

ATU-R REPORT

relating to

State of Satellite Resources for Africa

numbered

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Acronyms

BR IFIC:	BR International Frequency Information Circular
GSO:	Geostationary Satellite Orbits
ITU:	International Telecommunication Union
MIFR:	Master International Frequency Register
NGSO:	Non-Geostationary Satellite Orbits
WARC Orb-88	: World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Orb-88)

WARC-77: World Administrative Radio Conference of 1977



EXECUTIVE SUMMARY

This report provides a status of satellite resources namely orbital slots and frequency Spectrum for African countries as of August 2021.

The ITU database as published in the BR IFIC 2953 (published on 24.08.2021) shows that fifty-three African countries have an assignment in the Broadcasting-Satellite Service Plan Appendices **30**, **30A**. However, only 53%¹ of those assignments are usable. The situation is better for the Fixed-Satellite Service Plan Appendix **30B** where up to 85% of African satellite resources are usable. These satellite resources in Appendices **30**, **30A**, and **30B** covering national territories are not economically viable noting the current development of satellite technology and launcher and earth station sizes in Appendix 30B. It is worth noting that few African countries such as Algeria, Egypt, Ethiopia, and Côte d'Ivoire have managed to leverage the existing ITU regulatory tools to secure satellite resources that are economically viable covering bigger territories in the planned services.

When it comes to satellite resources in unplanned bands that are registered on a first-come, first served basis, only Algeria, Côte d'Ivoire, Egypt, Ethiopia, and Nigeria have satellite resources there. The overall picture shows that the big part of satellite resources registered under African countries is in Appendices **30**, **30A** and **30B** planned bands. Only nine countries have secured satellite resources in the unplanned bands: two countries in both geostationary and non-geostationary satellite orbits, three countries in the geostationary satellite orbit and four countries in non-geostationary satellite resources in the non-geostationary orbits). In addition to that, a big percentage of satellite resources in the planned bands' App **30**, **30A**, and **30B** have been degraded due to lack of proper coordination.

The main principles of efficient use of and equitable access to the spectrum/orbit resources are laid down in No. 196 of the ITU Constitution (Article 44²) and Resolution 2 of the ITU Radio Regulations. Yet Africa still lags in terms of satellite resources access and utilization. This is mainly due to loopholes in the Radio Regulations that govern the management of satellite resources which do not facilitate developing countries with limited resources for conducting satellite filing and coordination properly. The African continent needs a harmonized strategy for optimum acquisition, retention and use in order to bridge the gaps in satellite resources access and utilization.

1. INTRODUCTION

The nature of satellites presents unique opportunities for addressing continental socio-economic needs. Their capacity to cover big territories can be leveraged to fill gaps in infrastructure deployment, especially connectivity. They can also be used in critical sectors such as agriculture and for managing precious resources of our continent like water, land, minerals, etc.

However, satellites need frequencies and orbital position/orbit to operate. Frequencies and orbital resources are managed by the ITU using the Radio Regulations and Rules of Procedures. Any country

¹ This figure may be further reduced should more assignments enter in the List in application of §4.1.18 of Appendices **30** and **30A**.

² "In using frequency bands for radio services, Members shall bear in mind that radio frequencies and any associated orbits, including the geostationary-satellite orbit, are limited natural resources and that they must be used rationally, efficiently and economically, in conformity with the provisions of the Radio Regulations, so that countries or groups of countries may have equitable access to those orbits and frequencies, taking into account the special needs of the developing countries and the geographical situation of particular countries"

wishing to use a part of these satellite resources must go through a process called filing³to enjoy international recognition and protection. When the filing process is finalized, the resources are recorded in a database managed by the ITU called Master International Frequency Register (MIFR). Also, the majority of the ITU Member States have predetermined frequencies and orbital positions at GSO in 2 specific space Plans for implementation of their national needs within the Broadcasting-Satellite (subject of Appendices **30** and **30A**) and Fixed-Satellite (subject of Appendix **30B**) services.

This document aims to assess African satellite resources that are registered in the MIFR or in the process of filing to the ITU as well as the current status of African satellite resources in the planned bands (Appendices **30**, **30A** and **30B**).

The document includes the following main parts:

- 1. Status of African Administrations (member states of ITU) that fulfil administrative requirements for filing and coordinating satellite resources: The ITU Radiocommunication Bureau has introduced a system called e-Communications for facilitating Administrations to exchange correspondence electronically and a system called *e-Submission* for filing satellite resources electronically. All Administrations, members of the ITU must nominate Administrators for managing the two systems. An Administration that does not fulfil these requirements face difficulties in protecting its satellite resources and cannot file new satellite resources.
- 2. Status of African satellite resources in the planned bands contained in Appendix 30, 30A and 30B of the Radio Regulations: Appendix 30, 30A and 30B have been created to ensure that every country member (State member) of the ITU obtains satellite resources to cover its national territories. This part shows the status of African satellite resources and indicate if they can be used or if they have been degraded.
- 3. Status of African satellite resources in the unplanned bands: satellite resources in the unplanned bands are accessed and acquired on a first-come, first-served basis. These resources include both non-geostationary satellite orbit (NGSO) and geostationary satellite orbit (GSO). This part shows African countries that have managed to acquire satellite resources in the unplanned bands.

