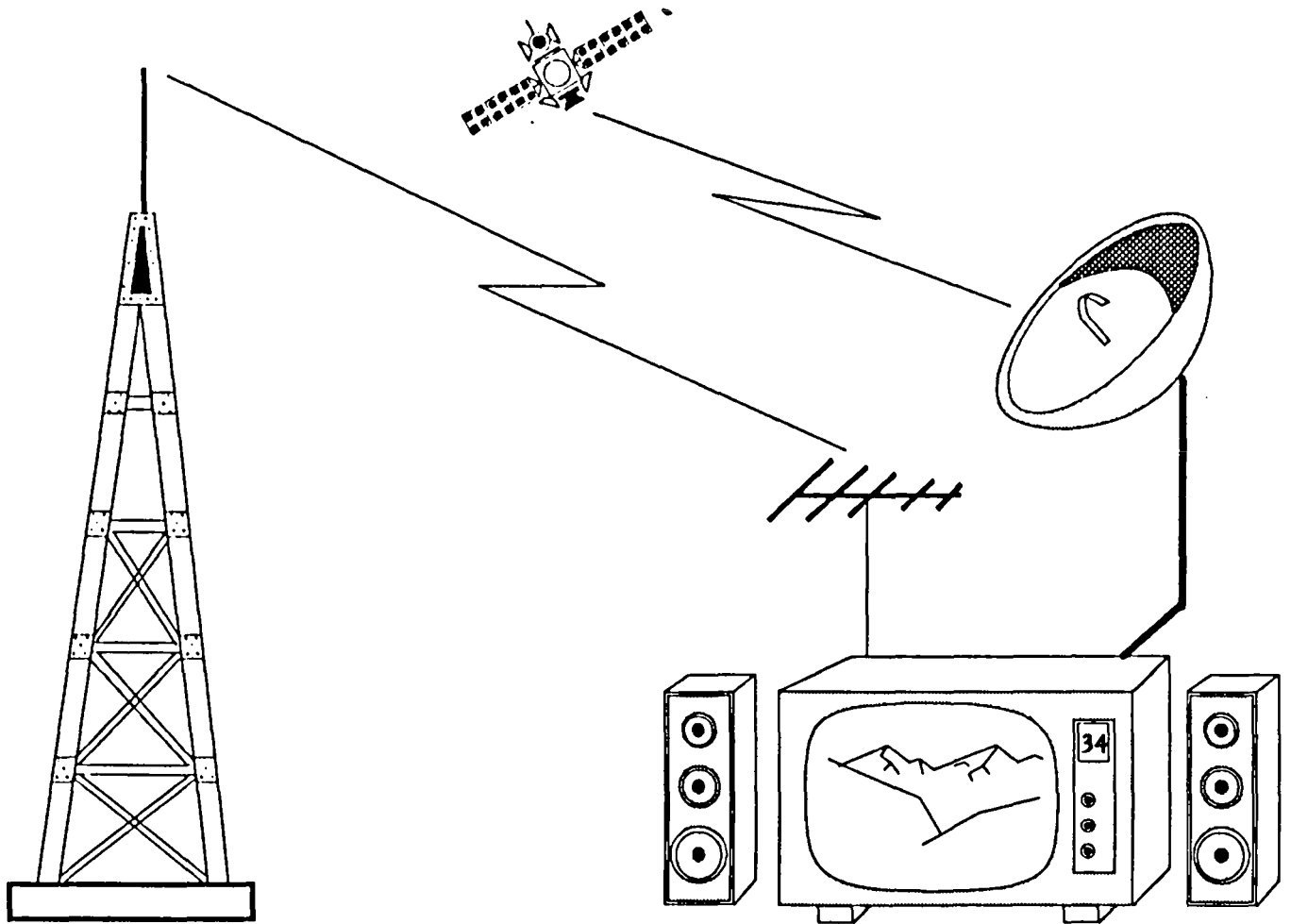




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RBT SERIES

BROADCASTING SERVICE

(TELEVISION)



INTERNATIONAL RADIO CONSULTATIVE COMMITTEE

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Recommendation 814 (1992)

