

RECOMMENDATION ITU-R BS.773^{*,**}**Radio-frequency protection ratios required by FM sound broadcasting
in the band between 87.5 MHz and 108 MHz against interference
from D/SECAM television transmissions**

(1992)

The ITU Radiocommunication Assembly,

considering

- a) that in some areas of Europe the part below 100 MHz of the VHF band II is used for television broadcasting;
- b) that for planning of sound broadcasting in that band it is, therefore, necessary to know to what extent the reception of sound broadcasting signals is interfered with by television transmissions,

recommends

that the criteria contained in Annex 1 should be used to protect the sound broadcasting service against interference from D/SECAM television transmissions.

ANNEX 1

1 Introduction

Measurements have been made in the Federal Republic of Germany and Finland, to study the radio-frequency protection ratios required by sound broadcasting reception against interference from D/SECAM television transmissions.

1.1 Measuring conditions**1.1.1 Measurements carried out in Finland**

In Finland, five representative domestic sound broadcasting receivers were measured making use of a D/SECAM television signal generator as the unwanted transmitter. The measurements were performed in accordance with Recommendations ITU-R BS.468 and ITU-R BS.641.

* This Recommendation should be brought to the attention of Radiocommunication Study Group 11.

** Radiocommunication Study Group 6 made editorial amendments to this Recommendation in 2002 in accordance with Resolution ITU-R 44.

The D/SECAM television signal generator used was modulated by a 13×17 grid electronic test pattern signal with 90% modulation depth. The sound carrier was at a level of -10 dB with respect to the vision carrier and was modulated by a 1 000 Hz signal with ± 50 kHz deviation. The wanted reference system was 1 000 Hz with ± 75 kHz deviation. The input level was 66 dB($1 \mu\text{V}$) into 75Ω . The signal-to-noise ratio required was 50 dB measured according to Recommendation ITU-R BS. 468.

In the range of wanted signal frequencies from 0.5 MHz to 4 MHz above the vision carrier, the required protection ratio values were found to be greatly dependent on picture content. The worst interference with varying degrees of frequency dependence was produced by test patterns. In this range, therefore, an envelope curve has been taken to represent the interference potential of commonly-used test pictures.

1.1.2 Measurements carried out in the Federal Republic of Germany

In the Federal Republic of Germany the RF wanted-to-interfering signal ratios were measured using one re-broadcast receiver and one domestic sound broadcast receiver of medium quality which reasonably met the RF protection ratio curves of Recommendation ITU-R BS.412.

The measurements were made using a PAL transmitter but with a vision-sound-carrier spacing of 6.5 MHz. The vision-to-sound-carrier ratio was chosen as 10 dB. Taking account of the greater video bandwidth of the D/SECAM standard the interference in the frequency range between 5 MHz and 6 MHz was extrapolated from the results at lower frequencies.

The frequency of the chrominance sub-carrier was at approximately 4.433 MHz according to the PAL standard but when evaluating the results, the special conditions of the D/SECAM standard using two sub-carriers at frequencies 4.25 MHz and 4.4 MHz were taken into account.

The measurements were made according to Recommendation ITU-R BS.641 using the D/SECAM television signals as the interfering signal. However, the interfering sound carrier was only modulated with a quasi-peak deviation of ± 24 kHz, thereby taking account of the smaller maximum deviation of ± 50 kHz for the sound in television systems. For the video signal, different test patterns were used.

1.1.3 Comparison of the results

The results obtained from the measurements carried out in the Federal Republic of Germany generally confirm those carried out in Finland. As a result of the different measuring methods and equipment used, the radio-frequency protection ratios differ below -1 MHz relative to the vision carrier and around the colour sub-carrier frequencies above 4 MHz. The results obtained in the Federal Republic of Germany require lower protection ratios below -1 MHz for stereophonic reception and above 4 MHz for monophonic reception.

2 Radio-frequency protection ratios

Based on the measurements described in § 1 the following radio-frequency protection ratios required by the sound broadcasting service against interference from D/SECAM television transmissions are given in Fig. 1 and Table 1.