2. ADMINISTRATIVE REQUIREMENTS FOR SATELLITE RESOURCES MANAGEMENT

2.1. e-Submission of satellite network filings and e-Communication for correspondence

In implementing WRC **Resolution 907 (Rev. WRC - 15)** and **Resolution 908 (Rev. WRC - 15)**, the Radiocommunication Bureau has developed electronic tools for exchanging correspondences related to satellite resources management online as well as submitting and publishing satellite network filings electronically. In accordance with Resolution **55 (Rev WRC-19)**, it is now mandatory to file satellite networks electronically. Administrations can still use traditional communication means such as Fax for communication with ITU, but e-Communication has made the process much easier and reduced risks of missing deadlines. To use these tools, Administrations are required to officially nominate one or more Administration Managers for these tools as outlined in the ITU Circular Letters CR/450⁴ and

³ Filing is a process of registration of satellite orbits and frequency in the ITU Master International Frequency Register

⁴ <u>https://www.itu.int/md/R00-CR-CIR-0450/en</u>

CR/434⁵. However, some Administrations in Africa have not yet submitted to the ITU contact details of their nominated Administrators. As of 24th August 2021, 22% of African Administrations did not have access to e-Communications while 19% of African Administrations did not have access to e-Submission. A list of all African Administrations members of the ITU and their status with regards to access to e-Communications or e-Submission can be found in Annex 1. Africa still has a big gap in terms of access to electronic tools that are critical for satellite resources management. One of the consequences of not accessing these tools is missing prescribed regulatory deadlines for coordination due to delays in receiving coordination correspondence. Missing deadlines for responding to coordination requests may lead to the degradation of a country's satellite resources.

3. AFRICAN SATELLITE RESOURCES IN APPENDIX 30, 30A (PLANNED BROADCASTING SATELLITE SERVICES)

3.1. Assignments in Appendix 30, 30A Plan

The World Radiocommunication Conference of 2000 (WRC-2000), revised the BSS Plan established by WARC-77 and WARC Orb-85 to ensure that all member states of the ITU obtain satellite resources in Broadcasting-Satellite Service for covering their national territories. Appendices **30**, **30A** contain Broadcasting-Satellite Service resources. It is comprised of two parts namely the Plan and the List. The Plan part contains Broadcasting satellite resources for all member states of the ITU for covering their national territories. The list contains additional uses submitted under Article 4.

In Region 1 (see Annex 2), every country was assigned 10 frequency channels of 27 MHz of bandwidth each.

All African countries were assigned satellite resources and have an assignment in Appendices **30**, **30A**. South Sudan joined ITU after WRC-2000 does not have an assignment yet. South Sudan and the ITU are actively taking steps to ensure the South Sudan can acquire the resources too.

However, thirty-one (31) African countries saw their satellite resources deteriorated over the following years due to a lack of resources for conducting proper coordination.⁶ The map below (Map shows countries with satellites resources in Appendices **30**, **30A** that were no longer usable⁷.



⁵ https://www.itu.int/md/R00-CR-CIR-0434/en

⁶ As a remedial measure, WRC-19 adopted **Resolution 559 (WRC-19)** which seeks to determine additional temporary regulatory measures following the deletion of part of Annex 7 to Appendix 30 (Rev.WRC-15) by WRC-19.

⁷ In this report, an assignment in Appendices **30**, **30A** was considered usable when the Equivalent Protection Margin for at least 50% of the downlink test points was above -10 dB



This situation lasted till the publication of BR IFIC 2950 dated 13.07.2021 where the EPM values of 6 countries (BEN, NIG, MLI, GNE, NMB and COD) are found to be temporarily improved above -10 dB following the cancellation of the DBL-G4-20W satellite network from the List in the said BR IFIC. Nevertheless, noting that these Administrations did not comment on other Part A networks which may affect their assignments in the Plans, the EPM of these countries may become less than -10 dB again should those Part A networks enter in the List. Hence, there are currently twenty-five (25) African countries with degraded satellite resources.

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3.2. Satellite assignments in Appendices 30, 30A List (Additional use)

The WRC-2000 created a List for additional use. This is mainly used when countries wish to cover areas beyond their national territories. Countries wishing to acquire satellite resources in the List must file to the ITU and coordinate with the assignments in the Plan and other services. In Africa, only Algeria and Egypt, have satellite resources in the List. Besides that, Ethiopia and Egypt are in the process of acquiring additional satellite resources in the List.

4. AFRICAN SATELLITE RESOURCES IN APPENDIX 30B (PLANNED FIXED SATELLITE SERVICES)

4.1. Allotments in the Appendix 30B

The Plan of the Appendix 30B was created by the WARC ORB-88 and later modified by the WRC-07. It

was created to ensure that all Administrations members of the ITU obtain satellite resources for Fixed-Satellite Service to cover their national territories. A new "Special Procedure", applicable only once, to facilitate entry into the Appendix **30B** FSS List, for countries that have no assignments in the List or submitted under App. **30B** Art. 6 was adopted by WRC 19 under a new Resolution **170**.



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All African countries have satellite resources in the Appendix **30B** Plan except Eritrea and South Sudan⁸. Both Administrations can benefit from application of the procedure for the addition of a new allotment for a new member as it is mentioned in Article 7 of Appendix **30B**. However, the resources for some African countries have been affected due to a lack of adequate resources to conduct coordination. As of today, the satellite resources for eight (8) African countries are no longer usable⁹ (see map 2 below).



MAP 3: USABILITY OF SATELLITE RESOURCES IN THE APPENDIX 30B

4.2. Assignments in the App 30B List

Before the utilization of satellite resources in the Appendix **30B** Plan, Administrations must first convert them into assignments and register them on the List. This process requires coordination based on the examination of the Bureau and some Administrations use this opportunity to extend coverage beyond national territories. In Africa, only Côte d'Ivoire (RASCOM) have satellite resources in the List.

Algeria¹⁰ and Ethiopia are in the process of converting their satellite resources from allotment into assignments (pending phase).

⁸ The request of South Sudan under Art.7 of Appendix **30B** as a new Member State was received by the Bureau on 28.04.2020 and it was published in Special Section AP30B/A6A/609 annexed to the BR IFIC 2944 of 20.04.2021.

⁹ In this report, an allotment in the Appendix 30B was considered usable when the Aggregated C/ I was equal or above 17dB. All cases of Aggregated C/I below 17 dB are occurring in 12-13 / 10-11 GHz bands. Furthermore, Aggregated C/I below 17 dB of the allotments of GUI (27.5E) and MWI (28.0E) is occurring in only one 250 MHz sub-band.

¹⁰ New submission is under preparation in replacement to the frequency assignments of ALGFSAT-33.5W satellite network (Special Section **30B/A6A/258**) that were cancelled in accordance with § 6.34 of Article **6** of Appendix **30B** (see BR IFIC 2937 dated 12.01.2021).

