0S"/>
          <epg:bearer id="e0.d06c.d210.0"/>
        </epg:location>
        <epg:mediumName>Fazit</epg:mediumName>
      </programme>
    - <programme shortId="50003">
      - <epg:location>
          <epg:time time="2008-10-10T01:00:00+02:00" duration="PT0H5M0S"/>
          <epg:bearer id="e0.d06c.d210.0"/>
        </epg:location>
        <epg:mediumName>Nachrichten</epg:mediumName>
      </programme>
```

2.6.5.8 Service component "Journaline"

This data application comprises several sources. It contains news messages in German, English and Hindi (non European characters!) an Fraunhofer Research news. It also contains a news ticker. This ticker changes every 20 seconds. It can be used to check whether the Journaline decoder is able to correctly process updates of an object. The OID of the ticker is 60001.

The entry page of the service looks like:

2.6.5.9 Service component "TPEG"

This recording made during the Mobile.Info project starts at 09:00. It starts with a stream directory. This is repeated every 10 seconds. Its size is 13 bytes.

Within the first minute there is just an SNI component that signals an additional TEC component. Since there are no TPEG messages available, the TEC component is not yet within the TPEG stream. This TPEG frame has a size of 86 bytes.

At 09:01 a TEC messages gets available (MessageID = 1, VersionNumber = 0). The size of the TPEG transport frame increases to 145 bytes.

At 09:02 this message is updated (MessageID = 1, VersionNumber = 1). The size of the TPEG transport frame remains at 145 bytes.

At 09:03 the message gets a Cancellation (MessageID = 1, VersionNumber = 2); the size decreases to 113 bytes.

At 09:03:59 the recording ends. In real-life, the message would still be broadcast for 15 minutes and might then be remove from the broadcast cycle.

In this ETI file, the 4 minute cycle starts from scratch.

The TPEG Service uses SID ABC = 0.44.203 (decimal), the TPEG Service Name is "TEC cycle", the Service Description is "TEC cycle generated by GEWI".

2.6.5.10 Service component "TPEG encr/journy"

This data application use two TPEG frames. The first frame carries three encrypted Journaline objects with OID 0x2ee1, 0x2eeb and 0x2eec. The used CAS is 124.

The second frame carries three unencrypted Journaline objects with OID 0x0005, 0x4e23, 0x6d61.

2.6.6 Service description / expected receiver behavior

The recording comprises 25000 DAB frame (10 minutes). If the ETI player loops around, a dropout occurs.

2.6.6.1 Audio service "192kbps LII A"

Every MPEG audio layer II decoder must be able to extract and play the signal (classical music).

The audio parameters are: MPEG audio layer II, 192 kbps, stereo, 48 kHz, no MPEG Surround.

The PAD channel of the audio carries the service components "SLS PAD" (Slideshow), "DLS PAD" (Dynamic Labels) and "Journaline PAD" (Journaline®).

2.6.6.2 Audio service "96kbps DAB+ A"

Every DAB+ decoder must be able to extract and play the signal (synthetic audio).

The audio parameters are: DAB+, 96 kbps, stereo, 48 kHz, no SBR, no MPEG Surround.

The PAD channel of the audio carries the service components "SLS PAD" (Slideshow), "DLS PAD" (Dynamic Labels) and "Journaline PAD" (Journaline®).

2.6.6.3 Audio service "192kbps LII"

Every MPEG audio layer II decoder must be able to extract and play the signal (classical music).

The audio parameters are: MPEG audio layer II, 192 kbps, stereo, 48 kHz, no MPEG Surround.

The PAD channel of the audio carries the service components "SLS PAD" (Slideshow), "DLS PAD" (Dynamic Labels) and "Journaline PAD" (Journaline®).

The audio service has a secondary data service components ("BWS Simple").

2.6.6.4 Audio service "96kbps DAB+"

Every DAB+ decoder must be able to extract and play the signal (synthetic audio).

The audio parameters are: DAB+, 96 kbps, stereo, 48 kHz, no SBR, no MPEG Surround.

The PAD channel of the audio carries the service components "SLS PAD" (Slideshow), "DLS PAD" (Dynamic Labels) and "Journaline PAD" (Journaline®).

The audio service has a secondary data service components ("BWS Full").

2.6.6.5 Data service "SLS slide NOW"

The data service is a slideshow that uses TriggerTime NOW in the MOT headers of the slide objects for triggering.

