

# Access to Spectrum in Rural Areas

Session 2.3

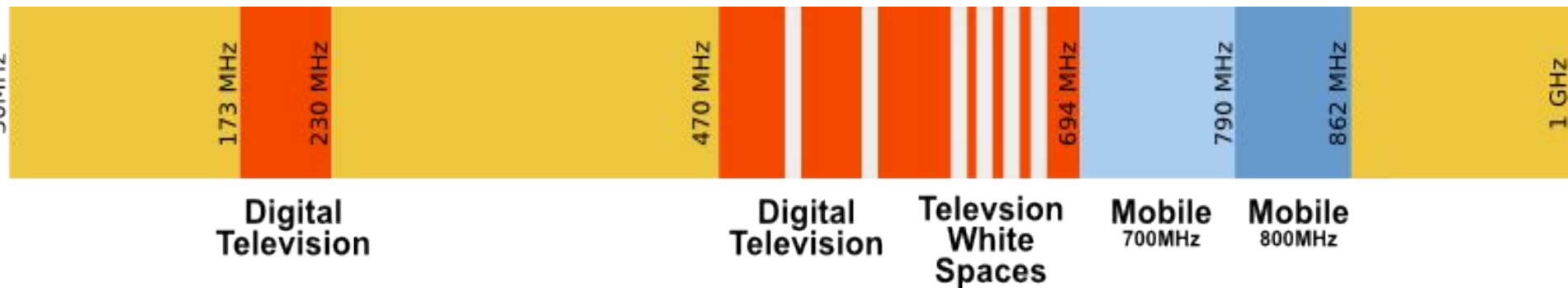
# Dynamic Spectrum

TVWS et al

# Dynamic Spectrum

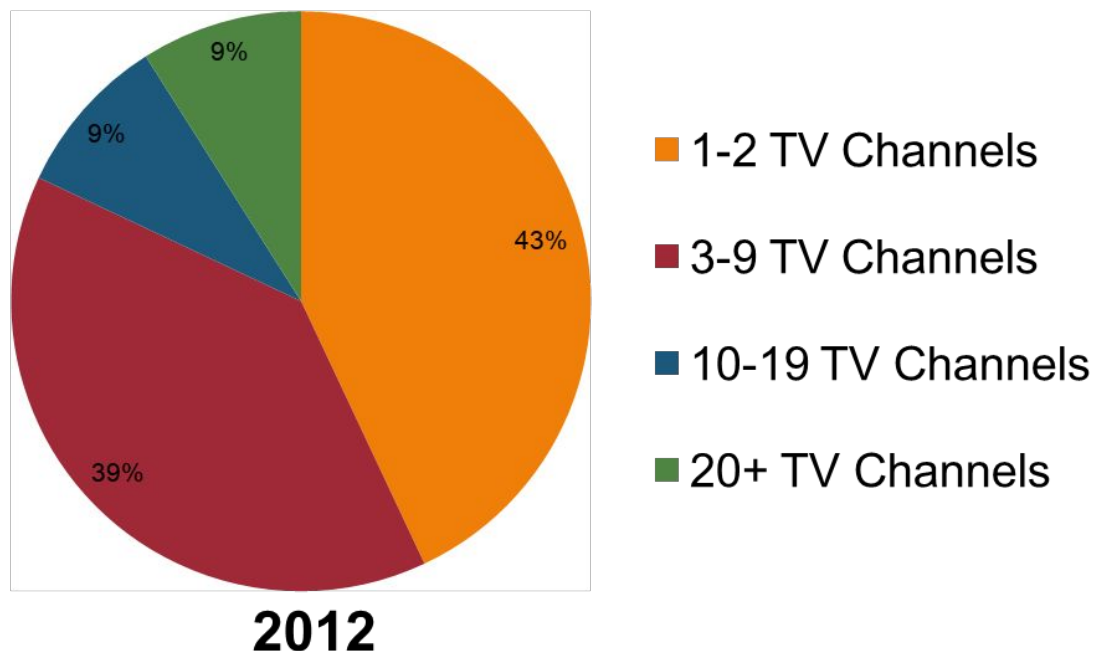
## Television White Spaces (TVWS)

- Allows for the dynamic re-use of spectrum without interfering with the primary spectrum holder
- Ideal for rural access
- Low television spectrum occupancy in African countries
- No re-allocation of spectrum required



# UHF Spectrum Occupancy

African Countries



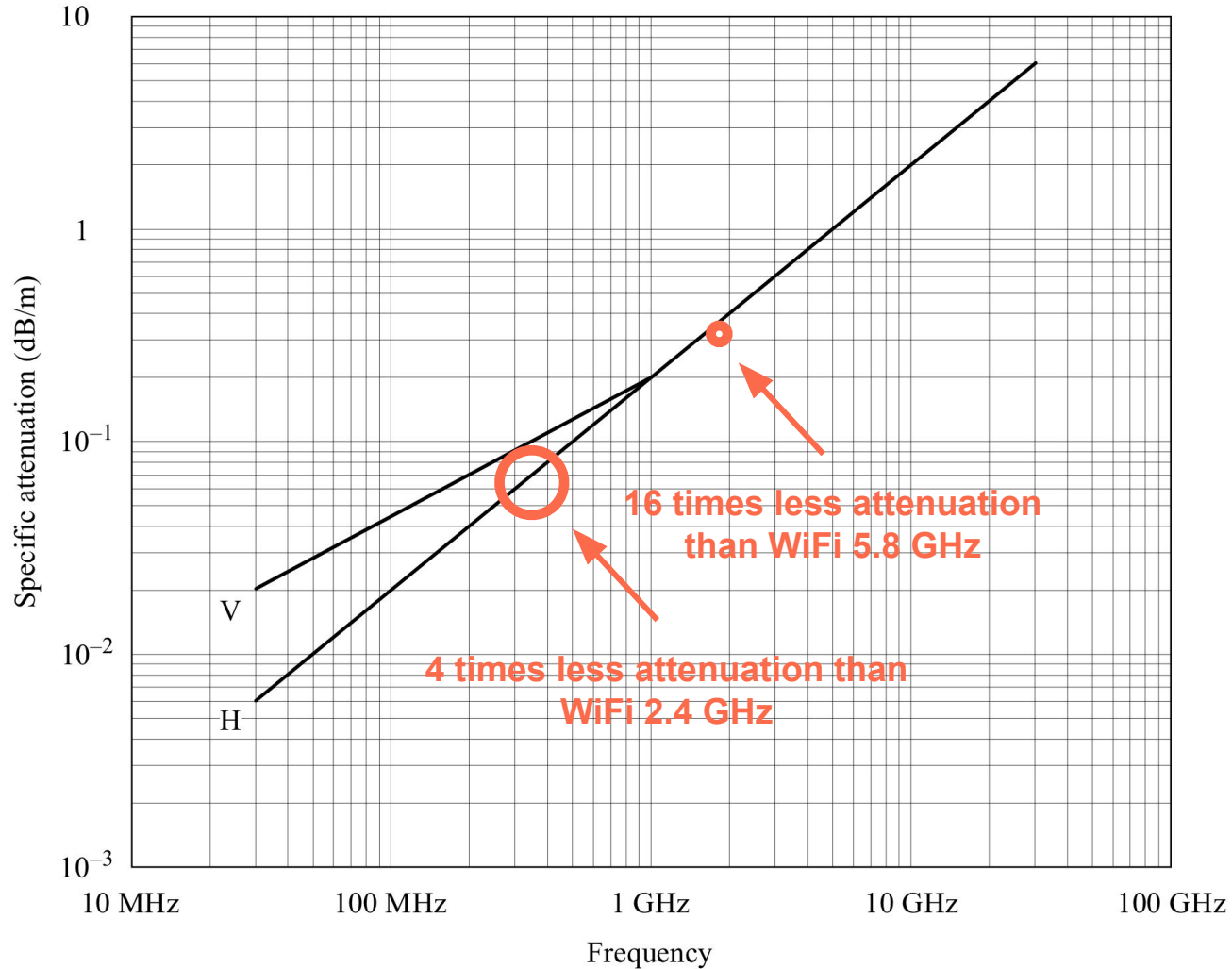
**In most cases,  
hundreds of  
megahertz of  
unused  
spectrum**

Source: **Balancing Act**

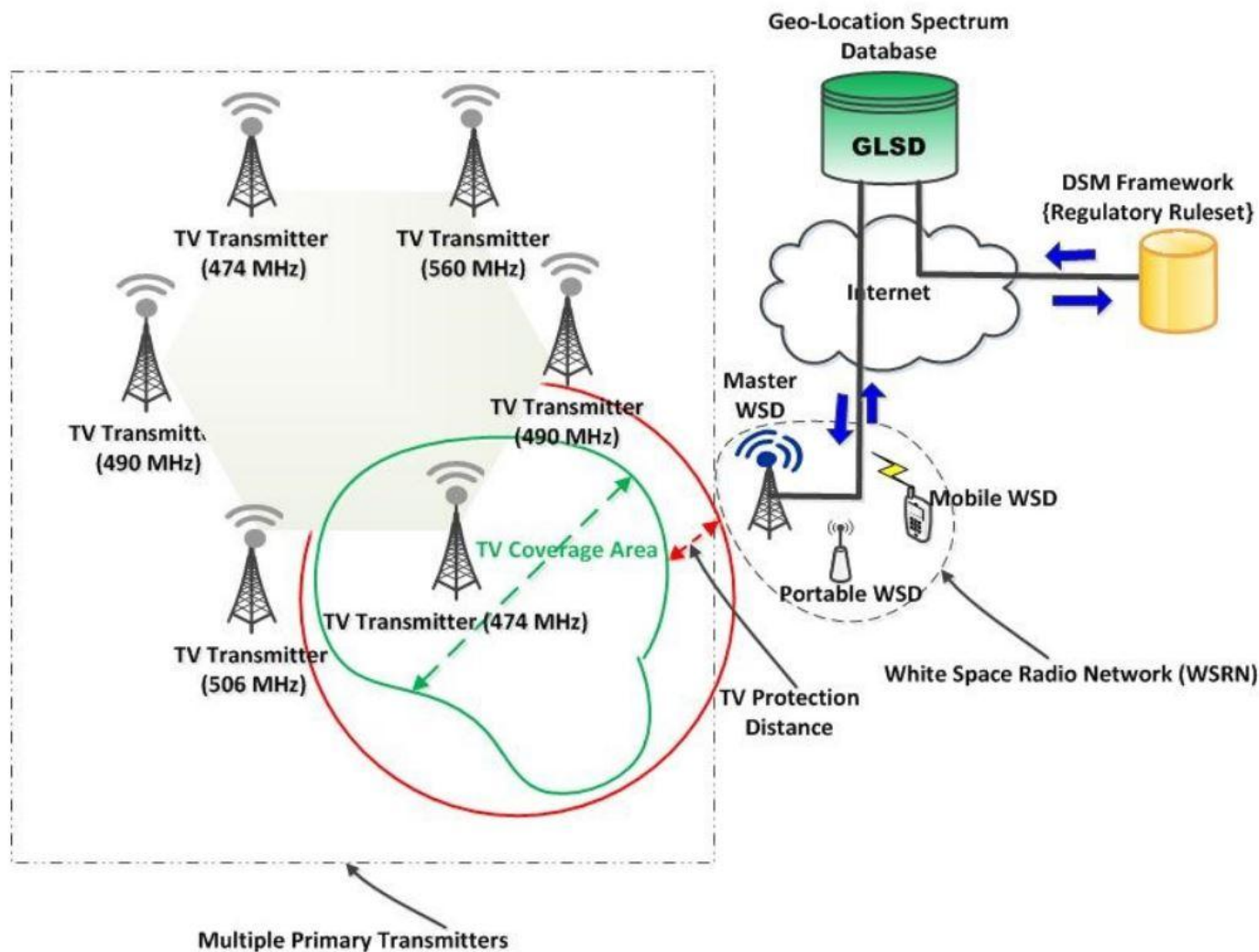
Presentation to African Telecommunications Union (ATU) Digital Migration Summit (May 2014)

<http://www.atu-uat.org/index.php/download-categories/category/10-afriswog-events?download=299:session-3-ppt-1-balancing-act-presentatio>

# Radio Attenuation in Vegetation



# Geo-Location Database Access



Source: CSIR

# Dynamic Spectrum in Africa



## 2012 – 2022

Opportunity to use fallow UHF spectrum to connect underserved communities

Formal regulations in

- ✓ Mozambique
- ✓ South Africa
- ✓ Kenya

# Formal TVWS Regulations

STAATSKOERANT, 23 MAART 2018

No. 41512 1913

INDEPENDENT COMMUNICATIONS AUTHORITY OF SOUTH AFRICA

NOTICE 147 OF 2018

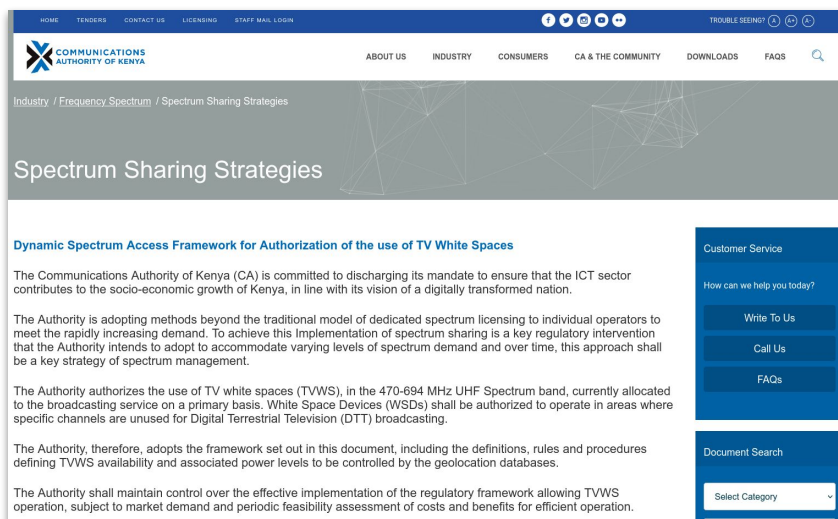


ELECTRONIC COMMUNICATIONS ACT 2005, (ACT NO. 36 OF 2005)

REGULATIONS ON THE USE OF TELEVISION WHITE SPACES

The Independent Communications Authority of South Africa ("the Authority"), in terms of section 4

## South Africa - 2018



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Industry / Frequency Spectrum / Spectrum Sharing Strategies

### Spectrum Sharing Strategies

#### Dynamic Spectrum Access Framework for Authorization of the use of TV White Spaces

The Communications Authority of Kenya (CA) is committed to discharging its mandate to ensure that the ICT sector contributes to the socio-economic growth of Kenya, in line with its vision of a digitally transformed nation.

The Authority is adopting methods beyond the traditional model of dedicated spectrum licensing to individual operators to meet the rapidly increasing demand. To achieve this implementation of spectrum sharing is a key regulatory intervention that the Authority intends to adopt to accommodate varying levels of spectrum demand and over time, this approach shall be a key strategy of spectrum management.

The Authority authorizes the use of TV white spaces (TVWS), in the 470-694 MHz UHF Spectrum band, currently allocated to the broadcasting service on a primary basis. White Space Devices (WSDs) shall be authorized to operate in areas where specific channels are unused for Digital Terrestrial Television (DTT) broadcasting.

The Authority, therefore, adopts the framework set out in this document, including the definitions, rules and procedures defining TVWS availability and associated power levels to be controlled by the geolocation databases.

The Authority shall maintain control over the effective implementation of the regulatory framework allowing TVWS operation, subject to market demand and periodic feasibility assessment of costs and benefits for efficient operation.

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## Kenya - 2021



REPÚBLICA DE MOÇAMBIQUE

MINISTÉRIO DOS TRANSPORTES E COMUNICAÇÕES

INSTITUTO NACIONAL DAS COMUNICAÇÕES DE MOÇAMBIQUE

PROPOSTA

DE NORMA TÉCNICA TV-WHITE SPACES PARA

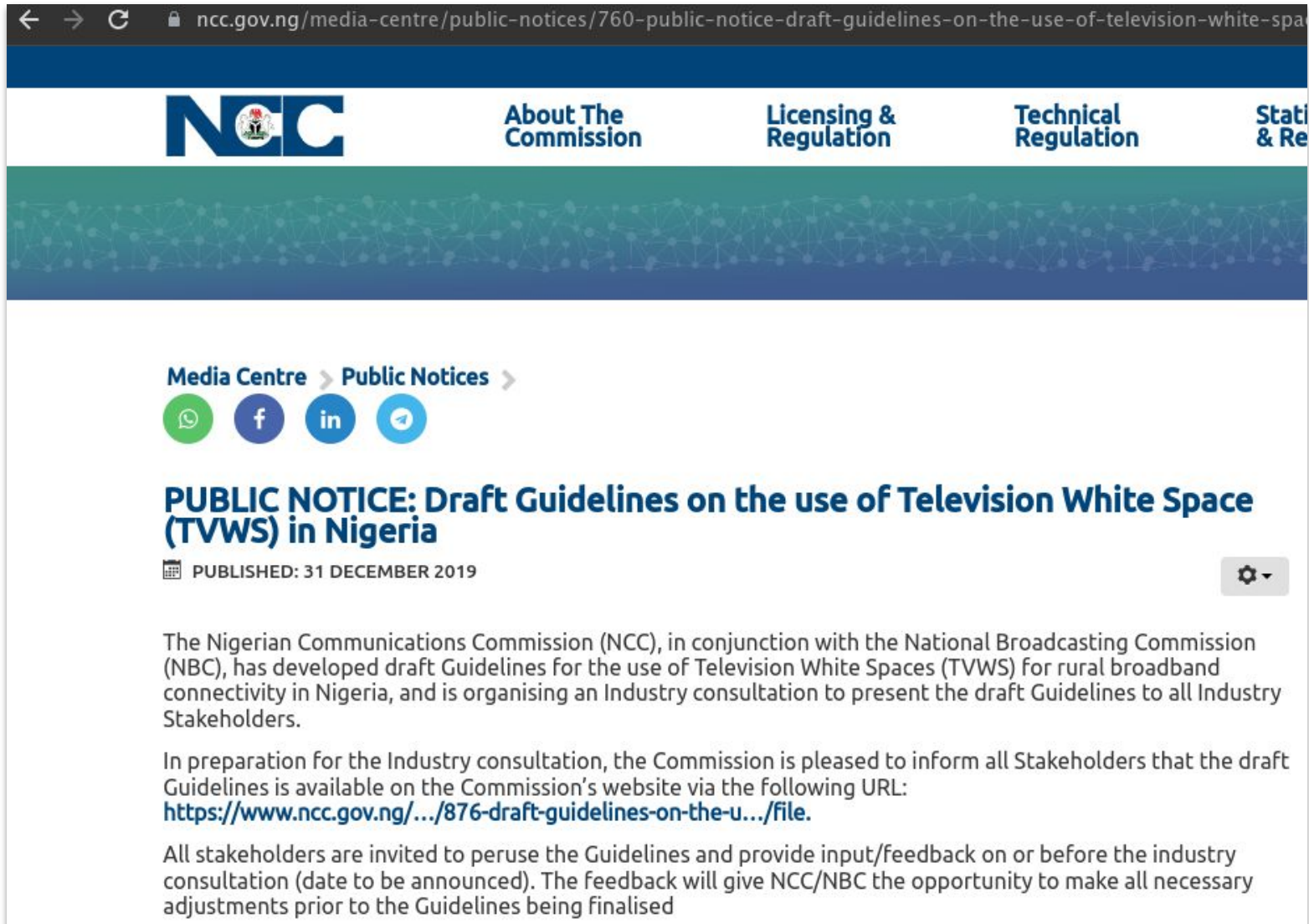
SERVIÇOS DE TELECOMUNICAÇÕES

NA FAIXA DE UHF (470-694 MHz)

## Mozambique - 2019



# Nigeria - 2020

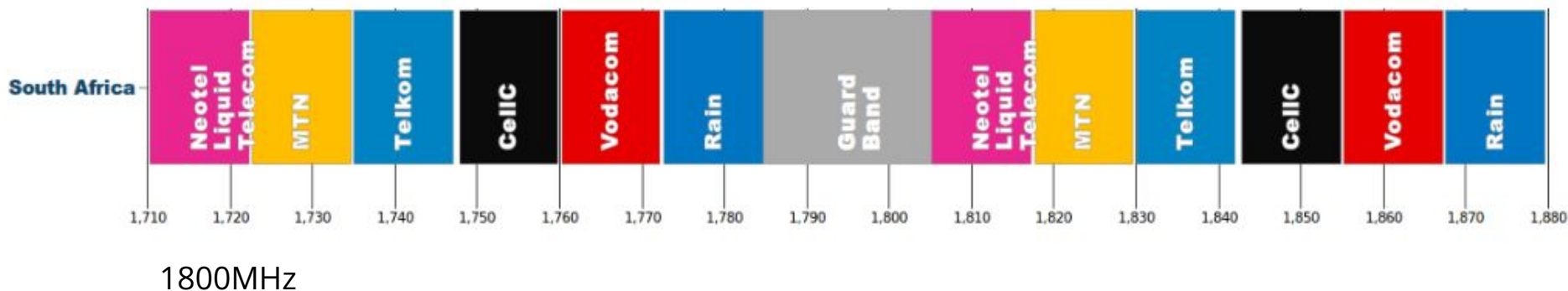
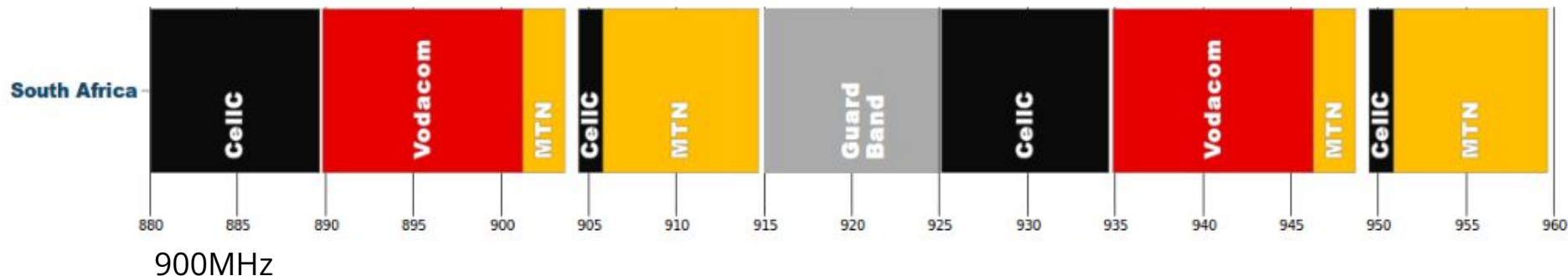


The screenshot shows a web browser window displaying a public notice from the Nigerian Communications Commission (NCC). The browser's address bar shows the URL: `ncc.gov.ng/media-centre/public-notices/760-public-notice-draft-guidelines-on-the-use-of-television-white-spa`. The website header features the NCC logo and navigation links for 'About The Commission', 'Licensing & Regulation', 'Technical Regulation', and 'Stat & Re'. Below the header is a decorative blue and green patterned banner. The main content area includes a breadcrumb trail 'Media Centre > Public Notices >', social media sharing icons for WhatsApp, Facebook, LinkedIn, and Telegram, and the title 'PUBLIC NOTICE: Draft Guidelines on the use of Television White Space (TVWS) in Nigeria'. A 'PUBLISHED: 31 DECEMBER 2019' date stamp is visible. The notice text states that the NCC, in conjunction with the National Broadcasting Commission (NBC), has developed draft Guidelines for the use of Television White Spaces (TVWS) for rural broadband connectivity in Nigeria, and is organizing an industry consultation. It provides a URL for the draft guidelines: <https://www.ncc.gov.ng/.../876-draft-guidelines-on-the-u.../file>. The notice concludes by inviting all stakeholders to peruse the guidelines and provide input/feedback on or before the industry consultation (date to be announced). The feedback will give NCC/NBC the opportunity to make all necessary adjustments prior to the guidelines being finalised.

# Innovation in IMT Spectrum Sharing

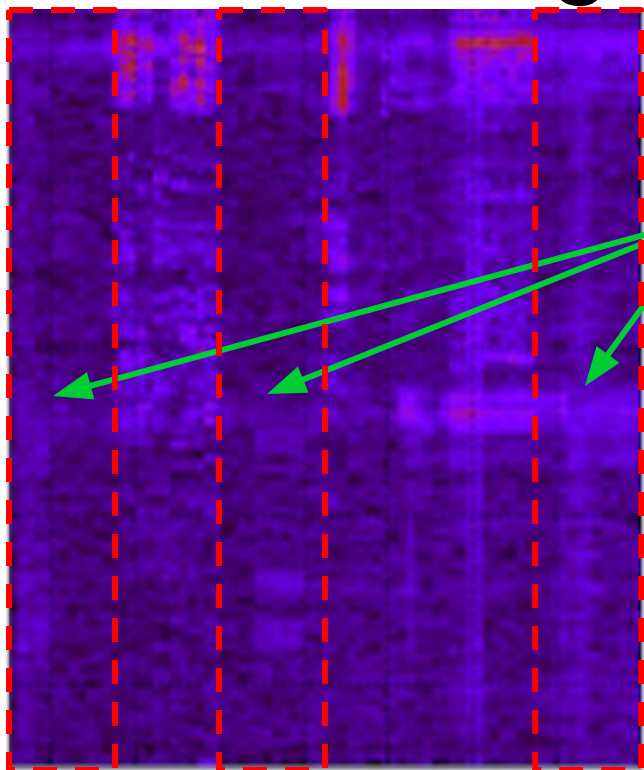
# Spectrum Use

## Case Study: South Africa

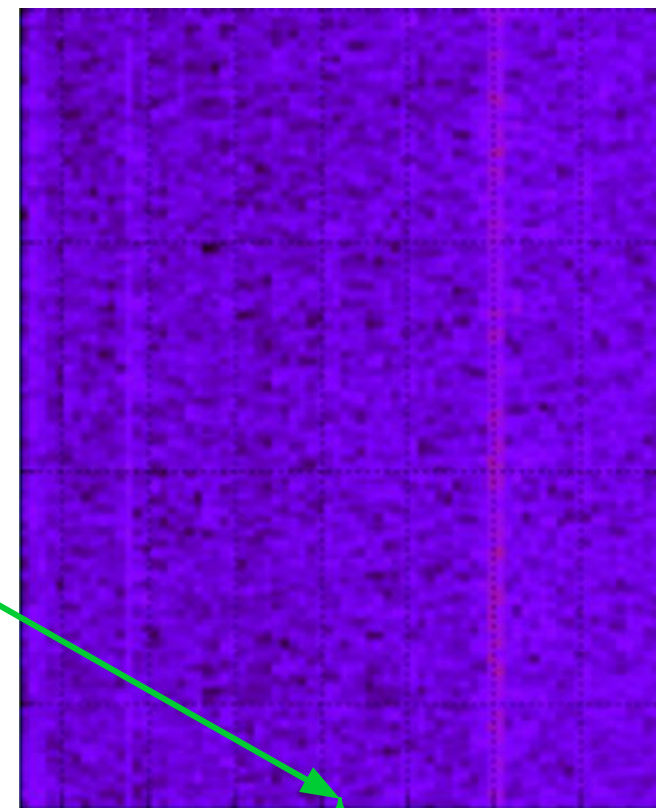


Source: <https://opentelecomdata.org/spectrum-chart/>

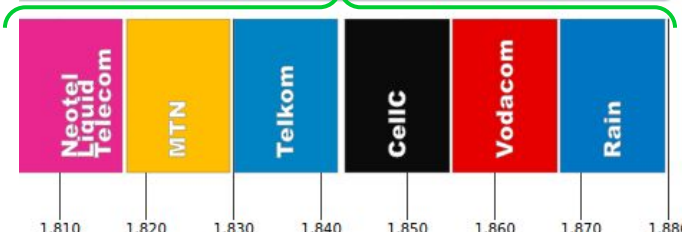
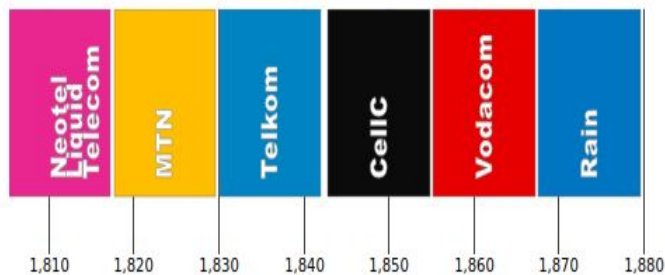
# 1800MHz usage in South Africa



N2 Route  
30 MHz  
unused



Rural  
65 MHz  
unused



80km along the N2 (EC)

4km in rural Eastern Cape

Source: <http://wireless.ictp.it/gsm/>

# Mexico

## Assignment of Spectrum for Social Purpose

- ❑ Regulator set aside 2x5MHz of 850MHz band for social purpose
- ❑ With 2x2 MHz TIC Rhizomatica has enabled 20 communities to provide themselves with voice services
- ❑ 70+ localities
- ❑ ~3,000 users daily
- ❑ ~\$10,000 capital cost per base station



# United Kingdom

## Innovation in Shared Spectrum



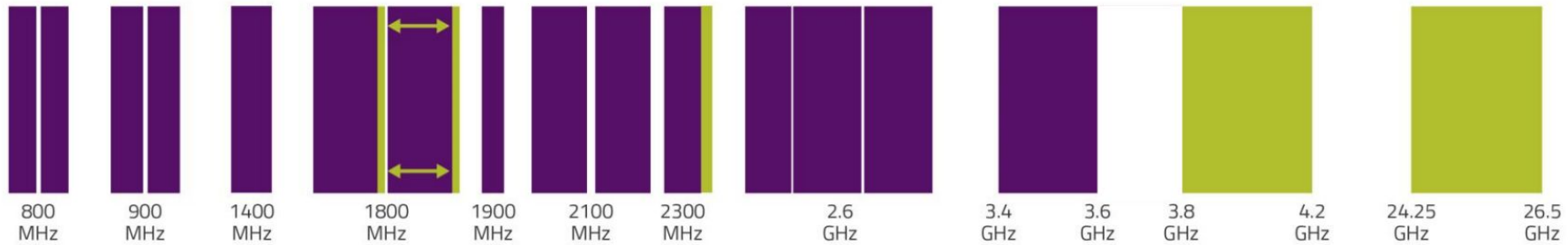
“Another possibility is encouraging community engagement in networks: why can’t they, if they get access to spectrum, manage a 4G or 5G network?”

*M. Hanif, CTO of OFCOM*

Source: <https://www.mobileworldlive.com/featured-content/top-three/ofcom-targets-rural-industrial-coverage-boost/>

# United Kingdom

## Innovation in Shared Spectrum



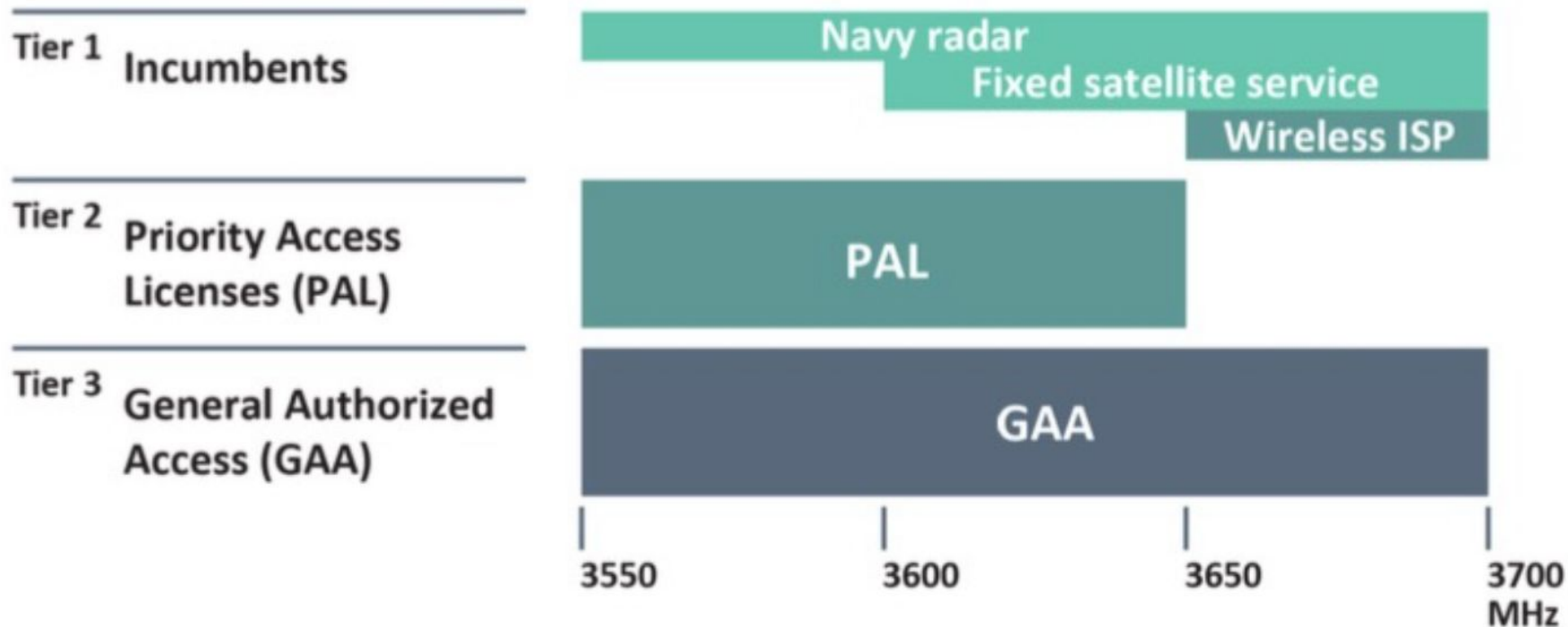
### Shared Access licence : Access to 4 Ofcom managed bands (available end 2019)

- 1800 MHz (DECT guard band) : 2x3.3 MHz (FDD)
- 2390 – 2400 MHz : 10 MHz
- 3.8 – 4.2 GHz : 10 – 100 MHz
- 24.25 – 26.5 GHz : 50, 100 and 200 MHz

### Local licence : Access to spectrum licenced on national basis to MNOs (available now)

# United States

## Citizens Broadband Radio Service (CBRS)





# New Zealand

## Managed Spectrum Park

- 40MHz of spectrum (2580MHz to 2620MHz) reserved for local and regional services.
- Available to any service provider
- Suitable for fixed or access LTE services
- In the event of competing applications a ballot elimination process is used.



### RADIO SPECTRUM MANAGEMENT

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## Managed Spectrum Park

Managed Spectrum Park (MSP) is a licence type in the frequency range 2580 MHz to 2620 MHz that's intended for local and regional services. When someone applies for an MSP licence, the details of their application are advertised on our website. If competing applications for the licence are received, a ballot elimination process is sometimes required.

Home > Projects and auctions > Expressions of Interest > Managed Spectrum Park

### Notification of applications for Managed Spectrum Park licences

When someone applies for a Managed Spectrum Park licence, the details of their application are advertised on our website. This page

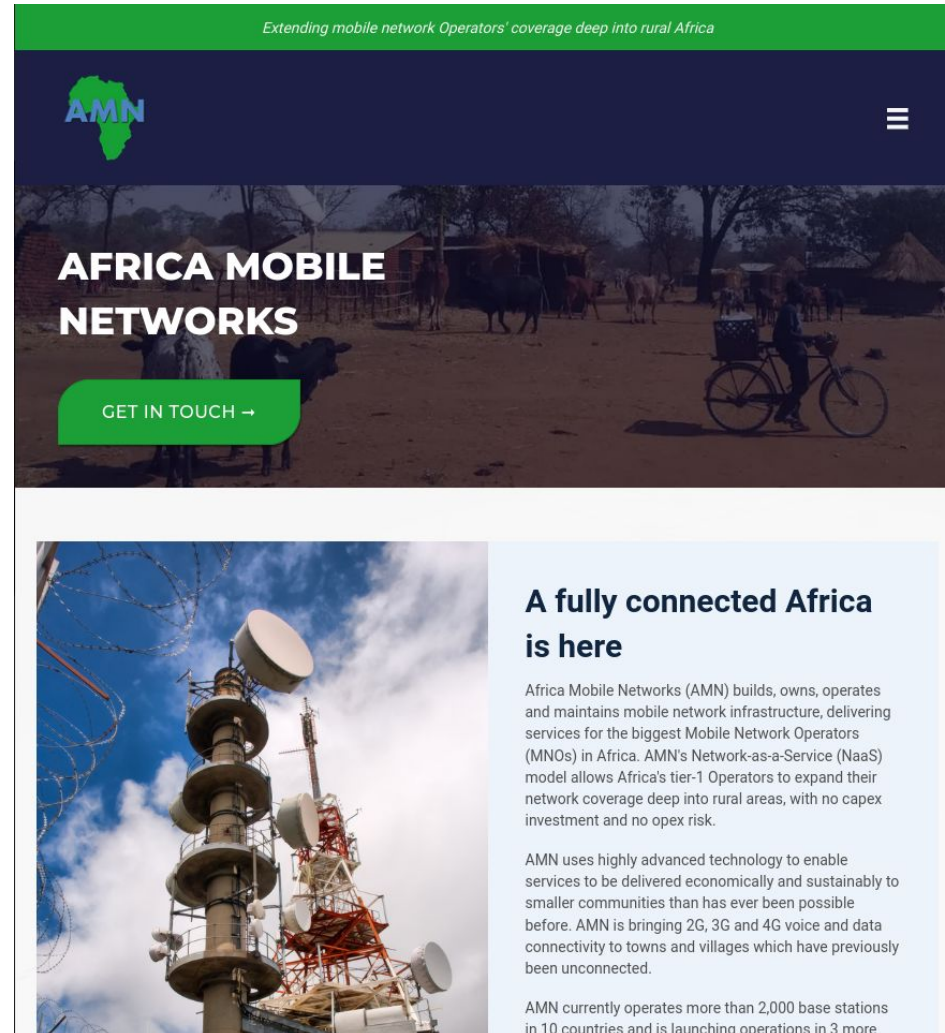
### Managed Spectrum Park ballot process

Applications for Managed Spectrum Park (MSP) licences are published on our website. Interested parties are allowed to submit a competing

# Infrastructure As A Service

## Example: Africa Mobile Networks

- Operation in 11 countries
- Benin, Bissau, Cameroon, Congo, DRC, Ghana, Guinea, Liberia, Nigeria, Sudan, and, Zambia
- Several hundred sites
- 7 other countries targeted
- Potential to reach 40-100 million people



Extending mobile network Operators' coverage deep into rural Africa

AMN

AFRICA MOBILE NETWORKS

GET IN TOUCH →

### A fully connected Africa is here

Africa Mobile Networks (AMN) builds, owns, operates and maintains mobile network infrastructure, delivering services for the biggest Mobile Network Operators (MNOs) in Africa. AMN's Network-as-a-Service (NaaS) model allows Africa's tier-1 Operators to expand their network coverage deep into rural areas, with no capex investment and no opex risk.

AMN uses highly advanced technology to enable services to be delivered economically and sustainably to smaller communities than has ever been possible before. AMN is bringing 2G, 3G and 4G voice and data connectivity to towns and villages which have previously been unconnected.

AMN currently operates more than 2,000 base stations in 10 countries and is launching operations in 3 more

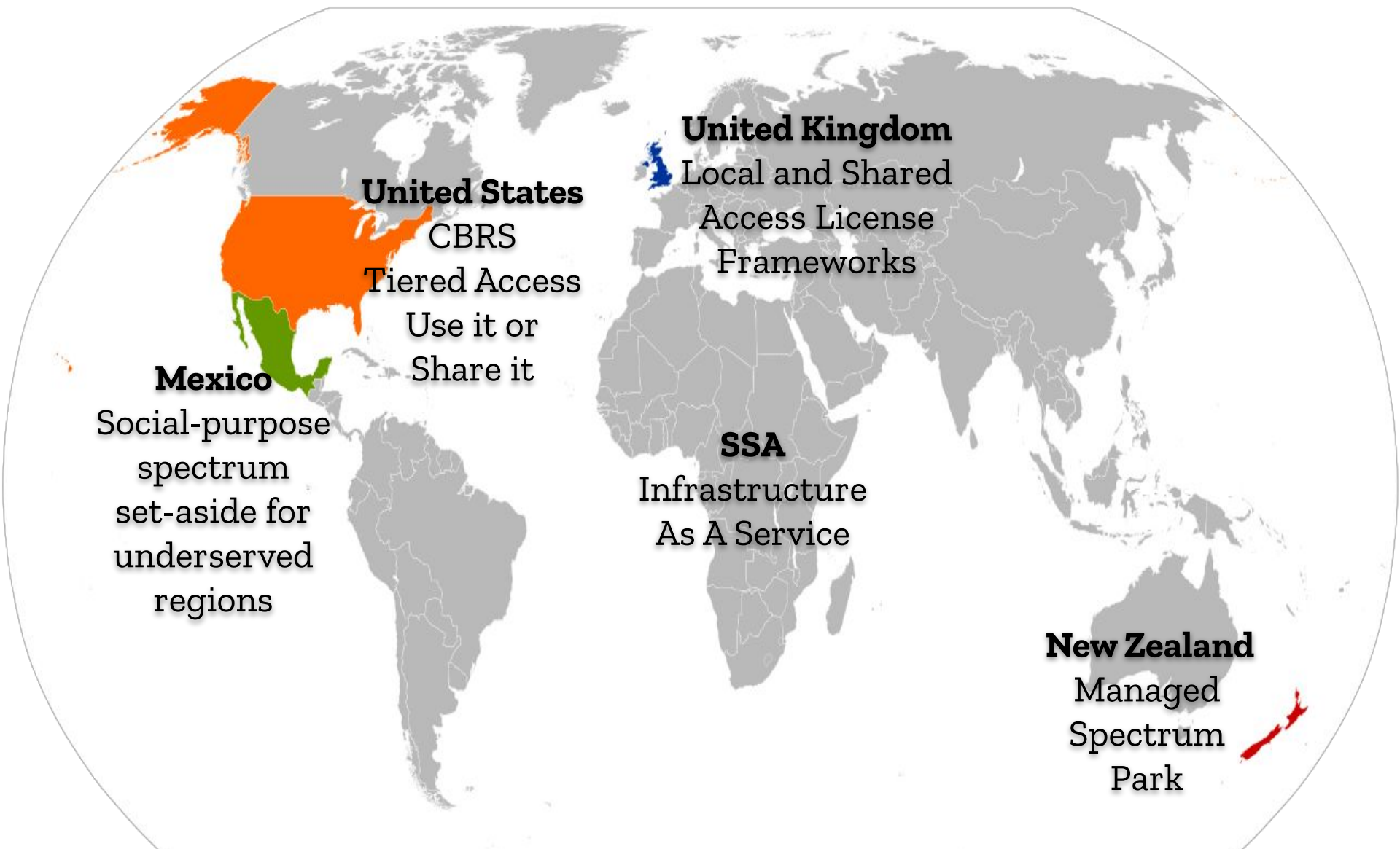
# Infrastructure As A Service

Example: Africa Mobile Networks

- No regulatory change required
- Partnership with major operators in order to gain access to spectrum
- Network is an extension of the major operator
- Low CAPEX - base station cost \$10-15K
- Low OPEX through low power consumption and solar power
- Radius 1-3km
- Dependent on incumbent



# Spectrum Innovation Summary



# South Africa - Draft Spectrum Policy



STAATSKOERANT, 8 SEPTEMBER 2022

No. 46873 3

## GENERAL NOTICES • ALGEMENE KENNISGEWINGS

DEPARTMENT OF COMMUNICATIONS AND DIGITAL TECHNOLOGIES

GENERAL NOTICE 1271 OF 2022

ELECTRONIC COMMUNICATIONS ACT, 2005

(ACT NO. 36 OF 2005)

### INVITATION TO PROVIDE WRITTEN SUBMISSIONS ON THE PROPOSED NEXT GENERATION RADIO FREQUENCY SPECTRUM FOR ECONOMIC DEVELOPMENT

#### 21. Alternative Network Infrastructure

- (a) To bridge connectivity gaps, extend broadband access and provide reliable data services for rural, remote and under-served communities including all low-income areas, and secondary cities and towns, this policy supports the “development of alternative infrastructure” such as Wi-Fi and Community Networks.
- (b) The alternative network infrastructure deployment will also be used to prevent data market dominance by the oligopoly and to address transformation objectives.

#### 21.2 Community Networks

- (a) This spectrum policy acknowledges that the current market failure as reported in the State of Broadband Report 2021, “in 2019, nearly 87 per cent of individuals in developed countries were using the Internet versus only 19 per cent in least developed countries (LDCs), as well as by households where nearly 89 per cent of households in developed economies were using the Internet versus less than 10 per cent in low-income countries”, can be addressed through supporting the viability of community networks.
- (b) Given the inability of community networks to take off in South Africa, this policy adopts a variation of the implementation model of community networks to those led by SMMEs to allow the development of Mobile Virtual Network Operators (MVNOs), Internet Service Providers (ISPs), Wireless Access/ Internet Service Providers (WASPs/ WISPs) as competitive and viable data service providers.
- (c) To address challenges that can impede the development of community networks including proliferation of these networks, the Regulator must develop a licensing framework for Community Networks in a manner that allows participation of new entrants, commercial viability, geographic spread of participants.
- (d) The Regulator must, within a year from publication of this spectrum policy, investigate and report with recommendation(s) to Minister, a new licensing framework for community network built, services, access and licensing fees or exemptions that can be implemented to ensure proliferation and success of community networks.
- (e) The Regulator must continuously identify and streamline or eliminate regulatory requirements that may impede the commercial viability and sustainability of community networks.

**September 8, 2022**

# Dynamic Spectrum Alliance - Kenya



# Thank you!