WRC-15 and WRC -18 Preparations
World Radio Conferences (WRC)

✓ Updates the Radio Regulations
  • Spectrum Allocation
  • Notification procedures
  • Administrative and operational procedures
✓ Adopts Resolutions
✓ Held every 3-4 years
✓ The last WRC (WRC-12) was held in Geneva during January 23- February 17, 2012
✓ The next WRC (WRC-15) will be held in Geneva during November 2-27, 2015
✓ Conference Preparatory Meetings (CPMs) for World Radio Conferences are constituted and organised in accordance with Resolution ITU-R 2-6
WRC-15 Preparatory Work Organisation

Radiocommunication Assembly + World Radiocommunication Conference

1st CPM Session

Draft CPM Report to WRC

Special Committee (Regulatory/Procedural)

2nd CPM Session

CPM Report to WRC

RA

WRC

Contributions from Membership (ITU MS & ITU-R SM)

Proposals from ITU Member States

ITU Study Groups
SG1 Spectrum Management
SG3 Radiowave Propagation
SG4 Satellite Services
SG5 Terrestrial Services
SG6 Broadcasting Services
SG7 Science Services
Conference Preparatory Meetings (CPMs)

- The first session of the WRC-15 Conference Preparatory Meeting (CPM15-1) was held in Geneva immediately after WRC-12.
- The second (and last) session of the WRC-15 Conference Preparatory Meeting (CPM15-2) was held in Geneva, 23 March - 2 April 2015. The CPM Report to WRC 15 has been prepared and may be accessed at: www.itu.int/md/R12-CPM15.02-R-0001.
- One of the outcomes of CPM15-1 was the establishment of a Joint Task Group among Study Groups 4, 5, 6 and 7 ("JTG 4-5-6-7") and charged with the responsibility of conducting relevant studies in accordance with the Terms of Reference specified in Annex 10 of the Administrative Circular CA/201. In addition ITU-R Working Party 5D ("WP 5D") was tasked with determining “suitable frequency ranges” for International Mobile Telecommunications ("IMT") systems. These two study groups undertook their work during the period February 2012 to July 2014.
WRC -15 Agenda

The Agenda for WRC 15 can be found on the ITU website at:
http://www.itu.int/dms_pub/itu-r/oth/12/01/R12010000014A01PDFE.pdf

In the CPM15-2 Report, the Agenda Items have been presented under the following Chapters:

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Agenda Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 1</td>
<td>Mobile and Amateur issues</td>
<td>Agenda Items 1.1, 1.2, 1.3, 1.4</td>
</tr>
<tr>
<td>Chapter 2</td>
<td>Science issues</td>
<td>Agenda items 1.11, 1.12, 1.13, 1.14, 9.2 (issues 9.2.1, 9.2.2)</td>
</tr>
<tr>
<td>Chapter 3:</td>
<td>Aeronautical, Maritime and Radiolocation issues</td>
<td>Agenda items 1.5, 1.15, 1.16, 1.17, 1.18</td>
</tr>
<tr>
<td>Chapter 4</td>
<td>Satellite services</td>
<td>Agenda items 1.6, 1.7, 1.8, 1.9.1, 1.9.2, 1.10</td>
</tr>
<tr>
<td>Chapter 5</td>
<td>Satellite regulatory issues</td>
<td>Agenda items 7, 9.1 (issues 9.1.1, 9.1.2, 9.1.3, 9.1.5, 9.1.8), 9.3</td>
</tr>
<tr>
<td>Chapter 6</td>
<td>General issues</td>
<td>Agenda items 2, 4, 9.1 (issues 9.1.4, 9.1.6, 9.1.7), 9.2, 10</td>
</tr>
</tbody>
</table>
Agenda Item 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)”
Agenda Item 1.1 (Cont’d 1)

Some of the frequency bands under consideration (the “Candidate Bands”) under Agenda Item 1.1 are in the C-Band, which is a part of the spectrum traditionally allocated to Satellite Services on a Primary Basis.
What is C-band?

