

RECOMMENDATION ITU-R SM.1792

Measuring sideband emissions of T-DAB and DVB-T transmitters for monitoring purposes

(2007)

Scope

This Recommendation provides guidance to measurement procedures and specifies settings in measuring emissions of terrestrial digital audio broadcasting (T-DAB) and digital video broadcasting-terrestrial (DVB-T) for conformity with the relevant spectrum masks.

The ITU Radiocommunication Assembly,

considering

- a) that Recommendation ITU-R BS.1660 gives definitions of spectrum masks specifying limits for out-of-band (OoB) domain emissions of T-DAB (terrestrial digital audio broadcasting) transmitters;
- b) that Annex 2 of the Final Acts of RRC-06 gives definitions of spectrum masks specifying limits for OoB domain emissions of DVB-T (digital video broadcasting-terrestrial) transmitters;
- c) that the potential of imposing harmful interference to adjacent radio services from T-DAB and DVB-T emissions is especially high due to their rectangular spectrum shape which places the maximum signal level up to the edges of the assigned bandwidth;
- d) that monitoring stations have to measure the conformance with the relevant masks for any T-DAB or DVB-T transmitter, preferably off-air, to protect adjacent radio services from harmful interference;
- e) that the dynamic range of spectrum analysers is not sufficient to measure the OoB emissions from these transmitters,

recommends

- 1 that, when measuring conformance of T-DAB and DVB-T emissions with the relevant spectrum masks, the method described in Annex 1 should be used.

