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**Study on questions related to
STANDARD ESSENTIAL PATENTS
DVB subtitles case study**

Report

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Abstract

Standards play critical role in contemporary technology in various areas. Audio/video – and in particular digital television – is probably the most standardized technology area with literally tens of standards incorporated in a typical product. Any standard is generally supported by multiple patents, owned by various patentees who typically participated in the formulation of such standards. Patents that are considered essential to the implementation of the standards are referred to as “Standard Essential Patents” (SEPs). In order to practice a specific standard, related SEPs must be licensed from their respective owners.

The assessment of essentiality by owners of patents or by independent reviewers is not always true. In the case studied in this paper, concerning implementation of the DVB subtitles standard without, we demonstrate that this standard can be implemented without the use of two patents deemed essential.

The industry practice of taking claimed essentiality of SEPs for granted should be reconsidered.

1. Standardization in multimedia communications

Digital communications, like multimedia communications (including audio and video coding and transmission, digital television, etc.) is an extremely highly standardized technology area, due to the requirements of interoperability of the products from various vendors. Standardization is important for customers as it provides a freedom of choice of the vendors thus enabling free competition that is crucial for the technological and economic progress.

The standards are set either by international industrial consortia or by specialized international organizations. The standards are also related to some technological solutions that often result from the international cooperation in research that is coordinated by international experts groups affiliated by international standardization bodies.

Nevertheless, many solutions are patented, and the inclusion of a solution into the standard requires the declaration of the patent – holder regarding to the non-discriminative access to the licenses. Therefore some patents are claimed as standard essential patents (SEPs), i.e. the patents that must be infringed when the standard solution is used. Obviously, the standardization institutions, like International Organization for Standardization (ISO), International Telecommunication Union (ITU) or European Telecommunications Standards Institute (ETSI) do not define the standard essential patents (SEPs). Such claims are made directly by the patent holders, and the technology developers are those who accept such statements or not.

Unfortunately, the **problem of abuse of standard essential patent declarations**, became an important danger for free competition on the market of advanced technology. Such problems were already discussed for several times within standardization groups like e.g. MPEG (ISO/IEC JTC1/SC29/WG11), ISO SC29 (ISO/IEC JTC1/SC29), ISO/IEC JTC 1.

The abuse of the declaration of the standard essential patent is often used by the companies that possess some patents related to the standardized technologies. The abuse consists in interpretation of the patent claims in the way that has no technical background.

Therefore, there are some related, widely recognized issues that are worth reconsideration. One of such issues is essentiality of patents that are claimed standard essential patents (SEPs) for a specific standard.

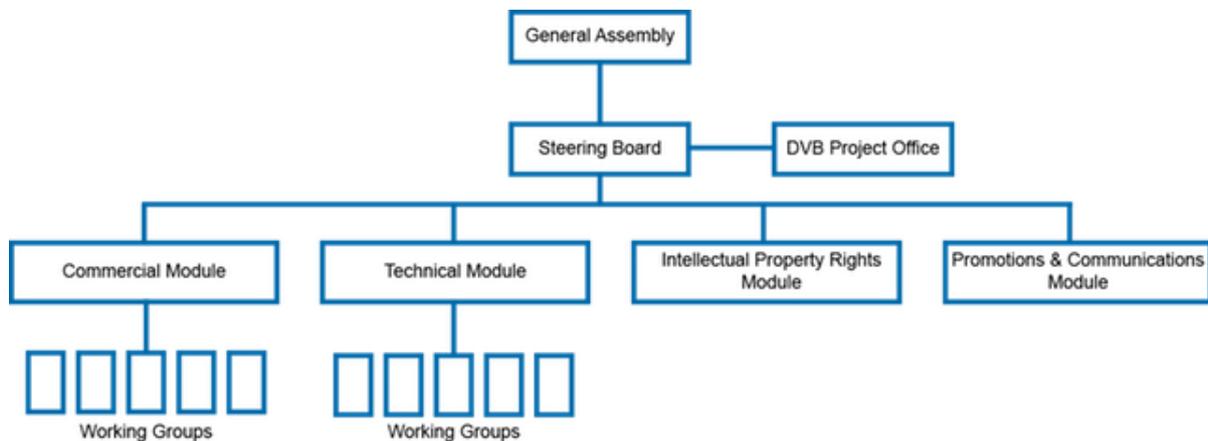
It is an industry practice to take a claim of essentiality for granted and to license SEPs whenever related standard is to be used. In this paper, through the analysis of a specific case, we demonstrate that essentiality of patents may be objected, in parallel to their validity.

