

Sound and television broadcast receivers and associated equipment: electromagnetic compatibility —

Part 2: Specification for immunity from radio interference of broadcast receivers and associated equipment

This European Standard EN 55020:1988 has the status of a
British Standard

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National foreword

This British Standard has been prepared under the direction of the General Electrotechnical Standards Policy Committee and is the English language version of EN 55020, which is related to CISPR Publication 20:1985

“Measurement of the immunity of sound and television broadcast receivers and associated equipment in the frequency range 1.5 MHz to 30 MHz by the current injection method. Guidance on immunity requirements for the reduction of interference caused by radio transmitters in the frequency range 26 MHz to 30 MHz”. It supersedes BS 905-2:1985 which is withdrawn.

The title has been changed from that of the 1985 edition to align with EN 55020.

Cross references. Details of other international publications quoted in this standard are given on page 2. Where there are British Standards either identical or technically equivalent to these International Standards, the relationship is given in National appendix Z.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 42, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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English version

Immunity from radio interference of broadcast receivers and associated equipment

Immunité aux perturbations radioélectriques
des récepteurs de radiodiffusion et des
appareils associés

Störfestigkeit von Rundfunkempfängern und
angeschlossenen Geräten

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
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Brief history

The Draft European Standard has been prepared by the Ad Hoc Working Group, installed during the CENELEC CISPR meeting in October 1984.

Comments, prepared by several National Committees, were discussed during the CENELEC CISPR meeting in November 1985. Most of these comments are included in this document.

Technical text

The text of the EN 55020 was approved by CENELEC on 22 September 1987 as a European Standard.

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Foreword

The aim of this document is to reduce effects of radio interference and to avoid trade-barriers between the CENELEC countries. This document provides a common standard on immunity for the period that an international CISPR Publication has not been accepted.

The Technical Committee CENELEC/CISPR recommends strongly that this European Standard should be adapted to the CISPR Publication on immunity as soon as this International Standard becomes available.

References

EN 55022 (1987), *Information Technology Equipment Limits of interference and measurement methods*.

IEC/CISPR Publication 16 (1987), *CISPR specification for radio interference measuring apparatus and measuring methods*.

IEC/CISPR Publication 20 (1985), *Measurement of the immunity of sound and television receivers and associated equipment in the frequency range 1.5 MHz to 30 MHz by the current injection method. Guidance on immunity requirements for the reduction of interference caused by radio transmitters in the frequency range 26 MHz to 30 MHz*

IEC Publication 315-1 (1970), *Methods of measurement on radio receivers for various classes of emission. Part 1: General conditions for measurements and measuring methods applying to several types of receivers*.

IEC Publication 50 (902) (1973), *International Electrotechnical Vocabulary. Chapter 902: Radio interference*

CCIR Recommendation 468-4 (1986), *Measurement of audio-frequency noise in broadcasting, in sound-recording systems and on sound programme circuits*.

CCIR Recommendation 471-1 (1986), *Nomenclature and description of colour bar signals*.

CCIR Recommendation 500-3 (1986), *Method for the subjective assessment of the quality of television pictures*.

CCIR Report 624-3 (1986), *Characteristics of television systems*.

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1 Scope

1.1 This standard applies to the radio interference immunity of:

- television broadcast receivers;
- sound broadcast receivers;
- associated equipment.

1.2 Procedures are given for the measurements of immunity and limits are laid down within the frequency range 0.15 MHz to 1 000 MHz. There shall be 80 % confidence that at least 80 % of the series-produced appliances comply with these limits.

1.3 For sound broadcast receivers in the long-wave, medium-wave and short-wave operation mode, immunity requirements are restricted to those in subclause 6.1.

1.4 No immunity requirements apply to sound broadcast receivers and television broadcast receivers which have an internal battery power facility and which have no built in facility for mains power connection.

1.5 No immunity requirements apply to sound broadcast receivers and television broadcast receivers without a connection facility for an external antenna.

2 Definitions

For the purpose of this standard, the definitions contained in IEC Publication 50 (902): International Electrotechnical Vocabulary (IEV), Chapter 902: Radio Interference, apply, extended with the following specific definitions:

2.1

sound receivers are appliances intended for the reception of sound broadcast radio transmissions

NOTE For the purpose of this standard, the VHF band II covers frequencies from 87.5 MHz to 108 MHz and VHF band II sound receivers shall be tunable over this band.

