

## OVERVIEW OF THE AUDIO DESCRIPTION IN SPANISH DTT CHANNELS

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**Abstract:** This paper presents a research of current practices in audio description broadcast in Spanish television channels. The results of this research show that in some television channels the audio description is broadcasted in 'receiver mix audio description' mode while in other channels the alternative used is 'broadcaster mix audio description' mode. In both cases, correct signalling and correct audio description coding is crucial so that digital television receivers can recognize audio description in the broadcast signal and reproduce it upon user request. The current practice of audio description broadcast in Spanish television channels only partially fulfils DVB standard. In addition, not all digital television receivers are able to reproduce appropriately the wide range of options defined in DVB to convey audio description in the television channels. The consequence for the users is less availability of audio description services than expected. Some of the problems detected for the activation of audio description in users' receivers can be solved by applying some enhancement to signalling information used by broadcasters in their DVB television channels. Finally, some recommendations for the users are included to present the key aspects for audio description activation in their digital television receivers.

**Keywords:** audio description, digital television, DTT, descriptor, audio stream, accessibility.

## Introduction

On 13 December 2006, the General Assembly of the United Nations adopted, ratified by more than 80 countries, the Convention on the Rights of Persons with Disabilities (CRPD) and an associated Optional Protocol (United Nations, 2006) (Kayess & French, 2008). Governments in many countries have taken initiatives to promote and regulate accessibility services to multimedia television contents. This is the case of Spain (Spanish Ministry of Industry, Tourism and Trade, 2006) (Spanish Government, 2010), UK (Ofcom, 2012), France, Italy, Germany and other countries in Europe. Current regulations establish minimum levels of availability of accessible multimedia in digital terrestrial television (DTT) and also in the fast growing IPTV networks.

In Spain the recent approval of the General Communication Audiovisual Law, LGCA (Spanish Government, 2010), minimum levels of availability of accessible multimedia in digital terrestrial television have been established. Among all accessibility services regulated, the LGCA establishes the minimum threshold of programs with audio description for most Spanish television channels. The audio description provides a narrative of the visual elements of an audiovisual program to visually impaired people (Utray, Pereira, & Orero, 2009). Once completed the transitory period that finished last 31th December, 2013, the Law establishes minimum levels for audio description that become 10 hours per week in every public television channel, and 2 hours per week in every private channel.

The Law defines quantitative obligations as well as recommendations to the broadcasters to fulfil technical requirements according to applicable standards.

Once these regulations are established, the need to measure and qualify the actual contents of subtitling and audiodescription services arises from the involved actors. Television providers need to evaluate the real presence of accessibility services in their emissions, and users' organizations are also interested parties, but it is a duty for regulators to monitor what providers are really offering. When dealing with quantity measurements of subtitling

time in digital terrestrial television or IPTV networks, the MPEG-2 transport stream (ISO/IEC 13818-1, 2007) composition and content need to be explored in detail. Along with the technical quality and related signalling parameters, there are codes of best practices in the field of audio description that address issues such as: language use, quality of diction (intonation and interpretation), sound mix and adequacy in fulfilling needs of users (Orero, 2005). All these parameters require the intervention of domain experts in the evaluation process.

In Spain and in Europe, terrestrial digital television is broadcast according to the family of international standards for Digital Video Broadcasting (DVB) (ETSI EN 300 744 , 2009) (ETSI EN 300 468, 2009). The DVB signal relies on a MPEG-2 structure consisting of data streams (video, audio, data) and signalling streams and, of these, some carry the so called PSI (Program Specific Information) signalling tables (Program Association Table, Program Map Table, ...) while other, in the case of DVB digital television (Reimers, 2006), are SI (Service Information) tables (Event Information Table, Service Description Table...). Audio description is carried as part of the television channel, as a private data elementary stream within the MPEG-2 streams.

Hence audio description offered by the television channels is regulated by the DVB standard family. DVB defines different ways in which broadcasters can embed audio description of television programs in their television channels.

On the other hand, DTT receivers and televisions with integrated DTT must fulfil the DVB standard's requirements to ensure that audio description in the received DTT signal is presented to the users and played correctly. Correct signalling and audio description coding is crucial so that television decoders can recognize audio description in the broadcast signal and reproduce it upon user request.

The current practice of audio description broadcast in Spanish television channels only partially fulfils DVB standards (ETSI EN 300 468, 2009), (ISO/IEC 13818-1, 2007). In addition, not all the televisions are able to play correctly the wide range of options defined in DVB for the delivery of audio

description in the television channels. The consequences to the users are less availability of audio description services than expected.

