

5G FWA in action

Case studies from MENA

October 2022



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1: Unlocking FWA's potential

While fixed wireless access (FWA) solutions have been around for more than two decades, the performance improvements enabled by 5G offer a larger addressable opportunity. This is driving renewed operator interest in the technology, reflected in the growing number of commercial deployments of 5G FWA around the world.

This report examines the current state of fixed broadband markets globally, before analysing FWA's technological improvements and cost effectiveness. Two case studies are then provided, casting light on operator FWA deployments in the MENA region.

The story so far

Several developed countries have nearly reached market saturation for fixed broadband (90–100% penetration). In these markets, FWA can be beneficial in upgrading legacy infrastructure in underserved areas, reducing the digital divide, and/or providing an alternative in markets or areas with a limited number of fixed broadband offerings.

In developing markets, FWA can play a role in driving first-time adoption of broadband. Fixed broadband penetration is on average around a third of that for developed markets, so there are significant opportunities for growth and to reduce the digital divide. GSMA Intelligence forecasts penetration to rise significantly over the next five years in several key markets, including Indonesia (from 25% to 33% of households), Brazil (from 67% to 81%) and Argentina (from 81% to 91%).

The share of fixed broadband connections by technology varies significantly between countries. Fibre-to-the-home (FTTH) solutions dominate in advanced Asia Pacific countries such as China, Japan and South Korea, as well as some European countries (e.g. Sweden and Spain). Cable solutions are at the forefront in the US and several Latin American markets, while xDSL dominates in several major European countries, such as France, Germany, Italy and the UK.

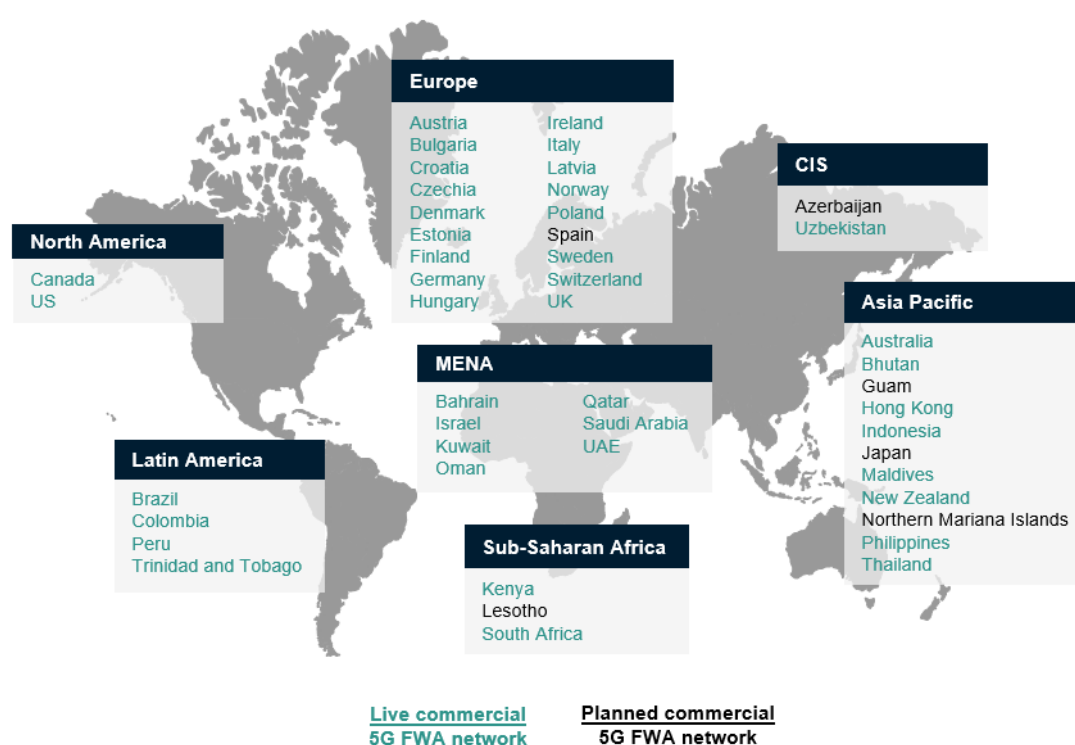
At a global level, FWA market share has remained relatively limited compared to other fixed options, in low to mid-single digits. This can be ascribed to a combination of reasons including inferior performance relative to fibre and cable, limiting data caps, and the need for extensive CPE installation on and within home premises.

