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UNITED STATES OF AMERICA

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

AGENDA ITEM 1.20: *To consider the results of ITU-R studies and spectrum identification for gateway links for high altitude platform stations (HAPS) in the range between 5 850-7 075 MHz in order to support operations in the fixed and mobile services, in accordance with Resolution 734 (Rev.WRC-07)*

BACKGROUND:

Different segments of the 5 850-7 075 MHz frequency band are utilized for fixed, fixed-satellite, and mobile services. Resolution **734 (WRC-07)** invites the ITU-R to study spectrum identification for gateway links for high-altitude platform stations in the range from 5 850 to 7 075 MHz. The study effort is to identify 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.

Previous WRC efforts (WRC-97, WRC-2000) had undertaken initiatives to examine HAPS types of applications in various frequency bands. Due to the fact that all previous studies were carried out in frequency bands significantly higher than 5 850-7 075 MHz, new electromagnetic compatibility (EMC) studies were conducted. The EMC studies addressed HAPS ability to coexist with mobile, fixed satellite services as well as with radiolocation service, which exists in adjacent frequency bands.

Land-based and maritime radiolocation systems operate in the lower adjacent frequency band. Fixed, mobile, and fixed-satellite systems also operate in the 5 850-7 075 MHz band. Remote sensing systems operate in the 6 475-7 075 MHz band.

The FS band is heavily utilized for point-to-point and point-to-multipoint links in many parts of the world, in particular the bands between 5 925 to 6 875 MHz. In the US alone, there are over 42,000 licenses with multiple locations and multiple frequencies in the band 5850-6875 MHz. The bands were originally used for backbone high capacity systems for FM and, subsequently, digital networks. However, they are now used primarily for backhaul for cellular mobile systems, office intranet, ethernet traffic, public safety communications traffic and for delivering traffic to the public switched and data networks, involving shorter hop systems. Introducing high altitude platform links in this band for gateway stations would make it difficult to mutually coordinate either type of system in this environment. ITU-R studies demonstrate that there would be large areas

surrounding HAPS gateway stations where FS would be difficult to coordinate and where, due to the presence of FS stations, gateway stations could not be installed.

The band 5 850-7025 MHz is an FSS uplink band that is heavily used worldwide by GSO FSS applications. The low atmospheric absorption in this band enables highly reliable Earth-to-space communication links with wide service coverage, particularly in, but not limited to, geographical areas with severe rain fade conditions. The wide coverage enables services to be provided in developing countries, to sparsely populated areas and over large distances.

This band has been used by the GSO FSS for over 40 years. The technology is mature and offers equipment at low cost. This, together with the wide coverage, has led to satellites in this band being an important part of the telecommunications infrastructure in many developing countries. Satellites operating in this band are the only efficient means for providing today global satellite coverage of the Earth.

There are approximately 160 geostationary satellites operating in the band 5 850-7025 MHz, comprising a total capacity exceeding two thousand 36 MHz transponders. Moreover, about two out of three satellites in production use this band. The use of this band by the GSO FSS includes governmental uses and international commitments within the WMO and ICAO which are essential for public security, civil aviation and weather, water, climate and environmental alerts.

Satellite services in this band currently include VSAT (“Very Small Aperture Terminal”) networks, internet services, point-to-point links, backhaul service (telephony, Internet), distribution of television programs, satellite news gathering, feeder-link for TV and data broadcasting to SMATV (“Satellite Master Antenna Television”) and DTH (“Direct-To-Home”) receivers, feeder links for the mobile satellite service. Due to their wide coverage characteristics, satellites operating in this band have been extensively used for disaster relief operations. Furthermore, in this band very high power telecommand signals, both for on-station operation and for transfer orbits (Launch and Early Operation Phase – LEOP), are required.

ITU-R studies have shown that the determining factor in sharing with the FSS is the protection of HAPS links, which would require distance separations of up to several hundred kilometers. Maintenance of such large distance separation would have a very negative impact on the US satellite licensees’ ability to further develop their systems domestically and internationally.

