Counterpoint
Technology Market Research

VELOCITY
UNLEASHING TOMORROW'S TECHNOLOGY – TODAY

MWC
GSMA

WRAP-UP REPORT
Back With a Bang Despite Macro Malaise

2023
MARCH

Executive Summary

- MWC was back to almost full strength in 2023, with nearly 90,000 visitors creating excitement and buzz that belied the ongoing macro challenges blighting the tech industry.

- The event theme of "Velocity" brought forth discussions across multiple areas including 5G, AI, private networks, digital transformation, eSIM, sustainability and, again, fair share.

- Network and infrastructure announcements dominated the show, although there was also a major undercurrent of ways to finally monetise 5G effectively.

- AI seemed to be moving from concept to reality, featuring in some of the most intriguing and impressive demos, but augmented and extended reality devices, while present on many stands, showed how far the technology still needs to progress before reaching mass adoption.

- And, of course, there was the usual slew of smartphone announcements, mostly from Chinese OEMs, although this once key side of MWC was somewhat muted given the decision by some vendors to separate their flagship launches from the show.

- Lastly, and a theme that underpinned almost every aspect of MWC, was sustainability, indicating that the industry seems to have finally accepted the critical need to act now to reduce its environmental impact.

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Counterpoint

Fair Share Argument Rumbles On

Summary

- Continuing a theme observed over the last few MWCs, European operators once again called for Big Tech companies and streaming service providers to help fund future broadband networks. In a welcome change, Netflix was given a platform to respond.

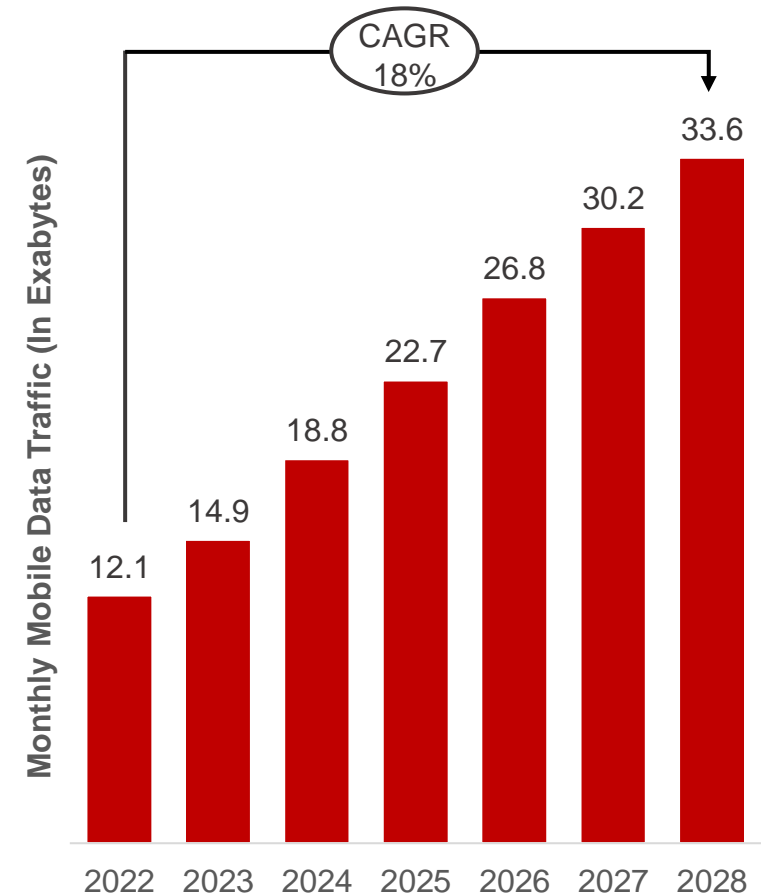| Arguments For	Arguments Against
• Christel Heydemann (CEO, Orange): Operators are facing capex pressure (€600 billion invested in networks over the last 10 years) while coping with exponential traffic growth, of which 55% is generated by the top five streamers.	• Greg Peters (Co-CEO, Netflix): Netflix has invested more than $60 billion over the last five years – more than 50% of revenue – on content. Many of Netflix's operator partners, some with margins significantly higher than Netflix (e.g. BT and Deutsche Telekom), bundle Netflix directly into their consumer offerings. So, one could argue that operators should pay their "fair share" for the cost of the content.
• Timotheus Höttges (CEO, Deutsche Telekom): Europe's global relevance is all but dead due to regulation, which hinders operators and does little to address the imbalance of connectivity costs. Operators spent €55 billion on connectivity in 2022 versus €1 billion by hyperscalers during the period.	• Vicki Brady (CEO, Telstra): Connectivity is absolutely the bedrock, but the real value comes from enabling things on top of the networks. Operators should become "ecosystem builders" that bring together technologies and applications, otherwise, the value will be captured by others.
• Pietro Labriola (CEO, Telecom Italia): There needs to be a level playing field with digital providers and more openness to consolidation, plus a more lenient requirement to switch off legacy systems.	• Thierry Breton (ever the diplomat): The fair share battle between Big Telco and Big Tech is "not so binary". There needs to be freedom to offer services in a fair and competitive way. The real challenge is to ensure citizens and businesses have access to gigabit networks by 2030.
• Thierry Breton (EU Commissioner for Internal Market): European regulation has to change with the times, with an "effectively mobilised" financing model for the huge investment required to create the networks of the future.	

Counterpoint

Fair Share Argument Rumbles On

Analysis

- European mobile data traffic will almost triple between 2022 and 2028. Although it is significant, it is not "exponential" as suggested by some.

- In this time frame, European operators are expected to invest almost €200 billion on their networks. Their grievance is understandable, given that most of the traffic comes from streaming services.

- However, there is an argument that investment is already fair. Operators pay for infrastructure, cloud players pay for cloud technology R&D and service providers pay for content. This is a mutually beneficial relationship.

- It can also be argued that service providers do not themselves generate traffic, but are simply responding to consumers' demand for greater choice in digital content. Let us not forget that consumers already pay operators to access this content.

- Nevertheless, it is true that operators are hindered by strict regulation and the requirement to allow switching flexibility to consumers, which have driven prices down. Meanwhile, service providers carry content exclusive to them, which boosts profitability.

- Therefore, regulation needs to be modernized to guarantee future investment and maintain competition across the ecosystem, while providing the best choice for consumers. The European Commission should work with the industry as a whole to find a fair solution.

Europe Mobile Data Traffic to Continue to Skyrocket

CAGR 18%

Monthly Mobile Data Traffic (In Exabytes)

Year	Value
2022	12.1
2023	14.9
2024	18.8
2025	22.7
2026	26.8
2027	30.2
2028	33.6

Source: Ericsson Mobility Report

Counterpoint

Operators Bet on Future Relevance with Open Gateway Initiative

Summary

- The GSMA announced a new industry-wide initiative called GSMA Open Gateway, a framework of universal network APIs designed to provide universal access to operator networks for developers.

- Launched with the support of 21 mobile operators, and initially with eight universal network APIs, the initiative aims to help developers and cloud providers enhance and deploy services more quickly via single points of access to operator networks.

- Examples of supported services include Edge Site Selection and Routing to support autonomous vehicles, Verify Location for fleet management and incident reporting, SIM Swap to combat financial crime and Quality on Demand for drones, robotics, eXtended Reality (XR) and immersive online gaming.

Analysis

- At the opening keynote of MWC 2023, Telefonica CEO Jose Maria Alvarez-Pallete hailed the dawn of a new era driven by the intersection of operators, computing, AI and Web 3.0, adding that "without telcos, there is no future".

- He used the term "Earth Computing" to describe the role of operators in supporting the traffic resulting from a "step change in technology", which the cloud alone will not be able to handle.

- Hence, he called for a collaboration among operators, big tech and industry players, in a bid to ensure the future relevance of operators in an increasingly cloud-centric world.

Counterpoint

Sustainability-seeking Operators Tout Energy-saving Initiatives

Summary

- Operators' energy consumption has remained flat since 2017, despite now carrying 10x the traffic. This means that operator networks are now 90% more efficient. However, that is still not enough to meet future demand.

- Most operators showcased energy-saving [initiatives](#) such as deploying [IoT](#) tracking more efficient network equipment and using data analytics, green coding and [AI](#) to dynamically reduce electricity consumption.

- Various operators, including Vodafone and Telia, also talked about collaborating with energy providers to support larger renewable projects.

- Meanwhile, a new [report](#) by the GSMA published during MWC 2023 stated that almost a quarter of electricity purchased by global operators is now renewable, up from 18% in 2021 and 14% in 2020.

- According to the report, 62 operators, representing 46% of global mobile connections and 61% of revenue, have committed to a science-based target of decreasing their emissions by 2030, up from 12 operators last year.

- A "considerable portion" of operators (accounting for 39% of global mobile connections and 43% of revenue) have also committed to net zero targets by 2050 or earlier.

Counterpoint

Sustainability-seeking Operators Tout Energy-saving Initiatives

Analysis

- 5G is up to 90% more energy efficient than 4G per unit of traffic. However, because 5G carries significantly more traffic (5G base stations consume nearly 70% more power than those using a mix of 2G, 3G and 4G). Further, global mobile data traffic is forecast to increase 24x in the next 10 years, and due to network densification and the use of energy-hungry Massive MIMO antennas, 5G-era operators could face as much as 2x to 3x higher energy costs than 4G.

- This has been exacerbated by the energy crisis resulting from the Russia-Ukraine war. Vodafone Group CFO and interim CEO Margherita Della Valle said that Vodafone's energy bill had more than doubled to €1.3 billion from €600 million in 2022. So, while 5G is more efficient per bit than 4G, the overall energy consumption of 5G networks is significantly higher. With energy costs rising, energy efficiency is an urgent priority for operators.

13 CLIMATE ACTION

TAKE URGENT ACTION TO COMBAT CLIMATE CHANGE AND ITS IMPACTS

Operator Target

To lower emissions by a minimum of 45% by 2030

- The highest profile UN sustainable development goal (SDG) is SDG 13, which calls for urgent action to combat climate change. Global emissions need to halve by 2030 to meet the Paris Agreement's global overheating limit target of 1.5°C.

- Operators are responsible for the production of about 490 million tonnes of CO2e per year (about 1% of total global carbon emissions) and the demand for sustainable business models has only been growing over the last few years. Most operators have adopted SDG 13 as the foundation for their sustainability missions and initiatives, aiming to lower emissions by a minimum of 45% by 2030.