That said, FWA has gained traction in certain markets, including Czechia and Poland, where FWA market share reached 16% and 13% respectively as of the end of 2021. There has also been strong take-up in parts of Asia Pacific (e.g. Philippines and Sri Lanka). Furthermore, large-scale FWA networks have been deployed in parts of MENA, including Kuwait, Oman, Saudi Arabia and Tunisia.

5G enhances the FWA business case

FWA solutions have seen renewed interest as a key use case for 5G networks. As of Q2 2022, 80 fixed broadband service providers (the vast majority mobile operators) had launched commercial 5G-based fixed wireless services across over 40 countries. This means around a third of the 5G commercial mobile launches worldwide include an FWA offering – a relatively high proportion at this early point in the generational cycle and one that could rise further as operators take stock of pilots, demand and return on investment.

Figure 1: 5G FWA deployments ramp up globally



Note: data as of 30 June 2022

Source: GSMA Intelligence

5G FWA solutions provide increases in speeds in the order of over 10× compared to 4G FWA, along with substantial improvements in capacity, due to a range of technological advancements:

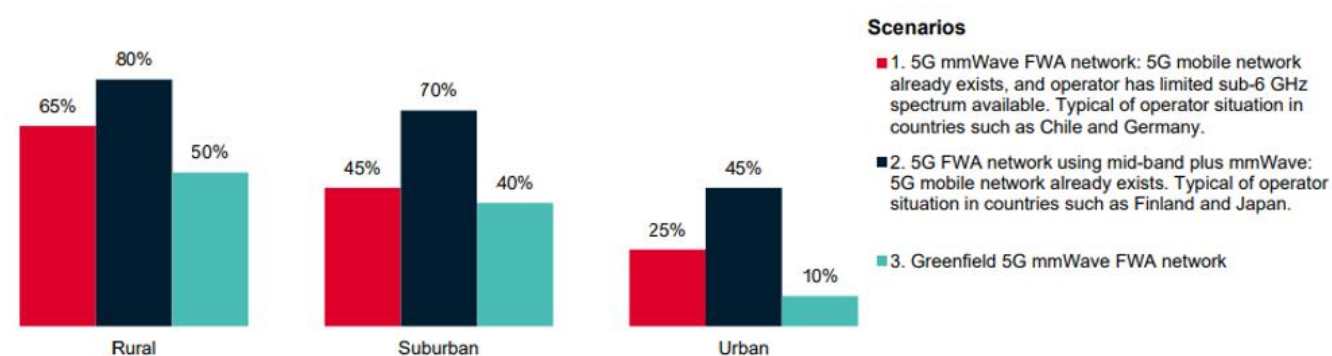
- **Spectral efficiency:** Compared to LTE, the 5G NR standard provides significant improvements in spectral efficiency by increasing the amount of data that can be carried per unit of spectrum (Hz).
- **Advanced features:** 5G supports more advanced features designed to boost performance by improving the capabilities of existing massive MIMO technology and beamforming, and driving improvements in coverage.
- **CPE innovation and model diversity:** The availability of 5G CPE models continues to grow. As of mid-2022, 144 indoor and outdoor 5G FWA CPE models had been announced (source: GSA).
- **New spectrum in mmWave bands:** While the majority of current 5G FWA deployments focus on the 3.5–3.8 GHz bands, several operators around the world are using mmWave spectrum as a capacity and performance booster to complement coverage provided by lower bands.

These advancements enable FWA to target a broader opportunity. This is demonstrated by recent developments in the US, where T-Mobile added over half a million 5G FWA customers in Q4 2021 and Q1 2022 combined. By 2025, it expects to have 7–8 million FWA subscribers, while Verizon is targeting 4–5 million FWA subscribers for the same period. This would give FWA a share of around 10% of the US fixed broadband market – an indication of the technology’s underlying potential.

The 5G FWA opportunity: TCO analysis

GSMA Intelligence has developed a unique total cost of ownership (TCO) model that considers a range of demand- and supply-side factors to determine the conditions under which FWA deployments could provide cost savings compared to wireline alternatives. This helps drive a better understanding of the conditions that enable FWA solutions to provide a cost-effective way to meet customer demand for improved fixed broadband performance.

