GSMA

Sustainable spectrum pricing to boost Indonesia's digital economy

Spectrum roadmap for mobile in Indonesia

Indonesia is among the largest and fast-growing digital economies in the Asia Pacific region. The government's digital roadmap for 2021-2024 recognises ICT infrastructure as a key enabler of digital transformation in Indonesia and the priorities include the completion of 4G infrastructure and development of 5G networks.

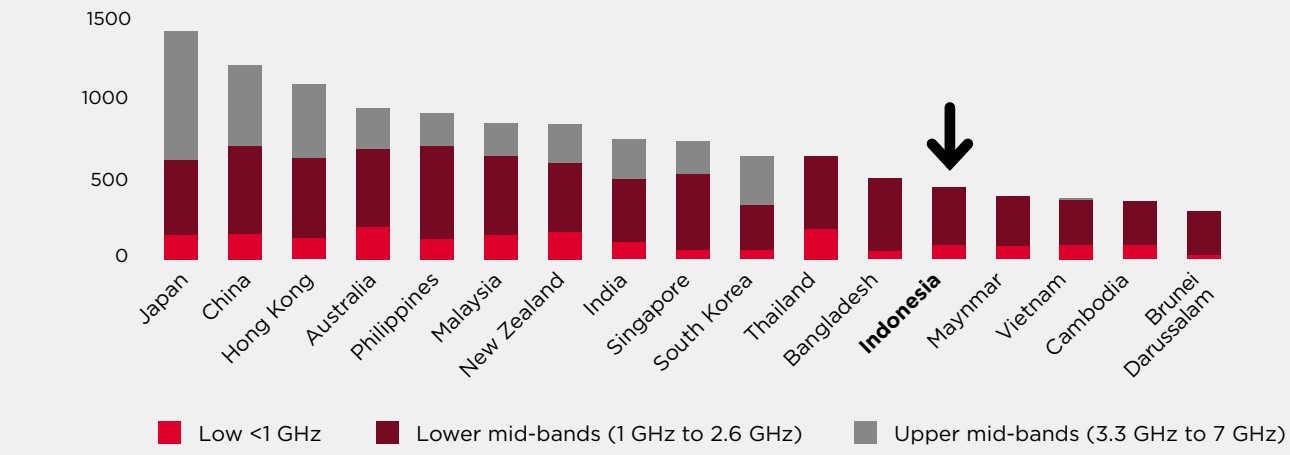
Indonesia is at start of the 5G journey and operators are still at the initial phase of their 5G rollout. As of Q3 2023, 5G network coverage is at 15% of population, compared to 97% for 4G. Currently, there is 452 MHz of mobile spectrum assigned in Indonesia, comprising 92 MHz in low-bands (below 1 GHz) and 360 MHz in mid-bands between 1 GHz and 7 GHz.[1] Compared to many Asia-Pacific markets, Indonesia is facing a shortage of mobile spectrum, especially mid-bands which are crucial for reliable high-speed mobile broadband services in heavily populated urban areas.[2]

www.gsma.com/spectrum/resources/5g-spectrum-in-the-apac-region-roadmaps-for-success/

1. In Indonesia, the current assignments are 850 MHz and 900 MHz in low bands, and 1800 MHz, 2100 MHz and 2300 MHz in mid bands.
2. The GSMA estimates that on average, a total of 2 GHz of mid-band spectrum will be required per market to support the growth of 5G by 2030.

FIGURE 1

Spectrum assigned to mobile operators (MHz, 2023)



Source: GSMA Intelligence estimates based on APT and GSMA Intelligence data

To support Indonesia's digital ambitions, the Ministry of Communication and Information Technology (Kominfo) is planning to award several frequency bands over the next two years including 700 MHz, 2.6 GHz and 3.5 GHz, as well as mmWave frequencies in the 26 GHz band. This additional spectrum will more than double the total supply of mobile spectrum.[3]

