Living in the moment

A REPORT FROM THE ACTIONABLE FUTURIST IN PARTNERSHIP WITH VODAFONE

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Living in the Moment – how 5G Standalone will transform the things we love most

Foreword from Ahmed Essam, CEO of Vodafone UK

Although we've been talking about 5G for a long time in the UK, we're yet to experience its true, game-changing potential brought about by 5G Standalone.

5G SA has the power to create experiences that are currently impossible – supercharging the things that enrich our lives. But we need a nationwide 5G SA network in place to make it all happen.

That's one of the reasons why I'm so excited about our proposed merger with Three UK. As a combined business, we'll deliver 5G SA to 99% of the UK population by 2034. Together, we're passionate about introducing the network the UK needs to make this exciting future a reality.

Ahmed Essam
Vodafone UK CEO

Summary

We've been talking about 5G for a long time in the UK; two-in-five people already enjoy the benefits of a 5G-enabled phone (according to research from GWI). But do we really understand how it could transform the things we love most in our day-to-day lives?

5G is about more than quicker download speeds on your mobile phone. Its greater capacity has the ability to connect millions of devices to one another, support higher quality content and deliver more reliable connectivity. Ultimately, it has the power to transform our experiences – whether that's watching your favourite football team on a Saturday or searching for new fashion styles and inspiration.

We live in a world where people want the things they love to be ultra-personalised, connected and experiential, and for it all to happen seamlessly. This is what 5G SA, coupled with IoT and big data, can unlock.

Crucially, this is not a technology of the future; 5G Standalone is here now. As it grows, our daily lives are becoming smoother, faster and more connected. And it is being used to develop technologies that will – in the not-too-distant-future – supercharge the things we love most, enabling things once unimaginable.

To explore how it could transform experiences in our day-to-day lives, Vodafone asked leading Futurist Andrew Grill what a 5G Standalone network in the UK would enable for people up and down the country, in the next five-to-seven years, across four beloved areas of our lives: gaming, sports, entertainment and retail.

What is 5G Standalone?

Many people in the UK with a newer model mobile phone will have noticed the 5G indicator at the top right of their screen, but what does this really mean?

According to leading consumer research agency GWI, 40% of people in the UK said they had 5G available on their phone. But one-in-four say they have a poor or very poor understanding of 5G (Vodafone, June 2023). That means millions of people are unaware of the additional, true benefits that 5G Standalone (5G SA) will bring.

Put simply, 5G SA is the fully upgraded 5G network. Existing 5G services offered by telecoms companies rely partly on 4G technology. Vodafone's 5G Standalone network has every element fully upgraded and future-proofed, and it is the first company in the UK to offer its customers a 5G Standalone network, the most advanced mobile network available today.

This means that customers with an eligible 5G Standalone device can expect...

- Up to 25% longer battery life
- Faster 5G data speeds
- Less lag in interactive experiences such as games
- The ability to communicate in busy places such as stadiums and festivals

Five Futurist Predictions for 5G Standalone

Leveraging comprehensive research and interviews, Andrew uncovered how 5G Standalone enhances existing digital interactions and paves the way for ground-breaking innovations in the areas we care most about.

His top five predictions for 5G Standalone in the next five-to-seven years are:

1. **Connected clothing**. 5G-enabled microchips (smaller than a 1p coin) will enable garments to 'talk' to each other, collecting style inspiration from other shoppers which power your own AI-enabled style tool housed in a wearable – allowing fashionistas to discover new styles and express themselves in new ways.

2. **A fully connected game**. Sports fans will get even closer to the teams they love thanks to 5G-enabled cameras on the pitch, as well as sensors embedded into "smart balls", worn by players and even in the pitches themselves. Giving everyone, both in the stadium and at-home, real-time access to the action and match data could bring an end to the much-debated Video Assistant Referee (VAR) system and off-side debates. This would allow more time to be devoted to the sports we love and less time to decision-making disputes.

