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Advancing Connectivity For All

User-centric and End-to-End approaches to measuring Meaningful Connectivity

ITU-D SG1 Cross-Cutting Workshops on Meaningful Connectivity

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Open and Transparent

Independent

- Editorially independent reports follow a standard cadence
- Reports are never sponsored

Revealing Network Experience

- Experiential metrics measuring typical end-to-end experience
- Best practice automated tests across a broad user base

Scientific Analysis

- Sophisticated, pioneering methodology applied consistently
- Conclusions tested for statistical significance

INDEPENDENCE CHARTER

EXPERIENCE CHARTER

ANALYTICS CHARTER

We are an independent business which transparently publishes the rules that govern our operations

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Quality of Service (QoS)

Traditional QoS measurements

Optimised routing does not represent true user experience

Content ⟷ Transport ⟷ Exchange Point ⟷ Core ⟷ RAN ⟷ Device ⟷ 24/7 user scenario

Network Testing *(e.g. Drive-testing)*

Peak Speed *(e.g. manual speed test app data)*

Only Opensignal measures the full **end-to-end user experience** (active & passive testing)

A Complete view of Mobile Experience - QoE

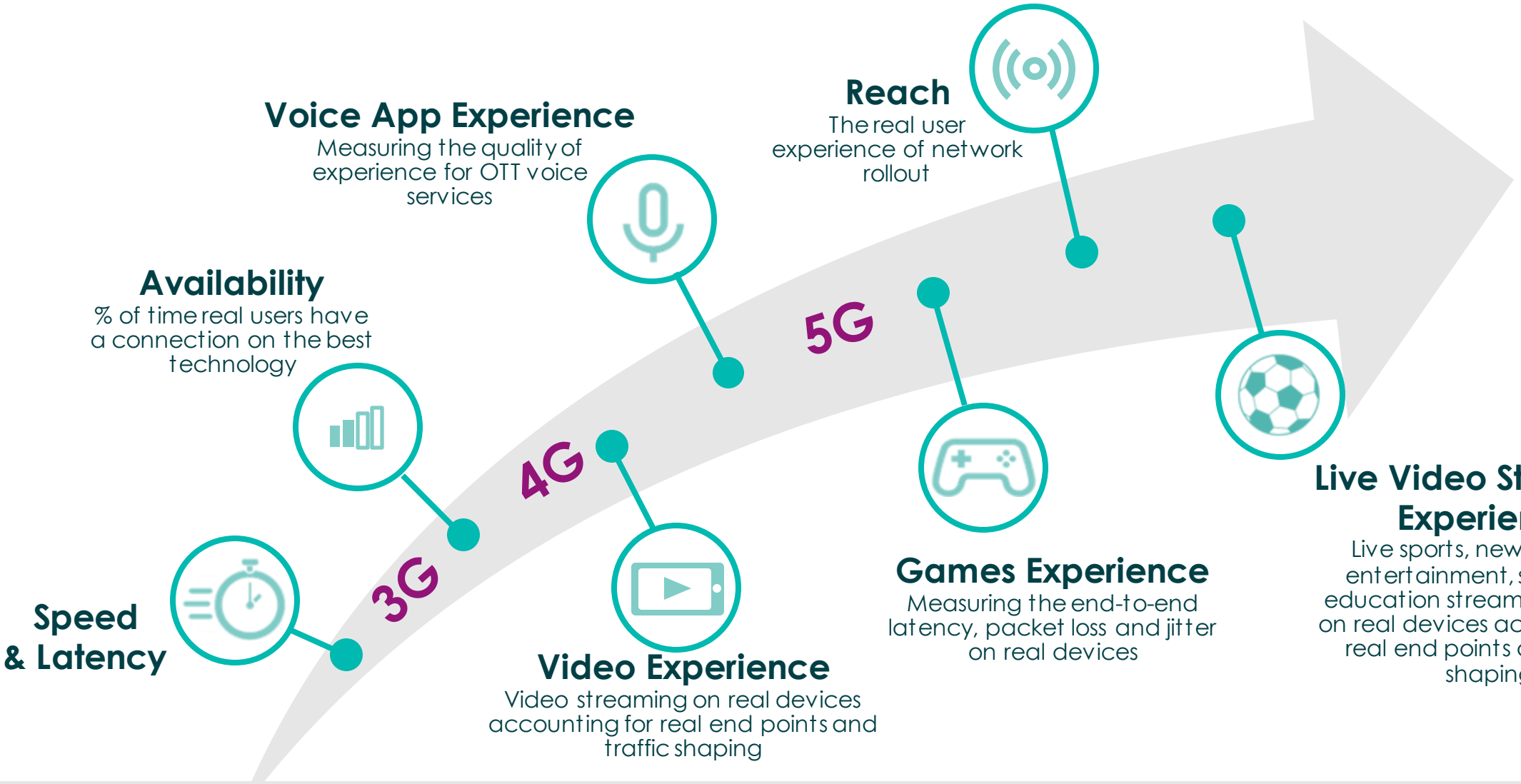
Content ⟷ Transport ⟷ Exchange Point ⟷ Core ⟷ RAN ⟷ Device ⟷ 24/7 user scenario