Specifications and alignment procedures for setting of brightness and contrast of displays

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RECOMMENDATION 814

SPECIFICATIONS AND ALIGNMENT PROCEDURES FOR SETTING
OF BRIGHTNESS AND CONTRAST OF DISPLAYS

(Question 51/11)

(1992)

The CCIR,

considering

- a) that precision picture monitors are used in a variety of applications including subjective laboratory testing and control room monitoring of operational systems;
- b) variations in the set-up and adjustment of monitors may lead to variations in displayed pictures;
- c) that special waveforms that assist with the set-up and adjustment of monitors have been developed and have been in operational use for many years,

recommends

1. that the PLUGE test signal (see Note 1) described in Annex 1 should be used for setting of displays used for subjective assessments, and for operational monitoring of systems described in Recommendations 470 and 601. The procedure for the use of the test signal is described in Annex 2;
2. that further study is required on the derivation of a PLUGE signal for HDTV, and a suggested solution is included in Annex 3.

Note 1 – The acronym, PLUGE, was originally derived from “Picture Line Up Generating Equipment”.

ANNEX 1

Specifications of PLUGE waveforms

The PLUGE waveform (see Fig. 1) is composed of:

- a) three closely spaced narrow vertical stripes on the left-hand side of the picture. The stripes are located to the left and right of a central vertical stripe which is at waveform black level. The left-hand stripe is slightly darker, and the right-hand stripe is slightly lighter than the central stripe;
- b) a broad bar signal located on the right-hand side of the picture. It is divided into four areas, one at white level and the other three at descending grey levels. This grey scale is in approximately equal steps, as seen by eye, over a contrast range of 30:1. The peak white area is sufficiently large to enable the peak luminance to be set by a measuring instrument;
- c) a uniform background surrounding the vertical stripes and a broad bar described above. Two different levels for this background are specified according to the application:
 - for operational monitoring the background level is set to waveform black level;
 - for subjective assessments the background level is set to the grey level shown in Table 1. This background level has been optimized to give a picture display subjective quality similar to that used in sequences used in subjective assessment.

To take account of the characteristics of the human eye, the luminance specified for the vertical stripes described in c) is slightly different for the two applications (see Table 1).

To ensure that the colour decoder of a display is working in its colour mode, it is recommended that a standard colour burst is included in the analogue waveform.

