



# PUBLIC NOTICE

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## FCC SEEKS COMMENT ON RECOMMENDATIONS APPROVED BY THE ADVISORY COMMITTEE FOR THE 2007 WORLD RADIOCOMMUNICATION CONFERENCE

### IB Docket No. 04-286

On December 13, 2006, the World Radiocommunication Conference Advisory Committee (WRC-07 Advisory Committee) approved and submitted for Commission's consideration its recommendations with regard to a number of issues that will be considered by the 2007 World Radiocommunication Conference (WRC-07).<sup>1</sup> These recommendations are attached to this Public Notice.

Based upon an initial review of the attached WRC-07 Advisory Committee recommendations, the International Bureau, in coordination with other FCC Bureaus and Offices, tentatively concludes that it can generally support these recommendations. We do, however, have some reservations about the proposals reflected in documents WAC/147. The International Bureau also notes the differing views expressed by WRC-07 Advisory Committee participants in documents WAC/148, WAC/149 and WAC/150.

The FCC seeks comment on the attached recommendations as well as recommendations that appear in all of the WRC-07 Advisory Committee documents.<sup>2</sup> The FCC also seeks comment on the attached draft preliminary views and proposals that have been developed by the Executive Branch Agencies and submitted to the FCC by the National Telecommunications and Information Administration (NTIA). Finally, the FCC seeks comment on the International Bureau's initial conclusions with regard to the WRC-07 Advisory Committee recommendations.

The comments provided by interested parties will assist the FCC in its upcoming consultations with the U.S. Department of State and NTIA in the development of U.S. positions for WRC-07. As the

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<sup>1</sup> The WRC-07 Advisory Committee was established by the FCC in January 2004 to assist the FCC in developing proposals for WRC-07. Since its inception, the WRC-07 Advisory Committee has developed and submitted recommendations and preliminary views for Commission consideration. *See, e.g., The FCC's Advisory Committee for the 2007 World Radiocommunication Conference Proposes Preliminary Views on WRC-07 Issues*, Public Notice, DA 04-1698 (rel. June 14, 2004) (Int'l Bur. 2004).

<sup>2</sup> These documents are available through the FCC's WRC-07 website at: <http://www.fcc.gov/wrc-07>.

recommendations that are attached to this Public Notice may evolve in the course of interagency discussions as WRC-07 nears, they do not constitute final U.S. Government position on any issue.

The complete text of these recommendations is available in the FCC's Reference Information Center, Room CY-A257, 445 12<sup>th</sup> Street, SW, Washington, DC 20554 or by accessing the FCC's WRC-07 world wide web site at: <http://www.fcc.gov/wrc-07>. Comments on the recommendations may be filed by referencing IB Docket 04-286 using the Commission's Electronic Comment Filing System (ECFS) or by filing paper copies. Parties are encouraged to file electronically by following the instructions at: <http://www.fcc.gov/cgb/ecfs>. Parties who choose to file paper copies only should submit an original and four copies of each filing. Guidelines and address for paper filings are available at: <http://www.fcc.gov/osec>. In addition, please submit one copy of your comments electronically or by paper to Alexander Roytblat, FCC WRC-07 Director, Federal Communications Commission, Room 6-A865, 445 12<sup>th</sup> Street, SW, Washington, DC 20554; e-mail: [WRC07@fcc.gov](mailto:WRC07@fcc.gov). Comments should refer to IB Docket No. 04-286 and to specific recommendations by document number. The deadline for comments on the recommendations is February 5, 2007.

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## **I. Recommendations by the Advisory Committee for the 2007 World Radiocommunication Conference:**

### **INFORMAL WORKING GROUP 1 (IWG-1)** **Terrestrial and Space Science Services**

**Document WAC/151(13.12.06):**

#### **DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE**

**Agenda Item 1.2:** to consider allocations and regulatory issues related to the Earth exploration-satellite (passive) service, space research (passive) service and the meteorological-satellite service in accordance with Resolutions **746 (WRC-03)** and **742 (WRC-03)**;

**Background Information:** This proposal addresses Resolution **742 (WRC-03)**, “consideration of sharing criteria between the passive services and the fixed and mobile services in the band 36-37 GHz to determine appropriate sharing criteria and to consider the possible inclusion of such sharing criteria within the Radio Regulations.”

The frequency band 36-37 GHz is allocated to the Earth exploration-satellite (passive), the space research (passive), the fixed and the mobile services on a primary basis. This band has been used for passive sensing of the Earth and its atmosphere for many years. It is an important resource for remote sensing of rain rates, snow, sea ice and clouds and is often used in conjunction with a number of other passive sensing bands to extract such data. A variety of scientific and meteorological spacecraft carry instruments that utilize this band. There is limited use of the band by the fixed or mobile services. However, determination of appropriate sharing criteria should not place undue constraints on the future use of the band by the fixed and mobile services.

The ITU-R has undertaken studies that should result in Recommendations in Study Group 9 and Study Group 7, which would recommend various interference mitigation measures to be taken. These studies indicate that passive sensing systems may receive excessive interference if there are no limitations on the power of fixed and mobile service transmitters as deployment densities of the terrestrial services in this band increase. Based on the results of these studies, a new footnote in Article **5** of the Radio Regulations should be added, containing appropriate transmitter power limits on future systems operating in the 36-37 GHz band for the fixed and mobile services.

**Proposal:**

**USA/ /1 MOD**

**34.2-40 GHz**

Allocation to services		
Region 1	Region 2	Region 3
.....		
36-37	EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.149 <b>ADD 5.AAA</b>	
.....		

**USA/ /2 ADD**

**5.AAA** In the band 36.0-37.0 GHz, the power delivered to the antenna of a station brought into use in the fixed or mobile services in that band after [effective date of WRC-07 Final Acts] ~~should~~ not exceed -10 dBW.

**Reasons:** Passive sensor measurements in this band are currently being used to determine rain, snow, ocean ice and water vapor properties for use in numerical weather prediction models and other scientific applications including studies the hydrological cycle or global water circulation. Currently, this band is lightly used worldwide by the fixed and mobile services. It is necessary to establish an appropriate operational environment to protect the future use of Earth exploration-satellite (passive) and space research (passive) services in this band without imposing undue constraints on the fixed or mobile services. Moreover, implementation of this power limit is sufficient to protect the passive services; no unwanted emissions requirements would be necessary.

**Document WAC/147(13.12.06):**

**DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE**

**Agenda Item 7.2:** to recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, taking into account Resolution **803 (WRC-03)**,

**Background Information:**

The accommodation of unmanned aircraft vehicles or systems (UASs) will likely have impact on overall aviation spectrum requirements. There is significant growth forecast in the UAS sector of aviation. Though UASs have traditionally been used in segregated airspace where separation from other air traffic can be assured, it is planned to deploy them in non-segregated airspace. If UASs operate in non-segregated civil airspace, they must be integrated safely and adhere to the same operational practices as conventional manned aircraft. To accommodate such actions, additional safety communication links will be required (such as AM(R)S and/or aeronautical mobile satellite (R) service (AMS(R)S)).

Although specific spectrum requirements have yet to be fully assessed, material has been received regarding UAS integration into non-segregated civil airspace. Because the pilot is located remotely from the UAS, bandwidth will be required to support, among other things, each UAS relaying Air Traffic Control instructions to its respective pilot, additional operational data, encryption, and interference resilience.

These applications will require additional safety communication links. While it is expected that short term requirements may be accommodated in either existing aeronautical bands (e.g. AM(R)S or AMS(R)S) or new AM(R)S allocations, given the longer term plans for large-scale deployment of UASs, additional spectrum may be required in the future.

**Proposal:**

**USA/1      MOD**

**RESOLUTION 803 (WRC-~~03~~07)**

**~~Preliminary~~ Agenda for the 2011 World Radiocommunication Conference**

The World Radiocommunication Conference (Geneva, 2003~~7~~),

**USA/ /2      ADD**

**2. UASCOM** to consider spectrum requirements and possible additional spectrum allocations in the aeronautical mobile (R), aeronautical mobile-satellite (R), and/or aeronautical radionavigation service to support the operation of unmanned aircraft systems (UASs), in accordance with Resolution **UASCOM (WRC-07)**.

**Reasons:** To have an agenda item for WRC-11 to consider the spectrum requirements for unmanned aircraft systems to be operated in non-segregated airspace.

**USA/ /3      ADD**

DRAFT RESOLUTION [UASCOM (WRC-07)]

**Consideration of spectrum allocations for use by unmanned aircraft systems (UASs)**

The World Radiocommunication Conference (Geneva, 2007),

*considering*

a) that world-wide use of unmanned aircraft systems (UASs) is expected to increase significantly in the next 10 years;

b) that there is a possible need for additional aeronautical mobile (R), aeronautical radionavigation, and/or aeronautical mobile-satellite (R) service spectrum to support the operation of future UASs;

c) that there is a need to protect existing services,

*further considering*

a) that UASs represent an application within a radio service such as, by way of example only, the aeronautical mobile (R) service or the aeronautical mobile-satellite (R) service;

b) that there are emerging UAS applications, including plans to deploy them in non-segregated airspace alongside conventional manned aircraft where the UAS must be integrated safely and adhere to the same operational practices as conventional manned aircraft;

c) that future technologies and performance expectations for UASs may require operations in aeronautical mobile (R), aeronautical mobile-satellite (R), and/or aeronautical radionavigation service spectrum to support the transfer of UAS status information to its control station, transfer flight commands to the UAS from its control station, and real-time relaying of air traffic control instructions to and from the UAS operator;

d) that studies will be required to provide a basis for considering regulatory changes, including additional allocations, consistent with the protection of incumbent services,

*recognizing*

that due to the importance of ensuring the safe operation of UASs in non-segregated airspace alongside conventional manned aircraft, this spectrum must be afforded consideration as a safety service according to No. 4.10 of the Radio Regulations.

