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Television systems; 625-line television Wide Screen Signalling (WSS)

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European Standard (Telecommunications series)

Television systems; 625-line television Wide Screen Signalling (WSS)

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650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
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Foreword

This European Standard (Telecommunications series) has been produced by Joint Technical Committee (JTC) Broadcast of the European Broadcasting Union (EBU), Comité Européen de Normalisation ELECtrotechnique (CENELEC) and the European Telecommunications Standards Institute (ETSI).

NOTE: The EBU/ETSI JTC Broadcast was established in 1990 to co-ordinate the drafting of standards in the specific field of broadcasting and related fields. Since 1995 the JTC Broadcast became a tripartite body by including in the Memorandum of Understanding also CENELEC, which is responsible for the standardization of radio and television receivers. The EBU is a professional association of broadcasting organizations whose work includes the co-ordination of its members' activities in the technical, legal, programme-making and programme-exchange domains. The EBU has active members in about 60 countries in the European broadcasting area; its headquarters is in Geneva.

European Broadcasting Union
CH-1218 GRAND SACONNEX (Geneva)
Switzerland
Tel: +41 22 717 21 11
Fax: +41 22 717 24 81

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Introduction

For a smooth introduction of new television services with a 16:9 display aspect ratio in PAL and SECAM standards, it is necessary to signal the aspect ratio used together with some switching information to the television receiver. The receiver should be capable of reacting automatically to this information by displaying the video information in a specified aspect ratio. This signalling is to be considered separately from the type of system used, but it should allow transmission of system related switching information as well.

The present document permits the later allocation of additional switching information, related to the introduction of enhanced television services.

The present document is applicable for 625-line PAL and SECAM television systems, but there is potential to adopt it to other standards as well.

1 Scope

The present document is applicable to 625-line PAL and SECAM systems in use, in case, where wide screen signalling is required by the broadcasters.

It specifies the wide screen signalling information, the coding and the way of incorporating the coded information into a 625-line system.

The wide screen signalling information contains information on the aspect ratio range of the transmitted signal and its position, on the position of the subtitles and on the camera/film mode. Furthermore signalling for EDTV and for surround sound is included. Some bits are reserved for future use.

The present document specifies the transmitted signal. Annex A gives the rules of operation for the minimum requirements for receiver display formats as well as for subtitling. Annex B gives recommendations. Annex C gives a guideline for copyright information. Annex D describes how the one remaining unused bit can be used to convey multi-bit information.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

- [1] EBU Recommendation R62 (1998): "Recommended dominant field for 625-line 50-Hz video processing".

3 Definition, symbols and abbreviations

3.1 Definition

For the purposes of the present document, the following definition applies:

letterbox operation: use of a picture format with an aspect ratio greater than 1,33, in such a way that empty (black) lines are added to conform to a 4:3 transmission format

3.2 Symbols

For the purposes of the present document, the following symbols apply:

a	aspect ratio
F_s	clock frequency
0_h	falling sync edge
T_d	data bit period
T_s	sampling period

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

EDTV	Enhanced Definition TeleVision
LSB	Least Significant Bit
MSB	Most Significant Bit
NRZ	Non-Return-to-Zero
PAL	Phase Alternation Line (Colour TV-System)
SECAM	Sequentielle Couleur Avec Memoire (French Colour-TV System)
WSS	Wide Screen Signalling