3. **Become part of the broadcast**. TV viewers can become part of broadcasting and the entertainment experience – going beyond merely watching TV to participating in it, in real-time. Thanks to 5G SA, viewers will be able to select which scenario they'd like to see play out on screen, with AI-generated content then bringing that to life.

4. **Competitive gaming, on the go**. Gamers can experience the latest console-level games on the move with any 5G SA-capable device, no matter what its other specifications are, opening up gaming to even more people.

5. **5G SA will be the norm**. As 5G Standalone supercharges the things that the UK loves most, it will become the norm and the hunt for a WiFi signal at a venue – whether it's a stadium or a shopping centre – will become a thing of the past.

Let's dive into the opportunities for each sector in more detail.

RETAIL

Futurist Predictions

1. As shoppers increasingly look for new ways to express themselves through fashion, 5G-enabled connected clothing will enable you to discover styles and experiment with fashion in new ways by powering your own personal AI-enabled style guide.

2. Frictionless shopping will be powered by 5G Standalone RFID chips. With the need for a checkout removed, shopping will be quicker, easier and less painful.

3. Shoppers will be able to create personalised products – exactly the size and shade they need – on-demand, which could support the shift towards more sustainable fashion.

1. **The rise of connected clothing**

Where we are now: We're familiar with wearable technology; we regularly use things like smart watches and fitness trackers to monitor our health. But these technologies mostly rely on the owner's mobile to be nearby to work effectively. What if everything we wear could not only measure our wellbeing, but also connect to other garments and provide a richer experience? What if they could even offer suggestions of what to wear, allowing us to try out new styles and express ourselves in new ways?

Where we could go: Thanks to 5G Standalone, coupled with IoT and big data, people can unlock the ability for the products they buy and wear to influence their style and future purchases, far beyond what is possible with today's wearables.

How it works: According to Sofia Remtulla, former Accenture Retail strategy lead, a futuristic use of 5G Standalone in the retail space will be product-to-product communication, where we may see garments like trainers 'talking' to each other as their wearers pass in the street. Informed by the data they collect, they would then suggest outfits for you to try based on the preferences of people whose style you admire, creating brand-new shopping experiences.

Anne-Marie Tomchak, former Digital Director for British Vogue, thinks we could see a time when wearable devices become a widely-used fashion tool, helping you identify what's in your wardrobe to suit your mood, or power an AI-enabled personal stylist that gives you suggestions of what to buy and wear based on the data collected from our connected clothing.

However, this will only be possible with a 5G Standalone network, thanks to its ability to connect large numbers of devices simultaneously. While we've been using wearables such as fitness trackers to monitor our physical health and emotional wellbeing for many years, we've yet to fully leverage the social potential of wearables.

What it would look like: In recent years, we've seen social media apps like Instagram and Pinterest become a go-to for fashionistas searching for style inspiration and new ways to express themselves through clothing. Shoppers use such apps to save 'looks' they want to experiment with, then shop for similar garments.

But connected garments, which have tiny micro-chips embedded in them, can fast-track that process for you and make searching for the latest look ultra-personalised to your individual style. Your clothing will hold data on your personal preferences, your work and hobbies, and your preferred brands and typical budget. Then, by 'communicating' with other people's connected clothing as you walk around the shops or commute to work, they will instantaneously collate data held in the cloud about what style combinations other similar people are trying out. Using AI technologies like ChatGPT, it will then suggest which looks you could experiment with and products to try out, based on your personal preferences – powering your very own AI-enabled style tool.

Everyone has their own style and shoppers are increasingly searching for ways to express their individuality. But connected clothing would allow shoppers to take this to the next level – the ultimate curated consumer experience.