*resolves*

that WRC-11 consider spectrum requirements and possible additional spectrum allocations for terrestrial and satellite services in the aeronautical radionavigation, aeronautical mobile (R) and/or aeronautical mobile-satellite (R) services to support the communications requirements of UASs;

*further resolves to invite the ITU-R*

1 to conduct, as a matter of urgency, studies to determine the spectrum requirements and potential frequency bands in the range 108 MHz to 30 GHz suitable to support deployment of UASs in non-segregated airspace.

2 that the studies referred to in *further resolves* 1 should include sharing and compatibility studies with services already having allocations in those bands having regard for not constraining the development of such services.

*further invites*

all members of the Radiocommunications Sector, the International Civil Aviation Organization (ICAO), and the International Air Transport Association (IATA) to contribute to these studies.

**Reasons:** This resolution details the scope and required studies related to future spectrum requirements of unmanned aircraft system communications links.

**INFORMAL WORKING GROUP 3 (IWG-3)**  
**IMT-2000 and 2.5 GHz Sharing Issues**

**Document WAC/148(13.12.06):**

**IWG-3 Views A and B on Agenda Item 1.4 (related to 698-806 MHz)**

**WRC-07 Agenda Item 1.4:** To consider frequency-related matters for the future development of IMT-2000 and systems beyond IMT-2000 taking into account the results of ITU-R studies in accordance with Resolution 228 (Rev. WRC-03).

**Summary**

Members of IWG-3 considered a proposal under Agenda Item 1.4 that the 698-806 MHz band be allocated to the Mobile Service in all three regions and be identified for IMT. WRC-07 Agenda Item 1.4 is “To consider frequency-related matters for the future development of IMT-2000 and systems beyond IMT-2000 taking into account the results of ITU-R studies in accordance with Resolution 228 (Rev. WRC-03).

After extensive debate, IWG-3 members were unable to reach agreement on this issue. Consequently, two views on the identification of 698-806 MHz with respect to Agenda Item 1.4 were developed. These two documents are attached as View A and View B.

View A proposes that the 698-806 MHz band be allocated to the Mobile Service in all three regions and be identified for IMT, the root name that encompasses both IMT-2000 and IMT-Advanced collectively. View A states that the identification of the 698-806 MHz band for IMT will provide administrations with increased flexibility in selecting suitable frequencies for deployment of advanced wireless technologies. It also states that such an identification will advance global interests in promoting the development of advanced wireless services, assist developing countries in meeting their specific needs, and otherwise meet the requirements outlined in Resolution 228. View A notes the current U.S. allocations in this band include new broadcast services, commercial mobile services, and public safety services.

View A proposes that this identification for IMT be made by adding a mobile allocation for 698-806 MHz in the ITU Table of Allocations and adding a footnote to these allocations, Footnote 5.XXX that “The band, or portions of the band, 698-806 MHz is identified for use by Administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of this band by any application of the services to which they are allocated and does not establish priority in the Radio Regulations.” View A also proposes modifying the footnotes of bands previously identified for IMT-2000 to reflect IMT to ensure consistent regulatory treatment for all bands. View A was supported by Alcatel-Lucent, CDMA Development Group, Cingular, Ericsson, Lockheed Martin, Nokia, Qualcomm, TMG, and Verizon.



View B also proposes to add a global mobile allocation to the 698-806 MHz band, and proposes to identify the band for IMT and other broadband wireless access systems. Proponents of View B felt that the US needed to more broadly address the agenda item, including modification of the existing IMT-2000 footnotes, in the proposal. Proponents of View B felt that its approach to spectrum identification is flexible and will allow current operators and new licensees in the identified frequency bands to bring advanced services to consumers as rapidly as new technology allows. . View B also proposes to modify all the existing IMT-2000 footnotes in a similar fashion, and to provide the necessary updates to the Resolutions associated with these footnotes (Resolutions 212, 223 and 224). With respect to the 698-806 MHz band, View B adds provisions to Resolution 224 to recognize that portions of the band are also used for public protection & disaster relief in some regions, as well as other services such as broadcasting. View B was supported by ArrayComm, Clearwire, Henry Straube, Intel, Motorola, Nortel, Sprint Nextel, and the Wireless Communications Association International, Inc.

IWG-3 respectfully submits the two views to the WRC Advisory Committee for consideration.

## *View A*

### **DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE**

**Agenda Item 1.4:** to consider frequency-related matters for the future development of IMT-2000 and systems beyond IMT-2000 taking into account the results of the ITU-R studies in accordance with Resolution 228 (Rev. WRC-03);

**Background:** WRC-2000 invited the ITU-R in Resolution 228 to continue studies on overall objectives, applications and technical and operational implementation for the future development of IMT-2000 and systems beyond IMT-2000. It also invited the ITU-R to study spectrum requirements and potential frequency ranges suitable for the future development of IMT-2000 and systems beyond IMT-2000, and to determine what time frame such spectrum would be needed. Resolution 228 (WRC-2000) also resolved that the requirements for the future development of IMT-2000 and systems beyond IMT-2000 are to be reviewed by WRC-07, taking into consideration the results of ITU-R studies presented to WRC-03. However, those studies were not completed in time for WRC-03.

WRC-03 revised Resolution 228 (Rev.WRC-03), inviting the ITU-R to further study the technical and operational issues relating to the future development of IMT-2000 and systems beyond IMT-2000 and to develop reports and recommendations as required in time for WRC-07. In particular, Resolution 228 (Rev. WRC-03) invites the ITU-R to report on the results of studies on the spectrum requirements and potential frequency ranges suitable for the future development of IMT-2000 and systems beyond IMT-2000, taking into account a variety of factors including the growth in demand for IMT-2000 services, the evolution of systems through advances in technology, the time-frame in which spectrum will be needed, and the extensive use of frequencies below those already identified for IMT-2000, i.e., below 806 MHz. It invites the ITU-R to conduct studies on the potential use of such frequencies for the future development of IMT-2000 and systems beyond IMT-2000, assessing whether their use could satisfy the needs of developing countries and countries with large areas of low-population density for more cost-effective alternatives when implementing IMT-2000 systems and systems beyond IMT-2000. Resolution 228 (Rev. WRC-03) requests that such studies consider the results of sharing and compatibility studies with services to which these bands have already been allocated.

Resolution 228 (Rev.WRC-03) also notes that the ITU-R has already begun considering appropriate naming for the future development of IMT-2000 and systems beyond IMT-2000 for a decision in advance of WRC-07. With that in mind, Study Group 8 has developed a new Draft Resolution ITU-R M.[IMT.NAME], “Naming for International Mobile Telecommunications,” for consideration by the Radiocommunication Assembly 2007. This Draft Resolution specifies the nomenclature for the future development of

IMT-2000 and systems beyond IMT-2000 through names uniquely associated with the advancement and continuation of International Mobile Telecommunications (IMT). In particular, it resolves that the term “IMT-2000” encompasses also its enhancements and future developments and that the new name “IMT-Advanced” be applied to those systems, system components, and related aspects that include new radio interface(s) that support the new capabilities of systems beyond IMT-2000. It also resolves that the term “IMT” be the root name that encompasses both IMT-2000 and IMT-Advanced collectively.

**Spectrum Below 806 MHz:** Some Administrations have already taken steps to enable IMT-2000 systems to be implemented in bands below those currently identified, i.e., below 806 MHz. Due to the favorable propagation characteristics of lower frequencies, there are significant coverage benefits and resulting reductions in equipment requirements associated with deploying advanced wireless systems in the 698-806 MHz band, especially in areas with low population densities. These benefits are important considerations for developing countries, which may have spectrum available but not have resources to deploy nationwide systems in the higher frequency ranges identified by the ITU for IMT.

Currently, the 698-806 MHz band is used throughout most of the world for Broadcasting Services. These services are experiencing significant changes coincident with the rapid introduction of new technologies. For example, the application of digital technologies to broadcast television has resulted in significant benefits to consumers including clearer, sharper pictures, higher quality sound, enhanced features such as access to information services, and the ability to integrate televisions with computers and other digital devices. These advancements parallel the significant innovations occurring within the mobile equipment and services market, and have resulted in the availability of enhanced video and audio services on mobile phones, laptop computers, and numerous other portable digital devices.

The use of digital technology for Broadcasting Services also substantially improves the manner in which the radio frequency spectrum is used. Digital compression substantially improves spectral efficiency, enabling more services to be supported on less spectrum. As a result, Administrations planning to transition existing Broadcasting Services to digital technology may wish to make some, or all, of the spectrum available for other uses, including advanced wireless technologies like IMT.

In the United States, for example, existing broadcast television services will be cleared from the 698-806 MHz band by February 17, 2009, as part of a comprehensive plan to transition to the use of digital technology. This transition will enable the spectrum to be freed up for other uses, including new broadcast services, commercial mobile services, and public safety services, consistent with current allocations. Some commercial licenses have already been assigned, while all remaining commercial licenses are required to be auctioned no later than January 28, 2008. Commercial deployments are expected to include advanced mobile technologies like IMT-2000, as well as advanced broadcasting technologies that will deliver multimedia content to handsets and other mobile devices.