FIGURE 1
PLUGE active field and waveform

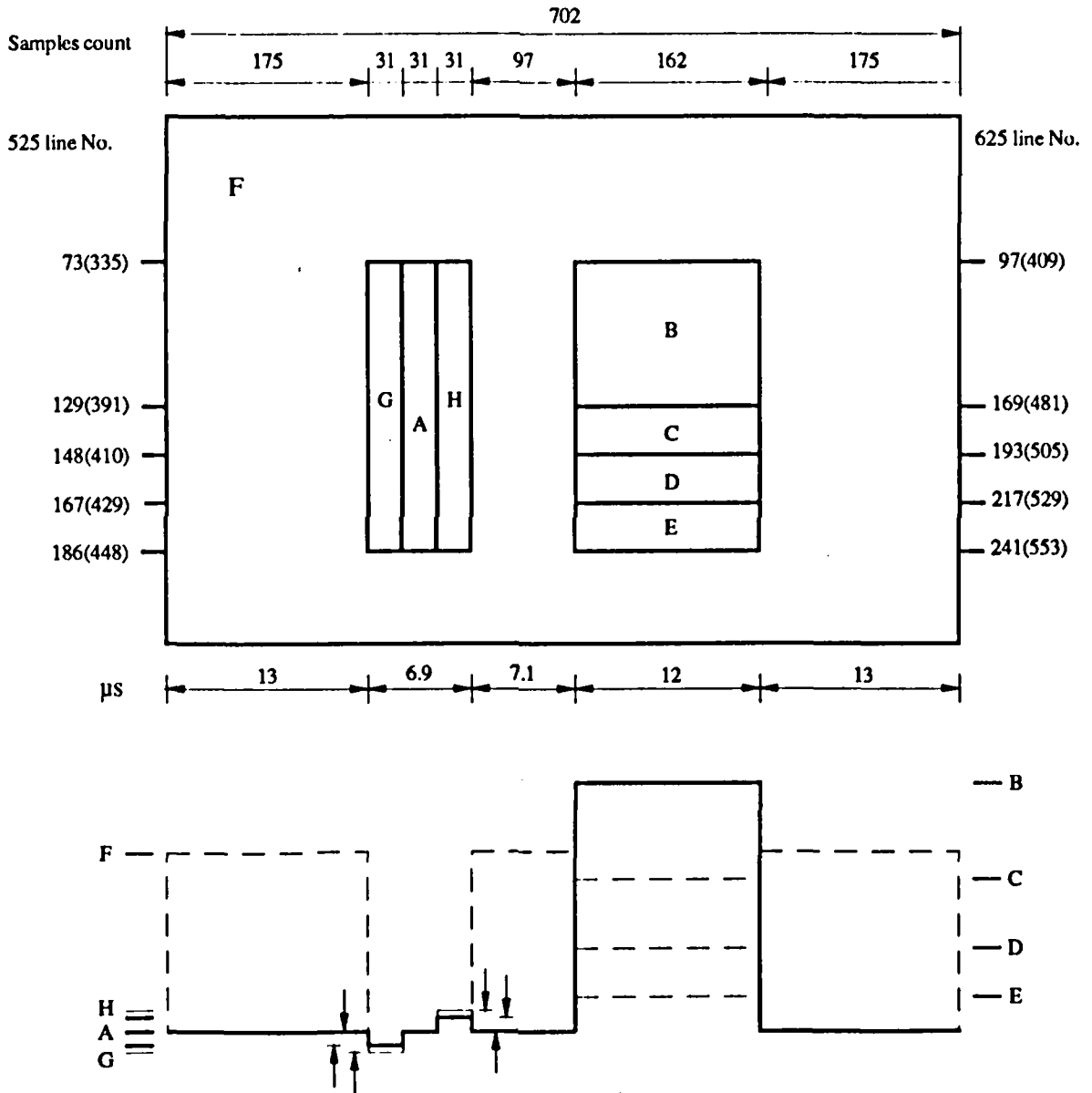


TABLE 1
Levels of waveform

	Operational monitoring			Subjective assessment monitoring		
	Level % (mV)		Digital level	Level % (mV)		Digital level
	625	525	Digital	625	525	Digital
A W/F black level	0(0)	7.5(53)	16	0(0)	7.5(53)	16
B white level	100(700)	100(714)	235	100(700)	100(714)	235
C grey level 3	62.8(439)	65.6(468)	154	62.8(439)	65.6(468)	154
D grey level 2	35.3(247)	40.2(287)	93	35.3(247)	40.2(287)	93
E grey level 1	15.0(105)	21.4(153)	49	15.0(105)	21.4(153)	49
F background level	0(0)	7.5(53)	16	70.3(492)	72.5(518)	170
G black stripe level	-2(-14)	5.5(39)	12	-4.6(-32)	3.0(21)	10
H grey stripe level	+2(+14)	9.5(68)	20	+4.6(+32)	12.0(86)	22

ANNEX 2

Procedure for use of PLUGE test signals

These adjustments are very dependent on the viewing conditions and it is preferable to conform to the conditions for viewing distance and ambient illumination contained in Recommendation 500:

- the brightness control is reduced until the blackest stripe disappears, whilst the brighter stripe remains visible. This setting shall correspond to the pre-set brightness condition;
- using a photometer, the contrast is adjusted until the centre of the white area (100% video level) has a luminance value of about 70 cd/m². This setting shall correspond to the pre-set contrast control condition;
- before a result that is entirely satisfactory is obtained, the procedure described above will usually be repeated, so as to reduce the effects of interactions between these two controls.

ANNEX 3

PLUGE for HDTV systems

A PLUGE signal for HDTV displays has been studied and is shown in Figs. 2 and 3. The peak white patch is used to set the peak luminance by means of the contrast control.

Two types of signal can be used to set the brightness of the black level of the display by means of the brightness control.

