EGTI/EGH Meetings 2024

ITU Internet Quality of Service indicators data collection

An overview and initial evaluation

26 September 2024
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1. Quality of Service (QoS) indicators on Internet collected by the ITU

ITU collects several Quality of Service (QoS) parameters related to Internet (both fixed and mobile) in the WTI Long Questionnaire

The indicators approved at the 11th meeting of the EGTI 2020 are:

	Mobile network	Fixed network
Average download speed (Mbps)	yes	yes
Average upload speed (Mbps)	yes	yes
Latency (ms)	yes	yes
Fault repair time (hours)		yes

A first glance at the QoS indicators collected

Problem 1: relatively few number of countries reporting the QoS indicators

Problem 2: variety of units of measurement used

Problem 3: some figures seem at odds with main technology/ standard used

Problem 2: units

- The **unit** of measurement initially defined as ***bits per second***, but some countries report speed in Mbps or other units

- A National Regulatory Authority may use different methodologies for measuring speed

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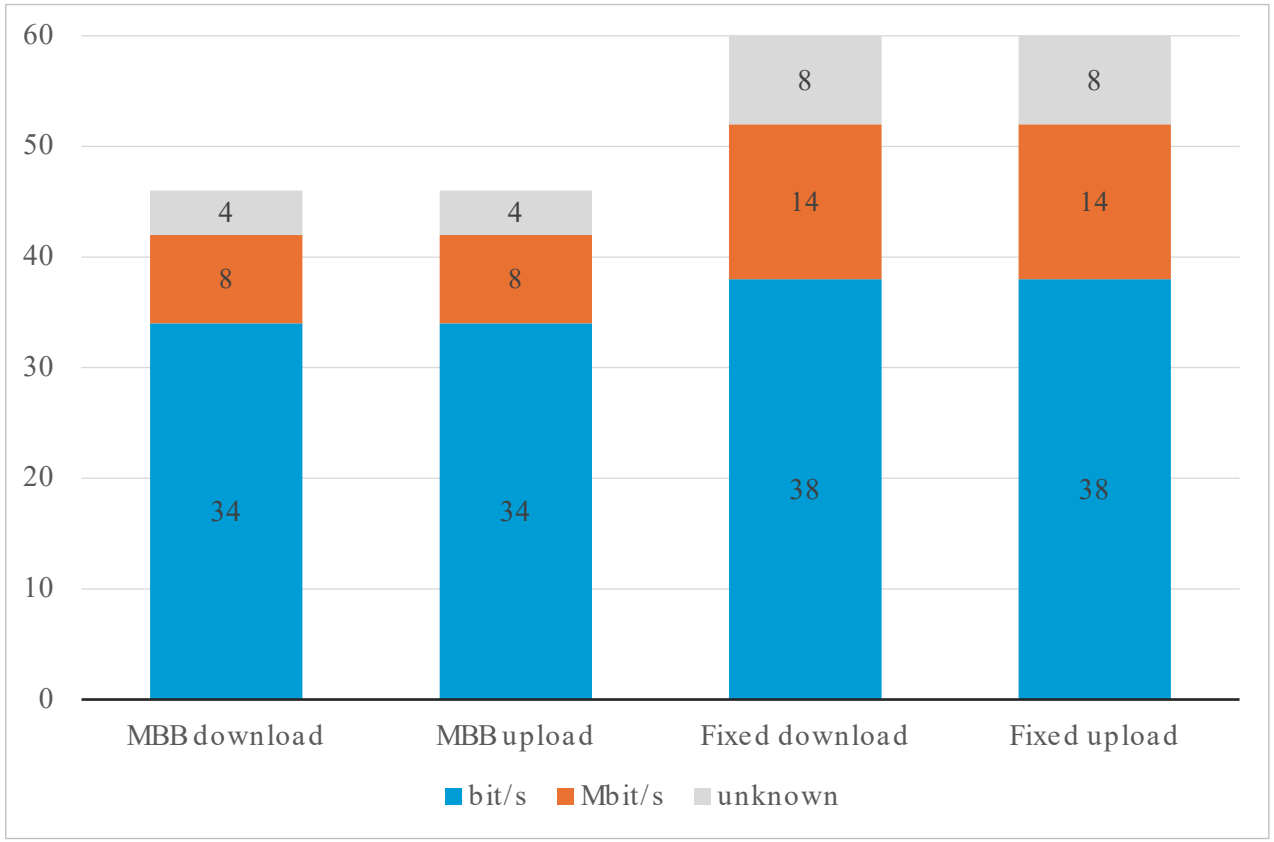
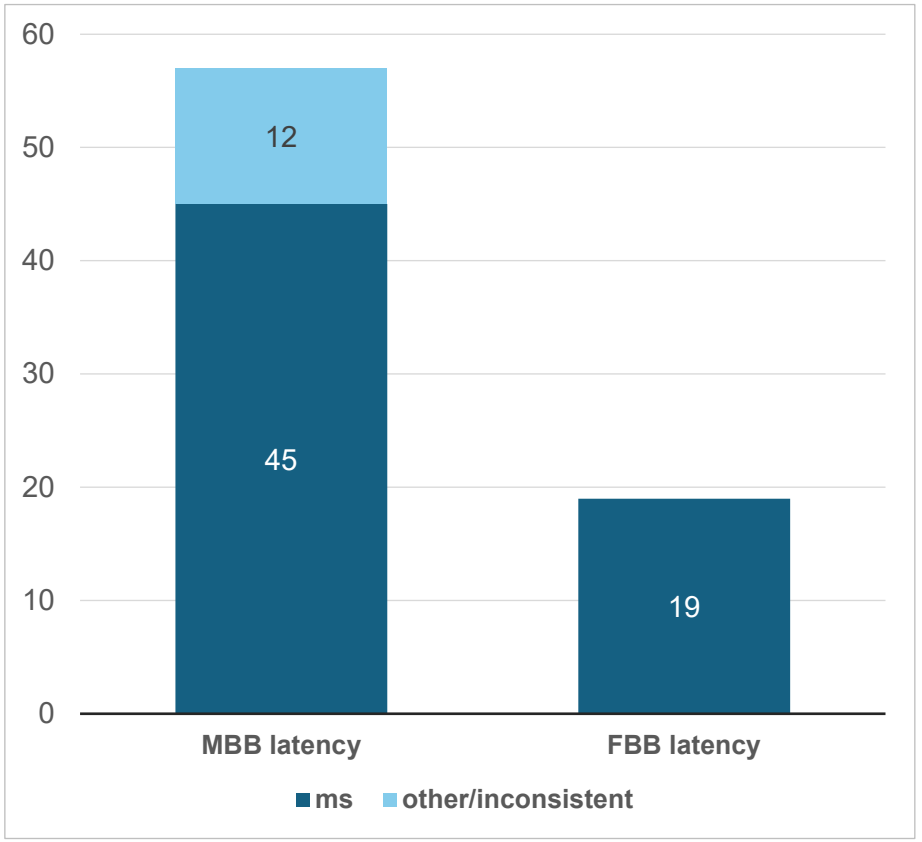
Number of countries submitting data to ITU for selected broadband QoS indicators (2022)





