

RECOMMENDATION ITU-R BT.1701-1

**Characteristics of radiated signals of conventional
analogue television systems**

(2005-2005)

Scope

This Recommendation provides RF systems specification details for different analogue television systems.

The ITU Radiocommunication Assembly,

considering

- a) that many countries have established satisfactory monochrome television broadcasting services based on either 525-line or 625-line systems;
- b) that a number of countries have established (or are in the process of establishing) satisfactory colour television broadcasting services based on the NTSC, PAL or SECAM systems;
- c) that Recommendation ITU-R BT.1700 provides the definition of the baseband video signal;
- d) that Report ITU-R BT.2043 – Analogue television systems currently in use throughout the world, gives information on different television systems used by different countries,

recommends

- 1** that, for a country wishing to initiate a conventional monochrome television service, a system using 525 or 625 lines as defined in Annex 1 is to be preferred;
- 2** that, for a country wishing to initiate a conventional colour television service, one of the systems defined in Annex 1 is to be preferred.

NOTE 1 – Pre-1986 editions of the ex-CCIR Volumes, and in particular that of 1982, contain a complete description of System E used in France until 1984, and System A used in the United Kingdom until 1985.

Annex 1**Characteristics of radiated signals of conventional
analogue television systems**

Table 1, given for information purposes, contains details of a number of different characteristics of radiated signals of analogue television systems in use.

TABLE 1

Characteristics of the radiated signals (monochrome and colour)

Item	Characteristics	M	N ⁽¹⁾	B, B1, G	H	I, I1	D, D1, K	K1	L
	Frequency spacing (see Fig. 2)								
1	Nominal radio-frequency channel bandwidth (MHz)	6	6	B:7 B1, G:8	8	8	8	8	8
2	Sound carrier relative to vision carrier (MHz)	+4.5 ⁽²⁾	+4.5	+5.5 ±0.001 (3), (4), (5), (6)	+5.5	+5.9996 ±0.0005 ⁽⁷⁾	+6.5 ±0.001 ⁽⁶⁾	+6.5 ⁽⁸⁾	+6.5 ⁽⁸⁾
3	Nearest edge of channel relative to vision carrier (MHz)	-1.25	-1.25	-1.25	-1.25	-1.25	-1.25	-1.25	-1.25
4	Nominal width of main sideband (MHz)	4.2	4.2	5	5	5.5	D, K: 6 D1: 5	6	6 ⁽⁸⁾
5	Nominal width of vestigial sideband (MHz)	0.75	0.75	0.75	1.25	1.25 ⁽³²⁾	0.75	1.25	1.25 ⁽⁹⁾
6	Minimum attenuation of vestigial sideband (dB at MHz) ⁽¹⁰⁾	20 (-1.25) 42 (-3.58)	20 (-1.25) 42 (-3.5)	20 (-1.25) 20 (-3.0) 30 (-4.43) (11)	20 (-1.75) 20 (-3.0)	20 (-3.0) 30 (-4.43) (32)	20 (-1.25) 30 (-4.33 ±0.1) (12), (13)	20 (-2.7) 30 (-4.3) ref.: 0 (+ 0.8)	15 (-2.7) 30 (-4.3) (9) ref.: 0 (+ 0.8)
7	Type and polarity of vision modulations	C3F neg.	C3F neg.	C3F neg.	C3F neg.	C3F neg.	C3F neg.	C3F neg.	C3F pos.
8	Levels in the radiated signal (% of peak carrier)								
	Synchronizing level	100	100	100	100	100	100	100	< 6 ⁽⁸⁾
	Blanking level	72.5 to 77.5	72.5 to 77.5 (75 ± 2.5)	75 ± 2.5 (14)	72.5 to 77.5	76 ± 2	75 ± 2.5	75 ± 2.5	30 ± 2
	Difference between black level and blanking level	2.88 to 6.75 (15)	2.88 to 6.75	0 to 2 (nominal)	0 to 7	0 (nominal)	0 to 4.5 (16)	0 to 4.5	0 to 4.5
	Peak white level	10 to 15	10 to 15 (10 to 12.5)	10 to 15 (14), (17)	10 to 12.5	20 ± 2	10 to 15 (18), (19)	10 to 12.5	100 (≈ 110) (20)
9	Type of sound modulation	F3E	F3E	F3E	F3E	F3E	F3E	F3E	A3E
10	Frequency deviation (kHz)	±25	±25	±50	±50	±50	±50	±50	