Network testing *(e.g. Drive-testing)*

Peak Speed *(e.g. manual speed test app data)*

Opensignal enables regulators to have a holistic view of consumers' experience, both from a **user-centric** and **network-centric** perspective.

Leading Experiential Metrics



Leading the evolution from network performance to network experience

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Opensignal testing definitions

Active vs Passive Testing	
Active Testing	When **traffic** is **put on the network** and the response is measured. *Examples: Download throughput, Upload throughput, Server Response Tests, Video Tests, etc*
Passive Testing	When **data** is **recorded from the device**, but no traffic is put on the network. *Examples: RSRP, RSSNR, Device Make or Model, Active Band, etc*

Background vs User Initiated Testing	
Background Testing	Run on the device in the **background** of an app **automatically** based on a number of test triggers, either periodic or based on device activity in the network.
User Initiated Testing	When a user has hit a **"run test now" button** to start a test. Can bias data as typically users are experiencing very positive or very negative service (not representative).

Opensignal Approach

Capturing on-device mobile experience

Analysing billions of records to reveal true experience

Delivering standardized, independent and consumer-centric insights for evidence-based decision making

End-to-end experience measurements

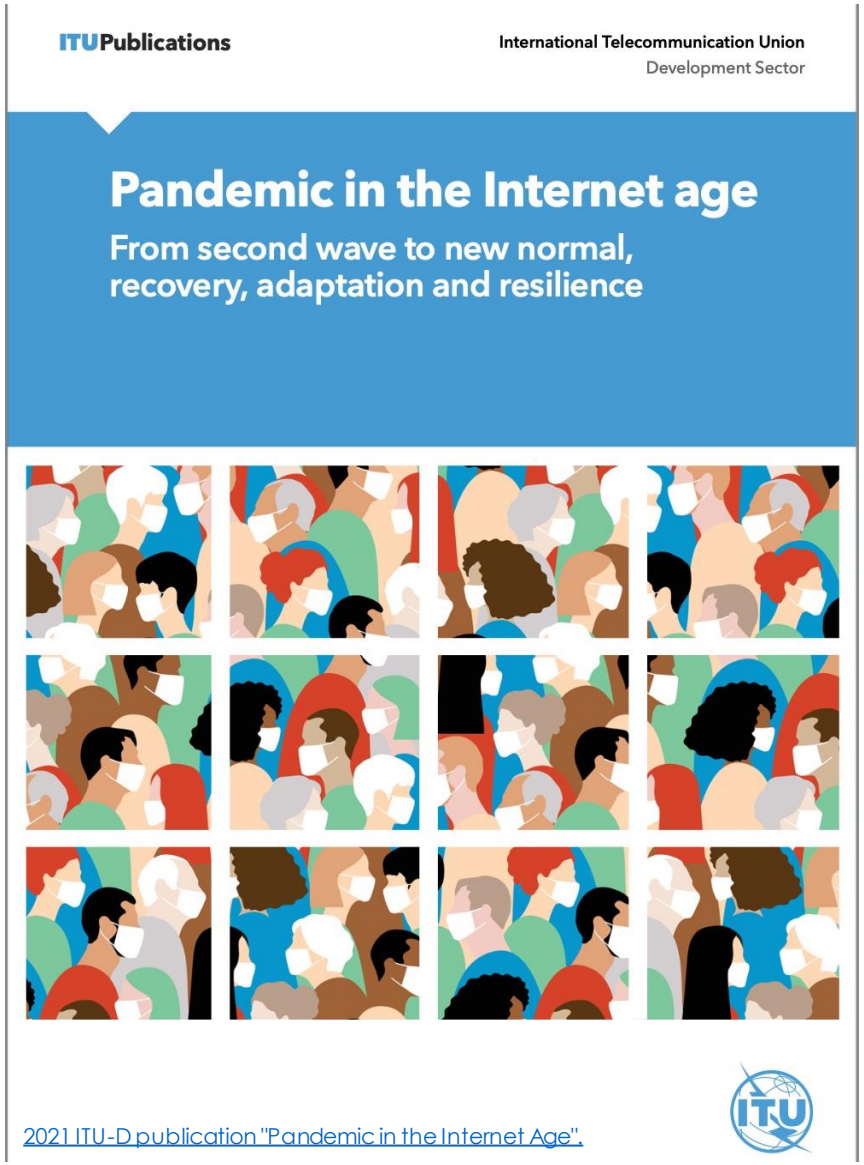
Representative sample

Innovative Data Science and Analytics

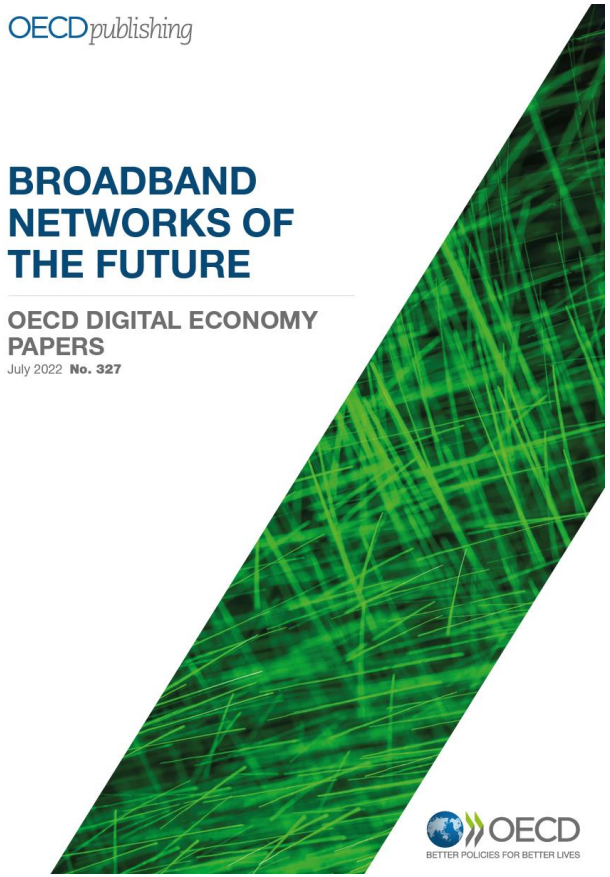
Impartial respected reports

Insights into the real experience

Institutional use of Opensignal's end-to-end methodology



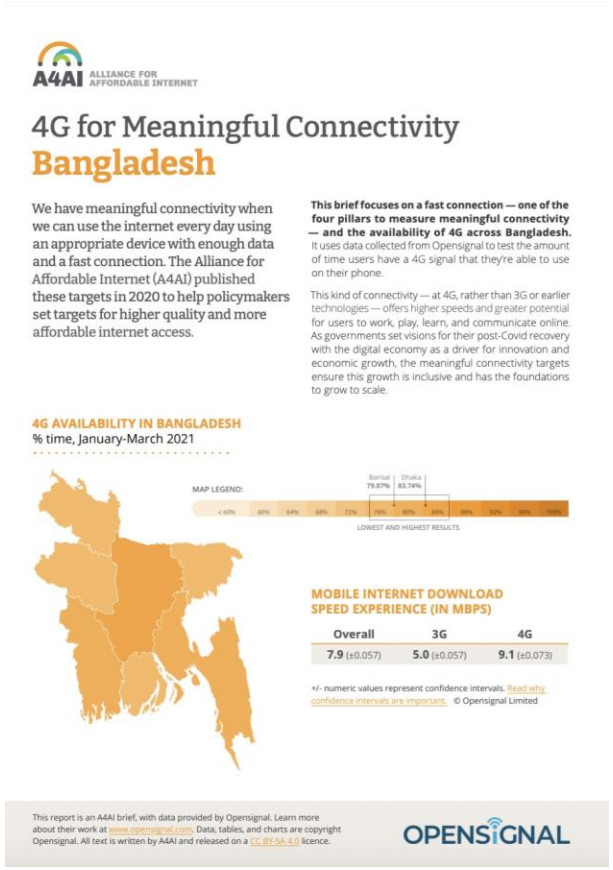
2021 ITU-D publication "Pandemic in the Internet Age".



OECD Digital Economy Papers: Broadband networks of the future

OECD Digital Economy Papers: Dev elopments in Spectrum Management for Communications Services

Alliance for Affordable Internet (A4AI)



A4AI ALLIANCE FOR AFFORDABLE INTERNET

4G for Meaningful Connectivity

Bangladesh

We have meaningful connectivity when we can use the internet every day using an appropriate device with enough data and a fast connection. The Alliance for Affordable Internet (A4AI) published these targets in 2020 to help policymakers set targets for higher quality and more affordable internet access.

This brief focuses on a fast connection — one of the four pillars to measure meaningful connectivity — and the availability of 4G across Bangladesh. It uses data collected from Opensignal to test the amount of time users have a 4G signal that they're able to use on their phone.

This kind of connectivity — at 4G, rather than 3G or earlier technologies — offers higher speeds and greater potential for users to work, play, learn, and communicate online. As governments set visions for their post-Covid recovery with the digital economy as a driver for innovation and economic growth, the meaningful connectivity targets ensure this growth is inclusive and has the foundations to grow to scale.

4G AVAILABILITY IN BANGLADESH

% time, January-March 2021

MAP LEGEND:

LOWEST AND HIGHEST RESULTS

MOBILE INTERNET DOWNLOAD SPEED EXPERIENCE (IN MBPS)

Overall	3G	4G
7.9 (±0.057)	5.0 (±0.057)	9.1 (±0.073)

+/- numeric values represent confidence intervals. Read why confidence intervals are important. © Opensignal Limited

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4G for Meaningful Connectivity

Indonesia

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4G AVAILABILITY IN INDONESIA

% time, January-March 2021

MAP LEGEND:

LOWEST AND HIGHEST RESULTS

MOBILE INTERNET DOWNLOAD SPEED EXPERIENCE (IN MBPS)

Overall	3G	4G
11.8 (±0.023)	4.36 (±0.023)	13.0 (±0.026)

+/- numeric values represent confidence intervals. Read why confidence intervals are important. © Opensignal Limited

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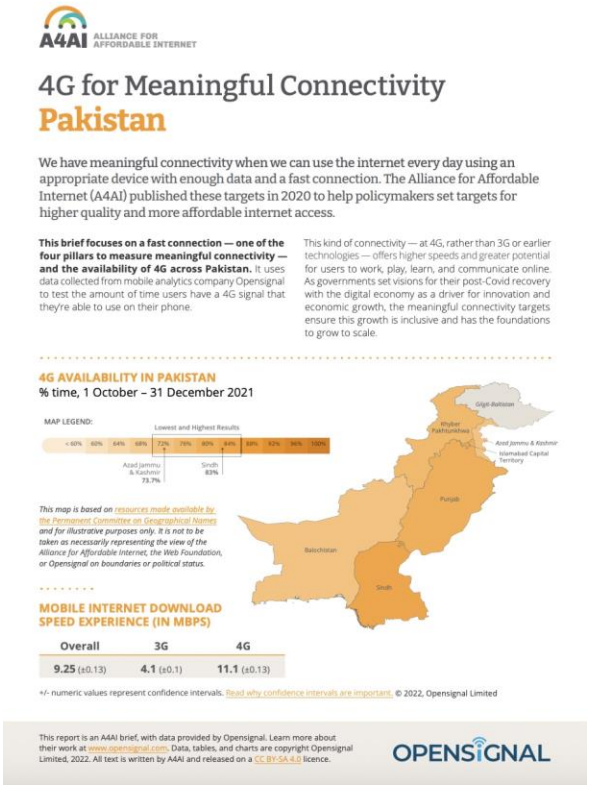

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4G for Meaningful Connectivity

Pakistan

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4G AVAILABILITY IN PAKISTAN

% time, 1 October – 31 December 2021

MAP LEGEND:

Lowest and Highest Results

This map is based on resources made available by the Permanent Committee on Geographical Names and for illustrative purposes only. It is not to be taken as necessarily representing the view of the Alliance for Affordable Internet, the Web Foundation, or Opensignal on boundaries or political status.

MOBILE INTERNET DOWNLOAD SPEED EXPERIENCE (IN MBPS)

Overall	3G	4G
9.25 (±0.13)	4.1 (±0.1)	11.1 (±0.13)

+/- numeric values represent confidence intervals. Read why confidence intervals are important. © 2022, Opensignal Limited

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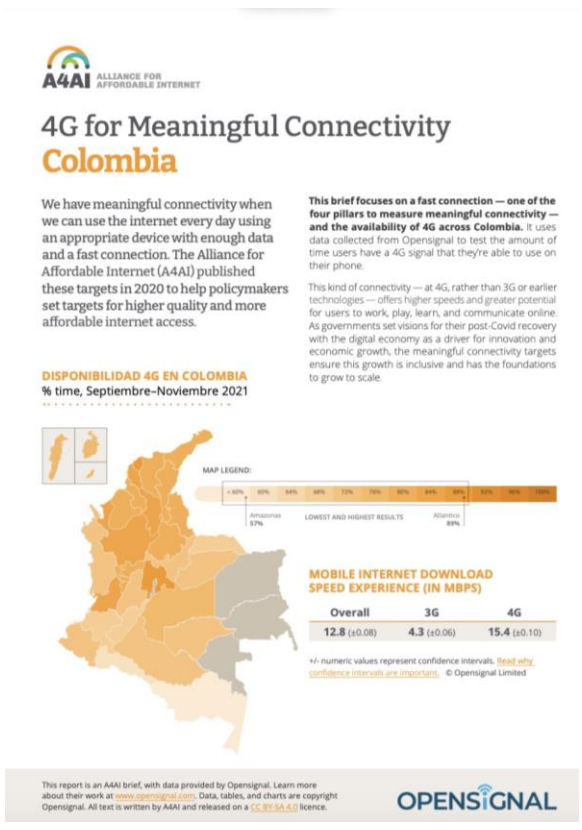

A4AI ALLIANCE FOR AFFORDABLE INTERNET

4G for Meaningful Connectivity

Colombia

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This brief focuses on a fast connection — one of the four pillars to measure meaningful connectivity — and the availability of 4G across Colombia. It uses data collected from Opensignal to test the amount of time users have a 4G signal that they're able to use on their phone.

This kind of connectivity — at 4G, rather than 3G or earlier technologies — offers higher speeds and greater potential for users to work, play, learn, and communicate online. As governments set visions for their post-Covid recovery with the digital economy as a driver for innovation and economic growth, the meaningful connectivity targets ensure this growth is inclusive and has the foundations to grow to scale.

DISPONIBILIDAD 4G EN COLOMBIA

% time, Septiembre–Noviembre 2021

MAP LEGEND:

LOWEST AND HIGHEST RESULTS

MOBILE INTERNET DOWNLOAD SPEED EXPERIENCE (IN MBPS)

Overall	3G	4G
12.8 (±0.08)	4.3 (±0.06)	15.4 (±0.10)

+/- numeric values represent confidence intervals. Read why confidence intervals are important. © Opensignal Limited

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[4G for Meaningful Connectivity Research Series, in partnership with Opensignal]