Problem 3: Figures at odds with technology used

- Different standards (2G, 3G, 4G and 5G) provide very different download/ upload speeds

- average speed tested in any country depends crucially on the coverage (over population) of the 3G, 4G and 5G standards

- In most countries coverage of each standard overlaps. This mix of coverage implies that **the average speed obtained from a sample shall be some averaging of effective 3G and effective 4G downloading speed**

Average data download speed for 3G, 4G and 5G mobile networks

Generation	Cellular technology	Average data speed (download)
2G	HSCSD	15-20 kbps
2G	GPRS	30-50 kbps
2G	EGPRS/EDGE	130-200 kbps
3G	UMTS	384 kbps
3G	HSPA	3-5 Mbps
3G	HSPA+	5-8 Mbps
4G	LTE	15-20 Mbps
4G	LTE-Advanced	50-80 Mbps
4G	LTE-Advanced Pro	60-100 Mbps
5G	NR	150-200 Mbps

https://commsbrief.com/mobile-data-speed-with-2g-3g-4g-and-5g-cellular-networks/

We group countries submitting mobile download speed in two sets:

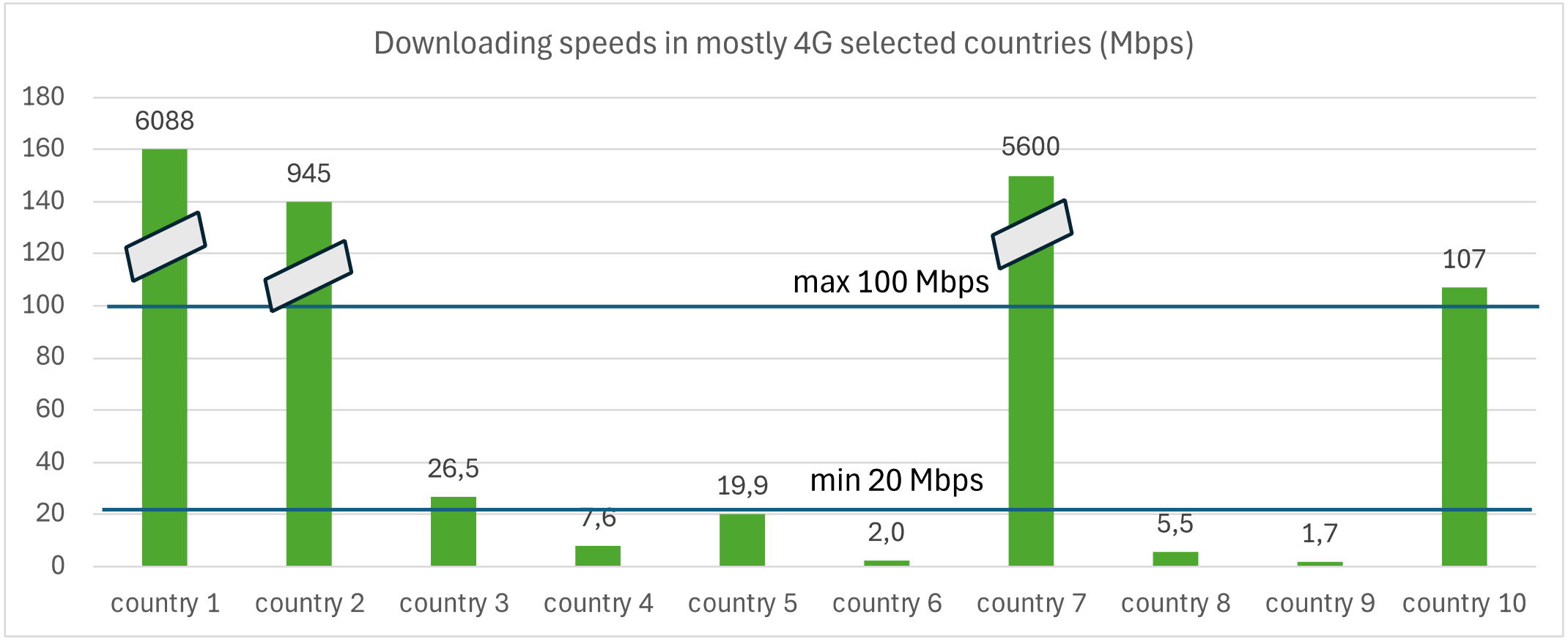
1. Mostly 3G

those covered mostly with 3G (at least 90% of population)

2. Mostly 4G/LTE (or higher)

those covered mostly (at least 90% of population) with 4G network (may also be covered by 5G)

In countries with **mostly 4G/LTE** coverage, we can expect 20 Mbps- 100 Mbps of **effective speeds**



Source: ITU

Some figures are provided in different units of measurement or a revision of speed declared is in order