The case under review refers to digital television subtitles. Subtitles comprise an imminent part of television experience and, like many other elements of digital television, have been standardized in Europe by the European Telecommunication Standards Institute (ETSI) as EN 300 743 “DVB Subtitling Systems”. Various patents have been claimed to be essential to this standard, including patents EP 0 745 307 and EP 0 754 393 which we analyse in the present paper.

The paper is organized as follows: first we briefly introduce the process of creating open standards by organizations such as the DVB Project. Then, we explain the concept of Standard Essential Patent (SEP), along with the process through which a patent is claimed to be SEP. Finally, we analyze the two patents above mentioned to conclude that the standard can be implemented without their use, hence the patents are not essential. Our analysis of the two patents also concluded that their validity is questionable, another issue that should be carefully considered before taking a license.

2. DVB and DVB Standards

Various organizations worldwide are involved in creating and maintaining technical standards. In the area of digital television and digital video an undoubted leading role is played by DVB (Digital Video Broadcasting) – a industry-led consortium of over 200 companies involved in digital TV and related technologies. Since its establishing in 1993, DVB's main goal has been to develop open technical standards for the delivery of digital TV and other broadcast services: transmission, multiplexing, service information, conditional access, internet protocol, interactivity, interfacing, TV middleware, measurement, content copy protection and subtitling. All standards are developed through collaboration of DVB members in numerous working groups within modules that are responsible for subsequent stages of standard development.



Source: https://www.dvb.org/resources/public/images/site/dvb-organigram_no_names_642.png

Each DVB standard begins in the Commercial Module, where a set of Commercial Requirements, based on the needs of the market, is defined. Commercial Requirements document outlines the market parameters, such as user functions, timescales and price range. When the document is agreed in the Commercial Module, it is forwarded to the Technical Module.

Members of the Technical Module, involved into various Working Groups, review technological implications of the Commercial Requirements and explore available technologies (or develop new ones if needed). This most time - and effort - consuming part of the process ends up with a draft of the specification, which – if supported by the Commercial Module – is put forward for final approval of the Steering Board.

Should the Steering Board approve the proposed standard draft, it offers it to a relevant international standards body (DVB does not issue any standards itself), such as European Telecommunications Standards Institute (ETSI) or European Committee for Electrotechnical Standardization (CENELEC).

In parallel to the finalization of the issuance of the standard, Intellectual Property Rights Module works towards ways to solve any potential issues that may arise in relation to the new standard. The most important of them is securing fair, reasonable and non-discriminatory (FRAND) terms of access to patents deemed essential to practicing the standard.

Securing FRAND terms is by any means not a trivial task due to contradicting interests of parties involved. On one hand, patent owners are obviously interested in securing their returns on investment as quickly as feasible through high royalties on their patents. On the other, potential licensees wish to minimize royalties to provide competitive products. In between, DVB shall balance the needs of both sides, not only because they constitute equally important members of the consortium, but also to facilitate wide standard adoption. The role of DVB in this phase is particularly difficult as it is not directly involved in licensing the patents. Instead, it helps (through Intellectual Property Rights Module) organizing joint licensing by inviting potential license administrators and facilitating contacts between them and patent owners. At this stage the key question is: "which patents would be necessary infringed by practicing the standard?"

