

RCR Wireless News

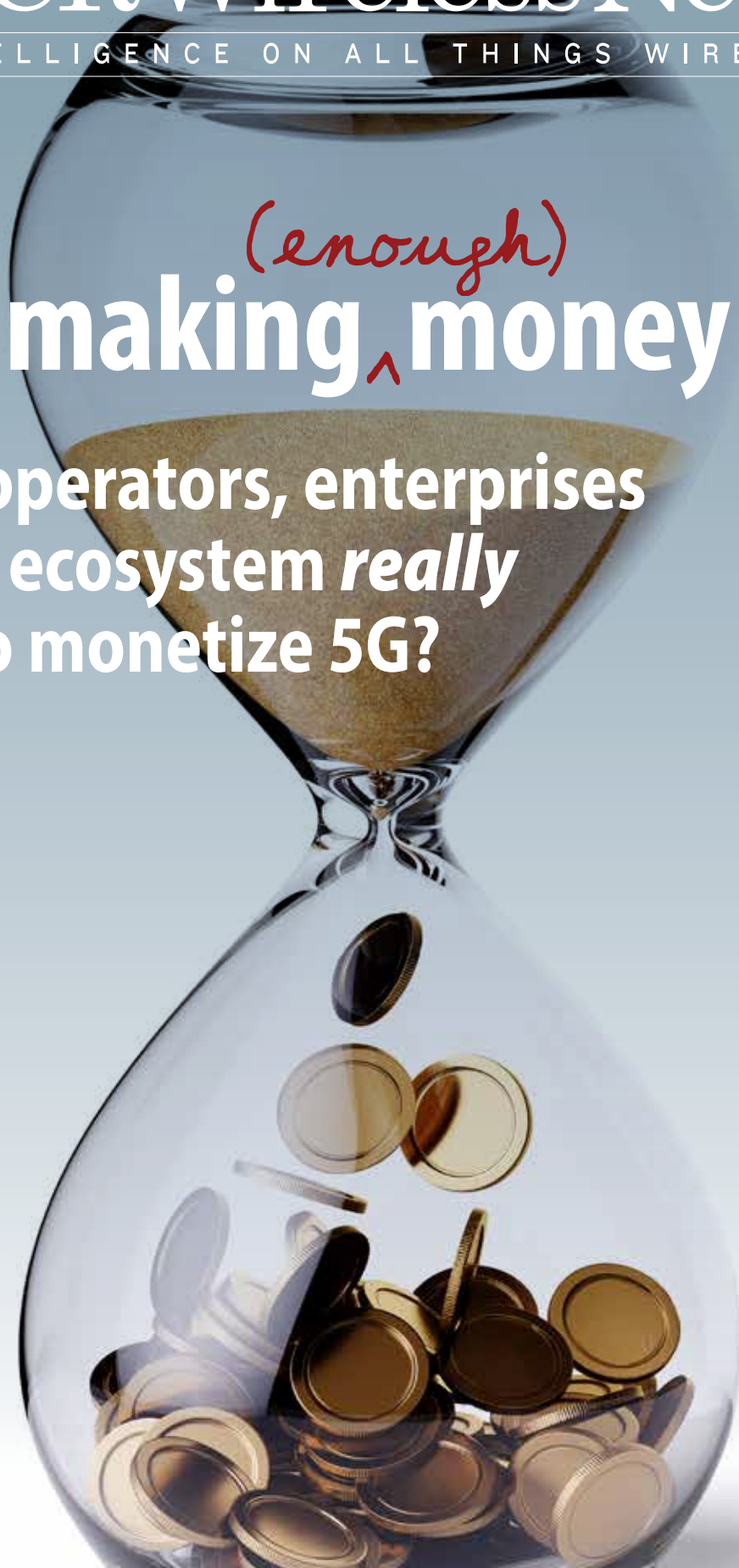
INTELLIGENCE ON ALL THINGS WIRELESS

FEBRUARY 2023

Is 5G making ^(enough) money yet?

Or, are operators, enterprises
and the ecosystem *really*
ready to monetize 5G?

By Sean Kinney



Introduction

5G monetization...one of those things that's simultaneously a pointed necessity for operators and a bit nebulous in terms of the when and how it will happen. Another wrinkle appears when you compare the bill of goods sold when the marketing machines switched into gear circa 2018 with the commercial reality of 2023. That to say, using a cellular network to deliver home internet is a far cry from robotic surgery; customers switching to 5G because they upgraded a device isn't exactly the same as seeking out a high-priced, high-powered performance tier optimized for mobile gaming.

