Communications for all in East Africa

EACO 3rd WRC-23 Online Preparatory Meeting

28th February 2022

Working Group 1A

PRELIMINARY VIEWS ON WRC-23 AGENDA ITEMS

(1.1, 1.2, 1.4**)**

1.0 Agenda Item 1.1

to consider, based on the results of the ITU-R studies, possible measures to address, in the

frequency band 4 800-4 990 MHz, protection of stations of the aeronautical and maritime mobile services located in international airspace and waters from other stations located within national territories, and to review the p.f.d. criteria in footnote No. **5.441B** in accordance with Resolution **223 (Rev.WRC-19).**

1.1. Background

This AI considers the frequencies 4 800-4 990 MHz which was discussed in detail at WRC-19. At WRC-19, 26 African countries signed into the footnote **5.441B**, with South Africa and Zimbabwe being among 11 countries which have been exempted from application of pfd limit under Resolution 223 (WRC-19).

The band 4 800-4 990 provides a good option for additional mobile spectrum for IMT. It is also likely to have a significant ecosystem, based on new assignments in China, Japan and the ongoing study for WRC-23.

1.2.Current Status of Band

According to the RR, the frequency band 4800-4990 MHz is allocated on a primary basis to the fixed and mobile services.

Region 1	Region 2	Region 3
4800-4990	FIXED MOBILE 5.440A 5.441A 5.441B 5.442 Radio astronomy 5.149 5.339 5.443	

The frequency range 4400-4990 MHz is allocated on a primary basis in all three ITU regions to the mobile service. There are currently no ITU-R Recommendations for MMS systems in the 4800-4990 MHz frequency band.

This Agenda Item is the joint responsibility of WPs 5B and 5D. Mr. Baxton Sirewu (ZWE) chairs the WP5D SWG AI 1.1. The SWG has developed the following two documents.

Link	Title
1	Working document towards a preliminary draft new Report ITU-R M. [CONDITIONS 1.1] - Working Document related to WRC-23 agenda item 1.1 - Technical and regulatory conditions for the protection of stations of the Aeronautical Mobile Service (AMS) and Maritime Mobile Service (MMS) located in international airspace or waters (i. e. outside national territories) and operating in the frequency band 4 800-4 990 MHz.
2	Working document towards A draft CPM Text on WRC-23 agenda item 1.1

WP5D updated the working document on technical and regulatory conditions for the protection of stations of the Aeronautical Mobile Service (AMS) and Maritime Mobile Service (MMS) located in international airspace or waters (i.e. outside national territories) and operating in the frequency band 4 800-4 990 MHz.

WP 5D also updated Working document towards A draft CPM Text on WRC-23 agenda item 1.1. A reply liaison statement to WP 5B was drafted and submitted.

It was noted that the discussions on the operational parameters of AMS and MMS systems respectively were still ongoing in WP 5B.

1.3.Situation at WRC-15

WRC-15 established RR No. **5.441B** which provided IMT identification for three Region 3 countries in the 4800-4990 MHz frequency band, already allocated to the MS on a primary basis, and introduced *inter alia* additional criterion consisting of a limit on the pfd produced by IMT station up to 19 km above sea level at 20 km from the coast in order to protect AMS. This criterion was subject to review at WRC-19.

Due to diverging views with regards to the relevance of pfd criterion to protect AMS, its value, conditions and frequency band for its application, noting that preparatory work was not finalized, WRC-15 invited ITU-R to study the technical and regulatory conditions for the use of IMT in this band in order to protect AMS and review pfd criterion in RR No. **5.441B** at WRC-19.

1.4. Situation at WRC-19

As invited by WRC-15, in accordance with Resolution **223 (Rev.WRC-15)** ITU-R carried out but did not finalize studies mentioned above. The report on the above mentioned ITU-R studies was submitted to WRC-19 for its consideration and necessary action, as appropriate.

