

# EACO 4<sup>th</sup> WRC-23 Online Preparatory Meeting

28<sup>th</sup> February 2021

# Chapter 4C - South Sudan

### Agenda Item 1.18 (Narrowband MSS)

Part A: Description

to consider studies relating to spectrum needs and potential new allocations to the mobilesatellite 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 systems

- 1. Res 248 invites ITU-R to:
  - i. 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).
  - ii. 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.
- iii. 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. 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:	Е	1 bps/Hz	1 bps/Hz
2	Traffic/terminal/month:	Т	100 Kbyte	120 Kbyte
3	Frequency Reuse:	F	7	7
4	Min population density:	U <sub>min</sub>	34 people/km <sup>2</sup>	
	Max population density:	U <sub>max</sub>	240 people/km <sup>2</sup>	312 people/km
6	Satellite Beam footprint area:	A	160,000 km <sup>2</sup>	160,000 km <sup>2</sup>
7	Terminal ratio	Ur	1/30 devices/person	1/50 devices/person
8	Peak data duration:	P <sub>H</sub>	8 hours	16 hours
9	Portion of traffic transferred during peak operation:	T <sub>t</sub>	0.85	0.90
10	Satellite Availability	P <sub>A</sub>	1	1
11	Duplex Method	-	Frequency Division Duplex	Time Division Duplex

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.

4. EACO Member States are invited to note that there is a frequency overlap between WRC-23 Agenda Items 1.18 and 1.4.

## Part C: Status of the Bands under consideration

## PART A – Article 5 of the Radio Regulations

Allocation to services				
Region 1 Region 2 Region 3				
1 690-1 700	1 690-1 700	I		
METEOROLOGICAL AIDS	METEOROLOGICAL AIDS			
METEOROLOGICAL-SATELLITE (space-to-Earth)	METEOROLOGICAL-SATELLITE (space-to-Earth)			
Fixed				
Mobile except aeronautical mobile				
5.289 5.341 5.382	5.289 5.341 5.381			

1 700-1 710		1 700-1 710
METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile		METEOROLOGICAL- SATELLITE (space-to- Farth)
		MOBILE except aeronautical mobile
5.289 5.341		5.289 5.341 5.384
1 980-2 010	FIXED	
MOBILE		
MOBILE-SATELLITE (Earth-to- 5.388 5.389A 5.389B 5.389	-space) 5.351A F	
2 010-2 025	2 010-2 025	2 010-2 025
FIXED	FIXED	
MOBILE 5.300A 5.300B	MOBILE MOBILE-SATELLITE	MOBILE 5.300A 5.300E
	(Earth-to-space)	
5.388	5.388 5.389C 5.389E	5.388
FIXED MOBILE 5.391 SPACE RESEARCH (Earth-to-s 5.392	pace) (space-to-space)	
3 100-3 300	RADIOLOCATION	
	Earth exploration-satellite (ac	tive)
	Space research (active)	
	5.149 5.428	
3 300-3 400	3 300-3 400	3 300-3 400
RADIOLOCATION	RADIOLOCATION	RADIOLOCATION
	Amateur	Amateur
	Fixed	
	Mobile	
5.149 5.429 5.429A 5.429B		
5.430	5.149 5.429C 5.429D	5.149 5.429 5.429E 5.429E

3 400-3 500	3 400-3 500
FIXED	FIXED
FIXED-SATELLITE (space-to- Earth)	FIXED-SATELLITE (space- to-Earth)
MOBILE except aeronautical	Amateur
mobile 5.431A 5.431B	Mobile 5.432 5.432B
Amateur	Radiolocation 5.433
Radiolocation 5.433	
5.282	5.282 5.432A
3 500-3 600	3 500-3 600
FIXED	FIXED
FIXED-SATELLITE (space-to- Earth)	FIXED-SATELLITE (space- to-Earth)
MOBILE except aeronautical mobile 5.431B	MOBILE except aeronautical mobile
Radiolocation 5.433	5.433A
	Radiolocation 5.433

## <u> PART B – Draft AfriSAP</u>

ITU Region 1 allocations and footnotes	Africa Common Allocation(s) and footnotes	Typical Applications	Additional information
1 690-1 700 MHz METEOROLOGICAL AIDS METEOROLOGICAL- SATELLITE (space-to- Earth) Fixed Mobile except aeronautical mobile 5.289 5.341 5.382	<b>1 690-1 700 MHz</b> METEOROLOGICAL AIDS METEOROLOGICAL- SATELLITE (space-to-Earth) Fixed Mobile except aeronautical mobile 5.289 5.341 <u>5.382[DcoS6]</u>		
1 700-1 710 MHz FIXED METEOROLOGICAL- SATELLITE (space-to- Earth) MOBILE except aeronautical mobile 5.289 5.341	1 700-1 710 MHz FIXED METEOROLOGICAL- SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.289 5.341	Fixed links (single frequency)	