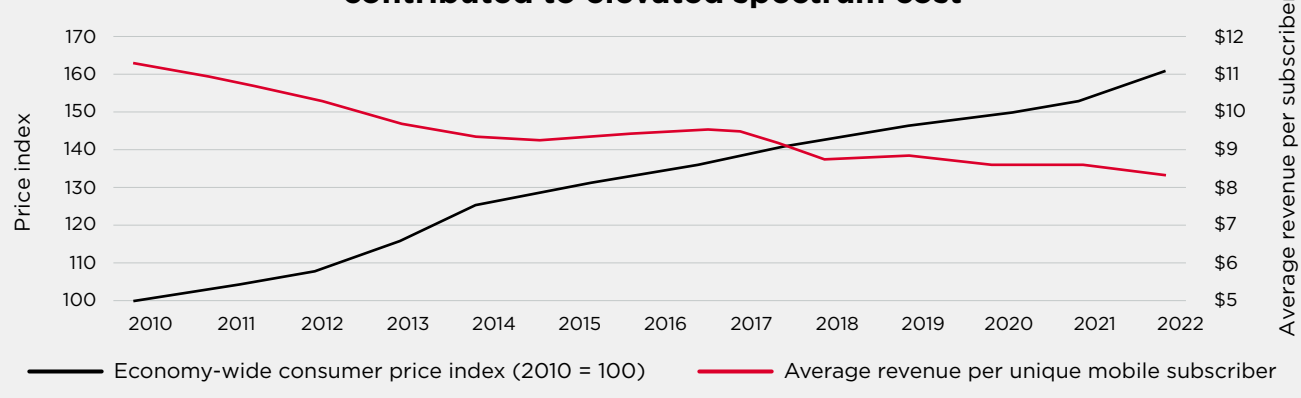
Rising spectrum costs despite falling ARPU

In Indonesia, new spectrum is assigned by auction based on a 10-year licence duration with the option of a 10-year extension upon the end of the initial period. Auction fees are payable annually over the first 10 years after which licence extensions, if granted, are subject to annual spectrum fees determined through a formula.[4]

Since 2010, there have been several auctions involving 2100 MHz and 2300 MHz bands, as well as licence extensions for existing spectrum holdings in 850 MHz, 900 MHz and 1800 MHz. The total mobile spectrum assignments in Indonesia have increased by 45% from 312 MHz in 2010 to 452 MHz today. Over the same period, estimated total annual spectrum cost has increased by more than five-fold as a result of auction-related payments and spectrum fees associated with licence renewals. In contrast, industry revenues have not kept pace with average revenue per unique mobile subscriber declining by 48% from $10.92 in 2010 to $5.66 in 2023. Meanwhile, spectrum fees which are adjusted annually by inflation and population have continued to increase.

FIGURE 2

Inflation adjustments and declining ARPU have contributed to elevated spectrum cost



Source: IMF and GSMA Intelligence estimates

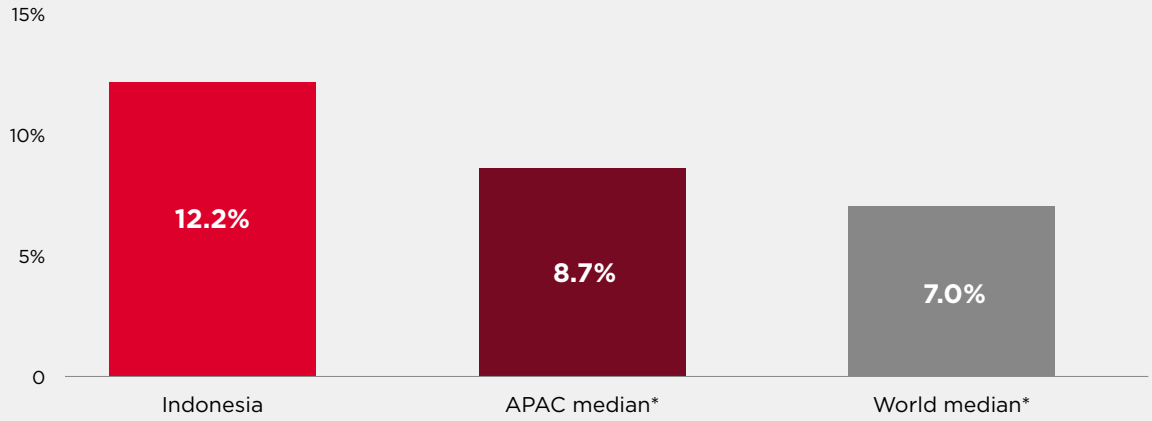
3. Additional spectrum of 480 MHz based on 2×45 MHz (700 MHz), 190 MHz (2.6 GHz) and 200 MHz (3.5 GHz).
4. The spectrum fee (BHP IPFR) is calculated through formula which includes factors such as economy-wide inflation, propagation characteristics, total population of licence area, economic value of spectrum and bandwidth assigned.