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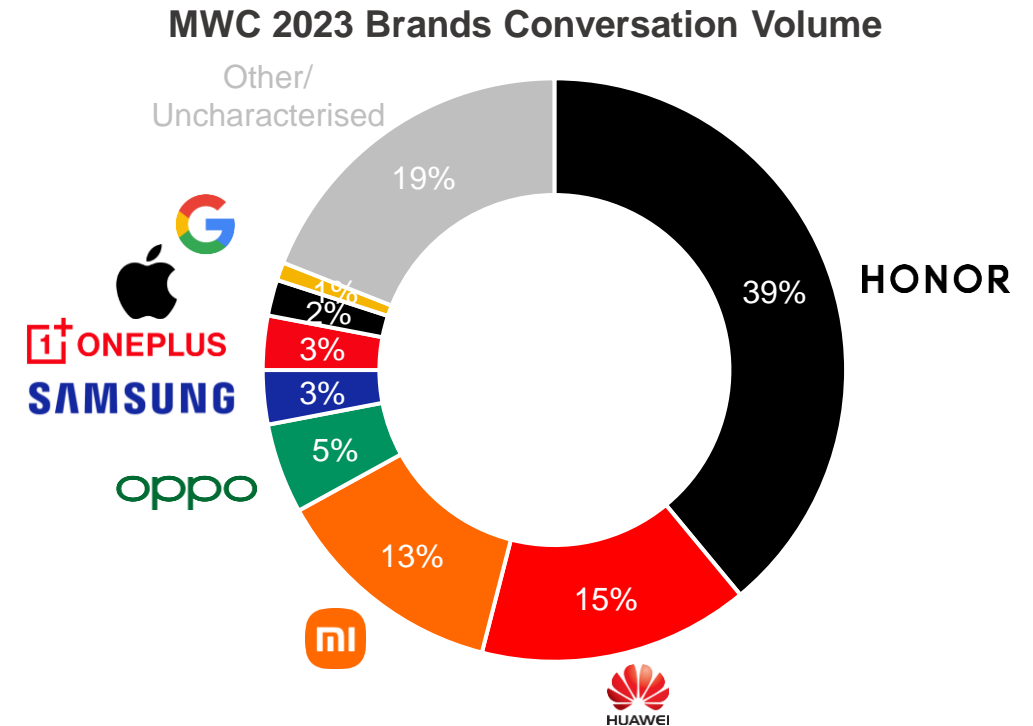
- IoT Platforms
- Industrial Metaverse
- AI

Chinese OEMs Go Premium Despite Gloomy Market Environment

Summary

- Despite the doom and gloom surrounding the smartphone market, we saw a number of important smartphone launches by Chinese OEMs at MWC 2023.

- Four global launches, namely by Xiaomi, HONOR, TECNO and realme, grabbed the most attention.

- Foldables (highlighted by HONOR, TECNO and OPPO) were pushed to the forefront of the show.

- Apart from the launches, there is a sense that a major breakthrough in smartphone form factor design is necessary to jumpstart the category for the next stage of growth.

MWC 2023 Brands Conversation Volume

Source: Brandwatch, February 27-28, 2023

Analysis

- The importance of MWC as the primary platform to launch new smartphones has diminished gradually over the years. Like Apple and Samsung, Chinese OEMs have also elected to launch new products at their own events.

- However, the US market has been virtually sealed-off for most Chinese smartphone OEMs. This led to a show of force at MWC 2023, with most companies staking big ambitions for the European market.

- Competition will remain fierce at the premium segment among Chinese OEMs. It will be a long and attritive battle to claim significant market share in Europe due to the dominance of Apple and Samsung, as well as the time and resources needed to build up distribution channels and mindshare.

Counterpoint

Xiaomi Exhibits Premium Camera Experience, With Price to Match

Summary

- The Xiaomi 13 and 13 Pro feature a Leica co-engineered camera system, combining hardware and software strengths for a professional photography experience.

- The more premium model, the Xiaomi 13 Pro, comes with a massive 50MP primary 1-inch camera sensor. All-round photography capabilities are likely to catapult the device to the top of the league of camera performances.

- Powered by the Qualcomm Snapdragon 8 Gen 2 SoC, the device brings top-of-the-range capabilities.

Analysis

- Winning over Leica to co-engineer the camera solution may be an important win. The Leica platform was one of the key selling points that elevated Huawei to the top of the Android smartphone league a few years ago.

- With the 13 Pro starting at £1,099/€1,299, and the 13 starting at £849/€999, Xiaomi is teeing the devices squarely in the highest bracket of the premium end against Apple and Samsung.

- The success of the 13 series is unlikely to make or break Xiaomi's overall performance for the year, as the brand continues to struggle due to high inventory woes and over-exposure to the mid-range segment in emerging markets where macroeconomic difficulties are still rampant.

Counterpoint

HONOR's 'Dual Flagship' Strategy Targets Overseas Premium Segment

Summary

- HONOR announced the global launch of the Magic Vs and Magic 5 series, in its latest push to enter the premium range in the overseas market.

- The Magic Vs, priced from €1,599, is positioned squarely at challenging Samsung's book-type foldable phone. The Magic Vs is powered by the Qualcomm Snapdragon 8+ Gen 1 platform, with a super-light hinge comprising of only four components.

- The Magic 5 Pro, priced from €1,200 and powered by the Qualcomm Snapdragon 8 Gen 2 SoC, features a "falcon camera" system and proprietary motion sensing capture AI. The device was awarded the top spot for Camera and Display by DXOMARK.

Analysis

- HONOR has been relatively more successful than other Chinese OEMs in 2022 as it captured a significant share in China's vast mid-range segment.

- The company now feels more confident in making a splash in developed world markets.

- The two new launches are top-quality smartphones. However, it remains to be seen whether that can lead to success in the overseas market, much of which will depend on marketing and channel investments. This will again depend on whether HONOR can (re)build confidence with partners, considering the losses it faced due to the retreat of Huawei.

Counterpoint

TECNO Debuts at MWC 2023 by Joining the Foldable Revolution

Summary

- Emerging markets powerhouse brand TECNO debuted at MWC 2023 with its first-ever foldable phone, the TECNO Phantom V Fold.

- TECNO continues its strong partnership with MediaTek, with the Phantom V Fold powered by the flagship Dimensity 9000+ SoC, which is also seen in the recently launched OPPO Find N2 Flip.

- The Phantom V Fold comes with standard foldable premium features, such as a 7.85" and 120Hz internal display, a 5000 mAh battery and a camera unit consisting of a main 50 MP module, a 50 MP 2x telephoto lens and a 13 MP ultra-wide-angle camera.

- Priced at $1,099 onwards, the device raised a few eyebrows considering the markets targeted (India, Eastern Europe, Africa).

Analysis

- The Transsion brands have enjoyed some success in entering geographies away from its dominant Africa market, for example, in Southeast Asia and Middle East.

- The TECNO Phantom V Fold is the company's boldest statement yet in its push towards premium. However, sales volume will likely be low, as there will be uncertainty over the affordability of the device in TECNO's target markets.

- On the other hand, the launch is a useful marketing ploy to raise the brand's profile in the international market, as well as to aspirational upgraders in the African home market looking for more sophisticated devices.

Counterpoint

realme Doubles Down on Distinctive Design and Quick Charging

Summary

- realme, the self-styled 'late-comer/disruptor' in the global smartphone market, launched the GT3 by touting its fast charging and distinctive design elements.

- The GT3 is powered by the Qualcomm Snapdragon 8+ Gen 1 SoC and features a 4600 mAh battery. With the help of its 240W wired fast charging capabilities, the phone can be charged from 0% to 20% in just 80 seconds.

- In the GT3, realme has retained one of the hallmarks of GT2, the paper-like lightweight touch.

- Attractively priced from $649, the device is packed with advanced features, which may tempt price-conscious customers that still want an almost premium experience.

Analysis

- realme has emphasized its positioning by making fast charging an integral part of its DNA, as well as disruptive design elements (i.e. the GT3 not showing much resemblance to the GT2) that prioritize co-design efforts with non-tech designers and brands.

- realme has chosen not to launch a Pro variant, evidently from a preference to streamline its product portfolio after a forgettable 2022, when the company's product positioning led to much confusion.

- In fact, portfolio streamlining will be a common theme across smartphone OEMs throughout 2023.

Counterpoint

OnePlus Shows Off "Cool" Concept and Teases Upcoming Foldable

Summary

- After launching the OnePlus 11 in February 2023, a OnePlus 11 concept smartphone was showcased at MWC 2023, with a new active cooling technology called Active CryoFlux (akin to liquid cooling systems used in desktop gaming PCs).

- The new cooling technology will lower smartphone temperatures by up to 2.1°C, improving a game's frame rate by 3 to 4 FPS, or by 1.6°C during charging, thus improving charging times.

- This is achieved through an industrial-grade piezoelectric ceramic micropump that runs cooling liquid through micropipes in the smartphone without significantly increasing the OnePlus 11 concept's weight or thickness.

- OnePlus is also expected to launch a foldable smartphone by H2 2023.

- No announcement on the form factor has been made yet, but looking at the roadmap of other OEMs, OnePlus' first foldable is likely to be a book-type device.

Coming in Q3

Counterpoint
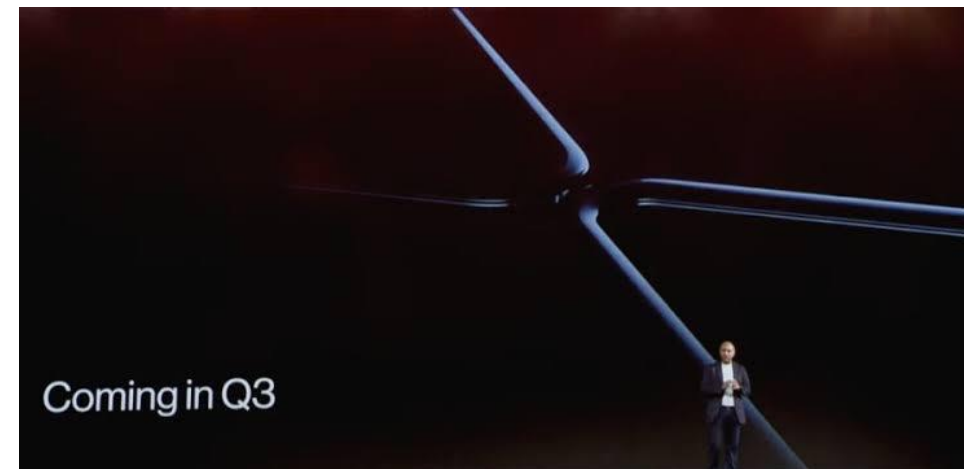
New Form Factors Likely in Next Two to Three Years

Key Demos

- Samsung showcased a range of OLED concept panels – slidable, foldable and dual-foldable.