3. Standard Essential Patents (SEP)

Patents that would be necessary infringed by practicing the standard are typically referred to as Standard Essential Patents (SEPs). While the concept is relatively clear, determining essentiality of a particular patent is not. As already mentioned, often essentiality is based solely on patent owner's own evaluation. Indeed, Intellectual Property Rights Policies of various bodies – including those of DVB and ETSI – call owners to voluntarily declare all essential patents they may own on a particular standard. Clearly, at initial stage of the standard creation, essentiality is assessed through self-evaluation. This freedom of declaration is often criticized for the reasons already mentioned.

However, in some cases, SEP may be licensed through patent pools. The license administrator invites SEP owners to participate to the pool and organize an independent reviewer of the declared essentiality of the patents to be included in the pool. The reviewer is typically a reputable patent attorney who compares patent claims with the standard specification.

In either case, particularly when an independent reviewer is involved, claimed essentiality is seldom challenged and patent owners or pool administrator chase after users of a standard alleging infringement of patents supposedly essential to the standard. Yet, the practice shows that such patents may turn non-essential or even should be invalidated.

4. DVB Subtitles Standard

As an example, let us investigate DVB standard on television subtitles, published by ETSI as EN 300 743 “DVB Subtitling Systems”, vis-à-vis two supposedly essential patents: EP 0 745 307 and EP 0 754 393. We will concentrate here on the terms used in further parts of this document. For details please refer to the full document of the standard.

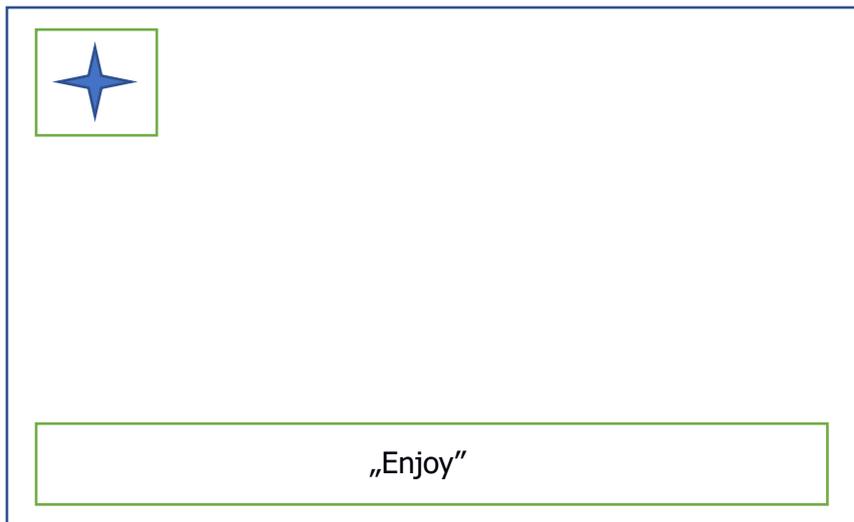
ETSI standard EN 300 743 “DVB Subtitling Systems” specifies a system for subtitles aimed at video images transmitted as MPEG-2 stream over arbitrary way of transport (DVB-T, DVB-S, DVB-C or DVB-H). Subtitles are graphical or textual images superimposed on the original video/television event. These may include a channel logo, audio description for deaf or localized language translation of dialogues.

Technically, subtitles are realized on the private stream 1 of the MPEG-2 transport stream. This way multiple subtitle services can be realized simultaneously (for instance for different languages).

The standard defines three main concepts that comprise subtitling service:

- Page
- Region
- Object

A “page” is a set of “regions” displayed during a certain period of time. Regions are rectangular areas overlaying video signal within the display area. Each region can include one or more objects – a graphical object (a logo or a character glyph text) or a text. A graphical object is defined by an encoded bitmap, whereas a text object is defined by a sequence of character codes with preset glyphs or a text.



A page with two regions – one with a graphical object and one with a text.