While fixed wireless access and cyclical device and plan upgrades are indeed creating revenue attributable to 5G, and that whole 5G for enterprise digital transformation theme is showing signs of life, no one is getting

close to recouping the cost of network deployments. Well, why not? That's a simple question with a not-so-simple answer. Part of it has to do with technology, certainly, but the bigger issue is perhaps around readiness: It's hard for an operator to sell advanced 5G services into an enterprise if that enterprise isn't organizationally ready to actually use it. At the same time, if an operator can't demonstrate immediate business value, what's the appetite for a business to invest in a loosely defined future state? It's not so much a chicken and egg problem as it is a problem of having chickens but not having a use for eggs or, conversely, needing a specific type of egg but not having access to the right type of chicken. That's a messy metaphor but 5G monetization, like managing a chicken coop, is a messy business. Time will surely tell, but who's most prepared to grit it out

as the clock continues to tick?

How do operators think 5G monetization will happen?

Verizon detailed five vectors of service revenue growth in March 2022

In March last year, Verizon executives convened for an investor presentation that took stock of the assets the company had assembled, particularly its nationwide C-Band spectrum portfolio, and looked ahead to how these assets would be positioned to drive revenue growth. CEO Hans Vestber laid out how Verizon's network-as-a-service strategy would support growth across 5G-backed mobility, nationwide broadband (both wired and fixed wireless access), enterprise-facing solutions like private networks and mobile edge computing (MEC) infrastructure, the "value market," and "network monetization."



5 Vectors of Growth Drive Verizon's Performance

Image courtesy of Verizon



Vestberg said at the time: “With one network architecture that supports multiple business cases, our foundation of network-as-a-service is the key of enabling the five vectors of growth that will drive Verizon’s performance as we create new markets that define the 5G economy.” Specific to projected growth, Vestberg expressed “high confidence” that Verizon would deliver 4% service and other revenue growth in 2024 and beyond; the bigger picture is a total addressable market expansion from \$340 billion in 2021 to \$460 billion in 2026.

Executive Vice President and Chief Strategy Officer Rima Qureshi detailed the five vectors of growth built on the network-as-a-service concept. 5G-backed mobile services grow ARPA through step-ups, premium offerings and bundled subscription services, she said. Nationwide broadband, particularly from FWA which “allows us to significantly expand our coverage of households and businesses...We intend to disrupt an existing market and capture share. MEC and other B2B solutions, coupled with an app-focused partner ecosystem and Verizon’s “first-mover advantage,” could translate into a \$30 billion “addressable opportunity by 2025 across private networks, edge computing, IoT and enterprise solutions,” Qureshi said. Prepaid brand and MVNO customers was also identified as an ARPU and revenue growth driver.

To the overarching point around network monetization, “We expect continued growth in mobility, which will still represent the majority of our total opportunity,” Qureshi said. “As we push into new markets, the bulk of the new growth is expected to come from nationwide broadband and MEC and B2B solutions. In total, this is a massive opportunity that will continue to grow beyond the planning horizon. In summary, we have a clear and consistent strategy. We have built the best portfolio of assets, and we are redefining the industry with our robust partner ecosystem. No other company in our industry has such diverse paths to revenue growth, and Verizon will lead the 5G economy.”

How is Verizon tracking on those five vectors of growth today?

Fast forward to Verizon’s Q4 2022 earnings, reported on Jan. 24 this year. In response to a question from Mike Rollings of Citigroup’s Research Division on expectations laid out at the investor day event versus the reality of today, Verizon Chief Financial Officer Matt Ellis said some growth expectations, notably around FWA expansion, were “very much in line with the expectations we outlined a year ago.” Same with enterprise mobility net additions.

Ellis continued: “A couple of areas where we are behind versus our expectation at that point in time. Firstly, you take one of them, the mobile edge

compute and 5G private networks, you’re talking about the technology adoption there on a new technology, that adoption curve, a little slower than maybe we would have liked. But as you heard from [Vestberg] in the prepared remarks, heating up, we’re starting to see some momentum there. So still feel good about the opportunity there. But the pace of the adoption curve, a little different than we hoped it might be. But the upside there still looks very good.

“And then, of course, the other one, consumer mobility. At this time a year ago, we had higher expectations for ‘22 than where we ended up. Obviously, a lot of that variance occurred in the first part of the year, and you saw the actions taken. But as you think about the piece parts of the long-term outlook that we described a year ago and then how those have played out in the past 12 months, hopefully, that gives you a little more color in terms of where things are moving along very much in line and where we also saw some areas where we’ve had to -- we have opportunity to see further improvement as we go forward.”

Bottomline, Vestberg told Rollins, “We’re more confident than ever that we have the right strategy and we have the five vectors of growth. All of them are going along. Some are actually exceeding our expectations. Some are a little bit slower, and some have a little bit different jump-off points. That’s

where we are. But there's no difference how we see the market and how we believe we can compete in all the five vectors of growth that we outlined the last time."

Fixed wireless access: The killer 5G app?

When Verizon initially launched 5G in 2018, it was a pre-standard mmWave FWA. Since then, and in line with the articulated plan to provide nationwide broadband using wireless and its fiber-based Fios footprint, Verizon has used its C-Band holding to dramatically expand the availability of home internet service. At the 2022 investor event, the company projected

that 50 million households would be covered by the end of 2025, 14 million business in the same timeframe, and 4 million to 5 million total subscribers by the end of 2025.