2. **Frictionless shopping becomes the norm**

Where we are now: We've seen green shoots of 'frictionless shopping' emerge in recent years. Uniqlo has pioneered the use of RFID tags for self-checkout, where you place all your items in a basket at the till and they're instantly scanned. Similarly, Amazon Fresh stores have shown frictionless shopping in action - as you walk out of the store, cameras and sensors recognise the items you've bought and charge your payment card or bank account – so you never have to queue at a till.

Where we could go: After experiencing seamless shopping in shops like Uniqlo and Amazon Fresh, demand for quicker and easier shopping is increasing. 5G Standalone will be the trigger for making frictionless shopping a reality in every shop – for all shoppers, not just those at selected brands.

How it works: That's because 5G Standalone allows millions of devices to be connected at once and can therefore power 5G RFID tags that track the movements of items in a shop, making the shopping experience quicker and less stressful, especially at peak periods like the pre-Christmas retail rush.

What it looks like: Imagine your Saturday morning shopping trip – thanks to 5G-enabled RFID tags, you'll be able to glide in and out of shops, accurately charged for products you've bought but without the hassle of queuing or waiting to be served.

Anne-Marie Tomchak believes that "A store is no longer just where the point of sale happens; it's also about the experience" and the shopping experience will only be enhanced thanks to 5G SA.

3. **Personalised products "at the edge"**

Where we are now: L'Oréal-owned NYX has been testing the ability to use an app that would allow shoppers to scan the colour of a garment and then "print" a lipstick to match, thanks to 3D printing and AI technologies.

Where we could go: Looking beyond the next five-to-seven years, this technology could be readily available, as 5G-enabled innovations enable us to create personalised items, on-demand.

How it works: Say you're shopping on a Saturday; you buy a new dress but can't find the perfect lipstick to match. You scan the colour of the dress on your phone and, using AI and AR technologies, can see what that colour lipstick would look like on you. If you love it, you can send a request to a local 'printer' who will quickly create it, ready for you to collect on your way home. These 'printers' could be housed in new concession stalls in places like Harrods and Selfridges and would work like the paint shops that we already use in the UK, which match and then mix a specific colour for you.

This new personalised process would ensure that beauty and fashion brands don't manufacture unwanted items at scale. Instead, consumers will tell them exactly what product they want and, in turn, reduce wastage of products that aren't quite right.

In addition, products could be manufactured in smaller sizes to suit the needs of the shopper, which would further reduce waste. You may, for example, only need a mini lipstick for your handbag.

As a result, 5G-enabled technologies could support the rise of 'conscious consumption'. The speed and bandwidth offered by a 5G SA network are key to making

this a reality, as only it can send AR and AI content between consumers and manufacturers in real time.

SPORTS

Futurist Predictions

1. Fans will be able to view the action up close thanks to 5G-enabled cameras on the pitch, which fans can access from their smartphone – even if they're not physically in the stadium. This will become the norm at large sporting moments.

2. Smart ball technology and player wearables will enable fans anywhere in the world to access even more information about their favourite teams and players, driving greater engagement.

3. Combining 5G-enabled smart balls, player wearables and pitch sensors will herald the end of VAR errors and disagreements, as well as enable undisputed off-side decision-making. As a result, more time is devoted to the sports we love, and less time to decision-making disputes.

1. Bringing sports fans closer to the games they love

Where we are now: For sports like football, if you're at the game, you've probably given up trying to share your experience with friends who can't get to the match using your mobile, due to poor connectivity. If you look up at the stadium's screen, you can see what the TV director thinks is the best camera angle. But how do you share what you're truly experiencing from your seat with your friends at home?

Where we could go: 5G Standalone will give fans, anywhere in the world, access to multi-camera angles, which they can select and view on their smartphones. It means you can get up close to the action – even if you're in the back row at the stadium or not in the grounds at all.

How it works: 5G SA connects these cameras to fans' smartphones – both in the stadium and at home. Crucially, 5G SA has a feature called "network slicing" where a dedicated "slice" of the network can be ring-fenced for an event or type of content. So those smart cameras will be able to reliably and consistently stream their footage, even when the network is incredibly busy with other users on game day.