- Lenovo had a rollable Motorola smartphone with a 6.5-inch screen when fully unrolled (5 inches in compact form).

Samsung OLED Displays

Motorola Rollable Smartphone

Analysis

- The 2010s marked the decline of cell phone form factors such as clamp-shell, flip and sliders, leaving only the "candy bar" form factor in existence today.

- As the pace of innovation in display panels accelerates, we can expect new and innovative form factors to emerge in the premium smartphone market, moving beyond the traditional candy bar or fold designs.

- User Interface/User Experience (UI/UX) development would be key to consumer acceptance of the new form factors.

Counterpoint

eSIM Proliferating: Foldables, Routers, IoT Devices and More

Key announcements

- **Thales** and **Qualcomm** announced certification of the world's first commercial **iSIM** on the **Snapdragon 8 Gen 2** mobile platform, which is seen as a huge step forward.

- **TCL** LINKZONE MW63 4G CAT 6 Wi-Fi **hotspot** also supports **eSIM.**

- **Mymanu** Titan launched **earbuds** with **eSIM** support for a standalone connected "phone-free" experience.

- **HONOR** announced its latest flagship series the Magic 5 Pro and the **foldable** Magic Vs. Both models, along with OPPO's Find N2, support eSIM.

- **Google** finally announced its eSIM plans for Android to streamline the eSIM transfer experience while switching phones. **Deutsche Telekom** will be one of the first to adopt **eSIM transfer** on **Android** handsets.

- **Motorola Defy Satellite Link,** a credit card-sized rugged companion device accessory capable of location sharing, SOS assistance and two-way messaging via satellite. It features a **MediaTek** SoC, **Bullitt** Satellite Connect (powered by **Skylo** Technologies) and eSIM (by **Kigen**).

- **Telit Cinterion** announced a new **5G** LPWA module with a future-proof design, including support for 3GPP Rel. 15/16/17 and **next-generation LTE-M/NB-IoT** supporting **eSIM/iSIM capabilities** with compliance to CC EAL 5+ sporting **Sony Altair ALT1350** chipset.

- **G+D, Sodaq**, **Lufthansa Industrial solutions** and **Nordic Semi** announced an eSIM-capable Smart Label.

- **Actility** selected **iBASIS** and **Sequans** to Deploy LTE-M Solutions with eSIM and iSIM.
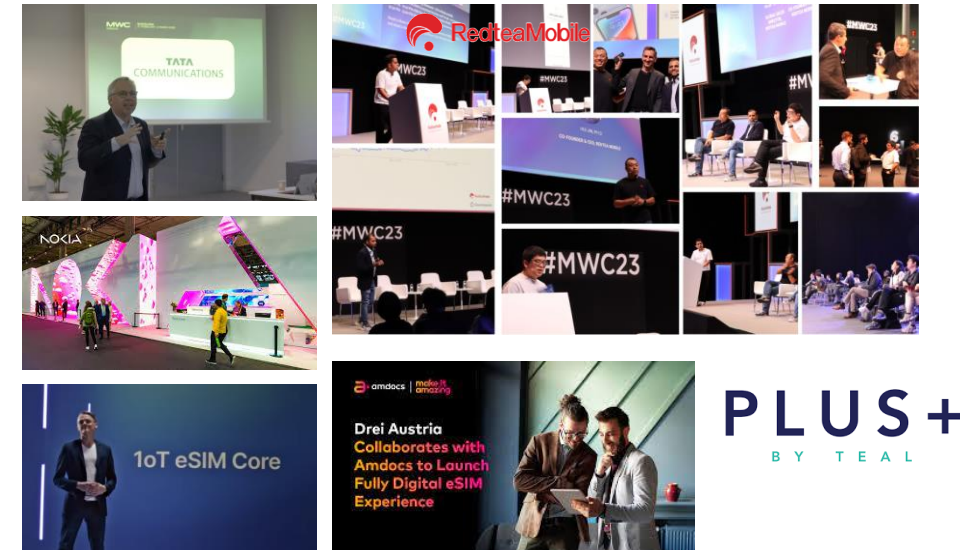

Analysis

- eSIM adoption is evident in devices beyond Apple and Samsung with Chinese vendors, IoT module vendors or CPE/Routers all integrating eSIM/iSIM capabilities to simplify remote provisioning and connectivity management.

- iSIM (or ieUICC) is taking shape from a standardization and commercial adoption perspective across devices helping reduce PCB footprint, power and costs.

- LPWA modules and almost all flagship smartphones are now eSIM capable (outside of China).

- It will be interesting to see if this gives rise to newer business models to bundle connectivity with the device. Apple and IoT module vendors are set to do the same.

Counterpoint

eSIM Proliferating: Number of RSP Players More Than Double
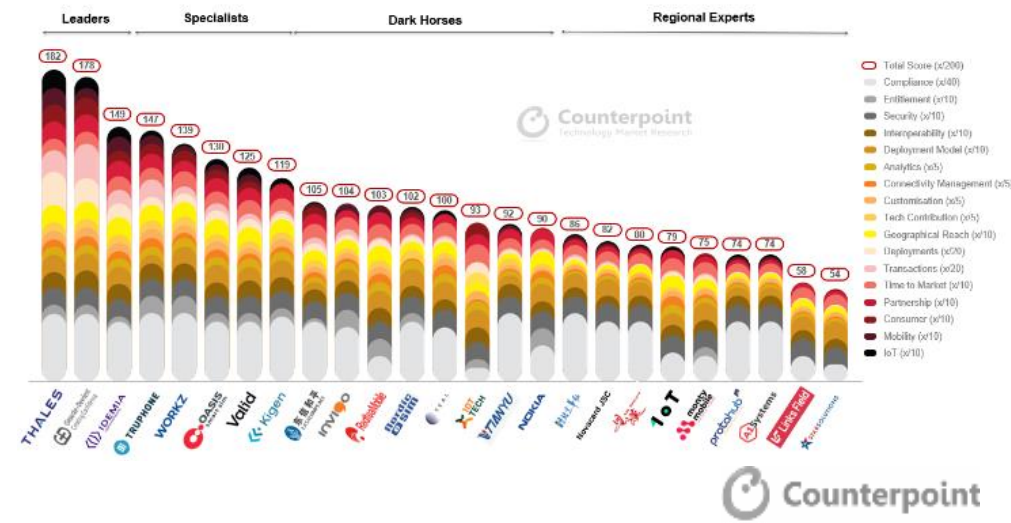
Key announcements

- US-based **TEAL** launched PLUS+, a cloud-native SMDP+ solution focusing on self-service functionality. It is the first US company to do so.

- **Nokia** Networks showcased its eSIM RSP platform with a focus on consumer as well as M2M use cases such as Private Networks. A natural extension to its Entitlement Server business, targeting hundreds of CSP & PN clients.

- **Redtea Mobile** also showcased its SM-DP+ and end-to-end eSIM capabilities through an eSIM workshop at MWC 2023.

- **Oasis Smart SIM** (now a **Tata Communications** subsidiary) also showcased its comprehensive RSP platform solutions and traction across CSPs.

- **1oT** showcased its eSIM RSP platform, the 1oT eSIM Core, complementing its Connectivity Management Platform (CMP) 1oT Terminal.

Analysis

- Apple accelerated the eSIM market with eSIM-only iPhone, which has forced global CSPs to adopt and support eSIM in smartphones (and IoT).

- The number of players offering GSMA SAS-SM RSP platforms has more than doubled to 25+ over the last two years.

- The digital transformation of CSPs will become end-to-end digital MNO/MVNOs by leveraging cloud platforms, which has also helped the eSIM RSP to move from vendor-hosted to cloud-hosted.

- This has reduced barriers to entry, allowing the number of players to proliferate with consumer eSIM RSP (SM-DP+) targeting tier-2/3/4 MNOs/MVNOs.

- As the number of private networks and MVNE rise and SGP.31 spec jumps into action, we will see these players also targeting M2M/IoT markets.


Counterpoint CORE Scorecard: eSIM Provisioning Landscape, 2022

# eSIM Proliferating: New Provisioning for IoT (SGP.31/32) Coming

Key announcements

- **Truphone** gave a demo of the SGP.31/32 at MWC 2023, which piqued a lot of interest across the industry. Despite struggling with ownership issues last year, the vendor was able to win back some mindshare.

- **Thales**, the world's top Remote SIM Provisioning (RSP) vendor with more than 300 deployments, also has been showcasing this capability called "Adaptive Connect" with commercialization expected later this year.

- **VALID** also hinted at this capability with the announcement of the SGP.31 spec being ready and that it is currently being tested by two to three CSPs.

- German eSIM RSP software provider **achelos** also gave a demo of its RSP software.
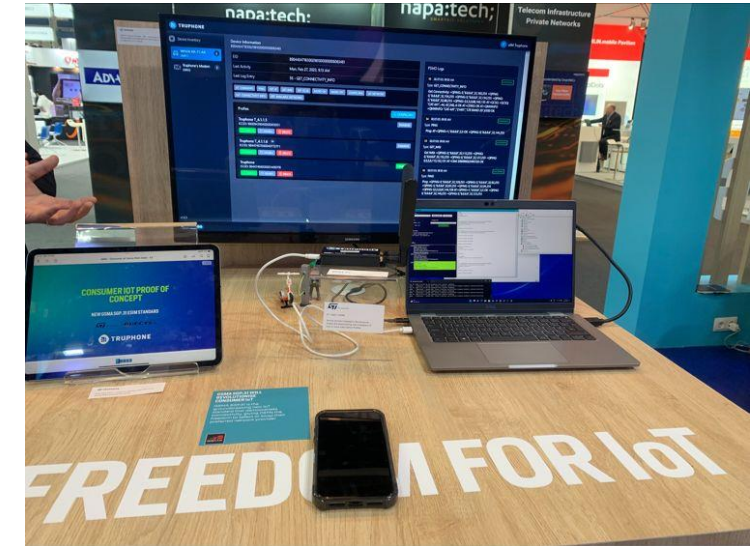
Analysis

- The eSIM value chain includes **eSIM RSP platforms** (see detailed research here) that play a key role in driving eSIM adoption for CSPs.

- Until now, most CSPs had **two different platforms (**SM-DP+ SGP.21 for consumer devices such as smartphones and smartwatches) and SM-DP (SGP.01 for automotive and IoT/M2M devices).

- However, SM-DP is a very complicated spec that has slowed the adoption of eSIM in the IoT segment. Hence, GSMA and industry stakeholders are releasing new spec SGP.31/32 to use SM-DP+ for other IoT devices.

- Multiple players demoed the RSP capability, but all are at different stages of commercialization. VALID and Truphone are closest with much interest from CSP and device vendors (pre-commercial solution works perfectly).

