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| **EACO 2nd WRC-23 Online Preparatory Meeting**17th – 19th August 2021 |

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**Chapter 4A - South Sudan**

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| **Agenda Item 1.18 (Narrowband MSS)** |
| ***Part A: Description*** |
| *to consider studies relating to spectrum needs and potential new allocations to the mobile-satellite service for future development of narrowband mobile-satellite systems, in accordance with Resolution* ***248******(WRC‑19)****;* |
| ***Part B: Key Elements – the notables*** |
| **RESOLUTION 248 (WRC-19):** Studies relating to spectrum needs and potential new allocations to the mobile satellite service in the frequency bands 1 695-1 710 MHz in R2, 2 010-2 025 MHz in R1, 3 300-3 315 MHz and 3 385-3 400 MHz in R2 for future development of narrowband mobile-satellite systems1. **Res 248** invites ITU-R to:
2. conduct studies on spectrum and operational requirements as well as system characteristics of low data-rate systems for the collection of data from, and management of, terrestrial devices in the MSS (description and basic characteristics specified in Res248).
3. conduct sharing and compatibility studies with existing primary services to determine the suitability of new allocations to the MSS, with a view to protecting the primary services, in the following frequency bands and adjacent frequency bands:
* 1 695-1 710 MHz in Region 2,
* **2 010-2 025 MHz in Region 1,**
* 3 300-3 315 MHz and 3 385-3 400 MHz in Region 2.
1. consider possible new primary or secondary allocations, with the necessary technical limitations, taking into account the characteristics described in Res248, to the MSS for non-geostationary satellites operating low data-rate systems for the collection of data from, and management of, terrestrial devices, based on the results of sharing and compatibility studies, while ensuring the protection of existing primary services in those frequency bands and adjacent frequency bands, without causing undue constraints on their further development,
2. CPM 23-1 identified WP4C as the responsible group for agenda item 1.18
3. For the estimates, two systems are under consideration and their characteristics are as mentioned in the table below:

| S/No | Characteristic | *Symbol* | System 1 | System 2 |
| --- | --- | --- | --- | --- |
| 1 | Spectral Efficiency: | *E* | 1 bps/Hz | 1 bps/Hz |
| 2 | Traffic/terminal/month: | *T* | 100 Kbyte | 120 Kbyte |
| 3 | Frequency Reuse: | *F* | 7 | 7 |
| 4 | Min population density: | *Umin* | 34 people/km2 | 312 people/km2 |
|  | Max population density: | *Umax* | 240 people/km2 |
| 6 | Satellite Beam footprint area: | *A* | 160,000 km2 | 160,000 km2 |
| 7 | Terminal ratio | *Ur* | 1/30 devices/person | 1/50 devices/person |
| 8 | Peak data duration: | *PH* | 8 hours | 16 hours |
| 9 | Portion of traffic transferred during peak operation:  | *Tt* | 0.85 | 0.90 |
| 10 | Satellite Availability | *PA* | 1 | 1 |
| 11 | Duplex Method | *-* | Frequency Division Duplex | Time Division Duplex |

1. Considering these factors, both System 1 and System 2 will require a 1.5:1 uplink/downlink ratio, giving **7 MHz uplink and 4.67 MHz downlink for System 1**, and 3**.5 MHz uplink and 2.33 MHz downlink for System 2.** All these estimates are not yet agreed.
2. EACO Member States are invited to note that there is a frequency overlap between WRC-23 Agenda Items 1.18 and 1.4.

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| ***Part C: Status of the Bands under consideration*** |
| ***PART A – Article 5 of the Radio Regulations***

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| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 1 690-1 700METEOROLOGICAL AIDSMETEOROLOGICAL-SATELLITE (space-to-Earth)FixedMobile except aeronautical mobile | 1 690-1 700METEOROLOGICAL AIDSMETEOROLOGICAL-SATELLITE (space-to-Earth) |
| 5.289 5.341 5.382 | 5.289 5.341 5.381 |
| 1 700-1 710FIXEDMETEOROLOGICAL-SATELLITE (space-to-Earth)MOBILE except aeronautical mobile | 1 700-1 710FIXEDMETEOROLOGICAL-SATELLITE (space-to-Earth)MOBILE except aeronautical mobile |
| 5.289 5.341 | 5.289 5.341 5.384 |