In the following sections, we present the result of the research done in the Spanish Centre of Subtitling and Audio Description (CESyA) during the monitoring of accessibility services in Spanish television channels, which has been done manually since 2006 and automatically since 2012. Automatic monitoring of the audio description presence in all nation-wide television channels is done systematically in CESyA since October 2013. Monitoring of subtitling and audiodescription is performed with SAVAT 2.0, CESyA's own technology that allows performing automatic monitoring of accessibility in DVB television channels. Studies in the areas of communication sciences, audiovisual translation, linguistics and telecommunications engineering, conducted in collaboration with leading companies and international experts (Looms, 2010), have led to significant and high quality technological developments in Europe and particularly in Spain. SAVAT 2.0 is the contribution of Spanish government to the monitoring of digital terrestrial television, as part of the monitoring activities foreseen by United Nations in its convention (United Nations, 2006).

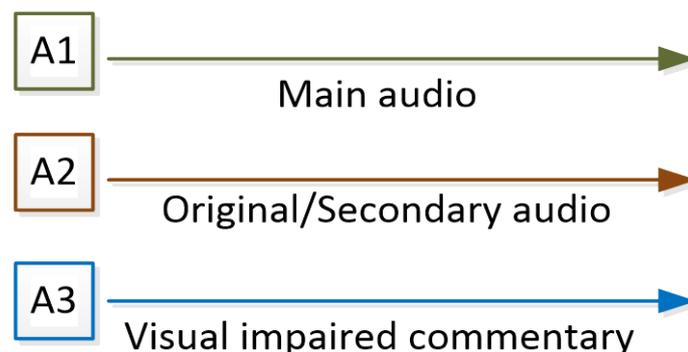
Next section provides an analysis of the different alternatives offered by the DVB standard family for broadcasting audio description in television channels; every broadcaster should deliver audio description according to one or these alternatives. Current practice in all public and private television channels is covered after that; the results presented are derived from the exhaustive research performed at CESyA covering audio description monitoring 24 hours/day over 26 television channels. All data presented here has been obtained in the period January 2014-May 2014. During these months, the overall audio description detected in the 26 DTT channels monitored adds up to 2201 hours; during this period, the total emission is 84048 hours for the 26 television channels.

## Audio description in digital television

Audio description in digital television (terrestrial, cable, satellite...) is included in the television channels as an option, selectable by users in reception. According to DVB, there are two ways to broadcast audio description for the visually impaired in a television channel:

- Audio stream dedicated entirely to the comments for visual impaired (unmixed audio description / receiver mix audio description): it is usually transmitted through the third audio stream of the television channel and requires the decoder to have the functions needed to mix both of the two audio streams involved: main audio stream and the audio stream that contains the audio description. It is schematically as is shown in Figure 1.

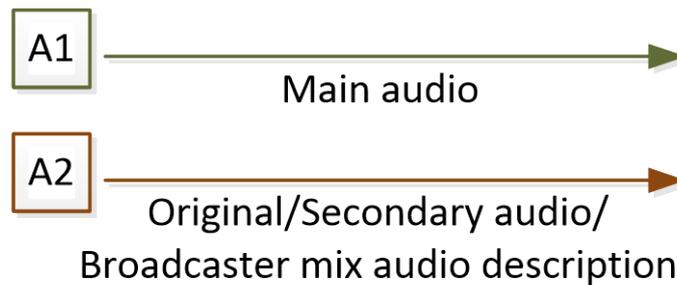
*Figure 1. Flow of visual impaired commentary in an independent audio channel*



- Audio channel with the comments for visual impaired mixed with the main audio of the program (mixed audio description / broadcaster mix audio description): it is usually broadcasted in the second audio stream of the television channel. In most broadcasters this audio stream is not only used to transmit audio description, but it is also used to transmit the original version of the television program or other types of audio (Figure 2). When there is no audio description or original version, the actual practice is broadcasting in the second

audio stream the same content transmitted through the main audio stream.

*Figure 2. Audio stream carrying the program's audio description mixed with main audio in the same channel*



The two alternatives imply different choices in the protocol elements involved. The most relevant aspects regarding audio description are those affecting signalling carried in PMT and EIT tables, which are summarized in next chapter.