5. AFRICAN SATELLITE RESOURCES IN THE NON-PLANNED SERVICES AS OF AUGUST 2021

Beyond the planned bands that were created by the ITU to ensure that all countries members of the ITU obtain satellite resources, countries can also acquire satellite resources in non-planned services on a first-come, first-served basis. In this category, Algeria, Côte d'Ivoire on behalf of the intergovernmental satellite organisation RASCOM, Egypt, Ethiopia and Nigeria have acquired satellite resources in the geostationary satellite orbit. Algeria, Egypt, Kenya, Mauritius, Morocco and Rwanda have acquired resources in the non-planned services for non-geostationary satellite orbits. In addition, Ghana, South Africa, Sudan and Uganda have submitted requests for resources in the non-planned services for non-geostationary satellite orbits.

More details on the satellite networks can be found on Annex 1.

6. INTERNATIONAL TELECOMMUNICATIONS SATELLITE ORGANIZATION (ITSO) COMMON HERITAGE

Several African countries are Members States of the International Telecommunications Satellite Organization (INTELSAT or ITSO)¹¹. From the beginning of its existence, one of the priorities of INTELSAT was to protect itself in the regulatory field by acquiring a sufficient number of orbital positions in order to successfully achieve its goal of providing global connectivity and coverage to all parts of the globe. Using its internal and external (international) coordination procedures, it established priority rights for the use of a considerable number of orbital positions (associated with frequency assignments) recorded in the Master International Frequency Register (MIFR) of the International Telecommunication Union (ITU) on behalf of all INTELSAT member countries. The acquired priority rights to use orbital positions and frequency spectrum, which were critical to the successful achievement of INTELSAT's mission, constituted a very valuable asset for the INTELSAT Parties.

The 25th Assembly of INTELSAT Parties, in 2000, decided to transfer the former INTELSAT frequency assignments associated with orbital locations to two Notifying Administrations: the United States of America (USA) and the United Kingdom (UK) and introduced in the amended ITSO Agreement a new characterization of these rights by describing them as constituting a "common heritage" of all INTELSAT Parties (Common Heritage). These Administrations became, on the date of the transfer (18 July 2001), responsible for these frequency assignments, including the subsequent application of procedures contained in the ITU Radio Regulations (coordination, notification, etc.).

This transfer was, however, accompanied by a series of conditions, the most important of which was the continuous utilization by the Intelsat of these frequencies so that its obligations vis-à-vis its customers would continue to be fulfilled. These conditions were understood to serve as the foundation for Intelsat's ongoing commitment to use those orbit positions and frequency spectrum in order to continue to provide global coverage and interconnectivity.

¹¹ The acronym "INTELSAT" refers to the international organization from the time of its establishment to that of restructuring in 2001, as governed by the original INTELSAT Agreement, and is also be used when referring to satellite filings for orbital positions which had been made on behalf of the international organization prior to restructuring. The acronym "ITSO" refers to the international organization continuing in existence subsequent to restructuring in 2001, as governed by the amended ITSO Agreement. The word "Intelsat" refers to the private company created as part of the restructuring process and also to individual satellites or generations of satellites in orbit or planned as of the time of restructuring.

Since the transfer of these frequency assignments, the Notifying Administrations have been managing the orbit/spectrum utilization rights. They apply the different procedures of the ITU Radio Regulations to protect and maintain these assignments under international recognition. In some cases, however, some changes have become inevitable, either because the privatized Intelsat required certain modifications or the Radio Regulations subsequently adopted at an ITU World Radiocommunication Conference (WRC) introduced regulatory changes in the frequency/orbit utilization environment. Some of the filings that existed in 2001 have subsequently expired in the intervening period due to limitations now contained in the ITU Radio Regulations concerning the realization timeframe of a satellite project that recent WRCs have introduced.

Based on the results of a study of the evolution Common Heritage since 2001, the Common Heritage by the end of 2019 consisted of:

- Regarding orbital positions,
 - 19 orbital positions, under USA as Notifying Administration.
 - 4 orbital positions, under UK as Notifying Administration.
- Regarding the overall capacity associated to the Common Heritage: an overall set of frequency assignments as per the following numbers represented also in breakdown form for each frequency band in subsequent tables here below:
 - 11,430 frequency assignments transmit and receive together including C and Ku bands under USA as Notifying Administration, representing an overall bandwidth of 730.03 GHz.
 - 1,226 frequency assignments transmit and receive together, under UK as Notifying Administration, representing an overall bandwidth of 38.42 GHz.

The full breakdown of the Common Heritage (as at December 2019) is provided in Annex 4.

7. CONCLUSION

The ITU Constitution calls for equitable access to satellite orbital slots and frequency spectrum. Also The Radiocommunication Assembly (RA-15) adopted Resolution ITU-R 69 titled "Development and deployment of international public telecommunications via satellite in developing countries" which, inter alia, mandates the ITU-R to continue to undertake studies to determine whether it might be necessary to apply additional regulatory measures to facilitate the development, deployment and availability of international public telecommunications via satellite in developing countries. It reaffirms the principle that countries should have equitable access to the radio-frequency spectrum and satellite orbits in accordance with the Radio Regulations, taking into account the special needs of developing countries and the geographical situation of particular countries.

However, the current status shows a big misbalance in access and utilization of those resources. This has been encouraged by the way the Radio Regulations governing those resources are written. Developing countries that have limited resources for conducting satellite filings and coordination lags in access and utilization of those resources. African needs to put in place a coordinated and

well-structured strategy for optimum acquisition, retention, and use of satellite resources to meet current and future need.

Annex 1: List of satellite resources as contained in BR IFIC database and status of e-Communication and e-Submission utilization

Annex 1 is an Excel document that contains eight sheets described below. The information is as of end of **August 2021**.