In all three scenarios shown in Figure 2, 5G FWA can deliver significant cost savings versus fibre to the premises (FTTP) across rural, suburban and urban geographies. Cost savings are the maximum achievable across the three geographies of Europe, Latin America and the US. For all three scenarios, savings versus FTTP are based on the assumption that the infrastructure required for rollout is either non-existent or unavailable for use through either rental or sharing. For the greenfield build scenario, savings figures are for the sub-case where duct infrastructure (as opposed to aerial pole infrastructure) is required for FTTP rollout.

Figure 2: Cost savings (potential) using 5G FWA versus FTTP

Source: [The 5G FWA opportunity report series](#), GSMA Intelligence, 2022

2: Case study: Zain Saudi Arabia

Context and rationale

Take-up of DSL and fibre has remained stubbornly low in Saudi Arabia over the past decade, reflecting the challenges of deploying these technologies. For example, fibre construction in the country can be slow and inefficient due to long distances and harsh topographies. Fibre rollout costs per premises passed can reach up to \$1,400. FTTP services are therefore mostly limited to large cities.

FWA has consequently proven to be the bedrock of the fixed broadband market in Saudi Arabia, playing a key role in alleviating the country's digital divide. With a much greater footprint than DSL or fibre, FWA has enabled many households in Saudi Arabia to subscribe to fixed broadband services for the first time, driving fixed broadband penetration from 30% in 2015 to more than 90% today (of which FWA is over 50%).

FWA's cost advantage over other fixed broadband technologies enables operators in Saudi Arabia to embark on large-scale FWA deployments. This has been underpinned by technical improvements that allow mobile signals to reach premises unimpeded by natural phenomena, enabling FWA to be deployed for less than \$500 per premises passed, even in more remote areas.

4G FWA was launched in Saudi Arabia in 2015, allowing operators to offer download speeds of around 10–20 Mbps, in line with typical DSL speeds. This enabled households to use the internet for a variety of purposes, including entertainment and education. More recently, 5G's enhanced capabilities have provided a boost to FWA demand, enabling operators to offer guaranteed speeds of 200 Mbps.

Zain Saudi Arabia's 5G network covers more than 5,000 towers across 53 cities. The operator put 5G FWA at the centre of its 5G launch strategy, as it saw the opportunity for a new revenue stream at a time when it has excess capacity. It also believes taking a leadership position on 5G FWA can boost its brand identity and help it appeal to the premium segment of the market, which is important as the number three player by mobile market share in Saudi Arabia.

Strategy

Zain Saudi Arabia opted for a rapid, full-scale deployment of 5G, resulting in 5G population coverage of 60% at the end of 2019. The operator's 5G FWA service is offered over the same network grid as its 5G mobile service, allowing the operator to target households in urban, suburban and rural areas.

5G FWA's performance advantage over legacy technologies means Zain is gaining subscribers in areas where customers are reliant on DSL connections. 5G FWA is also proving competitive in areas with FTTP coverage, which is around 50% in Saudi Arabia, helped by the minimum speed guarantees Zain offers on all its 5G FWA plans.

Figure 3: Zain Saudi Arabia fixed broadband packages

	5G Home Basic	5G Home	5G Home Movies	Fiber Home	Fiber Home Movies
Download speed	100 Mbps	200 Mbps	200 Mbps	200 Mbps	200 Mbps
Upload speed	20 Mbps	60 Mbps	60 Mbps	50 Mbps	50 Mbps
Content			OSN+ Shahid VIP STARZPLAY GeForce Now	OSN+ GeForce Now	OSN+ Shahid VIP GeForce Now
Price per month	SAR289 (\$77)	SAR299 (\$80)	SAR349 (\$93)	SAR299 (\$80)	SAR349 (\$93)

Note: data correct as of 3 October 2022. Unlimited data offered on all packages shown. 24-month contract. Selected packages shown only.