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| 1 980-2 010 FIXEDMOBILEMOBILE-SATELLITE (Earth-to-space) 5.351A5.388 5.389A 5.389B 5.389F |
| 2 010-2 025FIXEDMOBILE 5.388A 5.388B | 2 010-2 025FIXEDMOBILEMOBILE-SATELLITE(Earth-to-space) | 2 010-2 025FIXEDMOBILE 5.388A 5.388B |
| 5.388 | 5.388 5.389C 5.389E | 5.388 |
| 2 025-2 110 SPACE OPERATION (Earth-to-space) (space-to-space)EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space)FIXEDMOBILE 5.391SPACE RESEARCH (Earth-to-space) (space-to-space)5.392 |

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| 3 100-3 300 RADIOLOCATION Earth exploration-satellite (active) Space research (active) 5.149 5.428 |
| 3 300-3 400RADIOLOCATION | 3 300-3 400RADIOLOCATIONAmateurFixedMobile | 3 300-3 400RADIOLOCATIONAmateur |
| 5.149 5.429 5.429A 5.429B 5.430  | 5.149 5.429C 5.429D | 5.149 5.429 5.429E 5.429F |
|  | 3 400-3 500FIXEDFIXED-SATELLITE (space-to-Earth)MOBILE except aeronautical mobile 5.431A 5.431BAmateurRadiolocation 5.4335.282 | 3 400-3 500FIXEDFIXED-SATELLITE (space-to-Earth)AmateurMobile 5.432 5.432BRadiolocation 5.4335.282 5.432A |
| 3 500-3 600FIXEDFIXED-SATELLITE (space-to-Earth)MOBILE except aeronautical mobile 5.431BRadiolocation 5.433 | 3 500-3 600FIXEDFIXED-SATELLITE (space-to-Earth)MOBILE except aeronautical mobile 5.433ARadiolocation 5.433 |

***PART B – Draft AfriSAP***

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| **ITU Region 1 allocations and footnotes** | **Africa Common Allocation(s) and footnotes** | **Typical Applications** | **Additional information** |
| 1 690-1 700 MHzMETEOROLOGICAL AIDSMETEOROLOGICAL-SATELLITE (space-to-Earth)FixedMobile except aeronautical mobile5.289 5.341 5.382 | 1 690-1 700 MHzMETEOROLOGICAL AIDSMETEOROLOGICAL-SATELLITE (space-to-Earth)FixedMobile except aeronautical mobile5.289 5.341 5.382[DcoS6] |  |  |
| 1 700-1 710 MHzFIXEDMETEOROLOGICAL-SATELLITE (space-to-Earth)MOBILE except aeronautical mobile5.289 5.341 | 1 700-1 710 MHzFIXEDMETEOROLOGICAL-SATELLITE (space-to-Earth)MOBILE except aeronautical mobile5.289 5.341 | Fixed links (single frequency) |  |

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| 1 980-2 010 MHzFIXEDMOBILEMOBILE-SATELLITE (Earth-to-space) 5.351A5.388 5.389A 5.389B 5.389F | 1 980-2 010 MHzFIXEDMOBILEMOBILE-SATELLITE (Earth-to-space) 5.351A5.388 5.389A 5.389B 5.389F[UseL5] | IMT (terrestrial and satellite) (1980-2010 MHz)Fixed Applications | Paired with 2170 - 2200 MHz.The development of satellites for IMT services to be monitored.Res 212 (Rev. WRC-19) applies. |
| 2 010-2 025 MHzFIXEDMOBILE 5.388A 5.388B5.388 | 2 010-2 025 MHzFIXEDMOBILE 5.388A 5.388B[UseL28]5.388 | IMT (terrestrial) (2010-2025 MHz)Fixed Applications | TDD |
| 2 025-2 110 MHzSPACE OPERATION (Earth-to-space) (space-to-space)EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space)FIXEDMOBILE 5.391SPACE RESEARCH (Earth-to-space) (space-to-space)5.392 | 2 025-2 110 MHzSPACE OPERATION (Earth-to-space) (space-to-space)EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space)FIXEDMOBILE 5.391SPACE RESEARCH (Earth-to-space) (space-to-space)5.392 | Fixed links (2025-2110 MHz paired with 2200-2285 MHz)Earth exploration satellite applications | Radio Frequency channel arrangement according to ITU-R F.1098. |

