Access to Spectrum in Rural Areas

Session 2.3

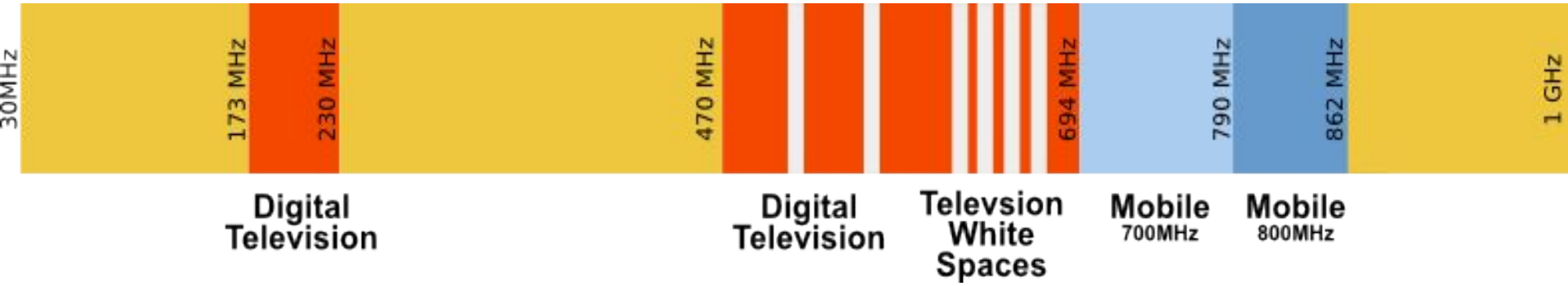
Dynamic Spectrum

TVWS et al

Dynamic Spectrum

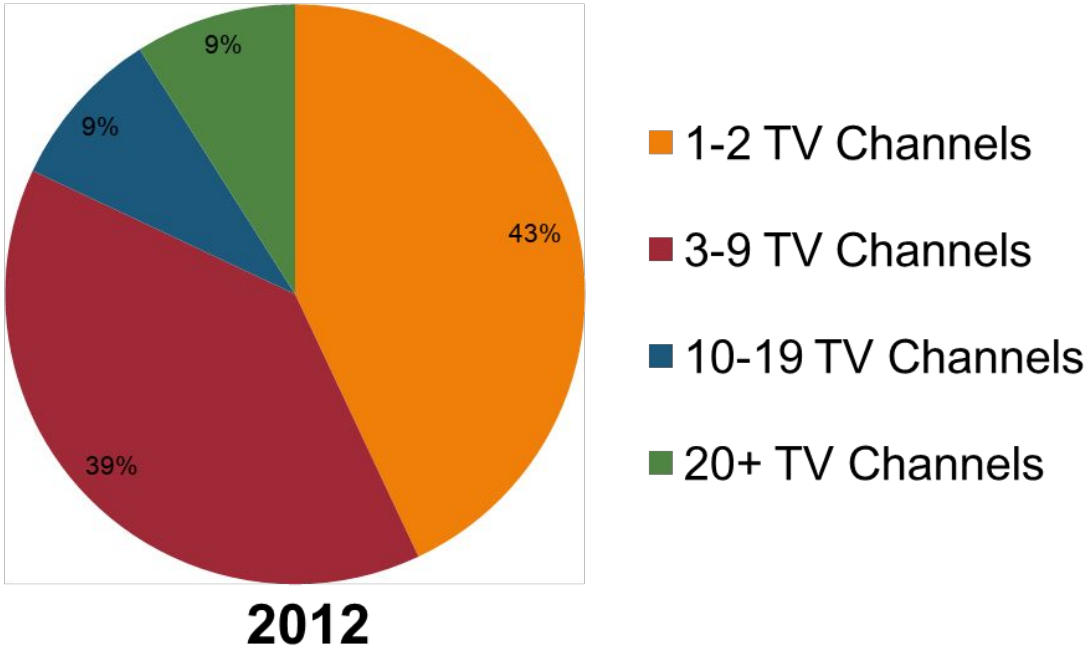
Television White Spaces (TVWS)

- 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

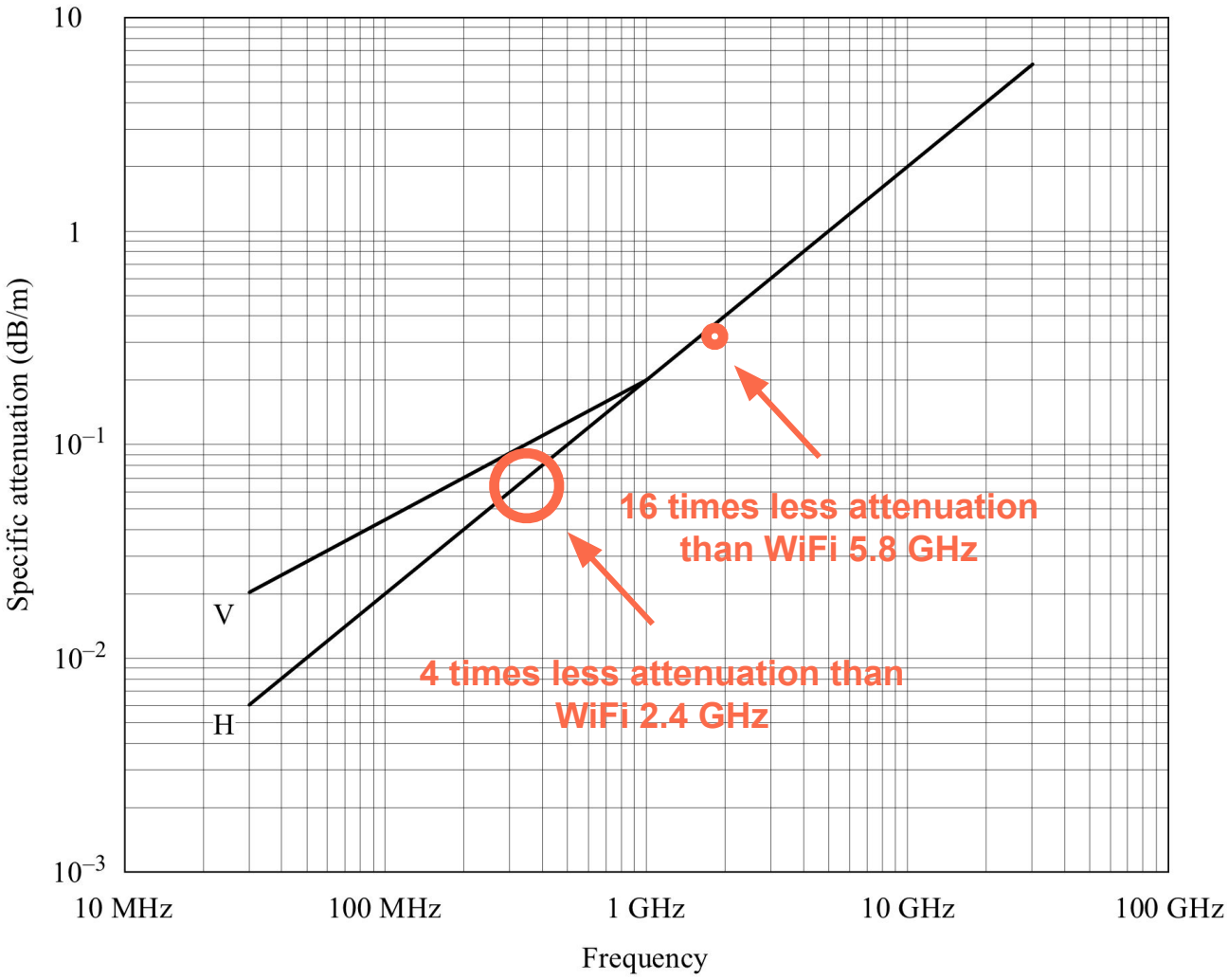
African Countries



In most cases, hundreds of megahertz of unused spectrum

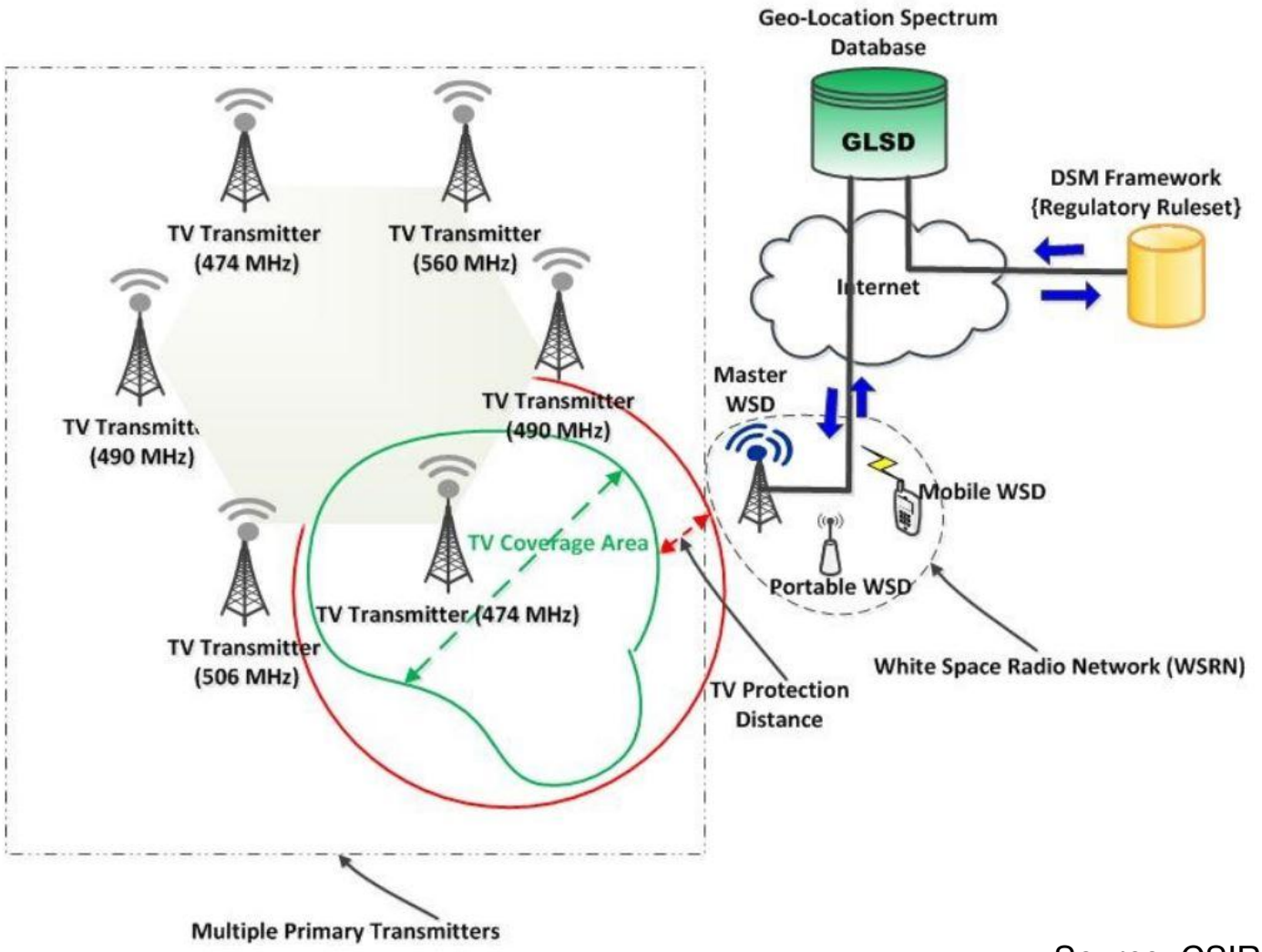
Source: Balancing Act
Presentation to African Telecommunications Union (ATU) Digital Migration Summit (May 2014)
http://www.atu-uat.org/index.php/download-categories/category/10-afriswog-events?download=299:session-3-ppt-1-balancing-act-presentation

Radio Attenuation in Vegetation



Rec. ITU-R P.833-7

Geo-Location Database Access



Source: CSIR

Dynamic Spectrum in Africa

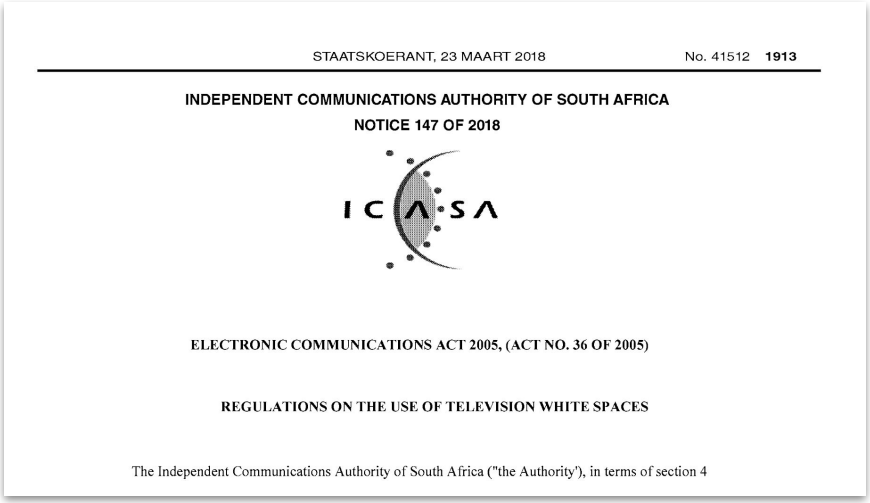
2012 – 2022

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

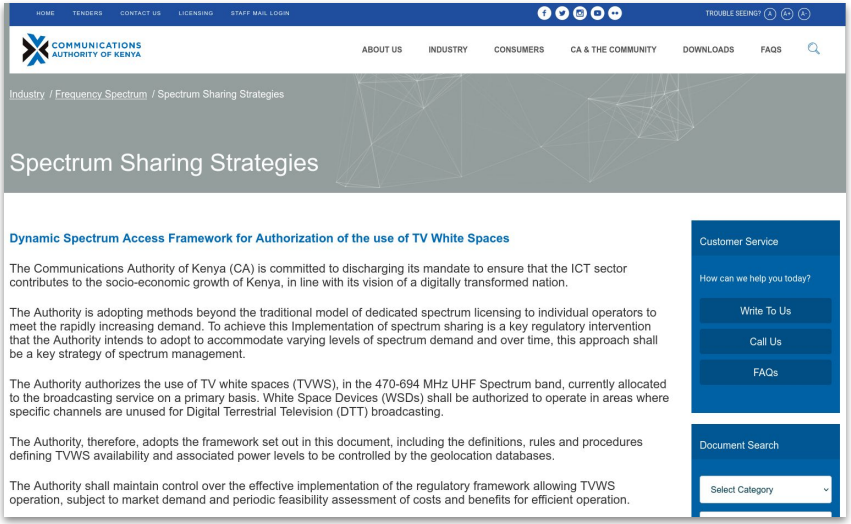
NOTICE 147 OF 2018

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



Kenya - 2021

REPÚBLICA DE MOÇAMBIQUE

MINISTÉRIO DOS TRANSPORTES E COMUNICAÇÕES

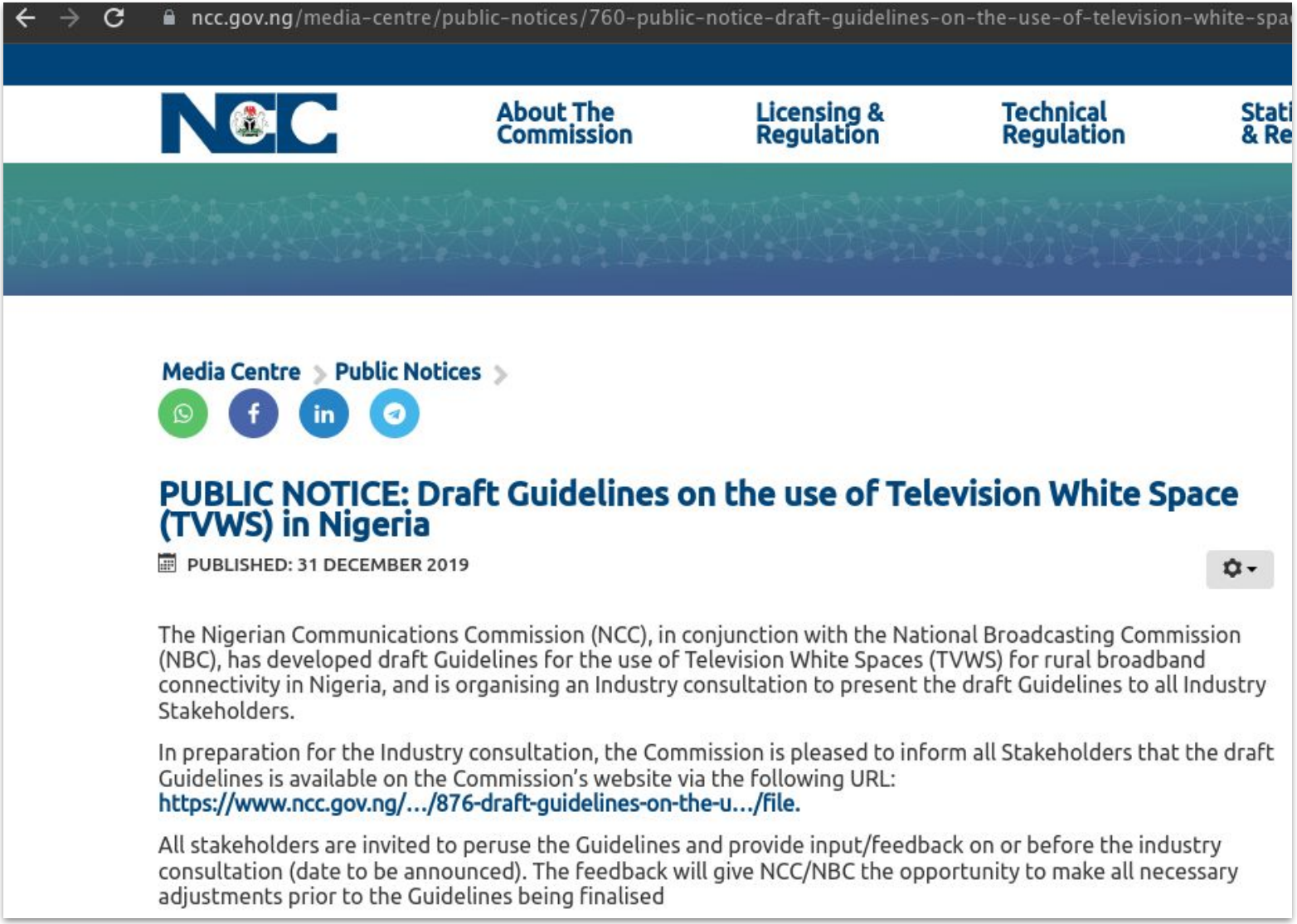
INSTITUTO NACIONAL DAS COMUNICAÇÕES DE MOÇAMBIQUE

PROPOSTA

DE NORMA TÉCNICA TV-WHITE SPACES PARA SERVIÇOS DE TELECOMUNICAÇÕES NA FAIXA DE UHF (470-694 MHz)

Mozambique - 2019

Nigeria - 2020



ncc.gov.ng/media-centre/public-notices/760-public-notice-draft-guidelines-on-the-use-of-television-white-spa

NCC

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Media Centre > Public Notices >

PUBLIC NOTICE: Draft Guidelines on the use of Television White Space (TVWS) in Nigeria

PUBLISHED: 31 DECEMBER 2019

The Nigerian Communications Commission (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 organising an Industry consultation to present the draft Guidelines to all Industry Stakeholders.

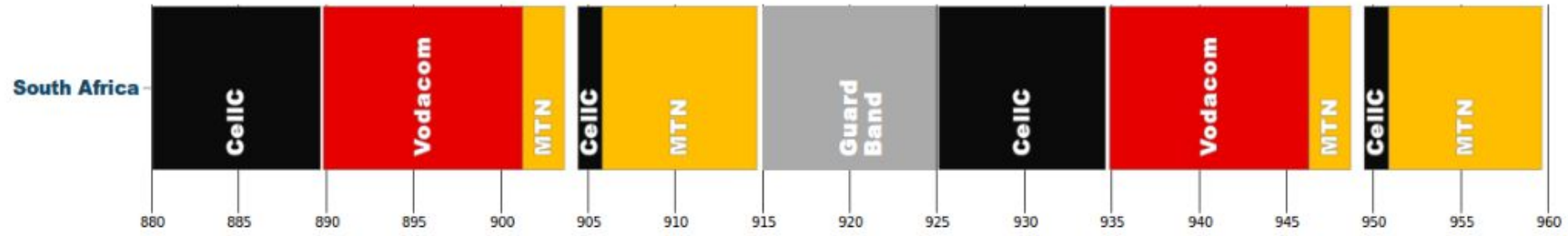
In preparation for the Industry consultation, the Commission is pleased to inform all Stakeholders that the draft Guidelines is available on the Commission's website via the following URL:
https://www.ncc.gov.ng/.../876-draft-guidelines-on-the-u.../file.

All stakeholders are invited 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

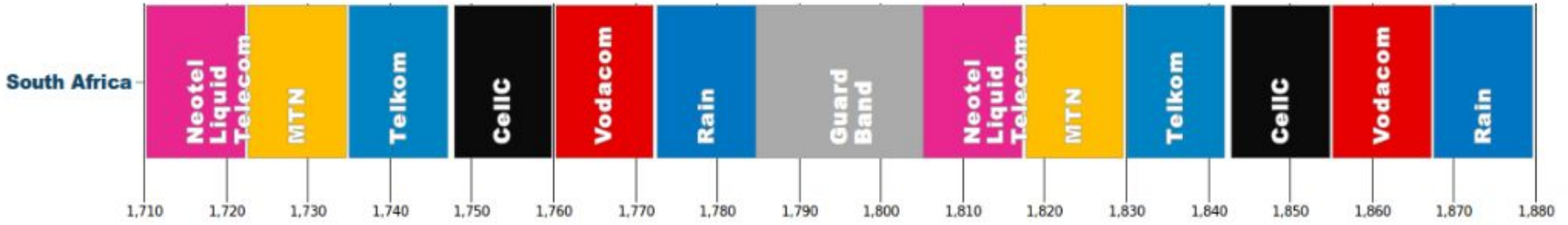
Innovation in IMT Spectrum Sharing

Spectrum Use

Case Study: South Africa



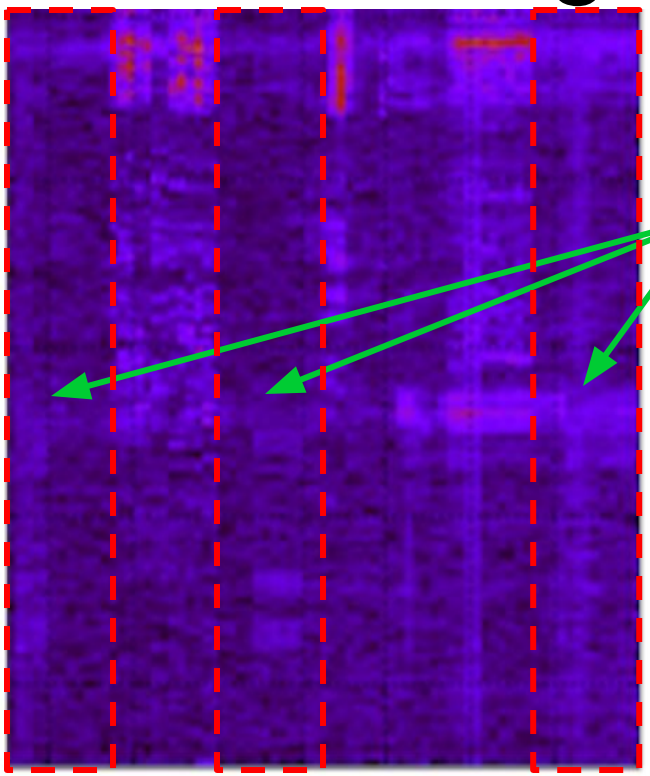
900MHz



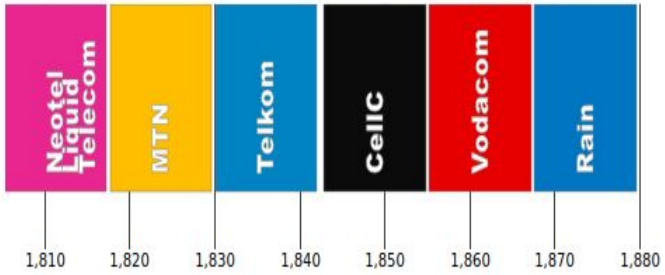
1800MHz

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

1800MHz usage in South Africa

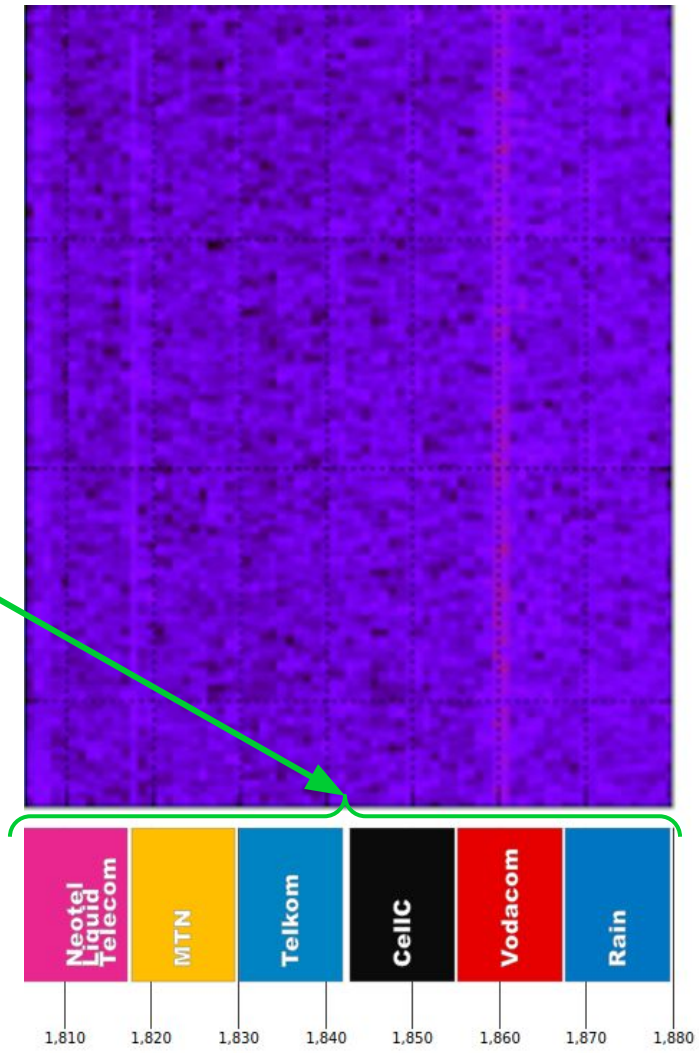


N2 Route
30 MHz
unused



80km along the N2 (EC)

Rural
65 MHz
unused



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

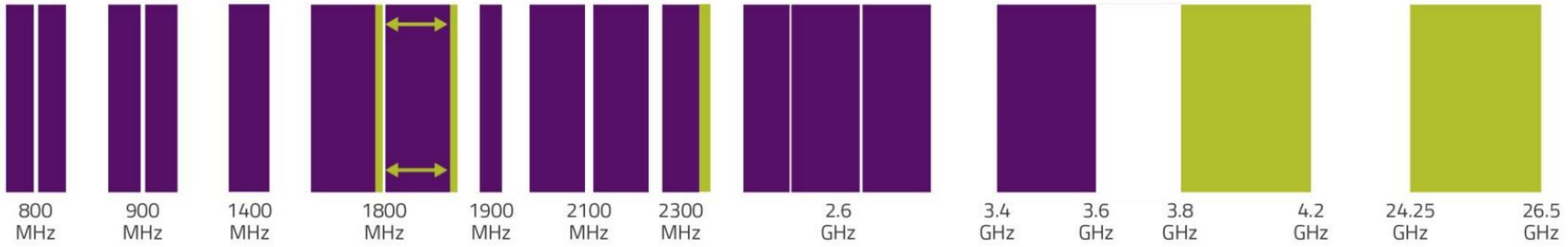
"Another possibility is encouraging community engagement in networks: why can't they, if they get access to spectrum, manage a 4G or 5G network?"

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**)

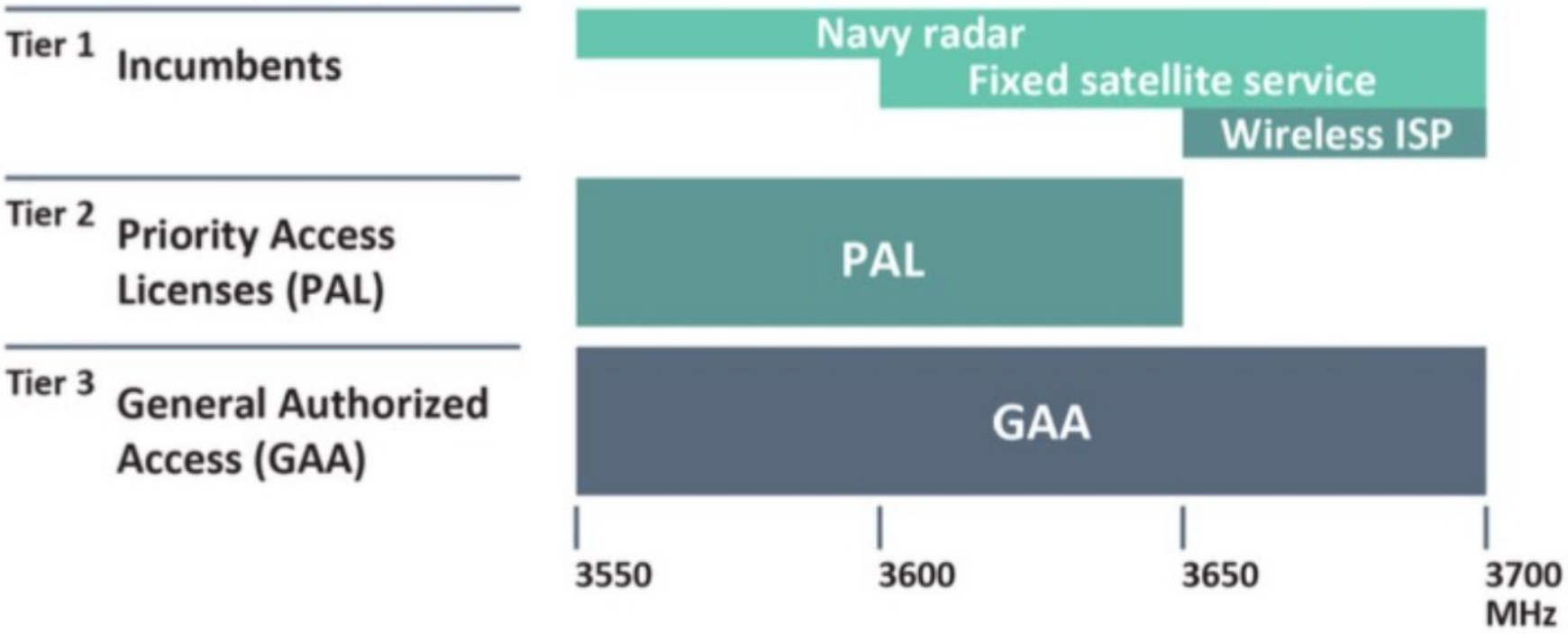
1800 MHz (DECT guard band)	: 2x3.3 MHz (FDD)
2390 – 2400 MHz	: 10 MHz
3.8 – 4.2 GHz	: 10 – 100 MHz
24.25 – 26.5 GHz	: 50, 100 and 200 MHz

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

Source: https://www.ofcom.org.uk/__data/assets/pdf_file/0033/157884/enabling-wireless-innovation-through-local-licensing.pdf

