**EACO 1st meeting in preparation of WRC-23 ( Agenda Items that Rwanda coordinate)**

WRC-23 Agenda Item 1.3: “Primary allocation of the band 3600-3800MHz to the mobile service in Region 1 in accordance with Resolution 246 (WRc-19)”.

1. **Introduction.**

In Radio Regulation, the frequency band 3 600-3 800 MHz is allocated to the fixed and fixed-satellite services on a primary basis in all three Regions and is also allocated to the mobile, except aeronautical mobile, service on a secondary basis within Region 1

to consider primary allocation of the band 3 600-3 800 MHz to mobile service within Region 1 and take appropriate regulatory actions, in accordance with Resolution 246 (WRC-19);

Resolution 246 (WRC-19) Studies to consider possible allocation of the frequency band 3 600-3 800 MHz to the mobile, except aeronautical mobile, service on a primary basis within Region 1.

1. **China’ experience**

The band 3.4-4.2GHz was assigned to FSS.

The band 3.4-3.6GHz was assigned to IMT, and the trials were conducted in December 2018

1. **Release plan for the band 3.4-3.6GHz**

* The band 3 300-3 600 MHz is planned for IMT-2020, where the band 3 300-3 400 MHz is only indoor in principle.
* No more new licenses for space service in the band 3 400 -3 700 MHz and space TT&C frequency in the band 3 400-3 600 MHz.
* No more new licenses for FS frequency in 3 400-4 200 MHz.

1. **Interference in the band**

Interference between the IMT stations in 3.4-3.6GHz band and FSS stations in 3.4-4.2GHz band station was experienced

The main factors for the inter- band and intra-band interferences in this band is the IMT station’s emissions and the FSS station LNA (Low Noise Amplifier/LNB (Low Noise Block down converter)’s overload

Interference from IMT station’s unwanted emissions:

– Due to FSS earth station’s input signal strength is always at very low power level, unwanted emissions generated by IMT base station could cause interference to reception of FSS earth station operating in IMT system’s adjacent band.

LNA/LNB overload:

– FSS Earth station’s LNAs and LNBs are optimized for receiving very low power level of satellite signal and have a very high sensitivity.

– IMT signal’s strength is always at much higher power level, it can severely affect the LNA/LNB and drive it out of its dynamic range to where it works at a non‑linear behaviour.

Based on the theoretical analysis the interference coordination areas are determined based on the station separation in distance. As indicated in doc 192; china’s contribution

1. **Interference mitigation technique**

In the Annex 1 of the Administrative Measures some interference mitigation techniques are recommended to be applied for the coordination between IMT stations and FSS earth stations:

* Improve the receive technique characteristics of LNA/LNB, such as adding an additional filter.
* Install shielding net around the earth station.
* Avoid installingIMT-2020(5G) base stations in the main lobe of earth station antenna.
* Adjust the maximum radiation direction.
* Reduce the IMT-2020(5G) maximum output power.
* Use building separation.

1. **Technical requirements**

Improving the radio performance of FSS earth stations and IMT base stations is proved to be one of the most effective way to avoid interference

* The LNA/LNB in the band 3 700-4 200 MHz band should work in its dynamic range when the input power in the band 3 300-3 600 MHz is −20 dBm.

This requirement could be realized by adding an additional filter between LNA/LNB and feeder.

* The limits of unwanted emission power from IMT-2020(5G) base station in the band 3 400-3 600 MHz is −26 dBm/MHz in the frequency range of3 650-3 700 MHz.
* The limits of unwanted emission power from IMT-2020(5G) base station in the band 3 400-3 600 MHz is −47 dBm/MHz in the frequency range of 3 700-4 200 MHz.

1. **Deployment of IMT services in 3.4-3.6GHz**

China’s experience proved that the method of adding an additional filter between the LNA/LNB and feeder is an effective way to avoid LNA/LNB overdrive occurred and to protect the FSS earth station to avoid harmful interference from IMT emission, and to ensure the operation of services.

1. **Work plan for Working Party 5A on Agenda item 1.3**

| **Working Party 5A meetings** | **Activity** |
| --- | --- |
| 23rd meeting  July 2020 | • Develop initial work plan;  • Develop liaison statement to contributing groups;  • Create placeholder for draft CPM text. |
| 24th meeting  November 2020 | • Consider the Work Plan for this agenda item and suggest necessary changes based on input contributions;  • Prepare the compilation of parameters/criteria received in response to liaison statements and contributions to WP 5A, if any;  • Develop working document on sharing and compatibility studies;  • Develop initial version of draft CPM text based on input contributions;  • Consider need for further liaison statements. |
| 25th meeting  May 2021 | • Further develop working document on sharing and compatibility studies based on input contributions;  • Further develop draft CPM text based on input contribution  • Liaise with those Working Parties contributing to the studies under this agenda item, as and if needed;  • Revise the work plan. |
| 26th meeting  November 2021 | • Further develop working document on sharing and compatibility studies based on input contributions;  • Further develop draft CPM text based on input contributions;  • Liaise with those Working Parties contributing to the studies under this agenda item, to include updates on the working document on sharing and compatibility studies and the draft CPM text, if needed. |
| 27th meeting  May 2022 | • Finalize working document on sharing and compatibility studies;  • Liaise final results of the above-mentioned studies to Working Parties contributing to the studies under this agenda item as appropriate;  • Finalize the work on draft CPM text and submit to Chapter Rapporteur. |

