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| **World Radiocommunication Conference (WRC-15)Geneva, 2–27 November 2015** |  |
| **INTERNATIONAL TELECOMMUNICATION UNION** |  |
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| PLENARY MEETING | **Addendum 3 toDocument 6(Add.1)-E** |
|  | **7 October 2015** |
|  | **Original: English** |
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| United States of America |
| Proposals for the work of the conference |
|  |
| Agenda item 1.1 |

1.1 to consider additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for International Mobile Telecommunications (IMT) and related regulatory provisions, to facilitate the development of terrestrial mobile broadband applications, in accordance with Resolution **233 (WRC‑12)**;

470-698 MHz

Introduction

Mobile broadband access has become a key driver of global economic growth, job creation and competitiveness. In developing countries, where mobile wireless is often the only means to achieve ubiquitous broadband access, it has become an economic imperative. Africa, for example, has experienced the highest growth, with mobile-broadband penetration increasing from 2% in 2010 to an estimated 17% in 2015.[[1]](#footnote-1) This dramatic growth in mobile-broadband traffic, with mobile video comprising 55% of traffic in 2014 and growing[[2]](#footnote-2), has resulted in an acute need for additional spectrum. The 2012 World Radiocommunication Conference recognized this need and adopted WRC‑15 agenda item 1.1, in an effort to address the looming spectrum shortage for the mobile broadband services.

In considering the global spectrum requirements under WRC-15 agenda item 1.1, it is important to acknowledge, as reflected in *recognizing* *d)* of Resolution 233 (WRC-12), that the spectrum below 1 GHz is exceptionally suited for mobile broadband applications. In particular, the unique propagation characteristics of the bands below 1 GHz allow for wider area coverage which in turn requires less infrastructure and facilitates service delivery to rural or sparsely populated areas, as reflected in *recognizing* *c*) of Resolution 233 (WRC-12).

The 470-806/862 MHz frequency range is allocated to the broadcasting service on a primary basis in all three Regions and used predominantly for the delivery of broadcast television. Broadcasting continues to be an important service as broadcast television stations provide information and video programming that is responsive to the needs and interests of the communities they serve. Moreover, broadcast television itself continues to evolve to keep pace with technological and marketplace changes. Many television broadcasters now pursue a three-screen approach, sharing their programming online and on mobile devices, in addition to providing it over the air. In fact, providing mobile access to broadcast television content is a compelling factor in the development of future DTTB systems.

In this regard, efforts are also underway in the United States and worldwide to develop the next generation of terrestrial broadcast systems. One such initiative, the Future of Broadcast Television Initiative (FoBTV) is a worldwide effort to define requirements, recommend technologies and request standardization for such systems. A key element of any next generation broadcast system recognized by the FoBTV Initiative is: “The importance of mobility in future broadcast systems and the desire for mobile, handheld and portable devices to be capable of working across borders …”. Within the United States, work on the development of these next generation standards has already begun. “The Advanced Television Systems Committee (ATSC) has received 11 initial proposals from 20 organizations for the Physical Layer of the new “ATSC 3.0” broadcast television standard.” “A primary goal of the ATSC 3.0 Physical Layer is to provide TV service to both fixed and mobile devices. Key considerations include efficiency and robust service, increased data rates to support new services such as Ultra High-Definition services, and enabling a smooth transition from existing systems for both broadcasters and consumers.”[[3]](#footnote-3)

The importance of broadcasting in emergencies has been recognized and highlighted in a recent draft ITU Report.[[4]](#footnote-4) As stated in this report, “television broadcasting is a critically important medium for information dissemination to the public in times of emergencies. The intrinsic one-to-many broadcast architecture and the geographic diversity of terrestrial broadcast transmission facilities provide high service reliability during crises of all types. … The case studies in this report represent only a few of countless examples that attest to the global importance of terrestrial broadcasting, helping to protect and save lives during local, national and international emergencies.” [[5]](#footnote-5)

Potential interference between broadcasting and mobile operations also needs to be taken into account. The protection of the broadcasting service is an important consideration. Preliminary studies submitted to ITU-R Joint Technical Group 4-5-6-7 indicate that co-frequency sharing in the UHF band between IMT and DTTB may require significant cross-border separation distances on a case-by-case basis. In this regard, it is emphasized the application of No. 9.21 would require explicit coordination agreement for implementation of mobile systems. To address these interference concerns, the mandatory application of No. 9.21, which would require explicit coordination agreement for implementation of mobile systems, is proposed.