Recognizing that Administrations are free to use the band for whatever purpose best suits their individual needs, including commercial and non-commercial applications, the identification of the 698-806 MHz band for International Mobile Telecommunications (IMT) will provide administrations with increased flexibility in selecting suitable frequencies for deployment of advanced wireless technologies. Taking into account the benefits of utilizing lower frequency bands in areas of less dense population, developing countries at WRC-03 specifically requested that bands below 806 MHz be considered for identification at WRC-07. This request was directed to all members of the ITU, both developed and developing countries.

**Proposal:** Resolution 228 (Rev. WRC-03) resolves that the ITU-R conduct studies on the spectrum requirements and potential frequency ranges suitable for IMT, including frequencies below those previously identified (i.e., below 806 MHz). These studies, which include sharing and compatibility studies with services already having allocations in those frequency bands, are already being undertaken. Consistent with Resolution 228 (Rev. WRC-03) and recognizing the needs of developing countries, the United States proposes that the 698-806 MHz band be allocated to the Mobile Service in all three regions and be identified for IMT. Such an identification will advance global interests in promoting the development of advanced wireless services, assist developing countries in meeting their specific needs, and otherwise meet the requirements outlined in Resolution 228.

Identification of the 698-806 MHz band for “IMT,” rather than “IMT-2000” which has been the case for spectrum identified at previous WRCs, will ensure that it is identified in a manner consistent with new Draft Resolution ITU-R M.[IMT.NAME], and thus, will encompass the future development of IMT-2000 as well as systems beyond IMT-2000. The United States also proposes modifying the footnotes of bands previously identified for IMT-2000 to reflect IMT. This will ensure that all bands have consistent regulatory treatment. Conforming amendments should be made to Resolutions 212, 223, and 224 to reflect the new naming convention.



USA/xx/2  
ADD 5.XXX

**5.XXX** The band, or portions of the band, 698-806 MHz is identified for use by Administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of this band by any application of the services to which they are allocated and does not establish priority in the Radio Regulations.

**Reasons:** To identify spectrum for advanced communications applications including International Mobile Telecommunications (IMT) to facilitate consistent deployment.

USA/xx/3  
MOD 5.317A

**5.317A** Administrations wishing to implement International Mobile Telecommunications-~~2000~~(~~IMT-2000~~) may use those parts of the band 806-960 MHz which are allocated to the mobile service on a primary basis and are used or planned to be used for mobile systems (see Resolution 224 (WRC-2000)). This identification does not preclude the use of these bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations.

**Reasons:** To facilitate the future development of IMT-2000 and systems beyond IMT-2000 by conforming existing footnotes to the new IMT naming conventions.

USA/xx/4  
MOD 5.384A

**5.384A** The bands, or portions of the bands, 1710-1885 MHz and 2500-2690 MHz are identified for use by administrations wishing to implement International Mobile Telecommunications-~~2000~~ (~~IMT-2000~~) in accordance with Resolution 223 (WRC-2000). This identification does not preclude the use of these bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations.

**Reasons:** To facilitate the future development of IMT-2000 and systems beyond IMT-2000 by conforming existing footnotes to the new IMT naming conventions.

USA/xx/5  
MOD 5.388

**5.388** The bands 1885-2025 MHz and 2110-2200 MHz are intended for use, on a worldwide basis, by administrations wishing to implement International Mobile Telecommunications-~~2000~~ (~~IMT-2000~~). Such use does not preclude the use of these bands by other services to which they are allocated. The bands should be made available for IMT-~~2000~~ in accordance with Resolution 212 (Rev. WRC-97). (See also Resolution 223 (WRC-2000).)

**Reasons:** To facilitate the future development of IMT-2000 and systems beyond IMT-2000 by conforming existing footnotes to the new IMT naming conventions.

## *View B*

### DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

**Agenda Item 1.4:** to consider frequency-related matters for the future development of IMT-2000 and systems beyond IMT-2000 taking into account the results of the ITU-R studies in accordance with Resolution 228 (Rev. WRC-03);

**Background:** WARC-92 identified the 1885-2025 MHz and 2110-2200 MHz bands for possible use on a worldwide basis by administrations wishing to implement IMT-2000 systems in footnote No. **5.388**. Subsequently, WRC-2000 identified the 806-960 MHz band in footnote No. **5.317A** and the 1710-1885 MHz and 2500-2690 MHz bands in footnote No. **5.384A** for possible IMT-2000 use.

The identification of multiple bands for IMT-2000 use reflects the national and regional differences that exist in the use of the radio spectrum. With identification of additional spectrum expected at upcoming WRCs for IMT-2000 and systems beyond IMT-2000, Administrations are likely to continue to utilize various subsets of the identified frequency bands to meet national, regional and international user demands.

There have been advances in a range of wireless technologies such that it is now prudent to review the current identifications of spectrum for IMT-2000. Technology is not static. IMT-2000 technologies will continue to evolve and comparable or more advanced technologies will be introduced. Some administrations may wish to implement comparable advanced wireless technologies in the current IMT-2000 bands and any other bands identified by WRC-07 that are not currently part of the IMT-2000 family. For example, in the 2500-2690 MHz band in the United States, service providers have chosen to deploy other broadband wireless access technologies that are not part of IMT-2000. These technologies may eventually become part of “systems beyond IMT-2000”, but, as described further in the following paragraphs, at this time the ITU-R is still in the process of defining the systems/technologies that will make up IMT-Advanced/systems beyond IMT-2000. It is expected that the WRC could provide clarification in this regard.

Furthermore, the United States believes that it is essential not to tie specific technologies to specific frequency bands. In keeping with its technology-neutral belief that existing mobile operators should be free to evolve to IMT-2000 and other advanced wireless systems as the market demands, the United States proposes a flexible approach to spectrum identification, to allow current operators and new licensees in the identified frequency bands to bring advanced services to consumers as rapidly as new technology allows. This approach has the advantage of not artificially tying the rollout of new technology and services to new spectrum as administrations assess their ability to use that spectrum for IMT-2000 and other advanced wireless systems.

Terminology. Draft Resolution ITU-R M.[IMT-NAME] identifies a root name, IMT, to cover the capabilities of “IMT-2000, future development of IMT-2000 and systems beyond IMT-



2000.” It also clarifies that IMT-2000 also encompasses its enhancements and future developments. The draft Resolution identifies a new name, IMT-Advanced, to cover systems beyond IMT-2000.

IMT-Advanced. IMT-Advanced is currently being studied within the ITU-R. The ITU-R has prepared draft new Resolution M.[Principles] that establishes principles for the process of development of IMT-Advanced. The document sets out that Recommendations and Reports will be developed for IMT-Advanced, including Recommendation(s) for radio interface specifications. In addition, Recommendation ITU-R M.1645 contains the framework for IMT-Advanced’s development and its overall objectives, and also describes the minimum technical requirements for IMT-Advanced.

The current ITU-R timeline for IMT-Advanced is to determine the radio interface technologies that make up IMT-Advanced around the year 2010, with the expectation that systems will be deployed around the year 2015. However, draft Resolution ITU-R M.[IMT-NAME] recognizes that wireless access technologies that may address some of the capabilities of systems beyond IMT-2000 have been or are being developed for deployment within or prior to the timeframes expressed in Recommendation ITU-R M.1645. The reality is that systems that meet the new capabilities for IMT-Advanced will have entered the market well prior to 2010 and have already been recommended by the ITU, such as the broadband wireless access systems in Recommendations ITU-R M.[8A-BWA] and ITU-R F.1763.

Resolution 228. WRC-03 revised Resolution **228 (Rev.WRC-03)**, inviting the ITU-R to further study the technical and operational issues relating to the future development of IMT-2000 and systems beyond IMT-2000 and to develop reports and recommendations as required in time for WRC-07. In particular, Resolution **228 (Rev. WRC-03)** invites the ITU-R to report on the results of studies on the spectrum requirements and potential frequency ranges suitable for the future development of IMT-2000 and systems beyond IMT-2000, taking into account a variety of factors including the growth in demand for IMT-2000 services, the evolution of systems through advances in technology, and the extensive use of frequencies below those identified for IMT-2000 in No. **5.317A**. It invites the ITU-R to conduct studies on the potential use of such frequencies for the future development of IMT-2000, assessing whether their use could satisfy the needs of developing countries and countries with large areas of low-population density for more cost-effective alternatives when implementing IMT-2000 systems. Resolution **228 (Rev. WRC-03)** requests that such studies consider the results of sharing and compatibility studies with services to which these bands have already been allocated.

Additional spectrum. Currently, the 698-806 MHz band is used throughout most of the world for Broadcasting Services. These services are experiencing significant changes coincident with the rapid introduction of new digital technologies. The use of digital technology for Broadcasting Services substantially improves the manner in which the radio frequency spectrum is used. Digital compression substantially improves spectral efficiency, enabling more services to be supported on less spectrum. As a result, Administrations planning to transition existing Broadcasting Services to digital technology may wish to make some, or all, of the spectrum available for other uses, including advanced wireless technologies like IMT-2000 and systems beyond IMT-2000. Due to the favorable propagation characteristics of lower frequencies, there are significant coverage benefits and cost efficiencies associated with deploying advanced

wireless systems in the 698-806 MHz band, especially in areas with low population densities. These benefits are important considerations for developing countries, which may have spectrum available but not have resources to deploy nationwide systems in the higher frequency ranges identified by the ITU for IMT-2000.