Nowadays, nearly all DVB DTT decoders and televisions with integrated DTT decoder are able to reproduce the secondary audio stream when audio description is mixed with the main audio of the program (Option 2). However, many DTT decoders are not fully DVB compliant and do not support receiver mix audio description mode (Option 1). In addition, some DTT decoders do not offer audio description related options in their On-Screen Display (OSD) menus.

This results in the inability of many users to reproduce audio description when receiver mix audio description is the option chosen by the broadcaster. Receiver mix audio description is the preferred option for many broadcasters for this service as it requires lower bandwidth.

## Audio description signaling

Digital television is carried over MPEG-2 Transport Streams. The MPEG-2 (ISO/IEC 13818-1, 2007) structure consists of data streams (video, audio, data) and signalling streams and, of these, some are PSI signalling tables

(PMT, PAT, ...) while other, in the case of Transport Streams carrying DVB digital television, are SI tables (EIT, SDT,...).

The applicable standards in this case are:

- ETSI EN 300 468 V 1.11.1 (ETSI EN 300 468, 2009)
- ISO 13818-1 (ISO/IEC 13818-1, 2007)
- ISO 639-2 (ISO 639-2, 2008)
- TS 101 154 V1.9.1 (ETSI TS 101 154, 2009)
- UNE 133300:2011 (UNE 133300, 2011)

When a television program includes audio description for the visual impaired users, this implies two types of data in the broadcast signal:

- Content information: The audio stream that carries audio description for the television channel.
- Signalling information: Transport Stream composition as defined in PSI tables and DVB program and service SI: EIT, SDT...

With regard to content information, Annex J (Signalling of Receiver-Mixed and Broadcast-Mixed Supplementary Audio) of DVB ETSI EN 300 468 defines two mechanisms for transmitting supplemental audio (audio description):

- a) Receiver mix audio description.
- b) Broadcaster mix audio description.

Signaling information describes the type of audio content and how it is conveyed in the MPEG-2 Transport Stream, together with other data of the television channel. Correct signalling comprises, in the case of audio description, information in two of the Transport Stream's tables: PMT and EIT.

- The composition of each television channel is transmitted in its PMT; among the information specified for a given channel is the description of the audio streams associated to the television channel. Audio description carried in one of the audio streams of the television channel is therefore specified through DVB descriptors foreseen in

(DVB), and shall be according to the option selected in emission. The descriptor used is the *ISO language descriptor* defined in ETSI EN 300 468.

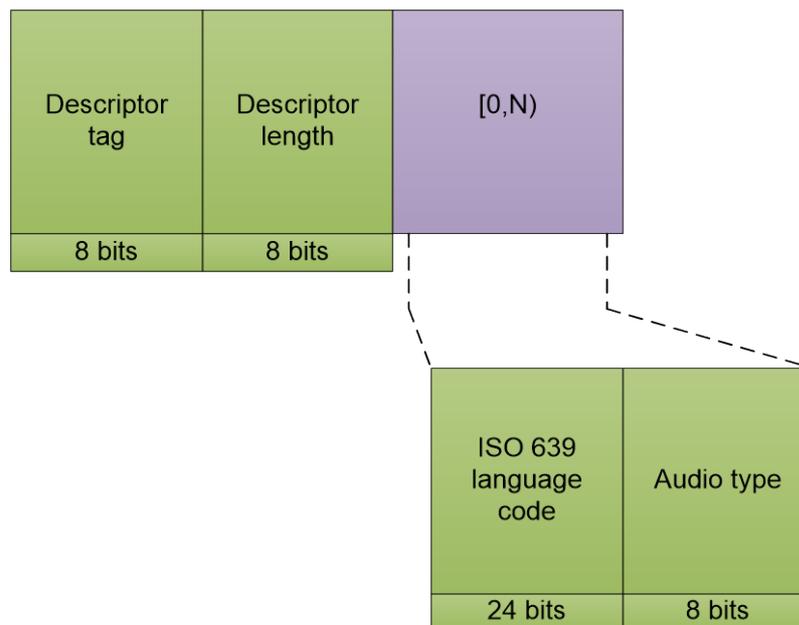
- The EIT carries the program schedule of all channels in the Transport Stream, including the indication of audio description availability and its type.

The correct signalling choices for receiver mix audio description and broadcaster mix audio description, both in the PMT and EIT tables, are described in next paragraphs.

### Audio description signaling in PMT table

Signaling the presence of audio description to the digital television receiver starts by indicating in the PMT table the type of audio conveyed in each audio stream. This is done in the PMT table by means of the *ISO 639 language descriptor* (ISO/IEC, 2007), which indicates the language and type of audio associated with an audio stream. The structure and fields of the *ISO 639 language descriptor* are shown in Figure 3.