1. **Conclusion.**

No studies have been conducted so far regarding this band, but there some studies that were conducted in the previous cycles that can be re-used in this study circle up to 2013.

We therefore encourage EACO Administrations to participate and actively follow ITU studies on this subject matter.

**Agenda item 1.5:**

***“To review the spectrum, use and spectrum needs of existing services in the frequency band 470-960 MHz in Region 1 and consider possible regulatory actions in the frequency band 470-​694 MHz in Region 1 on the basis of the review in accordance with Resolution******235 (WRC-15)”.***

**Studies on the agenda item 1.5:**

1. **Sharing and compatibility studies between digital terrestrial television broadcasting and terrestrial mobile broadband applications, including IMT, in the frequency band 470-694 MHz in the GE06 planning area.**

The analysis of the studies indicated a range of frequency and geographic separation distances required for sharing between DTTB systems and mobile (IMT) systems.

The results of the studies show that, if one country wants to use the frequency band for broadcasting and the other wants to deploy IMT networks, sharing will be very difficult.

1. **Sharing and compatibility studies between digital terrestrial television broadcasting and terrestrial mobile broadband applications, including IMT, in the frequency band 470-694/698 MHz outside the GE06 planning area.**

Analysis of the studies indicated a range of frequency and geographic separation distances required for sharing between DTTB systems and mobile (IMT) systems.

Some studies on adjacent and multiple adjacent channel scenarios show that under some conditions, compatibility in the frequency band 470-694/698 MHz may be achieved. The co-channel studies show that separation distances between mobile (IMT) base-stations and DTTB receivers/transmitters are several tens of kilometers, which makes sharing difficult.

* Studies of compatibility between terrestrial TV broadcasting and terrestrial mobile networks based on various simulation methods, show that there is the possibility of interference in the co-channel and multiple adjacent channels case.
* At the same time, no field trials for frequency bands sharing between two systems conducted yet.
* This contribution represents the results of field trials of the of wireless broadband access system, similar to the wireless broadband communications in the mobile networks (IMT/LTE).
* Studies have been conducted on Interference from and to mobile service user equipment.

1. **Study on Degradation of reception location probability**

The aim of this study is to assess the co-channel impact of a network of IMT base-stations in one country into DTTB reception in a neighboring country in terms of degradation in location probability at different levels of the DTTB coverage area: at one pixel at the edge and in a ring of pixels at the coverage edge.

The study also assesses the required geographical separation, for co-channel operation, between IMT base-stations (single and multiple) and DTTB reception area for a land path and for different network configurations.

The individual interference contributions must be reduced in order to keep the ‘total’ interference within the protective limits. That is, the trigger value must also be significantly lower than a single-interferer trigger value.

The study revealed that a single IMT base-station needs to be 53 km away from the border in order to be implemented without coordination. If 91 similar stations are implemented in an urban area beyond this distance they will similarly not need to be individually coordinated.