Service component "SLS" provides more details about the broadcast slides.

2.6.6.6 Data service "SLS slide ABS"

The data service is a slideshow that uses an absolute TriggerTime in the MOT headers of the slide objects for triggering.

Service component "SLS" provides more details about the broadcast slides.

2.6.6.7 Data service "SLS hdrupd NOW"

The data service is a slideshow that uses TriggerTime NOW in a HeaderUpdate object for triggering. The slides do not have a parameter TriggerTime.

Service component "SLS" provides more details about the broadcast slides.

2.6.6.8 Data service "SLS hdrupd ABS"

The data service is a slideshow that uses an absolute TriggerTime in a HeaderUpdate object for triggering. The slides do not have a parameter TriggerTime.

Service component "SLS" provides more details about the broadcast slides.

2.6.6.9 Data service "BWS simple"

This data service is a Broadcast Web Side as primary service component and a secondary audio service component (classical music) including PAD data.

2.6.6.10 Data service "BWS full"

This data service is a Broadcast Web Side as primary service component and a secondary audio service component (synthetic audio) including PAD data.

2.6.6.11 Data service "EPG"

This data service is an EPG describing two audio services ("192kbps LII A" and "96kbps DAB+ A").

2.6.6.12 Data service "Journaline"

This data service is a Journaline® data application.

2.6.6.13 Data service "TPEG mobile.info"

This data service carries a TPEG data application.

2.6.6.14 Data service "TPEG encr/journy"

This data service carries a TPEG data application with CAI and Journaline embedded in TPEG frames.

2.7 DAB reconfiguration (eti_subchannel_reconfig.dabp_c)

2.7.1 Purpose

This ETI file contains two different DAB multiplexes and about every 30 s there will be a reconfiguration from one multiplex to the other.

Both multiplexes carry the same service, but there are changes to bit rate/protection-level and start address within the ETI frame.

Therefore this tests permits to determine whether the receiver is able to handle ensemble reconfigurations on subchannel level. It also permits to tell whether the receiver is able to update ensemble and service labels.

The file also permits to test whether a receiver is able to follow a service even if the subchannel carrying a service component of the selected service is changed during a reconfiguration. Such functionality is essential for the broadcaster for the following example scenario.

There are two services "Station South" and "Station North". Most of the time, there is music only and the content is the same for both stations. Therefore it makes sense that both stations share one (big) subchannel (i.e., the audio subchannel is a service component of both services).

During times where there should be different content for north and south, this (big) subchannel is split into two smaller subchannels. While then one of these stations keeps the subchannel number of its audio service component (just the size of this subchannel changes), the other station will use a newly added subchannel with a different subchannel number. For this scenario to work it is therefore essential that a receiver follows a service and not a subchannel during reconfigurations. The user selects services, not subchannels.

2.7.2 DAB multiplex 1

2.7.2.1 General ensemble information

Ensemble label	'Multiplex 1 ' (abbreviated label: 'Mux 1'; flag field 0xc0e0; character set EBU basic core)
Ensemble identifier	0xdabf
Transmission mode	1
PAD Encoder flags	No restrictions (all optimizer steps used)
Ensemble country	Germany (D) (ecc and country code: E0D)
International table for PTy codes	All countries, except for North America

Ensemble time zone	Europe/Berlin
Alarm announcements	Alarm announcements are not supported
DAB time format (FIG0/10)	Long-form version

2.7.2.2 Service information

Table 2-77: Service 1 ('56kbps/EEP3-A')

Service label	'56kbps/EEP3-A' (abbreviated label: '56/3-A'; flag field 0xc238; character set EBU basic core)
