



Recommendation ITU-R F.1191-3
(05/2011)

**Necessary and occupied bandwidths
and unwanted emissions of digital
fixed service systems**

F Series
Fixed service



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Foreword

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SF	Frequency sharing and coordination between fixed-satellite and fixed service systems
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Note: This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.

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RECOMMENDATION ITU-R F.1191-3*

**Necessary and occupied bandwidths and unwanted emissions
of digital fixed service systems**

(1995-1997-2001-2011)

Scope

This Recommendation gives an explanation of basic terms relating to unwanted emissions and bandwidths of digital fixed service systems to clarify the application of definitions in the Radio Regulations and Recommendations ITU-R SM.328 and ITU-R SM.329, as well as guidance consideration on these subjects for use for system or equipment designer of fixed service systems.

Considerations are also made on the occupied bandwidth of multi-carrier systems and requirements for out-of-band emissions for systems used in the block-based assignment.

The ITU Radiocommunication Assembly,

considering

- a) that it is necessary for designers of digital fixed service systems (DFSS) to give guidance for the application of the terms relating to bandwidths and unwanted emissions;
- b) that it is relatively unlikely that out-of-band (OoB) emissions from DFSS will cause significant interference into systems operating in adjacent bands, because:
 - the power spectrum of a DFSS decays rapidly outside the occupied bandwidth;
 - the e.i.r.p. of line-of-sight DFSS is low or medium;
 - trans-horizon DFSS employing a high e.i.r.p. are not widely used;
- c) that from the viewpoint of interference into other systems sharing the same frequency band, interference due to OoB emissions will be, in general, less significant than that due to emissions within the necessary bandwidth;
- d) that intra-system interference related problems, which may be caused by unwanted emissions, are normally taken into account by DFSS designers;
- e) that at the allocated band edges, RF band edge guardband ZS, as defined in Recommendation ITU-R F.746, is given by the relevant ITU-R Recommendations in order to control power spill-over into adjacent allocated bands;
- f) that it is not always possible or convenient to make the occupied bandwidth of DFSS smaller than or equal to the bandwidth of the RF channel provided by the relevant RF channel arrangement established for the allocated band by ITU-R or by a national regulatory authority;
- g) that in most bands allocated to fixed services on a primary basis, a radio-frequency (RF) channel arrangement is usually established by a relevant ITU-R Recommendation or by a national regulatory authority;

* This Recommendation should be brought to the attention of Radiocommunication Study Group 1.

h) that, within the allocated band, coordination between various fixed service systems, based on the use of a RF channel arrangement, is covered by a spectrum-efficient concept summarized by Recommendation ITU-R F.746 and by the statistical propagation behaviour reported in Recommendation ITU-R P.530 and Recommendation ITU-R F.1093;

j) that DFSS, with suitable scrambling applied, have in general a transmitted spectral density and unwanted emissions with power peak factors that may be conservatively considered noise-like;

k) that DFSS generate unwanted emissions, composed of both noise-like and discrete components, in both out-of-band and spurious emissions domains;

l) that single or multi-carrier systems are widely used in DFSS,

noting

a) that Recommendation ITU-R SM.328 gives information on the evaluation of OoB spectral emission for various modulation formats;

b) that Recommendation ITU-R SM.329 gives the limits and the reference bandwidth for unwanted emissions in the spurious domain of all services, including the fixed service;

c) that Recommendation ITU-R SM.1541 gives generic limits for unwanted emissions in the OoB domain for most of the services, including the fixed service (see Note 1);

d) that Recommendation ITU-R SM.1539 gives guidance on the variation of the boundary between OoB and spurious domains for very narrow-band and very wideband emissions,

recommends

1 that the following terms should be applied to DFSS:

1.1 Allocated frequency band

For DFSS the allocated frequency band may be considered as the overall frequency band allocated to the fixed service on a primary or co-primary basis.

1.2 Assigned frequency band

For the purpose of this Recommendation this term may be considered to apply also to a block of spectrum assigned to one or more stations of an operator under a single exclusive licence (block-assignment, see examples in Recommendations ITU-R F.1488, ITU-R F.748 and ITU-R F.749).

Inside a single block-assignment, the system designer may, in general, subdivide the block into suitable smaller sub-blocks in order to deploy a radio network in the geographical area where the assignment has been made, within conditions specified above (see Recommendation ITU-R F.1399).

1.3 Radio-frequency channel separation

Bandwidth equal to the frequency separation, defined in Recommendation ITU-R F.746, of adjacent channels of the relevant RF channel arrangement established within the allocated frequency band.

1.4 Guardband

Bandwidth equal to the frequency separation, defined in Recommendation ITU-R F.746 as ZS , between the nominal centre frequency of the outermost channel of a RF channel arrangement and the limit of the allocated band.