Fast forward to the latest quarterlies and Verizon reported 379,000 FWA net additions. With regard to the 4 million to 5 million goal reported at the investor event in 2022, Vestberg said, "We are well ahead on that plan...When it comes to our capacity, we definitely have capacity for that and much more."

Using excess mobile network capacity to offer up cellular-based FWA is model Verizon and competitor T-Mobile US are both using. T-Mobile US appears largely focused on customer acquisition in small and rural markets. The broader dynamic is around putting in-market a home internet service to challenge cable players, which in many cases enjoy near-monopolies in many markets, while also increasing

bundling opportunities for existing mobile customers in areas also served by FWA.

Back to T-Mo's FWA ambitions. On Feb. 1 the operator reports fourth quarter 2022 numbers, including a break out of home broadband subs. In that quarter, there were 524,000 net customer additions for a total of 2 million in 2022, and 2.6 million total in the base. CEO Mike Sievert said on the call, "We're moving our eligible homes from 40 million to 50 million, and that means that there's 50 million homes out of 140 million nationwide, where if tomorrow morning you applied for service, we'd say yes. And so that is a big footprint."

Sievert also used a vehicular analogy to lay out his thoughts on 5G FWA versus fiber. "It's kind of like the people at Ferrari pointing a finger at the world's best-selling car, Toyota, saying, 'We're faster. We have the faster car.'"



"In the case of T-Mobile 5G home broadband... it's perfectly suited to what people want."

Mike Sievert, CEO, T-Mobile US



Image courtesy of T-Mobile US

Yes, but Toyota is the world's best-selling car, and that's because--and if you look in the case of T-Mobile 5G home broadband--because it's perfectly suited to what people want. And although it has less overall potential for capacity than a strand of fiber, which is patently obvious, it's radically simple. It's low cost. It's transparent. It's portable within tens of millions of households. And it has the speed and capacity that allows people to do what they want."

He continued: "When we launched this product, we talked about 7 million to 8 million homes. And as you can see from our numbers, we're tracking beautifully to that. And the question now is where do we go from here. And I gave comments before about whether or not we're looking at ways that could augment that strategy. Of course, we are. But that's because we have a winning product and massively expanding

capacity to support it. One of the things to keep in mind is that economically, this, unlike fiber and cable, this product so far is not burdened by amortization of capital and the cost structure, right? So we're able to take the capital that we deployed from mobile and find places with excess capacity and market broadband there. And those places are rapidly expanding, even though we have millions of customers on board now soaking some of it up."

Ericsson examines the 5G fixed wireless access market and opportunity

FWA could address up to 60% of households; on track for 300 million connections by 2028

Ericsson conducts ongoing research and monitoring of major developments impacting the global ICT industry, its customers, and itself. With regard to

FWA, the network infrastructure vendors found in a 2023 handbook it published that more than 75% of all operators offer some kind of fixed wireless services. 5G accounts for around 33% of those FWA services, a 50% increase compared to a year earlier. The handbook identifies two variants of FWA: "best-effort" service and a service with a speed-based quality of service. The speed-based service, which guarantees specific performance metrics, comes with higher ARPU compared to "best-effort," and accounts for about 25% of offerings, Ericsson said.

If you look at the U.S. market, AT&T and Verizon both build fiber, but Verizon has placed much more emphasis on using its cellular network to offer home internet services. T-Mobile US doesn't do much in terms of building its own fiber, but, like Verizon, is going big on FWA. While the strategy differences