Figure 3. Structure of ISO 639 language descriptor.



- Descriptor\_tag: "0x0A".

- *Descriptor\_length*: identifies the descriptor's size
- *ISO\_639\_language\_code*: identifies the language or languages of the audio stream with 3 characters. For those cases in which the flow uses different types of language or audio, depending on the program that is being emitted, it is allowed either to define multiple languages or to use a generic *language code*. Table 1 shows the most common values used in Spain:

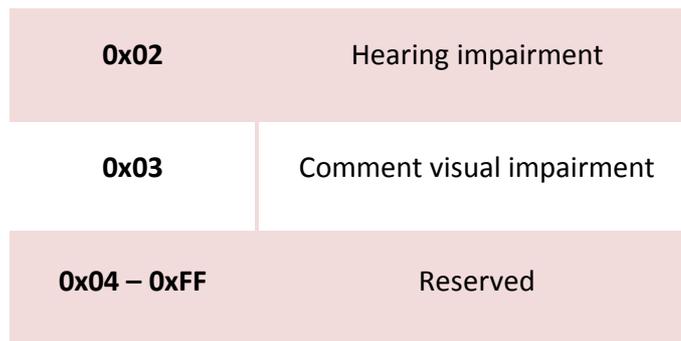
Table 1. *Language\_code values*

Language_code	Description
spa	Spanish
qaa	Reserved for original version
qad	Reserved
mul	Multiple languages
und	Undefined

- *Audio\_type*: describes the type of audio associated with an audio stream. Table 2 shows the values allowed for this field.

Table 2. *Audio\_type values.*

Audio_type	Description
0x00	Undefined
0x01	Audio for the hearing impaired



Among all possible combinations of fields *audio\_type* and *language\_code*, only a subset of them are valid in the case of audio description. Subsections J.2.2 y J.3.2 of Annex J of DVB ETSI EN 300 468 specify the values to be used in the two scenarios foreseen:

#### Receiver mix audio description:

- *ISO\_639\_language\_code*: the value of this field, taking into account that the audio description will be in Spanish, should be "spa".
- *Audio\_type*: for the case where the audio stream carries just the visual impairment comments, its value must be "0x03".

#### Broadcaster mix audio description:

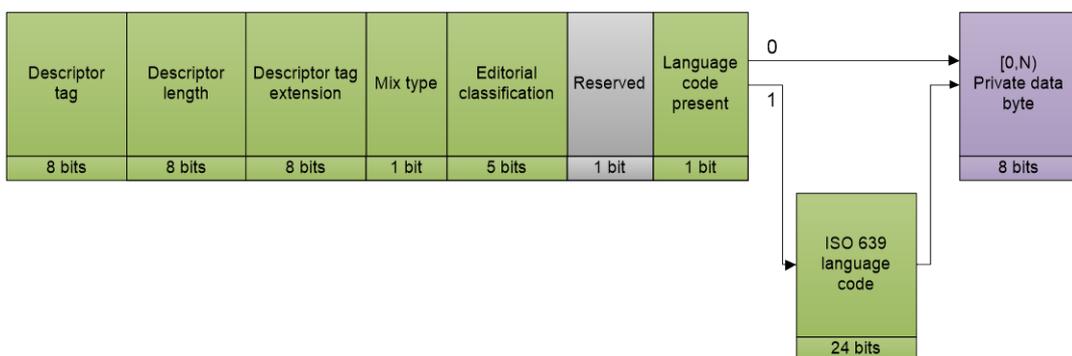
- *ISO\_639\_language\_code*: in this case, the encoding depends on the broadcast method chosen. There are two main possibilities:
  - a) A single audio stream: when a single audio stream is used to broadcast alternatively audio description and original version depending of the program, there exist in its turn two signaling alternatives: 1) transmitting a single *ISO\_639\_language\_code* within the *ISO\_639\_language\_descriptor* containing one of these two values: "NAR" or "qad" (other allowed values defined in ISO 639-2 being "mul" and "und"), or 2) alternatively an *ISO\_639\_language\_descriptor* could be sent with two *ISO\_639\_language\_code*: one with value "qad" referring to audio description and another with the value "qaa" referring to original version.

b) Dedicated audio stream: when different streams are used for audio description, original version, secondary language, etc., a second *ISO\_639\_language\_descriptor* will be introduced in the PMT for each audio stream; the respective fields *ISO\_639\_language\_code* of those descriptors will be coded according to the standard ISO 639-2, namely, "spa" for Spanish, "cat" for Catalan, "qaa" for original version, "qad" for audio description...