2.2

television receivers are appliances intended for the reception of television broadcast radio transmissions

NOTE Modular units which perform a part of the functions unique to a sound or television receiver are considered to be sound or television receivers respectively.

2.3

associated equipment is either intended to be connected directly to sound or television receivers, or to generate or to reproduce audio or visual information (e.g. audio amplifiers, record and compact disc players, magnetic recording and playback equipment, electric organs etc.). Excluded are information technology equipment even if they are intended to be connected to a television broadcast receiver

connections via the mains plug, local area network or home network are considered to be indirect connections

NOTE Information technology equipment is defined in EN 55022 (1987).

2.4

multi-function equipment are appliances in which two or more functions are provided in the same unit, for instance television reception, radio reception, digital clock, tape-recorder or disc player etc

2.5

interference signal is a radio frequency signal which may degrade radio reception or cause malfunction in equipment

unwanted signal is a radio frequency signal which simulates the interference signal

2.6

immunity is the ability to maintain a specified performance when the equipment is subjected to interference signals of specified levels

NOTE In this standard the specified performance is:

- a specified sound signal-to-interference ratio and/or
- no greater than just perceptible degradation of the picture to be maintained when a wanted signal and an unwanted signal occur simultaneously.

2.6.1

input immunity is the immunity from unwanted signals present at the antenna input terminal

2.6.2

immunity from conducted voltages is the immunity from unwanted signal voltages present at the audio and mains input terminals and audio output terminals

2.6.3

immunity from conducted currents is the immunity from unwanted signal (common mode) currents present in cables connected to the equipment

2.6.4

immunity from radiated fields is the immunity from unwanted electromagnetic fields present at the equipment

2.7

screening effectiveness is the characteristic of a coaxial connector terminal to attenuate the transfer of external currents into internal voltages

3 Limits of immunity

The immunity of tested equipment shall be equal to or better than the specified limits given in clauses 4, 5, 6, 7 and 8, when measured using the methods given in clause 9 and subsequent clauses. At transition frequencies the more stringent limit shall apply.

The limits values specified for the input immunity and the immunity from conducted currents correspond to a nominal antenna impedance of 75 Ω . For receivers with nominal antenna impedance other than 75 Ω , these limits values and the level of the wanted signals on the antenna terminals are modified, according to the following formula:

$$\begin{aligned} &\text{Limit in } R(\Omega), \text{ dB } (\mu\text{V}) \\ &= (\text{Limit in table, dB } (\mu\text{V}) + 10 \log_{10} R/75) \end{aligned}$$

4 input immunity requirements

Input immunity requirements apply for the VHF band II part of sound receivers (including car radios) and VHF and UHF television receivers.

Input immunity requirements for associated equipment are under consideration.

Multi-function equipment which perform one or more of the functions included in this clause shall meet all the relevant requirements.

4.1 Limits of input immunity of the VHF band II part of sound receivers

Sound receivers with a VHF band II part shall meet the sound criterion of subclause 9.1.

They shall be tested at a tuned frequency f_n and subjected to an unwanted signal of frequency f_f and level n_f as specified in Table 1 and Table 2. Receivers with mono/stereo facility shall be tested in stereo mode.

4.2 Limits of input immunity of television receivers

Television receivers shall meet the sound criterion of subclause 9.1 and the picture criterion of subclause 9.2. They shall be tested at a tuned television channel N and subjected to an unwanted signal in channel M, level n_f , and of the following types.

Unwanted signal types:

A: an unmodulated signal at the picture carrier frequency of the relevant channel M;

B: two unmodulated signals each at the level as given in the table, one at the relevant picture carrier frequency + 0.5 MHz and the other at the picture carrier frequency – 0.5 MHz;

C: a modulated signal at the relevant sound carrier frequency, 1 000 Hz F.M. at 30 kHz deviation;
For television receivers for countries, in which television-signals of systems B and G with two frequency modulated sound carriers can be received (even for one-sound-channel-television-receivers receivers)

C1: a modulated signal at the relevant frequency of the first sound carrier, 1 000 Hz F.M. at 30 kHz deviation, and

C2: a modulated signal at the relevant frequency of the second sound carrier, 1 000 Hz F.M. at 30 kHz deviation;

D: a modulated signal at the relevant picture carrier frequency, 1 000 Hz A.M. at 80 % depth.