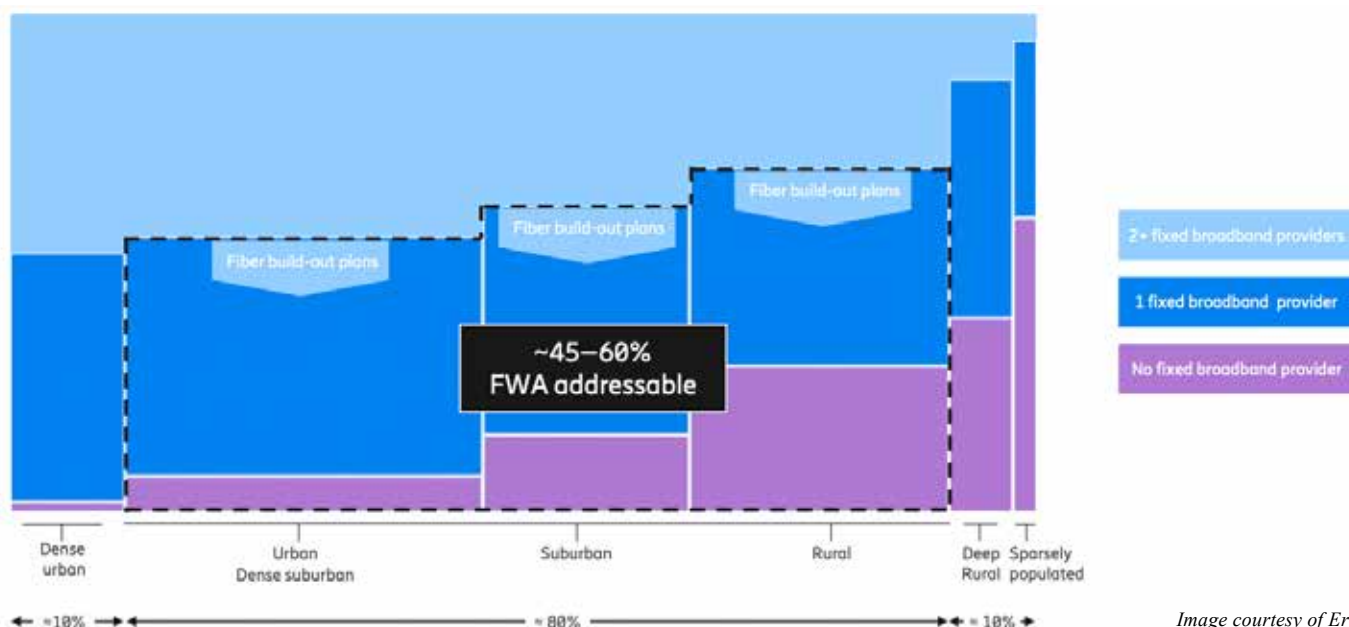


Image courtesy of Ericsson

can be chalked up to a number of different factors ranging from total network capacity to execution ability, Ericsson makes the case for FWA in comparison to fiber by playing up the latter's faster time to market, lower cost, and ability to re-use existing infrastructure.

Ericsson divides the FWA market into three segments:

- A “wireless fiber” option positioned to compete with fiber; “typical sold data rates are 100 - 1,000+ Mbps, and typical ARPU” is \$50 to \$100.
- The “build with precision” segment competes against DSL; data rates are between 50 and 200 Mbps with ARPU between \$20 and \$60.
- The “connect the unconnected” segment focuses on rural areas with little to no fixed options; data rates are between 10 and 100 Mbps with ARPU between \$10 and \$20.

A “surgical approach” for fixed wireless access success

In its handbook, Ericsson said operators should “adopt a surgical approach to selecting areas for” deployment...A surgical FWA approach starts from the exclusion of less attractive areas based on household density.” In its example, homes in dense urban areas and “deeply rural areas” are excluded, and account for around 20% of households.

“This means that around 80% of households remain addressable, in urban and dense suburban, suburban and rural areas. Next, the attractive

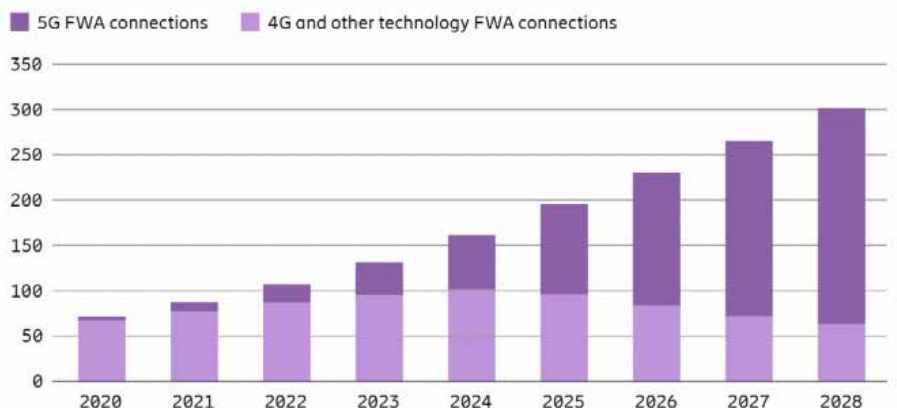
areas for FWA deployment are filtered further by analyzing fixed broadband competition and estimated fiber build-out.” Another factor is the competitive landscape; Ericsson found that, in the example, a further 20% of households are excluded given access to two or more providers, leaving a 60% addressable market for FWA. One more exclusionary pass, based on projected fiber build out, could potentially exclude

another 15% of the market. “Operators who act fast could grab areas for FWA and render competitors’ fiber build-out plans uneconomical.”

Looking ahead, Ericsson sees FWA connections around 100 million by the end of last year, growing to 300 million by 2028. Further splicing that, the number of 5G-enabled FWA connections could hit 235 million (of 300 million total) by 2028.



FWA connections (millions)



Images courtesy of Ericsson

eMBB and FWA lead operators' 5G monetization efforts

Ericsson has tracked a two-year revenue increase in the top 20 5G markets as measured by device penetration

In recently published research, Ericsson found that 5G monetization is picking up in the top 20 global markets as measured by device penetration. After years of stagnant ARPU, operators are seeing a service revenue lift from consumers using enhanced mobile broadband (eMBB) services; behind eMBB, the Swedish vendor identified fixed wireless access as another growth driver, as discussed in more length earlier in this report.