- *Audio\_type*: taking into account that former *ISO\_639\_language\_code* field refers to different types of audio, the *audio\_type* field has to carry the undefined audio value, and therefore "0x00" value shall be assigned.

In addition to this, the standard ETSI EN 300 468 offers the possibility to describe in greater detail in the PMT the content of the audio stream. For this purpose, the subsection J.4 of annex J specifies an additional descriptor. *Supplementary audio descriptor* allows the broadcaster to specify the type of audio description mix conveyed in the audio stream. The *Supplementary audio descriptor* belong to the *Extension descriptor* family, its structure being depicted in Figure 4:

Figure 4. Structure of the Supplementary audio descriptor.



- *Descriptor\_tag*: "0x7F". Identifies the *Extension descriptor* family.
- *Descriptor\_tag\_extension*: "0x06". Identifies the *Supplementary audio descriptor*.
- *Mix\_type*: identifies the type of mix. Allowed values are shown in Table 3.

Table 3. Mix\_type values.

Mix_type	Description
0x00	Supplementary stream
0x01	Complete and independent audio stream

- *Editorial\_classification*: classifies the audio stream's content. Allowed values are shown in Table 4.

Table 4. Editorial\_classification values.

Audio_type	Description
00000	Main audio
00001	Audio description for the visually impaired
00010	Clean audio for the hearing impaired
00011	Spoken subtitles for the visually impaired
00100 a 10111	Reserved for future use
11000 a 1111	User defined

- *Language\_code\_present*: when the value of this field is set to one, it indicates that the following 3 bytes will indicate the audio’s language by the field *ISO\_639\_language\_code*.
- *Private\_data\_byte*: the values in this field are reserved for private use.

None of the above described descriptors are independent. Subsection J.4 of ETSI EN 300 468 specifies the valid combinations of the fields of the descriptors *Supplementary audio descriptor* and *ISO 639 language descriptor* to signal the details of the audio stream carrying the audio description of the television channel. Table 5 summarizes the field’s combination and values allowed. Field *audio\_type* belongs to the *ISO 639 language descriptor*, while the fields *mix\_type* and *editorial\_classification* belong to *Supplementary audio descriptor*.

Table 5. Audio descriptor’s possible combinations in PMT.

Audio	Audio type	Mix type	Editorial classification
Main	0x00	1	0
Audio description (mixed broadcast)	0x00 o 0x03	1	1
Audio description (mix in receptor)	0x03	0	1

These two descriptors, when used by broadcasters, provide the maximum information about all the audio streams associated with each television channel, and allow the digital terrestrial television receivers to present enhanced information to the users in the On Screen Display menus.

## Audio description signalling in EIT table

On the other hand, the standard DVB ETSI EN 300 468 specifies the way to signal through the EIT table that a specific program in the television channel has audio description available. This information is relevant for the Electronic Program Guide (EPG) that digital terrestrial television receivers present to the users in their On Screen Display menus. OSDs are an additional source of information for the users in order to present all accessibility services available for each television channel.

For each program in the television channel, an entry in EIT table shall specify the content type of the streams associated to the channel while the program is on air. For instance, if a movie is broadcast with two languages, this must be taken into account and therefore show that the audio is multilanguage. Another example regarding video characteristics may be that if a movie has a panoramic format, it should be indicated as video format 16:9. All this information describing the content of each stream in the television channel is provided through the EIT's *component descriptor*. The structure of this descriptor is as follows in Figure 5:

Figure 5. Structure of the Component descriptor.

Descriptor tag	Descriptor length	Reserved future use	Stream content	Component type	Component tag	ISO 639 language code	[0,N) Text char
8 bits	8 bits	4 bits	4 bits	8 bits	8 bits	24 bits	8 bits

- *Descriptor\_tag*: "0x50".
- *Stream\_content*: specifies the stream type. Table 6 shows the possible values that this field can take for audio description.

*Component\_type*: specifies the type of content conveyed in the respective video, audio or data stream.

- Table 6 shows the possible values that this field can take for audio description.
- *Text\_char*: contains a textual description of the stream component.

Table 6. Values of the field component descriptor for audio description.