- Sheet 1: List of African Administrations and their status with regard to the utilization of e-Communication and e-Submission.
- Sheet 2: Broadcasting satellite resources for African countries registered in the Appendices **30**, **30A**. It also shows if the resources are usable or if they cannot be used. Satellite resources highlighted in orange color cannot be used while satellite resources highlighted in green are in good status and can be used.
- Sheet 3: Broadcasting satellite resources for African countries registered in the Appendices
 30, **30A** List. This part contains satellite resources for additional use (beyond national territories).
- Sheet 4: African broadcasting satellite resources Article 4 pending submissions.
- Sheet 5: African broadcasting satellite resources pending submissions under **Resolution 559 (WRC-19)**.
- Sheet 6: Fixed satellite resources for African countries registered in the Appendix **30B**. It also shows if they are useable or if they cannot be used. Satellite resources highlighted in orange colour cannot be used while satellite resources highlighted in green are in good status and can be used.
- Sheet 7: Fixed satellite resources for African countries registered in the Appendix **30B** List. Before bringing into use an allotment recorded in the Appendix **30B**, it must be converted into an assignment in the App **30B** List.
- Sheet 8: African broadcasting satellite resources Article 6 and 7 pending submissions.
- Sheet 9: Unplanned satellite resources for African countries registered in the MIFR.

Satellite Resources in BR IFIC database as of 24 August 2021

https://drive.google.com/drive/folders/1-3GOVt3PNR2ISONt4ZWn3tqVFID_PWd4?usp=sharing

Annex 2: ITU Regions and areas

For the allocation of frequencies, the world has been divided into three Regions as shown on the following map. Africa is in Region 1.



Annex 3: Status of Satellite Resources Exploitation within the SADC Sub-Region

Angola is the only Member State in the SADC region with a moderate level of degradation in its BSS Appendix 30/30A reference situation values. This has been mainly due to regular commenting and the existence of few satellite networks in the vicinity (+/- 9 degree) of the orbital position of Angola at 24.8° West with BSS filings for additional use.

Consequently, Angola was not eligible for the procedure outlined in Resolution 559 (WRC-19).

Angola is building a HTS Satellite telecommunication network named ANGOSAT-2 that will provide services in the unplanned services C and Ku-bands.

Here are the technical parameters thereof:

Parameter	value		
Туре	GSO		
Ku-band Transponder	24 (108 MHz each)		
C-Band transponder	6 (72 MHz each)		
Coverage	C-band: Africa and Europe		
	Ku-band: 24 beams over Africa		
Gateway channel	1 in Ka-band		
Launch period	2 nd Quarter of 2022		

BSS PLAN CHARACTERISTICS FOR ANGOLA ADMINISTRATION

BSS Down Link Characteristics (Appendix 30):

- EIRP: 59 dBW
- Bandwidth: 27 MHz
- Each Planned Assignment: Channels: 10 27*10 = 270 MHz (11.7-12.5 GHz)
- Polarization: Circular
- Receiving Antenna: 0.6 m
- Antenna pattern: MODRES
- Availability: 99% worst month
- Protection Criteria: Reference Situation Value based on EPM (Equivalent Protection Margin).

BSS Feeder Link Characteristics (Appendix 30A):

- EIRP: 84 dBW for the 5 m diameter antenna
- Bandwidth: 27 MHz per channel
- Total of Planned channels: 10
- Polarization: Circular
- Receiving Antenna: 5 m diameter in 17 GHz band (17.3-18.1 GHz)
- Antenna Pattern: MODTES

• Frequency Band: 17 GHz (17.3-18.1 GHz)

The present reference situation values for SADC Member States are given in **Table 2A**. All SADC Member States, except **Angola** (24.8° West) and Democratic Republic of the Congo (19.2° West)¹², has BSS allotments in the Appendix **30/30A** with reference EPM below -10 dB, which allows prejudicial level of interference for satellite operations of any decent quality. This degradation is primarily caused by a lack of commenting by SADC member to protect their allotments against any satellite filings made in the recent past by other Administrations for additional uses affecting them (Article **4** of Appendix **30/30A**) in the 17 GHz (17.3-18.1 GHz) feeder links and the Ku-band (11.7-12.5 GHz, 800 MHz).

Appendix **30A**, 14 GHz (14.5-14.8 GHz) feeder links are likely to provide better reference situation values because most satellite networks prefer the 17 GHz band for feeder links, justifying, the high degradation in EPM values for feeder links of SADC Member States in the 17 GHz.

			long_no	emi_rc			
adm	ntc_id	sat_name	m	р	Band	MinEpm	MaxEpm
AFS	100550002	AFS02100	4.8	E	12GHz	-18.799	-16.599
AGL	100550003	AGL29500	-24.8	E	12GHz	<mark>0.888</mark>	<mark>3.754</mark>
BOT	100550034	BOT29700	-0.8	E	12GHz	-20.996	-17.806
COD	100550051	COD_100	-19.2	E	12GHz	<mark>3.836</mark>	<mark>7.499</mark>
СОМ	100550053	COM20700	29	E	12GHz	-17.68	-15.841
LSO	100550133	LSO30500	4.8	E	12GHz	-19.04	-15.711
MAU	100550137	MAU100	29	E	12GHz	-18.762	-13.511
MDG	100550140	MDG23600	29	E	12GHz	-18.106	-15.14
MOZ	100550148	MOZ30700	-1	E	12GHz	-19.262	-18.146
MWI	100550151	MWI30800	4.8	E	12GHz	-18.494	-17.832
NMB	100550154	NMB02500	-18.8	E	12GHz	-3.699	9.383
SEY	100550181	SEY00000	42.5	E	12GHz	-17.151	-14.892
SWZ	100550194	SWZ31300	4.8	E	12GHz	-18.071	-16.247
TZA	100550208	TZA22500	11	E	12GHz	-18.404	-17.478
ZMB	100550222	ZMB31400	-0.8	E	12GHz	-21.207	-17.206
ZWE	100550223	ZWE13500	-0.8	E	12GHz	-19.16	-16.772

Table 2A: SADC Member States present reference situation values for BSS Down LinkAssignments (Appendix 30)

			long_no	emi_rc			
adm	ntc_id	sat_name	m	р	Band	MinEPM	MaxEPM
					14		
AFS	100550401	AFS02101	4.8	R	GHz	-37.533	-29.488
					14		
AFS	100550402	AFS02102	4.8	R	GHz	-37.538	-28.41

¹² The EPM of Democratic Republic of the Congo is temporarily increased following the cancellation of the DBL-G4-20W satellite network from the List.

					17		
AGL	100550603	AGL29500	-24.8	R	GHz	<mark>6.767</mark>	<mark>9.468</mark>
					17		
ВОТ	100550679	BOT29700	-0.8	R	GHz	-26.662	-20.562
					17		
COD	100550694	COD_100	-19.2	R	GHz	<mark>2.093</mark>	<mark>7.787</mark>
					17		
СОМ	100550696	COM20700	29	R	GHz	<mark>4.756</mark>	<mark>7.026</mark>
					17		
LSO	100550774	LSO30500	4.8	R	GHz	-16.599	-14.363
				_	17		
MAU	100550778	MAU100	29	R	GHz	-15.836	-12.156
				_	17		10.000
MDG	100550781	MDG23600	29	R	GHz	-15.319	-10.866
1407	100550447	N40720704		_	14	4 774	0.654
MOZ	100550417	MOZ30701	-1	R	GHz	-1.//1	-0.651
1407	100550440	NA0720702		_	14	4 77	0 407
MOZ	100550418	M0230702	-1	К	GHZ	-1.//	0.437
N 41 A /I	100550701	N414120800	4.0	D	1/	21 220	20 575
	100550791	10100130800	4.8	К	GHZ	-31.228	-30.575
	100550421		10.0	Б		4 401	0.000
INIVID	100550421	INIVIDU2501	-10.0	n	14	<u>4.401</u>	<mark>9.090</mark>
NMB	100550422		_12.2	D		1 1 2 1	0 870
INIVID	100330422	NIVIDO2302	-10.0	n	14	4.401	9.079
SEV	100550433	SEV00001	42 5	R	GH7	23.69	20 528
521	100550455	SETUDOU	72.5	IN .	14	23.05	50.550
SEY	100550434	SEY00002	42 5	R	GH7	23.69	37 12
JET	100330434	32100002	42.5		17	23.05	<u></u>
SEY	100550814	SEY00000	42.5	R	GHz	4.568	6.82
					17		
SWZ	100550826	SWZ31300	4.8	R	GHz	-24.821	-21.199
					17		
TZA	100550839	TZA22500	11	R	GHz	-0.971	2.017
					17		
ZMB	100550854	ZMB31400	-0.8	R	GHz	-23.833	-20.014
					17		
ZWE	100550855	ZWE13500	-0.8	R	GHz	-23.248	-19.164

Table 2B: SADC Member States present reference situation values for BSS Feeder LinkAssignments (AP30A)

In general, the 14 GHz feeder links reference situation EPM values for SADC Member States are relatively reasonable. For those SADC Member States with good reference situation EPM values in the 17 GHz, they need to comment against any new filings for additional uses as identified by the ITU-R bureau to protect their allotments. See Angola (24.8° West), Democratic Republic of the

Congo (19.2° West), Comoros (29° East), Republic of Namibia (18.8° West)¹³ and Seychelles (42.5° East).

FSS PLAN CHARACTERISTICS FOR ANGOLA ADMINISTRATION

FSS Up and Down Link Characteristics (Appendix 30B):

Each frequency allotment for any administration in the Region 1 has 300 MHz in 6/4 GHz and 500 MHz in 12-13/10-11 GHz.

Protection Criteria: Reference Situation Value based on Overall Aggregate Carrier-to-Interference Ratio (C/I).

C-band (Up Link – 6725-7035 MHz)	C-band (Down Link – 4500-4800 MHz)
Transmitting:	Receiving:
5.5 m in 6 GHz	5.5 m in 4 GHz
Earth Station EIRP/36MHz: 67.2 dBW	Satellite EIRP/36 MHz: 36.4 dBW
	14 Transponders with two polarizations
	Availability: 99.95% of the year
Ku-band (Up Link – 12.75-13.25 GHz)	Ku-band (Down Link – 10.70-10.95 & 11.20-11.45 GHz)
Transmitting:	Receiving:
2.7 m in 13 GHz	2.7 m in 11/12 GHz
Earth Station EIRP/36MHz: 78.3 dBW	Satellite EIRP/36 MHz: 48.4 dBW
	24 Transponders with two polarizations
	(x2 bandwidth capacity due to 2 polarization)
	Availability: 99.95% of the year

Table 3: C-band and Ku-band FSS Planned Band Typical Characteristics

The present reference situation values for FSS Assignments in Appendix **30B** Plan are given in **Table 4**. Only Botswana, Kingdom of Eswatini, Malawi and Zimbabwe have severe level of degradation in their FSS Appendix 30B reference situation values in the Ku-band. That is, their reference situation Aggregate C/I values are less than 21 dB. For C-band, the FSS planned allotment are not affected.

¹³ The EPM of Democratic Republic of the Congo and Republic of Namibia is temporarily increased following the cancellation of the DBL-G4-20W satellite network from the List.

		Orbital	Worst	Agg C/I
Adm	Satellite name	Position	(d	В)
			ku	с
AFS	AF\$00000	71	28.6	33.4
AGL	AGL00000	-36.1	29.1	35.4
BOT	BOT00000	21.2	14.6/14.7	30.1
COD	COD00000	50.95	23.6	34.5
COM	COM00000	94.5	27.8	27.1
LSO	LSO00000	-19.3	25.4	40.7
MAU	MAU00000	92.2	33.9	33.1
MDG	MDG00000	16.9	24	36.4
MOZ	MOZ00000	90.6	31.1	31.6
MWI	MW100000	28	-9.1/23.3	32.1
NMB	NMB00000	12.2	23.4	26.1
SEY	SEY00000	42.25	21.9	24.3
SWZ	SWZ00000	30.1	17.5/25.2	26.2
TZA	TZA00000	67.5	20	26.6
ZMB	ZMB00000	39.55	21.7	27.3
ZWE	ZWE00000	65.6	1.4	27.5