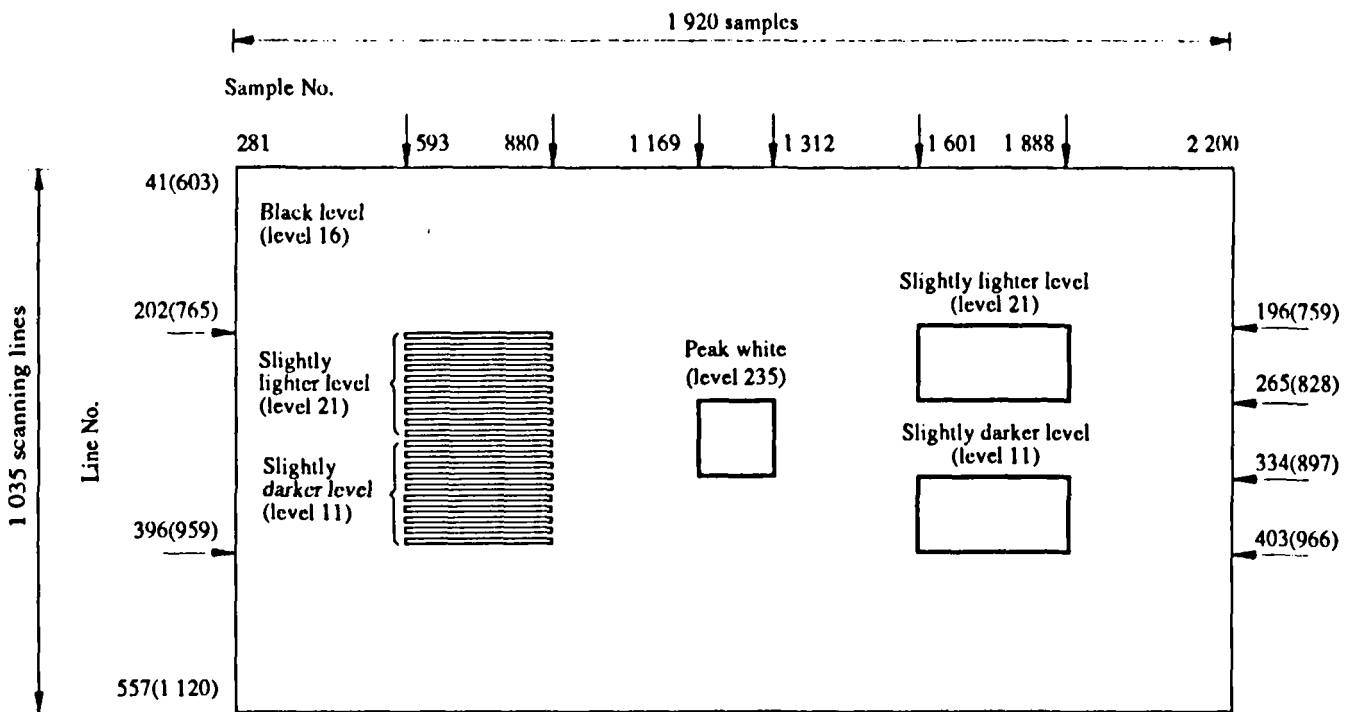
The signal on the left-hand side of the picture consists of narrow horizontal stripes (a width of 10 scanning lines). The stripes extend from approximately 2% above the black level of the waveform to approximately 2% below the black level. This signal gives the most accurate adjustment for CRT-type displays. The signal on the right-hand

side of the picture consists of two coarse stripes (a width of 138 lines) one stripe is approximately 2% above black level the other is approximately 2% below black level. This signal is suitable for setting projection type displays.

As in Annex 2, the luminance of the black level of the display is adjusted by the display brightness control such that the negative horizontal stripes disappear, whilst the positive horizontal stripes remain visible.

Studies need to be carried out to ascertain if this type of PLUGE signal can be used in conventional 525 and 625 pictures.

FIGURE 2
Signal for adjusting the luminance of black level



() Indicates in 2nd field

FIGURE 3
Waveform of the signal for adjusting the luminance of black level