Source: operator website

Zain's 5G FWA pricing highlights the opportunity for operators to achieve material revenue contributions from FWA. Zain's cheapest 5G FWA plan is SAR289 (\$77), which is more than double its current mobile ARPU. Zain's 5G FWA tariffs also show there is potential to grow revenues indirectly via bundling content add-ons. Furthermore, 5G FWA can enable mobile-centric operators to transform into fixed-mobile convergent players (a stated aim of Zain in its annual report) by bundling 5G FWA with mobile SIMs, as Zain does with its 5G Family package.

Zain has sold 5G FWA through a mix of distribution channels. When selling the proposition, a challenge has been helping subscribers understand the difference between a mobile and fixed-wireless service. Some customers tried inserting the SIM card from the router in their mobile device, while others tried taking the router to a second property to get 5G FWA when outside of their home. Zain has educated customers on how 5G FWA works, through marketing campaigns and carefully explaining the terms and conditions of the FWA service at the point of sale.

Results and learnings

A quarterly report on internet speeds from Saudi Arabia's regulator, the Communications and Information Technology Commission (CITC), highlights the impact of Zain's 5G FWA service.¹ In Q4 2021, Zain Saudi Arabia's average fixed broadband download speed was 165 Mbps, 66% higher than the national average. The report also highlights the breadth of Zain's 5G coverage, with the operator's 5G network ranked first in 11 out of 13 regions.

Government support has been crucial to the development of 5G FWA in Saudi Arabia, particularly in making spectrum available with the right conditions to support infrastructure deployment. The government established a National 5G Task Force to increase regulatory certainty, particularly through the Unified Licence scheme, and the timely availability of 5G spectrum. For example, the country released an additional 400 MHz in mid-band (3.5 GHz) spectrum in early 2019, taking the combined spectrum available to around 1,000 MHz. This enabled Zain to use the 2.6 GHz frequency band as the coverage layer for its 5G FWA deployments, with spectrum in the 3.5 GHz band deployed to provide additional capacity. The operator also deployed further sites and upgraded its backhaul network to cope with additional data traffic and ensure it could meet its download speed guarantees.

¹ Quarterly Report for Internet Speeds and Digital Content Access Speed in the Kingdom of Saudi Arabia "Meqyas": Fourth Quarter 2021, CITC

3: Case study: Omantel

Context and rationale

According to Oman's Telecommunications Regulatory Authority, the number of fixed broadband subscriptions in Oman exceeded half a million at the end of 2021, equivalent to a household penetration rate of around 75%.² The share of connections by technology is shifting from DSL as operators deploy FWA services in more locations and Oman Broadband (OBB) progresses with its FTTP rollout.³

In December 2019, Omantel launched its 5G FWA service, known as 5G Home Internet. This builds on the operator's 4G FWA service launched in 2017. Omantel views 5G FWA as a crucial technology to close the fixed broadband coverage gap in Oman. It highlights two main advantages over alternative solutions:

- **Cost:** 5G FWA offers a significant cost advantage, particularly in rural locations where conditions favour wireless connectivity over fibre densification. Around 15% of Oman's population live in rural areas, according to the latest figures from the World Bank.
- **Time to market:** Deploying FTTP services can take several months (and sometimes even years) due to the need to apply for civil permits, dig trenches, build ducts and deploy physical cables. Omantel's 5G FWA strategy is based on using existing cell sites to offer 5G FWA services, enabling the operator to deploy services quickly.

Strategy

Omantel launched its 5G FWA service using 3.5 GHz of spectrum in all main towns and cities, including Muscat, Barka, Sohar, Rustaq and Saham. The operator targets two main groups of customer:

- **Fixed broadband first-timers:** The cost advantages of FWA enable Omantel to offer fixed broadband services for the first time in underserved areas – specifically, sparsely populated rural areas.
- **Dissatisfied DSL customers:** Some households in Oman still rely on ADSL broadband products with low speeds (less than 10 Mbps). In this situation, Omantel positions 5G FWA as an upgrade in terms of performance, particularly download speeds. This helps the operator upsell xDSL customers to 5G FWA plans generating higher revenue levels.

² Market Indicators Telecom and Postal Semiannual (July to December 2021), Oman Telecommunications Regulatory Authority

³ Oman Broadband Company provides and maintains Oman's fixed broadband infrastructure for the country's two main operators: Omantel and Ooredoo

While actual user speeds depend on factors such as network load and cell site backhaul, 5G's enhanced capabilities enable Omantel to offer speeds of up to 1 Gbps on 5G FWA – a vast improvement on 4G. 5G also allows Omantel to offer larger data bundles and additional services such as OSN+ with FWA packages, driving a price uplift versus 4G FWA.