United States

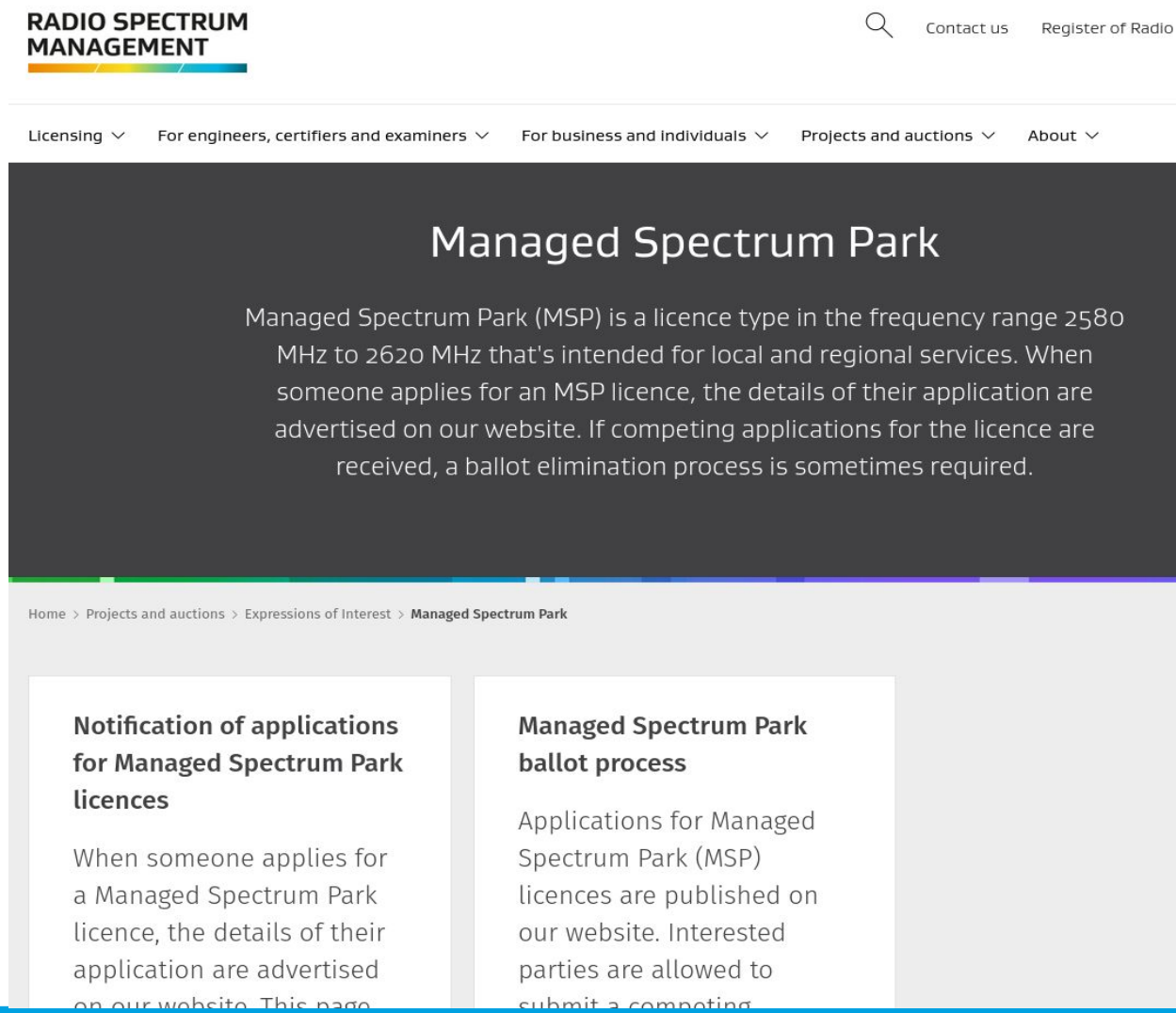
Citizens Broadband Radio Service (CBRS)



New Zealand

Managed Spectrum Park

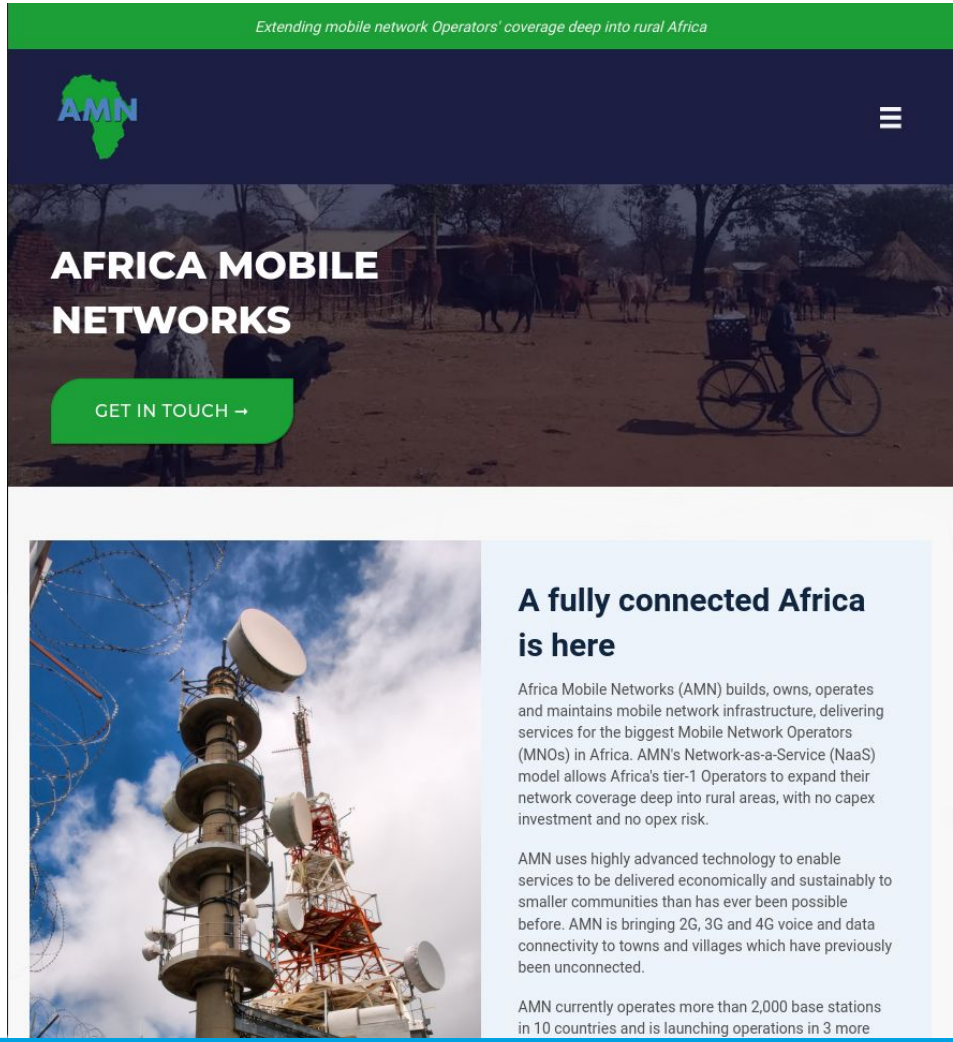
- 40MHz of spectrum (2580MHz to 2620MHz) reserved for local and regional services.
- Available to any service provider
- Suitable for fixed or access LTE services
- In the event of competing applications a ballot elimination process in used.