Recognizing the growing need for mobile spectrum below 1 GHz, the current deployment and future development of broadcasting systems, and the differing national priorities of the member states as regards UHF broadcasting, it is necessary for WRC-15 to adopt a regulatory solution that would:

a) Enable administrations to preserve and protect broadcasting and other services in the UHF range,

b) Consider ways to facilitate the development of future broadcasting systems, and

c) Allow administrations flexibility to address the mobile spectrum shortage consistent with their domestic requirements.

To achieve these objectives, modifications to the Radio Regulations that would add an allocation to the mobile services and identification for IMT in the range 470-694/698 MHz except for the 608‑614 MHz band in Region 2 are proposed. It is also proposed to retain of the primary allocation to the Broadcasting Service in the 470-890 MHz frequency range, including the mandatory application of No. 9.21, which would ensure that the existing services, such as broadcasting, maintain coordination priority (i.e., remain super-primary) vis-à-vis IMT systems.

Proposals

ARTICLE 5

Frequency allocations

Section IV – Table of Frequency Allocations
(See No. 2.1)

MOD USA/6A1A3/1

460-890 MHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 470-614BROADCASTINGMOBILE ADD 5.A11 ADD 5.B115.149 5.291A 5.294 5.296 5.300 5.304 5.306 5.311A 5.312 5.312A | 470-512BROADCASTINGFixedMOBILE ADD 5.A11 ADD 5.B115.292 MOD 5.293 | 470-585FIXEDMOBILE ADD 5.A11 ADD 5.B11BROADCASTING5.291 5.298 |
| 512-608BROADCASTINGMOBILE ADD 5.A11 ADD 5.B11 MOD 5.297 |
| 585-610FIXEDMOBILE ADD 5.A11 ADD 5.B11BROADCASTINGRADIONAVIGATION5.149 5.305 5.306 5.307 |
| 608-614RADIO ASTRONOMYMobile-satellite exceptaeronautical mobile-satellite(Earth-to-space) |
| 610-614FIXEDMOBILE 5.313A ADD 5.A11 ADD 5.B11BROADCASTING5.149 5.305 5.306 5.3075.311A 5.320 |

**Reasons:** Globally harmonized allocations to the mobile service in the 470-614 MHz frequency range would enable introduction of innovative broadband services while preserving access to spectrum for the existing services, such as broadcasting. A new allocation to the mobile service would provide administrations with the flexibility to maximize spectrum utilization. Under the proposed allocation arrangements, administrations may continue to operate existing services, such as broadcasting, or utilize portions of the UHF band for the implementation of new mobile broadband applications, such as IMT, as they deem appropriate based on their domestic priorities, taking into account potential interference considerations.

MOD USA/6A1A3/2

460-890 MHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 614-790BROADCASTINGMOBILE MOD 5.317A ADD 5.B115.149 5.291A 5.294 5.296 5.300 5.304 5.306 5.311A 5.312 5.312A | 614-698BROADCASTINGFixedMOBILE MOD 5.317A ADD 5.B11MOD 5.293 5.309 5.311A | 614-890FIXEDMOBILE 5.313A MOD 5.317A ADD 5.B11BROADCASTING |
| 698-806MOBILE 5.313B MOD 5.317A BROADCASTINGFixedMOD 5.293 5.309 5.311A |
| 790-862FIXEDMOBILE except aeronautical mobile 5.316B MOD 5.317ABROADCASTING5.312 5.314 5.315 5.316 5.316A 5.319 |  |
| 806-890FIXEDMOBILE MOD 5.317A BROADCASTING5.317 5.318 |
|  |
|  |
| 862-890FIXEDMOBILE except aeronauticalmobile MOD 5.317A BROADCASTING 5.322 |
| 5.319 5.323 |  | 5.149 5.305 5.306 5.3075.311A 5.320 |

**Reasons:** Globally harmonized allocations to the mobile service in the 614-698 MHz frequency range would enable introduction of innovative broadband services while preserving access to spectrum for the existing services, such as broadcasting. A new allocation to the mobile service would provide administrations with the flexibility to maximize spectrum utilization. Under the proposed allocation arrangements, administrations may continue to operate existing services, such as broadcasting, or utilize portions of the UHF band for the implementation of new mobile broadband applications, such as IMT, as they deem appropriate based on their domestic priorities, taking into account potential interference considerations.