Counterpoint
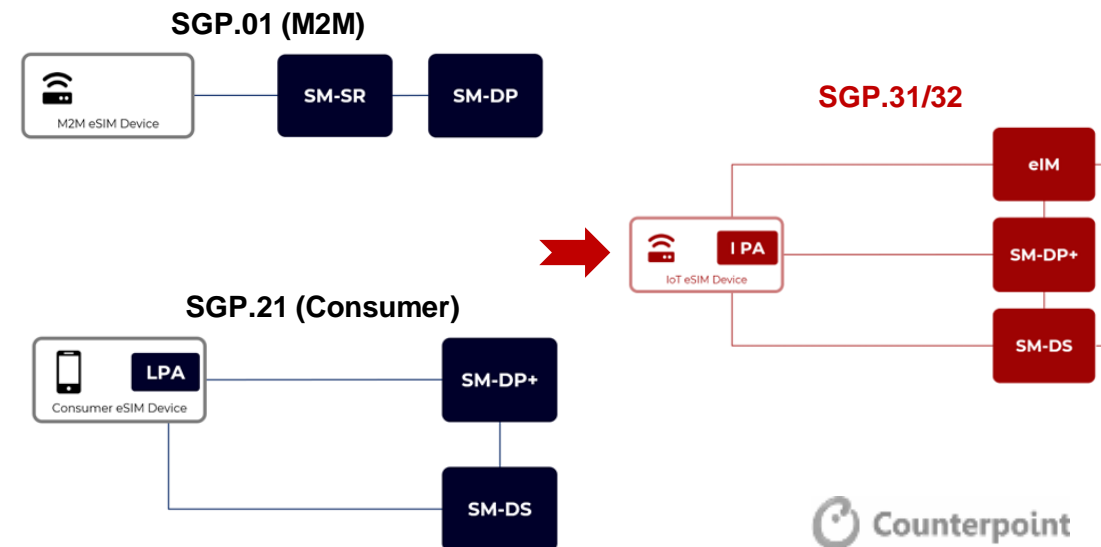
eSIM Proliferating: New Innovations Catalyzing eSIM

Key announcements

- **Oasis Smart SIM** showcased an innovative solution called **CloudSIM™** to accelerate eSIM adoption, use cases and business models targeting "on-demand connectivity" addressing a huge gap in the market. Private Networks, Asset Tracking will be some of the hot use-cases benefitting from this technology. We discussed this with Oasis's CEO Olivier Leroux [here](#).

- The rise of "Digital MNO/MVNO" - several showcases - **Amdocs** orchestrating **Drei Österreich** to go **all digital** with eSIM. Drei Austria customers who use the Up³ app can now manage their eSIM on devices produced by Apple, Google, Samsung and more.

Analysis

- As eSIM adoption rises, newer solutions and business models will emerge to address different gaps in the market, leveraging the blend of eSIM+cloud technologies.

- This blend of **eSIM+cloud** is allowing many MNOs/MVNOs to **go all digital** from **acquiring** customers (eSIM trials) and **provisioning**/delivering connectivity remotely (using eSIM) to **authentication** (digital KYC), **one-click** plan purchase via an app and customer support. Players such as **Amdocs** are driving this trend.

- It has become imperative for incumbents and upstart CSPs to **benchmark** these **operators** to help themselves transform digitally, improve time to market and boost customer satisfaction with provisioning in minutes right from home. See our [research](#) on these leading CSPs in partnership with **Amdocs**.

📠 **Demo**   🎙️ **Podcast**

⬇️ **eSIM L.E.A.D.E.R Whitepaper**

Counterpoint

IoT Module Vendors Expanding 5G and LPWA Portfolios

Key announcements

- **Sierra Wireless** announced 5G LPWA HL7900 module integrating **Sony's Altair ALT1350** Chipset, plus support for 3GPP Rel. 15/16/17 updates for LTE-M/NB-IoT.

- **Quectel** showcased its middleware solution for **Dual SIM Service** utilizing the **Qualcomm** telematics software framework, which provides access to next-generation connectivity and telematics solutions based on **5G**, **C-V2X, location, telematics, automotive**, functional safety, **hypervisors** and security.

- **Telit Cinterion** expanded 5G LPWA portfolio with new modules featuring **Sony's Altair ALT1350** Chipset.

- **Fibocom** launched 5G Sub-6GHz/mmWave Module Fx190/Fx180 Series Based on **Qualcomm Snapdragon X75** and X72 5G Modem-RF System.

- **Fibocom** collaborated with **MediaTek** to pioneer the FWA market with "fast-to-deploy" 5G solution based on the **FG370** module.

Analysis

- Leading IoT module vendors are racing to expand their 5G LPWA portfolios based the on the latest **Qualcomm**, **MediaTek** and **Altair** solutions.

- Most of these modules target applications such as **utilities**, **asset** tracking, **healthcare**, retail and **5G FWA CPEs**.

- Great win for **Sony Altair** across multiple IoT vendors for its **ALT1350** chipset which offers higher security features, **iSIM** capabilities and supports both **unlicensed spectrum and satellite** connectivity in a single chipset.

- **Qualcomm X75** is the most advanced 5G modem in the market and will see rapid adoption in modules and devices which are premium and need future proofing (**5G Advanced Ready, Wi-Fi 7 and mmWave** capability).

- **MediaTek,** in partnership with Fibocom, is making inroads into the **5G FWA** market, where Qualcomm is the leader.

Counterpoint

Smartwatches: A New Battleground For Smartphone OEMs

Key announcements

- Less focus is on smartwatches, but an unconventional attempt from Huawei stands out. OEMs seem to have begun to consider a new form factor beyond functionality.

- Xiaomi announced the Xiaomi S1 Pro smartwatch at its global launch event of Xiaomi 13 series.

- Huawei showcased its latest smartwatch, Watch Buds, a unique concept combined with earbuds. Another worth mentioning is its Watch GT Cyber. This new smartwatch takes a modular approach to smartwatch components.

- Google announced nine new features for Android and Wear OS.

Analysis

- Global smartwatch shipments have continued to grow rapidly, recording annual growth rates of 21% and 12% in 2021 and 2022 respectively, which is why smartphone OEMs are turning their eyes to this market. OPPO and vivo entered the smartwatch market in 2020, Oneplus in 2021, and Google in 2022.

- Smartphone OEMs are increasingly active in the smartwatch space, seeking to lock users into their ecosystems by appealing for the seamless connectivity and flexible user experience between smartphones and wearables, like smartwatches and TWS.

- As a result, traditional smartwatch brands such as Garmin, Fitbit, and Amazfit have been limited in their growth, and they are seeking changes in design and pricing to survive intensified competition.

- Google Keep for Wear OS has added a function that allows users to create memos or to-do lists simply by tapping the watch face on a smartwatch. Also, Wear OS 3+ adds new sound modes, display modes, and gray scale to improve watch's accessibility.

- These new features show that the value of wearables pursued by Google in the future lies in more productivity and better design that are more closely related to real life as well as the purpose of healthcare.
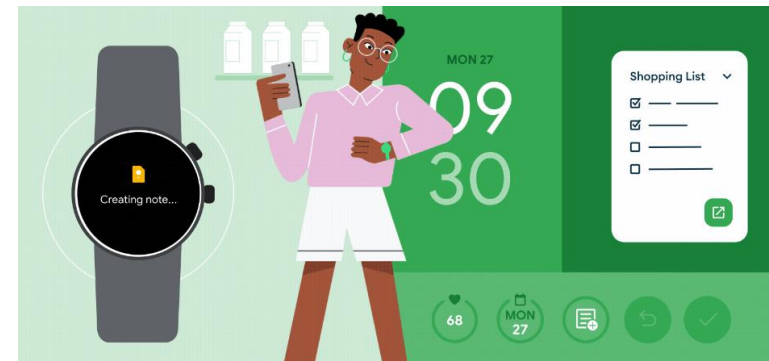
Image source: Google Blog

Counterpoint

Smartwatch OEMs Focus on Form Factor, Connectivity and Battery

Key announcements

- New innovations in the smartwatch **form factor** came from [Huawei](#) with their newly launched model, Watch Buds, in which **TWS are stored inside the smartwatch.**

- **Cellular connectivity in smartwatches** remains a hot topic, particularly in the premium and kid's smartwatch segment.

- Xiaomi **focuses on the display aspect** with its newly-launched device, the Watch S1 Pro, which offers the **slimmest bezels.**

- HONOR emphasizes on **design** in its **Watch GS 3,** which comes with a **curved screen and slim form factor.**

- **Diffusion of new health-related features like BP measurement and ECG analysis, and AI noise cancellation calling** was quite visible in premium devices.

- Various OEMs focused on **battery-related aspects with Quick Charge and Wireless Charging functionality.**

- Another key feature was **video call support**, especially for kids' devices where a **camera sensor** sits on top of the display. Huawei's Watch Kids 4 Pro and Xiaomi Mitu 5 Pro support dual cameras.

Slimmest bezels (Xiaomi Watch S1 Pro)

Video Camera (Huawei Watch Kids 4 Pro)

Xiaomi Mitu 5 Pro (4G, Unisoc 8541E)

Innovative Form Factor (Huawei Watch Buds)

Slim Design (Huawei Watch GS 3)

Counterpoint

Featured Smartwatches

	Xiaomi S1 Pro	**Huawei Watch Buds**	**Huawei Watch GT Cyber**

At its launch event, Xiaomi emphasized the S1 Pro's conventional design and connectivity with its devices through an integrated UI. Long battery life of up to 14 days is one of its strengths.

Huawei had two experimental smartwatch showcases. The WATCH Buds combines the functions of a smartwatch and earbuds, allowing earphones to be stored inside the display. GT Cyber strengthened its design function by making the bezel and strap removable.
Huawei is focusing on consumer IoT and wearables to offset the sluggishness in its smartphone business. It ranked third globally by smartwatch shipments in 2022.

|			
Display	1.47" OLED, 480 x 480 pixels	1.43" OLED, 466 x 466 pixels	1.32" OLES, 466 x 466 pixels
Cellular Connectivity	Not supported	Not supported	Not supported
OS	MIUI Watch OS	HarmonyOS 3.0	HarmonyOS 2.0
Battery	500 mAh	410 mAh (Watch) / 30 mAh (TWS)	292 mAh
Sensors	Accelerometer, gyro, compass, barometer, heart rate, SpO2, thermometer	Accelerometer, gyro, heart rate, (No temperature sensor)	Accelerometer, gyro, heart rate, barometer, compass, SpO2
Other Features	Wi-Fi 802.11 b/g/n, Bluetooth 5.2, GPS	Bluetooth 5.2, GPS	Wi-Fi, Blutooth, GPS
Price	$229~	$430~	$176~

Smart Home = Smart Living/Workplace and Connected Lifestyle
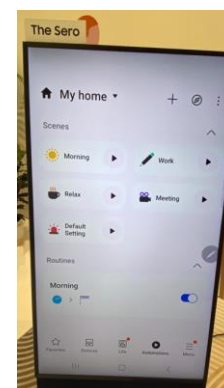
Key announcements

- Ossia unveiled the **first ever real wirelessly-powered security cameras**. It has partnered with Archos to bring the first FCC /CE-approved Cota wirelessly powered security camera to the market. The device is easy to install without the need for batteries, wiring or manual charging.