Rec. ITU-R BT.1701-1

TABLE 1 (end)

Item	Characteristics	M	N ⁽¹⁾	B, B1, G	H	I, II	D, D1, K	K1	L
11	Pre-emphasis for modulation (μs)	75	75	50	50	50	50	50	
12	Ratio of effective radiated powers of vision and (primary) sound ⁽²¹⁾	10/1 to 5/1 (22)	10/1 to 5/1	20/1 to 10/1 (3), (6), (23)	5/1 to 10/1	5/1 10/1 ⁽²⁴⁾ 20/1 ^{(7), (25)}	10/1 to 5/1 (6), (26)	10/1	10/1 10/1 to 40/1 (8), (27)
13	Pre-correction for receiver group-delay characteristics at medium video frequencies (ns) (see also Fig. 1)	0	$\begin{pmatrix} 1 \text{ MHz } 0 \pm 100 \\ 1 \text{ MHz } 0 \pm 100 \\ 1 \text{ MHz } 0 \pm 60 \end{pmatrix}$	⁽²⁸⁾			^{(29), (31)}		
14	Pre-correction for receiver group-delay characteristics at colour sub-carrier frequency (ns) (see also Fig. 1)	-170 (nominal)	$\begin{pmatrix} +60 \\ -170 \\ -40 \end{pmatrix}$	-170 (nominal) ⁽²⁸⁾			^{(30), (31)}		

- (1) The values in brackets apply to the combination N/PAL used in Argentina.
- (2) In Japan, the values $+4.5 \pm 0.001$ are used.
- (3) In the Federal Republic of Germany, Austria, Italy, the Netherlands, Slovak Republic and Switzerland a system of two sound carriers is used, the frequency of the second carrier being 242.1875 kHz above the frequency of the first sound carrier. The ratio between vision/sound e.r.p. for this second carrier is 100/1. For further information on this system see Recommendation ITU-R BS.707. For stereophonic sound transmissions a similar system is used in Australia with vision/sound power ratios being 20/1 and 100/1 for the first and second sound carriers respectively.
- (4) New Zealand uses a sound carrier displaced 5.4996 ± 0.0005 MHz from the vision carrier.
- (5) The sound carrier for single carrier sound transmissions in Australia may be displaced 5.5 ± 0.0005 MHz from the vision carrier.
- (6) In Denmark, Finland, New Zealand, Poland, Sweden and Spain a system of two sound carriers is used. In Iceland, Norway and Ukraine the same system is being introduced. The second carrier is 5.85 MHz above the vision carrier and is differential quadriphase pulse shift keying (DQPSK) modulated with 728 kbit/s sound and data multiplex. The ratios between vision/sound power are 20/1 and 100/1 for the first and second carrier respectively. For further information, see Recommendation ITU-R BS.707.
- (7) In the United Kingdom, a system of two sound carriers is used. The second sound carrier is 6.552 MHz above the vision carrier and is DQPSK modulated with a 728 kbit/s sound and data multiplex able to carry two sound channels. The ratio between vision and sound e.r.p. for the second carrier is 100/1.
- (8) In France, a digital carrier 5.85 MHz away from the vision carrier may be used in addition to the main sound carrier. It is modulated in differentially encoded QPSK with a 728 kbit/s sound and data multiplex capable of carrying two sound channels. The nominal width of the main sideband is limited to 5.1 MHz. With the L standard, the depth of video modulation in the radiated signal is reduced to leave a residual radiated carrier level of $5 \pm 2\%$. For further information, see Recommendation ITU-R BS.707.