Service identifier	0xd121 (audio service)
Static Program Type (PTy)	Education (PTy code 5; code for all countries except North America)
Static Language of Primary service component	German (language code 8)
Primary service component	Is there anybody out there? 2 (audio: live source or playlist)
Service component carried in	Stream 4
SCIDS	0 (automatically assigned)
Announcements	No announcements

Table 2-78: Service 2 ('72kbps/EEP4-A')

Service label	'72kbps/EEP4-A' (abbreviated label: '72/4-A'; flag field 0xc238; character set EBU basic core)
Service identifier	0xd122 (audio service)
Static Program Type (PTy)	Education (PTy code 5; code for all countries except North America)
Static Language of Primary service component	German (language code 8)
Primary service component	Words 2 (audio: live source or playlist)
Service component carried in	Stream 1
SCIDS	0 (automatically assigned)
Announcements	No announcements

Table 2-79: Service 3 ('192kbps/UEP4')

Service label	'192kbps/UEP4' (abbreviated label: '192/UEP4'; flag field 0xe1f0; character set EBU basic core)
Service identifier	0xd123 (audio service)
Static Program Type (PTy)	Education (PTy code 5; code for all countries except North America)
Static Language of Primary service component	German (language code 8)

Primary service component	Is there anybody out there? (audio: live source or playlist)
Service component carried in	Stream 2
SCIDS	0 (automatically assigned)
Announcements	No announcements

Table 2-80: Service 4 ('96kbps/EEP3-A')

Service label	'96kbps/EEP3-A' (abbreviated label: '96/3-A'; flag field 0xc238; character set EBU basic core)
Service identifier	0xd124 (audio service)
Static Program Type (PTy)	Education (PTy code 5; code for all countries except North America)
Static Language of Primary service component	German (language code 8)
Primary service component	Is there anybody out there? 3 (audio: live source or playlist)
Service component carried in	Stream 6
SCIDS	0 (automatically assigned)
Announcements	No announcements

Table 2-81: Service 5 ('96kbps/UEP3')

Service label	'96kbps/UEP3' (abbreviated label: '96/UEP3'; flag field 0xc3e0; character set EBU basic core)
Service identifier	0xd125 (audio service)
Static Program Type (PTy)	Education (PTy code 5; code for all countries except North America)
Static Language of Primary service component	German (language code 8)
Primary service component	Words (audio: live source or playlist)
Service component carried in	Stream 3
SCIDS	0 (automatically assigned)
Announcements	No announcements

Table 2-82: Service 5 ('96kbps/UEP3')

Service label	'72kbps/EEP3-A' (abbreviated label: '72/3-A'; flag field 0xc238; character set EBU basic core)
Service identifier	0xd126 (audio service)

Primary service component	Words 3 (audio: live source or playlist)
Service component carried in	Stream 5
SCIDS	0 (automatically assigned)
Announcements	No announcements

Table 2-83: Service 6 ('72kbps/EEP3-A')

Service label	'72kbps/EEP3-A' (abbreviated label: '72/3-A'; flag field 0xc238; character set EBU basic core)
Service identifier	0xd126 (audio service)
Primary service component	Words 3 (audio: live source or playlist)
Service component carried in	Stream 5
SCIDS	0 (automatically assigned)
Announcements	No announcements

Table 2-84: Service 7 ('Subch. change')

Service label	'Subch. change' (abbreviated label: 'Subch.'; flag field 0xfc00; character set EBU basic core)
Service identifier	0xd127 (audio service)
Primary service component	Is there anybody out there? 4 (audio: live source or playlist)
Service component carried in	Stream 8
SCIDS	0 (automatically assigned)
Announcements	No announcements

Table 2-85: Service 8 ('Journaline(R)')

Service label	'Journaline(R)' (abbreviated label: 'Journali'; flag field 0xff00; character set EBU basic core)
Service identifier	0xe0d00128 (data service)
Primary service component	Journaline ticker (application: Journaline(R) Ticker)
Service component carried in	Stream 7
SCIDS	0 (automatically assigned)

2.7.2.3 Stream information

Table 2-86: Stream 1

Subchannel mode	Audio