- On the software side, **Samsung showcased its SmartThings platform,** which aims to seamlessly connect and control all smart home devices with a focus on energy efficiency.

- Among operators, **ZTE displayed quite a few smart home products,** including STBs, smart TVs, routers, smart home cameras and smart doorbells. Its mesh routers support Wi-Fi 6.

- Xiaomi showcased the **Smart Living** concept through an entire ecosystem of smart home products, which can be operated through its app called **Xiaomi Home**. Its product range include smart humidifier, smart tower fan, Mi smart clock, Xiaomi camera, Mi TV, smart pet food feeder, electric shaver, electric toothbrush, smart LED bulb and smart kitchen appliances. Most of these are **targeted toward the China market.**

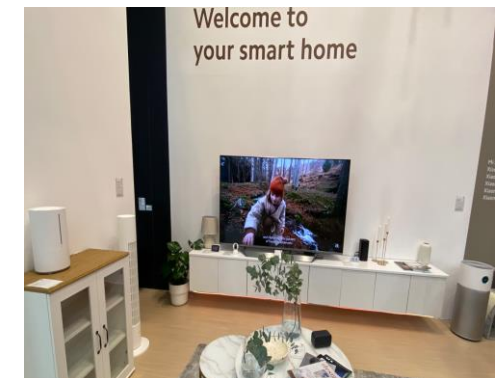*Wireless powered Security Cameras by Ossia*
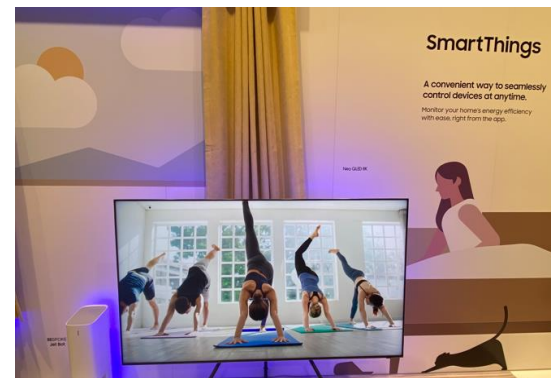
Samsung SmartThings Platform

Samsung App

ZTE Smart Home Offerings

Xiaomi Smart Living Portfolio

Counterpoint

Various Attempts to Grow XR Market, but Displays Aren't Ready

Key announcements

- Several players, including OEMs, carriers, component makers and app developers, showcased XR technology hands-on experiences. However, the display technology to provide the optimal UX to users still seems to be lacking.

- Qualcomm announced its cooperation with seven global mobile carriers in the XR field. At the same time, it also announced that it has stepped up support and expansion of its XR solution. The development came as numerous OEMs, including Xiaomi and OPPO, expanded XR products available in MWC 2023.

- HTC Vive, unveiled a new 'VIVERSE for Business' solution designed to help businesses take full advantage of immersive technology. It presents an easy and intuitive way for companies to build collaborative virtual spaces.

- NTT Docomo demonstrated its effort to promote the XR ecosystem at its booth.

Analysis

- The most impressive announcement from Qualcomm was the collaboration with seven carriers (Vodafone, Deutsche Telecom, Telefonica, KDDI, DoCoMo, T-Mobile, and China Mobile) for its XR expansion ecosystem. By helping these carriers support and commercialize developers in each country based on Qualcomm's Snapdragon Spaces' XR developer platform, more diverse content key to expanding the XR market will be created. It is expected to grow into an XR platform that can compete with Apple's ARKit.

- Many OEMs and carriers also expressed expectations for future XR market expansion by placing XR experience spaces in their booths. However, it is somewhat disappointing that Apple's XR, which is rumored to be released this year, has not yet revealed its specific appearance before the MWC event.

- We believe that most of the requirements for the growth of the XR market are now in place, but what is still lacking is the display. Most XR devices released so far support 90Hz, but a minimum of 120Hz is required for better UX. In that respect, it is significant that Samsung Display exhibited the world's first 240Hz OLED this time. However, it will have to go further to accommodate the requirements of displays for XR, such as wider viewing angles and greater PPD (Pixel Per Degree).
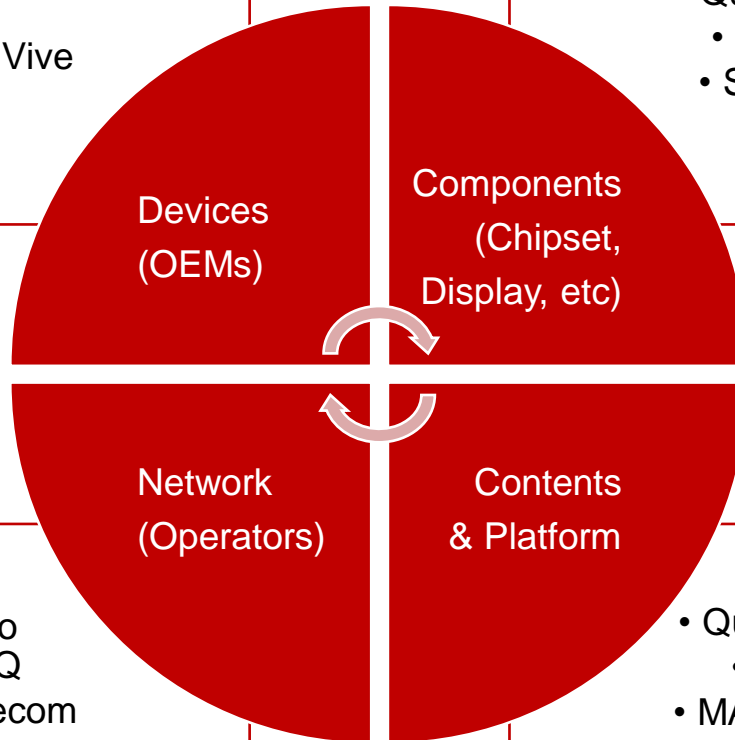

The world's first 240Hz OLED

XR: Who Showed Up

- ZTE has introduced Nubia's first AR glasses.
- HTC Vive showcased various consumer XRs and ran a hands-on experience.
- Oppo also showed off their second generation of Air Glass.

- Snapdragon AR2 Gen 1 Chipset
- UNISOC exhibited INMO Air2 AR glasses equipped with their W517 chipset.
- Samsung Display's 240Hz OLED

Devices (OEMs)
- ZTE
- HTC Vive

Components (Chipset, Display, etc)
- Qualcomm
- UNISOC
- Samsung Display

Network (Operators)
- Docomo QONOQ
- SK Telecom
- Telefonica

Contents & Platform
- Qualcomm
- MAXST
- MARVRUS
- beXReal

Many mobile carriers recognize XR as their next-generation consumer device and provided an opportunity to experience it. Docomo QONOQ and SK Telecom booths had a long line of people who wanted to experience them.

- Snapdragon Spaces
- At 4YFN, small tech companies showcase content platforms for XR in education, industry, and etc.

Counterpoint
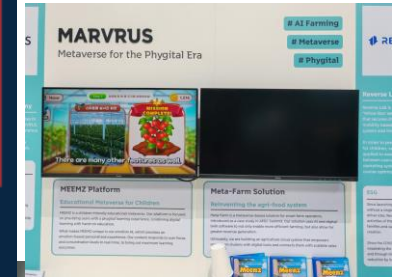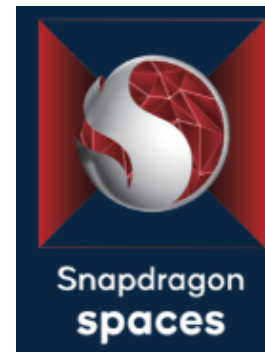
Small Technology Innovations: Getting the Full Picture

Key developments

- Prophesee event camera – announcement with Qualcomm.

- iniVation also active in neuromorphic vision systems.

- Cambridge Mechatronics offers best-in-class image stabilization using lens, sensor or module shift based on shape memory alloy (SMA).

Analysis

- Amid falling CIS revenues in the $19 billion market, two neuromorphic vision competitors, with roots in Zurich, showed competing event cameras. Prophesee and iniVation came out of the same Swiss university. iniVation is less well funded but is primarily focusing on enterprise use cases. Meanwhile, Prophesee believes one application is for eye tracking in XR.

- Prophesee has partnered with Qualcomm to offer a reference design kit based on Prophesee's event-based Metavision Sensors and Software, and premium Snapdragon mobile platforms. A key use case is deblurring movement in fast moving scenes, especially in low light when shutter times are longer. However, the presented use case was underwhelming in our view and may not justify additional BOM cost. If event cameras can enhance the camera function and replace more expensive components to provide a higher-performing imaging system while reducing BOM cost, it may be more beneficial to prospective OEMs, especially in premium smartphone camera systems.

- iniVation also provides neuromorphic vision systems for industrial, automotive, and aerospace and defense sectors. It foresees consumer applications, but not until 2025.
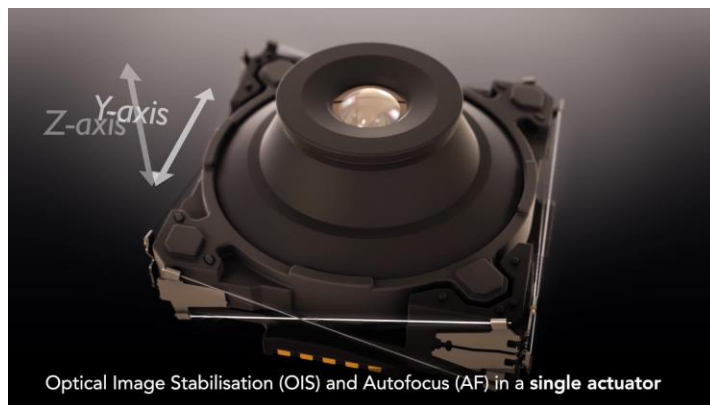
OIS Innovation

- There are currently two main ways of delivering optical image stabilization (OIS) in smartphone camera systems – voice coil motors (VCM), which has the major share, and shape memory alloy (SMA). VCM is a mature and therefore lower cost technology, but, on the downside, has relatively low force, bulky design, multiple components including magnets, Hall sensors, ball bearings and more. The use of magnets makes them susceptible to interference from other magnets, e.g. in foldable phone designs.