<b>Stream content</b>	<b>Component type</b>	<b>Description</b>
<b>0x02</b>	<b>0x40</b>	Audio MPEG-1, audio description for visually impaired people
<b>0x02</b>	<b>0x47</b>	Audio MPEG-1, audio description mixed in reception
<b>0x02</b>	<b>0x48</b>	Audio MPEG-1, broadcast mixed audio description
<b>0x06</b>	<b>0x40</b>	Audio HE-AAC, audio description for visually impaired people
<b>0x06</b>	<b>0x44</b>	Audio HE-AAC V2, audio description for visually impaired people
<b>0x06</b>	<b>0x47</b>	Audio HE-AAC, audio description mixed in reception
<b>0x06</b>	<b>0x48</b>	Audio HE-AAC, broadcast mixed audio description
<b>0x06</b>	<b>0x49</b>	Audio HE-AAC, audio description mixed in reception
<b>0x06</b>	<b>0x4A</b>	Audio HE-AAC, broadcast mixed audio description

As in the case of PMT, these values must be used to signal via the EIT table the availability of audio description for a television program in the channel. Taking into account what is specified by ETSI EN 300 468 (Table 6) and the limitations imposed in the Spanish market by the norm UNE 133300:2011, valid values for the *component descriptor* in EIT for audio description in Spain are the following:

- Receiver mix audio description:
  - a) MPEG-1:
    - Stream\_content: "0x02"
    - Component\_type: "0x47"
  - b) HE-AAC:
    - Stream\_content: "0x06"
    - Component\_type: "0x47"
- Broadcast mix audio description:
  - a) MPEG-1:
    - Stream\_content: "0x02"
    - Component\_type: "0x48"
  - b) HE-AAC:
    - Stream\_content: "0x06"
    - Component\_type: "0x48"
- Usual case:
  - a) MPEG-1:
    - Stream\_content: "0x02"
    - Component\_type: "0x40"
  - b) HE-AAC:
    - Stream\_content: "0x06"
    - Component\_type: "0x40"
  - c) HE-AAC V2:
    - Stream\_content: "0x06"
    - Component\_type: "0x44"

## Current practice of audio description broadcast in Spanish television channels

Spanish television outlook in terms of audio description signaling is very varied. All channels are choosing to signal the audio description in one of the two methods that we have seen in figures 1 and 2, with some exceptions such as TV3 that add a fourth audio channel to broadcast the program's audio in more than 2 languages.

Regarding PMT, the use made by broadcasters of the different options given by DVB to signal the streams is appropriate. They signal audio streams in a standardized way, depending on whether the audio description is mixed in emission or in reception. For this, they always use the descriptor *ISO 639 language descriptor* which was described above.

Moreover, it is noteworthy that in any case program audio description's signaling is done using the EIT tables. Currently, any channel uses the *component\_descriptor* (ETSI. Digital Video Broadcasting (DVB), 2009) to signal the accessible contents of channel's programs for people with visual impaired. However, this same descriptor is used to signal the type of audio or video. On the other hand, it is usually signal through descriptors in the table EIT the name, genre and even the minimum age to watch the program.

### RTVE

#### Signaling

As shown in the table below, channel TDP has only one audio stream and therefore this channel does not broadcast audio description in any of its programs. On the other hand, channels La 1, Clan and La2 have three audio streams, while the second stream is used to send the program's original audio ("qaa") the third audio stream is used for just broadcast the audio description content (mix in reception). Finally, channel 24h has a second audio stream in which they only broadcast the program's original audio.

Table 7. Audio streams language in RTVE

	First stream	Second stream	Third stream (AD)
<b>TDP</b>	spa	-	-
<b>La 1</b>	spa	qaa	spa
<b>La 2</b>	spa	qaa	spa
<b>24h</b>	spa	qaa	-
<b>Clan</b>	spa	qaa	spa

### Optimal signaling

In case of channel 24h wants to broadcast audio description, they should change the value "qaa" of *ISO\_639\_language\_code* in their second stream for either "NAR", "qad", "und" or "mul" as it has been shown before.

Table 8. Proposal of audio description broadcast in channel 24h

	First stream	Second stream
<b>24h</b>	spa	<b>NAR, qad, und or mul</b>

### Statistical data

The statistical data obtained by analyzing the channels belonging to this media group during 2014 are shown in the following table.

Table 9. RTVE audio description weekly hours

	AD weekly hours
<b>TDP</b>	0h
<b>La 1</b>	2,39h
<b>La 2</b>	1,40h
<b>24h</b>	0h
<b>Clan</b>	0h

In RTVE group, La1 and La2 are the only channels which broadcast audio description, and its emission is mainly based on movies, TV series and culture shows.

