

ITU-R

Radiocommunication Sector of ITU

Recommendation ITU-R F.2011
(01/2012)

**Evaluation of interference from
high-altitude platform (HAPS) gateway
links (HAPS-to-ground direction) in the
fixed service to conventional fixed wireless
systems in the range 5 850-7 075 MHz**

F Series
Fixed service



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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.2011*

Evaluation of interference from high-altitude platform (HAPS) gateway links (HAPS-to-ground direction) in the fixed service to conventional fixed wireless systems in the range 5 850-7 075 MHz

(2012)

Scope

This Recommendation provides a method for the evaluation of interference between fixed service (FS) systems using high-altitude platform stations (HAPS) gateway links (HAPS-to-ground) and conventional fixed wireless systems in the range 5 850-7 075 MHz in response to the technical study invited by Resolution 734 (Rev.WRC-07). The method is used to determine areas where specific values of I/N would be exceeded in an FS receiver. Results include plots and calculations of the areas for various specified I/N values.

The ITU Radiocommunication Assembly,

considering

- a) that new technology utilizing high-altitude platform stations (HAPS) in the stratosphere has been developed to provide high-capacity services;
- b) that some administrations intend to operate the systems using HAPS in the bands allocated for such use by the Table of Frequency Allocations or by footnotes for the fixed service;
- c) that in addition to such service links, there is a requirement for gateway links which can connect the service links to the public switched telephone network (PSTN), broadband data networks, cellular telephone systems and sound and television broadcasting providers;
- d) that WRC-07 adopted Resolution 734 (Rev.WRC-07) requesting ITU-R sharing studies with a view to identifying two channels of 80 MHz each for gateway links for HAPS in the range from 5 850 to 7 075 MHz, in bands already allocated to the fixed service, while ensuring the protection of existing services;
- e) that large portions of this band are heavily used by existing services,

recommends

that, in response to the technical study stated in *considering d)*, to evaluate interference from HAPS gateway links (HAPS-to-ground) in the fixed service to conventional fixed wireless systems in the range 5 850-7 075 MHz the methodology described in Annex 1 should be used.

* This Recommendation has been prepared in support of World Radiocommunication Conference 2012 (WRC-12) Agenda item 1.20. In the event that WRC-12 does not identify spectrum for gateway links for high-altitude platform stations in this band, the Recommendation will be suppressed.

Annex 1

Evaluation of interference from high-altitude platform gateway links (HAPS-to-ground direction) in the fixed service to conventional fixed wireless systems in the range 5 850-7 075 MHz

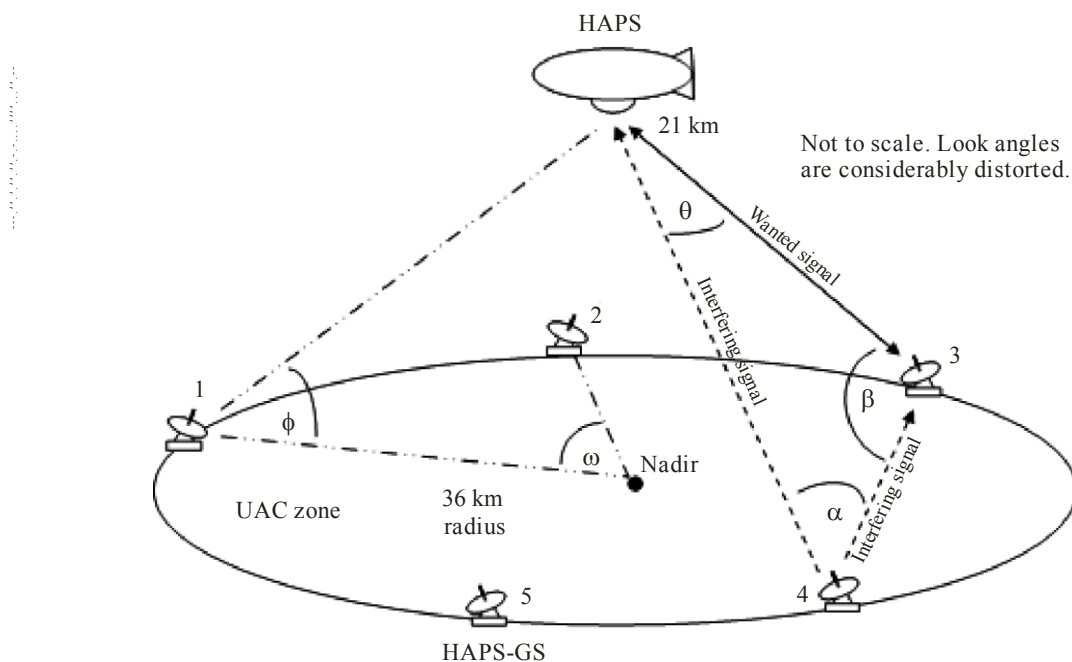
1 Introduction

This Annex presents a methodology for determining the ratio of interference power to noise power at the input of a point-to-point receiver in the fixed service due to operation of HAPS gateway downlinks. This is one of the interference cases that should be considered under WRC-12 Agenda item 1.20. The parameters and models used in the analysis are described in Section 2; the possible I/N criteria that might be applied are described in Section 3; the methodology is described, applied and the results obtained with it are presented in Section 4 for the case where the HAPS platform is transmitting to only one gateway station. In Section 5, consideration is given to the aggregate interference when the HAPS platform is transmitting to multiple gateway ground stations in a symmetrical configuration. In Section 6, considerations are given to the effect of other parameters on the results obtained. The focus of the studies in this document is on the band 5 925-6 875 MHz, because this band is heavily used by the FS.

2 System description and parameters

The HAPS system under consideration in this study provides communication to five gateway stations. Figure 1, which is taken from Recommendation ITU-R F.1891, shows the geometric configuration of the system. The characteristics of the signals transmitted by the HAPS platform transmitter are the ones given in Recommendation ITU-R F.1891. They are summarized in Table 1.

FIGURE 1
Example of HAPS gateway station configuration and
internal HAPS network interference



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