

RECOMMENDATION ITU-R BT.1439-1

Measurement methods applicable in the analogue television studio and the overall analogue television system

(Question ITU-R 86/6)

(2000-2006)

Scope

This Recommendation defines measurement methods and test signals used in analogue television systems programme verification.

The ITU Radiocommunication Assembly,

considering

- a) that proper operation of analogue television studios and of other analogue parts of the television chain requires accurate monitoring of the correct performance of individual sections of the overall system;
- b) that such monitoring is best performed on analogue video equipment using appropriate analogue video test signals;
- c) that the methods to measure the correct performance of sections of the analogue television chain, based on the use of analogue video test signals, should desirably be standardized;
- d) that ITU-T Recommendation J.61 recommends nomenclature and measuring methods for analogue video test signals at baseband, for use on analogue video transmission links;
- e) that most of the test signals and measuring methods recommended in ITU-T Recommendation J.61 are also applicable and are indeed already widely applied to the measurement of the performance of analogue video production chains;
- f) that, whenever possible, the same measurement signals and measurement methods should desirably be applied throughout the analogue television chain, including both the production sections and the transmission sections,

recommends

- 1 that the definitions of video parameters at baseband, as given in Part 1 of this Recommendation, should be applied where appropriate to measurement of video baseband parameters in analogue television studios and the overall analogue television system;
- 2 that the measuring methods and test signals, as given in Part 2 and Annex 1 to this Recommendation, should be used where appropriate to perform measurements at video baseband in analogue television studios and the overall analogue television system;
- 3 that the design for filters, as given in Annex 2 to this Recommendation, for application to specific measuring methods should be used where appropriate, when performing similar measurements at video baseband in analogue television studios and the overall analogue television system;

4 that, when it is desired to perform on-line measurements of performance at video baseband in the overall analogue television system in the presence of programme signals, the measurement methods and insertion test signals given in Annex 3 to this Recommendation should be applied where appropriate;

5 that the *K*-rating methods of assessment given in Annex 4 to this Recommendation for the measurement of short-term waveform distortion may also usefully be applied to measurements in the analogue television studio and the overall analogue television system, if desired.

NOTE 1 – Measurement methods for digital television equipment with analogue input and output are defined in Recommendation ITU-R BT.1204. Measuring methods and test signals are the same as in ITU-T Recommendation J.61.