Subtitling system defined by the standard EN 300 743 applies several techniques to reduce the amount of bits needed to transmit the subtitle data, including:

- Associating a background colour to each region;
- Limiting the colours that can present the pixels of a region, considering three ranges, inclusive of 256, 16 and 4 colours, to be represented respectively by 8, 4 or 2 bits only. Each region has associated a family of colour lookup tables (CLUT, "Colour Look-Up Tables"), with 256, 16 or 4 inputs, which can obtain the actual colour of the pixels from the compact representation. This real colour is specified by four parameters: luminance Y, chrominance red Cr, chrominance blue Cb and transparency T. Total transparency is achieved for a null luminance ($Y = 0$).
- Consecutive series of pixels of the same colour are compressed with the run-length coding.
- The families of colour query tables are defined independently of the pages, regions and objects and are referenced by their individual identifiers.

A region is defined by a "region composition", which indicates a set of attributes of the region (identifier of the region, size, pixel depth (number of bits to encode its colour) family of lookup tables used colours and the background colour) and a list of objects to be displayed.

A page is defined by a "page composition", which indicates a set of attributes of the page (identifier of the page and an expiration time of the page) and a list of regions to be displayed. The list of regions to display indicates the ID of the region and its position within the display area of the screen (position its top left corner). Regions may not overlap.

Over time regions and pages may change their appearance.

The time period during which this page does not change (i.e. during which there is no change in the composition of the page, or in the composition of the region, or in any object composing the regions, or in any family of colour lookup tables used) is called “page unit”.

Each page unit comprises of one or more “subtitling segments”, defining various elements of the page, including:

- Screen definition segment (full screen or a rectangular part of it)
- Page composition segment
- Region composition segment
- CLUT definition segment
- Object data segment
- Other segments not referenced in this document.

A “display set” is a set of all segments associated with a new page unit, which are included within one or several PES packets of the private stream 1 of the MPEG-2 transport stream, characterized by having the same time stamp of the presentation (PTS).

5. Two patents claimed as SEPs for DVB Subtitles

5.1. Evidence that patent EP 0 745 307 B3 is not essential

DESCRIPTION OF THE PATENT

Patent EP 0 745 307 B3 (hereinafter '307) was filed on 12th December 1995, on a European priority of 14th December 1994, and refers to a "Subtitling Transmission System". The '307 patent is related to subtitles implementation. The patent comprises 15 claims out of which 8 concern a receiver and the remaining 7 concern a transmitter. The patent expired on 12th December 2015. We note below that validity of patent '307 was questionable, in view of prior art.

The '307 defines a method of transmitting encoded data defining a graphic image in the form of a rectangular region for display within an area of an active video signal, the pixels forming said region being individually defined by the encoded data, characterized in that the encoded data includes the size and position of said region and a time stamp representing the time at which said region is to be displayed. The image region can comprise subtitling or closed captions information.

NON-ESSENTIALITY

Products decoding TV signals implementing subtitles, strictly complying with the ETSI EN 300 743 specification, recognise two container objects, PAGE and REGION, which are defined with size and location and are not graphical objects since they do not contain any graphic data but merely serve as data containers. Further, the standard defines objects that contain pixels, i.e. a graphic image.

The patent requires that for each video frame the constraints are defined anew whereas in the specification from DVB the constraints can remain fixed for more than one frame, while only objects data are updated. In many products which we have analysed, and which are DVB subtitling compliant, the constraints can remain fixed for more than one frame, which is not what patent '307 requires.

Thus, the patent '307 feature of "decoding from said encoded data for each graphic image the size and position of said region and a time stamp" can be not implemented in DVB subtitling compliant products: therefore this patent is not essential to the ETSI standard.

The aforementioned patent feature is mandatory in the claim as it distinguishes the limited patent scope from prior art, as concluded by the German federal Court of Justice in its court case Xa ZR 128/05. Thus, the feature of “for each graphic image” is an essential feature of the claim as well as a special technical feature.

1 Prior art

PA1: (this prior art was not used during prosecution of this patent at the EPO)

ETSI ETS 300 072 - This European Telecommunication Standard (ETS) was produced by the Terminal Equipment (TE) Technical Committee of the European Telecommunications Standards Institute (ETSI) and adopted in September 1990. This ETS is one of an integrated package of 5 ETSs covering various aspects of videotex which comprises:

- ETS 300 073 Videotex presentation layer data syntax T Geometric Display;
- ETS 300 074 Videotex presentation layer data syntax transparent data;
- ETS 300 075 Terminal Equipment (TE); Videotex processable data;
- ETS 300 076 Terminal Equipment; Videotex Terminal Facility Identifier (TFI).