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| 3 100-3 300 MHzRADIOLOCATIONEarth exploration-satellite (active)Space research (active)5.149 5.428 | 3 100-3 300 MHzRADIOLOCATION Earth exploration-satellite (active)Space research (active)5.149 |  | In making assignments to stations in the frequency band 3100-3300 MHz, administrations are urged to give consideration to Radio Astronomy applications as per RR n° 5.149 |
| 3 300-3 400 MHzRADIOLOCATION5.149 5.429 5.429A 5.429B 5.430  | 3 300-3 400 MHzMOBILE except aeronautical mobile 5.149 5.429[AddA10] 5.429A[AddA27] 5.429B[IMT33]  | IMT | Res. 223 (Rev.WRC-19) applies.IMT Radio Frequency Channel arrangement according to ITU-R M.1036Report ITU-R M.2481 may be consultedIn making assignments to stations in the frequency band 3300-3400 MHz, administrations are urged to give consideration to Radio Astronomy applications as per RR n° 5.149 |
| 3 400-3 600 MHzFIXEDFIXED-SATELLITE (space-to-Earth)MOBILE except aeronautical mobile 5.430ARadiolocation5.431 | 3 400-3 600 MHzFIXEDFIXED-SATELLITE (space-to-Earth)MOBILE except aeronautical mobile 5.430A Radiolocation | BFWAIMT (3400-3600 MHz) |  |

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| ***Part D: Conclusions of the Results of Studies if any*** |
| 1. The last WP4C meeting resulted in two new documents to support the studies as follows:
2. A working document towards a preliminary draft new report ITU-R M.[NB-MSS] is under development. This document intends to provide a methodology to estimate the spectrum requirements of narrowband MSS systems and base on a proposed methodology, presents preliminary spectrum requirement estimates. Due to the difficulty to obtain agreement on some issue related to this document, a correspondence Group was formed in order to attempt to make some progress. This document can be found following this link: [https://www.itu.int/dms\_ties/itu-r/md/19/wp4c/c/R19-WP4C-C-0245!N08!MSW-E.docx](https://www.itu.int/dms_ties/itu-r/md/19/wp4c/c/R19-WP4C-C-0245%21N08%21MSW-E.docx)

 1. A working document towards a preliminary report/recommendation on the sharing and compatibility issues for Narrowband MSS with incumbent services in the frequency bands 1 695-1 710 MHz, 2 010-2 025 MHz, 3 300-3 315 MHz and 3 385-3 400 MHz is also under development. This document can be found at [https://www.itu.int/dms\_ties/itu-r/md/19/wp4c/c/R19-WP4C-C-0245!N09!MSW-E.docx](https://www.itu.int/dms_ties/itu-r/md/19/wp4c/c/R19-WP4C-C-0245%21N09%21MSW-E.docx)
2. For these two documents, nothing has been agreed on and further review will be done.
3. The Work Plan for this agenda item and applicable Terms of reference for the correspondence group were also reviewed and amended.
4. Some of the aspects under studies in the various frequency bands under consideration include;

Sharing and compatibility studies between MSS and IMT in the 2 010-2 025 MHz frequency band Compatibility with MOBILE-SATELLITE (Earth-to-space) service and satellite IMT systems in the 1 980-2 010 MHz frequency band1. Sharing with HIBS in the 2 010-2 025 MHz frequency band in Region 1
2. Compatibility with SPACE OPERATION service in the 2 025-2 110 MHz frequency band
3. Compatibility with EARTH EXPLORATION-SATELLITE service in the 2 025‑2 110 MHz frequency band
4. Sharing with RADIOLOCATION service in the 3 300-3 400 MHz frequency band
5. The Correspondence Group (CG) will work electronically between the virtual meeting of WP 4C of July 2021 and the scheduled virtual meeting of WP 4C in October 2021 to work on:

Compilation of spectrum requirements and operational needs for each system. Each system shall have a completed spectrum requirements and operational needs analysis. Compilation of agreed representative narrowband MSS technical and operational characteristics. Each narrowband MSS system shall be limited to the basic characteristics in accordance with recognizing c) of Resolution 248 (WRC-19). |
| ***Part E: Options and Associated Implications***  |
| Compatibility studies are still underway thus options and associated implications are yet to be established. |
| ***Part F: Proposed EACO Preliminary View and or Position***  |
| EACO is invited to;1. Acknowledge the importance of and developing interest among EACO Member States to venture into small satellite technologies that will deliver narrow band applications.
2. Support the ongoing studies at ITU-R on this agenda item with the view of ensuring the protection of primary services including the protection for IMT systems deployed or that may be deployed in the same and adjacent frequency bands and to not impose any additional constraints on the current use and future development of existing primary services in these frequency ranges and adjacent frequency bands.
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| ***Part G: Recommendations and way forward*** |
| The following are recommended for EACO administrations;1. Support studies on spectrum needs conducted under the resolves to invite the ITU-R 1) of Resolution 248 (WRC-19),
2. Follow and actively participate in the studies to ensure that existing services allocated in the frequency band **2 010-2 025 MHz** are protected and adjacent bands, without causing undue constraints on their further development.
3. Follow up studies at the ITU-R to ensure that a new allocation to MSS in the frequency bands 1 695-1 710 MHz, 3 300-3 315 MHz and 3 385-3 400 MHz in R2 for future development of narrowband mobile-satellite systems will ensure the protection of existing services in the frequency band and adjacent bands in Region 1 and will not create undue constraints on future developments of services in this band.
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| ***Part G: Other Regional Groups and International Organisations Preliminary Views or Positions*** |
| **APT:** * APT Members support the studies at ITU-R for ensuring the protection of primary services including the protection for IMT systems deployed in the same and adjacent frequency bands for Region 3, noting that they are Regions 1 & 2 issues. In addition, these existing primary services can continue operations without additional regulatory or technical constraints imposed on these services, in any potential decisions made at WRC-23 regarding agenda item 1.18.

**ASMG:** * Support the studies in the frequency range 2010 to 2025 MHz for narrow band mobile-satellite systems in accordance to resolution 248 (WRC-19), taking into account the protection of the existing services in the bands and adjacent bands.
* Inviting ASMG administrations to study and define the required bandwidth for narrow band mobile-satellite systems, and determine wither this service define as primary or secondary in this band.

**CEPT:** * CEPT views/positions based on direct extract from the relevant information document Based on the results of spectrum needs and sharing and compatibility studies conducted respectively under the *resolves to invite the ITU‐R* 1) and 2) of Resolution **248 (WRC‐19)**, CEPT will consider possible new primary or secondary allocations, with the necessary technical limitations, taking into account the characteristics described in *recognizing* c), to the MSS for non‐GSO satellites operating low‐data rate systems for the collection of data from, and management of, terrestrial devices, while ensuring the protection of existing primary services in those frequency bands, and adjacent bands, without causing undue constraints on their further development.

**CITEL:** * An administration supports studies to consider appropriate regulatory measures for the allocation of additional MSS spectrum in the following frequency bands or portions thereof: 1 695 - 1 710 MHz, 3 300 - 3 315 MHz, 3 385 - 3 400 MHz in Region 2, while providing protection to primary incumbent services in these frequency ranges and in adjacent frequency bands.
* An administration supports conducting studies to consider appropriate regulatory measures, if applicable, for the allocation of additional spectrum in the MSS in the frequency bands under consideration, while ensuring the protection of existing primary services in these frequency bands and adjacent frequency bands.
* An administration supports the sharing and compatibility studies to determine the suitability of new primary or secondary allocations for NGSO MSS in the frequency bands, or portions thereof, 1695 – 1710 MHz, 3 300 - 3 315 MHz, and 3 385 - 3 400 MHz in Region 2, as well as 2 010 - 2 025 MHz in Region 1, taking into account the need to ensure protection and to not impose any additional constraints on the current use and future development of existing primary services in these frequency ranges and adjacent frequency bands.

**RCC** * The RCC Administrations consider that additional MSS allocation is permissible only if technical and operational characteristics of narrow band mobile satellite systems are justified, аs well as regulatory conditions of their use, and allowing the exclusion of unacceptable interference towards existing and planned systems operated in the same and adjacent frequency bands in accordance with Article 5 RR.
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