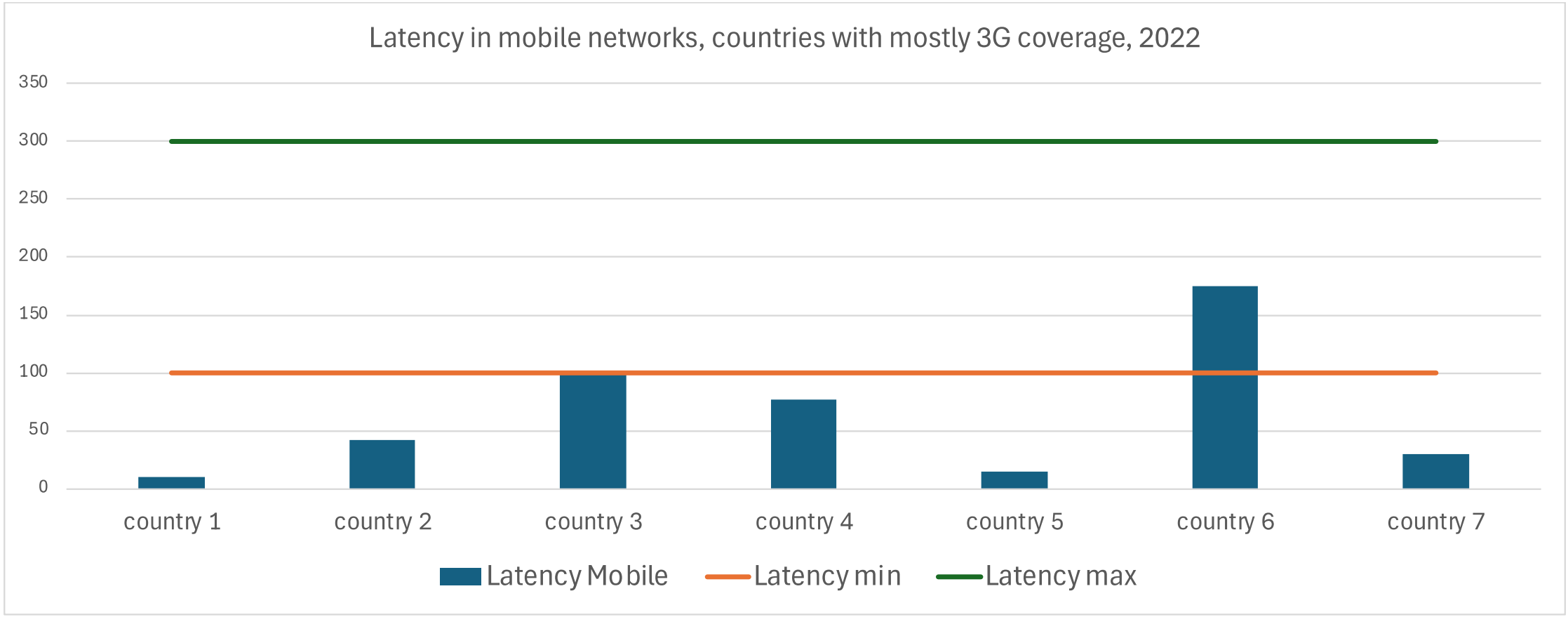
Latency in mobile networks

- **Packet latency** is the round-trip time taken by a packet to reach its destination and return to the source (in milliseconds).
  It is calculated as the total packet latency measured in milliseconds divided by the number of tests

- Latency varies a lot depending on the standard for communications used

Latency expected (in ms)	minimum	maximum
2G	300	1000
3G	100	300
4G	20	50
5G	< 1	10

In countries with mostly **3G coverage**,
we expect **latency** to vary between 100 ms (min) to 300 ms (max)

