

RECOMMENDATION ITU-R BO.1373-2

Use of broadcasting-satellite service assignments and of the associated feeder-link assignments for fixed-satellite service transmissions in bands subject to Appendices 30 and 30A of the Radio Regulations

(Question ITU-R 70/6)

(1998-2002-2005)

Scope

The objective of this Recommendation is to increase its usefulness to administrations through the following:

- a) modifying the Recommendation in order to reflect WRC-03's decisions related to the use of BSS downlink Plan assignments and feeder-link Plan assignments for FSS transmissions;
- b) adding a new Annex 2 to the Recommendation to provide guidelines on power levels for FSS transmissions in BSS feeder-link assignments.

The ITU Radiocommunication Assembly,

considering

- a) that No. 5.492 of the Radio Regulations (RR) allowing broadcasting-satellite service (BSS) assignments to be used for fixed-satellite service (FSS) transmissions in Region 2 has been extended by the World Radiocommunication Conference (Istanbul, 2000) (WRC-2000) to be applicable also in Regions 1 and 3;
- b) that use of BSS assignments for transmission in the FSS is addressed in § 5.2.1 *d*) of Article 5 of RR Appendix 30;
- c) that use of assignments in the 14.5-14.8 GHz and 17.3-18.1 GHz band for transmissions in the FSS (Earth-to-space) other than for feeder link to the BSS is addressed in § 5.2.1 *d*) of Article 5 of RR Appendix 30A;
- d) that some administrations may notify FSS transmissions for use in their BSS channels;
- e) that such use is only possible if the FSS transmissions do not cause more interference or require more protection than the corresponding BSS assignments,

recognizing

- a) that implementation of such transmissions is subject to not causing more interference nor requiring more protection than the corresponding BSS feeder-link assignments;
- b) that the Region 2 BSS Plan is prevalently based on analogue frequency-modulated carriers and that other modulating signals (e.g. digital) are not precluded;
- c) that the Regions 1 and 3 BSS Plan and List are prevalently based on digital carriers;
- d) that various types of FSS carriers may be transmitted in the BSS Plan and feeder-link channels;
- e) that Recommendation ITU-R BO.1293, contains interference calculation methods for BSS sharing situations involving carriers which differ from the standard TV/FM carriers used for establishing the Region 2 BSS Plan;

- f) that the use of 14.5-14.8 GHz and 17.3-18.1 GHz bands is subject to RR No. 5.510 and Nos. 5.516, 5.516A and 5.516B;
- g) that irrespective of the use of BSS assignments for FSS transmissions, the entry will continue to be considered as BSS in the application of RR Nos. 23.13, 23.13A, 23.13B and 23.13C;
- h) that the Radiocommunication Bureau has the necessary tools to carry out the required examination in order to ensure that the conditions referred to in RR No. 5.492 and § 5.2.1 *d*) of Article 5 of RR Appendix 30A (last indent) are fully met,

recommends

- 1 that the information contained in Annex 1 may be used by administrations as a guideline in application of RR No. 5.492;
- 2 that the information contained in Annex 2 may be used by administrations as a guideline in the application of § 5.2.1 *d*) of Article 5 of RR Appendix 30A (last indent);
- 3 that Notes 1 and 2 be considered as part of this Recommendation.

NOTE 1 – Further study is needed for analogue FSS transmissions, especially for narrow-band FSS transmissions.

NOTE 2 – FSS transmissions referred to above are not entitled to receive more protection than the corresponding BSS assignments and associated feeder-link assignments as appearing in the appropriate Plan or List according to the case.

Annex 1

Guidelines on power levels for FSS transmissions in BSS assignments

When BSS assignments are used for FSS transmissions, it is assumed that these assignments may not cause more interference than BSS transmissions operating in conformity with the Plan. This Annex presents guidelines on the power levels of FSS transmissions with respect to BSS transmissions (analogue or digital) in order to satisfy this criterion.

The interference possibilities are shown in Table 1 which is an example applicable for all Regions. This Table covers co-channel and adjacent channel cases only. For other frequency spacings, and for the different possible carrier types, on-going work on protection ratio templates should be further reflected in the Table.

In this Table, it is assumed that the BSS plan entry was designated for analogue FM/TV or Digital TV (columns 2 and 3). Column 1 identifies the FSS usage to which such a channel is to be put.

In the case of co-channel interference, the requirement that the FSS transmission causes no more interference than a BSS transmission would be satisfied if the FSS interference power is less than or equal to the BSS power.

In the case of adjacent channel interference, when using a digital signal instead of an analogue signal the approach for an FSS digital signal is as follows:

$$P_{fss} \leq P_{bss} - \Delta - 10 \log(b/B) + K \quad \text{dBW}$$

where:

- B : bandwidth of the analogue TV carrier (MHz)
- b : bandwidth of the overlapping spectrum (MHz)
- K : digital/analogue correction factor (dB)
- Δ : difference between co- and adjacent channel protection ratios (dB).

Examples:

Regions 1 and 3:

For wideband digital systems of 27 MHz necessary bandwidth:

$$B = 27 \text{ MHz}, b = 7.82 \text{ MHz}$$

$$P_{fss} \leq P_{bss} - \Delta + 5.4 + K \quad \text{dBW}$$

Region 2:

For wideband digital systems of 24 MHz necessary bandwidth:

$$B = 24 \text{ MHz}, b = 9.42 \text{ MHz}$$

$$P_{fss} \leq P_{bss} - \Delta + 4.06 + K \quad \text{dBW}$$

For narrow-band digital systems, each of n carriers within the overlapping bandwidth permitted the same interference value, resulting in:

$$P_{fss} \leq P_{bss} - \Delta - 10 \log n + K \quad \text{dBW}$$

The results are summarized in Table 1.

TABLE 1
Estimated allowable FSS power levels

FSS usage ⁽¹⁾		BSS analogue filing	BSS digital filing
Analogue FM/TV	Co-channel	$P_{fss} \leq P_{bss}$	$P_{fss} \leq P_{bss}$
	Adjacent channel	$P_{fss} \leq P_{bss}$	$P_{fss} \leq P_{bss}$
Digital wideband	Co-channel	$P_{fss} \leq P_{bss}$	$P_{fss} \leq P_{bss}$
Digital TV	Adjacent channel	$P_{fss} \leq P_{bss} - \Delta + S + K^{(2)}$	$P_{fss} \leq P_{bss}$
Digital narrow-band ⁽³⁾	Co-channel	$P_{fss} + 10 \log N \leq P_{bss}$	$P_{fss} + 10 \log N \leq P_{bss}$
	Adjacent channel	$P_{fss} + 10 \log n \leq P_{bss} - \Delta + K^{(2)}$	$P_{fss} + 10 \log n \leq P_{bss}$

⁽¹⁾ Co-channel and adjacent channel cases are given. Other frequency off-set values need further study.

⁽²⁾ Possible values of K range from 3-4 dB. S equals 5.4 for Regions 1 and 3 and equals 4.06 for Region 2.

⁽³⁾ N : No. of narrow-band carriers replacing the BSS TV carrier.
 n : No. of narrow-band FSS channels in the over-lapping bands.

Annex 2**Guidelines on power levels for transmissions
in BSS feeder-link assignments**

The allowable power levels of the carriers notified for transmission in the BSS feeder links are such that the on-axis and off-axis e.i.r.p. density levels (maximum averaged over the worst 1 MHz band) do not exceed the on-axis and off-axis e.i.r.p. density levels of the corresponding BSS feeder-link assignments as appearing in a Regional Plan or List.