PART 1

Definitions of video parameters

1 Waveform terminology

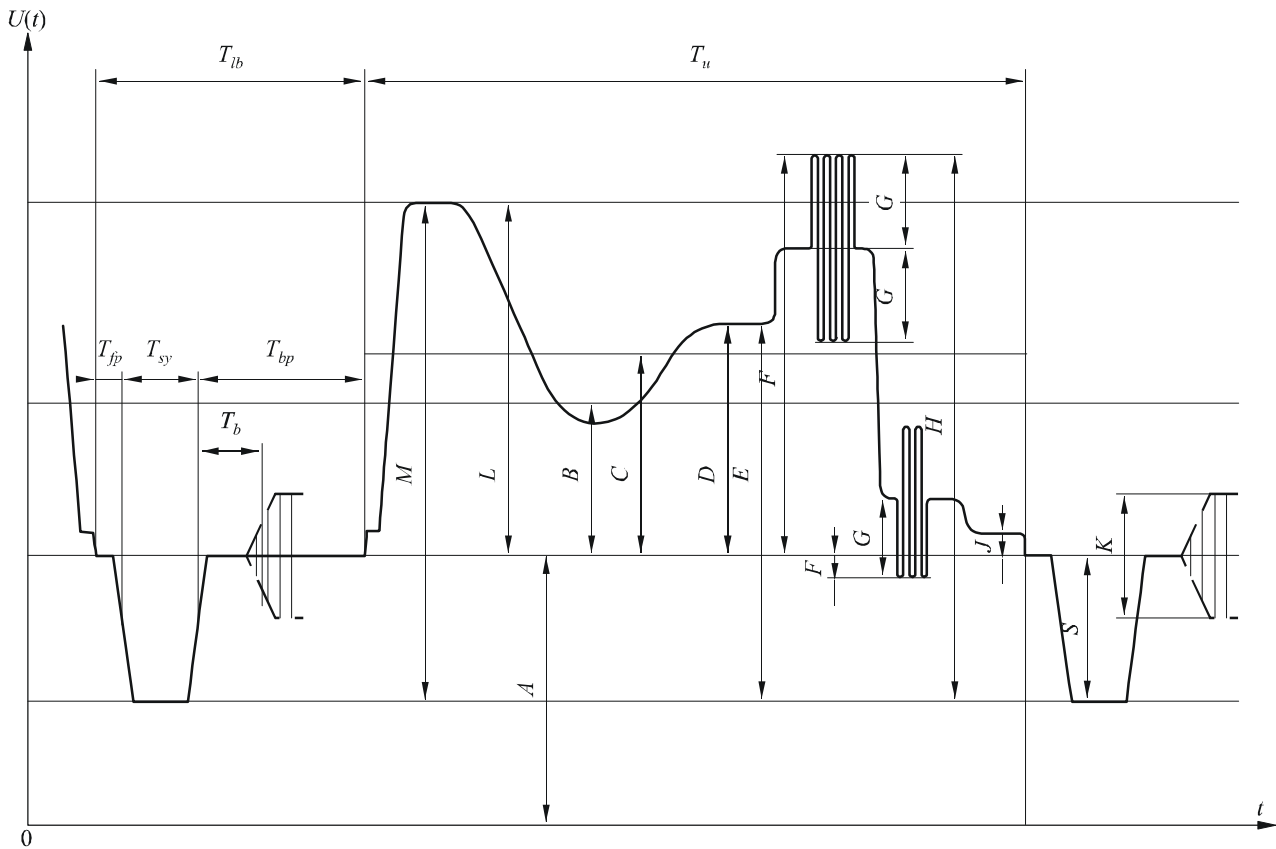
The following terms concerning the components and values of a composite colour video signal are illustrated in Fig. 1:

- A*: the non-useful d.c. component
- B*: the useful d.c. component, integrated over a complete frame period
- C*: the picture d.c. component, integrated over the active line period, T_u
- D*: the instantaneous value of the luminance component
- E*: the instantaneous signal value with respect to the bottom of the synchronizing pulses
- F*: the peak signal amplitude (positive or negative with respect to blanking level)
- G*: the peak amplitudes of chrominance components
- H*: the peak-to-peak signal amplitude
- J*: the difference between black level and blanking level (set-up)
- K*: the peak-to-peak amplitude of the colour burst
- L*: the nominal value of the luminance component
- M*: the peak-to-peak amplitude of a monochrome composite video signal ($M = L + S$)
- S*: the amplitude of the synchronizing pulses
- T_{sy} : duration of line synchronizing pulse
- T_{lb} : duration of line blanking period
- T_u : duration of active line period
- T_b : duration of breezeway
- T_{fp} : duration of front porch
- T_{bp} : duration of back porch.

The amplitudes *L*, *S* and *M* are used as reference amplitudes for the video signal. The amplitudes defined by *B*, *C*, *D*, *E*, *F*, *G*, *H* and *J* above, may be expressed as percentages of the value *L*.

Average picture level (APL) is the mean value of C over a complete frame period (excluding blanking periods) expressed as a percentage of L .

FIGURE 1
One line of a composite colour video signal



1439-01

2 Definitions of signal parameters

2.1 Nominal impedance, Z_0

The input and output impedance, Z_0 of each device should be specified, as either unbalanced or balanced with respect to earth.

2.2 Return loss

The return loss, relative to Z_0 , of an impedance Z is, in the frequency domain:

$$20 \log \left| \frac{Z_0 + Z(f)}{Z_0 - Z(f)} \right| \quad \text{dB}$$

In the time domain, it is expressed by the symbolic formula:

$$20 \log \left| \frac{A_1}{A_2} \right| \quad \text{dB}$$