***4:* Work plan for working party 5A on agenda item 1.5.**

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| --- | --- |
| **Title** | Studies under agenda item (AI) 1.5 of WRC-23 |
| **Document type** | Draft CPM text under AI 1.5 |
| **Task** | Implementation of Resolution **235 (WRC-15)** and the decisions of CPM23-1 as contained in Annex 9 to CA/251. |
| **Related documents** | [Resolution](https://www.itu.int/md/R16-WRC19-C-0550/en) **235 (WRC-15)**, [CA/251](https://www.itu.int/md/R00-CA-CIR-0251/en) (Results of CPM23-1) |
| **Objectives** | *NOTE: Number of meetings as stipulated in paragraph 9 of Annex 9 to CA/251 (Results of CPM23-1).*  **Meeting No. 1 (19-23 October 2020)**  1 Consider the received contributions;  2 Develop structure of the TG 6-1 and appoint chairmen for the WGs;  3 Develop workplan for the TG 6-1 studies;  4 Develop structure of draft CPM text on AI 1.5;  5 Develop and send LS to the contributing Groups, if necessary;  6 Establishment of Correspondence/Rapporteur activity on Section 2 of the draft CPM text, on a purely informative basis and if necessary.  **Meeting No. 2 (28 June-7 July 2021)**  1 Consider the received contributions;  2 Develop studies based on the input contributions and comments thereto at the meeting, if available;  3 Initiate the first draft CPM text on Section 2;  4 Initiate the development of the first draft CPM text on Section 3 based on consideration of material provided by the contributing groups (spectrum use, needs and parameters), if available;  5 Initiate the development of possible methods to satisfy the agenda item taking into account Geneva-06 Agreement.  6 Develop and send LS to the contributing groups, if necessary.  7 Establish Correspondence/Rapporteur activities on a purely informative basis and if necessary.  *NOTE: The following objectives are for information at this stage and they will be reviewed and revised accordingly. See introductory note at the beginning of this work plan.*  **Meeting No. 3 ([21 October – 1 November 2021])**  1 Consider the received contributions;  2 Continue consideration and development of studies (focus on sharing and compatibility issues);  3 Consider sharing and compatibility studies with the views to development of draft CMP text with focus on Section 3;  4 Continue developing methods to satisfy the agenda item and developed first draft CPM text and update Sections 4 on Methods to satisfy the agenda item;  5 Initiate the development of Section 5 on possible regulatory and procedural considerations, based on input contributions and comments thereto at the meeting.  6 Develop and send LS to the contributing group, if necessary;  7 Establish Correspondence/ Rapporteur activities on a purely informative basis and if necessary.  **Meeting No. 4 ([April 2022])**  1 Consider the received contributions;  2 Endeavour to finalize studies on sharing and compatibility;  3 Continue development of draft CPM text with focus on Sections 4 and 5;  4 Develop and send LS to the contributing Group, if necessary;  5 Establish Correspondence/Rapporteur activities on a purely informative basis and if necessary.  **Meeting No. 5/6 (as contained in Annex 9 to CA/251)**  *NOTE: The date for the last Meeting of TG 6/1 is expected to be early October 2022. Possible objectives (see below) for the Meetings No. 5 and No. 6 will be discussed and decided upon at the end of the Meeting No. 3.*  To this effect, preliminary / provisional objectives of this / these meeting( s) is summarized below:  1 Consider the received contributions;  2 Update all sections of the preliminary draft CPM text based on input contributions;  3 Finalize draft CPM text to be submitted to the CPM23-2;  4 Finalize studies, if necessary. |

1. **Recommendations:**
2. The frequency band 470-694MHz should remain assigned to Digital TV Broadcasting in Region 1. EACO should follow closely this compatibility studies with a view of protection broadcasting services in the band 470-694MHz.
3. The frequency band 694-960MHz should be assigned to IMT and short range devices in Region 1.

**Agenda Item 9.1 Topic C: “Use of International Mobile Telecommunications systems for fixed wireless broadband in the frequency bands allocated to the fixed service on a primary basis The World Radiocommunication Conference (Sharm el-Sheikh, 2019)”.**

1. Recognizing;
2. That Resolution 139 (Rev. Dubai, 2018) of the ITU Plenipotentiary Conference calls for bridging the digital divide worldwide through the use of telecommunications/information and communication technologies to bridge the digital divide and build an inclusive information society;
3. That Resolution 37 (Rev. Buenos Aires, 2017) of the World Telecommunication Development Conference calls for bridging the digital divide;
4. That the ITU Radiocommunication Sector (ITU-R) Handbook on fixed wireless access addresses the use of IMT systems for fixed wireless access, and Recommendation ITU-R M.819 contains specific requirements pertaining to fixed wireless access.
5. Resolves;

to conduct any necessary studies on the use of IMT systems for fixed wireless broadband in the frequency bands allocated to the fixed service on primary basis, taking into account the relevant ITU-R studies, Handbooks, Recommendations and Reports.

In order to comply with the resolves, WP5A has planned 5 meetings to conduct necessary studies on the use of IMT systems for fixed wireless broadband in the frequency bands allocated to the fixed services on the primary service.

1. In the first meeting of WP5A which occurred in July the following were done;
2. Considered the chairmen report 5A/19 of (WP5A and WP5C), china document 5A/58 and Germany document 5A/72.
3. Good discussion of the topic and it was clarified that the objective being investigated is the use of IMT technologies for fixed wireless broadband in the fixed service and not the deployment of mobile systems in the fixed service.
4. Different opinions were expressed by administrations on whether the possible regulatory related studies could be conducted or not on this topic; however, no consensus was reached.
5. No plans were made yet on the development of specific new or revised ITU-R Recommendations, Reports and/or Handbooks and contributions are encouraged for the next meeting.
6. **Conclusion**

The discussions on the agenda item 9.1 topic C are in the first stages, Rwanda as coordinator of this agenda item has no objection for the successful studies in the implementation of IMT systems for fixed wireless broadband technologies in the frequencies allocated for fixed services.

We also encourage EACO Administrations to actively participate in all ITU meetings concerning this agenda item.