CEPT Recommendation T/CD 06-01 was a standard set in 1981 by the European Conference of Postal and Telecommunications Administrations (CEPT) for the display of Videotex; specifically, for the Videotex Presentation Layer Data Syntax. It was revised a number of times in the 1980s, and also later redesignated as recommendation T/TE 06-01.

The standard was aimed at harmonizing various Europe's emerging videotex systems, which had been diverging along national lines. It recognised four baseline profiles (with conformance criteria set out in Annex C) based on existing videotex services:

CEPT1: BTX (Germany)

CEPT2: Teletel (France)

CEPT3: Prestel (UK)

CEPT4: Prestel Plus (Sweden)

and defined criteria for a "harmonised enhanced" service.

National videotex services were encouraged to either follow one of the existing four basic profiles; or to extended them in ways compatible with the harmonised enhanced specification.

Responsibility for the standard was passed to the new European Telecommunications Standards Institute (ETSI) in 1988. The ETSI version of the standard is designated ETS 300 072.

History of versions

ETSI ETS 300 072 ed.1 (1990-Nov) Terminal Equipment (TE);Videotex presentation layer protocol;Videotex presentation layer data syntax

ETSI ETS 300 072/A1 ed.1 (1996-Oct) Terminal Equipment (TE);Videotex presentation layer protocol;Videotex presentation layer data syntax

Independent evidences of PA1 publication date:

The following patent application publications refer to Videotex:

- EP1788738 (A2) - Distributed database system and database receiver thereof (priority date 27 Nov 1992)
- EP0632397 (A2) - Book data service system with data delivery by broadcasting (priority date 2 July 1993)
- The following patent publication refers to ETS 300 072:US 5696902 (filing date 10 March 1994)

PA2: (this prior art was not used during prosecution of this patent at the EPO) REIHE INFORMATIK 5/92; “A *Movie Transmission Protocol for Multimedia Applications*”

PA3: (this prior art was not used during prosecution of this patent at the EPO) Patent US5287182: “*Timing recovery for variable bit-rate video on asynchronous transfer mode networks*”; Published / Filed: 15 Feb1994 / 2 July 1992

PA4: (this prior art was not used during prosecution of this patent at the EPO) ISO/IEC JTC1/SC29/WG11 N0801, 13 November 1994

PA5: (this prior art was not used during prosecution of this patent at the EPO) Turbo Pascal 5.5; Object-Oriented Programming Guide; Copyright © 1989 All rights reserved. Borland International, Inc.

PA6: (this prior art was not used during prosecution of this patent at the EPO) Patent US4823120: "*Enhanced video graphics controller*"; Published / Filed: 18 Apr 1989 / 12 Sep 1986

2. Conclusion of the German Federal Court of Justice

Claims of the '307 have been maintained in amended form in Germany by the German Federal Court of Justice on 17 September 2009 in patent invalidity court case Xa ZR 128/05.

Independent claims 1, 7, 13, 14, and 15 have been amended to define that the size and position are included in the encoded data.

The '307, as amended, meets the requirement of being limited, because the claims can no longer be interpreted to also mean that an encoded size and/or position applies to plural graphic images, e.g. all images of a sequence of images.

On 28 May 2010, EPO issued a decision to limit the patent at the request of the patent owner dated 18 November 2009.

NON-VALIDITY

Our analysis of patent '307 shows lack of Inventive Step in view of PA1 + PA2 (or PA3) + (for particular claims) PA5 (or PA6).

PA1 has not been used in the German Federal Court against the '307. It is a piece of prior art never considered before.

Claims 7 (independent), 8, 9, 10, 11, 12 define a 'Method of receiving encoded data'. Claim 14 (Receiver) as well as claim 15 (Image signal) lack inventive step for the reasons presented with reference to claim 7.