Table 4: SADC Member States present reference situation values for FSS Allotments (Appendix **30B**)

Annex 4: Status of of the International Telecommunications Satellite Organization (ITSO) Common Heritage (as at December 2019)

1. The number of orbital positions constituting the ITSO Common Heritage registered in the MIFR of ITU (C-band, Ku-band) for 2001, 2010, 2015, 2018 and 2019 are:

Number of orbital positions registered in the MIFR of ITU (C, Ku)	2001	2010	2015	2018	2019
USA administration	25	22	21	19	19
UK administration	28	4	4	4	4

2. The following two tables provide *detailed* the evolution of the Common Heritage since 2001 till 2019.

PART A: United States of America as the Notifying Administration

	Notifying Administration: United States of America							
	2001	2010	2015	2018	2019			
Orbital position (°W/°E)	Satellite filing name (as maintained in MIFR)	Satellite filing name (as maintained in MIFR)	Satellite filing name (as maintained in MIFR)	Satellite filing name (as maintained in MIFR)	Satellite filing name (as maintained in MIFR)			

	INTELSAT7 304E				
56°W	INTELSAT8 304E				
	INTELSAT5A 304.5E				
	INTELSAT IBS 304.5E				
	INTELSAT6 304.5E				
55.5°W	INTELSAT7 304.5E	INTELSAT7 304.5E	INTELSAT7 304.5E	INTELSAT7 304.5E	INTELSAT7 304.5E
	INTELSAT8 304.5E	INTELSAT8 304.5E	INTELSAT8 304.5E	INTELSAT8 304.5E	INTELSAT8 304.5E
	INTELSAT9 304.5E	INTELSAT9 304.5E	INTELSAT9 304.5E	INTELSAT9 304.5E	INTELSAT9 304.5E
	INTELSAT IBS 307E	INTELSAT IBS 307E	INTELSAT IBS 307E	INTELSAT IBS 307E	INTELSAT IBS 307E
	INTELSAT5A CONT1				
53°W	INTELSAT7 307E	INTELSAT7 307E	INTELSAT7 307E	INTELSAT7 307E	INTELSAT7 307E
	INTELSAT8 307E	INTELSAT8 307E	INTELSAT8 307E	INTELSAT8 307E	INTELSAT8 307E
	INTELSAT9 307E	INTELSAT9 307E	INTELSAT9 307E	INTELSAT9 307E	INTELSAT9 307E
	INTELSAT5A CONT2	INTELSAT5A CONT2			
50°W	INTELSAT7 310E	INTELSAT7 310E	INTELSAT7 310E	INTELSAT7 310E	INTELSAT7 310E
	INTELSAT8 310E				
	INTELSAT9 310E	INTELSAT9 310E	INTELSAT9 310E	INTELSAT9 310E	INTELSAT9 310E
	INTELSAT10 310E	INTELSAT10 310E	INTELSAT10 310E	INTELSAT10 310E	INTELSAT10 310E
	INTELSAT6 325.5E	INTELSAT6 325.5E	INTELSAT6 325.5E	INTELSAT6 325.5E	INTELSAT6 325.5E
24 5914/	INTELSAT7 325.5E	INTELSAT7 325.5E	INTELSAT7 325.5E	INTELSAT7 325.5E	INTELSAT7 325.5E
54.5 VV	INTELSAT8 325.5E	INTELSAT8 325.5E	INTELSAT8 325.5E	INTELSAT8 325.5E	INTELSAT8 325.5E
	INTELSAT9 325.5E	INTELSAT9 325.5E	INTELSAT9 325.5E	INTELSAT9 325.5E	INTELSAT9 325.5E
	INTELSAT5A ATL6				
	INTELSAT7 328.5E				
31.5°W	INTELSAT8 328.5E	INTELSAT8 328.5E	INTELSAT8 328.5E	INTELSAT8 328.5E	INTELSAT8 328.5E
	INTELSAT9 328.5E	INTELSAT9 328.5E	INTELSAT9 328.5E	INTELSAT9 328.5E	INTELSAT9 328.5E
	INTELSAT5A 330.5E				
	INTELSAT6 330.5E	INTELSAT6 330.5E	INTELSAT6 330.5E	INTELSAT6 330.5E	INTELSAT6 330.5E
29.5°W	INTELSAT7 330.5E	INTELSAT7 330.5E			
	INTELSAT8 330.5E	INTELSAT8 330.5E	INTELSAT8 330.5E	INTELSAT8 330.5E	INTELSAT8 330.5E
	INTELSAT9 330.5E	INTELSAT9 330.5E	INTELSAT9 330.5E	INTELSAT9 330.5E	INTELSAT9 330.5E