WRC-19 updated footnote RR No. **5.441B** and Resolution **223 (Rev.WRC-19)** and as a result additional countries were included in the IMT identification in footnote RR No. **5.441B** (now footnote includes 40 countries) and for 11 of these countries the pfd criterion in footnote RR No. **5.441B** was deactivated. However, due to diverging views on whether or not to apply a pfd criterion, WRC-23 was invited, in accordance with Resolution **223 (Rev.WRC-19)**, to consider possible measures to address protection of stations of the aeronautical and maritime mobile services located in international airspace and waters from other stations located within national territories, and to review the pfd criterion in RR **5.441B**.

WRC-19 therefore adopted agenda item 1.1 referred to above.

1.2. Protection of stations in AMS in the international airspace

There is common understanding that no country has jurisdiction over the use of spectrum in international airspace/waters.

According to the provision in RR No. 8.1, "The international rights and obligations of administrations in respect of their own and other administrations' frequency assignments shall be derived from the recording of those assignments in the Master International Frequency Register (the Master Register) or from their conformity, where appropriate, with a plan. Such rights shall be conditioned by the provisions of these Regulations and those of any relevant frequency allotment or assignment plan."

However, there is no specific notification and registration procedure in international airspace and waters for frequency assignments of AMS and MMS stations in this band pursuant to RR No. 11.14. Such situation does not provide possibility to obtain international rights recognition in respect to frequency assignments of AMS stations in international airspace and waters and to claim protection against subsequent assignments from another country taking into account Article RR 8.1, taking also into account that there is no frequency allotment or assignment Plan for the AMS nor MMS services, in particular, in the frequency band 4800-4990 MHz. Therefore, protection of AMS/MMS stations in international airspace/waters on the basis of registration of frequency assignments is not feasible. At the same time it should be noted that AMS/MMS frequency assignments for stations on the land can cover a service area which overlaps with international space/ waters. For this case, application of 9.21 would enable the protection of AMS/MMS stations in the international airspace covered by the service area.

1.3. Preliminary Position

- There is a common understanding that no country has jurisdiction or exclusive spectrum rights over the use of spectrum in international airspace/waters.
- There is no specific notification and registration procedure in international airspace and waters for frequency assignments of AMS and MMS stations in this band for administrations to obtain spectrum rights obligation to claim protection.
- AMS and MMS applications do not have priority over other applications of terrestrial services used in international airspace and waters or within national territories of countries.

- There is no frequency allotment or assignment Plan for the AMS nor MMS services, in particular, in the frequency band 4800-4990 MHz.
- The pfd limit imposes unjustified restrictions on the use of this frequency band by radio services within national territories.

The 4 800-4 990 MHz band provides opportunities to EACO members to increase mid-band 5G spectrum for city-wide and suburban coverage including FWA services. Therefore, support removal of the restrictive conditions in footnote 5.441B to facilitate IMT deployment.

EACO members are encouraged to submit contribution, participate and follow the ITU-R studies closely in order to satisfy the agenda item.

2.0. Agenda Item 1.2 (IMT mid-band)

to consider identification of the frequency bands 3 300-3 400 MHz, 3 600-3 800 MHz,

6 425-7 025 MHz, 7 025-7 125 MHz and 10.0-10.5 GHz for International Mobile

Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis, in accordance with Resolution **245 (WRC-19)**;

2.1.Background

With demand for IMT applications continuing to increase, additional IMT spectrum identifications in the mid-range frequency bands need to be considered in order to enable future deployments, where these applications and services might be difficult to implement using lower or higher frequency bands. Agenda item 1.2 can help give ITU Member States greater flexibility in their adoption of suitable frequency bands for IMT implementation subject to sharing and compatibility studies.