ADD USA/6A1A3/3

5.A11 Those parts of the band 470-614 MHz which are allocated to the mobile service on a primary basis are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) – see Resolution **224 (Rev.WRC-15)**, as appropriate. 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. (WRC-15)

**Reasons:** Globally harmonized allocations to the mobile service in the 470-614 MHz frequency range would enable introduction of innovative broadband services, such as IMT, while preserving access to spectrum for the existing services, such as broadcasting. The new allocation to the mobile service would provide administrations with the necessary flexibility to maximize spectrum utilization consistent with their domestic timetables, requirements and objectives.

ADD USA/6A1A3/4

5.B11 The operation of stations in the mobile service for the implementation of International Mobile Telecommunications (IMT) in the frequency band 470-694 MHz in Region 1, in the frequency bands 470-608 MHz and 614-698 MHz in Region 2, and in the frequency band 470-698 MHz in Region 3 shall be subject to agreement obtained under No. **9.21**. (WRC-15)

**Reasons:** The application of No. **9.21** requires the explicit agreement of the affected administrations. The mandatory application of No. **9.21**, therefore, would ensure the protection of incumbent systems such as broadcasting vis-à-vis IMT systems. The above provision would also facilitate the development of future broadcasting systems. Global harmonization is an important factor for broadcast television services and will become even more so as mobile broadcast services are implemented that will facilitate the use of portable television broadcast devices.

MOD USA/6A1A3/5

5.293 *Different category of service*: in Canada, Chile, Cuba, the United States, Guyana, Honduras, Jamaica, Mexico, Panama and Peru, the allocation of the bands 470-512 MHz and 614-806 MHz to the fixed service is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21**. In Argentina and Ecuador, the allocation of the band 470-512 MHz to the fixed service is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21**.    (WRC‑15)

**Reasons:** Consequential change. Proposed allocation to the mobile service in the Table of Allocations supersedes allocation(s) by footnote.

MOD USA/6A1A3/6

5.297 *Additional allocation:*in Canada, Costa Rica, Cuba, El Salvador, the United States, Guatemala, Guyana, Honduras, Jamaica and Mexico, the band 512-608 MHz is also allocated to the fixed services on a primary basis, subject to agreement obtained under No. 9.21.     (WRC‑15)

**Reasons:** Consequential change. Proposed allocation to the mobile service in the Table of Allocations supersedes allocation(s) by footnote.

MOD USA/6A1A3/7

5.317A Those parts of the band 614-960 MHz which are allocated to the mobile service on a primary basis are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) – see Resolutions **224 (Rev.WRC‑15)** and **749 (Rev.WRC‑12)**, as appropriate. 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.    (WRC‑15)

**Reasons:** Globally harmonized allocations to the mobile service in the 614-960 MHz frequency range would enable introduction of innovative broadband services, such as IMT, while preserving access to spectrum for the existing services, such as broadcasting. The new allocation to the mobile service would provide administrations with the necessary flexibility to maximize spectrum utilization consistent with their domestic timetables, requirements and objectives.