## Atresmedia

### Signaling

All channels in Atresmedia Group broadcast audio description in the same way, through the second audio channel giving to it a value of “und”. This way of broadcast audio description is the appropriate because that audio stream is used to send the original language of the program and also to send audio description. Therefore, the indication is adequate.

Table 10. Audio streams language in Atresmedia Group

	First stream	Second stream	Third stream (AD)
<b>Antena 3</b>	spa	und	-

	First stream	Second stream	Third stream (AD)
Neox	spa	und	-
Nova	spa	und	-
LaSexta	spa	und	-

### Statistical data

All channels in Atresmedia group broadcast audio description, with the results shown in the following table during 2014.

*Table 11. Atresmedia audio description weekly hours*

	AD weekly hours
Antena 3	4,37h
Neox	9,21h
Nova	2,66h
LaSexta	4,45h

Among Atresmedia group is noteworthy NEOX, because in addition to having the highest level of weekly audio description, has programs with audio description almost every day while other channels just have isolated programs.

## Mediaset

### Signaling

Within Mediaset Group all channels broadcast audio description in the same way, in their third channel with visual impaired commentary to mix with first audio stream in receiver.

*Table 12. Audio streams language in Mediaset Group.*

	<b>First stream</b>	<b>Second stream</b>	<b>Third stream (AD)</b>
<b>Telecinco</b>	spa	qaa	spa
<b>FDF</b>	spa	qaa	spa
<b>Energy</b>	spa	qaa	spa
<b>Cuatro</b>	spa	qaa	spa
<b>Boing</b>	spa	qaa	spa
<b>Divinity</b>	spa	qaa	spa

### Statistical data

In Mediaset group, all channels have broadcasted audio description during 2014 as is shown in the following table.

*Table 13. Mediaset audio description weekly hours*

	<b>AD weekly hours</b>
<b>Telecinco</b>	1,40h

	AD weekly hours
<b>FDF</b>	28,68h
<b>Energy</b>	3,20h
<b>Cuatro</b>	1,75h
<b>Boing</b>	2,09h
<b>Divinity</b>	2,06h

FDF is the channel in Spanish TV with the highest level of audio description and has daily programs which are always audio described. Almost all channels base their audio description programming on movies and series, highlighting Boing which is entirely devoted to children's programming.

### Other television channels

#### Signaling

In this case we can see that there is a disparity in the methods used for managing audio streams. In the case of Paramount Channel in the same way as channel 24h, use the second audio stream to send original audio of programs. Furthermore, as we have seen in the case of channel TDP, channels Intereconomía and 13 TV only have one audio stream and therefore it is impossible to broadcast audio description. The channel Discovery Max has only two audio streams and the second one is used only for broadcast the original audio in English. Finally, Disney Channel like Mediaset group sends in third audio channel visual impaired commentary to mix with first audio stream in receiver.

Table 14. Audio streams language in various communication groups.

	First stream	Second stream	Third stream (AD)
<b>Paramount Channel</b>	spa	qaa	-
<b>Intereconomía</b>	spa	-	-
<b>Discovery Max</b>	spa	eng	-
<b>Disney Channel</b>	spa	eng	spa
<b>13 TV</b>	spa	-	-

### Optimal signaling

As much in Paramount Channel as Discovery Max only use second audio stream to broadcast original audio language of TV show or movies. In case of these channels want to broadcast audio description, they should change their respective fields *ISO\_639\_language\_code of second stream* to "NAR", "qad", "und" or "mul". Another option to broadcast audio description and not delete the original audio of second stream would be open a new third audio stream to send visual impaired commentary with value of field *ISO\_639\_language\_code* to "spa".

Table 15. Proposal of audio description broadcast in channel Discovery Max and Paramount Channel

	First stream	Second stream	Third stream (AD)
<b>Paramount Channel</b>	spa	NAR, qad, und or mul	spa
<b>Discovery Max</b>	spa	NAR, qad, und or mul	spa

#### Statistical data

During 2014, channels in this group have the levels of audio description per week shown in the following table:

Table 16. Other channels audio description weekly hours

	AD weekly hours
<b>Paramount Channel</b>	0,53h
<b>Intereconomía</b>	0h
<b>Discovery Max</b>	0,77h
<b>Disney Channel</b>	14,73h
<b>13 TV</b>	0h

Disney Channel stands out among these channels. It is entirely devoted to children's programming. Some of the programs always include audio description.