What it looks like: With access to these cameras, fans can choose the best angles for viewing the action and see the tackles, passes and winning goals on their smartphones. 5G Standalone will offer every viewer an up-close look at the action – regardless of where they are in the world – bringing sports fans closer to the games they love.

Further in the future, cameras could even sit within robots that move around the touch line, taking fans even closer to the ball and moving at quicker speeds to keep up with the players.

5G-enabled cameras could be the start of a major shift in how we watch live sport.

2. **"Smart Balls" bringing unparalleled stats to fans**

Where we are now: During the 2023 Six Nations Rugby Tournament, rugby ball maker Gilbert collaborated with Sportable to bring real-time data from the match ball direct to the fans. It was a big, innovative step forward for the much-loved British game. But what if this technology was rolled out across all sports?

Where it could go: Smart ball technology would become commonplace across sports like rugby and football, giving both the players and the fans – as well as the broadcasters – access to real-time match data. It will bring fans closer to the action like never before.

How it works: The smart ball communicates with wireless beacons around the pitch, enabling powerful augmented reality graphics to provide real-time match stats such as kick distance, pass distance and territory gained. In rugby, it can also measure how fast a rugby ball is spinning, possession time, forward passes and accuracy of kicks to touch. The micro-tracking module embedded in the ball offers instant data at centimetre-level accuracy with real-time statistics.

What it looks like: Ultimately, this would give every fan access to match data like never before. Aimeé Howells, former Global Sponsorship Director for Manchester United, thinks that the future of sport is anything that gets the fans closer to the passion of the game. "The ability to connect people to a live experience or connect them to each other within that live moment so you can learn about each other, is the future."

3. **The end of VAR and off-side decision-making**

Where are we now: As mentioned, we're seeing the emergence of innovative technologies like connected cameras and smart balls.

Where we could go: But, as they are rolled out more widely and used together, we could even see them impact how we navigate the historic rules of sport.

How it works: Currently, when an offence takes place during a game, the Video Assistant Referee (VAR) process will help the ref make a call on who was at fault. The technology is often hotly debated, holds up games and with room for human error.

But 5G innovations can help. By giving fans access to 5G-enabled cameras, when a foul or poor tackle takes place, everyone watching the game can see whether it really is a red

card or penalty. This could bring an end to the much-debated, and sometimes much-hated VAR process.

In addition, pairing these cameras with 5G-enabled smart ball technology as well as sensors and microchips on the player and pitch means everyone – from referees to fans – has a completely accurate view of the action, down to the most precise detail. This level of accuracy could usher in an era of undisputed off-side decision-making – removing the need for VAR and replacing it with live data to show what's on- and off-side.

What it looks like: Put simply, 5G-enabled technologies will give everyone real-time, highly accurate data on game day. Armed with this, we can reduce the time spent on off-side decision-making or VAR arguments and devote more time to the game fans love.

ENTERTAINMENT

Futurist Predictions

1. 5G Standalone will enable you to stream Netflix or Amazon Prime content on the move, but at a consistent quality to rival a home theatre, thanks to its faster speeds and greater capacity.

2. 5G Standalone will enable viewers to become part of the broadcast experience, so entertainment will no longer be simply watching TV. You will be able to participate in it, in real-time, from anywhere there is a 5G SA signal.

1. Quality viewing, on the move

Where we are now: Streaming services like Netflix and Amazon Prime are replacing traditional broadcast TV. However, bandwidth limitations of previous generations of wireless technology have often resulted in buffering issues and therefore reduced video quality on mobile devices, especially while on the move.

Where we could go: With 5G technology comes the ability to stream content from Netflix or Amazon Prime with high-quality video and sound, even when you're on the move – perfect for those commuting from the countryside, for example.

How it works: 5G technology eliminates bandwidth concerns by providing faster speeds and greater capacity, allowing for uninterrupted streaming of 4K and even 8K resolution videos – even when there are large numbers streaming from the same place, at the same time.