Claims 1-6 (Method of transmitting) and 13 (Transmitter) are not relevant to Decoders of TV signals; additionally, they lack inventive step for the reasons presented with reference to reception method claims 7-12.

Referring to the independent claim 7, document PA1 discloses specifications of Videotex Presentation Layer Data. PA1 describes a method of implementation of 'photographic layer' (graphics image) over a video source layer. The size and position of photographic layer can be defined. PA1 specifies also a method of timing control for data (e.g. photographic layer) display.

A specific implementation of timing control is described in the 'Summary of the invention' of PA3 as "so called Presentation/Decode Time Stamps (. . .) to display properly (timely) the received data."

Feature described in dependent claim 8 is not standardized for subtitling and is considered known for a person skilled in the art; from common general knowledge in the technical field concerned (any software object may be visible on the display or hidden).

Techniques described in claims 9-12 were well known at the time of invention, described in PA2, PA3 and PA4.

5.2. Evidence that patent EP 0 754 393 B1 is not essential

DESCRIPTION OF THE PATENT

Patent EP 0 754 393 B1 (hereinafter '393) was filed on 26th January 1996, claiming two British priorities of 03rd February 1995 and 16th February 1995. The '393 refers to "A *Video Image Colour Encoding*" and describes a graphical image encoding method, in particular for colour encoding. The patent comprises 12 claims, out of which 10 concern a method of encoding, 1 concerns an encoder and 1 concerns a decoder. The patent expired on 26th January 2016. We note below that validity of patent '393 was questionable, in view of prior art.

The '393 invention relates to the encoding and decoding of digital video image frames, and particularly to the coding of pixel colour values using a special run length encoding type. In the independent claims, two specific RLE encodings are defined.

NON-ESSENTIALITY

Typically decoders of TV signals supports the following digital video image formats:

- JPEG
- PNG
- GIF
- MPEG-2 I-Frames
- MPEG-2 Video drips

Above listed digital video image formats do not infringe the claims of the '393 invention.

We note the following non-essentiality arguments:

(a) the receiver claim 12 refers to an encoded frame, while subtitles in Decoders of TV signals are not encoded video frames but rather small overlays transmitted separately from the data streams comprising the video data encoded on a frame by frame basis. A video frame is defined as a full screen video frame (i.e. nominal resolution of the video signal). Thus, decoders of TV signals do not process video frames encoded according to the patent;

(b) DVB considers Colour 0 as the run-length-only coded colour. DVB does not require Colour 0 of the subtitles CLUT to be a predominant colour. There are no requirements in the ETSI 300 743 to make the Colour 0 the predominant colour. Hence, Colour 0 is an arbitrary colour according to the DVB standard: decoders of TV signals do not set or treat Colour 0 as predominant, and thus do not fall under the scope of the claimed subject matter;

(c) the receiver claim 12 requires data “encoded in the form of a first code word indicating a run and a second code word indicating the run length”. The standard mentions “0000 0LLL -> L pixels (3..9) in colour 0 (L>0)”. This means that 00000 is the first code word and LLL is the second code word. In case LLL is 111 this means, according to the standard, a run of 9 pixels while its decimal value is 7. Similarly 001 means a run of 3 pixels while its decimal value is 1. Thus, the second DVB code word does not indicate the run length. In other words, one cannot reasonably imply that a received value of 7 indicates a final value of 9 or that a received value of 1 indicates a final value of 3 without any further action. The data, received by the DVB subtitles compliant device, do not indicate the length of a run but they must rather be processed in order to arrive at the final length of the run. Thus, decoders of TV signals do not fall under the scope of the claimed subject matter.

NON-VALIDITY

The following prior art has been considered:

- PA1: (this prior art was not used during prosecution of this patent at the EPO) US 5270812 A – Method of encoding image pixel values for storage as compressed digital data and method of decoding the compressed digital data (published 14 December 1993)
- PA2: (this prior art was not used during prosecution of this patent at the EPO) US 5357546 A – Multimode and multiple character string run length encoding method and apparatus (published 18 October 1994)
- PA3: (this prior art was not used during prosecution of this patent at the EPO) Vivid 2.0 / Written and Copyright 1989-1992 by Stephen B. Coy / 14 March 1992

In view of PA1 + PA2, claim 12 (the decoder-receiver) lacks inventive step.