In the Ericsson Mobility Report Business Review edition, EVP and Head of Business Area Networks Fredrik

Jejdling wrote that eMBB “offers the fastest revenue opportunities for 5G, as it is an extension of service providers’ existing business, relying on the same business models and processes. Many service providers are updating their charging models and shifting customers to new, 5G-adapted subscriptions. The mobile broadband business will continue to comprise a significant part of service providers’ revenue in the foreseeable future, but it is not expected to drive long-term growth on its own.”

Before getting to what else is need for operators to fully realize 5G monetization, on the consumer eMBB front, Ericsson suggested a performance ladder providing “an incremental upgrade path for consumers, while also creating a gradual monetization model... Incremental pricing models are key for

service providers, both for effectively addressing the individual needs of each customer and for continuing to drive long-term revenue growth.”

By the numbers, Ericsson researchers identified revenue growth in the top 20 5G markets beginning in the first quarter of 2020, with average revenue growth of 3.2% annually. This lift corresponds with the commercialization and scale-out of 5G networks in these leading markets.

In terms of the big picture on 5G monetization, Ericsson sees three bands: core connectivity which includes eMBB, FWA, mission critical networks, and wide-area IoT; “current adjacencies” includes mobile, cloud-based gaming, private networks, the positioning of 5G as a primary network rather than a fallback, CPaaS models, and in-building/venue coverage; and

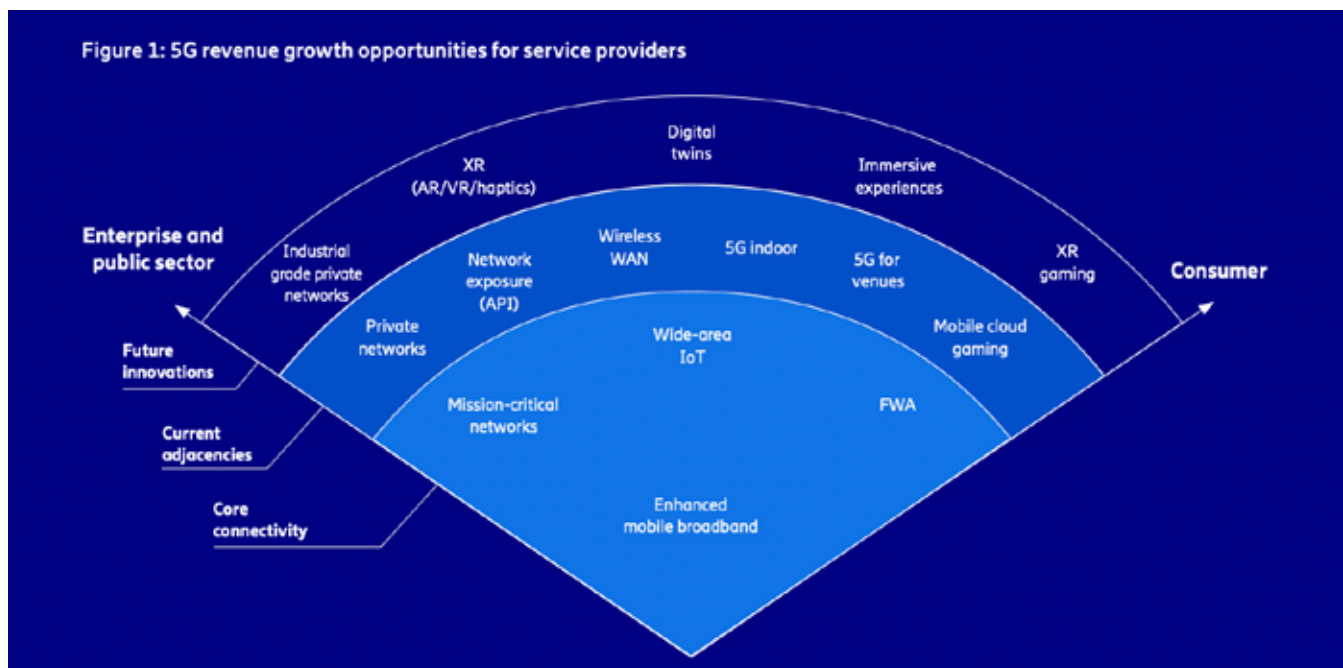
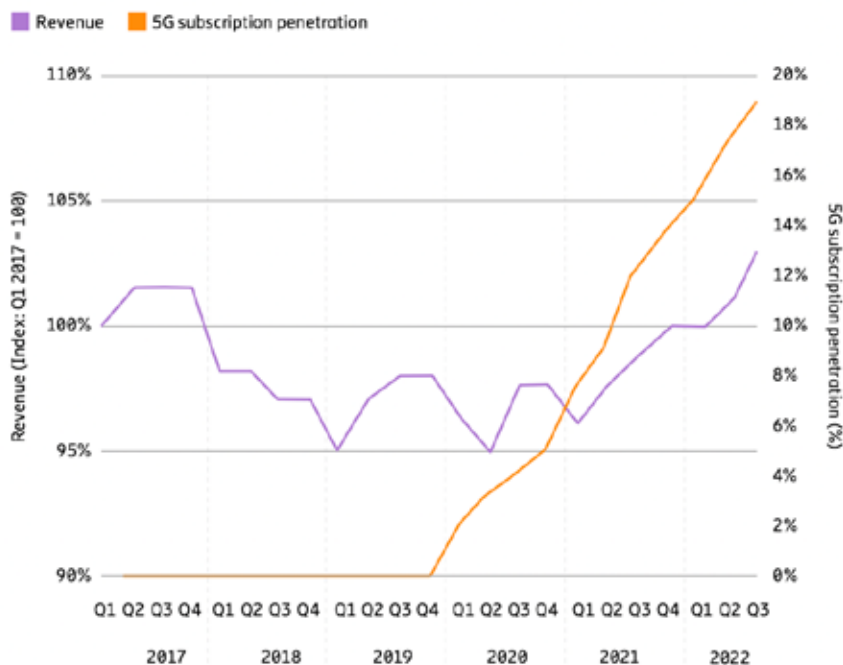
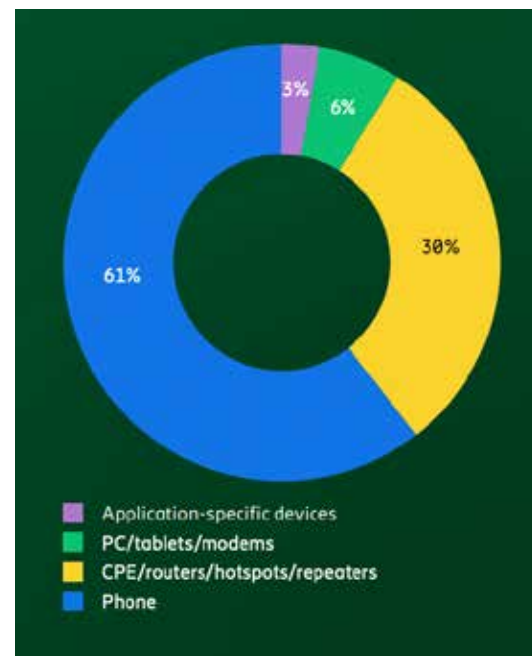


