

November 22, 2006

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United States of America

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	
470-698 BROADCASTING 5.149 5.291A 5.294 5.296 5.300 5.302 5.304 5.306 5.311 5.312	470-512 BROADCASTING Fixed Mobile 5.292 5.293	470-585 FIXED MOBILE BROADCASTING 5.291 5.298	
	512-608 BROADCASTING 5.297		585-610 FIXED MOBILE BROADCASTING RADIONAVIGATION 5.149 5.305 5.306 5.307
	608-614 RADIO ASTRONOMY Mobile-satellite except aeronautical mobile-satellite (Earth-to-space)	614-698 BROADCASTING Fixed Mobile 5.293 5.309 5.311	610-698 FIXED MOBILE 5.317A BROADCASTING 5.149 5.305 5.306 5.307 5.311 5.320
	614-698 BROADCASTING Fixed Mobile 5.293 5.309 5.311		610-698 FIXED MOBILE 5.317A BROADCASTING 5.149 5.305 5.306 5.307 5.311 5.320
	698-790 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>	698-806 BROADCASTING <u>MOBILE</u> Fixed	698-806 FIXED MOBILE 5.317A BROADCASTING 5.149 5.305 5.306 5.307 5.311 5.320 <u>5.537A</u>
790-806 FIXED BROADCASTING <u>MOBILE</u> 5.312 5.314 5.315 5.316 5.319 5.321 <u>5.317A</u>	698-806 BROADCASTING <u>MOBILE</u> Fixed 5.293 5.309 5.311 <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-20007)

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;

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

~~m)~~ 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;

~~n)~~ 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.

USA/xx/6
MOD Resolution 212

RESOLUTION 212 (REV.WRC-097)

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;
- gd) 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;~~;

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

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;

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 implemented ~~ion 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)**^{*}, 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;

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

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;

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.