Bit rate	72 kbps (36 CUs, starting at CU 0)
Reassign unused bit rate	yes
Protection level	EEP 4-A
Subchannel identifier	11 (automatically assigned)
Service component	Words 2 (audio: live source or playlist)
Audio configuration	DAB+ (stereo, 48 kHz, SBR on, no MPEG Surround)
PAD mode	Variable size X-PAD
Service component used by	Audio (program) service '72kbps/EEP4-A ' (primary service component)

Table 2-87: Stream 2

Subchannel mode	Audio
Bit rate	192 kbps (116 CUs, starting at CU 36)
Reassign unused bit rate	yes
Protection level	UEP 4
Subchannel identifier	12 (automatically assigned)
Service component	Is there anybody out there? (audio: live source or playlist)
Audio configuration	MPEG audio layer II (stereo, 48 kHz, no MPEG Surround)
PAD mode	Variable size X-PAD
Service component used by	Audio (program) service '192kbps/UEP4 ' (primary service component)

Table 2-88: Stream 3

Subchannel mode	Audio
Bit rate	96 kbps (70 CUs, starting at CU 152)
Reassign unused bit rate	yes
Protection level	UEP 3
Subchannel identifier	14 (automatically assigned)
Service component	Words (audio: live source or playlist)

Audio configuration	MPEG audio layer II (mono, 24 kHz (half sampling rate), no MPEG Surround)
PAD mode	Variable size X-PAD
Service component used by	Audio (program) service '96kbps/UEP3 ' (primary service component)

Table 2-89: Stream 4

Subchannel mode	Audio
Bit rate	56 kbps (42 CUs, starting at CU 222)
Reassign unused bit rate	yes
Protection level	EEP 3-A
Subchannel identifier	21 (automatically assigned)
Service component	Is there anybody out there? 2 (audio: live source or playlist)
Audio configuration	DAB+ (stereo, 48 kHz, SBR on, no MPEG Surround)
PAD mode	Variable size X-PAD
Service component used by	Audio (program) service '56kbps/EEP3-A ' (primary service component)

Table 2-90: Stream 5

Subchannel mode	Audio
Bit rate	72 kbps (54 CUs, starting at CU 264)
Reassign unused bit rate	yes
Protection level	EEP 3-A
Subchannel identifier	23 (automatically assigned)
Service component	Words 3 (audio: live source or playlist)
Audio configuration	DAB+ (stereo, 48 kHz, SBR on, no MPEG Surround)
PAD mode	Variable size X-PAD
Service component used by	Audio (program) service '72kbps/EEP3-A ' (primary service component)

Table 2-91: Stream 6

Subchannel mode	Audio
Bit rate	96 kbps (72 CUs, starting at CU 318)
Reassign unused bit rate	yes

Protection level	EEP 3-A
Subchannel identifier	24 (automatically assigned)
Service component	Is there anybody out there? 3 (audio: live source or playlist)
Audio configuration	DAB+ (stereo, 32 kHz, SBR off, no MPEG Surround)
PAD mode	Variable size X-PAD
Service component used by	Audio (program) service '96kbps/EEP3-A ' (primary service component)

Table 2-92: Stream 7

Subchannel mode	Packet mode
Bit rate	8 kbps (6 CUs, starting at CU 390)
Reassign unused bit rate	yes
Protection level	EEP 3-A
Enhanced packet mode	no
Assigned bit rate	8000.0 bps
Subchannel identifier	50 (manually assigned)
Service component	Journaline ticker (application: Journaline(R) Ticker)
Service component used by	Data service 'Journaline(R) ' (primary service component)
Bit rate	8000 bps
Packet address	9 (automatically assigned)
SCID	9 (automatically assigned)

Table 2-93: Stream 8

Subchannel mode	Audio
Bit rate	96 kbps (72 CUs, starting at CU 396)
Reassign unused bit rate	yes
Protection level	EEP 3-A
Subchannel identifier	60 (manually assigned)
Service component	Is there anybody out there? 4 (audio: live source or playlist)
Audio configuration	DAB+ (stereo, 32 kHz, SBR off, no MPEG Surround)

PAD mode	Variable size X-PAD
Service component used by	Audio (program) service 'Subch. change ' (primary service component)

2.7.3 DAB multiplex 2

2.7.3.1 General ensemble information

Ensemble label	'Multiplex 2' (abbreviated label: 'Mux 2'; flag field 0xc0e0; character set EBU basic core)
Ensemble identifier	0xdabf
Transmission mode	1
PAD Encoder flags	No restrictions (all optimizer steps used)
Ensemble country	Germany (D) (ecc and country code: E0D)
International table for PTy codes	All countries, except for North America