- SMA offers many of the same benefits but with significant additional benefits in terms of performance and design freedom. SMA offers higher force so it can move a larger load. This makes it suitable for everything from lens and sensor shift to module shift. It could be used to offer gimbal-like stabilization in very small form-factor devices.

- SMA has been used in products such as the Huawei P50 Pro, which was the highest-rated smartphone camera on DXO Mark until MWC.

Optical Image Stabilisation (OIS) and Autofocus (AF) in a **single actuator**

Image source: Cambridge Mechatronics

Counterpoint

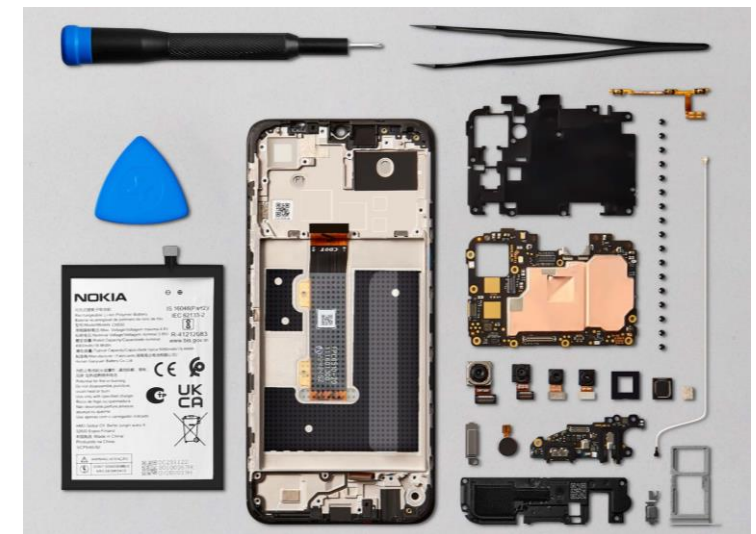# Device Circularity Takes Centre Stage at MWC 2023

Summary

- [Smartphone circularity](#) was a key theme at MWC 2023, highlighting the need for a zero waste supply chain and longer-lasting devices.

- Many companies showcased solutions to boost smartphone circularity, with most focussing on the [refurbishing](#), [repair](#) and recycling segments.

- HMD Global launched three new smartphones featuring longer battery life, improved durability and a repairability partnership with iFixit. The G22, designed with "repairability at its core", allows users to replace a broken screen, charging port and battery themselves in minutes. We did this ourselves on the HMD stand: the process was fiddly, but surprisingly easy.

Just Some Companies Focusing On Device Sustainability at MWC 2023

Analysis

- Around [1.4 billion](#) new handsets are sold every year. In 2022, 5.3 billion handsets were thrown away, of which only around 20% were recycled. This single-use approach is catastrophic to the environment, and at this rate, we will run out of many core materials in the next century.

- A [Circular Economy](#) approach – a model of production and consumption which involves reusing, repairing, [refurbishing](#) and recycling existing materials and products as much as possible – is vital to make the smartphone industry sustainable in the long term.

- Manufacturing needs to become resilient and sustainable, and devices need to last as long as possible until they are [refurbished](#), reused or recycled, thereby reducing [e-waste](#) and supporting a more circular model of business.

Counterpoint

Smartphone Sustainability Climbing the Agenda…For Some

Summary

- Although Samsung did not launch any smartphones at MWC 2023, it still showcased its sustainability credentials, especially the improvements in its latest flagship. It has 12 components made from recycled materials, up from six in the S22 Ultra.

- Xiaomi also emphasized on sustainability during the launch of the 13 series, its first smartphone to undergo Carbon footprint analysis.

- Nokia's G22, launched at MWC 2023, features a 100% recycled plastic back.

Analysis

- While Samsung's progress is a step in the right direction, having only 20% of its components recycled is a bit disappointing for the world's largest smartphone vendor. It has a long way to go before it can be considered a sustainability pioneer.

- On a positive note, Xiaomi appears to be the first Chinese OEM to be taking sustainability seriously. OnePlus, HONOR, realme and TECNO did not address sustainability in any of their product launches at MWC 2023.

Counterpoint

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Future of Operators

- Fair Share
- Open Gateway Initiative
- Operator Sustainability

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- New Form Factors
- eSIM
- IoT Modules
- Smartwatches
- Smart Home
- XR
- Small Tech Innovations
- Smartphone Sustainability

Infrastructure and Connectivity

- Open RAN
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- 5G
- Wi-Fi 7
- Satellite

Digital Transformation

- IoT Platforms
- Industrial Metaverse
- AI

Counterpoint

Open RAN: An Expanding Ecosystem

Open RAN radio summary

- New vendors exhibiting Open RAN radio products include Abside Networks, Astrome, Atos, AW2S, Azcom, Baytec, BMI, Cellixca, CIG, H3C, GreenTech, Qucell, Saankya Labs, Tejas Networks and ULAK.

- Mavenir exhibits its second-generation 32T/32R mMIMO radio with Qualcomm QR100 chip. Its first-generation radio uses an AMD chip.

- Qualcomm's QR100 chip is also used in Viettel's mMIMO radio products. Qualcomm has a partnership with Vodafone (QR100 and X100 card).

- Nokia and Samsung have Marvell's 5nm Octeon 10 Fusion for both RU and DU products.

L1 accelerator cards: Horses for courses?

- Server manufacturers are trying to accommodate as many accelerator card options as possible. In-line accelerator cards exhibited by Dell included cards from Qualcomm, Nokia, NVIDIA along with its own card. HPE showed in-line cards from Nokia and Qualcomm in its ProLiant servers.

- Incumbent infrastructure vendors are also offering options. For example, Ericsson will offer both Intel and AMD x86 chip options using Intel or third-party FPGA cards and AMD/Xilinx's T2 accelerator card. Nokia and Samsung offer in-line Marvell cards along with other vendor cards.

- FPGAs vs ASIC debate: Power consumption and cost may not be the most critical metrics for all use cases. For example, FPGAs may be better suited to enterprise/private network applications which require a higher degree of programmability.

Counterpoint

Where Are We With Open RAN?

Analysis

- With the RAN market dominated by incumbents such as Huawei, Ericsson and Nokia, Open RAN is designed to open up the market to other vendors, thus providing more choices and more innovation for operators.

- The Open RAN ecosystem is growing and Counterpoint Research expects to see progress with the rollout of new RUs and DUs during 2023. It will be particularly interesting to see how the performance of the new RUs and DUs (with the various L1 accelerator cards) compares with proprietary products.

- However, challenges exist, particularly with respect to product maturity and integrating products from multiple vendors. There are clearly costs for operators here. The adjacent Exhibit shows various combinations of DU elements from different vendors being tested by NTT DoCoMo in Japan.

- To overcome this multi-vendor integration challenge, some open RAN vendors have developed an end-to-end 5G product range, i.e. they are effectively positioning themselves as a "mini-Ericsson" in the belief that a single-vendor Open RAN network will be easier to deploy than a multi-vendor network. Verizon seems to be adopting this approach as its rolls out its vRAN/Open RAN network.
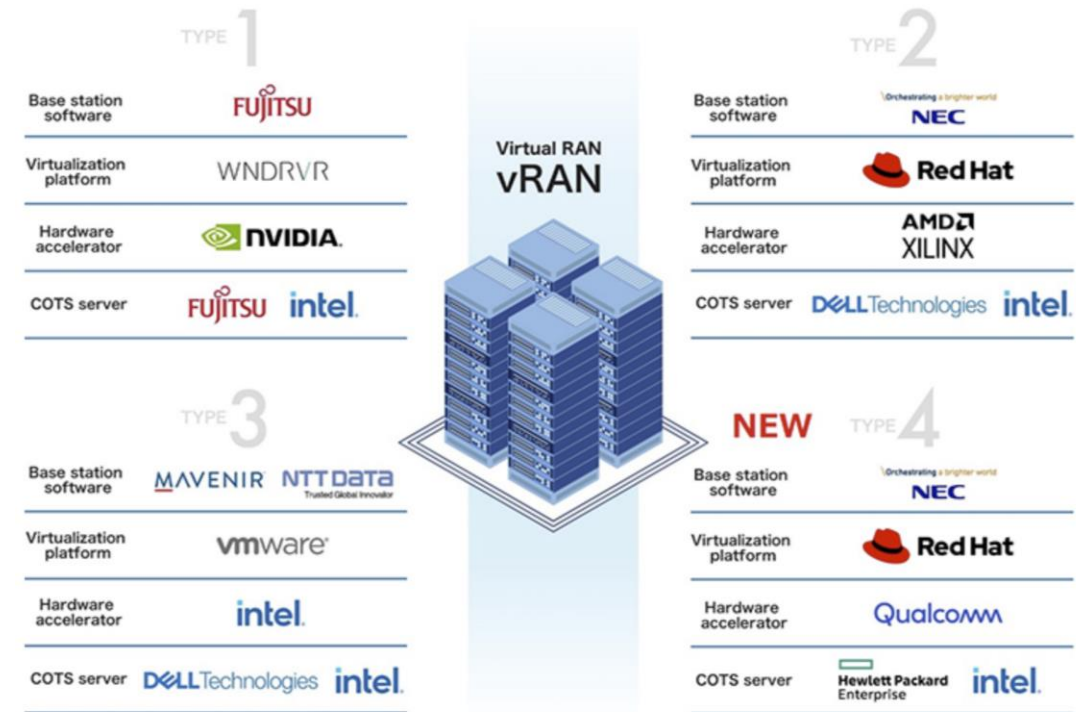
©NTT DoCoMo

Multi-vendor DU Testing undertaken by NTT DoCoMo's OREC initiative

Counterpoint

Private Networks: A Crowded Market

Summary

- A hot topic this year, like last year. This market has a lot of players from traditional vendors to several start-ups. Server manufacturers and hyperscalers are becoming increasingly involved.

- HPE recently acquired enterprise small core specialist Athonet, indicating that they intend to become an important player in the private networks market. Rival Dell is also actively partnering with numerous small private network companies, for example, Canadian small core provider Expeto.

- Hyperscalers: AWS announced an interesting service called "Integrated Private Wireless" running on the AWS Portal which enables enterprise customers to test private network solutions from various operators. Deutsche Telekom, KDDI, Orange, T-Mobile and Telefonica signed up to offer this service.