What it looks like: For City workers commuting in and out of London, for example, the days of putting up with poor-quality video streams on your phone will be a thing of the past. What's more, as autonomous driving becomes a reality in the future, we could even

see cars evolving to include more immersive entertainment features, as seen in the Sony-Honda Afeela concept – a movie theatre on wheels – all powered by 5G technology.

In addition, 5G SA's increased capacity could enable immersive entertainment experiences to become commonplace. In January 2024, Netflix promoted its new sci-fi drama series '3 Body Problem' by allowing people to try out "an otherworldly headset" that transported them into an immersive, real-world extension of the series. Thanks to 5G SA, these kinds of viewing experiences could become far more accessible – particularly exciting for sci-fi fans where the alternate universes they love to watch on TV could be brought to life in brand new ways.

2. **Become part of the broadcast**

Where we are now: Viewers are demanding more choices delivered via dynamic content and packages, and access to faster 5G is changing the media landscape.

"Bandersnatch" the interactive Black Mirror film released in 2018, is a great example of dynamic content. At various points within the film, the viewer can choose from a set of options for what happens next.

You have ten seconds to make a choice or a default decision is made for you. The producers developed 150 minutes of unique footage divided into 250 segments, yielding over one trillion possible paths for viewers to take. By connecting various technologies, the potential combinations of such content could be almost limitless.

Where we could go: With the latest Generative AI, Cloud, Edge and 5G Standalone technologies, we can expect more dynamic content choices, and non-linear entertainment will become the norm. Put simply, viewers will be increasingly able to take part in the broadcast, rather than just watch it.

How it works: Take ITV's reality TV dating programme Love Island, for example, which attracts millions of British viewers every year. Everyone has an opinion on who should date who. But what if you could be the matchmaker? It will be possible, thanks to 5G SA.

On their smartphone or TV, viewers will be able to select different scenarios – which individuals they want to couple up, or who they want to complete a challenge – and watch each scenario play out via AI generated content.

GAMING

Futurist Predictions

1. 5G Standalone will enable anyone with a mobile phone to compete on the same playing field as console and PC gamers at home.

2. Players will become part of the game like never before, with immersive experiences created by incorporating AR and VR.

3. 5G Standalone will level the playing field for gaming, opening up new high-quality gaming experiences to everyone – not just those who can afford high-end gaming PCs.

1. **Console-quality, wherever you are**

Where we are now: For gamers, milliseconds matter. When you're fighting in real-time combat, racing a Formula One car against an opponent or running into battle, fast reactions mean everything. If you can reduce latency – the time between pressing a button and seeing that action on your screen – the more likely you are to win the game. That's why, historically, fast-paced game genres such as fighting, sports or multiplayer online battle arena games, were less feasible on mobile phones.

Where we could go: But 5G Standalone will offer the required fast speeds and low latency, enabling PC- and console-quality gaming on the go.

What it could look like: The latest games will no longer be restricted to the home. Gamers anywhere in the world, including those who don't own expensive gaming PCs and consoles, will be able to enjoy the latest experiences.

2. **More immersive experiences**

Where we are now: Niantic, an American software development company which created the likes of Pokémon Go, has experimented with 4G mobile gaming. But it has found that 5G enables it to go much further and create immersive experiences thanks to its low latency.

Where we could go: John Hanke, founder and CEO of Niantic said that 4G just isn't ready for these multiplayer games. "We're really pushing the boundaries of what we can do on today's networks. We need 5G to deliver the kinds of experiences that we are imagining." For example, Niantic's 'Harry Potter: Wizards Unite' game is currently using 5G to seamlessly combine the real world with the wizarding world.

How it works: 5G Standalone will enable innovative mobile gaming products with real-time online capabilities that, combined with augmented reality (AR) and virtual reality (VR), will completely transform gaming experiences.