Ensemble time zone	Europe/Berlin
Alarm announcements	Alarm announcements are not supported
DAB time format (FIG0/10)	Long-form version

2.7.3.2 Service information

Table 2-94: Service 1 ('64kbps/EEP4-B')

Service label	'64kbps/EEP4-B' (abbreviated label: '64/4-B'; flag field 0xc238; character set EBU basic core)
Service identifier	0xd121 (audio service)
Static Program Type (PTy)	Education (PTy code 5; code for all countries except North America)
Static Language of Primary service component	German (language code 8)
Primary service component	Is there anybody out there? 2 (audio: live source or playlist)
Service component carried in	Stream 4
SCIDS	0 (automatically assigned)
Announcements	No announcements

Table 2-95: Service 2 ('64kbps/EEP3-A')

Service label	'64kbps/EEP3-A' (abbreviated label: '64/3-A'; flag field 0xc238; character set EBU basic core)
Service identifier	0xd122 (audio service)
Static Program Type (PTy)	Education (PTy code 5; code for all countries except North America)
Static Language of Primary service component	German (language code 8)
Primary service component	Words 2 (audio: live source or playlist)
Service component carried in	Stream 1
SCIDS	0 (automatically assigned)
Announcements	No announcements

Table 2-96: Service 3 ('160kbps/UEP3')

Service label	'160kbps/UEP3' (abbreviated label: '160/UEP3'; flag field 0xe1f0; character set EBU basic core)
Service identifier	0xd123 (audio service)
Static Program Type (PTy)	Education (PTy code 5; code for all countries except North America)
Static Language of Primary service component	German (language code 8)
Primary service component	Is there anybody out there? (audio: live source or playlist)
Service component carried in	Stream 2
SCIDS	0 (automatically assigned)
Announcements	No announcements

Table 2-97: Service 4 ('96kbps/EEP4-A')

Service label	'96kbps/EEP4-A' (abbreviated label: '96/4-A'; flag field 0xc238; character set EBU basic core)
Service identifier	0xd124 (audio service)
Static Program Type (PTy)	Education (PTy code 5; code for all countries except North America)
Static Language of Primary service component	German (language code 8)
Primary service component	Is there anybody out there? 3 (audio: live source or playlist)
Service component carried in	Stream 6
SCIDS	0 (automatically assigned)
Announcements	No announcements

Table 2-98: Service 5 ('128kbps/UEP4')

Service label	'128kbps/UEP4' (abbreviated label: '128/UEP4'; flag field 0xe1f0; character set EBU basic core)
Service identifier	0xd125 (audio service)
Static Program Type (PTy)	Education (PTy code 5; code for all countries except North America)
Static Language of Primary service component	German (language code 8)
Primary service component	Words (audio: live source or playlist)
Service component carried in	Stream 3
SCIDS	0 (automatically assigned)
Announcements	No announcements

Table 2-99: Service 6 ('Journaline(R)')

Service label	'Journaline(R)' (abbreviated label: 'Journali'; flag field 0xff00; character set EBU basic core)
Service identifier	0xe0d00128 (data service)
Primary service component	Journaline ticker (application: Journaline(R) Ticker)
Service component carried in	Stream 7
SCIDS	0 (automatically assigned)

Table 2-100: Service 7 ('Subch. change')

Service label	'Subch. change' (abbreviated label: 'Subch.'; flag field 0xfc00; character set EBU basic core)
Service identifier	0xd127 (audio service)
Primary service component	Is there anybody out there? 4 (audio: live source or playlist)
Service component carried in	Stream 8
SCIDS	0 (automatically assigned)
Announcements	No announcements

Table 2-101: Service 8 ('96kbps/EEP3-A')

Service label	'96kbps/EEP3-A' (abbreviated label: '96/3-A'; flag field 0xc238; character set EBU basic core)
Service identifier	0xd126 (audio service)
Primary service component	Words 3 (audio: live source or playlist)

Service component carried in	Stream 5
SCIDS	0 (automatically assigned)
Announcements	No announcements

2.7.3.3 Stream information

Table 2-102: Stream 1

Subchannel mode	Audio
Bit rate	64 kbps (48 CUs, starting at CU 0)