MOD USA/6A1A3/8

RESOLUTION 224 (Rev.WRC‑15)

Frequency bands for the terrestrial component of International
Mobile Telecommunications below 1 GHz

The World Radiocommunication Conference (Geneva, 2015),

considering

*a)* that International Mobile Telecommunications (IMT) is the root name, encompassing both IMT‑2000 and IMT‑Advanced (see Resolution ITU‑R 56);

*b)* that IMT systems are intended to provide telecommunication services on a worldwide scale, regardless of location, network or terminal used;

*c)* that parts of the band 806-960 MHz are extensively used in the three Regions by mobile systems;

*d)* that IMT systems have already been deployed in the band 806-960 MHz in some countries of the three Regions;

*e)* that some administrations are planning to use the band 470-862 MHz, or part of that band, for IMT;

*f)* that, as a result of the transition from analogue to digital terrestrial television broadcasting, some countries are planning to make or are making the band 470-862 MHz, or parts of that band, available for applications in the mobile service (including uplinks);

*g)* that the band 450-470 MHz is allocated to the mobile service on a primary basis in the three Regions and that IMT systems have already been deployed in some countries of the three Regions;

*h)* that results of the sharing studies for the band 450-470 MHz are contained in Report ITU‑R М.2110;

*i)* that cellular-mobile systems in the three Regions in the bands below 1 GHz operate using various frequency arrangements;

*j)* that, where cost considerations warrant the installation of fewer base stations, such as in rural and/or sparsely populated areas, bands below 1 GHz are generally suitable for implementing mobile systems, including IMT;

*k)* that bands below 1 GHz are important, especially for some developing countries and countries with large areas where economic solutions for low population density areas are necessary;

*l)* thatRecommendation ITU‑R M.819 describes the objectives to be met by IMT‑2000 in order to meet the needs of developing countries, and in order to assist them to “bridge the gap” between their communication capabilities and those of developed countries;

*m)* that Recommendation ITU‑R M.1645 also describes the coverage objectives of IMT,

recognizing

*a)* that the evolution of cellular-based mobile networks to IMT can be facilitated if they are permitted to evolve within their current frequency bands;

*b)* that the band 450-470 MHz and parts of the bands 746-806 MHz and 806-862 MHz are used extensively in many countries by various other terrestrial mobile systems and applications, including public protection and disaster relief radiocommunications (see Resolution **646 (Rev.WRC‑12)**);

*c)* that there is a need, in many developing countries and countries with large areas of low population density, for the cost-effective implementation of IMT, and that the propagation characteristics of frequency bands below 1 GHz identified in Nos. **5.286AA** and **5.317A** result in larger cells;

*d)* that the band 450-470 MHz, or parts of that band, is also allocated to services other than the mobile service;

*e)* that the band 460-470 MHz is also allocated to the meteorological-satellite service in accordance with No. **5.290**;

*f)* that the frequency band 470-806/862 MHz is allocated to the broadcasting service on a primary basis in all three Regions and used predominantly by this service, and that the GE06 Agreement applies in all Region 1 countries, except Mongolia, and in the Islamic Republic of Iran in Region 3;

*g)* that the GE06 Agreement contains provisions for the terrestrial broadcasting service and other primary terrestrial services, a Plan for digital television, and a list of stations of other primary terrestrial services;

*h)* that the transition from analogue to digital television is expected to result in situations where the band 470-806/862 MHz will be used extensively for both analogue and digital terrestrial transmission, and the demand for spectrum during the transition period may be even greater than the standalone usage of analogue broadcasting systems;

*i)* that the time-frame and transition period for analogue to digital television switchover may not be the same for all countries;

*j)* that, after analogue to digital television switchover, some administrations may decide to use all or parts of the band 470-806/862 MHz for other services to which the band is allocated on a primary basis, in particular the mobile service for the implementation of IMT, while in other countries the broadcasting service will continue to operate in that band;

*k)* that in the band 470-862 MHz, or parts of that band, there is an allocation on a primary basis for the fixed service;

*l)* that, in some countries, the band 470-806/862 MHz is allocated to the mobile service on a primary basis;

*m)* that the band 645-862 MHz is allocated on a primary basis to the aeronautical radionavigation service in the countries listed in No. **5.312**;

*n)* that the compatibility of the mobile service with the broadcasting, fixed and aeronautical radionavigation services in the band referred to in *recognizing k)* and *m)* will need further study in ITU‑R;

*o)* that Recommendation ITU‑R M.1036 provides frequency arrangements for implementation of the terrestrial component of IMT in the bands identified for IMT in the Radio Regulations;