A portion of this spectrum, the band 6 725-7 025 MHz, is the uplink band for the FSS Allotment Plan of Appendix **30B (Rev.WRC-07)** of the Radio Regulations. The fixed-satellite service Plan (RR Appendix **30B**) is intended to preserve orbit/spectrum resources for future use, on an equitable basis among all country Members of the ITU, and is of the utmost importance to developing countries that may not have the possibility to implement satellite systems in unplanned bands (that suffer more and more from congestion) in the short-and mid-terms. Use of the band is subject to the provisions of Appendix **30B** to the

Radio Regulations, which sets out the regulatory and technical requirements to be met by FSS networks employing the band and also the protection to be afforded to those networks by systems of the other services having allocations in the band (currently the FS and the MS). The potential introduction of another source of interference, or another set of stations which require protection from Appendix 30B earth stations, would have a negative effect on the possibility of this Plan “guaranteeing in practice equitable access to the geostationary orbit.”

Feeder-links (space-to-Earth) for non-geostationary mobile-satellite service (MSS) systems are allocated in the 6 700-7 075 MHz range, at gateway earth stations. These frequencies are utilized on a world wide basis to provide connections between remote terminals and the terrestrial infrastructure. Given the necessity of tracking low earth orbit (LEO) spacecraft, near hemi-spherical coverage of the sky is required at these gateway earth stations. The reception of signals from spacecraft requires low-noise, high sensitivity amplifiers at these stations that could be overloaded by powerful signals from HAPS gateway ground stations and HAPS platform stations. It will, thus, be very difficult to site HAPS systems and still provide the required protection to MSS feeder downlink earth stations.

In many countries, satellite systems utilizing these frequencies provide the only means for communications between these remote regions and the world telecommunications infrastructure. First responders routinely use MSS systems, of which the feeder links in this frequency range are a part, to coordinate rescue and relief operations. One MSS system provides an emergency location beacon service for which the feeder links provide the vital connection between the MSS spacecraft and the terrestrial portion of the system. The introduction of HAPS gateway links into this frequency range could create an adverse interference environment impacting these critical applications.

The proposal below is for Method A of the draft CPM text. Method A proposes no change to the 5 850-7 075 MHz band. Under this method, it is envisaged that HAPS gateway links may be able to make use of the existing identified spectrum in the bands 47.2-47.5 GHz and 47.9-48.2 GHz in RR No. **5.552A** (and the bands 27.9-28.2 GHz and 31.0-31.3 GHz for the countries listed in RR No. **5.537A** and **5.543A**). There is no indication of requirement within or outside of the United States for HAPS in the band indicated in this agenda item or for any other band even those already identified for HAPS, and certainly not under the conditions indicated in Method B.

Proposal:

NOC USA/1.20/01

5570-7250 MHz

Allocation to Services

Region 1	Region 2	Region 3
5850-5925	5850-5925	5850-5925

FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.150	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Amateur Radiolocation 5.150	FIXED FIXED-SATELLITE (Earth-to=space) MOBILE Radiolocation 5.150
5925-6700 FIXED FIXED-SATELLITE,5.457A (Earth-to-space), 5.457B MOBILE,5.457C 5.149 5.440 5.458	5925-6700 FIXED FIXED-SATELLITE (Earth-to-space),5.457B MOBILE,5.457C 5.149,5.440,5,458	5925-6700 FIXED FIXED-SATELLITE (Earth-to-space), 5.457B MOBILE, 5.457C 5.149,5.440,5.458
6700-7075 FIXED FIXED-SATELLITE,5.441 (Earth-to-space)(space-to- Earth) 5.458,5.458A,5.458B,5.458C	6700-7075 FIXED FIXED-SATELLITE,5.441 (Earth-to-space)(space-to- Earth) 5.458,5.458A,5.458B,5.458C	6700-7075 FIXED FIXED-SATELLITE,5.441 (Earth-to-space)(space-to- Earth) 5.458,5.458A,5.458B,5.458C

Reason: In the bands indicated, regulatory identification would be too difficult to achieve and sustain without causing constraint on the development of the services allocated to the bands of concern. Under this method, it is envisaged that HAPS gateway links may be able to make use of the existing identified spectrum in the bands 47.2-47.5 GHz and 47.9-48.2 GHz in RR No. **5.552A**, which indicates that the use of these bands by HAPS is subject to the provisions of Resolution **122 (Rev.WRC-07)**. This Resolution, in its recognizing a) states that these bands are expected to be required for both gateway and ubiquitous terminal applications. It is therefore clear that there is already spectrum designated for gateway operations for HAPS.

In addition, the bands 27.9-28.2 GHz and 31.0-31.3 GHz are also available for use by HAPS in the countries listed in RR No. **5.537A** and **5.543A**. Added flexibility with respect to spectrum to be used by gateway links could be achieved by administrations by adding their name to these footnotes (in case their names were not yet in these provisions).