Reassign unused bit rate	yes
Protection level	EEP 3-A
Subchannel identifier	11 (automatically assigned)
Service component	Words 2 (audio: live source or playlist)
Audio configuration	DAB+ (stereo, 48 kHz, SBR on, no MPEG Surround)
PAD mode	Variable size X-PAD
Service component used by	Audio (program) service '64kbps/EEP3-A ' (primary service component)

Table 2-103: Stream 2

Subchannel mode	Audio
Bit rate	160 kbps (116 CUs, starting at CU 48)
Reassign unused bit rate	yes
Protection level	UEP 3
Subchannel identifier	12 (automatically assigned)
Service component	Is there anybody out there? (audio: live source or playlist)
Audio configuration	MPEG audio layer II (stereo, 48 kHz, no MPEG Surround)
PAD mode	Variable size X-PAD
Service component used by	Audio (program) service '160kbps/UEP3 ' (primary service component)

Table 2-104: Stream 3

Subchannel mode	Audio
Bit rate	128 kbps (84 CUs, starting at CU 164)
Reassign unused bit rate	yes

Protection level	UEP 4
Subchannel identifier	14 (automatically assigned)
Service component	Words (audio: live source or playlist)
Audio configuration	MPEG audio layer II (joint stereo (intensity stereo), 24 kHz (half sampling rate), no MPEG Surround)
PAD mode	Variable size X-PAD
Service component used by	Audio (program) service '128kbps/UEP4 ' (primary service component)

Table 2-105: Stream 4

Subchannel mode	Audio
Bit rate	64 kbps (30 CUs, starting at CU 248)
Reassign unused bit rate	yes
Protection level	EEP 4-B
Subchannel identifier	21 (automatically assigned)
Service component	Is there anybody out there? 2 (audio: live source or playlist)
Audio configuration	DAB+ (stereo, 48 kHz, SBR on, no MPEG Surround)
PAD mode	Variable size X-PAD
Service component used by	Audio (program) service '64kbps/EEP4-B ' (primary service component)

Table 2-106: Stream 5

Subchannel mode	Audio
Bit rate	96 kbps (72 CUs, starting at CU 278)
Reassign unused bit rate	yes
Protection level	EEP 3-A
Subchannel identifier	23 (automatically assigned)
Service component	Words 3 (audio: live source or playlist)
Audio configuration	DAB+ (stereo, 32 kHz, SBR off, no MPEG Surround)
PAD mode	Variable size X-PAD
Service component used by	Audio (program) service '96kbps/EEP3-A ' (primary service component)

Table 2-107: Stream 6

Subchannel mode	Audio
Bit rate	96 kbps (48 CUs, starting at CU 350)
Reassign unused bit rate	yes
Protection level	EEP 4-A
Subchannel identifier	24 (automatically assigned)
Service component	Is there anybody out there? 3 (audio: live source or playlist)
Audio configuration	DAB+ (stereo, 32 kHz, SBR off, no MPEG Surround)
PAD mode	Variable size X-PAD
Service component used by	Audio (program) service '96kbps/EEP4-A ' (primary service component)

Table 2-108: Stream 7

Subchannel mode	Packet mode
Bit rate	8 kbps (6 CUs, starting at CU 398)
Reassign unused bit rate	yes
Protection level	EEP 3-A
Enhanced packet mode	no
Assigned bit rate	8000.0 bps
Subchannel identifier	51 (manually assigned)
Service component	Journaline ticker (application: Journaline(R) Ticker)
Service component used by	Data service 'Journaline(R) ' (primary service component)
Bit rate	8000 bps
Packet address	9 (automatically assigned)
SCID	9 (automatically assigned)

Table 2-109: Stream 8

Subchannel mode	Audio
Bit rate	96 kbps (72 CUs, starting at CU 404)
Reassign unused bit rate	yes
Protection level	EEP 3-A
Subchannel identifier	61 (manually assigned)

Service component	Is there anybody out there? 4 (audio: live source or playlist)
Audio configuration	DAB+ (stereo, 32 kHz, SBR off, no MPEG Surround)
PAD mode	Variable size X-PAD
Service component used by	Audio (program) service 'Subch. change ' (primary service component)

2.7.4 Parameters of the subchannels

The following table provides the parameters used for the subchannels carried in the ensembles. The parameters comprise: Service identifier (SID), Song, Subchannel identifier (SC), Service Label (giving bit rate and protection level), number of capacity units used by this subchannel (CU), start address with the MSC (SAD) and the audio parameters.