1 980-2 010 MHz FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.388 5.389A 5.389B 5.389F	1 980-2 010 MHz FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A <u>5.388</u> 5.389A 5.389B <u>5.389F[UseL5]</u>	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 MHz FIXED MOBILE 5.388A 5.388B 5.388	2 010-2 025 MHz FIXED MOBILE 5.388A <u>5.388B[Usel_28]</u> 5.388	IMT (terrestrial) (2010-2025 MHz) Fixed Applications	TDD
2 025-2 110 MHz SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION- SATELLITE (Earth-to- space) (space-to- space) FIXED MOBILE 5.391 SPACE RESEARCH (Earth- to-space) (space-to- space) 5.392	2 025-2 110 MHz SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION- SATELLITE (Earth-to- space) (space-to- space) FIXED MOBILE 5.391 SPACE 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.
<b>3 100-3 300 MHz</b> RADIOLOCATION Earth exploration- satellite (active) Space research (active) 5.149 5.428	3 100-3 300 MHz RADIOLOCATION 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 MHz	3 300-3 400 MHz	IMT	Res. 223	
RADIOLOCATION	MOBILE except		(Rev.WRC-19)	
	aeronautical mobile		applies.	
5 149 5 429 5 4294	<b>5</b> 149 5 429[AddA10]			
5 /29B 5 /30	5.149 <u>5.429[AddA10]</u> 5.4290[AddA27]		IMT Radio	
5.4270 5.430	5 /208[INT23]		Frequency	
	<u>5.4270[IIVI135]</u>		Channel	
			arrangement	
			according to ITU-	
			R M.1036	
			Report ITU-R	
			M.2481 may be	
			consulted	
			In making	
			assignments to	
			stations in the	
			frequency band	
			3300-3400 MHz,	
			administrations	
			are urged to give	
			consideration to	
			Radio Astronomy	
			ner RR nº 5 149	
3 400-3 600 MHz	3 400-3 600 MHz	BFWA		
FIXED	FIXED			
FIXED-SATELLITE	FIXED-SATELLITE (space-	IMT (3400-		
(space-to-Earth)	to-Earth)	3600 MHz)		
MOBILE except	MOBILF except			
aeronautical mobile	aeronautical mobile			
5.430A	5.430A			
Radiolocation	Radiolocation			
5.431				
Part D: Conclusions of the Results of Studies if any				
1. Some of the aspects under studies in the various frequency bands under consideration				

- i. Sharing and compatibility studies between MSS and IMT in the 2 010-2 025 MHz frequency band
- ii. Compatibility with MOBILE-SATELLITE (Earth-to-space) service and satellite IMT systems in the 1 980-2 010 MHz frequency band
- iii. Sharing with HIBS in the 2 010-2 025 MHz frequency band in Region 1
- iv. Compatibility with SPACE OPERATION service in the 2 025-2 110 MHz frequency band
- v. Compatibility with EARTH EXPLORATION-SATELLITE service in the

2 025-2 110 MHz frequency band

- vi. Sharing with RADIOLOCATION service in the 3 300-3 400 MHz frequency band
- 2. The last WP 4C extensively considered and discussed, through the work at its SWG (i.e. SWG 4C2), the technical and operational parameters developed by the multiple operators as an input document with the aim to provide the required parameters through a liaison statement to WP 5D and to input into the Preliminary Draft New Report ITU-R [NB.MSS] on Spectrum Requirements, Technical and Operational Requirements.
- 3. Although an extensive effort was dedicated to work through these parameters, an agreement was not reached. The main difficulty of this agenda item would be attributed to the ambiguity of recognizing c) of Resolution 248 (WRC-19) which reads "that the studies envisaged under resolves to invite the ITU Radiocommunication Sector in this Resolution are to be limited to those systems with space stations that have a maximum equivalent isotropically radiated power (e.i.r.p.) of 27 dBW or less, with a beamwidth of no more than 120 degrees". The e.i.r.p. of 27 dBW could be understood as either per satellite basis or per system basis.
- 4. WP 4C did agree to form a CG to focus on advancing the work on (i) the technical and operational parameters and system characteristics to be used for sharing and compatibility studies for protection of services to which the bands are allocated and those adjacent, in accordance with Resolution 248 (WRC-19) and (ii) further efforts with a view to enable WP 4C to duly and appropriately address the objectives of this agenda item.
- 5. The ToR for the CG was developed and the work plan for the agenda item revised

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.

### 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.

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 mobilesatellite 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, as 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.