4 Requirements

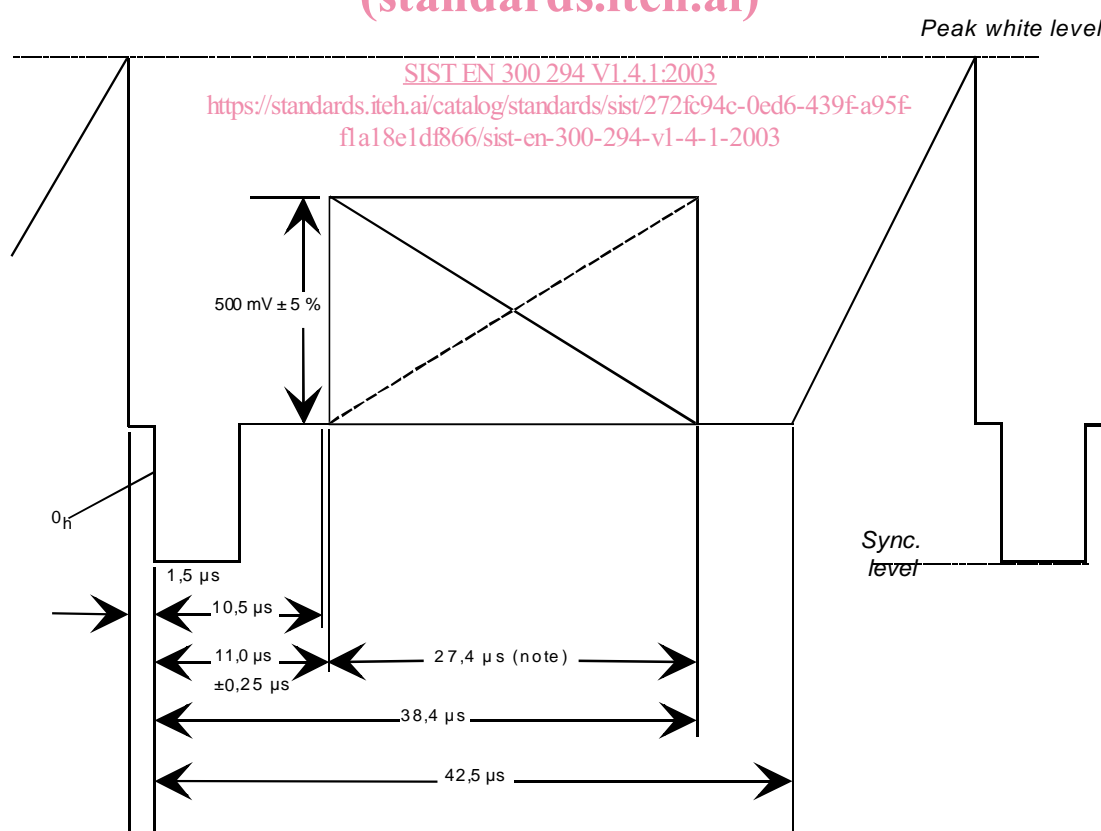
4.1 Line code

The following clauses specify the line code of the Wide Screen Signalling (WSS).

4.1.1 Position

The signalling bits shall be transmitted as a data burst in the first part of line 23.

The position of the beginning of the Wide Screen Signalling bits shall be $11,0 \pm 0,25 \mu\text{s}$ from 0_{H} of the horizontal sync, as indicated in figure 1. This figure is intended to illustrate the position of the signalling bits in line 23. For the purpose of commonality between PAL and SECAM, the colour burst and chrominance sub-carrier are not shown.



NOTE: For optimum decoder performance, it is recommended that this period is free from other signals.

Figure 1: Position of status bit signalling in line 23

In each frame line 23 shall be occupied with the WSS.

4.1.2 Clock frequency

The clock frequency shall be: $F_s = 5 \text{ MHz } (\pm 1 \times 10^{-4})$;

The period shall be: $T_s = 200 \text{ ns}$.

4.1.3 Pulse shape

The pulse shaping function $h(\tau)$ shall be approximately a sine square:

$$h(\tau) \approx \begin{cases} \frac{2}{T_2} \sin^2\left(\frac{\pi\tau}{2T_s} + \frac{\pi}{2}\right) & |\tau| \leq T_s \\ 0 & \text{elsewhere} \end{cases}$$

The half amplitude pulse duration shall be: $200 \text{ ns } \pm 10 \text{ ns}$.

4.1.4 Signal amplitude

The signal amplitude with respect to a maximum video signal amplitude of 700 mV shall be:

$$0,5 \text{ V } \pm 5 \%$$

4.1.5 Modulation coding

Bi-phase coding shall be used in accordance with figure 2.

Duration of one data bit:

$$T_d$$

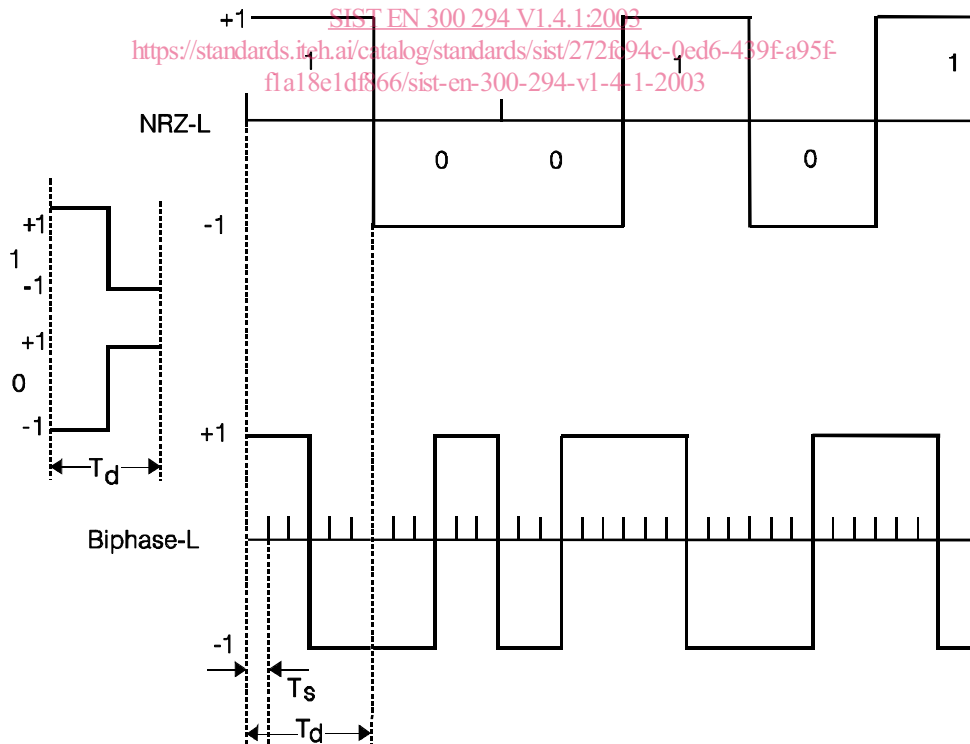


Figure 2: Example of bi-phase-L coding

The data bits shall be inserted in bi-phase-L, in which one data bit period equals 2×3 clock periods, whereby:

$$T_d = 6T_s$$

4.1.6 Preamble

The preamble contains a run-in and a start code. The preamble shall be in accordance with table 1.

4.1.7 Data bits

There shall be 14 bits in total. 1 out of these 14 bits shall be allocated to the error detection code. There shall be 13 data-bits available for transmission of information. The data bits shall be grouped in 4 data groups, see table 1.

4.1.8 Odd parity bit

For error detection, an odd parity bit has been introduced. The odd parity bit shall belong to the first 3 data bits only, see table 1.

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Table 1: Status bits transmission scheme

Status bits transmission					
Insertion: First half of line 23 Coding: Bi-phase modulation coding Clock: 5 MHz (Ts = 200 ns)					
Run-in	Start code	Group 1 Aspect Ratio	Group 2 Enhanced Services	Group 3 Subtitles	Group 4 Others
29 elements based on 5 MHz	24 elements based on 5 MHz	24 elements based on 5 MHz	24 elements based on 5 MHz	18 elements based on 5 MHz	18 elements based on 5 MHz
		bit numbering 0 1 2 3 LSB MSB per info bit (note) "0" = 000 111 "1" = 111 000	bit numbering 4 5 6 7 LSB MSB per info bit (note) "0" = 000 111 "1" = 111 000	bit numbering 8 9 10 LSB MSB per info bit (note) "0" = 000 111 "1" = 111 000	bit numbering 11 12 13 LSB MSB per info bit (note) "0" = 000 111 "1" = 111 000
MSB transmitted first	MSB transmitted first	LSB transmitted first	LSB transmitted first	LSB transmitted first	LSB transmitted first
0 × 1F1C 71C7 1 1111 0001 1100 0111 0001 1100 0111 MSB LSB	0 × 1E 3C1F 0001 1110 0011 1100 0001 1111 MSB LSB	0123 bit number 0001 full format 4:3 1000 box 14:9 Centre 0100 box 14:9 Top 1101 box 16:9 Centre 0010 box 16:9 Top 1011 box 16:9 Centre 0111 full format 4:3 (shoot and protect 14:9 Centre) 1110 full format 16:9 (anamorphic) b ₃ = Odd Parity Bit	4 bit number 0 Camera mode 1 Film mode 5 bit number 0 standard coding 1 Motion Adaptive Colour Plus 6 bit number 0 no helper 1 modulated helper b ₇ = Reserved Should be set to "0"	8 bit number 0 no subtitles within Teletext 1 subtitles within Teletext 9 10 bit number 0 0 no open subtitles 1 0 subtitles in active image area 0 1 subtitles out of active image area 1 1 reserved	11 bit number 0 no surround sound information 1 surround sound mode 12 bit number 0 no copy right asserted or status unknown 1 copy right asserted 13 bit number 0 copying not restricted 1 copying restricted
NOTE: One info bit consists of 6 elements based on 5 MHz clock. Td = 6Ts (see clauses 3.2 and 4.1.5).					

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