High spectrum costs and implications

Spectrum fees in Indonesia are already high – annualised, WACC-adjusted spectrum costs to recurring cellular revenue is currently at 12.2%, compared to the APAC and global median values of 8.7% and 7.0%, respectively.[5] As mobile users put greater demand on networks, more spectrum will be necessary to meet growing data traffic. The release of new spectrum bands will be crucial in supporting traffic growth and the development of 5G networks. Yet, this also potentially represents a huge challenge to operators financially.

FIGURE 3

Annualised and WACC-adjusted spectrum cost to recurring cellular revenue ratio



Notes: *Medians based on countries where data are available. APAC median: Australia, South Korea, India, Pakistan, Bangladesh, Indonesia, Singapore, China, Japan. World median: APAC countries outlined above and: Ecuador, Argentina, Mexico, Germany, Brazil, Colombia, Peru, UK, Paraguay, Uruguay, Bolivia, Costa Rica, Honduras, Panama, Chile, Finland, El Salvador, Nicaragua. Based on the latest available year data, depending on the country. UK, Germany and Finland values based on the cost to total revenue ratio.*
Source: *GSMA Intelligence and Coleago Consulting calculations*

Expensive spectrum negatively impacts the quality of mobile networks. High burden of ongoing spectrum cost means reduced investment and slower deployment of the latest network technologies. This, in turn, means lower availability of mobile connectivity, decreased adoption, and a missed opportunity to benefit from the economic growth unlocked by advanced mobile use cases. This could mean lower-than-optimal GDP growth, and fewer social and environmental benefits linked to the mobile-enabled technologies.[6,7] Indeed, empirical evidence shows that high spectrum cost burden leads to worse network quality, measured in terms of coverage and speeds, thus affecting the consumers and economic outcomes.[8]

Based on Indonesia's spectrum roadmap,[9] GSMA Intelligence assessed the impacts of different spectrum cost scenarios on 5G network rollout, adoption and the associated socio-economic benefits over the period 2024-2030. We developed the following spectrum cost scenarios based on the expected expansion of spectrum supply in the 700 MHz, 2.6 GHz and 3.5 GHz bands.

5. Based on GSMA analysis of information from Kominfo and other sources, Coleago Consulting. The APAC sample includes selected countries where data were available.
6. Bahia, Castells and Pedros (2020) "Mobile technology: two decades driving economic growth". https://data.gsmaintelligence.com/api-web/v2/research-file-download?id=54165922&file=121120-working-paper.pdf
7. GSMA (2023) "Spectrum: the Climate Connection". https://www.gsma.com/spectrum/wp-content/uploads/2023/05/Spectrum_Climate_Connection.pdf
8. Bahia and Castells (2022) "The impact of spectrum assignment policies on consumer welfare". https://www.sciencedirect.com/science/article/abs/pii/S0308596121001324
9. With auctions making 700 MHz band available from 2024, followed by 2.6 GHz and 3.5 GHz being made available from 2025. The 26 GHz band is not considered in our assessment due to its different characteristics and currently limited empirical evidence.