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

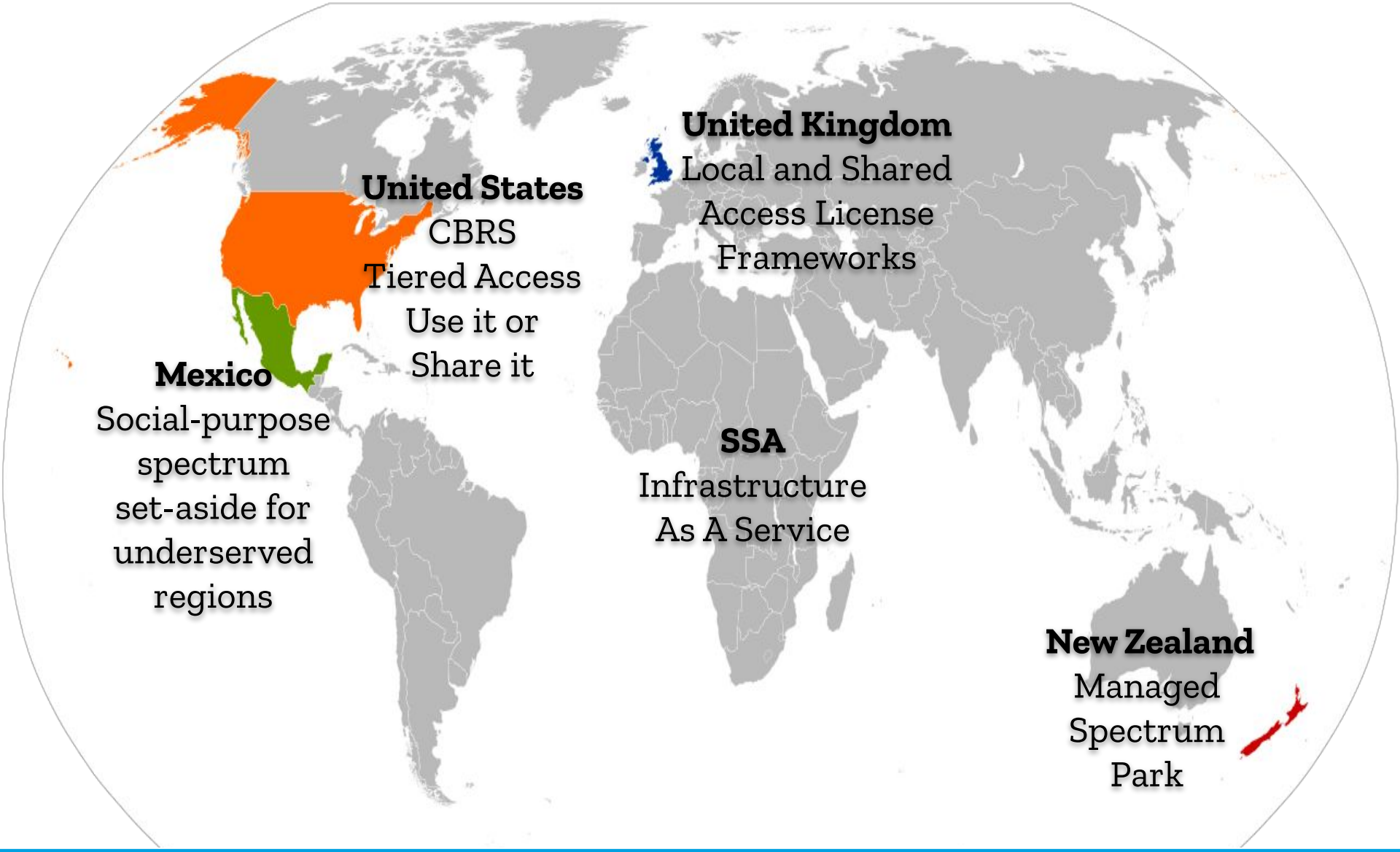


Infrastructure As A Service

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

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.

September 8, 2022

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.

Dynamic Spectrum Alliance - Kenya

Thank you!