

**XVIII MEETING OF PERMANENT
CONSULTATIVE COMMITTEE III:
RADIOCOMMUNICATIONS
June 11 – 15, 2001
Ottawa, Canada**

**OEA/Ser.L/XVII.4.3
PCC.III/doc. 1975/01
14 June 2001
Original: English**

**REPORT FOR CHAPTER 2
OF THE WRC-2003 WORKING GROUP**

(Item on the Agenda: 4.1)

(Document submitted by the Coordinator of Chapter 2)

CHAPTER 2

Mobile, mobile satellite and space science services

Agenda Item 1.33. *To review and revise technical, operational and regulatory provisions, including provisional limits in relation to the operation of high altitude platform stations within IMT-2000 in the bands referred to in No. S5.388A, in response to Resolution [221] (WRC-2000);*

Background

A high altitude platform station (HAPS) is defined in No. **S1.66A** as “a station located on an object at an altitude of 20 to 50 km and at a specified, nominal, fixed point relative to the Earth”. Thus, HAPS may offer a new means of providing IMT-2000 services with minimal network infrastructure since they are capable of providing service to a large footprint together with a dense coverage.

The bands 1 885-2 025 MHz and 2 110-2 200 MHz are identified in No. **S5.388** as intended for use on a worldwide basis for IMT-2000. The use of HAPS as base stations within the terrestrial component of IMT-2000 is optional for administrations, and that such use should not have any priority over other terrestrial IMT-2000 use. Furthermore, in accordance with No. **S5.388** and Resolution **212 (Rev.WRC-97)**, administrations may use the bands identified for IMT-2000, including the bands referred to in this resolution, for stations of other primary services to which they are allocated. These bands are allocated to the fixed and mobile services on a co-primary basis.

The ITU-R has studied sharing and coordination between HAPS and other stations within IMT-2000, has considered compatibility of HAPS within IMT-2000 with some services having allocations in the adjacent bands, and has established Recommendation ITU-R M.1456. However, additional ITU-R study is needed to consider compatibility of HAPS within IMT-2000 with some other services that share portions of these bands on a co-primary basis. Based on the above considerations, Resolution **221 (WRC-2000)** defined provisional pfd limits as described in the following paragraphs.

For the purpose of protecting certain stations operating within IMT-2000 in neighbouring countries from co-channel interference, a HAPS operating as a base station to provide IMT-2000 shall not exceed a provisional co-channel power flux-density (pfd) of -121.5 dB (W/(m² • MHz))

at the Earth's surface outside an administration's borders unless agreed otherwise by the administration of the affected neighbouring country.

A HAPS operating as a base station to provide IMT-2000, in order to protect fixed stations from interference, shall not exceed the following provisional values of out-of-band pfd at the Earth's surface in the bands 2 025-2 110 MHz:

- $-165 \text{ dB(W/(m}^2\cdot\text{MHz))}$ for angles of arrival (θ) less than 5° above the horizontal plane;
- $-165 + 1.75 (\theta - 5) \text{ dB (W/(m}^2\cdot\text{MHz))}$ for angles of arrival between 5° and 25° above the horizontal plane; and
- $-130 \text{ dB(W/(m}^2\cdot\text{MHz))}$ for angles of arrival between 25° and 90° above the horizontal plane.

The ITU-R did not address sharing and coordination between HAPS and some existing systems, particularly PCS (personal communications service), MMDS (multichannel multipoint distribution service) and systems in the fixed service which are currently operating in some countries in the bands 1 885 – 2 025 MHz and 2 110 – 2 200 MHz. Therefore, Resolution **221** invited the ITU-R to complete additional regulatory, operational and technical studies on sharing criteria for HAPS with other systems in the bands 1 885 – 1 980 MHz, 2 010 – 2 025 MHz and 2 110 – 2 170 MHz in Regions 1 and 3 and 1 885 – 1 980 MHz and 2 110 – 2 160 MHz in Region 2, and in adjacent bands in order to review and, if necessary, revise these provisional pfd limits. Additionally, Resolution **221** asked for consideration of appropriate regulatory and technical provisions to allow bilateral co-ordination of HAPS in an IMT-2000 system with affected neighboring administrations.

Issues

- 1) What are the additional regulatory, operational and technical sharing criteria for HAPS with other systems in the bands 1885-1980 MHz, 2010-2025 MHz and 2110-2170 MHz in Regions 1 and 3 and 1885-1980 MHz and 2110-2160 MHz in Region 2?
- 2) What revisions are required to Resolutions [221](WRC-2000)?
- 3) What are the appropriate regulatory and technical provisions of HAPS within a terrestrial IMT-2000 system to take into account the bilateral coordination with affected neighbouring administrations the operation and growth of existing and planned systems in the fixed and mobile services having allocations on a primary basis?