Image courtesy of Ericsson



Source: Ericsson analysis of Strategy Analytics data, Q3 2022.



Images courtesy of Ericsson

the broad “future innovations” band which includes Extended Reality, digital twins and “industrial grade private networks.”

As operators around the world are learning, the more durable 5G monetization strategies involving advanced enterprise-facing solutions aren’t yet making a meaningful impact on balance sheets. Ericsson called out “growing 5G opportunities in enterprise and public sector applications across the world,” but also cautioned that, “It is as yet early days for 5G...”

As it relates to private 5G networks as an enabler of enterprise digital transformation, one problem identified in these pages and elsewhere is a lack of vertically-focused devices with the necessary capabilities. Examining the

5G device landscape, Ericsson tallied announced products and found that 61% were phones, 30% were CPEs, 6% were PCs or tables, and just 3% were “application-specific devices.”

That said, the report authors wrote, “There are already clear signs of a coming uptake of 5G services in several industries...Industrial ruggedized 5G handsets have been launched... Mobile devices such as autonomous mobile robots (AMRs), drones and XR devices are already being connected by modules to a gateway. This is expected to accelerate in the coming years. As innovation in 5G...picks up the pace, not only on the consumer side but also for enterprises, new application-specific devices will increase in number, possibly also in areas not yet considered.”

Juniper Research projects 5G revenue will hit \$625 billion by 2027

eSIM and device diversification driving revenue growth: Analysis

Mobile operators are forecast to generate \$625 billion from 5G services globally by 2027, up from \$310 billion in 2023, according to recent analysis by Juniper Research.

The report, published in February, predicts that this growth of more than 100% over the next four years will be chiefly driven by the migration of mobile subscriptions to 5G networks, and the increasing inclusion of eSIMs in devices such as laptops and Wi-Fi hotspots.

Juniper Research also forecasts that 80% of global operator-billed service revenue will be attributable to 5G

Upcoming Events

Brought to you by

RCRWirelessNews
INTELLIGENCE ON ALL THINGS WIRELESS



March 28th-29th 2023,
Free-to-Attend Virtual Event

Cloud Native and MEC - the Path to 5G El Dorado?

Join the conversation this year in the combined Cloud and Edge Forum 2023 where top telecom industry experts will discuss how networks are evolving. They will address the transformation journey to a reliable, self-healing and efficient network and how carriers are planning to monetize 5G networks being deployed via cloudification and MEC.