*p)* that ITU‑R has produced Reports ITU‑R M.2241, ITU‑R BT.2215 and ITU‑R BT.2248 and is still continuing the compatibility studies in relation to this Resolution,

emphasizing

*a)* that in all administrations terrestrial broadcasting is a vital part of the communication and information infrastructure;

*b)* that flexibility must be afforded to administrations:

– to determine, at a national level, how much spectrum to make available for IMT from within the identified bands, taking into account current uses of the spectrum and the needs of 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, in order to meet particular market demand and other national considerations;

*c)* that the particular needs and national conditions and circumstances of developing countries, including least-developed countries, highly-indebted poor countries with economies in transition, and countries with large territories and territories with a low-subscriber density, must be met;

*d)* thatdue consideration should be given to the benefits of harmonized utilization of the spectrum for the terrestrial component of IMT, taking into account the current and planned use of these bands by all services to which these bands are allocated;

*e)* that the use of frequency bands below 1 GHz for IMT also helps to “bridge the gap” between sparsely-populated areas and densely-populated areas in various countries;

*f)* that the identification of a band for IMT does not preclude the use of this band by other services or applications to which it is allocated;

*g)* that the use of the band 470-862 MHz by the broadcasting service and other primary services is also covered by the GE06 Agreement;

*h)* that the requirements of the different services to which the band is allocated, including the mobile and broadcasting services, need to be taken into account,

resolves

1 that administrations which are implementing or planning to implement IMT consider the use of bands identified for IMT below 1 GHz and the possibility of cellular-based mobile network evolution to IMT, in the frequency band identified in Nos. **5.286AA**, **5.317A**, and **5.A11**, based on user demand and other considerations;

2 to encourage administrations to take into account the results of the ITU‑R studies referred, and any recommended measures when implementing applications/systems in the 470-806/862 MHz band, and in those administrations mentioned in No. **5.313A**;

3 that administrations should take into account the need to protect the existing and future broadcasting stations, both analogue and digital, in the 470-806/862 MHz band, as well as other primary terrestrial services;

4 that administrations planning to implement IMT in the bands mentioned in *resolves*2 shall effect coordination with all neighbouring administrations prior to implementation;

5 that in Region 1 (excluding Mongolia) and in the Islamic Republic of Iran the implementation of stations in the mobile service shall be subject to the applications of procedures contained in the GE06 Agreement. In so doing:

*a)* administrations which deploy stations in the mobile service for which coordination was not required, or without having obtained the prior consent of those administrations that may be affected, shall not cause unacceptable interference to, nor claim protection from, stations of the broadcasting service of administrations operating in conformity with the GE06 Agreement. This should include a signed commitment as required under § 5.2.6 of the GE06 Agreement;

*b)* administrations which deploy stations in the mobile service for which coordination was not required, or without having obtained the prior consent of those administrations that may be affected, shall not object nor prevent the entry into the GE06 plan or recording in the MIFR of additional future broadcasting allotments or assignments of any other administration in the GE06 Plan with reference to those stations;

6 that implementation of IMT shall be subject to the decision of each administration on the transition from analogue to digital television,

invites the Director of the Telecommunication Development Sector

to draw the attention of the Telecommunication Development Sector to this Resolution.

**Reasons:** Consequential updates to Res. 224 (Rev.WRC-12). Studies on the subject issue in bands below 1 GHz have been completed.

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1. http://www.itu.int/en/ITU-D/Statistics/Documents/statistics/2015/ITU\_Key\_2005-2015\_ICT\_data.xls [↑](#footnote-ref-1)
2. http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/
white\_paper\_c11-520862.html [↑](#footnote-ref-2)
3. http://atsc.org/cms/ [↑](#footnote-ref-3)
4. [www.itu.int/go/ITU-R/RWP6A-2013](http://www.itu.int/go/ITU-R/RWP6A-2013) [↑](#footnote-ref-4)
5. See proposed draft new Report on the Importance of Terrestrial Broadcasting in Providing Emergency Information to the Public, Document 6/156-E, Document 6A/301-A, 28 October 2013, at p. 12. [↑](#footnote-ref-5)