Preliminary Views

In some CITELE countries, the band 1 850 - 1 990 MHz is currently used by PCS (personal communications service) and some existing fixed systems. A number of fixed systems have been licensed in the band 2 110 - 2 150 MHz and this band may also be available for mobile systems in the future. Furthermore, the band 2 150 – 2 160 MHz is currently used in some CITELE countries by the fixed service for MCS/MDS (multipoint communications systems/multipoint distribution television systems). Therefore, existing primary allocated services, current radio systems and evolving mobile systems shall be protected and not constrained from the introduction of HAPS in these bands.

Traditionally, terrestrial-to-terrestrial coordination with other administrations has been a domestic or bilateral issue and consequently, coordination criteria has not been specified in the Radio Regulations. However, depending on the results of the ITU-R studies, new procedures and/or revisions to the provisional pfd limits may need to be incorporated in the Radio Regulations.

Agenda Item 1.38. *To consider provision of up to 6 MHz of frequency spectrum to the Earth exploration-satellite service (active) in the frequency band 420-470 MHz, in accordance with Resolution 727 (Rev.WRC-2000);*

Background

The United Nations Conference on Environment and Development (UNCED) (Rio de Janeiro, 1992) identified an urgent need for assessment and systematic observations of forest cover and rate of forest degradation in tropical and temperate regions. The frequencies around 450 MHz have been identified as having the unique capability to penetrate the canopy of forest and a bandwidth of about 6 MHz is considered necessary to provide the required resolution.

Likewise, a similar agenda item was debated at WRC-97 resulting in a decision not to adopt proposed allocations for the Earth exploration-satellite service in the 420-470 MHz band. The Earth sensing community has identified that the need for such an allocation, at a radio spectrum wavelength of approximately one meter, is important because experiments have shown good correlation of backscatter radiation with biomass and soil moisture, which are parameters needed for forest monitoring. The need for such forest monitoring was emphasized at the United Nations Conference on Economic Development (UNCED) (Buenos Aires - 1992). Subsequent to UNCED 1992, studies have identified a minimum bandwidth requirement of 6 MHz to satisfy mission objectives.

Resolution **727 (Rev. WRC-2000)** invites the ITU-R to study technical and operational characteristics for active space borne sensors in the frequency band 420 – 470 MHz in order to consider provision of up to 6 MHz of frequency spectrum to the Earth exploration-satellite service (active) in this frequency band

Studies to date have shown the potential for interference between EESS (active) sensors and ground-based radars when in the line of sight of the ground-based radars. Preliminary studies have also shown that there is a potential for interference from EESS (active) to airborne radars operating worldwide.

The amateur community is concerned with the possibility of harmful interference to amateur operations in the 430-440 MHz portion of the band. There are currently 16 amateur satellites in orbit that use frequencies within the band 435-438 MHz for both up and down links internationally.

The band 430–440 MHz is allocated to the amateur service on a co-primary basis in Region 1, and on a primary basis in eight Region 2 countries: Argentina, Colombia, Costa Rica, Cuba, Guyana, Honduras, Panama and Venezuela (No. **S5.278**). Elsewhere in Region 2 and in Region 3, the amateur service allocation is secondary. Additionally, the bands 420–430 MHz and 440–450 MHz are allocated to the amateur service on a secondary basis in Australia, the United States, Jamaica and the Philippines (No.**S5.270**).

The band 420-450 MHz is also allocated to the radiolocation service on a primary basis and is used for telemetry, telecommand and long-range surveillance by land, ship and airborne stations for early missile warning, detection of low-observable targets, and the tracking of all objects in Earth orbit. The band 450-470 MHz is used by the Fixed, Mobile and Mobile-Satellite services.

Studies to date have shown the potential for interference between EESS (active) sensors, and amateur stations when the SAR is in the line of sight of amateur stations, and specifically in the band 435-438 MHz, which would be the worst-case scenario for the amateurs.

Preliminary Views

Canada

The 420-470 MHz frequency band is shared between various services. The importance of this band for the implementation of spaceborne sensors in the Earth exploration satellite service for environmental monitoring purposes, as well as, the importance of this program for environmental protection is recognized. The continued investigation by ITU-R to identify a suitable band to accommodate the spaceborne active earth observation sensors while providing adequate measures to protect existing services is supported.

United States of America

The U.S. opposes this allocation unless a) it can be shown that EESS (active) sensors would not cause harmful interference to radiolocation systems in the 420-450 MHz band and b) it can be shown that the EESS (active) sensors do not cause harmful interference to amateur systems and stations in the 420-450 MHz band. Due to existing use by the fixed, mobile and mobile-satellite services, the U.S. does not consider the 450-470 MHz band to be a viable option based on studies in the ITU-R.