The following bands are being considered under AI 1.2:

- 3 300-3 400 MHz and 3 600-3 800 MHz (Region 2);
- 3 300-3 400 MHz (amend footnote 5.429B in **Region 1**);
- 7 025-7 125 MHz (**Globally**);
- 6 425-7 025 MHz (**Region 1**);
- 10 000-10 500 MHz (Region 2),

Frequency range 3.3-3.4 GHz

In Region 1, the band 3.3-3.4 GHz is already allocated to mobile and identified for IMT by many countries via footnotes 5.429 A and B. This band forms part of the 3.5 GHz range which is in use for 5G services.

The frequency band 3 300-3 400 MHz is allocated, in all three Regions, to the Radiolocation Service on a primary basis. ITU-R has conducted studies on the coexistence between RLS and IMT system in the 3 GHz frequency range, namely, Report ITU-R M.2481 In-band and adjacent band coexistence and compatibility studies between IMT systems in 3 300-3 400 MHz and radiolocation systems in 3 100-3 400 MHz.

Frequency range 6 425-7 125 MHz

The frequency range 6 425-7 125 MHz is allocated to the FS, FSS, MS, SOS.

Fixed Services

The band 6425-7125 MHz is allocated to fixed service on primary basis and used for long haul, high capacity and long-distance fixed links supporting variety of applications such as mobile networks backhaul.

Satellite Services.

The frequency band **6 425-6 725 MHz** is allocated to the FSS (Earth-to-space) in all Regions and is not subject to a Plan. The frequency band **6 725-7 025 MHz** is allocated to the FSS (Earth-to-space) in all Regions and the use of the band is subject to the provisions of Appendix **30B** (RR **5.441**). The band is used for the uplinks by GSO FSS networks. The main

objective of the FSS Plan of AP**30B** is to guarantee in practice, for all countries, equitable access to the geostationary-satellite orbit in the frequency bands covered by this Plan.

There is a limited number of Earth stations deployed in Region 1 which operate with existing GSO FSS satellite systems, including feeder links for GSO MSS systems, in the bands 6 425-6 725 MHz (Earth-space) and 6 725-7 025 MHz (Earth-space). New earth stations operating with GSO FSS satellites may be deployed in the future.

The frequency band **6 700-7 075 MHz** is allocated to the FSS (space-to-Earth) in all Regions limited to feeder links for NGSO MSS systems. The use of this band by feeder links for NGSO MSS is subject to coordination under RR No. **9.11A** and is not subject to No. **22.2** as per footnote **5.458B**. There is a limited number of earth stations (space-to-Earth) in the bands 6 725-7 025 MHz, 7 025-7 075 MHz, operating with LEO and MEO satellites and new earth stations operating with LEO, MEO and HEO satellites may be deployed in the future.

The C-band for satellite communications 3700 - 4200 MHz has been paired with 5925 – 6425 MHz (2x500 MHz). The frequency band 3400 – 3700 MHz paired with 6425 – 6725 MHz (2x300 MHz) as the new allocation for the Fixed Satellite Service. The frequency band 4500 – 4800 MHz downlink is paired with 6725 – 7025 MHz uplink

2.2.Current Status of the Studies

WP5D established three Drafting Groups as listed below:

DG	Chairperson
DG 3GHz	Ms. Dong Zhao (Samsung)
DG 6GHz	Mr. El Hadjar ABDOURAMANE (CME)
DG 10 GHz	Dr. Golnar KHOMAMI (AUS)

The Working Document towards Draft CPM Text on AI 1.2 was further reviewed. Contributions are invited, in particular, to review the Methods proposed as well as the regulatory solutions.

The working documents on sharing and compatibility studies were further reviewed and updated the working document towards draft CPM text.

WP 5D developed a table to allow for the comparison of sharing studies using different assumptions.
There are still a number of discussions on parameters ongoing and four questions were asked on Sharing studies and will be further discussed at the upcoming April meeting:

- Application of Rb when satellite footprint includes significant unpopulated landmass-areas
- Clutter loss
- Rb when satellite has small footprint
- AAS adjacent studies

A liaison statement was sent to WP4A for further clarification. The work plan for WRC-23 AI 1.2 was also updated.