3. **Levelling the playing field**

Where we are now: Gaming has evolved rapidly from arcades to PCs and consoles. Mobile gaming is now the biggest market and is projected to grow from $5.76 billion in

2023 to $84.97 billion by 2030, according to a report from Fortune Business Insights. The main reason for its growing popularity is that it removes the need to buy expensive hardware setups, with phones democratising access to graphically intensive games.

Where we could go: 5G Standalone will further democratise gaming for the masses, enabling it to become available to everyone – not just those who can afford to build a high-end gaming PC.

How it works: That's because 5G SA will transform cloud gaming and give rise to new gaming formats. With the faster speeds and lower latency offered by 5G Standalone, cloud computing can put the power of high-end gaming PCs in the hands of anyone.

British Esports CEO Andy Payne sees the rise of connectivity as key to the growth of gaming and Esports, saying, "Active tech will get more useful and reliable and live events will be accessible to all, in a 'not in person' reality which will take online to a different dimension. Everything will be digital, accessible, collectable, tradeable and available. Everything and everyone will be connected."

What it looks like: As well as opening the gaming experience up to more people, 5G-enabled gaming can make education more accessible to students. Gaming can help develop coding and critical thinking skills; platforms such as Roblox and Minecraft already facilitate coding skills and teach students how to write contracts to sell digital collectables.

Education could be disrupted by using games to transform how we learn, but students without access to higher-speed connectivity may be left behind.

5G SA & the UK

As we've seen in this report, 5G SA has the power to supercharge the things we love most – whether you're a fashionista, sports fan or gamer. This means we should expect 5G SA to become the norm and, therefore, the hunt for a WiFi signal when you're at a venue – be that a stadium or shopping centre – to become a thing of the past.

The network slicing provided by 5G SA will also enable these venues to become safer, more efficient and increase their capacity, as venues will be able to ring-fence network capabilities for staff and security systems. Events like Black Friday at your local shopping centre and the cup final at your team's stadium will be better able to host more people.

And, critically, a nationwide 5G SA network will enable communities in every corner of the UK to enjoy the benefits of these technologies. Having a 5G SA network in place across the country means any football team can benefit from smart ball tech and every fashion lover can use connected trainers to inform their next purchase – regardless of where they live. It won't just be the city-dwellers that benefit from innovation.

IS THE UK FALLING BEHIND?

However, unless the rollout of 5G Standalone is accelerated, the UK risks being left behind, with people up and down the country unable to enjoy these new experiences.

In other countries, mobile operators are already utilising the full capabilities of 5G SA.

TPG Telecom, a leading challenger full-service telecommunications provider, aims to realise 5G's full potential and expand coverage to most of the population in Australia's largest cities and regions. TPG uses 5G SA's low latency and high reliability to deliver advanced mobile broadband. They also found that 5G SA allows for efficient rural deployments, achieving 50% higher data rates with extended coverage in rural areas.

Similarly, Rogers in Canada has started to realise the true benefits of 5G SA after rolling out Canada's first 5G Standalone network. It reinforced their position as a driving force in Canada's digitalisation and enables developers to build applications that were not possible before, by accelerating technologies that will have a profound impact on Canada’s economy and society.

Mirroring this approach in the UK could help bring innovative services to more rural areas of the country, using 5G SA where existing broadband services are incapable of delivering higher speeds.

CONCLUSION

5G Standalone can enhance and supercharge the experiences that we love most in the UK.

Sport and entertainment will no longer be things we merely watch, but we things we help create and participate with in real-time.

Shopping will become even more personalised and seamless.

And gaming will become accessible to so many more people, with immersive and real-time experiences that were previously unimaginable.

But this can only be delivered with the speed, millisecond-latency and better battery life that 5G Standalone brings. The UK must not fall behind on its 5G roll-out, or we all risk missing out on these amazing experiences.

The future is bright, and here it is now, thanks to 5G Standalone.