Join the forum to dive deep into the challenges, solutions, possibilities and capabilities arising from the cloudification of networks and what the future holds for the wider telecoms industry.

www.telco-cloudforum.com



May 9th 2023,
Free-to-Attend Virtual Event

Test and Measurement In a New Network Paradigm

There is a huge leap in the complexity of testing from 4G to 5G and then to 6G networks. With this increasing complexity of testing posed by 5G and open network environments, it is more challenging, time-consuming and costly to test equipment and systems.

Join this event to dig into the details of lab and manufacturing testing, field network testing and service assurance challenges and solutions.

www.testandmeasurementforum.com

Explore all upcoming events at [RCRWireless.com/events](https://www.rcrwireless.com/events)

services by 2027, getting operators closer to securing ROI on 5G networks. However, the increasing implementation of eSIMs into new devices will drive global cellular data traffic to grow by over 180% between 2023 and 2027, as data traffic is offloaded from fixed and Wi-Fi networks to 5G.

“eSIM-capable devices will drive significant growth in cellular data, as consumers leverage cellular networks for use cases that have historically used fixed networks. Operators must ensure that networks, including 5G and upcoming 6G networks, are future-proofed by implementing new technologies across the entirety of networks,” said research author Frederick Savage.

To prepare for this increasing demand in cellular data, the report predicts that 6G standards must adopt innovative technologies that are not currently used in 5G standards. It identified Non-terrestrial Networks (NTNs) and sub-1 THz frequency bands as key technologies that must be at the center of initial trials and tests of 6G networks, to provide increased data capabilities over existing 5G networks.

However, the research cautions that the increased cost generated by the use of satellites for NTNs and the acquisition costs of high-frequency spectrum will create longer timelines for securing return on 6G investment for

mobile operators. As a result, it urges the telecommunications industry to form partnerships with specialists in non-terrestrial connectivity, to benefit from lower investment costs into as-yet-unstandardized 6G networks.

A separate report by Juniper Research recently [forecasted](#) that the embedded SIM market is expected to grow from about \$4.7 billion this year to \$16.3 billion by 2027—representing 249% growth during the period.

The total number of smartphones that use eSIM will jump from about 986 million this year to 3.5 billion by 2027, Juniper estimates. The analyst firm says that eSIM-enabled consumer devices, like Apple’s eSIM-only iPhone 14, will trigger increased operator acceptance of the technology.

China and India are expected to account for about 25% of smartphones that use eSIM by 2027, with the United States making up about 10% of the projected smartphone eSIM market. But, Juniper notes, that depends on the tech being developed to the satisfaction of the Chinese government, which currently does not allow its domestic device manufacturers to sell eSIM devices in their home market because eSIM does not allow the level of device monitoring and tracking required by the Chinese government. Juniper said that growth of eSIM in China will depend on country-specific standards being implemented.

5G monetization hinges on CSP, enterprise and ecosystem readiness

On the technical side, Oracle sees the transition to 5G Standalone as key to delivering 5G monetization

So far, consumer-facing efforts at 5G monetization have been largely limited to providing home internet service with FWA. We have yet to see things like bespoke service tiers for cloud-based mobile gaming or a take-off in 5G-connected PCs deliver meaningful new service revenues.

On the enterprise front, the North Star of digital transformation of verticals promises to help operators monetize the billions spent on deploying 5G via private networks, a tsunami of internet of things connections, and selling customized network slices against service level agreements. That promise, however, has yet to turn into a reality at scale, and the reality for operators today is that ARPU and ARPA are in a period of stagnation, 5G has yet to live up to the world-changing hype, and we’re already starting to talk about 6G.

So why are we here, and how do we get out of the trough of disillusionment? “To put it at a very high level, I think it’s about the industry’s readiness,” Oracle Senior Director of Product Marketing and Strategy Anil Rao said. That includes the telecom sector’s readiness to deliver 5G, as well as



“If there is an early opportunity that will bring new revenue to CSPs, I think it’s private 5G.”

Anil Rao, Senior Director of Product Marketing and Strategy, Oracle

enterprise’s readiness to consume 5G, and the broader ecosystem’s ability to support comprehensive solutions.

“Consumers are not going to move the needle for 5G,” Rao said. “It’s got to be the enterprises. That creates sort of a big dependence on are the enterprises ready to adopt 5G?” Then there’s the question of ecosystem readiness, devices for instance; if your goal as an operator is 5G monetization as a function of selling private networks to manufacturers, then you need device OEMs to build ruggedized devices that deliver the features and functionality manufacturers need.

“Real 5G” and the move to Standalone

In terms of operator readiness, Rao further specified both technical readiness and business case readiness. On the technical side, “Most of the 5G

we have in the world is not real 5G... There’s a reason why we need 5G Standalone in that all the new capabilities that you talk about—network slicing in its true form, or even the IoT, like massive machine-type communications, or even ultra low latency use cases—all of those are going to be really well and truly supported by 5G Standalone. And 5G Standalone is still not widespread.”