In the United States, for example, existing broadcast television services will be cleared from the 698-806 MHz band by February 17, 2009, as part of a comprehensive plan to transition to the use of digital technology. This transition will enable the spectrum to be freed up for other uses, including new broadcast services, commercial mobile services, and public safety services, consistent with current allocations. The United States reallocated 84 MHz for commercial wireless services and 24 MHz for public safety services. Some commercial licenses have already been assigned, while all remaining commercial licenses are required to be auctioned no later than January 28, 2008. Commercial deployments are expected to include advanced mobile technologies like IMT-2000, as well as advanced broadcasting technologies that will deliver multimedia content to handsets and other mobile devices. Public safety systems are also under development in the 24 MHz of spectrum designated for public safety services, and will use this spectrum for narrowband, wideband and broadband communications requirements. These uses are consistent with Resolution **646 (WRC-03)**, which encourages administrations in Region 2 to use common frequency bands for public protection and disaster relief and to consider the use of the band 746-806 MHz, among others. In addition, it also states that some countries in Region 3 have identified the 746-806 MHz band for public protection and disaster relief applications.

Recognizing that Administrations are free to use the band for whatever purpose best suits their individual needs, including commercial and non-commercial applications, the identification of the 698-806 MHz band for IMT will provide administrations with increased flexibility in selecting suitable frequencies for deployment of advanced wireless technologies. Taking into account the benefits of utilizing lower frequency bands in areas of less dense population, developing countries at WRC-03 specifically requested that bands below 806 MHz be considered for identification at WRC-07. This request was directed to all members of the ITU, both developed and developing countries.

**Proposal:** Consistent with Resolution **228 (Rev. WRC-03)** and recognizing the needs of developing countries as well as the continued development of advanced wireless technologies, the United States proposes that the 698-806 MHz band be identified for IMT and other broadband wireless systems in accordance with a revised Resolution 224. IMT is the root name which includes both IMT-2000 and systems beyond IMT-2000. Such an identification will advance global interests in promoting the development of advanced wireless services based on a flexible framework that accommodates a broad base of comparable wireless technologies, assist developing countries in meeting their specific needs, and otherwise meet the requirements outlined in Resolution 228. This proposal also contains the proposed revisions to Resolution 224, which addresses spectrum for IMT below 1 GHz.

In addition, the United States proposes that the current footnotes identifying spectrum for IMT-2000 (Nos. 5.517A, 5.384A & 5.388) be revised to refer to IMT and other broadband wireless systems. This will facilitate implementation of IMT-2000, systems beyond IMT-2000 and other broadband wireless access systems by providing clear guidance on the use of these frequency bands for these advanced communications applications. Corresponding modifications are required to the Resolutions associated with these footnotes—Resolution 212, Resolution 223 and Resolution 224.

**Proposal:**

**USA/xx/1  
MOD**

**698-806 MHz**

Allocation to services			
Region 1	Region 2	Region 3	
<b>470-698</b> BROADCASTING  5.149 5.291A 5.294 5.296 5.300 5.302 5.304 5.306 5.311 5.312	<b>470-512</b> BROADCASTING Fixed Mobile  5.292 5.293	<b>470-585</b> FIXED MOBILE BROADCASTING  5.291 5.298	
	<b>512-608</b> BROADCASTING  5.297		<b>585-610</b> FIXED MOBILE BROADCASTING RADIONAVIGATION
		<b>608-614</b> RADIO ASTRONOMY Mobile-satellite except aeronautical mobile-satellite (Earth-to-space)	5.149 5.305 5.306 5.307 <b>610-698</b> FIXED MOBILE 5.317A BROADCASTING
		<b>614-698</b> BROADCASTING Fixed Mobile  5.293 5.309 5.311	5.149 5.305 5.306 5.307 5.311 5.320
<b>698-790</b> BROADCASTING <u>MOBILE</u>  5.149 5.291A 5.294 5.296 5.300 5.302 5.304 5.306 5.311 5.312 <u>5.317A</u>	<b>698-806</b> BROADCASTING <u>MOBILE</u> Fixed  5.293 5.309 5.311 <u>5.317A</u>	<b>698-806</b> FIXED MOBILE 5.317A BROADCASTING  5.149 5.305 5.306 5.307 5.311 5.320 <u>5.337A</u>	
<b>790-806</b> FIXED BROADCASTING <u>MOBILE</u>  5.312 5.314 5.315 5.316 5.319 5.321 <u>5.317A</u>			

**Reasons:** To identify spectrum for advanced communications applications, including IMT-2000, systems beyond IMT-2000 and other broadband wireless access systems, to facilitate consistent deployment.

USA/xx/2

**MOD 5.317A**

**5.317A** Administrations wishing to implement International Mobile Telecommunications (IMT) and other broadband wireless access systems ~~International Mobile Telecommunications-2000 (IMT-2000)~~ may use those parts of the bands 698-806-960 MHz which are allocated to the mobile service on a primary basis and are used or planned to be used for mobile systems, ~~(see in accordance with Resolution 224 (rev. WRC-20070))~~. This identification does not preclude the use of these bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations.

**Reasons:** To identify spectrum for advanced communications applications including IMT-2000, systems beyond IMT-2000 and other broadband wireless access systems in order to provide clear guidance on the use of the frequency band for advanced communications applications and encourage spectrum harmonization.

USA/xx/3

**MOD 5.384A**

**5.384A** The bands, or portions of the bands, 1 710-1 885 MHz and 2 500-2 690 MHz, are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) and other broadband wireless access systems ~~International Mobile Telecommunications-2000 (IMT-2000)~~ in accordance with Resolution **223 (rev. WRC-20070)**. This identification does not preclude the use of these bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations.

**Reasons:** To identify spectrum for advanced communications applications including IMT-2000, systems beyond IMT-2000 and other broadband wireless access systems in order to provide clear guidance on the use of the frequency band for advanced communications applications and encourage spectrum harmonization.

USA/xx/4

**MOD 5.388**

**5.388** The bands 1 885-2 025 MHz and 2 110-2 200 MHz are intended for use, on a worldwide basis, by administrations wishing to implement International Mobile Telecommunications (IMT) and other broadband wireless access systems~~International Mobile Telecommunications-2000 (IMT-2000)~~. Such use does not preclude the use of these bands by any application of other the services to which they are allocated. The bands should be made available for IMT and broadband wireless access systems-2000 in accordance with Resolution **212 (Rev.WRC-20097)**. (See also Resolution **223 (rev. WRC-20070)**.)

**Reasons:** To identify spectrum for advanced communications applications including IMT-2000, systems beyond IMT-2000 and other broadband wireless access systems in order to provide clear guidance on the use of the frequency band for advanced communications applications and encourage spectrum harmonization.

USA/xx/5  
MOD Resolution 224

RESOLUTION 224 (REV. WRC-2007)

**Frequency bands for the terrestrial component of IMT-2000 and other broadband wireless systems below 1 GHz**

The World Radiocommunication Conference (Istanbul, 2000~~Geneva, 2007~~),

*considering*

- a) that parts of the band 806-960 MHz are extensively used in the three Regions by first- and second-generation mobile systems;
- b) that WRC-2007 established a worldwide mobile service allocation in the band 698-806 MHz on a primary basis;
- c) that, as a result of the transition from analog to digital terrestrial television broadcasting, some countries are making the band 698-806 MHz available for applications in the mobile service;
- bd) that some administrations are planning to use part of the band 698-806 MHz for International Mobile Telecommunications-2000 (IMT-2000) and other advanced wireless systems;
- e) that IMT is an advanced mobile communication applications concept intended to provide telecommunication services on a worldwide scale regardless of location, network or terminal used;
- f) that IMT includes IMT-2000, its future development, and systems beyond IMT-2000, otherwise known as IMT-Advanced;
- g) that the technical characteristics of IMT-2000 are specified in ITU-R and ITU-T Recommendations, including Recommendation ITU-R M.1457, which contains the detailed specifications of the radio interfaces of IMT-2000;
- h) that IMT-Advanced is being studied within ITU-R, and the framework for its development and its overall objectives is contained in Recommendation ITU-R M.1645;

~~e) that, in some countries, the band 698-806 MHz is allocated to the mobile service on a primary basis;~~

j) that, to promote harmonization, the IMT and broadband wireless access systems referred to in No. 5.317A should utilize technologies endorsed by external standards organizations;

k) that the ITU-R has developed various Recommendations and Reports on broadband wireless access systems, including Recommendation ITU-R M.[8A/BWA] which addresses radio interface standards for broadband wireless access systems, including mobile and nomadic applications;

~~li)~~ that first- and second-generation mobile systems in the three Regions operate using various frequency arrangements;

~~emk)~~ that where cost considerations warrant the installation of fewer base stations, such as in sparsely populated areas, bands below 1 GHz are generally suitable for implementing mobile systems including IMT and other broadband wireless access systems-2000;

~~fn)~~ Recommendation ITU-R M.819 which describes the objectives to be met by IMT-2000 to meet the needs of developing countries,