2.3.Preliminary Views

2.3.1. Frequency range 3 300-3 400 MHz

Support removal or relaxation of stringent conditions through amendment of footnote 5.429B.

2.3.2. Frequency range 6 425 - 7 125 MHz

- Support ITU-R compatibility studies and participate and follow the ITU-R studies closely to satisfy the agenda item.

2.3.3. Recommendation

EACO members are encouraged to participate and follow the ITU-R studies closely to satisfy the agenda item. In addition, there is need for EACO to undertake study to determine the extent of usage of the spectrum in the 6 425 - 7 125 MHz and thereafter conduct a technical study.

3.0 Agenda Item 1.4 (HIBS)

to consider, in accordance with Resolution **247 (WRC-19)**, the use of high-altitude platform stations as IMT base stations (HIBS) in the mobile service in certain frequency bands below 2.7 GHz already identified for IMT, on a global or regional level;

3.1.Background

The high-altitude platform stations as IMT base stations (HIBS) are located in the stratosphere, providing both uplink and downlink mobile connectivity to the ground-based user equipment (UE). HIBS are intended to be used as part of terrestrial International Mobile Telecommunications (IMT) networks, as an application of the mobile service, and may use the same frequency bands with ground-based IMT base stations. The UE to be served by the HIBS are proposed to be the same as the ground-based IMT base stations. Currently, the UE support a variety of frequency bands identified for IMT, including bands below 2.7 GHz.

WRC-2000 identified through RR No. **5.388A** the bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz in Regions 1 and 3, and the bands 1 885-1 980 MHz and 2 110-2 160 MHz in Region 2 that may be used by high-altitude platform stations as base stations to provide IMT, in accordance with Resolution **221 (Rev.WRC-07)**. Furthermore, Resolution **221 (Rev.WRC-07)** provides the technical conditions that need to be met by these high-altitude platform stations to ensure that emissions to neighbouring countries do not cause co-channel harmful interference to the other services and applications allocated in these bands, including terrestrial IMT-2000 stations.

3.2. Issues

The work under WRC-23 agenda item 1.4 includes studying sharing and compatibility in the frequency bands 694-960 MHz, 1 710-1 885 MHz and 2 500-2 690 MHz, as well as appropriate modifications to the existing RR No. **5.388A** and associated Resolution **221 (Rev.WRC-07)**. These studies are intended to allow the use of such frequency bands by HIBS. This would allow HIBS to provide mobile-broadband connectivity to underserved communities, and in rural and remote areas, while ensuring the protection of existing primary services in the same and adjacent bands.

3.3. Current status

The ITU-R is conducting co-channel sharing analysis involving IMT-Advanced systems using HIBS.

WP5D updated the working document towards a PDN Report ITU-R M.[HIBS-CHARACTERISTICS], which addresses the spectrum needs, usage and deployment scenarios, and technical and operational characteristics for the use HIBS.

HIBS characteristics and parameters for studies under WRC-23 agenda item 1.4 were finalized by the deadline of 23 July 2021, as requested by CPM23-1, and no changes will be made to these characteristics.

The working document on the draft CPM text for WRC-23 agenda item 1.4 was also updated based on the input contributions and discussions.
The working document towards sharing and compatibility studies of HIBS under WRC-23 agenda item 1.4 was updated, which contains a framework for the studies, and four annexes

divided into the different frequency ranges under study. Several studies have been provided regarding the sharing and compatibility of HIBS with the existing services in different bands. As part of the discussions regarding the sharing and compatibility studies, it was suggested that a summary table be provided to facilitate the comparison among the different studies. The table provides an overview of the assumptions and methodology used in each study.

3.4. Preliminary Views

Support ITU-R technical studies on HIBS and protection of co-primary and primary services in adjacent bands without imposing any undue technical or regulatory constraints on these services.

3.5. Recommendations

EACO administrations are encouraged to participate actively in the ITU-R studies to satisfy the agenda item.