Analysis

- Overall, the growth in the private network market has been disappointing to date. In particular, the low-end SME market – the so-called "carpeted buildings" market – will likely be cutthroat. Some vendors such as Nokia and NTT are avoiding this end of the market. Others, such as Ericsson/Cradlepoint, are embracing it. Counterpoint Research believes that it will be difficult to beat Wi-Fi on its home turf, particularly with Wi-Fi 7/8 on the way.

- Main market traction is in the mid- to large-size enterprise market, where critical connectivity, and vertical knowledge and expertise are required. Also, stadium-type hot spot use cases are gaining traction.

Network Vendor Themes and Highlights

Analysis

- **Key themes**: Sustainability, transition to 5.5G (and even 6G) plus enterprise digitalization.

- **Huawei**: Major push on 5.5G and a 10Gbps user experience, talking about integrated sensing and comms, Level 4 autonomous driving, green ICT, 3D online malls, 24K VR gaming and glasses-free 3D video.

- **Nokia rebranding**: New neutral, pastel-colored logo to reflect Nokia's presence as a B2B networking equipment and services player. Branding will help with its increased focus on industrial digitalization.

- **Ericsson**: Also increased focus on industrial digitalization, including its Vonage network API business.

- **Samsung, Fujitsu, NEC and Qualcomm**: The Open RAN challenger vendors. In revenue terms, Samsung has gained the most from the Open RAN opportunity to date. However, short-term revenue targets are being revised downwards by some of these vendors. Ericsson expects a flat 2023 due to the slowdown in the 5G market, particularly in the US. In contrast, Nokia expects mobile networks to be its fastest-growing segment in 2023 and expects further market share gains across several business segments.

Counterpoint
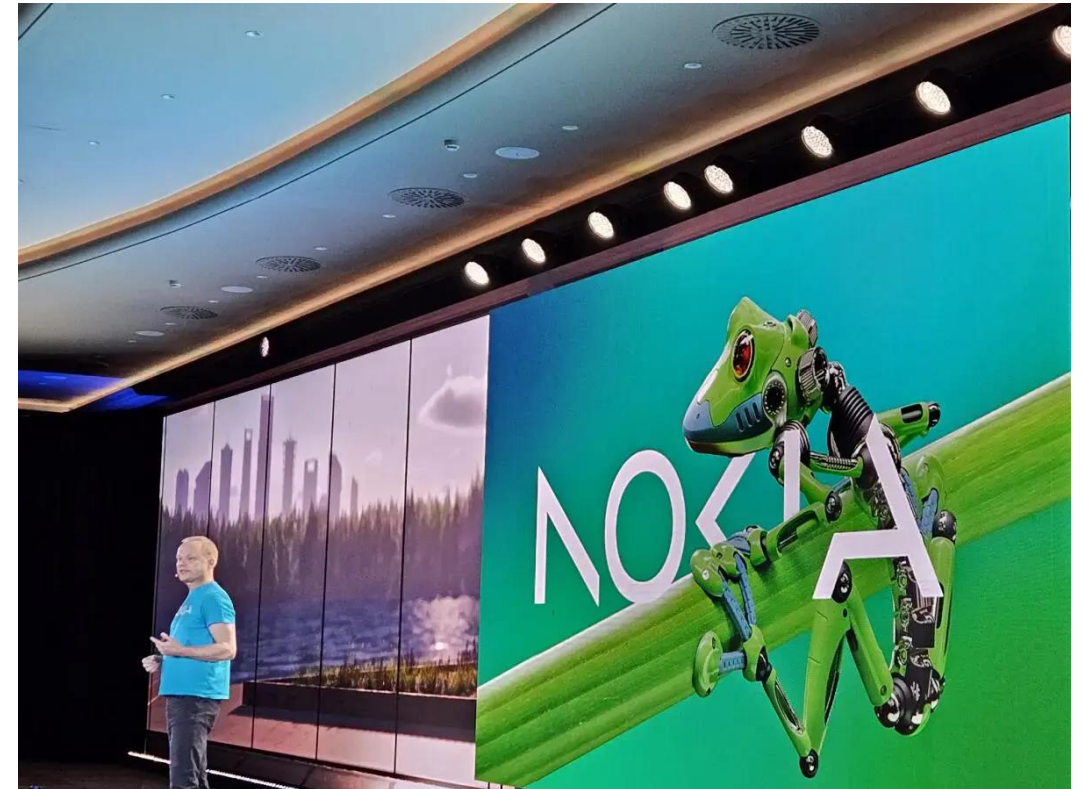
Expanding 5G Device and Components Portfolio

Key demos

- **Industrial IoT:** Fibocom launched Fx180/Fx190 series 5G Sub 6 + mmWave modules to power FWA, IIoT, C-V2X, Private Networks

- **5G Industrial CPE:** Four Faith CPE powered by Fibocom FM160 module targeting smart factory, port, transportation, mining, smart city, etc

- **Smart Sports**: Pongbot from Future Mind is a smart table tennis robot that helps improve the player skills

- **Automotive**: Telit Cinterion plans to give out first samples of AV64/62 NAD based 5G NR for connected vehicles in Q2 2023

- **Tracking & Metering**: Murata launched Type2GD module based on Sony semi's ALT1350 which has 5G supported LPWA with NTN capabilities. This module will likely focus on tracking & metering

Analysis

- Operators are focusing not only on 5G connectivity and private networks, but also on the ecosystem of devices enabling 5G connectivity.

- Many leading module and chipset players have announced and showcased their latest 5G-enabled gateways, fixed wireless access (FWA) and customer premises equipment (CPE). These devices play a crucial role in enabling various digital transformation applications.

- The expanding 5G ecosystem will give customers wider choice and will boost pricing competition.

Counterpoint

Wi-Fi 7 Retail Market Home to Multiple Players Already

Key announcements

- MediaTek showcased **Filogic 880 and Filogic 380 platforms** which support Wi-Fi 7 technology and are ready to get equipped in a wide range of smart home devices including residential gateways, mesh routers (Arcadyan, TP Link, KT), TVs, streaming devices, laptops (Lenovo) and tablets.

- Qualcomm featured the **Networking Pro 1220 Platform and Networking Pro 1620 Platform** which are specially designed for routers, carrier gateways and mesh Wi-Fi networking. Both platforms feature next-generation Wi-Fi 7 technology and are already available on a number of devices. For instance, Xiaomi (Xiaomi Router, BE10000, Router BE 7000) and TP-Link (Deco BE 95). According to Qualcomm, **over 6.5 million Wi-Fi products have been shipped** since 2015.

- TP-Link unveiled its full home and enterprise Wi-Fi 7 product line under the **Archer series,** including the **world's first quad-band Wi-Fi 7 routers and Wi-Fi 7 gaming router.**

- In addition to the above, several smartphone players, including vivo, Xiaomi, Motorola, iQoo, ZTE and OnePlus, showcased their new **smartphone devices with Wi-Fi 7 capabilities**.

MediaTek Filogic 880 solution targeted towards Mesh Routers

Qualcomm Wi-Fi 7

TP-Link Archer Series for home and enterprise solutions

Wi-Fi 7 Smartphone by vivo

Counterpoint

Satellite Priming for Serious Traction

Key Announcements

- MediaTek demonstrated its innovative 3GPP non terrestrial network (NTN) technology that brings two way satellite communications to smartphones. Its standalone MT6825 chipsets can be integrated into any smartphone for satellite connectivity.

- Qualcomm is working with OPPO, vivo, Xiaomi, HONOR, Motorola and Nothing to commercialize the Snapdragon Satellite, which is capable of two-way messaging.

- Deutsche telecom introduces satellite communication in its IoT service in partnership with Intelsat and Skylo.

- Murata brings Skylo's NTN technology to its low-powered module.

Image source: Deutsche Telecom

Analysis

- The penetration of satellite connectivity-enabled smartphones will grow over the next few years, especially in the high-end segments. Most flagships will have chipsets supporting NTN connectivity by next year, but mainstream adoption will take longer.

- Massive IoT will likely get a leg up with satellite. Using 5G NTN technology standards (3GPP Rel. 17), certified NB-IoT-capable device or modules will be able to connect to the satellite network without the need for any extra hardware. It will then switch autonomously and seamlessly between terrestrial and non-terrestrial networks.

- Quectel has already announced that it plans to work with Skylo to bring Satellite connectivity to its LPWA modules. Maritime, agriculture, forestry and supply chain tracking will likely be early use cases.

- Murata/Skylo collaboration allows manufacturers to connect devices such as wearables, sensors and trackers directly over satellite without requiring new hardware or specialized equipment.
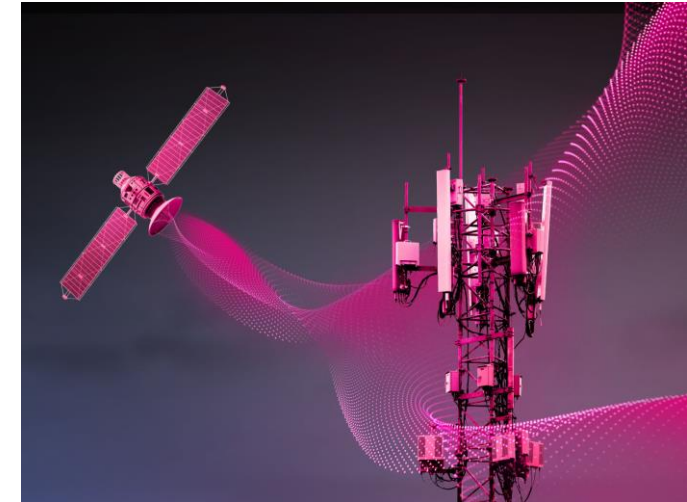
Counterpoint

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- **IoT Platforms**
- **Industrial Metaverse**
- **AI**

Counterpoint

Improving Connectivity and Computing to Drive Digital Transformation

Human Augmentation – 6G (Docomo)

Human augmentation platform facilitates remote sharing of feelings and sensations using special wearables. Healthcare and retail are expected to benefit from this innovation from Docomo.

Metaverse is likely to be a direct beneficiary of human augmentation technology.

Smart Farming by Telefonica

IoT, AI and Blockchain facilitating precision farming and provenance.

Robotic Surgery

Surgeon operates remotely using hybrid 3D glasses that allow the surgeon to see the information in a 3D environment.

6G and Edge computing will be key to bringing remote surgery to reality.

Counterpoint

Reducing Friction in IoT Value Chain

Summary

- Qualcomm unveiled the Aware platform.

- Thales and Qualcomm announced iSIM in the modified Snapdragon 8 Gen 2 chipset.