*recognizing*

a) that the evolution of first- and second-generation cellular-based mobile systems to more advanced systems IMT-2000 can be facilitated if they are permitted to use their current frequency bands;

b) that the field of mobile wireless telecommunications is experiencing many rapid improvements in capability, due to technology advances, and that Administrations should be encouraged to facilitate the deployment of these rapid improvements;

c) that the bands below 1 GHz are already heavily used for a wide variety of terrestrial services, especially in urban areas;

d) that parts of the band 746-806 MHz and 806-860 MHz are widely used by some administrations for point-to-point, point-to-multipoint, trunked and conventional dispatch systems that include critical applications such as public protection and disaster relief radiocommunications (PPDR);

e) that Resolution 646 (WRC-2003) recommends that administrations use common frequency bands for PPDR and to consider the use of the band 746-806 MHz, among others, in Region 2, and states that some countries in Region 3 have identified the 746-806 MHz band for PPDR applications;

f) that because of the importance of certain applications in the bands below 1 GHz, administrations may, pursuant to their regulatory framework, undertake measures to ensure the protection of such usage;

*emphasizing*

- a) that flexibility must be afforded to administrations:
- to determine, at a national level, how much spectrum to make available for IMT and other broadband wireless access systems-2000 from within the identified bands, taking into account current usages of the spectrum and the need for other applications;
  - to develop their own transition plans, if necessary, tailored to meet their specific deployment of existing systems;
  - to have the ability for the identified bands to be used by all services having allocations in those bands;
  - to determine the timing of availability and use of the bands identified for IMT-2000 and other broadband wireless access systems, in order to meet particular market demand and other national considerations;

- b) that the particular needs of developing countries must be met,

*resolves*

- 1) \_\_\_\_\_ to request administrations which are implementing, or planning to implement IMT-2000, and other broadband wireless access systems to consider the use of bands below 1 GHz and the possibility of evolution of first- and second-generation mobile systems to IMT-2000, in the frequency band identified in No. **5.317A**, based on market demand and other national considerations;
- 2) \_\_\_\_\_ to request administrations to conduct studies to determine the availability of the bands identified in No. 5.317A for IMT and other broadband wireless access systems, taking into account the current and planned usage of other applications in the mobile services and other services in these bands, including PPDR applications as described in *recognizings* d) and e).

*invites ITU-R*

to study compatibility between mobile systems with different technical characteristics and provide guidance on any impact on spectrum arrangements.

**Reasons:** To provide guidance to Administrations on considering the existing uses and other applications that may use the frequency bands identified for IMT and other broadband wireless access systems below 1 GHz. To allow Administrations greater flexibility to select technology. To also recognize the importance of other applications in the band, such as PPDR.



RESOLUTION 212 (REV.WRC-~~09~~7)

**Implementation of International Mobile  
Telecommunications-~~2000~~ (IMT-2000) and Other Broadband Wireless Access  
Systems\***

The World Radiocommunication Conference (Geneva, ~~1997~~2007),

*considering*

- a) that ITU-R has recommended the 1-3 GHz band as the most suitable for IMT-2000;
- b) that IMT is an advanced mobile communication applications concept intended to provide telecommunication services on a worldwide scale regardless of location, network or terminal used;
- c) that IMT includes IMT-2000, its future development, and systems beyond IMT-2000, otherwise known as IMT-Advanced;
- d) that the technical characteristics of IMT-2000 are specified in ITU-R and ITU-T Recommendations, including Recommendation ITU-R M.1457, which contains the detailed specifications of the radio interfaces of IMT-2000;
- e) that IMT-Advanced is being studied within ITU-R, and the framework for its development and its overall objectives is contained in Recommendation ITU-R M.1645;
- ~~b)~~ that ITU-R has recommended approximately 60 MHz for use by personal stations and approximately 170 MHz for use by mobile stations;
- ~~f)~~ that ITU-R has recognized that space techniques are an integral part of IMT-2000;
- ~~g)~~ that, in No. 5.388, this Conference WARC-92 has identified bands to accommodate IMT-2000, and this Conference has modified the identification to the broader terms IMT and other broadband wireless systems to facilitate use of advanced technologies in the identified bands~~this future service;~~
- h) that, to promote harmonization, IMT and other broadband wireless systems referred to in No. 5.388 should utilize radio interface technologies endorsed by external standards organizations;

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\* IMT-2000 was previously known as Future Public Land Mobile Telecommunication Systems (FPLMTS).

j) that the ITU-R has developed various Recommendations and Reports on broadband wireless access systems, including Recommendation ITU-R M.[8A/BWA] which addresses radio interface standards for broadband wireless access systems, including mobile and nomadic applications,

*considering further*

~~a) that ITU-R has not completed its studies regarding duplexing methods, modulation techniques, channelling arrangements, signalling or communication protocols;~~

~~b) that no worldwide intersystem numbering plan currently exists that would facilitate worldwide roaming,~~

recognizing

a) that the evolution of first- and second-generation cellular-based mobile systems to more advanced systems can be facilitated if they are permitted to use their current frequency bands;

b) that the field of mobile wireless telecommunications is experiencing many rapid improvements in capability, due to technology advances, and that Administrations should be encouraged to facilitate the deployment of these rapid improvements;

*noting*

~~a) that some administrations have already the implementedion of the terrestrial component of IMT-2000 in the bands 1 885-2 025 MHz and 2 110-2 200 MHz is expected to commence around the year 2000, and that others may do so subject to market and technical considerations;~~

~~b) that the availability of the satellite component of IMT-2000 in the bands 1 980-2 010 MHz and 2 170-2 200 MHz simultaneously with the terrestrial component of IMT-2000 in the bands identified in No. 5.388 would improve the overall implementation and the attractiveness of IMT-2000 to both developed and developing countries,~~

*invites administrations*

to give due consideration to the accommodation of other services currently operating in these bands when implementing IMT and other broadband wireless access systems-2000,

*invites ITU-R*

to continue its studies with a view to developing ~~suitable and acceptable technical characteristics~~ Recommendations for IMT-2000 and other broadband wireless access systems that will facilitate worldwide use and roaming, including sharing studies with other services and other applications in the mobile service, and ensure that IMT and other broadband wireless access systems-2000 can also meet the telecommunication needs of the developing countries and rural areas,

*invites ITU-T*

~~a) to complete its studies of signalling and communication protocols;~~

~~b) — to develop a common worldwide intersystem numbering plan and associated network capabilities that will facilitate worldwide roaming;~~

*resolves*

1) that administrations which implement IMT-2000 and other broadband wireless access systems:

a) should make the necessary frequencies available for system development;

b) should use those frequencies when IMT and other broadband wireless access systems-2000 ~~are~~ implemented;

c) should use the relevant international technical characteristics, as identified by ITU-R and ITU-T Recommendations.

**Reasons:** To provide guidance to Administrations on considering the existing uses and other applications that may use the frequency bands identified for IMT and other broadband wireless access systems below 1 GHz. To allow Administrations greater flexibility to select technology.

USA/xx/7

**MOD Resolution 223**

RESOLUTION 223 (REV. WRC-2007)

**Additional frequency bands identified for IMT and other broadband wireless access systems-2000**

The World Radiocommunication Conference (~~Istanbul~~Geneva, 2007),

*considering*

a) that International Mobile Telecommunications-2000 (IMT-2000) is the ITU vision of global mobile access ~~and is scheduled to start service around the year 2000, subject to market and other considerations;~~

b) that IMT-2000 is an advanced mobile communication applications concept intended to provide telecommunication services on a worldwide scale regardless of location, network or terminal used;

c) that IMT includes IMT-2000, its future development, and systems beyond IMT-2000, otherwise known as IMT-Advanced;

~~e) — that IMT-2000 will provide access to a wide range of telecommunication services supported by fixed telecommunication networks (e.g. PSTN/ISDN), and to other services which are specific to mobile users;~~

- d) that the technical characteristics of IMT-2000 are specified in ITU-R and ITU-T Recommendations, including Recommendation ITU-R M.1457, which contains the detailed specifications of the radio interfaces of IMT-2000;
- ~~e) that the evolution of IMT-2000 is being studied within ITU-R;~~
- e) that IMT-Advanced is being studied within ITU-R, and the framework for its development and its overall objectives is contained in Recommendation ITU-R M.1645;
- f) that the review of IMT-2000 spectrum requirements at ~~this Conference~~ WRC-2000 has concentrated on the bands below 3 GHz, and resulted in the identification of additional frequency bands in No. 5.384A for IMT-2000 in order to meet the additional spectrum requirement projected by ITU-R;
- g) that at WARC-92, 230 MHz of spectrum was identified for IMT-2000 in the bands 1 885-2 025 MHz and 2 110-2 200 MHz, including the bands 1 980-2 010 MHz and 2 170-2 200 MHz for the satellite component of IMT-2000, in No. 5.388 and under the provisions of Resolution 212 (Rev.WRC-97);
- h) that since WARC-92 there has been a tremendous growth in mobile communications including an increasing demand for wideband multimedia capability;
- ~~i) that ITU-R studies forecasted that of the order of 160 MHz of spectrum, in addition to that already identified for IMT-2000 in No. 5.388 and in addition to the spectrum used for first- and second-generation mobile systems in all three ITU Regions, will be needed in order to meet the projected requirements of IMT-2000 in those areas where the traffic is the highest by 2010;~~
- j) that this Conference has modified the IMT-2000 identifications to the broader terms IMT and other broadband wireless systems to facilitate use of advanced technologies in the identified frequency bands~~has identified additional frequency bands in No. 5.384A for IMT-2000 in order to meet the additional spectrum requirement projected by ITU-R;~~
- k) that many of the bands identified for IMT and other broadband wireless access systems-2000 are currently used by either first- or second-generation mobile systems or applications of other radiocommunication services;
- l) that Recommendation ITU-R M.1308 addresses the evolution of existing mobile communication systems to IMT-2000;
- m) that harmonized worldwide bands for IMT and other broadband wireless access systems -2000 are desirable in order to achieve global roaming and the benefits of economies of scale;
- n) that the bands 1 710-1 885 MHz and 2 500-2 690 MHz are allocated to a variety of services in accordance with the relevant provisions of the Radio Regulations;
- o) that, for technical reasons, the existing applications in the bands identified for IMT and other broadband wireless access systems -2000 require spectrum below 3 GHz;

