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| **World Radiocommunication Conference (WRC-19) Sharm el-Sheikh, Egypt, 28 October – 22 November 2019** |  |
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| PLENARY MEETING | **Document 94-E** |
|  | **9 October 2019** |
|  | **Original: English** |
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| Angola (Republic of)/Botswana (Republic of)/Burundi (Republic of)/Comoros (Union of the)/Eswatini (Kingdom of)/Kenya (Republic of)/Lesotho (Kingdom of)/Madagascar (Republic of)/Malawi/Mauritius (Republic of)/Mozambique (Republic of)/Namibia (Republic of)/Uganda (Republic of)/Democratic Republic of the Congo/Rwanda (Republic of)/Seychelles (Republic of)/South Sudan (Republic of)/South Africa (Republic of)/Tanzania (United Republic of)/Zambia (Republic of)/Zimbabwe (Republic of) | |
| Proposals for the work of the conference | |
| Studies on frequency-related matters for identification of International Mobile Telecommunications in the frequency band of 3 600-3 800 MHz | |
| Agenda item 10 | |

10 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, in accordance with Article 7 of the Convention.

Introduction

This document contains proposals for a) a new WRC-19 Resolution to study coexistence of IMT and FSS in 3 600-3 800 MHz, and b) a WRC-23 agenda item for a potential IMT identification in that frequency range in Region 1.

Background

The frequency band 3 600-4 200 MHz is currently allocated in the Radio Regulations to a variety of services, as shown in tables below.

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| **Allocation to services** | | |
| **Region 1** | **Region 2** | **Region 3** |
| **3 600-4 200**  FIXED  FIXED-SATELLITE (space-to-Earth)  Mobile | **3 600-3 700**  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile 5.434  Radiolocation 5.433 | **3 600-3 700**  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile  Radiolocation  5.435 |
| **3 700-4 200**  FIXED  FIXED-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile | |

In summary, in Region 1 the 3 600-3 800 MHz range is allocated on a primary basis to the fixed and fixed satellite (space-to-Earth) services, and on a secondary basis to the mobile service.

ITU-R has been developing the technical specifications for IMT-2020 since 2015, and 3GPP has specified 5G NR Band 77 (3 300-4 200 MHz) and NR Band 78 (3 300-3 800 MHz) in its Release 15.

In terms of national allocation and assignment, several countries and regions have already taken the steps for use of spectrum in the 3 300-4 200 MHz range for 5G mobile systems:

• In Europe, the Conference for European Postal and Telecommunications Administrations (CEPT) has harmonized the 3 400-3 800 MHz range for mobile communications. The European Commission has released in January 2019 a binding decision requiring member states to make the 3 400-3 800 MHz band available for terrestrial services including 5G. Several countries have released parts or the whole of 3 400-3 800 MHz in 2018/2019 and deployments have already started.

• The Arab Spectrum Management Group agreed in December 2018 on the harmonized use of mobile broadband in the Arab region in 3 300-3 800 MHz. All countries support 3 400-3 800 MHz.

• In the United States of America, the 3 550-3 700 MHz has been allocated for mobile use through a spectrum sharing mechanism. In addition, Federal Communications Commission is consulting on opening the 3 700-4 200 MHz band, currently reserved for FSS, for 5G.

• In Asia, Korea (Rep. of) auctioned the 3 420-3 700 MHz block in 2018, networks have now been deployed and 5G services are commercialized. Japan has already released 3 400-3 600 MHz for 4G, and plans to release 3 600-4 100 MHz and 4 500-4 800 MHz for 5G in 2019.

The 3 300-4 200 MHz is therefore the key band globally for deployment of IMT-2020, with the 3 400-3 800 MHz range being adopted by Europe and the Arab States in Region 1. In Africa only the 3 400-3 600 MHz block is allocated to mobile as a primary service and identified for IMT. 3 300-3 400 MHz is also identified by footnotes in many African countries, but this is under the condition of no interference to, and no protection from, radiolocation systems (No. **5.429B**).

Spectrum needs for IMT in the 3 300-3 800 MHz in Africa

There is agreement among regulators, operators and vendors that a contiguous block of at least 80 or 100 MHz per operator is recommended in the 3 300-4 200 MHz range in order to support IMT-2020 use cases and to derive maximum benefits from the IMT-2020 technologies.