FIGURE 1

**Radio-frequency protection ratio required by frequency modulation sound-broadcasting
at frequencies between 87.5 and 108 MHz
against interference from D/SECAM television transmissions**

(Steady interference)

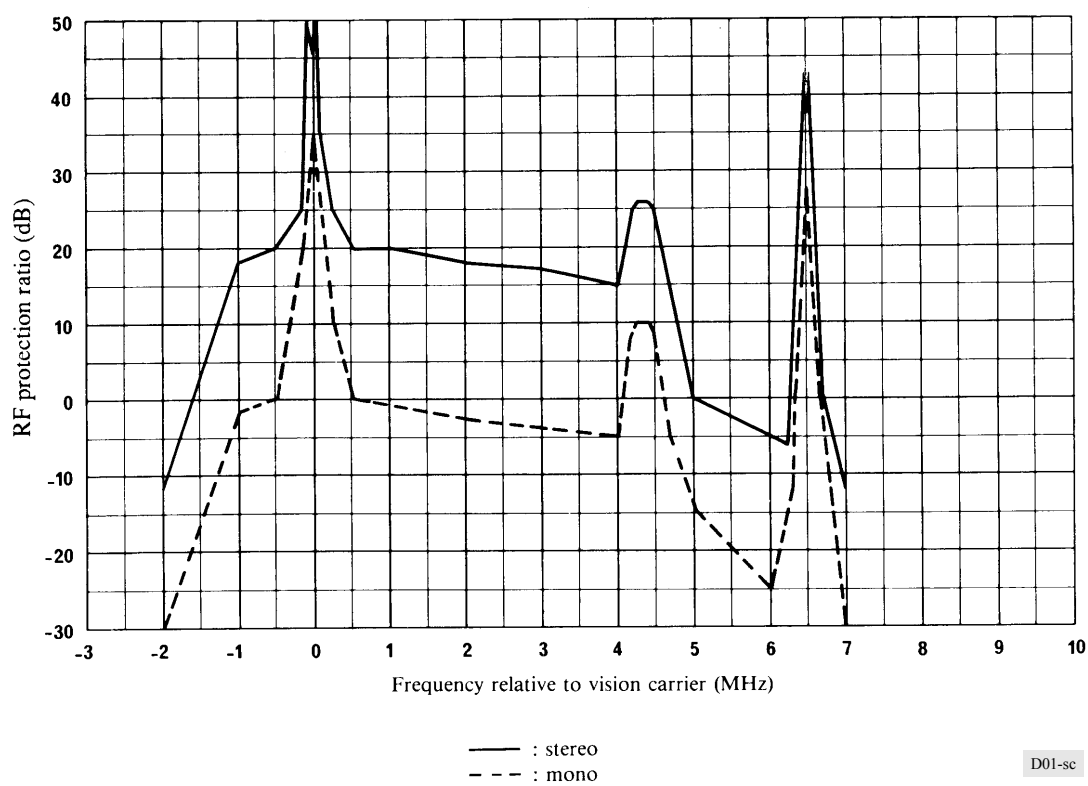


TABLE 1

Radio-frequency protection ratio required by frequency modulation sound broadcasting at frequencies between 87.5 and 108 MHz against interference from D/SECAM television transmissions

(Steady interference)

Difference between wanted signal and picture carrier frequencies (MHz)	RF protection ratio (dB)	
	Mono	Stereo
- 2.0	- 30	- 12
- 1.0	- 2	18
- 0.5	0	20
- 0.15	19	25
- 0.1	24	35
- 0.05	30	50
0.0	35	45
0.05	30	50
0.1	24	35
0.15	19	31
0.25	10	25
0.5	0	20
1.0	- 1	20
2.0	- 3	18
3.0	- 4	17
4.0	- 5	15
4.18	8	25
4.25	10	26
4.41	10	26
4.48	8	25
4.7	- 5	15
5.0	- 15	0
6.0	- 25	- 5
6.25	- 13	- 6
6.3	- 5	5
6.4	6	26
6.45	15	40
6.475	25	43
6.5	28	35
6.525	25	43
6.55	15	40
6.6	6	26
6.7	- 3	0
7.0	- 30	- 13

NOTE 1 – For tropospheric interference (protection 99% of the time) these values may be reduced by 8 dB.

NOTE 2 – Values for frequencies from 0.5 to 4 MHz are greatly affected by picture content. The figures given are for a test pattern and are representative of the on-the-air test picture transmissions.

NOTE 3 – The effect of offset frequency operation should be taken into account separately especially when using frequencies near the carrier frequency.