Data-enabled Decisions

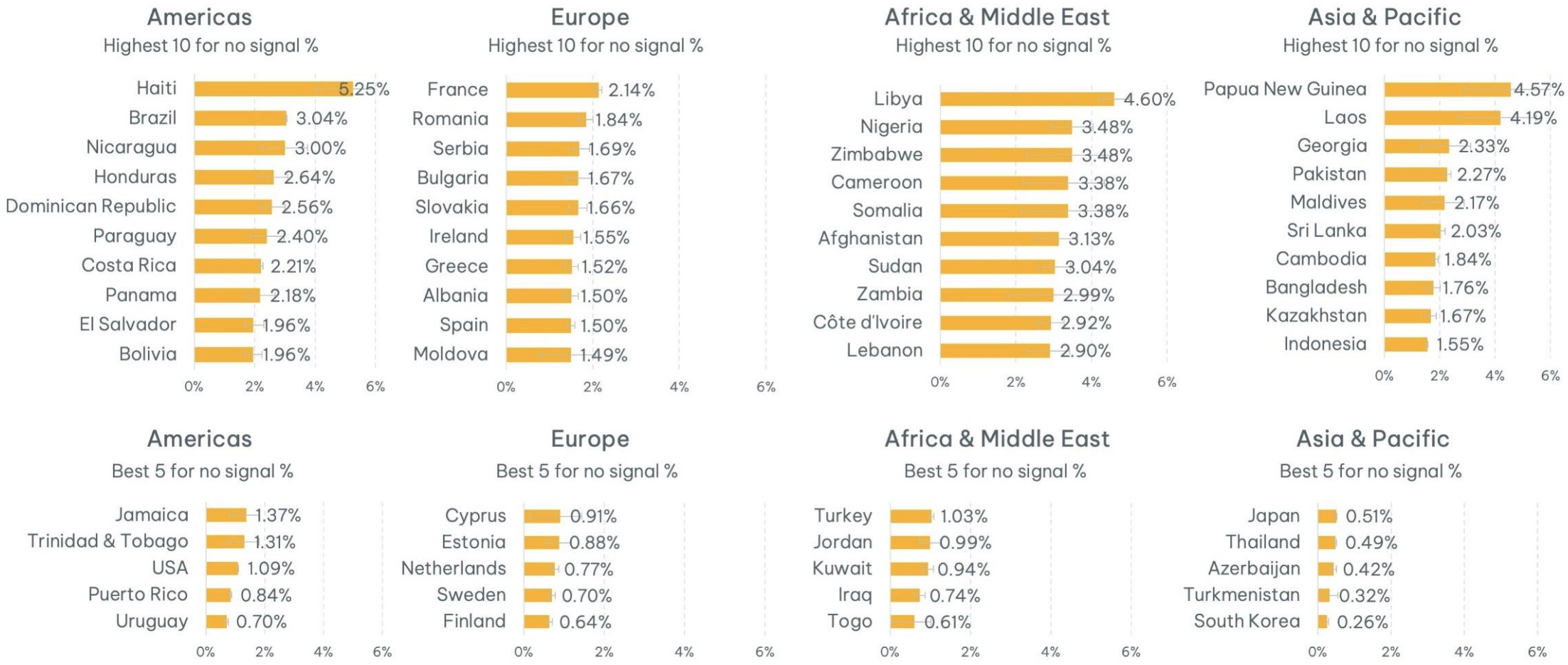
User-centric and End-to-End measurement methodology reflects the real Quality of Experience (QoE) – this is deeply aligned with the values of Meaningful Connectivity

Examples of **policy recommendations** driven by our data:

- Modernise the regulatory framework to attract complementary providers
- Use USAF funds towards high-quality connectivity projects (towards broadband projects rather than infrastructure only)
- Conduct impact evaluations of all telecom and internet-related projects
- Use spectrum to spur infrastructure and investment
- Reduce sector-specific tax burdens on ICTs
- Adopt a new National Broadband Plan with clear targets for meaningful connectivity
- Increase transparency within the sector with clear rules for evidence and inclusive participation
- Make new infrastructure easier to build with clear policies
- Provide sufficient spectrum on regular basis to enable coverage

Sizing the Satellite Connectivity Opportunity for Smartphones

Users spend under 6% of time with no cellular signal



Data collection period: 1 June 2022 – 29 August 2022 | © Opensignal Limited

Sizing the satellite connectivity opportunity for smartphones

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The Bigger Picture

Digital Inclusion

More nuanced than:

- Infrastructure deployment as a proxy for real-world coverage (not human-centric)
- Reliance on optimised peak throughput data/unstandardized speed testing

QoS + QoE

- Historically, Quality of Service (QoS) measures **network performance** from a technical point of view
- Increasingly, regulators are supplementing this with Quality of Experience (QoE) data to more accurately understand the **actual consumer experience**.

Meaningful Connectivity

- **Turns** the **spotlight** on the users/participants of the digital economy
- However, **not all QoE data is equal**. It is critical to consider factors like methodological standardisation, representation and independence and move beyond just peak speeds.

Thank You

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