SIDSong	SC	Service label (bit rate/ PL)multiplex 1CUs SAD	Audio parameters multiplex 1	Service label in multiplex 2	Bit rate/PL in multiplex 2
0xd122 Words	11	72kbps/EEP4-A 36 0	DAB+, stereo, 48 kHz, SBR on	64kbps/EEP3-A 48 0	DAB+, stereo, 48 kHz, SBR on
0xd123 Is there..	12	192kbps/UEP4 116 36	Layer II, stereo, 48 kHz	160kbps/UEP3 116 48	Layer II, stereo, 48 kHz
0xd125 Words	14	96kbps/UEP3 70 152	Layer II, mono, 24 kHz	128kbps/UEP4 84 164	Layer II, joint stereo, 24 kHz
0xd121 Is there..	21	56kbps/EEP3-A 42 222	DAB+, stereo, 48 kHz, SBR on	64kbps/EEP4-B 30 248	DAB+, stereo, 48 kHz, SBR on
0xd126 Words	23	72kbps/EEP3-A 54 264	DAB+, stereo, 48 kHz, SBR on	96kbsp/EEP3-A 72 278	DAB+, Stereo, 32 kHz, SBR off
0xd124 Is there..	24	96kbps/EEP3-A 72 318	DAB+, stereo, 32 kHz, SBR off	96kbps/EEP4-A 48 350	DAB+, Stereo, 32 kHz, SBR off

SIDSong	SC	Service label (bit rate/ PL)multiplex 1CUs SAD	Audio parameters multiplex 1	Service label in multiplex 2	Bit rate/PL in multiplex 2
0xe0d00128	50/51	8kbps/EEP3-A 6 390	Journaline® ticker	8kbps/EEP3-A 6 398	Journaline® ticker
0xd127 Is there…	60/61	96kbps/EEP3-A 72 396	DAB+, stereo, 32 kHz, SBR off	96kbps/EEP3-A 72 404	DAB+, stereo, 32 kHz, SBR off

2.7.5 Expected receiver behavior

The receiver should be able to play the audio even if the audio subchannel is reconfigured. It should also change the service label according to the audio parameters.

The audio reconfiguration will not be perfectly seamless.

For DAB+, all DAB+ super frames are syntactically correct (no RS, CRC or fire code errors). However, since the audio decoder needs some time after startup with the new configuration, a very short audible artifact might occur. Note that the DAB+ standard urges the broadcaster to change audio parameters only in periods of silence.

For Layer II, the standard permits to seamlessly switch to new audio parameters. However, the current implementation of the DAB ContentServer will cause a short dropout (concealed by the audio decoder). The very first two audio frames (e.g. 48 ms for 48 kHz sampling rate; 96 ms for 24 kHz sampling rate) of the new configuration will be concealed since their ScfCRC will fail.

Note that if the number of CUs used for the layer II audio subchannel is increased or remains the same, then the audio reconfiguration occurs at the reconfiguration instant.

If the number of CUs used for the layer II audio subchannel is decreased, then the audio reconfiguration occurs 15 DAB frames (i.e. 15 * 24 ms) ahead of the reconfiguration instant

Service "Journaline Ticker" (service identifier 0xe0d00128) and Service "Subch. change" (Service identifier 0xd127) do not change subchannel parameters (i.e., they keep subchannel bit rate and protection level); however, their SAD (start address) changes and their subchannel identifier.

It is essential that a receiver tuned to one of these services is able to follow the service even if the subchannel is changed during a reconfiguration.

A short drop out of the audio might be acceptable (provided no noise is generated). However, the receiver should switch very fast (and automatically!) to the new subchannel.

Sub channel 14 changes from (joint) stereo to mono and back. Such a change is permitted, but some decoders seem to have problem with such a scenario.

2.8 Test radio equipment directive (RED_Sine +_120s_eti_ni_file.dabp_c)

2.8.1 Purpose

For tests according to the Radio Equipment Directive 2014/53/EU, in line with ETSI EN 303 345.

The ETI file contains one DAB multiplex, consisting of the MPX_RED multiplex with one service, Sine+. The service includes a sine signal of 1 kHz with a level of 3 dB full scale.

2.8.2 General ensemble information

Ensemble label	RED_1kHz-3dB
Ensemble identifier	0x1000
Transmission mode	1
PAD encoder flags	No restrictions (all optimizer steps used)
Ensemble country	Germany (1)
Table for PTY codes	Determined by ensembly country
Ensemble time zone	UTC
Alarm announcement	Alarm announcements are not supported.
DAB time format	Long-form version

2.8.3 Service information

Service label	Sine+
Service identifier	0x1001
Static program type	No program type
Static language of primary service component	No static language
SCIDS	0 (automatically assigned)
Announcements	No announcements
Service identifier	0x1001

2.8.4 Stream information

Subchannel mode	Audio
Bit rate	128 kbps
Reassign unused bit rate	No unassigned bit rate
Protection level	EEP 3-A
Subchannel identifier	1
Service component	1kHz_-3dB (audio: live source or play list) HE-AAC v2
Audio configuration	DAB+ (mono, 48 kHz)
PAD mode	Variable size X-PAD
Service component used by	Audio (program) service "Sine+" (primary component service)

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