## **Access for users**

Activating audio description in a television channel is not always trivial and it can involve a series of steps regarding the receivers or televisions the user has and the way television broadcasters broadcast their contents.

Currently in Spain, program's audio description is done by broadcasters in two different ways as it has been shown in previous points: mixing in emission the original audio with the audio description or broadcasting only the audio description so that it is mixed with the original audio in the user's receiver or television. Each one of these ways has a method to be activated in the receptor and therefore we will explain both of them separately.

When a television channel broadcasts an audio description mixing it directly in the emission, the user has the audio description service in his receiver through the channel's second audio stream. Therefore, in this second audio stream it is available the original program's audio mixed with audio description, without the receiver having to do any additional work. To activate audio description within this method, the user only has to change to the second audio stream, usually by a command button called DUAL or I-II, which is the same used to listen programs' original version when this option exists. In some receivers, the second audio stream is activated through the menu, which is accessible via one button in the remote control.

Alternatively, television broadcasters can broadcast audio description through an independent stream, which will be mixed with the program's original audio in the user's receiver when he activates the audio description in it. This mix is always dependent on the receiver, so it exists the possibility that the receiver lacks of the mixture option and therefore it cannot be done. This should be the first condition a user should check in his receiver before purchasing it, reviewing the user's manual or by contacting the manufacturer.

Once it has been checked that the receiver allows making the mix, the way to activate it is very different depending on the type of receiver, the manufacturer, the menu's organization in the user interface, etc. The

simplest, although not the most common, is when the remote control has a button with the initials AD and in these cases, just by pressing a button the mixture is activated in the receiver and every time a program has audio description, it will be played automatically at the same time as the original audio is played. In other receivers, the users must activate the mix of audio description using the receiver's setting audio options. For this, they must explore the receiver's menus in order to search for the audio settings, looking for the option called "audio description" or similar. In this option, audio description has to be enabled along with the volume (optionally) which the user desire to listen audio description regarding the original audio. In some receivers, audio description activation options and volume settings are located in different menus. Therefore, it is important to check the user's manual in order to configure properly the device

In most devices, once audio description is configured, this configuration remains permanently active. In this way, when a program is being broadcasted with audio description, the user will listen it in the device's speakers.

As it can be seen, not all devices are prepared for the new methods used for broadcasting audio description, although most modern devices have incorporated the possibility of mixing streams in the receiver itself. If the user has a receiver that allows it, the user is responsible for properly configure it so that audio description can be received without any problem.

## Conclusions

Audio description's broadcasting in Spanish TV channels has begun to include an option, which was recently unused, that provides the mixture in reception. This method saves bandwidth and production costs to broadcasters, but it is not compatible with many of the currently installed devices in Spanish homes, despite being one of the provided options given by the standard DVB.

Receivers and DTT televisions which are able to play an audio description stream mixing it with the program's main audio have, in many cases, user interfaces with low usability, making it very difficult for many users to access audio description services and leads them to believe that audio description is not available when in fact it is truly being emitted.

The Spanish Center for subtitling and audio description gives recommendations and future working guidelines for answering this problem and they have been broken into two big groups:

- Recommendations for broadcasters:
  - Choose preferably the option of broadcasting audio description mixed in emission while most of users' installed receivers and DTT televisions are not compatible with the mixture in reception option.
  - Once most of users' installed receivers and DTT televisions are compatible with mix in reception, broadcasters should choose preferably this option which allows users not to worry activating the second audio stream to test if a program has or has not audio description contents.
  - Signal correctly audio description's broadcast in the tables SI and PSI according to what it is established in the standards DVB and AENOR (Spanish Association for Standardisation and Certification).

- Recommendations for manufacturers:
  - Full audio description functionality support as defined in standard DVB, taking care of all descriptors and information elements defined by the protocol and implementing the functionality for each one of them.
  - Incorporation in the remote control of buttons for direct access to audio description for receivers, DTT televisions and in the future, Smart TVs and HbbTV (Hybrid Broadcast Broadband TV) receivers in order to guarantee an easy access for visually impaired people.
  - Improve the settings menu and audio description activation usability.
  - Show in the OSD menus the availability of audio description in TV programs, in response to the signalling information received in the tables SI and PSI.
  - Display the availability of audio description when it is available in TV channels in any of its modalities (mix in reception, mixed broadcast) using acoustic signs which will be activated with channel switching and other user´s relevant actions.

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