FIGURE 4

Potential spectrum cost scenarios

Baseline (as is)	Reference: constant spectrum cost at current level (12 % of operators' revenues)
1: Past Indonesia's prices	Consistent with prices paid in Indonesia on similar bands
2: At reserve price level	Consistent with reserve prices in Indonesia on similar bands
3: International benchmarking	Prices in upcoming auctions aligned with international benchmarks
4: Extrapolated growth	Extrapolating the 2012-2022 trend of increasing cost

In the baseline scenario where the spectrum cost to recurring revenue ratio remains at the current level of 12%, we forecast 5G coverage in Indonesia to reach 80% of population by 2030, with 5G penetration rate reaching 41% in that year. Over the period 2024-2030, 5G is forecast to contribute more than $41 bn (IDR 650 tn) in GDP to the Indonesian economy. By 2030, 5G will add 0.6% to Indonesia's GDP. In monetary terms, that is over $11 bn (IDR 172 tn) annually.

However, the results indicate that 5G rollout will be delayed significantly if the cost of new spectrum bands continues to increase in line with prices from past auctions in Indonesia. In this scenario, 5G coverage will only reach 58% in 2030 which translates into lower 5G penetration and a cumulative GDP loss of $13.6 bn (IDR 210 tn) over the 2024-2030 period.

Even in a scenario where the new 700 MHz, 2.6 GHz and 3.5 GHz bands are modestly priced at levels consistent with reserve prices from the previous Indonesia's auctions, the significant amount of new spectrum means that the spectrum cost to revenue ratio will increase from 12% to 15% by 2030. This will slow down 5G network rollout by 8 percentage points (72% in 2030 compared to baseline of 80%) and lead to a GDP loss of $4.9 bn (IDR 76 tn).

Alternative spectrum cost scenarios based on international price benchmarks and extrapolated growth in costs also show significant negative impacts on 5G and GDP.

FIGURE 5

Summary of results

	Spectrum cost to recurring revenue ratio (2030)	5G network coverage (2030)	5G penetration (2030)	GDP impact ($ billions, cumulative 2024-2030)
Baseline (as is)	12%	80%	41%	—
1: Past Indonesia's prices	20%	58%	30%	-13.6
2: At reserve price level	15%	72%	37%	-4.9
3: International benchmarking	19%	61%	31%	-12.3
4: Extrapolated growth	17%	66%	34%	-6.0

In summary, our key findings are:

- Over the 2024-2030 period, 5G is projected to contribute more than $41 bn (IDR 650 tn) in GDP to the Indonesian economy.
- However, for a 1 percentage point increase in spectrum cost to revenue ratio, there is a corresponding 2.8 percentage point slower network rollout.
- If spectrum cost to revenue ratio continues to grow, coverage could be more than 20 percentage points lower by 2030 and 5G adoption could fall behind by over 2 years (11 percentage points lower by 2030)
- For the highest spectrum cost scenario, around one-third of the socio-economic benefits of 5G – some $14bn (IDR 216 tn) (cumulative over 2024-2030) in GDP could be lost.

Recommendations

The cost of spectrum in Indonesia has risen significantly in the last decade and this poses a major threat to future development of mobile services. To avoid total spectrum costs spiralling, a reduction in unit spectrum prices is vital. If not, operators will struggle to make the significant investments required for 5G development, resulting in slower network rollout, poorer user experience, and missed opportunities for digital transformation and mobile-enabled growth.

Our recommendations for Indonesia are:

1

For upcoming auctions of new spectrum bands, reserve prices should be set conservatively below estimates of market value. This will allow room for price discovery and reduce the risk of unsold spectrum.

2

The formula for calculating annual spectrum fees (BHP IPFR) should be reviewed, and adjustments to parameters should be considered to provide the right long-run incentives and avoid disproportionate increases in costs that are not aligned with evolving market conditions.

3

Ensure a clear spectrum roadmap that considers not only current bands under planning but also longer terms needs for Indonesia, especially for mid-bands in the 2025-2030 timeframe. Greater certainty on the availability of spectrum and associated conditions is crucial for operators to prepare investment plans, secure financing and develop strategies for network deployment and service delivery.