RECOMMENDATION ITU-R BT.1206

SPECTRUM SHAPING LIMITS FOR DIGITAL TERRESTRIAL TELEVISION BROADCASTING

(Question ITU-R 121/11)

(1995)

The ITU Radiocommunication Assembly,

considering

a)   that digital terrestrial television broadcasting will share frequency bands with analogue television;

b)   that for efficient planning for terrestrial broadcasting the spectrum limits for digital television should be defined for maximum compatibility,

recommends

1   that the spectrum characteristics for digital terrestrial transmission should conform to the limits defined in:

–   Annex 1 for 6 MHz channels;

–   Annex 2 for 7 MHz channels;

–   Annex 3 for 8 MHz channels.

ANNEX 1

Spectrum shaping limits for digital terrestrial television systems using 6 MHz channels

(Under study)

ANNEX 2

Spectrum shaping limits for digital terrestrial television systems using 7 MHz channels

1   Types of 7 MHz system covered

The spectrum shaping limits described in this Annex are applicable to 7 MHz multicarrier orthogonal frequency division multiplex (OFDM) systems, irrespective of the number of carriers employed.

2   Sampling the transmitter output

To examine the spectrum, the output port of the transmitter (including any RF channel-defining filters) is connected to a spectrum analyser via an attenuator, or to an artificial load with some means of monitoring the emissions with a spectrum analyser. A spectrum analyser with variable persistence or digital storage is used, and its controls are adjusted as shown in Table 1, for OFDM systems.

TABLE 1

Spectrum analyser settings for OFDM systems

RF centre frequency	Centre frequency of standard TV channel
Amplitude scale (dB/division)	10
Resolution bandwidth (kHz)	10
Total span (MHz)	10
Total sweep time (ms)	300
Video filter (kHz)	10

3 Setting the spectrum analyser reference level

For multicarrier OFDM systems the spectrum analyser is adjusted so that the maximum level displayed corresponds to the 0 dB reference line. For comparison purposes, the signal power displayed on the spectrum analyser, corresponding to the reference level, can be calculated from:

$$\text{Reference level} = 10 \log_{10} P_{(av)} \cdot P_{(meas)}/B_{(act)} \qquad \text{dBW}$$

where:

$P_{(av)}$: true average (heating) power (W) of OFDM signal measured in full system bandwidth

$B_{(meas)}$: equivalent noise bandwidth of spectrum analyser (use of spectrum analyser resolution bandwidth yields results with an accuracy of approximately ± 2dB)

$B_{(act)}$: total active bandwidth of the OFDM signal spectrum.

The recorded spectral plot is compared with Fig. 1 to ensure that the spectrum is contained entirely within the mask.

FIGURE 1

Spectrum limit mask for 7 MHz OFDM digital terrestrial television systems

Frequency (MHz) relative to the TV channel centre frequency
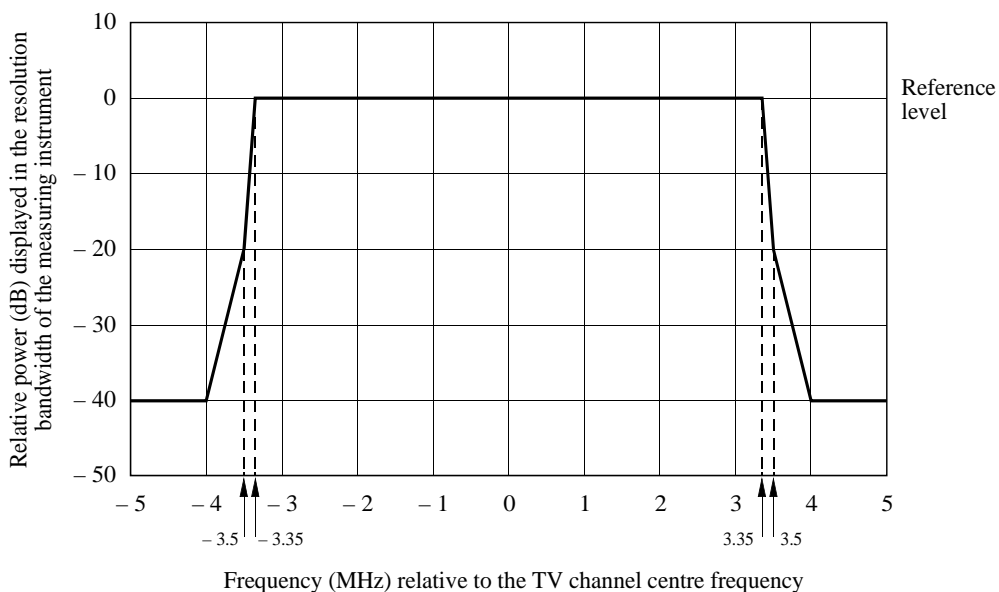
ANNEX 3

Spectrum shaping limits for digital terrestrial television systems using 8 MHz channels

1   Types of 8 MHz systems covered

The spectrum shaping limits described in this Annex are applicable to 8 MHz multicarrier OFDM systems, irrespective of the number of carriers employed.

2   Sampling the transmitter output

The transmitter output is sampled as described in § 2 of Annex 2. The spectrum analyser controls are adjusted as shown in Table 1.

3   Setting the spectrum analyser reference level

The spectrum analyser reference level is set as described for multicarrier OFDM systems in § 3 of Annex 2.

The recorded spectral plot is compared with Fig. 2 to ensure that the spectrum plot is contained entirely within the mask.

FIGURE 2

Spectrum limit mask for 8 MHz digital terrestrial television systems

Frequency (MHz) relative to the TV channel centre frequency

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