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	1				
	INTELSAT6 332.5E	INTELSAT6 332.5E	INTELSAT6 332.5E	INTELSAT6 332.5E	INTELSAT6 332.5E
07 5044	INTELSAT7 332.5E	INTELSAT7 332.5E	INTELSAT7 332.5E	INTELSAT7 332.5E	INTELSAT7 332.5E
27.5 VV	INTELSAT8 332.5E	INTELSAT8 332.5E	INTELSAT8 332.5E	INTELSAT8 332.5E	INTELSAT8 332.5E
	INTELSAT9 332.5E	INTELSAT9 332.5E	INTELSAT9 332.5E	INTELSAT9 332.5E	INTELSAT9 332.5E
	INTELSAT6 335.5E	INTELSAT6 335.5E	INTELSAT6 335.5E	INTELSAT6 335.5E	INTELSAT6 335.5E
24.5°W	INTELSAT7 335.5E	INTELSAT7 335.5E	INTELSAT7 335.5E	INTELSAT7 335.5E	INTELSAT7 335.5E
	INTELSAT8 335.5E	INTELSAT8 335.5E	INTELSAT8 335.5E	INTELSAT8 335.5E	INTELSAT8 335.5E
	INTELSAT9 335.5E	INTELSAT9 335.5E	INTELSAT9 335.5E	INTELSAT9 335.5E	INTELSAT9 335.5E
	INTELSAT6 340E	INTELSAT6 340E	INTELSAT6 340E	INTELSAT6 340E	INTELSAT6 340E
20014	INTELSAT7 340E	INTELSAT7 340E	INTELSAT7 340E	INTELSAT7 340E	INTELSAT7 340E
20 VV	INTELSAT8 340E	INTELSAT8 340E	INTELSAT8 340E	INTELSAT8 340E	INTELSAT8 340E
	INTELSAT9 340E	INTELSAT9 340E	INTELSAT9 340E	INTELSAT9 340E	INTELSAT9 340E
	INTELSAT IBS 342E				
	INTELSAT5A 342E				
18°W	INTELSAT7 342E	INTELSAT7 342E	INTELSAT7 342E	INTELSAT7 342E	INTELSAT7 342E
	INTELSAT8 342E	INTELSAT8 342E	INTELSAT8 342E	INTELSAT8 342E	INTELSAT8 342E
	INTELSAT9 342E	INTELSAT9 342E	INTELSAT9 342E	INTELSAT9 342E	INTELSAT9 342E
	INTELSAT5A CONT4				
	INTELSAT7 359E	INTELSAT7 359E	INTELSAT7 359E	INTELSAT7 359E	INTELSAT7 359E
1°W	INTELSAT8 359E	INTELSAT8 359E	INTELSAT8 359E	INTELSAT8 359E	INTELSAT8 359E
	INTELSAT9 359E	INTELSAT9 359E	INTELSAT9 359E	INTELSAT9 359E	INTELSAT9 359E
	INTELSAT10 359E	INTELSAT10 359E	INTELSAT10 359E	INTELSAT10 359E	INTELSAT10 359E
	INTELSAT5 33E	INTELSAT5 33E	INTELSAT5 33E	INTELSAT5 33E	INTELSAT5 33E
	INTELSAT6 33E				
33°E	INTELSAT7 33E	INTELSAT7 33E	INTELSAT7 33E	INTELSAT7 33E	INTELSAT7 33E
	INTELSAT8 33E	INTELSAT8 33E	INTELSAT8 33E	INTELSAT8 33E	INTELSAT8 33E
	INTELSAT9 319.5E	INTELSAT9 33E	INTELSAT9 33E	INTELSAT9 33E	INTELSAT9 33E
	INTELSAT6 60E	INTELSAT6 60E	INTELSAT6 60E	INTELSAT6 60E	INTELSAT6 60E
60°E	INTELSAT7 60E				
	INTELSAT8 60E	INTELSAT8 60E	INTELSAT8 60E	INTELSAT8 60E	INTELSAT8 60E
	INTELSAT9 60E	INTELSAT9 60E	INTELSAT9 60E	INTELSAT9 60E	INTELSAT9 60E
	INTELSAT6 62E	INTELSAT6 62E	INTELSAT6 62E	INTELSAT6 62E	INTELSAT6 62E
62°E	INTELSAT7 62E	INTELSAT7 62E	INTELSAT7 62E	INTELSAT7 62E	INTELSAT7 62E

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	INTELSAT8 62E	INTELSAT8 62E	INTELSAT8 62E	INTELSAT8 62E	INTELSAT8 62E
	INTELSAT9 62E	INTELSAT9 62E	INTELSAT9 62E	INTELSAT9 62E	INTELSAT9 62E
	INTELSAT5A INDOC3				
63°E	INTELSAT6 63E				
	INTELSAT7 63E				
	INTELSAT6 64E	INTELSAT6 64E	INTELSAT6 64E	INTELSAT6 64E	INTELSAT6 64E
64°E	INTELSAT7 64E	INTELSAT7 64E	INTELSAT7 64E	INTELSAT7 64E	INTELSAT7 64E
	INTELSAT8 64E	INTELSAT8 64E	INTELSAT8 64E	INTELSAT8 64E	INTELSAT8 64E
	INTELSAT9 64E	INTELSAT9 64E	INTELSAT9 64E	INTELSAT9 64E	INTELSAT9 64E
	INTELSAT5 INDOC4	INTELSAT5 INDOC4			
	INTELSAT5A 66E				
66°E	INTELSAT7 66E	INTELSAT7 66E	INTELSAT7 66E	INTELSAT7 66E	INTELSAT7 66E
	INTELSAT8 66E				
	INTELSAT9 66E	INTELSAT9 66E	INTELSAT9 66E	INTELSAT9 66E	INTELSAT9 66E
	INTELSAT5 85E				
	INTELSAT6 85E	INTELSAT6 85E	INTELSAT6 85E	INTELSAT6 85E	INTELSAT6 85E
85°E	INTELSAT7 85E	INTELSAT7 85E	INTELSAT7 85E	INTELSAT7 85E	INTELSAT7 85E
	INTELSAT8 85E	INTELSAT8 85E	INTELSAT8 85E	INTELSAT8 85E	INTELSAT8 85E
	INTELSATKFOS 85E	INTELSAT KFOS 85E	INTELSAT KFOS 85E	INTELSAT KFOS 85E	INTELSAT KFOS 85E
	INTELSAT5A 157E	INTELSAT5A 157E	INTELSAT5A 157E	INTELSAT5A 157E	INTELSAT5A 157E
15705	INTELSAT6 157E	INTELSAT6 157E	INTELSAT6 157E	INTELSAT6 157E	INTELSAT6 157E
157 2	INTELSAT7 157E	INTELSAT7 157E	INTELSAT7 157E	INTELSAT7 157E	INTELSAT7 157E
	INTELSAT8 157E	INTELSAT8 157E	INTELSAT8 157E	INTELSAT8 157E	INTELSAT8 157E
	INTELSAT5A PAC1				
	INTELSAT7 174E	INTELSAT7 174E			
1/4 6	INTELSAT8 174E	INTELSAT8 174E			
	INTELSAT9 338.5E	INTELSAT9 174E			
176°E	INTELSAT7 176E				
	INTELSAT8 176E				
	INTELSAT9 176E				
47705	INTELSAT7 177E	INTELSAT7 177E	INTELSAT7 177E		
177°E	INTELSAT8 177E				
178°E	INTELSAT6 178E	INTELSAT6 178E			