p) that technological advancement and market demand will promote innovation and accelerate the delivery of advanced communication applications to consumers;

q) that changes in technology may lead to the further development of communication applications, including IMT-2000 and other broadband wireless access systems,

considering further

a) that, to promote harmonization, IMT and other broadband wireless access systems referred to in No. 5.384A should utilize radio interface technologies endorsed by external standards organizations;

b) that the ITU-R has developed various Recommendations and Reports on broadband wireless access systems, including Recommendation ITU-R M.[8A/BWA] which addresses radio interface standards for broadband wireless access systems, including mobile and nomadic applications,

c) that the evolution of first- and second-generation cellular-based mobile systems to more advanced systems can be facilitated if they are permitted to use their current frequency bands;

d) that the field of mobile wireless telecommunications is experiencing many rapid improvements in capability, due to technology advances, and that Administrations should be encouraged to facilitate the deployment of these rapid improvements;

*emphasizing*

a) that flexibility must be afforded to administrations:

- to determine, at a national level, how much spectrum to make available for IMT and other broadband wireless access systems-2000 from within the identified bands;
- to develop their own transition plans, if necessary, tailored to meet their specific deployment of existing systems;
- to have the ability for the identified bands to be used by all services having allocations in those bands;
- to determine the timing of availability and use of the bands identified for IMT and other broadband wireless access systems-2000, in order to meet particular market demand and other national considerations;

b) that the particular needs of developing countries must be met;

c) that Recommendation ITU-R M.819 describes the objectives to be met by IMT-2000 in order to meet the needs of developing countries,

*noting*

- a) Resolutions **224 (WRC-2000)** and **225 (rev. WRC-2003)**<sup>\*</sup>, which also relate to IMT and other broadband wireless access systems-2000;
- b) that the sharing implications between services sharing the bands identified for IMT and other broadband wireless systems-2000 in No. **5.384A** will need further study in ITU-R;
- c) that studies regarding the availability of the bands 1 710-1 885 MHz and 2 500-2 690 MHz for IMT and other broadband wireless access systems-2000 are being conducted in many countries, the results of which could have implications for the use of those bands in those countries;
- d) that, due to differing requirements, not all administrations may need all of the IMT and other broadband wireless access-2000 bands identified ~~at this Conference~~ in Article 5, or, due to the usage by and investment in existing services, may not be able to implement IMT or other broadband wireless access systems-2000 in all of those bands;
- e) that the spectrum for IMT-2000 identified by ~~this Conference~~ WRC-2000 ~~may does not~~ completely satisfy the ~~expected~~ requirements of some administrations for IMT and other broadband wireless access systems;
- f) that currently operating second-generation mobile communication systems may evolve to IMT or other broadband wireless access systems-2000 in their existing bands;
- g) that services such as fixed, mobile (second-generation systems), space operations, space research and aeronautical mobile are in operation or planned in the band 1 710-1 885 MHz, or in portions of that band;
- h) that services such as broadcasting-satellite, ~~broadcasting-satellite (sound), mobile-satellite, and fixed and mobile~~ (including multipoint distribution/communication systems) are in operation or planned in the band 2 500-2 690 MHz, or in portions of that band;
- i) that the identification of several bands for IMT and other broadband wireless access systems-2000 allows administrations to choose the best band or parts of bands for their circumstances;
- j) that ITU-R has identified additional work to address further developments in IMT-2000 and beyond;
- k) that the IMT-2000 radio interfaces as defined in Recommendation ITU-R M.1457 are expected to evolve within the framework of ITU-R beyond those initially specified, to provide enhanced services and services beyond those envisaged in the initial implementation;
- l) that the identification of a band for IMT and other broadband wireless access systems-2000 does not establish priority in the Radio Regulations and does not preclude the use of the band for any application of the services to which they are allocated;

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\* *Note by the Secretariat:* This Resolution was revised by WRC-03.

m) that the provisions of Nos. **5.317A**, **5.384A** and **5.388** do not prevent administrations from having the choice to implement other technologies in the frequency bands identified for IMT-2000 and other broadband wireless access systems, based on national requirements,

*recognizing*

a) that some administrations are planning to use the band 2 300-2 400 MHz for IMT-2000;

b) that for some administrations the only way of implementing IMT and other broadband wireless access systems ~~2000~~ would be spectrum refarming, requiring significant financial investment;

c) that spectrum for IMT and other broadband wireless access systems ~~2000~~ is identified in Nos. **5.317A**, **5.384A** and **5.388**, but this identification does not preclude the use for IMT and other broadband wireless access systems ~~2000~~ of other bands allocated to the mobile service,

*resolves*

1 to invite administrations implementing IMT and other broadband wireless access systems ~~2000~~ or planning to implement IMT and other broadband wireless access systems ~~2000~~ to make available, based on market demand and other national considerations, additional bands or portions of the bands above 1 GHz identified in No. **5.384A** for the terrestrial component of IMT-2000 and other broadband wireless access systems; due consideration should be given to the benefits of harmonized utilization of the spectrum for the terrestrial component of IMT-2000 and other broadband wireless access systems, taking into account the use and planned use of these bands by all services to which these bands are allocated;

2 to acknowledge that the differences in the texts of Nos. **5.384A** and **5.388** do not confer differences in regulatory status,

*invites ITU-R*

1 to continue its studies ~~on~~ the implications of sharing of IMT and other broadband wireless access systems ~~2000~~ with other applications and services in the bands 1 710-1 885 MHz and 2 500-2 690 MHz and the implementation, sharing and frequency arrangements of IMT and other broadband wireless access systems ~~2000~~ in the bands 1 710-1 885 MHz and 2 500-2 690 MHz ~~in accordance with Annex 1~~;

2 to develop harmonized frequency arrangements for operation of the terrestrial component of IMT and other broadband wireless access systems ~~2000~~ in the spectrum mentioned in this Resolution, aiming to achieve compatibility with existing frequency arrangements used by the first- and second-generation systems;

3 to continue its studies on further enhancements of IMT-2000, IMT-Advanced and other broadband wireless access systems, including the provision of Internet Protocol (IP)-based applications that may require unbalanced radio resources between the mobile and base stations;

4 to provide guidance to ensure that IMT and other broadband wireless access systems-2000 can meet the telecommunication needs of the developing countries and rural areas in the context of the studies referred to above;

5 to include these frequency arrangements and the results of these studies in one or more ITU-R Recommendations,

*invites ITU-T*

~~1 to complete its studies of signalling and communication protocols for IMT-2000;~~

~~2 to develop a common worldwide intersystem numbering plan and associated network capabilities that will facilitate worldwide roaming;~~

*further invites ITU-R and ITU-T*

~~to commence these studies forthwith;~~

*instructs the Director of the Radiocommunication Bureau*

to facilitate to the greatest extent possible the completion of these studies and to report the results of the studies before the next competent conference, or within three years, whichever is the earlier,

*requests administrations and Sector Members*

to submit the necessary contributions and to participate actively in the ITU-R studies.

## ~~ANNEX 1 TO RESOLUTION 223 (WRC 2000)~~

### **~~Request for studies by ITU-R~~**

~~In response to Resolution 223 (WRC 2000), studies that address the following should be conducted:~~

- ~~1 sharing implications and possibilities for all services having allocations in the identified frequency bands;~~
- ~~2 harmonized frequency arrangements for the implementation of IMT-2000 in the bands mentioned in this Resolution that take into account the services currently using the bands or planning to use the bands and the required compatible frequency arrangements of second-generation systems using these bands, taking into account the need to facilitate the evolution of current mobile systems to IMT-2000;~~
- ~~3 means to facilitate global roaming across different regional band usage within the bands identified for IMT-2000;~~
- ~~4 spectrum demand predictions related to traffic density and timing;~~



- ~~5—planning tools for adaptation of mobile radiocommunication technologies, including IMT 2000, for the needs of developing countries;~~
- ~~6—maintaining a database of national studies and decisions on selection of spectrum for IMT 2000;~~
- ~~7—study of the provision of a fixed wireless access interface using IMT 2000 technologies.~~

**Reasons:** To provide guidance to Administrations on considering the existing uses and other applications that may use the frequency bands identified for IMT and other broadband wireless access systems below 1 GHz. To allow Administrations greater flexibility to select technology.

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## **Document WAC/149(13.12.06):**

### **Views A and B on Agenda Item 1.4 (related to 3650-3700 MHz)**

**WRC-07 Agenda Item 1.4:** To consider frequency-related matters for the future development of IMT-2000 and systems beyond IMT-2000 taking into account the results of ITU-R studies in accordance with Resolution 228 (Rev. WRC-03).