Figure 4: Omantel fixed broadband packages

	5G FWA	5G FWA	ADSL	FTTP	FTTP
Data allowance	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited
Download speed	Up to 250 Mbps	Up to 1 Gbps	10 Mbps	200 Mbps	1 Gbps
Upload speed	Up to 65 Mbps	Up to 250 Mbps	1 Mbps	50 Mbps	256 Mbps
Content	Yes	Yes	No	Yes	Yes
Price per month	OMR40 (\$104)	OMR99 (\$257)	OMR25 (\$65)	OMR35 (\$91)	OMR100 (\$260)

Data correct as of 3 October 2022. 12-month contract. Selected packages shown only. 5G Home Internet and Ultra-Fast Home Internet come with a choice of GeForce Now, STARZPLAY, OSN+, Jawwy and Shahid VIP.

Source: operator website

FWA adoption should further benefit from the trend of cross-selling fixed services into the mobile subscriber base, which can drive new revenues and reduce customer churn. Omantel's customer intelligence capabilities play an important role in supporting this strategy, giving the operator a strong understanding of its user demographics. Average household income and fixed broadband penetration data, for example, help drive effective below-the-line sales and marketing campaigns by ensuring only the most relevant prospects are targeted. This is combined with data on existing service uptake and usage (e.g. mobile-only subscribers with high data usage are ideal 5G FWA candidates), helping Omantel direct investments to the most profitable areas of opportunity.

Results and learnings

At the end of 2021, Oman had more than 75,000 5G FWA subscriptions, equivalent to 15% of the country's total fixed broadband subscriptions.⁴ With Omantel deploying 5G FWA in more areas over the coming years, this figure can be expected to continue to grow. To support uptake, two main areas for improvement have been identified:

- **Generating CPE economies of scale:** Around three quarters of Omantel 5G FWA customers require a fixed antenna to be attached to the outside of their property. This needs to be done by an engineer, which can delay the set-up process. It also adds to the customer acquisition cost, as Omantel does not charge customers for the CPE. Omantel's per-unit CPE costs have remained relatively flat since launching 5G FWA services at the end of 2019, highlighting the difficulty of building economies of scale during the initial stages of customer adoption.
- **Managing network capacity:** Deploying 5G FWA on a large scale can be challenging where radio network capacity utilisation is already high. This has led Omantel to deploy additional cell sites to boost capacity in areas where 5G FWA take-up has been strongest. The operator is also looking at additional spectrum bands to support future 5G FWA demand. For example, it recently trialled mmWave spectrum in the 26 GHz band at its headquarters in Madinat al Irfan.

⁴ Market Indicators Semiannual Report – Telecom & Post (July–December 2021), Telecommunications Regulatory Authority, March 2022

4: Outlook

Pursuing the 5G FWA opportunity ahead

The outlook for FWA rests on a combination of factors, including 5G network rollout pace, spectrum availability and refarming, and the marketing and pricing strategies of operators promoting the service. As the examples from Oman and Saudi Arabia have shown, when these factors are in place, there is a significant opportunity for operators to drive incremental revenues through FWA. This opportunity is not limited to these markets, with FWA growth expected globally.

Over the next four years, GSMA Intelligence expects 5G FWA connections to grow by around 90% per annum (on average, across the 52 countries that have either launched or announced a 5G FWA service). Although this figure is boosted by the current small 5G FWA base, it shows the clear momentum behind 5G FWA. By 2025, the total number of 5G FWA connections across the 52 countries is expected to reach around 40 million, up from 4 million connections in 2021. Around a fifth of the 52 markets are expected to have more than 1 million 5G FWA subscribers by 2025.

Markets such as Austria, Bahrain and Australia, where the mix of fixed broadband technologies is skewed towards xDSL, are likely to lead 5G FWA penetration growth. Markets with low total fixed broadband penetration such as Philippines will also see faster-than-average growth. As 5G rollout starts in more developing markets, the list of fast-growth markets should expand, with more operators benefiting from the 5G FWA opportunity.

