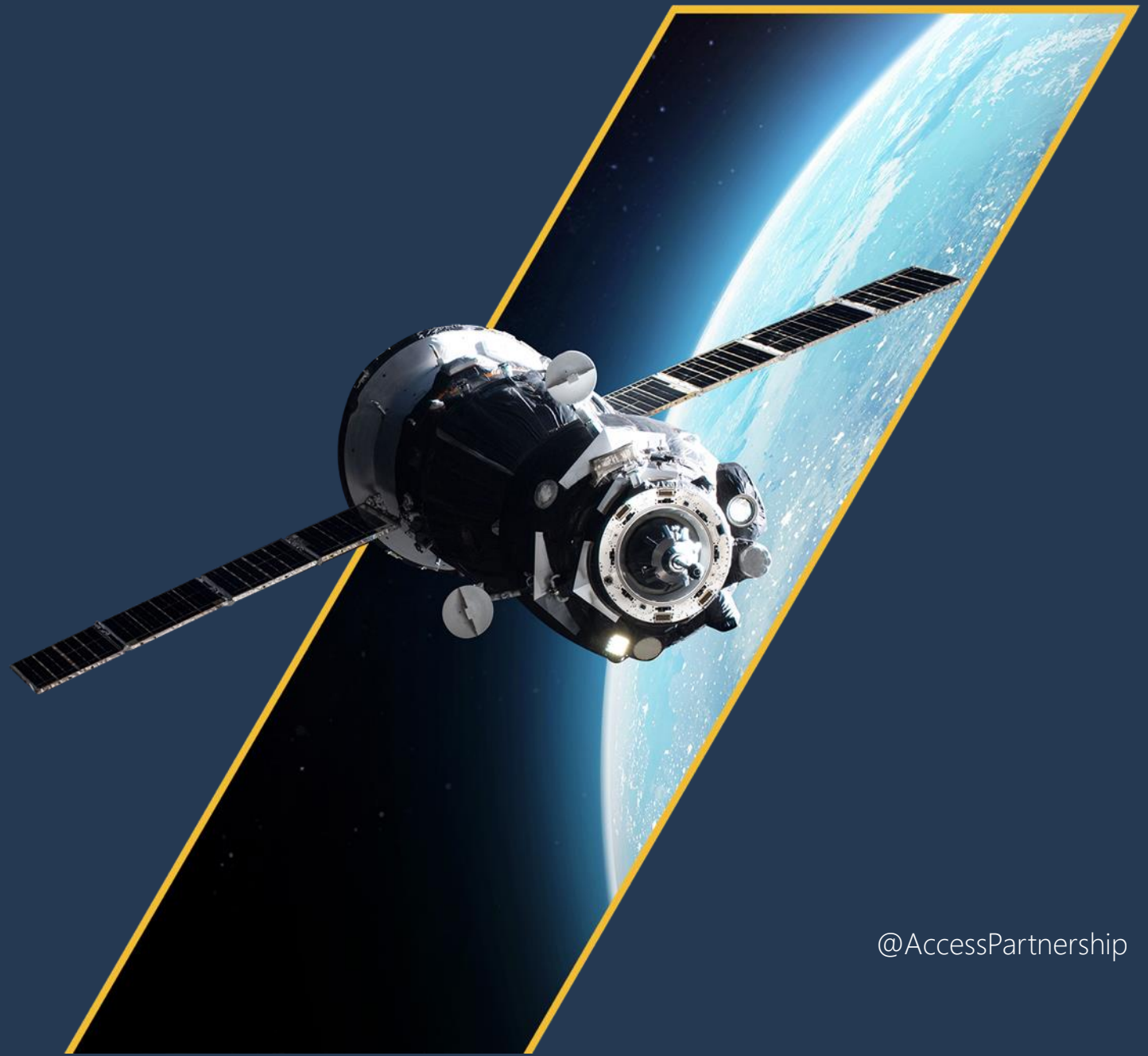
Access Partnership

Direct-to-Device

Opportunities, challenges and forward-looking Regulations

November 2023



accesspartnership.com

@AccessPartnership

Who is Access Partnership?

Where we operate

6

Offices worldwide allow us to offer both a global and local perspective

140+

Employees with deep understanding of areas ranging from policy to legal and engineering

200+

jurisdictions where we devise strategies to overcome technical, regulatory, and political barriers

35

The number of languages – from Arabic to Mandarin – spoken by our teams

About Access Partnership

Experts in regulatory and technical affairs.

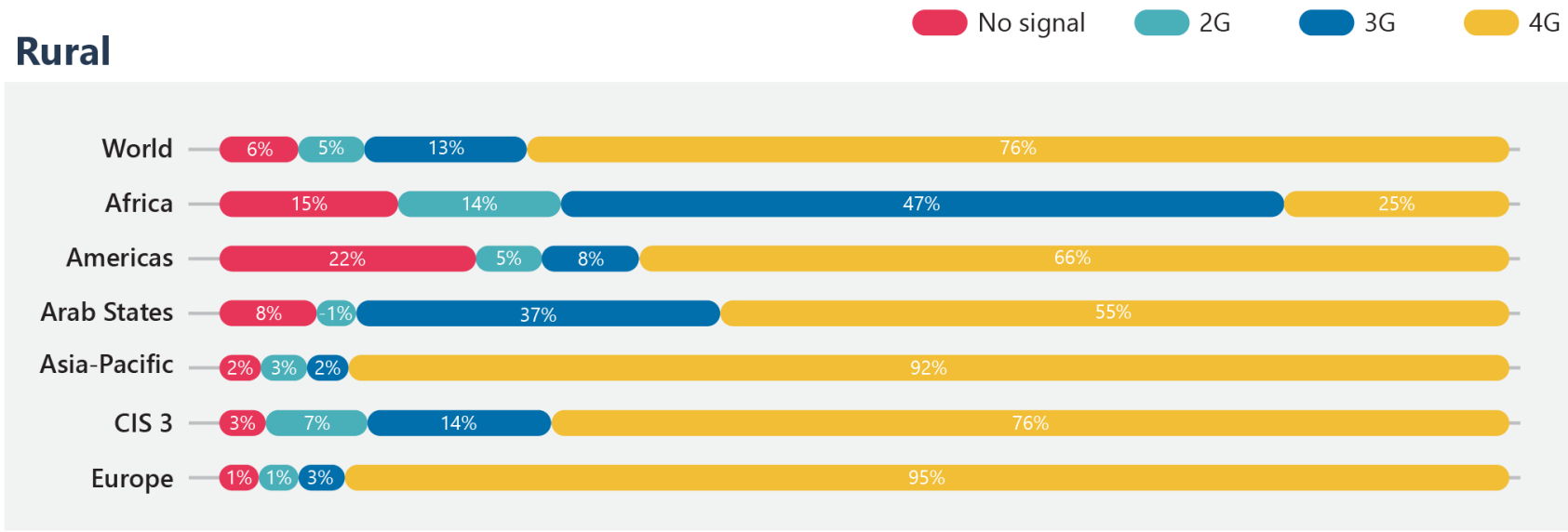
Spectrum leaders at ITU

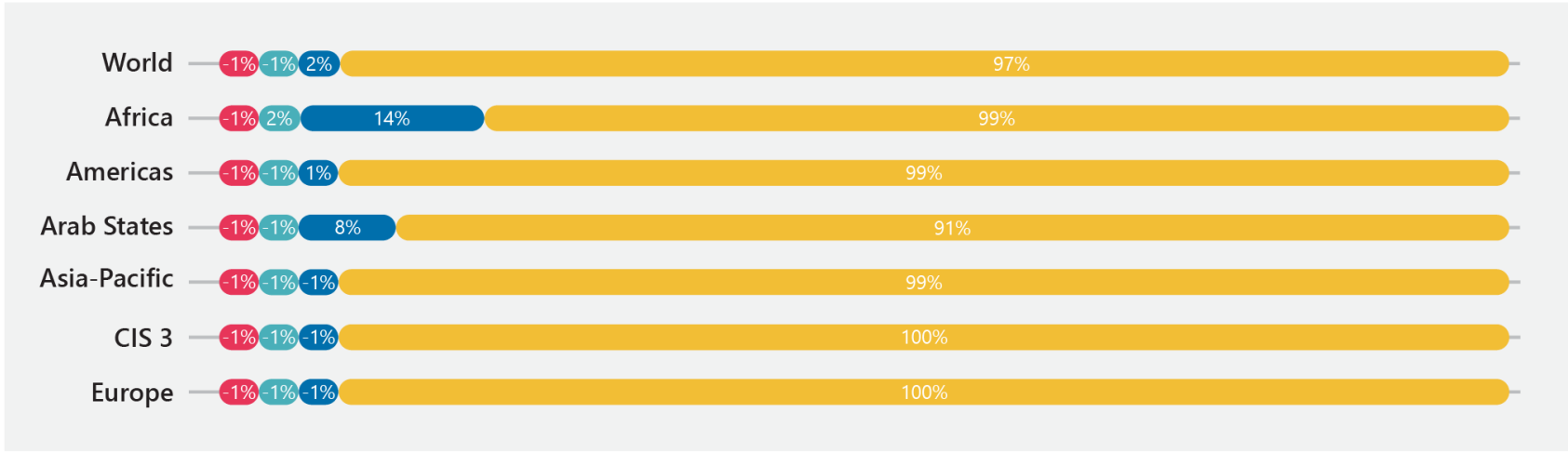
Global footprint

Multidisciplinary research

Unique experience in managing D2D projects

Population Coverage by Type of Mobile Network and Area, 2022

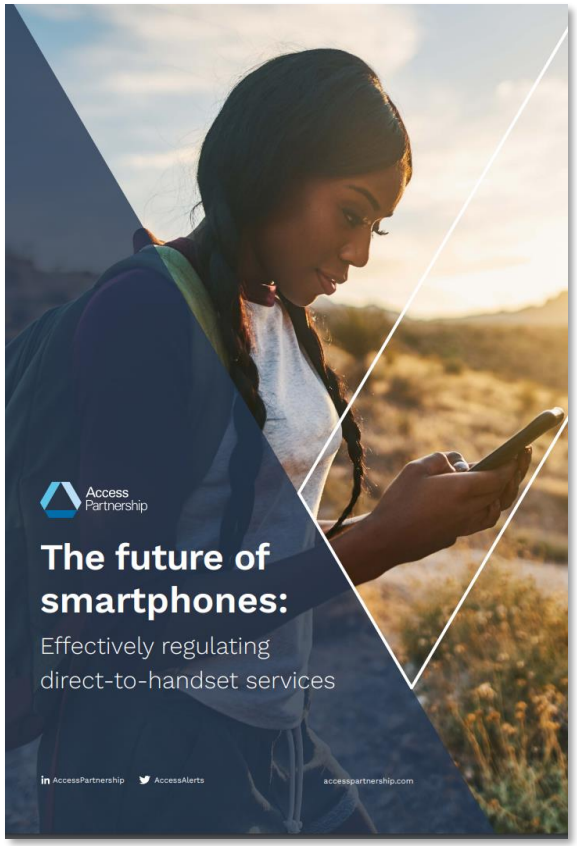




Promoting widespread connectivity can mitigate the impacts of disasters by enabling communities in distant locations to receive emergency updates and critical information.

The D2D Opportunity

Access Partnership conducted extensive research around this technology



Public Value & Decentralization: accessible and affordable connectivity.

Extending connectivity for governments and the private sector in various use cases.

Disaster Response & Recovery: Saving lives through supplemental emergency services connectivity.

Key Finding

enhanced D2D services require additional spectrum (MSS)

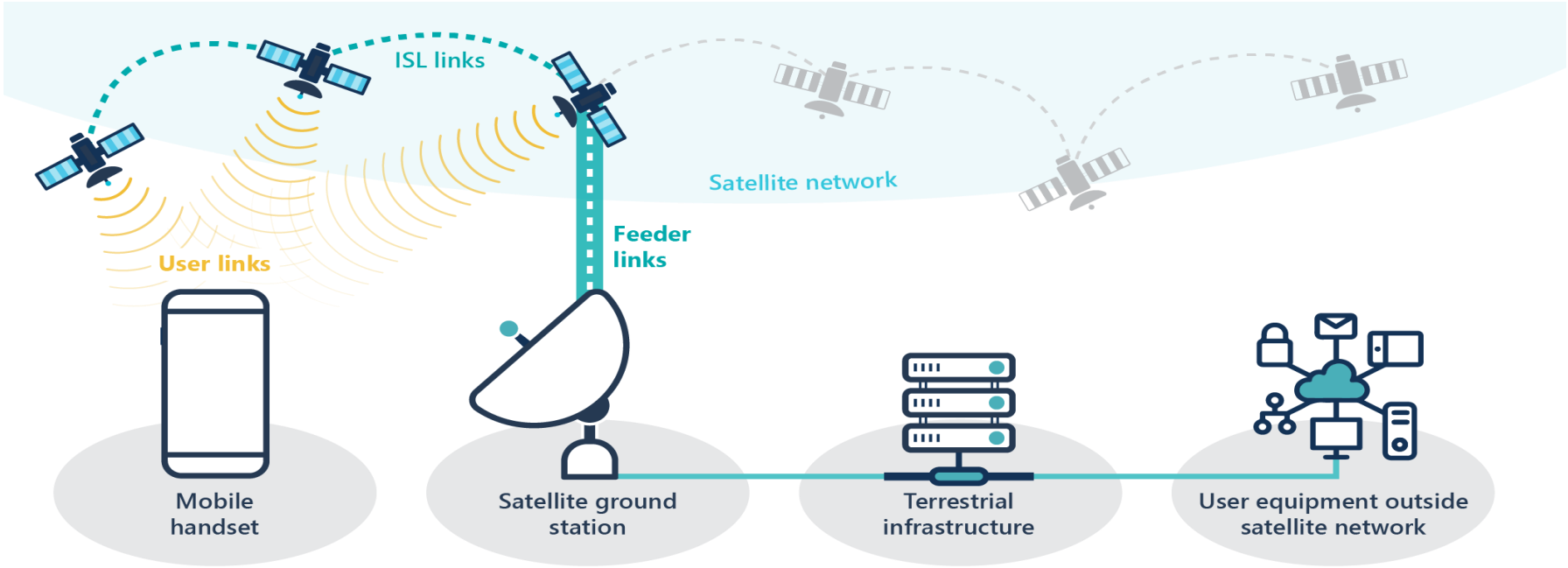
The Future of Smartphones

Dubbed direct-to-device, this new paradigm brings satellite capability to devices

- The impact of the emerging D2D market goes beyond just connecting people.
- It has the power to transform economies, boost GDP, and increase productivity.

The communication journey in a D2D context follows:

- a user initiates communication via satellite
- the satellite relays the transmission to a ground station; which
- processes and routes it to a global destination.



D2D Deployment Models

1

By-the-Book Approach

- Leverages established ITU global spectrum allocation for MSS.
- However, there is limited amount of currently allocated spectrum.

2

Alternative Approach

- Utilizes spectrum allocated to terrestrial mobile services (MS).
- No need for handset modification.
- It calls for new regulatory policies for satellite usage of MS spectrum.

Enhancing the satellite component of IMT

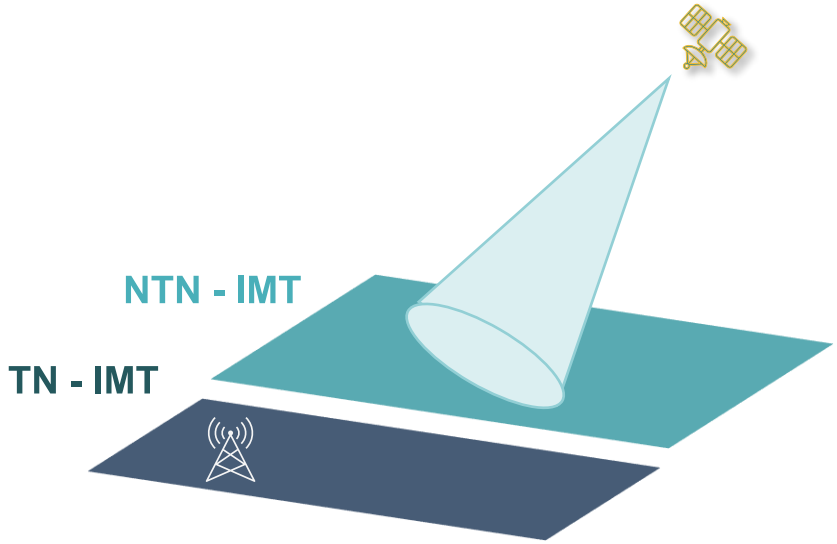
Underutilization of Terrestrial Component

Underutilized frequencies available to connected the un(der) served communities in the world.

Repurposing Spectrum for the Satellite Component

Given the nature of the service, spectrum repurposing can be proposed to harness the Satellite Component of IMT.

Meeting connectivity targets

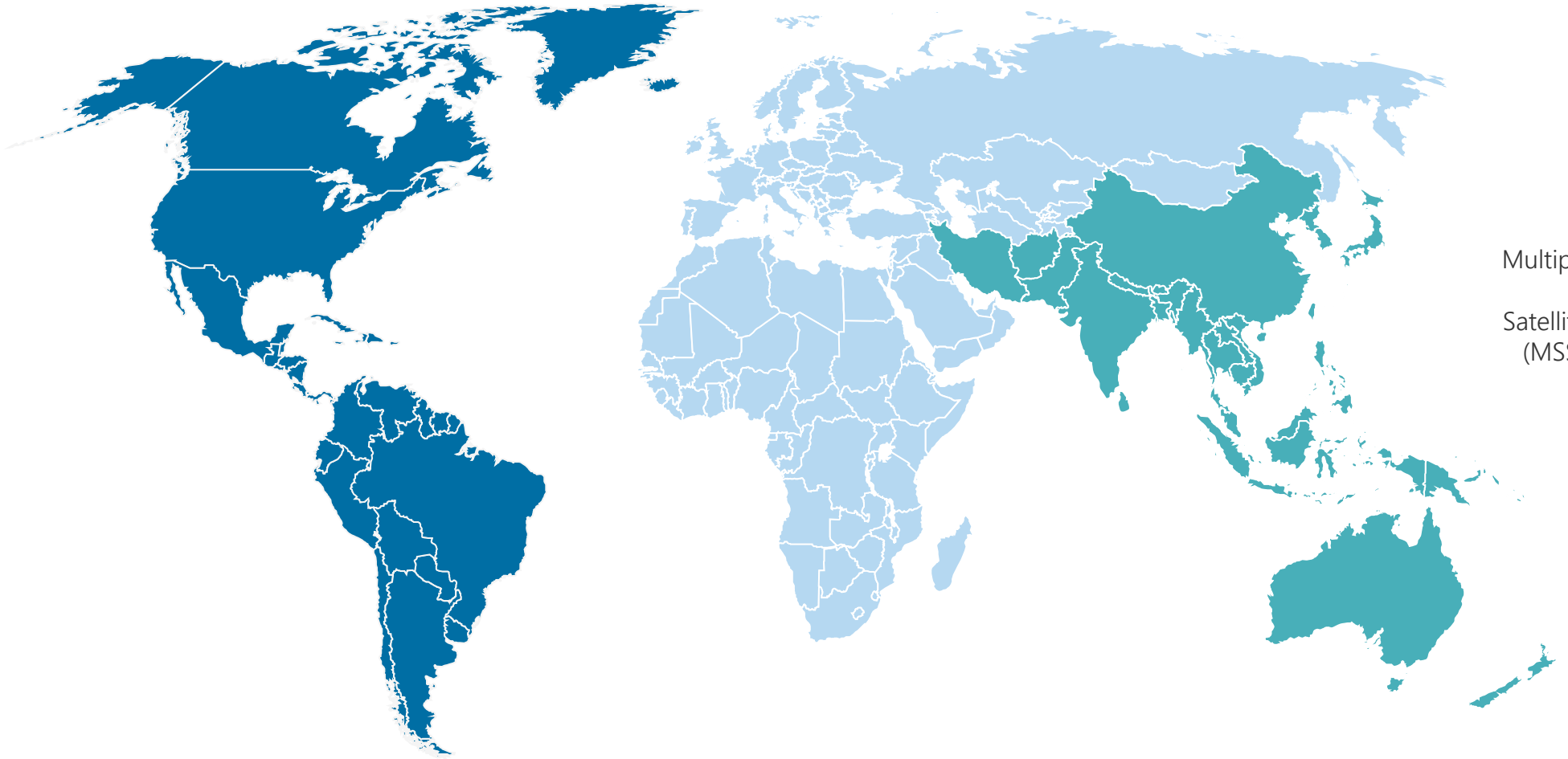


Satellite component of IMT / not MS

WRC-23

Region 2
Common Proposal CITEL - Satellite Component of IMT (MSS) for D2D / **range agreed**
Common Proposal CITEL - MSS non-D2D / **non-IMT**

Region 1
Common Position CEPT - Satellite Component of IMT (MSS) for D2D / **no bands agreed**
Common Proposal ASMG - Satellite Component of IMT (MSS) / **2 bands + open to IMT bands**
Common Proposal RCC - Satellite Component of IMT (MSS) / **range agreed**
Common Proposal APM - MSS non-D2D / **non-IMT**



Region 3
Multiple Proposal from APT members - Satellite Component of IMT (MSS) / **no bands agreed**

Economic Impact of DTH

An upcoming market

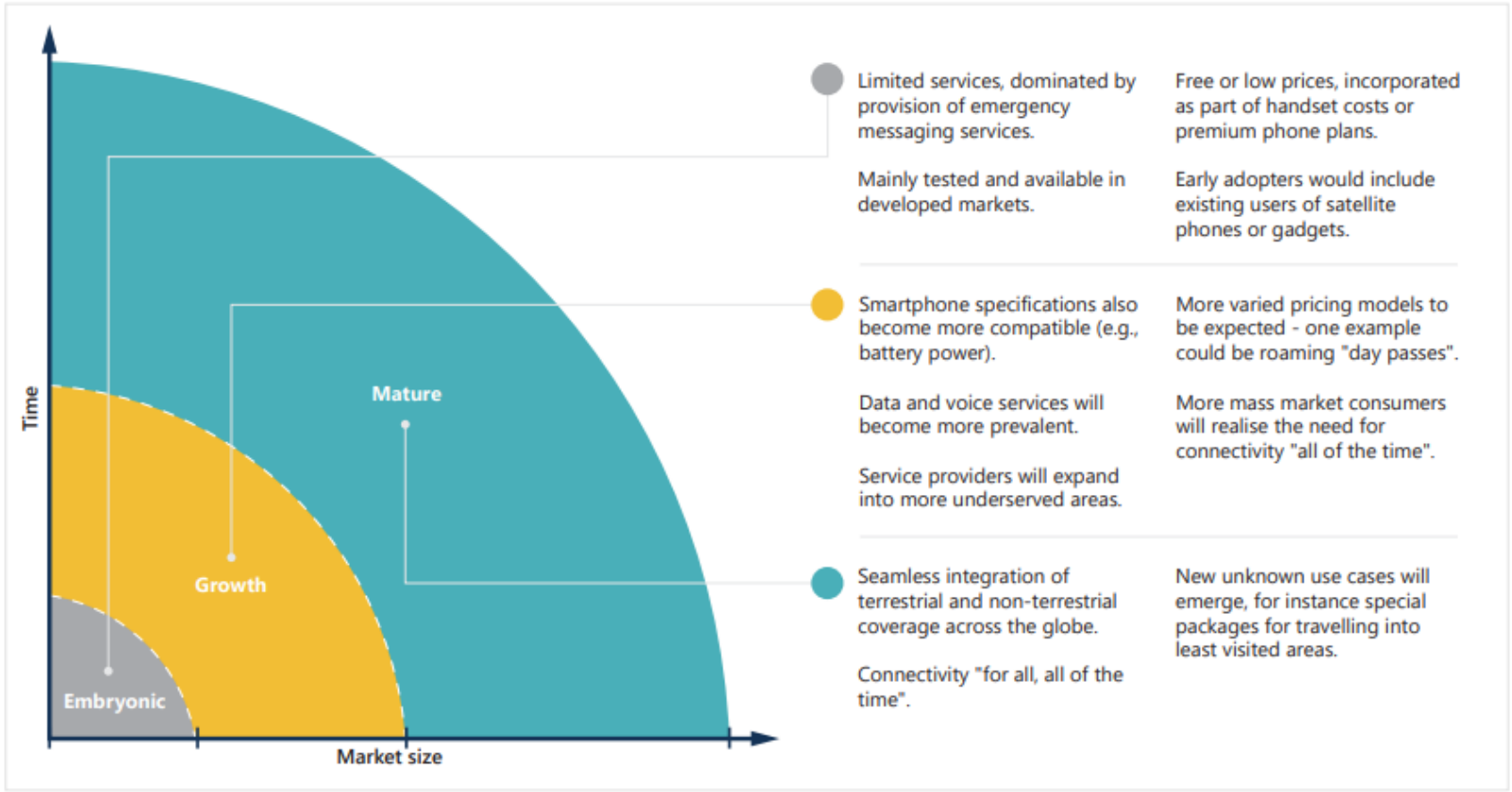


Figure 8: Increasing maturity of the DTH market

Source: Access Partnership analysis

Global Addressable Market Opportunity

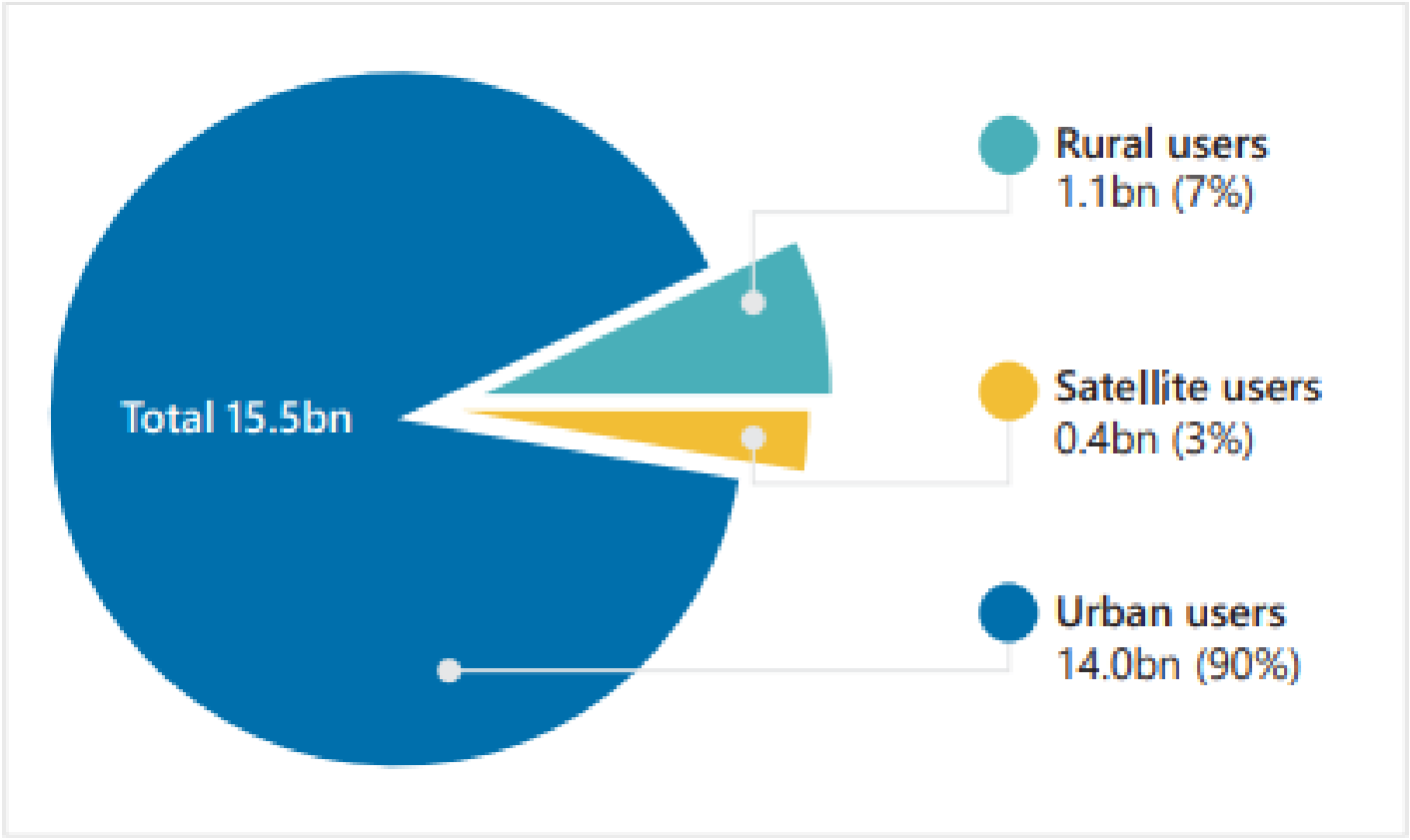


Figure 10: Global addressable market opportunity by type of end-user demand - US$ billion, 2035

Source: Access Partnership analysis

Regulatory Discussion

Spectrum Matters Affecting D2D

Interference:

Overlapping satellite and terrestrial coverage could lead to interference, impacting system performance. Regulators have a crucial role in ensuring coexistence free of interference.

Cross-border coordination:

Ensuring effective coordination of spectrum usage across borders is crucial. Technical analyses, including signal propagation modelling, can identify potential interference and guide necessary measures to protect in-band services.

Sharing mechanisms:

Regulators need to create sharing mechanisms to prevent harmful interference between new and existing services. Approaches like spectrum sharing and paired spectrum are under consideration.

Bandwidth:

Given the expected high demand for DTH services, more radio spectrum will be required. Proposals for new spectrum allocations are underway, but cross-border interference and coexistence with other services need careful study.

Road Ahead

Advanced antenna technology & power consumption:

Development of compact, efficient antennas for consumer devices is a significant challenge. Managing power consumption to maintain effective communication without affecting device battery life is critical.

Regulatory Landscape:

Varying regulatory regimes for D2D, and the need for clearer regulatory definitions.

Interference management & device compatibility:

Managing interference between terrestrial and non-terrestrial networks, especially in densely populated areas, requires sophisticated techniques. Ensuring seamless network transitions and maintaining constant connectivity are essential.

Spectrum allocation:

Managing spectrum competition and coordinating interference among D2D operators in light of increasing demands.

Thank you

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