<table>
<thead>
<tr>
<th>Band</th>
<th>Frequency Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>L band</td>
<td>1 to 2 GHz</td>
</tr>
<tr>
<td>S band</td>
<td>2 to 4 GHz</td>
</tr>
<tr>
<td>C band</td>
<td>4 to 8 GHz</td>
</tr>
<tr>
<td>X band</td>
<td>8 to 12 GHz</td>
</tr>
<tr>
<td>Kᵤ band</td>
<td>12 to 18 GHz</td>
</tr>
<tr>
<td>K band</td>
<td>18 to 26.5 GHz</td>
</tr>
<tr>
<td>Kₐ band</td>
<td>26.5 to 40 GHz</td>
</tr>
<tr>
<td>Q band</td>
<td>30 to 50 GHz</td>
</tr>
<tr>
<td>U band</td>
<td>40 to 60 GHz</td>
</tr>
<tr>
<td>V band</td>
<td>50 to 75 GHz</td>
</tr>
<tr>
<td>E band</td>
<td>60 to 90 GHz</td>
</tr>
<tr>
<td>W band</td>
<td>75 to 110 GHz</td>
</tr>
<tr>
<td>F band</td>
<td>90 to 140 GHz</td>
</tr>
<tr>
<td>D band</td>
<td>110 to 170 GHz</td>
</tr>
</tbody>
</table>
C-Band Satellite User Groups in Africa

Africa’s C-band Satellite User Groups: Achieving Policy Goals and Economic Objectives

- Maritime Communications
- Aviation Security
- Wireless Extension Services
- Corporate Networks
- Internet Connectivity
- Peace Keeping
- TV contribution
- Disaster Preparedness
- Distance Education
- Telemedicine

C-band satellite applications increase teledensity rates, provide distance education and telemedicine, enable broadband to rural areas, and more
Frequency Bands Proposed for IMT

Frequencies identified for consideration under Agenda Item 1.1 for possible future deployment of IMT:

- Frequency band 470-694/698 MHz
- Frequency band 1 350-1 400 MHz
- Frequency band 1 427-1 452 MHz
- Frequency band 1 452-1 492 MHz
- Frequency band 1 492-1 518 MHz
- Frequency band 1 518-1 525 MHz
- Frequency band 1 695-1 710 MHz
- Frequency band 2 700-2 900 MHz
- Frequency band 3 300-3 400 MHz
- Frequency band 3 400-3 600 MHz
- Frequency band 3 600-3 700 MHz
- Frequency band 3 700-3 800 MHz
- Frequency band 3 800-4 200 MHz
- Frequency band 4 400-4 500 MHz
- Frequency band 4 500-4 800 MHz
- Frequency band 4 800-4 990 MHz
- Frequency band 5 350-5 470 MHz
- Frequency band 5 725-5 850 MHz
- Frequency band 5 925-6 425 MHz

Allocated on a Primary Basis to FSS (Space-to-Earth)
Use of C-band frequencies by IMT

- Under a footnote arrangement, a number of countries identified the band 3,400-3,600 MHz for terrestrial IMT at WRC-07. Since that time, several administrations have licensed parts of this band for IMT systems and some terrestrial systems based on WiMAX technology. What is true though is that in some European administrations these IMT licences were returned and in the case of WiMAX use, there has not been significant commercial success.

- This lack of success is attributable to a number of factors including: the propagation conditions for terrestrial mobile applications are not optimum, given that the range of a macro-cell base station in this band is about 2.5 km and is probably lower in an urban environment; second, the wall and glass penetration losses at C-band are relatively high when compared to the lower frequency bands; and third, there is limited availability at present of consumer equipment for terrestrial mobile broadband systems in C-band.
Sharing Concerns - FSS downlink bands

• Due to the limited power available on a satellite, ground terminals are designed to receive very low-power signals transmitted by a satellite located thousands of kilometers away and as a consequence, receiving hardware is usually very sensitive to any external interference.