However, this objective may be not achievable in many African countries due to the limited amount of spectrum identified for IMT, and the fact that in some cases the spectrum remains encumbered with legacy services. Extending IMT use outside of the identified bands is not feasible today in Africa. Unlike other regions and countries, African countries rely strongly on ITU harmonisation through the ITU Radio Regulations, applicable Reports and Recommendations. As a result, African countries would not adopt an approach to re-allocate a band to a service unless it has been incorporated into the ITU Radio Regulations.

It must be recognised that many African countries continue to rely on satellite connectivity in C‑band (3 600-4 200 MHz) to cover areas that terrestrial networks cannot cover affordably. Therefore, individual countries may have varying views on which of these services (FSS or IMT) provide higher benefits to their citizens, and hence on how much spectrum in the band should be dedicated to each. Furthermore, countries may consider that the most efficient use of the band is one where one service is deployed in certain geographical areas (for instance, IMT in urban areas) whereas the other is maintained in other areas (satellite services in rural areas).

In conclusion, it is necessary to upgrade the Mobile allocation in 3 600-3 800 MHz in Region 1 to primary, and to add an identification for IMT in the band. These are preconditions for African countries to be able to extend the IMT above 3 600 MHz. It is also necessary that coexistence studies are carried out for the IMT-FSS scenario, using up-to-date specifications of IMT-2020 and of the propagation models. These studies need to consider the conditions for coexistence in adjacent channels, in particular when the frequency boundary between the allocations could be decided at national level. The studies need also to consider co-channel coexistence and take account of the latest regulatory developments on this area.

Proposal for WRC-19

• To agree to a new WRC Resolution to request ITU-R to study coexistence of IMT-2020 systems with fixed satellite systems operating in the same channel and in an adjacent channel in 3 600-3 800 MHz frequency range.

• To add to the agenda of WRC-23 an item to consider in 3 600-3 800 MHz in Region 1:

a) upgrade of the Mobile allocation to primary,

b) IMT identification,

taking consideration of the studies conducted by ITU-R.

Attachments

Attachment 1: Draft new Resolution [IMT-3600-R1] (WRC 19) on studies for possible identification of 3 600-3 800 MHz for IMT in Region 1

Attachment 2: Proposal for an additional agenda item in WRC-23 to consider identification of 3 600-3 800 MHz for IMT

ATTACHMENT 1

ADD AGL/BOT/BDI/COM/SWZ/KEN/LSO/MDG/MWI/MAU/MOZ/NMB/UGA/COD/RRW/SEY/SSD/AFS/TZA/ZMB/ZWE/94/1

Draft New Resolution [AGL/BOT/BDI/COM/SWZ/KEN/LSO/MDG/MWI/MAU/MOZ/NMB/UGA/COD/RRW/SEY/SSD/AFS/TZA/ZMB/ZWE/94/1-IMT-3600-R1] (WRC‑19)

Studies for possible identification of 3 600-3 800 MHz for IMT in Region 1

The World Radiocommunication Conference (Sharm el-Sheikh, 2019),

considering

*a)* that in Region 1, the 3 600-3 800 MHz range is allocated on a primary basis to the fixed, fixed satellite (space-to-Earth) services, and on a secondary basis to the mobile service;

*b)* that portions of the 3 300-4 200 MHz range have been allocated to IMT-2020 services in many countries, and as a result the 3 300-4 200 MHz range has become the key spectrum for the deployment of IMT-2020 globally;

*c)* that as a result of the global adoption of the band for IMT-2020, equipment is becoming readily available supporting the 3 400-3 800 MHz range;

*d)* that a contiguous block of at least 80 or 100 MHz per operator is recommended to fully benefit from the IMT-2020 technology, and to be able to provide the throughput and capacity expected from IMT-2020 networks in this band;

*e)* that many African countries would not be able to fulfil that bandwidth recommendation within their existing IMT identification;

*f)* that it is desirable that African countries that want to extend their current IMT allocation above 3 600 MHz are able to do so, and that this is in compliance with the Radio Regulations;

*g)* that the existing studies on coexistence of IMT and fixed satellite services date from before 2015;

*h)* that ITU-R has since 2015 specified IMT-2020 which introduces significant changes to the air interface notably Advanced Antenna Systems, and agreed Recommendation ITU-R M.2101 on the modelling and simulation of IMT networks and systems for use in sharing and compatibility studies and Recommendation ITU-R P.2108 on clutter loss;

*i)* that the new features of IMT-2020 and the new Recommendations changes can have a significant impact on the modelling of the studies,

noting

*a)* that Report ITU-R M.2109 addresses the sharing studies between IMT-Advanced systems and geostationary satellite networks in the fixed-satellite service in the 3 400-4 200 MHz and 4 500-4 800 MHz frequency bands;