Instead of PA2 any of PA4, PA5, PA6 or PA7 may be used to argue lack of inventive step.

- PA4: (this prior art was not used during prosecution of this patent at the EPO) “Enhanced Systems Network Architecture Data Compression”
IP.com Disclosure Number: IPCOM000102128D
Publication Date: 17 March 2005 / Original Publication Date: 1 October 1990
- PA5: (this prior art was not used during prosecution of this patent at the EPO) US 4956808 A – “Real time data transformation and transmission overlapping device”
Published 11 September 1990

PA6: (this prior art was not used during prosecution of this patent at the EPO) © 1993 / Die Netzwerkarchitektur SNA

Eine praxisorientierte Einführung in die Systems Network Architecture der IBM

Authors: Schröder, Hugo, Stalke, Thomas

<http://www.springer.com/jp/book/9783322915641#aboutAuthors>

page 231 / chapter "Compression Protokoll" / <http://tinyurl.com/o7ko2PA4>

PA7: (this prior art was not used during prosecution of this patent at the EPO) Systems Network Architecture – Technical Overview GC30-3073-0

First Edition (March 1982)

© Copyright International Business Machines Corporation 1982

Directly referencing:

Systems Network Architecture-Sessions between Logical Units, GC20-1868

© Copyright International Business Machines Corporation 1978, 1979, 1981

(An independent proof of public availability of PA7 is a reference to PA7 made in EP 0288713 A2 published on 2 November 1988 claiming priority date of 29 April 1987)

6. Conclusion

Numerous arguments provided in our paper demonstrate that both patents EP 0 745 307 B3 and EP 0 754 393 B1 are non-essential and not infringed by a compliant implementation of the ETSI EN 300 743 – “DVB Subtitling Systems”. In particular, a reference is made to the fact that, according to the patents, for each frame the regions’ constraints are defined anew and that in case of the RLE coding the method is applied to encoded video frames. Further, DVB Subtitles receiver does not verify which colour is a predominant colour. These are also not the requirements of the ETSI EN 300 743 and thus we assessed lack of essentiality with respect to the analysed patent claims.

In view of the foregoing, we conclude that implementations of the EN 300 743 “DVB Subtitling Systems” standard can be made without falling under the scope of protection of patents EP 0 745 307 B3 and EP 0 754 393 B1. Therefore these two patents are not essential to the standard.

As part of our analysis we also noted that the particular techniques of RLE pixel coding as well as regions coding in subtitles described in patents EP 0 745 307 B3 and EP 0 754 393 B1 were either known or could be implemented without exercising an inventive step prior to the filing dates of the two patents. Numerous prior art documents, the main ones being ETSI ETS 300 072 VIDEOTEX and US 5357546 A - “Multimode and multiple character string run length encoding method and apparatus” as well as Technical Overview GC30-3073-0, dated as early, as 1982, evidence that the techniques claimed in both patents were known before filing of the patents. Accordingly, the patents shall be considered as invalid; they thus should not have been granted patent protection from the outset.

In view of the findings of this paper concerning non-essentiality and non-validity, we conclude that adopters of the ETSI EN 300 743 – “Subtitling segments” could implement the standard without a license to these patents.

The case of the ETSI EN 300 743 – “Subtitling segments” vs patents EP 0 745 307 B3 and EP 0 754 393 B1 is just an illustration of that essentiality as assessed by owners of patents or by independent reviewers is not always true. The industry practice of taking claimed essentiality of SEPs for granted should be reconsidered.

The expert groups, the committees and subcommittees that are affiliated by international standardization organizations (ISO, IEC, ITU, ETSI, CENELEC) are discussing that issue, showing that the claims about SEPs sometimes could be classified as dishonest. The believe

that the technology developers who use standards are not sufficiently secured against unjustified SEPs claims has become stronger and stronger recently.