- Quectel launched a 5G RedCap module, the Rx255c series, while Telit Cinterion announced a 5G sub-6 GHz module.

- Cisco and NTT collaborate to drive private 5G adoption and digital transformation across industries.

Analysis

- The building blocks of IoT seem to be falling into place, although slowly.

  - Stronger collaboration among chipset, module, eSIM and connectivity management players.

  - Focus on connectivity with many players showcasing early 6G use cases with IoT at its core, while the operators and module and chipset players announced their satellite plans and 5G portfolio expansion.

  - MNOs and network equipment players have made it a priority to promote private 5G networks, which is a key part of industry 4.0/IIoT.

- Ecosystem fragmentation is the key challenge in the IoT landscape and Qualcomm is looking to solve this problem with its Aware platform.

- Although Qualcomm's iSIM is for smartphones, it has a big potential for massive IoT due to its small size, remote provisioning capabilities and power efficiency. Sony Semiconductor was the first company to launch iSIM chips for cellular IoT but support from larger players is essential.

- The Cisco/ NTT tie-up will accelerate Edge connectivity by integrating private 5G into existing LAN/WAN enterprise deployments, which will reduce operational complexity.

Counterpoint

Qualcomm Aware Platform Aims to Reduce Fragmentation

Summary

- Qualcomm Aware IoT platform unifies hardware, built-in connectivity and services (location and asset environment data like temperature and humidity).

- Provides a suite of APIs and developer tools to connect with private cloud and ERP integration capabilities.

- Logistics is the initial target segment followed by retail, manufacturing, utilities and construction.

- Qualcomm has multiple partners supporting the platform, which will have a subscription-as-a-service revenue model.
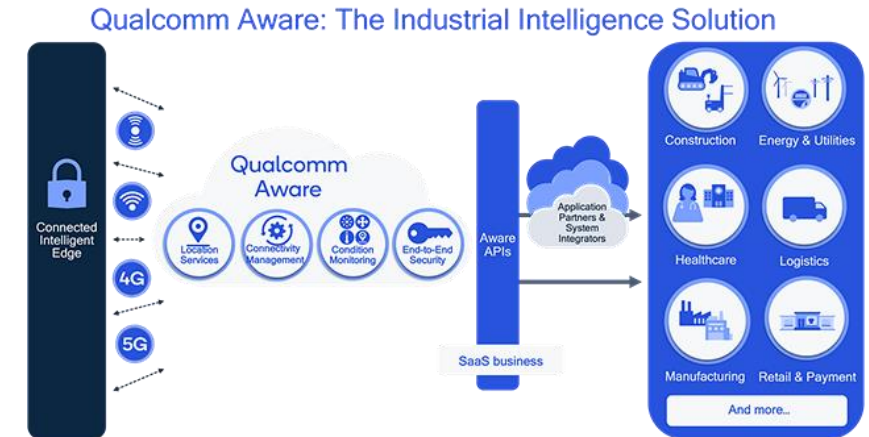
Image source: Qualcomm

Analysis

- Qualcomm aims to reduce fragmentation in IoT, which has been a key challenge for most IoT implementations.

- The Aware platform is the first solution that embeds location capabilities at the chipset level.

- Open APIs will enable integration with enterprise software tools, like Microsoft Dynamics, for a seamless end-to-end experience.

- Aware IoT platform will provide various services for managing assets that require critical, accurate and time-sensitive decision-making.

- Built-in connectivity may lead to conflicts with MVNOs/MNOs, although Qualcomm has stressed that they do not have MVNO ambitions.

- The end-to-end platform helps reduce fragmentation, but it still does not do away the need for maintaining multiple platforms.

  - Existing devices are not covered.

  - Only eSIM-enabled devices managed on the platform are covered, leaving the other devices out of scope.

Counterpoint

Metaverse Focus Shifts From Consumer to Industrial

Nokia senses opportunity in Industrial Metaverse

Orange showcased digital twin of robot control

Telefonica demo of equipment digital twin

Analysis

- Despite showcasing immersive consumer products, players like SK Telecom and HTC were unable to create a buzz in the consumer metaverse. This lack of enthusiasm can be attributed to the persisting issues of unpleasant experiences, indicating that there is still much room for improvement in the consumer metaverse.

- The industrial metaverse presents a contrasting scenario, as its use cases, including digital twins, remote maintenance and training, have piqued significant interest. The driving force behind this surge in attention is the rapid improvement in technologies such as 5G, Edge computing, data analytics and machine learning. Consequently, mobile operators, equipment manufacturers and application developers have taken notice of this opportunity.

- Currently, the industrial metaverse appears to have better adoption and monetization potential than the consumer metaverse.

Counterpoint

AI Quietly Pervasive; Generative AI Making Presence Felt

Key announcements

- HONOR and Xiaomi mentioned AI in relation to flagship imaging in the Magic5 Pro and 13 series, respectively.

- Qualcomm demonstrated its **offline** abilities with Stable Diffusion image generation on a smartphone.

Analysis

- AI was not widely visible in public announcements at MWC 2023 but suffused through most sectors during the show. AI is extensively deployed in network automation – Ericsson, Nokia and Huawei have been using it for years with increasing sophistication.

- AI has also been used for years in improving smartphone imaging through computational photography, compensating for the compromises needed to deliver high imaging performance from small lens arrays and, mostly, fixed-focus cameras. Interestingly, the Xiaomi concept D-SLR phone (see image right) that uses Leica M-mount lenses has to disable AI when a lens is attached, relying instead on the manual controls on the lens itself.
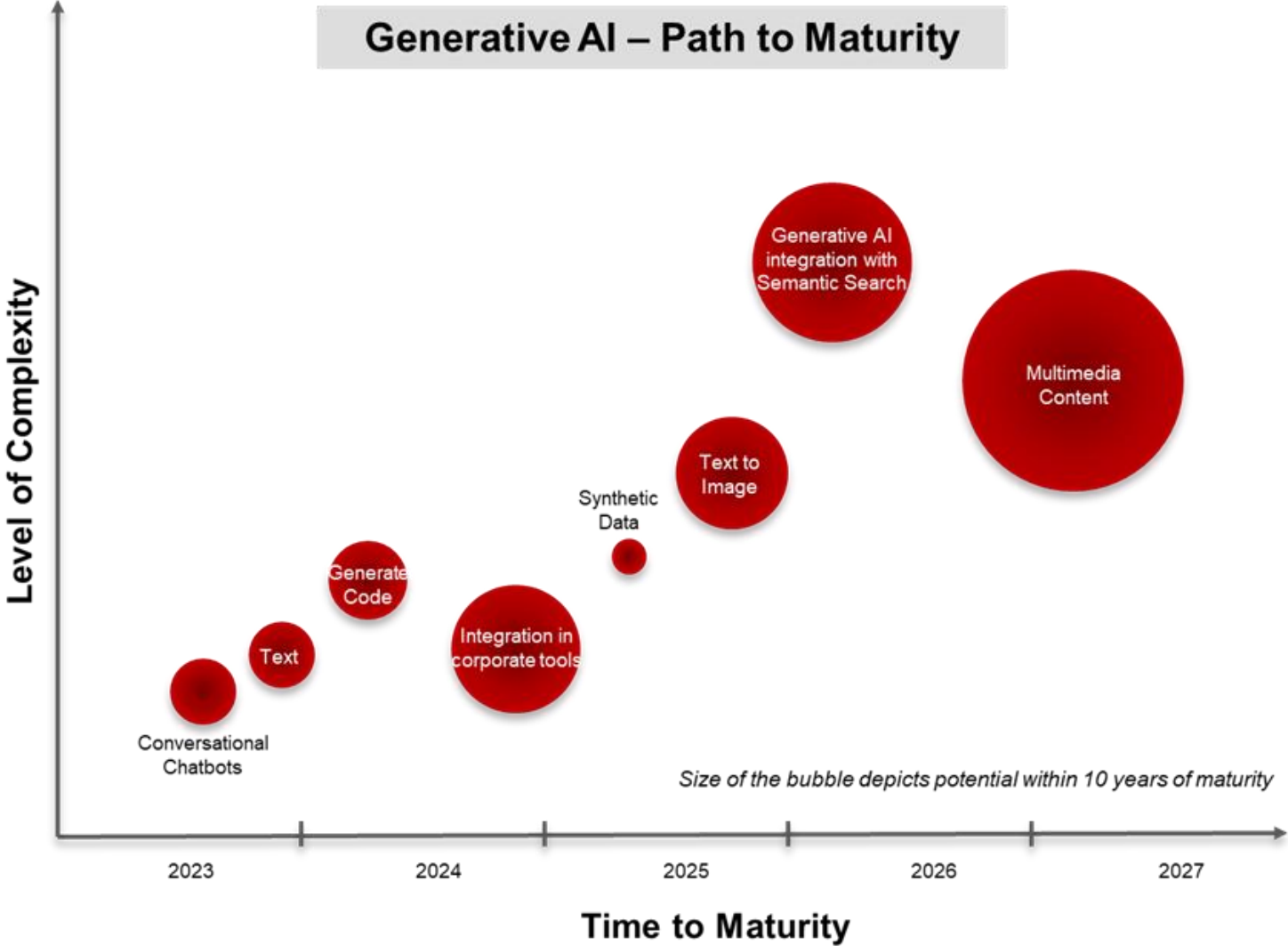
- Qualcomm has integrated a 1 billion-parameter Stable Diffusion model into a smartphone which was the brand's most impressive demonstration. This occupies around 1GB of memory but can generate unique images in a few seconds. A critical aspect of the demonstration was that it was done entirely offline – with the phone in flight mode – making no recourse to cloud computing. Future models are planned with expansion to 10 billion or more parameters. Qualcomm utilized lower precision INT8 data rather than the single-precision floating-point data format (or FP32) used by Stable Diffusion. Qualcomm used its AI Model Efficiency Toolkit's (AIMET) post-training quantization, enabling improved performance while saving power and maintaining accuracy at a lower precision. After this, many other generative AI models may also be able to be run in constrained or offline scenarios in the future on a range of Edge-based devices, for example, cars.

- Generative AI is gaining significant interest with wild speculations about its potential impact. Much of this is likely overdone, but there are multiple startups focusing on developing new and innovative use cases. Discussions at MWC 2023 focused on the potential for content creation with specific mention of players, such as Luma AI, which enables images and videos to be rapidly converted into 3D objects. This enables the creation of immersive content that was never previously possible without expensive special effects. This has the potential to transform content creation for games, video production, virtual reality and more.

Image source: Qualcomm

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Generative AI: Rapid Development, But Search Still Some Years Away

Generative AI – Path to Maturity

Size of the bubble depicts potential within 10 years of maturity

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Thank You