

RECOMMENDATION ITU-R SM.1539-1

Variation of the boundary between the out-of-band and spurious domains required for the application of Recommendations ITU-R SM.1541 and ITU-R SM.329

(Question ITU-R 211/1)

(2001-2002)

The ITU Radiocommunication Assembly,

considering

- a) that Recommendations ITU-R SM.1541 and ITU-R SM.329 give the definitions of the terms “out-of-band domain” and “spurious domain”, but that these definitions do not precisely specify the boundary between the out-of-band (OoB) and spurious domains;
- b) that the boundary between the OoB and spurious domains is important for the application of both Recommendations ITU-R SM.1541 and ITU-R SM.329;
- c) that the boundary between the OoB and spurious domains is, in general, a function of the necessary bandwidth, but may be functions of different parameters other than the necessary bandwidth in certain applications;
- d) that the boundary between the OoB and spurious domains may require variations, in particular, for narrow-band and wideband transmissions, as well as for primary radars,

noting

- a) that, according to Recommendations ITU-R SM.1541 and ITU-R SM.329, normally the boundary between the OoB and spurious domains is the frequency separated from the centre frequency of the emission by 250% of the necessary bandwidth of the emission (see Note 1),

recommends

- 1 that Annex 1 should be referred to in the case of variation of the boundary between the OoB and spurious domains which may be required for the application of Recommendations ITU-R SM.1541 and ITU-R SM.329.

NOTE 1 – Recommendation ITU-R SM.1138, which is incorporated by reference into the Radio Regulations (RR), deals with the determination of necessary bandwidth for various emissions. Recommendation ITU-R SM.853 presents additional information concerning the determination of necessary bandwidth for certain emissions, including unmodulated pulse emissions and some digital modulation.

In addition, Recommendations ITU-R SM.1541 (*recommends* 2.3) and ITU-R SM.329 (*further recommends* 1.4 and 2.3) discuss the necessary bandwidth for certain emissions for the purpose of determining the boundary between the OoB and spurious domains.

ANNEX 1

Variation of the boundary between the OoB and spurious domains**1 Introduction**

As stated in *recommends* 2.3 of Recommendation ITU-R SM.1541 and *further recommends* 2.3 of Recommendation ITU-R SM.329, the boundary between the OoB and spurious domains, which is generally specified as being separated from the centre frequency by 250% of the necessary bandwidth, needs to be modified for narrow-band and wideband (including multicarrier) systems, and certain other situations. This Annex provides:

- a set of guidelines on values of bandwidths across the spectrum at which the general definition needs to be varied; and
- a set of known situations in which additional guidelines are required.

2 Boundary variations for narrow-band and wideband systems

For the definition of necessary bandwidth, its applicability to multichannel or multicarrier transmitters/transponders, and its use in the fixed and radiodetermination services, see *further recommends* 1.4 of Recommendation ITU-R SM.329.

Figure 1 shows the spurious boundary as a function of necessary bandwidth, indicating the boundary variations. The normal separation between the centre frequency and the spurious domain boundary is 250% of the necessary bandwidth, as shown in Fig. 1, between the vertical dashed lines.

For some narrow-band emissions, it is appropriate to avoid specifying OoB and spurious domains in very narrow bandwidths near to the emission, which will usually be under the control of the same operator. On the other hand, it is necessary to restrict the linear growth of the OoB domain versus necessary bandwidth for wideband emissions, in order to restrict the incursion of the OoB domain into adjacent bands.

Figure 1 shows how the boundary is determined for the narrow-band and wideband cases. When the necessary bandwidth of the emission is less than the lower threshold value B_L , the boundary is a constant $2.5 B_L$. Conversely, when the necessary bandwidth exceeds the upper threshold value B_U , the boundary increases at a lower rate, having a value of $1.5 B_N + B_U$. Table 1 shows the formulas for the narrow-band, normal and wideband cases.