#### **Summary**

At the request of the WAC, members of IWG-2 and IWG-3 met within IWG-3 to jointly consider how to treat the band 3650-3700 MHz as it relates to WRC-07 Agenda Item 1.4 which is “To consider frequency-related matters for the future development of IMT-2000 and systems beyond IMT-2000 taking into account the results of ITU-R studies in accordance with Resolution 228 (Rev. WRC-03).

After extensive debate, IWG-3 members were unable to reach agreement on this issue. Consequently, two views on the treatment of 3650-3700 MHz with respect to Agenda Item 1.4 were developed. These two documents are attached as View A and View B.

View A proposes no change to the Table of Frequency Allocations of the Radio Regulations with regard to the 3650 – 3700 MHz band. View A states that such a proposal is consistent with the results of the ITU-R studies to date have shown that sharing of the 3650 – 3700 MHz band by IMT-Advanced systems and the fixed satellite service is not feasible in the same geographic area. View A also states that there are significant FSS assets on the 3650 – 3700 MHz around the world, including a significant number of space networks registered by the United States that utilize this band, that would be severely impacted by the identification of this band under WRC-07 agenda item 1.4. View A was supported by Boeing, Intelsat, the Global VSAT Forum; Northrop Grumman Corporation and the Satellite Industry Association (SIA - whose members also include Arrowhead Global Solutions, Inc.; Artel, Inc.; ATK, Inc.; The DirecTV Group; EMC, Inc.; Eutelsat, Inc.; Globalstar, LLC; Hughes Network Systems, LLC; ICO Global communications; Inmarsat, Inc.; Integral Systems, Inc.; IOT Systems; Iridium Satellite LLC; Lockheed Martin Corp.; Loral Space & Communications Inc.; Loral Skynet ; Marshall Communications Corp.; Mobile Satellite Ventures LP; SES-New Skies, Inc.; SES-Americom, Inc.; Spacecom Corp.; Spacenet, Inc.; Stratos Global Corp. and TerreStar Networks, Inc.).

View B proposes that the US have no proposal of no change to 3650-3700 MHz under Agenda Item 1.4. View B states that unlike the satellite operations in the US above 3700 MHz, which is much more heavily used with satellites at approximately 2 degree spacing across the domestic arc and the corresponding higher number of associated earth stations, the United States does not believe that the limited number of satellites and earth stations below 3700 MHz present the same sharing concerns and therefore do not justify a no change proposal from the United States. Further, View B states that it would send the wrong message internationally, especially as the United States decided to limit satellite

use in the band in order to facilitate broader terrestrial use. View B states that, however, given the type of terrestrial use in the US (e.g., low EIRP limits), the United States does not propose the identification of the 3650-3700 MHz band under agenda item 1.4 at this time. View B was supported by Intel, Motorola, Nokia, Sprint Nextel, and the Wireless Communications Association International, Inc.

IWG-3 respectfully submits the two views to the WRC Advisory Committee for consideration.

## *View A*

### DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

**WRC-07 Agenda Item 1.4:** To consider frequency-related matters for the future development of IMT-2000 and systems beyond IMT-2000 taking into account the results of ITU-R studies in accordance with Resolution **228 (Rev. WRC-03)**.

#### **Background**

The RCS had previously proposed in IWG-3/WRC-07/Proposal/Background/Doc. 4 that the ITU Table of Frequency Allocations not be changed in the frequency band 3400 – 4200 MHz, citing that ITU-R studies had not shown compatibility between IMT systems and the radiolocation service, nor between IMT systems and the fixed or fixed satellite service. The Satellite Industry Association (“SIA”) proposed in IWG-3/WRC-07/Proposal/Doc. 15 that the ITU Table of Frequency Allocations not be changed in the frequency band 3400 – 4200 MHz citing that ITU-R studies had shown that sharing between IMT systems and the fixed satellite service was not feasible within the same geographic area.

After discussion within IWG-3, the SIA document was subsequently modified such that it proposed no change to the ITU Table of Frequency Allocation only in the 3700 – 4200 MHz band (see WAC/135(04.10.06) and FCC Public Notice DA 06-2013, October 12, 2006). The RCS document was modified so that it proposed no change to the ITU Table of Frequency Allocation only to the frequency band 3400 – 3650 MHz.

The modified RCS document was subsequently submitted to and reviewed by IWG-2 (see document IWG-2/067). After consideration of this document, IWG-2 felt that the “no change” should be extended to the entire 3400 – 4200 MHz band, and not limited to the 3400 – 3650 MHz band. IWG-2 emphasized the extreme significance of the 3650 – 4200 MHz band for the FSS industry. IWG-2 comments were submitted to IWG-3 for further consideration of this matter (see IWG-3/WRC-07/Background/Doc. 7).

With regard to the 3650 – 3700 MHz band, IWG-3 had indicated that “no change” status as originally proposed by RCS (and also by SIA) should not be applied to this band and opposed adding sharing issues with the fixed satellite service (“FSS”). IWG-3 indicated that although the 3700 – 4200 MHz band was extensively used by FSS in the United States; this was not the case in the band below 3700, as the density of FSS earth station deployment is much lower. In the United States, the 3650 – 3700 MHz band is allocated to the fixed and mobile terrestrial services and FSS use is limited to certain grandfathered sites. Further, the use of the 3600 – 3650 MHz band by the FCC is limited to international, inter-continental systems. IWG-3’s comments are contained in document IWG-3/WRC-07/Proposal/Doc.17r2.

IWG-3 is aware that ITU-R Working Party 8F (“WP8F”) has conducted a number of technical studies pertaining to sharing of the 3400 – 4200 MHz band by FSS and systems beyond IMT-2000 (hereafter referred to as “IMT-Advanced”). WP8F has indicated that some physical separation between and FSS receive earth station and the IMT-Advanced transmitter would be

required. Based upon the results of the sharing studies conducted by WP8F and the allocation/use of the 3400 – 4200 MHz band within the United States, the administration of the United States has supported within WP8F the position that sharing between IMT-Advanced and FSS in the 3600 – 4200 MHz band is not feasible in the same geographic area (see ITU-R Document 8F/947).

In the course of further discussions of this issue by IWG-3, FSS representatives emphasized that frequencies below 3700 MHz, especially the band 3625-3700 MHz, had significant use in other areas of the world, i.e. outside of the United States. For example one global FSS operator, Intelsat, operates 14 U.S. licensed satellites that utilize the 3625 – 3700 MHz band. These satellites cumulatively provide an equivalent of 124, 36-MHz transponders in this band. This is, in turn, equivalent to approximately five satellites, with each carrying 24 standard 36-MHz transponders. The signals from these channels are received by over 1100 receive stations worldwide. In addition to Intelsat, several other satellite operators have significant investments in spacecraft with payloads that include the band 3625 – 3700 MHz with large number of customers using these frequencies worldwide. The identification of the 3650 – 3700 MHz band as a candidate for identification for IMT-Advanced systems would encourage the introduction of terrestrial systems that are not compatible with extensive FSS operations and would affect the significant investments already made by FSS operators and users.

IWG-3 notes that the decision to use the 3650 – 3700 MHz band for terrestrial services can continue on a country-by-country basis as is currently happening. However, given the mixed allocation environment that is currently prevalent worldwide with respect to the 3400 – 4200 MHz and the extensive use of this by U.S. registered space stations (and their associated receive earth stations worldwide) the identification of the 3650 – 3700 MHz band on a worldwide basis does not seem to be feasible or appropriate.

### **Proposal**

No change to the table of Frequency Allocations of the Radio Regulations with regard to the 3650 – 3700 MHz band.

### **Reasons**

Results of the ITU-R studies to date have shown that sharing of the 3650 – 3700 MHz band by IMT-Advanced systems and the fixed satellite service is not feasible in the same geographic area. This band may be used for terrestrial services (e.g. BWA) on a country-by-country basis. However, there are significant FSS assets on the 3650 – 3700 MHz around the world, including a significant number of space networks registered by the United States that utilize this band, that would be severely impacted by the identification of this band under WRC-07 agenda item 1.4.

## *View B*

### DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

**WRC-07 Agenda Item 1.4:** To consider frequency-related matters for the future development of IMT-2000 and systems beyond IMT-2000 taking into account the results of ITU-R studies in accordance with Resolution 228 (Rev. WRC-03).

**Background:**

Document IWG-3/WRC-07/Proposal/Doc. 20 proposes no change to the International Table of Frequency Allocations in the band 3650-3700 MHz, because of the potential for interference to satellite downlinks deployed in the same geographic area.

In the United States, fixed and mobile terrestrial services are allocated on a primary basis in 3650-3700 MHz and the FCC adopted service rules to govern the terrestrial operations with the intent of stimulating the rapid expansion of broadband wireless services. When adopting the terrestrial allocations, the FCC limited the FSS use to certain grandfathered sites<sup>3</sup> in order to ensure availability of the band for terrestrial services. Further, use of the FSS allocation is limited to international/inter-continental systems.

Any US proposal for no change to expand terrestrial use of the band internationally because of concerns with interference to or constraining satellite use would be inconsistent with domestic use of the band, and would disenfranchise domestic terrestrial users from the benefits of a potential global market. It would send the wrong message internationally, especially as the United States decided to limit satellite use in the band in order to facilitate broader terrestrial use. Unlike the satellite operations in the United States above 3700 MHz, which is much more heavily used with satellites at approximately 2 degree spacing across the domestic arc and the corresponding higher number of associated earth stations, the United States does not believe that the limited number of satellites and earth stations below 3700 MHz present the same sharing concerns and therefore do not justify a no change proposal from the United States. Further, it is common US policy to promote international use that is harmonized with its domestic use. US service providers who use the 3650-3700 MHz band and manufacturers who build equipment for the band would benefit from harmonized use outside of the United States, as economies of scale would result in lower equipment costs which could also be passed on to US consumers.