• Although historically, the C-band Fixed Satellite Service (FSS) frequencies have also been used for terrestrial radio-relay systems, sharing with such systems has been possible due to the limited number of radio-relay stations required in most cases. In addition, due to the fact that radio-relay systems are usually authorised on a station-by-station basis, coordination can be easily done.
On the other hand, given that IMT terrestrial networks normally make use of an extensive distribution of base stations within a given geographic area, transmitting high power simultaneously in every horizontal direction, sharing frequencies with FSS stations becomes much harder. And therefore planning for an adequate frequency and geographical separation between IMT systems and FSS earth stations is a major challenge considering that studies have shown that distance separations of at least tens of kilometres, and in some specific cases more than 100 km, between a transmitting IMT station and a receiving FSS station would be required in order to avoid harmful interference to the FSS earth station.
Furthermore, the requirement to protect ubiquitously deployed FSS earth stations by maintaining large separation distances would lead to large holes in any potential coverage by terrestrial IMT networks and in the same vein, implementation of IMT stations would preclude the use of C-band receiving stations within a relatively large area around each IMT station, thus restricting further development/expansion of C-band satellite services.

The foregoing issues are largely supported by the outcomes of the studies carried out by JTG: 4-5-6-7.
Concluding Statements of CPM15-2 on Agenda Item 1.1

The conclusions as summarized in the above report on the sharing and compatibility studies for the band 3400-4200 MHz highlight the following aspects that are reflected below verbatim:

- The sharing between IMT-Advanced and the FSS is feasible only when FSS earth stations are at known, specific locations, and deployment of IMT-Advanced is limited to the areas outside of the minimum required separation distances for each azimuth to protect these specific FSS earth stations. In this case, the FSS protection criteria should be used to determine the necessary separation distances to ensure protection of the existing and planned FSS earth stations.

- When FSS earth stations are deployed in a typical ubiquitous manner or with no individual licensing, sharing between IMT-Advanced and the FSS is not feasible in the same geographical area since no minimum separation distance can be guaranteed.

- Deployment of IMT-Advanced would constrain future FSS earth stations from being deployed in the same area in the bands 3 400-4 200 MHz as shown by the studies.
Concluding Statements of CPM15-2 on Agenda Item 1.1 (Cont’d 1)

- Some administrations are of the view that, considering the extent of the FSS deployment worldwide in the band 3 600-4 200 MHz, there is no potential for harmonization of the band 3600-4 200 MHz, either regionally or globally, for IMT or other mobile broadband.

- Some administrations are of the view that there is potential for harmonization in portions or the whole of the band 3 600-4 200 MHz, either regionally or globally, for IMT or other mobile broadband. Some administrations are of the view that WRC-07 under agenda item 1.4, after extensive and lengthy discussions and hard work, reached a consensus on the band 3400-3600 MHz which is currently included in the RR together with the conditions thereto. These administrations are of the strong view that there should be no change to those agreements reached and thus 3 400-3 600 MHz is outside WRC-15 agenda item 1.1 except for Region 2.

- Some administrations are of the view that WRC-15 agenda item 1.1 also includes the consideration of the frequency band 3 400-3 600 MHz, including worldwide allocation.
It is worth mentioning that RR Appendix 30B contains worldwide Plans in the 4/6 GHz and 10-11/13 GHz frequency bands. The Plans and their associated procedures are a worldwide treaty. This Appendix and its 4/6 GHz Plan are envisaged and used as a supporting backbone to the telecommunication infrastructure of many developing countries, in particular those which are located in high rain fall zones/areas of the globe.

WRC-07 revised the regulatory procedure of the above-mentioned Appendix using the approach currently applied in RR Appendices 30 and 30A. As a consequence of that, the application of the procedure became much more rapid by administrations and the Bureau. Member States are therefore applying the procedure of Articles 6 and 7 of that Appendix more frequently than they applied before WRC-07.
Questions for the Conclusion on Agenda

Item 1.1

Is it justifiable to allocate C-Band frequencies to terrestrial Operations?

Is it Technically feasible to share C-Band between Satellite and Mobile Services?

This question will be answered and conclusions made at the WRC-15.
WRC-18 preliminary Agenda
Resolution 808 (WRC-12)

Following issues in addition to standing agenda items on 1bR of ITU-R Rec., review of WRC Res. & Rec., Country footnotes, Res.86, BR Dir.’s Report:

- Regulatory actions, including spectrum allocations, to support GMDSS modernization and implementation of e-navigation

- Appropriate regulatory procedures for notifying satellite networks needed to facilitate the deployment and operation of nano-satellites and pico-satellites
Thank You!

Questions/Feedback?