For signal types C, C1 and C2 and D, n_f refers to the r.m.s. level of the unmodulated carrier.

Table 1 — Limits of input immunity from unwanted signals outside the VHF band II range

f_n MHz	f_f MHz	n_f [dB (μ V)] (75 Ω)	
		mono	stereo
87.6	66.2 ^a	80	80
	76.9	80	80
	87.1	80	80
	87.2	80	80
	87.25	80	80
	87.30	72.4	69.2
	87.35	64.8	58.4
	87.40	57.2	47.6
	87.45	49.6	36.8
	87.50	42.0	26.0
107.9	129.3 ^b	80	80
	118.6	80	80
	108.4	80	80
	108.3	80	80
	108.25	80	80
	108.20	72.4	69.2
	108.15	64.8	58.4
	108.10	57.2	47.6
	108.05	49.6	36.8
	108.00	42.0	26.0
^a Only applicable for receivers with the local oscillator frequency below the tuned frequency.			
^b Only applicable for receivers with the local oscillator frequency above the tuned frequency			

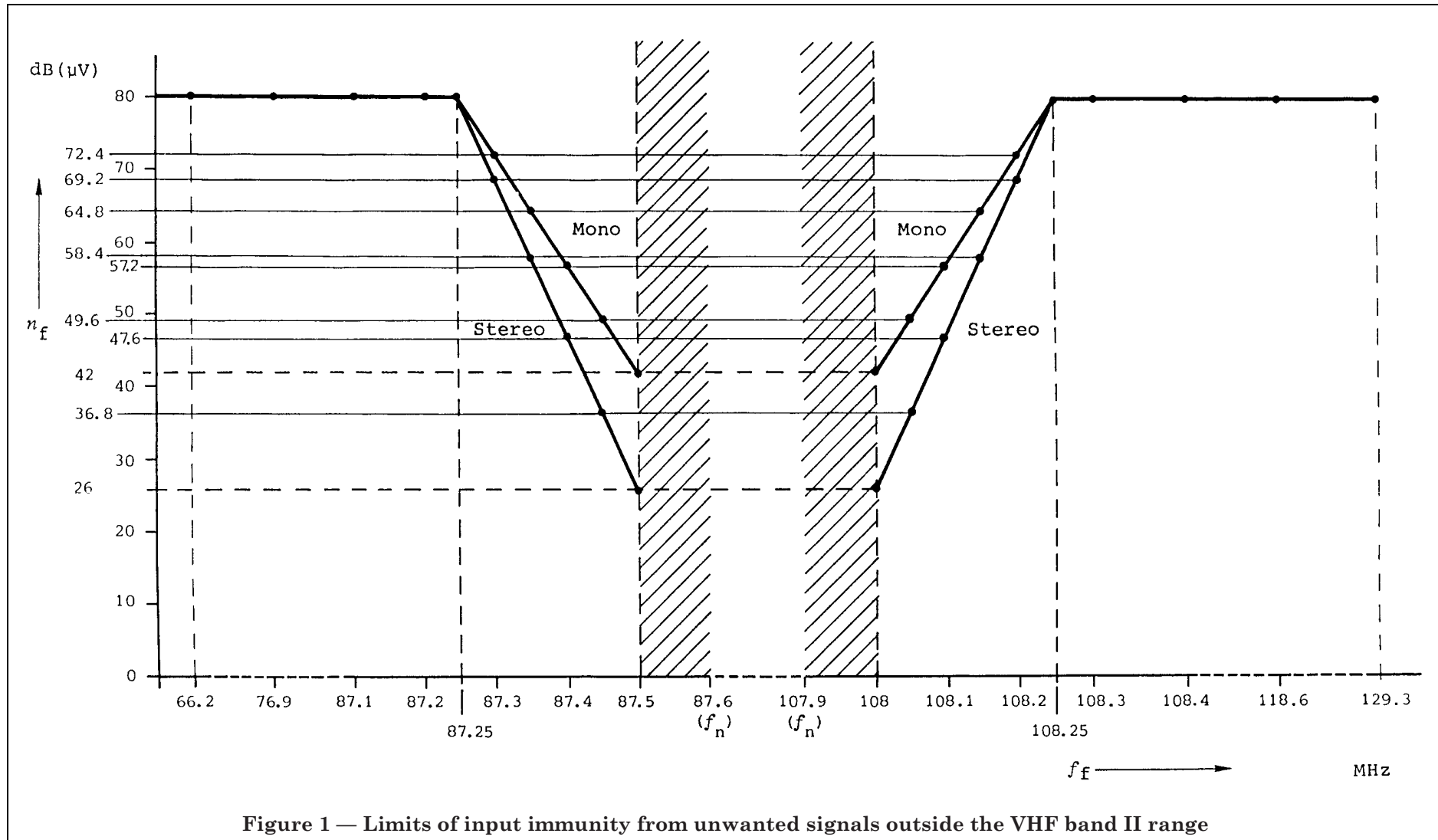


Table 2 — Limits of input immunity from unwanted signals inside the VHF band II range

f_n MHz	f_f MHz	n_f [dB (μV)] (75 Ω)	
		mono	stereo
98	97.5 and 98.5	85	85
	97.6 and 98.4	85	85
	97.65 and 98.35	80	80
	97.7 and 98.3	72	72
	97.75 and 98.25	63	63
	97.8 and 98.2	59	58
	97.85 and 98.15	57	47
	97.9 and 98.1	53	32
	97.925 and 98.075	49	20
	97.95 and 98.05	41	14
	97.975 and 98.025	34	14
	98	29	20