However, given the type of terrestrial use in the US (e.g., low EIRP limits), the United States does not propose the identification of the 3650-3700 MHz band under agenda item 1.4.

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<sup>3</sup> Although there are only 49 grandfathered sites, BWA transmitters must be coordinated within a 150 km radius around each of these sites. Many of the grandfathered sites are in close proximity, resulting in a significant overlap of the 150 km coordination zones (see Attachment 1)

**Proposal:**

Considering the above perspectives, the United States has decided not to have a proposal under agenda item 1.4 on 3650-3700 MHz.

**Reason:** Unlike the satellite operations in the US above 3700 MHz, which is much more heavily used with satellites at approximately 2 degree spacing across the domestic arc and the corresponding higher number of associated earth stations, the United States does not believe that the limited number of satellites and earth stations below 3700 MHz present the same sharing concerns and therefore do not justify a no change proposal from the United States. Further, it would send the wrong message internationally, especially as the United States decided to limit satellite use in the band in order to facilitate broader terrestrial use. However, given the type of terrestrial use in the US (e.g., low EIRP limits), the United States does not propose the identification of the 3650-3700 MHz band under agenda item 1.4.

**Attachment 1 (for information; not intended to be part of the proposal)**

**Coordination Zones: 3650 to 3700 MHz**



Small dark gray circles = Federal Government stations  
Large light gray circles = Grandfathered FSS stations  
Not displayed, Guam FSS stations

Federal Communications Commis  
Office of Engineering And Techno

**INFORMAL WORKING GROUP 4 (IWG-4)**  
**Broadcasting and Amateur Issues**

**Document WAC/150(13.12.06):**

**Informational Report**  
**To WRC-07 Advisory Committee**  
**Regarding an AM(R)S allocation in the 5 to 6 GHz Band**

**Agenda Item 1.6:** to consider additional allocations for the aeronautical mobile (R) service in parts of the bands between 108 MHz and 6 GHz, in accordance with Resolution **414(WRC-03)**.

The CPM text for Agenda Item 1.6 was developed by Working Party 8B after liaison with Working Party 8D. This text reflects the possibility of using the 5000-5010 MHz and 5010-5030 MHz bands currently allocated to the aeronautical radionavigation service (ARNS), aeronautical mobile satellite (R) service (AMS(R)S) and Radionavigation Satellite Service (RNSS) to provide for AM(R)S under the provision that the AM(R)S could not cause harmful interference to, nor claim protection from, nor constrain the development of the RNSS.

In response, the U.S. GPS Industry Council, on behalf of the U.S. RNSS private industry and users of RNSS services (including the U.S. GPS system) presented a proposal to IWG-4 that the U.S. propose to WRC '07 that there be no change to the Table of Allocations in the frequency bands 5000-5010 MHz and 5010-5030 MHz. This proposal was opposed by ASRI (Aviation Spectrum Resources, Inc.) on behalf of the civil aviation community, citing the existing congestion of AM(R)S spectrum, and recent International Civil Aviation Organization (ICAO) studies pointing to a need for up to 100 MHz of new spectrum to support civil aviation airport surface communications.

Given the new nature of the RNSS allocation at WRC-03, the U.S. RNSS industry has not yet had the opportunity to develop applications for its use. However, industry envisions the possibility of its use for both RNSS service and feeder-link applications, and would not want to have these possible applications foreclosed by a new additional allocation in these bands. Consequently, the RNSS industry is opposed to the use of the aforementioned RNSS bands for any other service if interference cannot be prevented by the new service or if constraints on use of the band for RNSS are reasonably expected to result from the new service.

The aviation community pointed to ITU-R studies and the recent introduction of RNSS into the heavily used 1164-1215 MHz band (e.g., GPS L5) as models demonstrating the feasibility of achieving compatibility between RNSS and AM(R)S. Civil aviation indicated it believes that sharing between RNSS and AM(R)S is feasible and further noted that any RNSS applications for those bands are far-term at best (e.g., the only mention in the current GPS III specification is for a possible future 5010-5030 MHz feeder link), and leaving the band fallow could set a bad precedent from a spectrum efficiency perspective.



IWG-4 considered the proposal suggested by the U.S. RNSS industry and the comments of the civil aviation community and was not able to reach consensus. Nonetheless, IWG-4 wishes to have the Report of WAC-'07 note the suggestions of both the U.S. RNSS industry and the US aviation community for consideration by the U.S. Government as it develops U.S. proposals to WRC '07.

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**Draft Proposals**  
**for the**  
**2007**  
**World Radiocommunication Conference**  
**developed by the**  
**Executive Branch Agencies**  
**and provided by the**  
**National Telecommunications and**  
**Information Administration (NTIA)**

## **II. Draft Proposals on WRC-07 Agenda Items received from the National Telecommunications and Information Administration (NTIA):**

**Document WAC/146(13.12.06):**

### **DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE**

**Agenda Item 7.2:** to recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, taking into account Resolution **803 (WRC-03)**,

**Background Information:** At WRC-03, Agenda Item 1.6 for the 2007 Conference was adopted to, in part, “consider additional allocations for the aeronautical mobile (R) service in parts of the bands between 108 MHz and 6 GHz, in accordance with Resolution **414 (WRC-03)**.” Studies in support of that agenda item concluded that:

“The accommodation of unmanned aerial vehicles (UAVs) will likely have impact on overall aviation spectrum requirements. There is significant growth forecast in the UAV sector of aviation. Though UAVs have traditionally been used in segregated airspace where separation from other air traffic can be assured, it is planned to deploy them in non-segregated airspace. If they operate in non-segregated civil airspace, they must be integrated safely and adhere to the same operational practices as conventional manned aircraft. To accommodate such actions, additional safety communication links will be required (AM(R)S and/or aeronautical mobile satellite (R) service (AMS(R)S))”; and

“Although specific spectrum requirements have yet to be fully assessed, material has been received regarding UAV integration into non-segregated civil airspace. Because the pilot is located remotely from the UAV, bandwidth will be required to support, among other things, each UAV relaying ATC instructions to its respective pilot, additional operational data, encryption, and interference resilience. These applications will require additional safety communication links. While it is expected that short term requirements may be accommodated in either existing aeronautical bands (AM(R)S or AMS(R)S) or the new AM(R)S allocations made under this agenda item, given the longer term plans for large-scale deployment of UAVs, additional spectrum may be required in the future.”

**Proposal:**

**USA/ 1      MOD**

**RESOLUTION 803 (WRC-~~03~~07)**

**~~Preliminary~~ Agenda for the 2010 World Radiocommunication Conference**

The World Radiocommunication Conference (Geneva, 20037),

USA/ /2      **ADD**

**2. UAVCOM** to consider spectrum requirements and possible additional spectrum allocations in the aeronautical mobile and/or aeronautical mobile satellite service to support the operation of unmanned aerial vehicles (UAVs), in accordance with Resolution **UAVCOM (WRC-07)**.

**Reasons:** To have an agenda item for WRC-10 to consider the spectrum requirements for unmanned aerial vehicles.

USA/ /3      **ADD**

DRAFT RESOLUTION [UAVCOM (WRC-07)]

**Consideration of spectrum allocations for use by unmanned aerial vehicles (UAVs)**

The World Radiocommunication Conference (Geneva, 2007),

*considering*

- a) that world wide use of unmanned aerial vehicles (UAVs) is expected to increase significantly in the next 10 years;
- b) that there is a possible need for additional aeronautical mobile and/or aeronautical mobile-satellite service spectrum to support the operation of future UAVs;

- c) that there is a need to protect existing services,

*recognizing*

- a) that there are emerging UAV applications, including plans to deploy them in non-segregated airspace alongside conventional manned aircraft where the UAV must be integrated safely and adhere to the same operational practices as conventional manned aircraft;
- b) that future technologies and performance expectations for UAVs will require the use of spectrum to support the transfer of UAV status information to its control station, transfer flight commands to the UAV from its control station, and real-time relaying of air traffic control instructions to and from the UAV operator;

- c) that due to the importance of ensuring the safe operation of UAVs in non-segregated airspace along side conventional manned aircraft, this spectrum must be afforded special consideration as a safety service according to No. **4.10** of the Radio Regulations (RR);

- d) that studies will be required to provide a basis for considering regulatory changes, including additional allocations, to accommodate spectrum requirements of UAVs consistent with the protection of incumbent services,

*resolves*

that WRC-10 consider spectrum requirements and possible additional spectrum allocations for terrestrial and satellite services in the aeronautical mobile and aeronautical mobile-satellite services to support the communications requirements of UAVs;

*further resolves to invite the ITU-R*

1 to conduct, as a matter of urgency, studies to determine the spectrum requirements and potential frequency bands suitable to support deployment of UAVs;

2 that the studies referred to in *further resolves* 1 should include sharing and compatibility studies with services already having allocations in those bands,

*further invites*

all members of the Radiocommunications Sector and the International Civil Aviation Organization (ICAO) to contribute to these studies.

**Reasons:** This resolution details the scope and required studies related to future spectrum requirements of unmanned aerial vehicles communications links.

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- FCC -