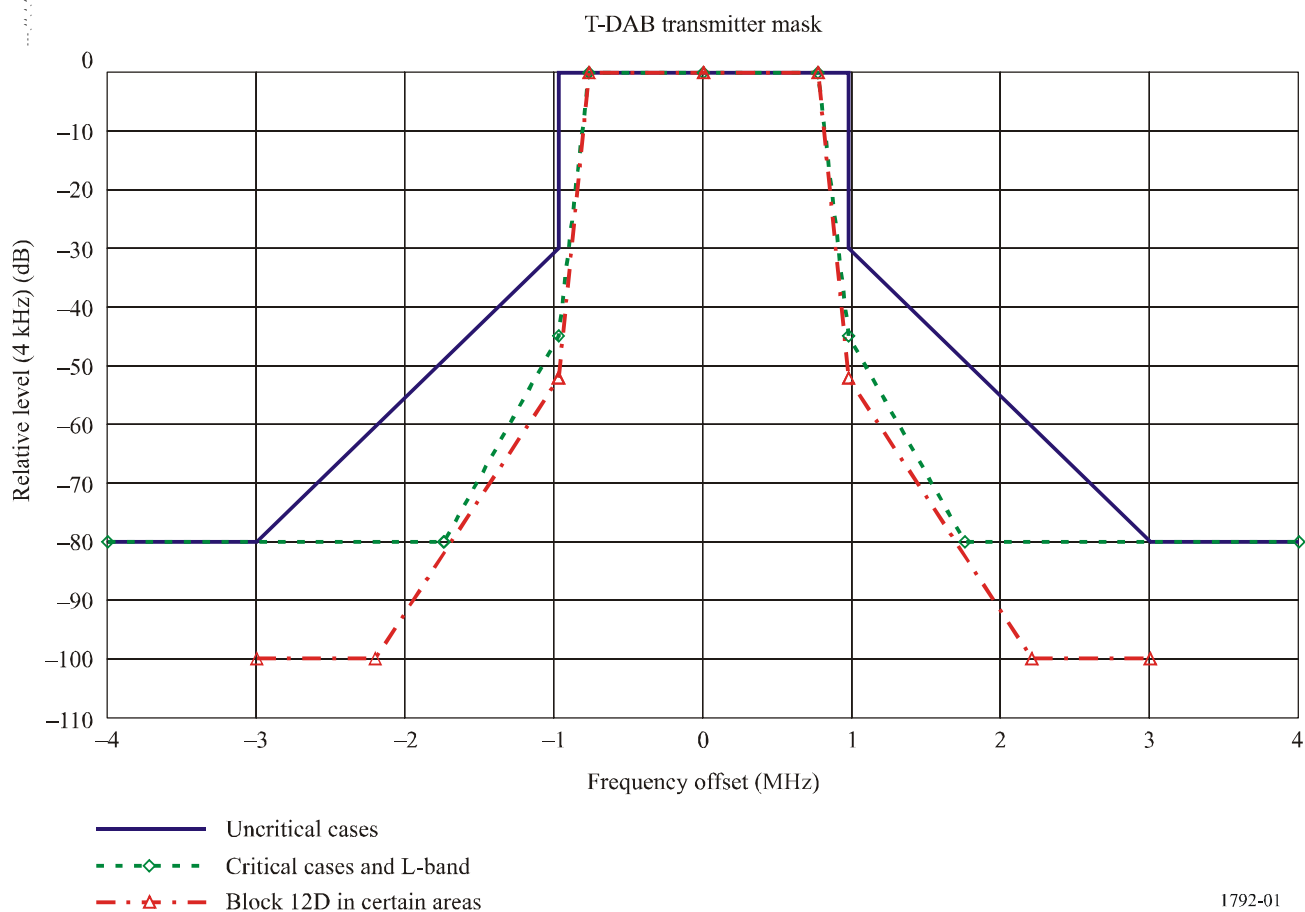
Annex 1**1 Spectrum masks**

To protect neighbouring radio services, spectrum masks are defined in the vicinity of the main emission. The level of any OoB and spurious emission has to be lower than the mask.

1.1 T-DAB

For T-DAB transmitters, Recommendation ITU-R BS.1660 defines the following spectrum masks:

FIGURE 1
OoB emissions from T-DAB transmitters



Note – The critical mask is to be used for the lowest and highest channel in the allocated band to protect neighbouring radio services, the uncritical mask is to be used inside the allocated band.

Uneven frequency breakpoints are ± 0.77 MHz, ± 0.97 MHz, ± 1.75 MHz and ± 2.2 MHz.

The mask assumes a 4 kHz measurement filter.