*b)* that Report ITU-R S.2368 also addresses the sharing studies between IMT-Advanced systems and geostationary satellite networks in the fixed-satellite service in the 3 400-4 200 MHz and 4 500-4 800 MHz frequency bands,

recognizing

*a)* that many African countries continue to rely on satellite connectivity in C-band (3 600-4 200 MHz) to cover areas that terrestrial networks cannot cover affordably;

*b)* that authorised use of IMT in 3 600-3 800 MHz should not result in interference to fixed satellite services being provided in the frequencies above the IMT allocation, or being provided in geographical areas where IMT is not deployed, or in neighbouring countries;

*c)* that individual countries may have different views on how much spectrum in 3 600-3 800 MHz they may want to allocate to mobile services;

*d)* that a primary allocation to mobile and an identification for IMT in the Radio Regulations does not mean the termination of the existing primary services, and that this remains a decision for the national administration,

resolves to invite ITU‑R

1 to carry out studies toward the development of regulatory measures and associated conditions that would provide for the coexistence of IMT-2020 and fixed satellite service in 3 600-3 800 MHz, operating in adjacent channels or operating in different geographical areas in the same channel;

2 to develop a recommendation on how a country that wants to deploy IMT, and a neighbour country that has FSS use, can put in place a bilateral agreement to ensure that FSS does not suffer interference;

3 to complete studies in time for WRC‑23,

resolves to invite WRC‑23

to review the results of these studies and consider upgrading the secondary allocation to the mobile service to a primary allocation in 3 600-3 800 MHz in Region 1, and an identification of the band for IMT in the same Region,

invites administrations

to participate actively in the studies by submitting contributions to ITU‑R.

ATTACHMENT 2

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| ***Subject:***  Proposal for an agenda item for WRC‑23 to consider identification of 3 600-3 800 MHz for IMT | |
| ***Origin:***  **ATU** | |
| ***Proposal*:**  To modify the agenda for WRC-23 by adding a new item:  1.[x] to consider a primary allocation to the mobile service in the frequency band 3 600-3 800 MHz in Region 1, and an identification of the band for IMT in the same Region, in accordance with the results of the studies carried out under Resolution **[IMT-3600-R1]** | |
| ***Background/reason*:**  There is agreement among regulators, operators and vendors that a contiguous block of at least 80 or 100 MHz per operator is recommended in the 3 300-4 200 MHz range in order to support IMT-2020 use cases and to derive maximum benefits from the IMT-2020 technologies.  However, this objective may be not achievable in many African countries due to the limited amount of spectrum identified for IMT, and the fact that in some cases the spectrum remains encumbered with legacy services. Furthermore, extending IMT use outside of the identified bands is not feasible today. This is because in the spirit of harmonization, African countries rely strongly on the ITU Radio Regulations, applicable Reports and Recommendations and would therefore not adopt an approach to re-allocate a band to a service unless it has been incorporated into the ITU Radio Regulations.  Therefore, IMT identification is necessary in 3 600-3 800 MHz for African countries to be able to introduce IMT services in the band. This identification does not mean the termination of the existing primary services. This remains a decision for the national administrations.  It is also necessary that coexistence studies are carried out, using up-to-date specifications of IMT-2020 and of the propagation models. These studies need to consider the conditions for coexistence in adjacent channels, in particular when the frequency boundary between the allocations could be decided at national level. The studies need also to consider co-channel coexistence and take account of the latest regulatory developments on this area. | |
| ***Radiocommunication services concerned*:**  ***FSS*** | |
| ***Indication of possible difficulties*:**  The proposed band is used for fixed satellite services. The coexistence of IMT with these services needs to be considered | |
| ***Previous/ongoing studies on the issue*:**  ITU-R Reports M.2109 and S.2368 address the sharing studies between IMT Advanced systems and geostationary satellite networks in the fixed-satellite service in the 3 400-4 200 and 4 500 and 4 800 MHz frequency bands | |
| ***Studies to be carried out by*:**  SG 5 WP 5D | ***with the participation of*:**  Administrations and Sector members of the ITU-R |
| ***ITU‑R Study Groups concerned*:**  SG 5, SG 4 and other groups | |
| ***ITU resource implications, including financial implications (refer to CV126)*:**  If a dedicated task group is needed to carry out research it will require a related budget | |
| ***Common regional proposal*:** Yes | ***Multi-country proposal*:** No  ***Number of countries*:** |
| ***Remarks*** | |

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