	INTELSAT7 178E	INTELSAT7 178E			
	INTELSAT8 178E	INTELSAT8 178E			
	INTELSAT9 178E	INTELSAT9 178E			
	INTELSAT5 PAC3	INTELSAT5 PAC3	INTELSAT5 PAC3	INTELSAT5 PAC3	INTELSAT5 PAC3
180°E	INTELSAT5A 180E				
	INTELSAT7 180E	INTELSAT7 180E	INTELSAT7 180E	INTELSAT7 180E	INTELSAT7 180E
	INTELSAT8 180E				

PART B: United Kingdom as the Notifying Administration

	Notifying Administration: United Kingdom					
	2001 2010 2015 2018			2019		
Orbital position (°W/°E)	Satellite filing name (as maintained in BR)	Satellite filing name (as maintained in BR)	Satellite filing name (as maintained in BR)	Satellite filing name (as maintained in BR)	Satellite filing name (as maintained in BR)	
131°W	INTELSAT KA 229E INTELSAT NKA-C 229E INTELSAT NKA-Ku 229E INTELSAT NKA 229E					
116.9° W	INTELSAT KA 243.1E INTELSAT NKA-C 243.1E INTELSAT NKA-Ku 243.1E INTELSAT NKA 243.1E INTELSAT V-B 243.1E					
110°W	INTELSAT V-B 250E					
108°W	INTELSAT V-B 252E					
81°W	INTELSAT V-B 279E					
72°W	INTELSAT V-B 288E					
56W	INTELSAT KUEXT 304E					
55.5°W	INTELSAT KUEXT 304.5E INTELSAT V-B 304.5E	INTELSAT KUEXT 304.5	INTELSAT KUEXT 304.5	INTELSAT KUEXT 304.5	INTELSAT KUEXT 304.5	
53°W	INTELSAT KA 307E INTELSAT NKA-C 307E INTELSAT NKA-Ku 307E INTELSAT NKA 307E					
50W	INTELSAT KUEXT 310E					
42°W	INTELSAT V-B 318E					
40°W	INTELSAT V-B 320E					
34.5°W	INTELSAT V-B 325.5E					
1°W	INTELSAT KA 359E INTELSAT NKA-C 359E INTELSAT NKA-Ku 359E INTELSAT NKA 359E INTELSAT V-B 359E					
13°E	INTELSAT V-B 13E					

18.5°E	INTELSAT V-B 18.5E				
	INTELSAT KA 33E				
	INTELSAT NKA-C 33E				
33°E	INTELSAT NKA-Ku 33E				
	INTELSAT NKA 33E				
	INTELSAT KUEXT 33E				
57°E	INTELSAT V-B 57E				
60°E	INTELSAT KUEXT 60E	INTELSAT KUEXT 60E	INTELSAT KUEXT 60E	INTELSAT KUEXT 60E	INTELSAT KUEXT 60E
62°E	INTELSAT KUEXT 62E				
64°E	INTELSAT KUEXT 64E				
	INTELSAT KA 66E				
	INTELSAT NKA-C 66E				
66°E	INTELSAT NKA-Ku 66E				
	INTELSAT NKA 66E				
	INTELSAT KUEXT 66E	INTELSAT KUEXT 66E	INTELSAT KUEXT 66E	INTELSAT KUEXT 66E	INTELSAT KUEXT 66E
74.25°E	INTELSAT V-B 74.25E				
76.5°E	INTELSAT V-B 76.5E				
	INTELSAT KA 137.7E				
	INTELSAT NKA-C 137.7E				
137.7°E	INTELSAT NKA-Ku 137.7E				
	INTELSAT NKA 137.7E				
	INTELSAT KUEXT 137.7E				
	INTELSAT V-B 137.7E				
140°E	INTELSAT V-B 140E				
142°E	INTELSAT V-B 142E				
	INTELSAT KA 157E				
	INTELSAT NKA-C 157E				
157°E	INTELSAT NKA-Ku 157E				
	INTELSAT NKA 157E				
	INTELSAT KUEXT 157E	INTELSAT KUEXT 157E	INTELSAT KUEXT 157E	INTELSAT KUEXT 157E	INTELSAT KUEXT 157E
				l	

3. Similarly, the tables below show the detailed evolution of the number of frequency assignments and associated bandwidth since 2015 as follows.

	Notifying Administration: United States of America				
	2015	2016	2017	2018	2019
Number of frequency assignments registered in the MIFR of ITU (C and Ku bands)	13,278	12,942	12,190	12,190	11,430
Bandwidth assignments registered in the MIFR of ITU (C and Ku bands) GHz	810.14	778.03	732.36	732.36	730.03

	Notifying Administration: United Kingdom				
	2015	2016	2017	2018	2019
Number of frequency assignments registered in the MIFR of ITU (C and Ku bands)	1,226	1,226	1,226	1,226	1,226
Bandwidth assignments registered in the MIFR of ITU (C and Ku bands) GHz	38.42	38.42	38.42	38.42	38.42

ABOUT THIS REPORT

Development: This report was developed by an ATU Task Group on Satellite Resources from December 2020 to July 2021. This group was led by the following:

Role	Name (Country)		
Chair – Task Group	Mr. Abdouramane El-HADJAR (Cameroun representing ECCAS)		
Vice Chair – Task Group	Mr. Martins LANGA (Mozambique representing SADC)		
Rapporteur	Mr. Leonel ZAMBA (South Sudan representing EACO)		
Rapporteur	Mr. Yetondji HOUEYETONGNON (Benin representing ECOWAS)		
Rapporteur	Mr. Ismail ANGRI (Morocco representing North Africa)		

Validation: This report was validated by a validation forum that was held from 30 to 31 August 2021. The forum was led by the following bureau:

- Chair: Valéry Hilaire OTTOU (Cameroun representing ECCAS)
- Vice-Chair: Ahmed BORAUD (Niger representing ECOWAS)
- **Rapporteurs**: Stella BANYENZA (Tanzania representing EACO/SADC) Mohamed ABDELHASEEB (EGYPT representing North)



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