What does this delay in 5G Standalone mean? Well, it gives more time for the buy and sell side of the equation to get ready to buy and sell 5G, respectively. Rao noted that private 5G is positioned to help operators with 5G monetization. “There’s definitely more appetite in the industry, in the enterprise sector, to embrace private 5G as opposed to the macro 5G. It’s all fully self-contained; You treat it as any

other enterprise IT capability...Private 5G will probably get a head start in all of this...If there is an early opportunity that will bring new revenue to CSPs, I think it’s private 5G.”

Further on private 5G, one plus is it can be sold and consumed as a service—“Telcos can take the as-a-service model to enterprises, and telcos are actually pretty good at as-a-service models,” Rao said. “It makes it easy for [enterprises] to transition to whatever the next big thing is.” He added that private 5G implementations, some of which use on-prem or near-perm dedicated 5G Standalone core infrastructure, can be further subdivided into slices. While public macro networks aren’t quite ready for slicing at any kind

of scale, private networks may be. This could help operators further evolve the private 5G business model to include revenue from slices.

When you look at when the 5G hype cycle kicked in, where the industry is today, the more-gradual-than-expected transition to Standalone, and how early looks at 6G rough drafts suggest a relatively niche appeal, has the historical 10-year cellular generational upgrade cycle been broken? Maybe.

Per Rao: “I think the real 5G hasn’t even started.” Rather than the typical decade, this cycle could last “even more than 15 years,” he said. “The positive effects of real 5G are going to be felt longer than 15 years...I think 5G is going to be a much longer cycle because 5G is so tied to the cloud as well. Cloud for telcos is also actively evolving. I think cloud plus 5G is going to be a story for awhile to come.”

Returning to the core considerations impacting 5G monetization efforts and operator ROI, Rao sees the move to 5G Standalone as “open[ing] up a whole raft of use cases and, for that, enterprise readiness is going to be critical. Probably that’s a silver lining in all of this delay.” That move to Standalone encompasses CSP and enterprise readiness, so that leaves the ecosystem angle.

Rao said operators and enterprises have ongoing relationships that can be tweaked to help both sides fully leverage 5G. Then, “You build an ecosystem of partners and you offer the ultimate service.” This is where Oracle slots in; “sort of a matchmaking between CSPs and enterprises,” he explained. In fact, Oracle has opened Industry Innovation Labs to provide fora for all parties to achieve readiness.

“The idea is...we still have to figure out a lot of things. We are doing this.

That’s the main spirit of these labs. We bring together friendly CSP customers on one side and potentially our own enterprise customers...As Oracle, and with these labs, we are uniquely positioned to bring telco customers and enterprise customers into this controlled environment and help enable these use cases.”

Conclusion

There you have it. Operators are and will continue to make money off of 5G, albeit maybe not in the way we thought it would play out. But, if you look ahead to the trendlines around MEC deployment, private network adoption and other things that would fall into the category of advanced 5G services, perhaps the best is yet to come. That said, the old adage—“you have to spend money to make money”—is definitely proving true in the crawl toward 5G monetization. ((••))



Navigating the Path From Telco to Techco

April 25th, Barbican Centre, London, UK

Download
Brochure

Need guaranteed leads? Thought leadership? Incremental content marketing opportunities?

Sponsor an *RCR Wireless News* multi-platform, editorial program and receive the following benefits:

Editorial Webinar – sponsorship includes 250 guaranteed leads, participation as sponsored guest and recognition as sponsor in all promotional materials. Sponsors will receive webinar registration and attendee list, responses to pre and post surveys and polling responses gathered during webinar.

Editorial Feature Report – in addition to recognition as sponsor in program promotion, sponsorship includes 250 guaranteed leads, distinct from webinar leads, one-page ad spread or advertorial in feature report, and responses to lead capture survey questions.

For information contact sales@rcrwireless.com

Fast facts about the *RCR Wireless News* digital network

- 382,000 monthly page views
- 170,000 unique monthly visitors to websites
- 81,000+ opt in newsletter subscribers
- 220,526 monthly video minutes viewed on *RCR Wireless News* Youtube channel
- 45,000 leads generated annually
- Industry leading demand generation programs and results



UPCOMING 2023 EDITORIAL PROGRAMS INCLUDE:

FEBRUARY 2023

- 5G Monetization Forum Key Findings
- Getting to ubiquity: The urban and rural digital divide
- Fighting the newest breed of DDOS attacks on data centers
- What will the wireless workforce look like in 2030?

MARCH 2023

- Private 5G for IoT—plotting timelines, defining applications, and making bets
- Private vs. public vs. hybrid cloud—what's right for operators in the shift to cloud-native?

APRIL 2023

- The evolution of T&M in the move to disaggregated, cloud-native networks
- When will small cell densification happen at scale?

MAY 2023

- How will Open RAN principles inform the development of 6G?

JUNE 2023

- Is fixed wireless the killer 5G use case?
- AI on the edge—when everything is connected to the cloud

Each program is limited to three (3) sponsors