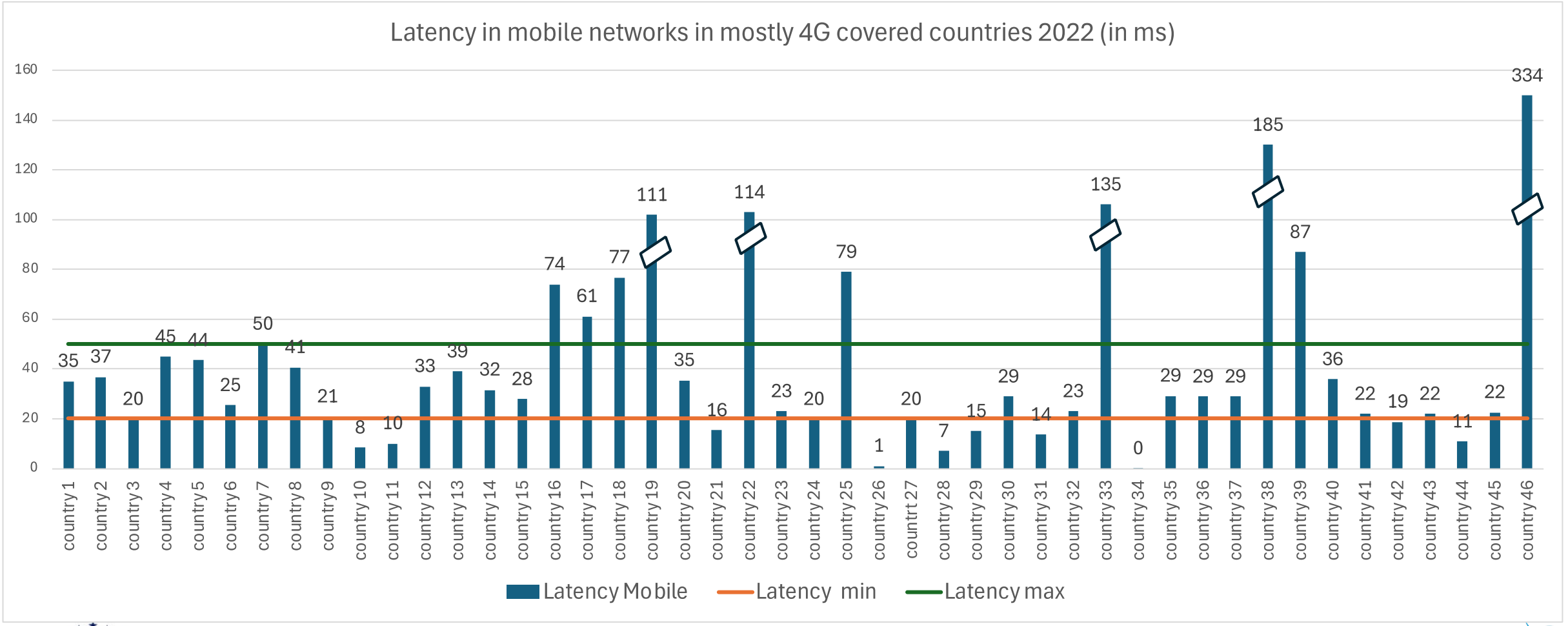


Source: ITU

In countries with **mostly 4G/LTE coverage**,

we expected **latency** between 20 ms and 50 ms

2022 Data reported to ITU:



Source: ITU

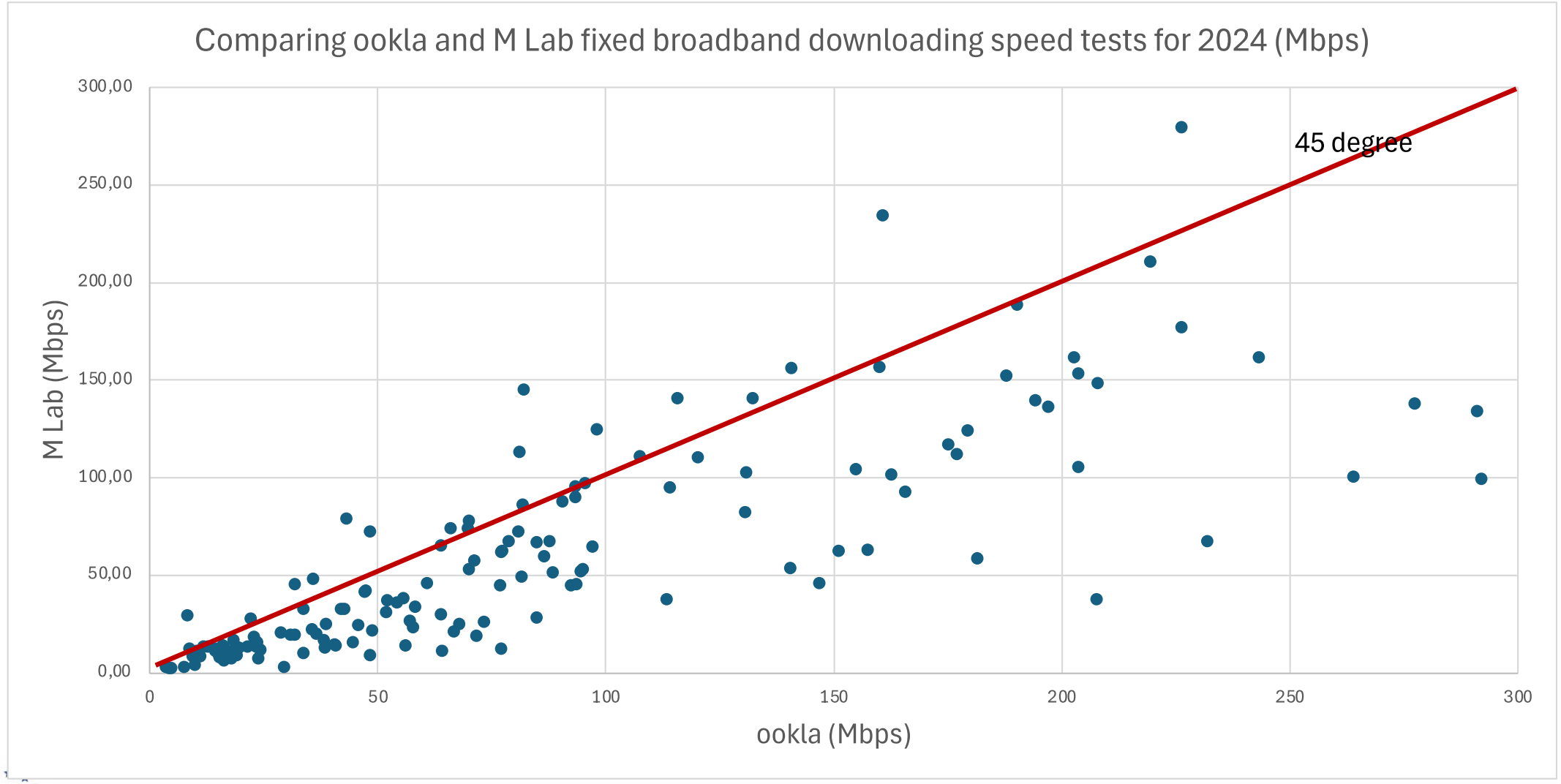
3. Other sources for QoS data

- Independent suppliers of QoS for broadband publish regularly several of the indicators of interest

- For illustrative purposes we compare for 2024 the downloading speed of fixed broadband using two sources: *Ookla* and *M Lab*, for 146 countries

Note: Method of measuring speeds varies across the different suppliers of information

Caution: both measures diverge in the period covered and methodology



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4. How to improve data on QoS being collected?

- Many countries measure QoS for mobile and fixed Internet, but the number of countries submitting data to the WTI Long Questionnaire is limited (52)
- Each measurement is conducted with a different methodology, which leads to comparability problems
- There are other sources for QoS data: ookla, M Lab, akamai…
- The timing of the measurement matters: rapid improvement in Internet speeds across years

Recommendation 1:

- **Define the units** of measurement for mobile and fixed broadband as (download/ upload speeds):

  - for mobile BB: units in Mbps
  - for fixed BB: units in Mbps

- and provide some guidance on expected speeds by technology (mobile and fixed) as well as for Latency

Recommendation 2:

- Better define methodology for sampling and aggregating measurement data
- or, at least, provide some **detail** on how speed was recorded/ measured
- **Specify in a note** the source and properties for QoS indicators when submitting data, i.e.:
  - If data on speeds/latency comes from all operators, or a subset of them
  - data coming from a sampling: provide details of sampling method
  - If speed figure provided is the mean, the median, mode…..
  - If speed is taken across different moments of day- time (peak/ off peak), across different technologies, urban/ rural….

Proposal:

- Many NRAs or Ministries do measure QoS for broadband, but many others do not
- when asked in Long Questionnaire for download speed,
  do report a number, or a set of numbers so that that the average speed can be obtained- be it a number produced officially by the institution or a number from other sources
- The NRA declaring a QoS indicator may make use of other sources (ookla, akamai, M Lab….) either for submitting data to ITU or for validation purposes

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Proposal:

- Prioritizing the list of QoS indicators to avoid burden on respondents

if we were to choose one/ two/ three… which ones are really fundamental?

	Mobile network	Fixed network
Average downloading speed (Mbps)		
Average uploading speed (Mbps)		
Latency		
Jitter		
Fault repair time (hours)		

Thanks a lot!

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