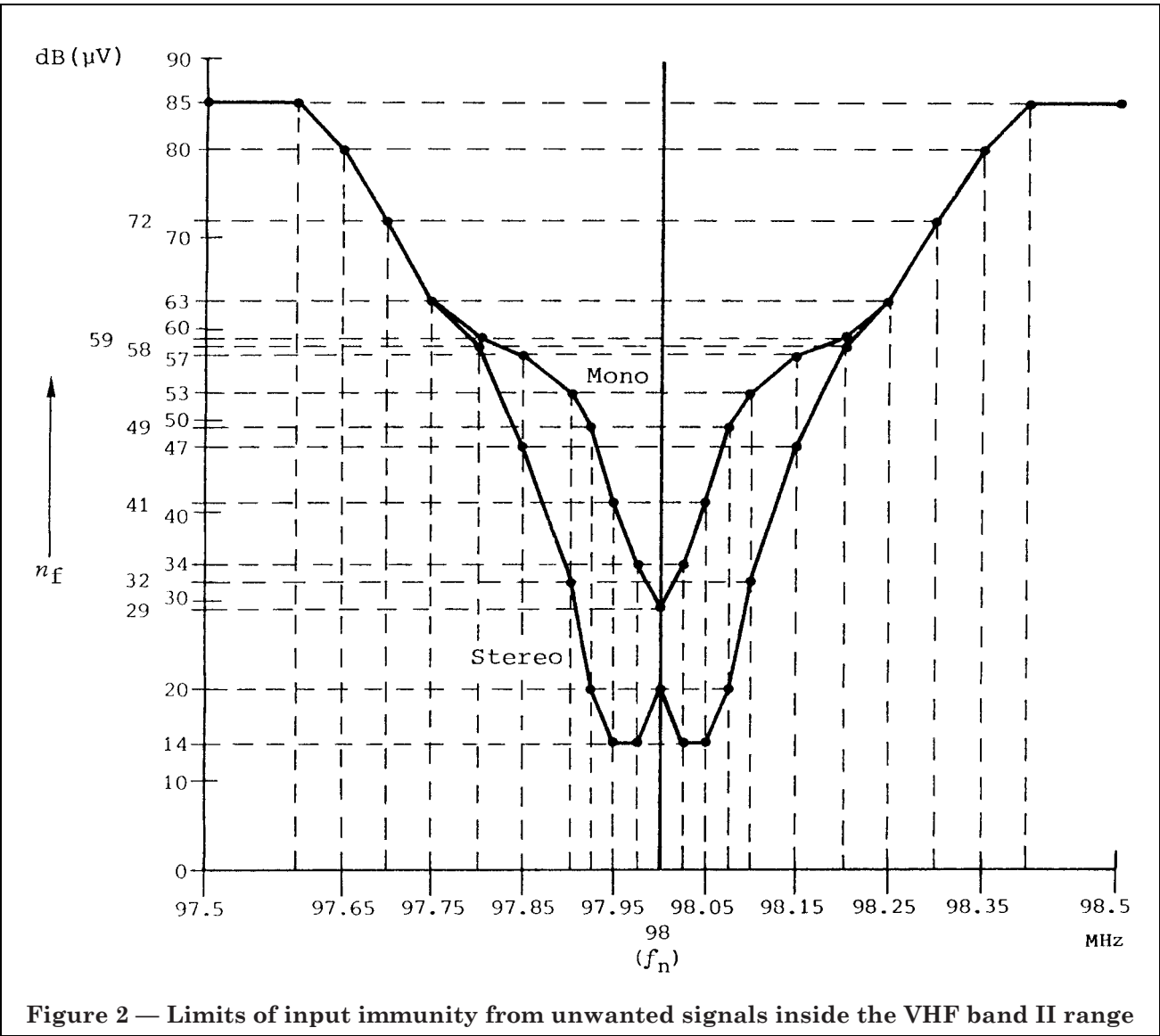


Table 3 — Limits of input immunity of television receivers for systems B, G and I

M	n_f [dB (μV)] (75 Ω) in channel M						Unwanted signal type
N	N - 5	N - 1	N + 1	N + 5	N + 9	N + 11	
N_i	—	73	73	—	—	—	A
	—	61	61	—	—	—	B
N_{iii}	70	73 - x	73 - x	70	—	68	C = C1
	—	73 - y	73 - y	—	—	—	C2
	70	—	—	70	—	68	D
N_{iv}	—	77	77	80	68	—	A
	—	65	65	68	56	—	B
	74	77 - x	77 - x	80 - x	68 - x	—	C = C1
	—	77 - y	77 - y	80 - y	68 - y	—	C2
	74	—	—	—	—	—	D
N_v	80	77	77	80	—	—	A
	68	65	65	68	—	—	B
	80 - x	77 - x	77 - x	80 - x	62	—	C = C1
	80 - y	77 - y	77 - y	80 - y	—	—	C2
	—	—	—	—	62	—	D

x is the relative level (dB) of the first sound carrier (mono sound channel) with respect to the vision carrier.

y is the relative level (dB) of the second sound carrier (stereo sound channel) with respect to the vision carrier.

x = 13 and y = 20 for systems B & G; x = 10 for system I.

Table 4 — Limits of input immunity of television receivers for system L

M	n_f [dB (μV)] (75 Ω) in channel M							Unwanted signal type
N	$N \leq N - 10$	N - 9	N - 4	N - 2	N - 1	N + 1	$N \geq N + 4$	
04	—	—	—	72	—	—	—	D
08	—	—	—	74	79	72	—	D
25	—	—	74	74	79	72	79	D
55	79	74	74	74	79	72	79	D

NOTE $N \pm m$ indicates the frequency of the picture carrier of the tuned television channel, plus or minus m times the channel frequency bandwidth. The test signal shall be applied at this frequency if a limit value is tabulated.

For the purpose of this standard, a television receiver shall meet the limits of Table 3 or Table 4 for all channels for which it is designed. For tests for conformity of appliances in series production (see clause 15) a television receiver shall be tested on one channel in each band for which it is designed, using the channel N for which the picture carrier frequency is nearest to the following frequencies:

Channel N_i in Band I nearest to 55 MHz

Channel N_{iii} in Band III nearest to 203 MHz

Channel N_{iv} in Band IV nearest to 503 MHz

Channel N_v in Band V nearest to 743 MHz

NOTE For the purpose of this standard the following frequency bands are defined:

— Band I from 47 MHz to 68 MHz

— Band III from 174 MHz to 230 MHz

— Band IV from 470 MHz to 598 MHz

— Band V from 598 MHz to 862 MHz

In practice not all television receivers are tunable over these complete frequency ranges. On the other hand many television receivers are tunable over additional channels, exclusively used in cable distribution networks.

For system L, signal D is a modulated signal at the relevant picture carrier frequency (r.m.s. value) 1 000 Hz at 80 % depth. This signal is also used in a second measurement for simulating the unwanted signal at the sound carrier frequency. In that case the limits indicated in the table have to be reduced by 10 dB.