1.2 DVB-T

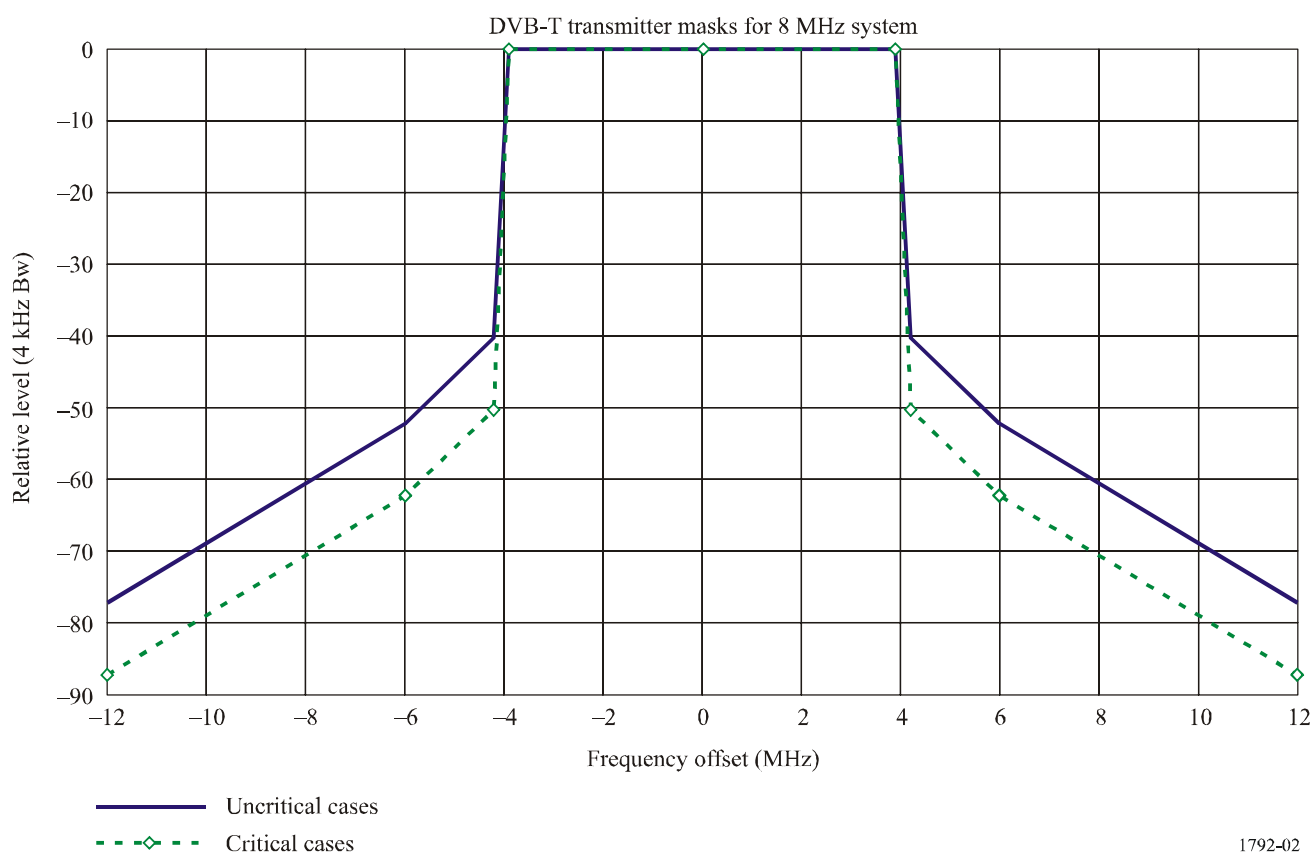
For DVB-T transmitters, Annex 2 to the Final Acts of RRC-06 defines spectrum masks for DVB-T systems. As an example, Fig. 2 shows the mask for 8 MHz channel width.

2 Measurement of sideband emissions from T-DAB and DVB-T transmitters¹

2.1 General as to be seen from Figs. 1 and 2, the maximum level of sideband emissions from T-DAB and DVB-T transmitters may go down to a level of -101 dB, compared to the maximum power in the assigned channel, measured with the same receiver bandwidth. To reliably measure true sideband emissions, the measurement equipment has to have a dynamic range of at least 110 dB. The dynamic range of modern monitoring receivers or spectrum analysers of around 80 dB is not sufficient to directly measure conformance with the masks.

¹ Measurements for T-DAB can also be used for other systems, e.g. terrestrial digital multimedia broadcasting (T-DMB) (see Report ITU-R BT.2069).

FIGURE 2
OoB emissions from 8 MHz DVB-T transmitters



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Note – The critical mask is to be used for the lowest and highest channel in the allocated band to protect neighbouring radio services, the uncritical mask is to be used inside the allocated band.

Uneven frequency breakpoints are ± 3.8 MHz and ± 4.2 MHz.

The mask assumes a 4 kHz measurement filter.

2.2 Measurement principle

To increase the dynamic range of the measurement receiver, the T-DAB or DVB-T signal has to be passed through a filter that suppresses the main signal and passes the OoB domain. The signal including one sideband in the OoB domain is scanned through this filter with a narrow resolution bandwidth (RBW) and the resulting spectral levels are recorded.

In a second scan, the frequency response of the filter (attenuation) is recorded for the same frequency range.

The filter attenuation is then added to the spectral levels from the first scan to give the true, unfiltered spectrum.

The achievable gain in measurement dynamics only depends on the sharpness of the filter.

2.3 Measurement set-up

Various different set-ups are possible to perform sideband measurements according to the described measurement principle. The following set-up is a version with separate units for receiver, filter and measurement controller: