

MOOR INSIGHTS & STRATEGY COVERAGE OF MOBILE WORLD CONGRESS 2022

COVERING THE TOP TECHNOLOGY TRENDS OF MWC 2022

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SUMMARY

Mobile World Congress (MWC) was held in Barcelona, Spain, and was attended by top analysts at Moor Insights & Strategy, including Anshel Sag, Will Townsend, and Patrick Moorhead. Moor Insights & Strategy analysts covered the top tech areas, including mobile device and chipset announcements, networking, 5G, edge, carrier services, and IoT.

Principal Analyst Anshel Sag begins his coverage of MWC 2022 with Qualcomm's latest offerings across its Wi-Fi, 5G, XR, and Automotive portfolios, focusing on Wi-Fi 7 and 5G. Sag analyzes Qualcomm Snapdragon Connect, Fast Connect 7800, and the Snapdragon X70. Sag then covers MediaTek's Dimensity 8000, 8100, and 1300 and follows with new mobile devices from TCL, Lenovo, Samsung, Realme, and Oppo.

Vice President and Principal Analyst Will Townsend gives his analysis of MWC 2022, focusing on private cellular networking, vRAN and Open RAN, and carrier enablement and services. Townsend begins his coverage with private cellular networking from Cisco, Hewlett Packard Enterprise (HPE), and their respective partners. In the realm of vRAN and Open RAN, Townsend covers Samsung's several announcements from Samsung, including the 5G vRAN ecosystem, and covers standout players Marvell and Intel and Rakuten Symphony. Townsend gives his analysis of AT&T announcements and T-Mobile announcements that happened before MWC 2022 within IoT.

CEO, Founder, and Chief Analyst Patrick Moorhead set his focus on Qualcomm's X70 system, highlighting Qualcomm's 5G leadership. Moorhead highlights Qualcomm's ability to be the first in many notable 5G accomplishments. He then covers Qualcomm's leadership in 5G and how its leadership in RF systems is complementary to its diversification.

Lastly, Patrick Moorhead sits down with Nokia, Accenture, IBM, AT&T, IBM, Dish, Boston Dynamics, and Movandi representatives on the [Six Five Podcast](#) with Futurum Research, Daniel Newman, and Patrick Moorhead. The Six Five Podcast covers MWC 2022 in [Episode 112](#). Anshel Sag and Will Townsend also cover MWC in [Episode 90](#) of the G2 on 5G with special guest Patrick Moorhead.

THE BIGGEST MOBILE DEVICE AND CHIPSET ANNOUNCEMENTS- ANSHEL SAG, PATRICK MOORHEAD



Snapdragon Connect QUALCOMM

Earlier this month, I attended Mobile World Congress (MWC) 2022 in Barcelona, my first in-person MWC since the pandemic outbreak in 2020. I felt comfortable attending this year knowing that strict testing, masking and tracing requirements were in place. Out of the approximately 61,000 people who attended the show, I am personally only aware of only one positive COVID case reported in the days after and it doesn't appear that COVID cases in Barcelona were affected at all, more than two weeks later. If that number holds up, I hope that this show can serve as a model for other events and how to hold them safely while Covid is still in the backdrop.

Today, though, I wanted to talk about the big mobile announcements (chipsets and devices) from MWC 2022, including those that were announced during the leadup to the event.

5G AND WI-FI CHIPS GALORE

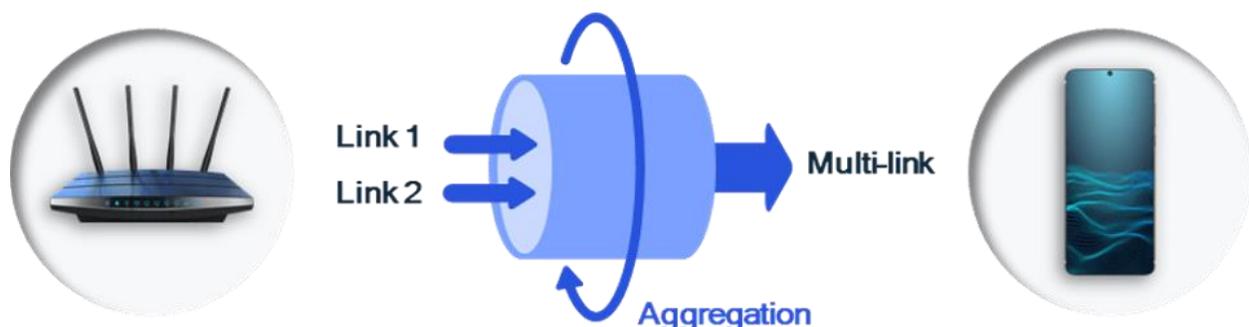
MWC is traditionally where the mobile industry's most prominent players announce the latest in mobile and infrastructure chips and the devices that leverage them. At MWC, all of the usual suspects were in attendance, but I would say Qualcomm had the biggest week of them all. Though the chipmaker announced new offerings across its Wi-Fi, 5G, XR and Automotive portfolios, this blog will focus on Wi-Fi 7 and 5G.

QUALCOMM SNAPDRAGON CONNECT, FASTCONNECT 7800, SNAPDRAGON X70, AND MORE

Qualcomm unveiled Snapdragon Connect, a unifying brand that represents its best-in-class offerings across 5G, Wi-Fi and Bluetooth, as well as the RF solutions that enable them all. This new branding and badge will exist across the many segments Qualcomm serves, including phones, PCs, gaming, XR, automotive and wearables. This aligns with the Snapdragon brand getting more prominence and unifying the different products that the company has created.

Qualcomm's new FastConnect 7800 is the world's first Wi-Fi 7 chipset. Since it is already sampling to customers, it will likely also be the first to ship in devices in the second half of this year. The new Wi-Fi 7 subsystem features a shockingly high peak theoretical throughput of 5.8 Gbps, achieved through its aggregation of 5GHz and 6GHz spectrum. When 6GHz isn't available, it peaks at 4.3 Gbps by aggregating two 160 MHz links (depending on spectrum availability). This multi-link technology enables the chipset to aggregate the performance of multiple concurrent channels to create more throughput or switch between streams for lower latency. It is also possible to use up to 320 MHz of spectrum in places like the 6GHz band, a technique that is gaining popularity worldwide as spectrum bodies search for the best way to make that spectrum available and deal with interference issues.

FastConnect 7800's speeds are also aided by 4K QAM modulation, which Qualcomm alone supports (the rest of the industry still uses 1024 QAM). That said, I expect we'll see many of Qualcomm's competitors introduce 4K QAM with their own Wi-Fi 7 solutions once those come to market.



Multi-link technology. Qualcomm

Another excellent capability of the FastConnect 7800 is its sub-2ms latency. This has many applications, but it is incredibly enticing for XR applications where wireless latency is crucial for features like split rendering. Qualcomm designed the FastConnect 7800 to maximize both Wi-Fi 6E and Wi-Fi 7 access points today, including features like 4-

Stream DBS to enable new Windows Features like Wi-Fi Dual Station. There are immediate benefits to having the FastConnect 7800 in devices later this year, even if Wi-Fi 7 access points aren't expected until sometime mid-next year (including the reduced power consumption and improved latency). In addition to all that, the FastConnect 7800 also has dual-stream Bluetooth 5.3 connectivity. Qualcomm says this increases both range and pairing distance by up to 2x while also consuming 50% less power. The company also introduced two new Snapdragon Sound chips for wearables, the Snapdragon Sound S3 and S5, which will pair with devices featuring the FastConnect 7800 and take advantage of the new capabilities afforded by the new chipset. I'm very excited to see what kind of devices will ship with the FastConnect 7800 later this year.

SNAPDRAGON X70

Nearly every year now, Qualcomm gives us a new 5G modem. The latest, the Snapdragon X70, is the company's 5th generation 5G modem built on a 4nm process node. While the Snapdragon X70 doesn't necessarily increase the throughput beyond the current 10 Gbps peak speed set by the X65, it introduces for the first time built-in onboard AI for optimization of the modem's performance. The X70 uses a multitude of AI features to improve the overall user experience on a 5G device, including:

1. Channel-state feedback and dynamic optimization to improve overall power and signal
2. mmWave beam management to improve 5G mmWave coverage
3. network selection for superior mobility and link robustness
4. adaptive antenna tuning for up to 30% improved context detection for higher speeds and coverage

The Snapdragon X70 also features 4X carrier aggregation across both TDD, FDD, mmWave and Sub-6 spectrum. Additionally, it features the 3rd generation of the company's 5G PowerSave, which, when paired with its QET7100 wideband envelope tracker, can reduce power consumption and extend battery life even further.

MEDIA TEK DIMENSITY 8000, 8100 AND 1300

MediaTek was also present at MWC 2022, giving demos of its Wi-Fi 7 technology to partners and the press. Late last year, the company introduced its new flagship processor, the Dimensity 9000, which comes to market this week inside the Oppo Find X5 Dimensity Edition in China. Notably, this is the first time the Dimensity 9000 will have a chance to go head-to-head with Qualcomm's Snapdragon 8 Gen 1. At MWC 2022,

MediaTek also introduced three new members of the Dimensity family: the Dimensity 1300, 8000 and Dimensity 8100. The Dimensity 1300 is a minor improvement with a slight tweak to add 10% more AI performance over the 1200 and will continue to ship the mid-range chip in high volumes as the company's lineup expands.

TSMC manufactures MediaTek's Dimensity 8000 and 8100 using its 5nm process node (compared to the Dimensity 9000's 4nm and the Dimensity 1200's 6nm process node). This is somewhat of an early indication of where the new 8000 series will lie in the existing product lineup. The Dimensity 8000 and 8100 will feature ARM's last generation Cortex A78 CPU cores instead of its latest ARM v9-based A710 cores. However, they will clock higher speeds than the Dimensity 1200's 2.6 GHz. The 8000 features a clock speed of 2.75 GHz and the 8100 comes in at 2.85 GHz. Additionally, neither the 8000 nor the 8100 will have any prime cores clocked higher, unlike the Dimensity 1200 and the Cortex X2 inside the Dimensity 9000. The Dimensity 8000 and 8100 also support LPDDR5, compared to the Dimensity 9000's support for LPDDR5X and the Dimensity 1200's support for LPDDR4X. Storage support remains UFS 3.1 across the board for all SoCs, from the Dimensity 1200 to the Dimensity 9000.

When it comes to the GPU, the Dimensity 8000 features Arm's Mali-G610 MC6 GPU, compared to the Dimensity 1200's G77 M9 and the Dimensity 9000's G710 MC10. The Dimensity 8100 has a 20% higher clocked version of the Mali G610, which helps to further differentiate it from the Dimensity 8000. As far as the ISP goes, the Dimensity 8000 and 8100 support up to 200MP images and have a 5 Gpixel/s pipeline. Additionally, they support 4K at 60 FPS with HDR10+ and dual recording, while the Dimensity 9000 adds triple recording.

On the 5G side, the Dimensity 8000 and 8100 both support a maximum downlink throughput of 4.7 Gbps, compared to the Dimensity 9000's 7 Gbps downlink. Like the Dimensity 9000, the Dimensity 8000 and 8100 also feature Wi-Fi 6E support (the Dimensity 1200 only supports Wi-Fi 6). The Dimensity 8000 and 8100 also match the 9000's Bluetooth 5.3 support, an upgrade from the Dimensity 1200's Bluetooth 5.2. I believe the Dimensity 8000 series helps fill a crucial gap in MediaTek's lineup, allowing it to ship in the higher-end mid-range devices—the ones that aren't quite flagship-tier, but require more features than what the Dimensity 1300 provides.

5G DEVICES AT MWC 2022

There was no shortage of 5G devices at MWC 2022. It was a coming out party of sorts for the Snapdragon 8 Gen 1, which will be shipping in many devices from many vendors. There were also other devices of note from TCL, Lenovo, and Samsung that caught my attention. Realme launched the Realme GT 2 Pro, which was very well received by the press thanks to its many improvements over the Realme GT. Poco, a Xiaomi subsidiary, did a big launch at MWC this year (Xiaomi, who launched a flagship

device at my last MWC, did not). Unfortunately, neither the new Poco X4 Pro 5G and Poco M4 Pro will be available in North America, forgoing it to focus on Europe and Asia. Honor launched its Magic4 Pro smartphone, which features Qualcomm's Snapdragon 8 Gen 1 processor and unique camera system. Honor's Magic V foldable, launched only a few weeks earlier in China, was also available for the press to play with. Honor also teased that the Magic 4 Pro will feature 100W wired and wireless charging.

Oppo launched the Find X5 Pro, featuring the Snapdragon 8 Gen 1, immediately before MWC 2022. I got mine shipped to me while I was at the show, and will have my review ready in the next few weeks. The device will not be available in the US, but is now on sale in Europe. Oppo has a history of showing off its latest innovations at MWC, and this year was no exception. The company teased its next generation of SuperVOOC wired fast charging technology, which will come in the form of 150W wired charging in the next generation of OnePlus' devices. Oppo also teased a prototype of its 240W charging, capable of charging a phone to 100% in 9 minutes flat. Since this was just a prototype, it is unclear when this technology would come to market. That said, Oppo has been a leader in fast charging, and was among the first in the world to adopt fast charging in its phones.

Phones weren't the only exciting devices announced at MWC 2022. Samsung didn't launch any phones at MWC, but it did announce a few new PCs based on Intel's 12th Gen processors. These included the new Galaxy Book2 Pro and Galaxy Book2 Pro 360. I was far more interested in the Book2 Pro because it looked and felt like a regular high-end PC while somehow weighing less than two pounds—a very welcome spec for any PC. The Pro 2 comes in 13.3" and 15.6" sizes, and ships with Intel Arc discrete Graphics. As far as weight goes, the Book2 Pro 13.3" weighs a paltry 0.87kg or 1.91 pounds. The 15.6" version with integrated graphics comes in at an equally impressive 2.44 lbs., while the version with Intel Arc discrete graphics totals 2.57 lbs. All sizes have a 1080P display and feature Wi-Fi 6E connectivity.

The 15.6" version also comes with an optional 5G modem, which, in my opinion, makes it the ultimate lightweight productivity anywhere machine. I'm also pretty excited about Lenovo's X13s, the first Lenovo ThinkPad with an Arm processor, the Snapdragon 8CX Gen 3, which Qualcomm announced late last year at its Snapdragon Tech Summit in Hawaii. The 8CX Gen 3, featuring a 5nm SoC, is a significant improvement over the previous generation, with a purported 85% better CPU performance and a 60% better GPU performance.

While TCL didn't announce any new smartphones at MWC 2022, the company did launch its TCL 30 Series lineup for Europe. The company did show off its latest 5G CPE and 5G mobile hotspot powered by MediaTek's T750, which has been very popular for these applications. TCL also showed off all of its different foldable concepts in a suite and while it hasn't announced anything, seems to be inching towards a launch. A lot of

people are excited to see TCL join the foldable fray and help to promote competition and improve consumer choice.

WRAPPING UP

Despite contact tracing, masking and vaccine verification/negative testing, MWC 2022 was a welcome return to semi-normality. I was thankful to see so many of my friends and colleagues from around the world. With 61,000 attending, I thought the show was the perfect size (compared to the 109,000 in attendance at the last in-person MWC in 2019). I think MWC 2022 made it clear who the big players in the mobile industry are today. The continued momentum of 5G was also on full display, with the new classes of 5G and Wi-Fi products. It's a shame that Apple didn't launch the iPhone SE at MWC; it would've been a perfect way to suck all the air out of the room. I think it was a lost opportunity for them, strategically. That said, I am still very excited about the industry's momentum overall and many of these companies are quite happy that Apple didn't. Competition is ripe and innovation is happening at a rapid pace, even if it doesn't always feel like it. I look forward to more in-person, semi-normal events as the year progresses.

MOBILE WORLD CONGRESS 2022 DELIVERS IN THREE KEY AREAS- WILL TOWNSEND, PATRICK MOORHEAD



MWC Barcelona 2022 GSMA

It has been two seemingly long years since the last in-person Mobile World Congress (MWC) Barcelona. I had the good fortune to attend this year, and the show did not disappoint. Though the attendance was smaller than in the past (the GSMA final estimate was about 60,000), all the stalwart companies were in attendance. I spent considerable time with infrastructure providers and mobile network operators at the event and wanted to share the most compelling things I heard in the realm of private cellular networking, vRAN and Open RAN and carrier enablement and services.

PRIVATE CELLULAR NETWORKING

In the lead up to the show, I predicted on my weekly podcast, the G2 on 5G, that it would serve as a coming-out party for private cellular networking. It turns out that I was spot on, and there were private cellular networking announcements from multiple companies. Cisco provided further details on its private-5G-as-a-service offering. The networking giant will provide the mobile core technology, while its partners, Airspan Networks and JMA Wireless, provide the Open RAN architecture. Cisco's proposition is

compelling, given its deep IoT capabilities, its broad portfolio of industrial routers, switches and gateways and its industrial security and management applications. I believe that over half of the addressable market for private cellular networking is manufacturing automation, which Cisco should be well-positioned to capitalize on. I also like that Cisco is facilitating the management of its new 5G service alongside Wi-Fi. The reality is that Wi-Fi will continue to dominate the traditional IT carpeted areas of enterprises, while 5G cellular connectivity provides the necessary propagation, throughput and latency for OT environments.

Hewlett Packard Enterprise (HPE) also provided details on its private-5G-as-a-service offering, not surprisingly, as a part of its GreenLake IT consumption services platform. HPE has arguably the most mature set of subscription offerings, including networking-as-a-service. 5G-as-a-service is a logical compliment. In partnering with Airspan Networks, the HPE solution parallels that of Cisco's, from a RAN perspective. However, I believe HPE's 5G superpower is software. HPE offers a mature and tested 5G Core Stack platform, along with the robust management capabilities of its HPE Service Director offering. Additionally, HPE is already an edge enablement leader with its Edgeline portfolio. I expect mobile edge computing will supercharge 5G use cases across many industries, and HPE has a portfolio aligned to deliver on many, if not all fronts.

HPE has also decided to deploy multiple routes to market as it vies for its share of the private networking opportunity. In addition to the GreenLake 5G service, the company's Aruba division is partnering with startup Celona to offer a turnkey LTE and 5G core and radio offering to the HPE customer base. I continue to be impressed with Celona's focus on ease of deployment and management—I believe its 5G LAN platform is as easy to manage as Wi-Fi. Apparently Verizon agrees, judging by its MWC announcement that it will leverage Celona's platform as a private label within the Verizon On-Site 5G portfolio.

vRAN AND OPEN RAN

Samsung Networks is also emerging as a leader in enabling operator network deployment agility, offering a broad set of vRAN and Open RAN capabilities. At MWC, Samsung made several announcements, including a 5G vRAN ecosystem it says will advance innovation and accelerate deployment. Samsung will collaborate with a “who's who” of companies, including Dell Technologies, HPE, Intel, Red Hat and Wind River. From an operator perspective, I believe success lies in commercial vRAN deployments versus proof-of-concept pilots. To this end, Samsung continues to build upon its previous vRAN wins last year, including KDDI in Japan and Verizon in the United States. I spent time with Samsung before MWC, discussing its vRAN and Open RAN capabilities. If interested, you can find that fireside chat [here](#). Notably, Samsung won the Global Mobile (GLOMO) CTO's Choice Award for its fully virtualized 5G RAN solution at MWC this year. That award is another proof point that demonstrates the

infrastructure provider's capabilities in vRAN.

Marvell continues to be a standout in the overall 5G ecosystem, powering much of the underlying infrastructure platforms with its silicon. Notably, it announced an Open RAN accelerator card design win at MWC, developed in partnership with Dell Technologies. It is a smart move for Dell, and I believe this purpose-built piece of hardware will strengthen its telecom portfolio and complement its PowerEdge server line. The value lies in the accelerator card's capability to free up valuable CPU compute cycles to support telecom workloads more efficiently. Dell will need to continue to make these kinds of investments if it hopes to compete with HPE in the long term. HPE has a much more mature set of telco-grade offerings and significant 5G lab capabilities aimed at speeding operator deployment and lowering capital and operation expenditures.

Intel is also doing its part to support the vRAN and Open RAN ecosystem. Before MWC, my colleague and 5G partner-in-crime Anshel Sag and I spoke with Intel about several announcements related to silicon and the developer ecosystem. If interested, you can find that conversation [here](#). Also worth noting was Qualcomm's announcement that it would help Mavenir develop and optimize its vDU RAN software stack on Qualcomm's recently announced X100 5G RAN accelerator card. If you are interested in learning more about the Qualcomm offering, I analyzed the details in this [Forbes article](#). From an Open RAN perspective, there was probably no other company as visible as Rakuten Symphony—it felt like there were dozens of announcements. Still, I have been skeptical of operator acceptance of Symphony given the platform is born out of Rakuten Japan's efforts to deploy Open RAN. It has not been an easy journey for Rakuten, but I give the company credit for working through the complex challenges of disaggregated RAN. Its announcements at MWC included:

- An acquisition of Robin.io to bolster automation and orchestration capabilities,
- A partnership with AT&T to simplify the design of network rollouts,
- A partnership with Cisco to develop and deliver solutions based on LTE and 5G Open RAN architecture.

It will be interesting to see the follow-on activities between Symphony, operators, and infrastructure providers. Suffice it to say, Rakuten Symphony seems to be gaining tremendous momentum with respect to Open RAN deployments.

CARRIER ENABLEMENT AND SERVICES HIGHLIGHTS

AT&T was front and center at MWC, and in addition to the previously mentioned partnership with Rakuten Symphony, the operator made several announcements. One involves collaboration with Intel and its FlexRAN software stack and Xeon processors to deliver an elastic 5G RAN capability. At the event, I spoke with Gordon Mansfield, VP of Mobility and Access Architecture, about deploying cloud-native architectures to dynamically scale computational power when needed. From a RAN perspective, it

allows AT&T to deploy what is termed advanced DU pooling to drive sustainability and improved efficiency. The efficiency comes from its ability to allow 5G radio to distribute baseband processing for user devices across multiple servers. This provides a mechanism to intelligently distribute and redistribute traffic instantly, without any disruption to subscribers and power down servers if traffic levels fall. On the surface, it looks compelling and like it could Cloud RAN to the next level. The other AT&T announcement worth mentioning is the operator's Private 5G Edge platform. In partnership with Microsoft Azure, the two companies will provide a private 5G service supercharged with edge computing enablement. I was impressed by the partnership's focus on specific use cases, its flexibility with public network slicing and its support for the CBRS/ OnGo spectrum deployment. In my mind, AT&T's edge strategy looks much stronger than what Verizon is doing with AWS to enable edge computing ahead of its 5G mid-band CBAND deployments.

Before MWC, T-Mobile announced its T IoT platform. T-Mobile and parent company Deutsche Telekom hope to solve the complexities of IoT deployments by harmonizing its program's sale, support and enterprise management on a global basis. I like the fact that there is a wide range of access supported, including LTE, 5G and NB-IoT. Pricing is flexible, with traditional and flat-rate unlimited plans. Most compelling, perhaps, is the visibility and ease-of-management offered by the solution's single pane of glass interface. It is a bold vision and, in my mind, the most significant step forward for T-Mobile U.S. to compete for enterprise services among its incumbent competitors.

WRAPPING UP

As my reintroduction to the event circuit post-pandemic, MWC 2022 did not disappoint. It was marked by significant momentum in private cellular networking, the evolution of the RAN, and operator enablement and services. Personally, one of the highlights was my meeting and spending time with Marc Rouanne, who leads Dish's effort to build a cloud-native, highly virtualized greenfield 5G network stateside. Much like Rakuten in Japan, Mr. Rouanne is leaning heavily into an emerging ecosystem of partners (many mentioned in this article) to deliver a highly agile, automated mobile network for Dish. It's not without complexity, but what results from operators, silicon providers, and infrastructure providers alike will drive innovation, sustainability and disruptive 5G service delivery. I am personally looking forward to what unfolds this year and beyond.

QUALCOMM SHOWING IT IS VERY MUCH STILL IN THE 5G LEADERSHIP POSITION- PATRICK MOORHEAD, JACOB FREYMAN



The Snapdragon X70 system QUALCOMM

Qualcomm is a company that I follow very closely across multiple market segments, including 5G, smartphones, laptops, and automotive. Last week I attended Mobile World Congress (MWC) 2022 in Barcelona, Spain, where Qualcomm's CEO, Cristiano Amon, announced new products, demonstrating to me that Qualcomm is still very much the leader in smartphone wireless connectivity.

It has not even been a year since Cristiano Amon took the role of CEO of Qualcomm, and since then, Amon has stuck too much of what he promised for Qualcomm's future, which included continuing its leadership in 5G. While Qualcomm's leadership in wireless connectivity is nothing new, especially considering it spearheaded the rollout of 5G connectivity, the gap that I see emerging within the 5G space between Qualcomm and its competitors is impressive.

Qualcomm announced many new innovative products at MWC 2022. I want to hit on its newly announced X70 5G system, which could make life more difficult for Apple's modem team. Let's take a look at Qualcomm's X70 among a sea of 'firsts' for Qualcomm.

THE FIRST OF MANY FIRSTS

Qualcomm's X70 5G modem is its 5th generation 5G modem and is the first to integrate an AI processor in a 5G Modem RF System. Qualcomm has had many firsts and this is just one of them. The X50 was the world's first 5G modem, 5G reference design, 5G mmWave module, and mmWave reference design. The X55 had the world's first wideband envelope tracking solution for higher 5G power efficiency. The X60 was the world's first mmWave to sub6 aggregation and from the X65 to the X70 is the world's only 5G solution supporting every 5G band from 600MHz to 41GHz. The X65 is also the world's first 10Gbps 5G solution, the first modem-RF solution with 3GPP Release 16, and the first with 5G uplink carrier aggregation support.

None of these are small 'firsts' either, and I believe they are incredible accomplishments for Qualcomm and the 5G space. These "firsts" show me that Qualcomm is still the leader in 5G technology, and it has made an even larger gap with the X70 5G modem as the first modem to have an AI processor integrated into the system.

I believe the AI processor addresses one aspect of connectivity that is hard to get around: subjectivity. Signal coverage, strength, and other variables like efficiency are subjective to real-world factors like location, population density, and even weather. Qualcomm's 5G AI Suite showcases AI-powered modem-RF techniques like AI-based channel-state feedback and beams management to combat the subjective nature of connectivity. The AI-based channel-state feedback should help increase the system's average downlink and uplink speeds for more reliability and better power efficiency. The AI-based beam management should increase coverage and mobility. Qualcomm's AI suite should improve speeds, coverage, mobility, and robustness for the X70 5G modem.

GLOBAL RF LEADERSHIP

Along with its list of 'firsts,' the Qualcomm X70 5G modem is unmatched in many areas of 5G connectivity that are worth noting. It has unmatched global band support and spectrum aggregation. Qualcomm says its 4X downlink carrier aggregation across TDD and FDD, mmWave-sub-6 aggregation offers global operators ultimate flexibility. This support and aggregation give Qualcomm a competitive advantage for consumers, enterprises, and the connected, intelligent edge.

This company's position in RF systems is strong, and although it is diversifying into other markets, its leadership in RF systems is complementary to its diversification. 5G connectivity is critical to the advancement of mobile devices, IoT, smart cities, eventually AR/VR, and instances where powerful computing could be remote and automotive. While some could say that Qualcomm is taking its foot off the 5G accelerator to switch lanes, it is actually ramping up its presence with the one innovative

technology that unites all its verticals—RF systems.

With the arrival of 5G, the entire industry saw just how much more important RF was and how there were benefits to a close digital and analog symbiosis. RF systems play a critical role in Qualcomm's mobile, ACPC, and automotive plays and are all stand-out factors within its respectable markets. Some of the greatest recent moves for Qualcomm revolve around its prowess in RF systems now and how it goes about making sure no one can keep up. This announcement by Qualcomm reinforces its wireless leadership and leaves everyone else number two within the realm of competition.

By continuing to add more modem and RF features at a rapid pace, this could become a competitive challenge for Apple, which is trying to build its own modem and partnering on the RF side. It's too early to say if this would drive a delay in Apple's roadmap as the company hasn't said a word about it since it bought the assets of Intel's 5G modem. One good question I get is about how Apple can do so well even though it's typically a laggard on the wireless comms side. Apple was 18 months late with 5G, and it didn't seem to cost them market share. It's a good question, but I think it has to catch up to the company at some point.

It allows Qualcomm to implement features as it did with AI-based enhancements on the X70 5G modem. Qualcomm's integrated AI processor reinforces the RF system as an innovation that guides the wireless industry rather than an innovation that follows standards and trends.

WRAPPING UP

I like Cristiano Amon's Qualcomm and do not see Qualcomm slowing down within the realm of 5G systems. Year after year, its 5G modems have shown Qualcomm's leadership with a long list of 'firsts,' and its RF parts are impressive. The X70 5G modem is the world's only modem to antenna 5G solution and the world's only 5G solution with every 5G band from 600MHz to 41GHz, and that is impressive.

I'd hate to be at Apple trying to keep up with this freight train. But does it have to?

VIDEO CITATIONS

THE SIX FIVE PODCAST- PATRICK MOORHEAD

The Six Five In the Booth with Nokia's Daniel Derksen at Mobile World Congress 2022

Six Five hosts Patrick Moorhead and Daniel Newman are joined by Nokia's Daniel Derksen, Director of Regional PLM EMEA, to talk about the challenges service providers are facing today and how Nokia is addressing those

The Six Five In the Booth with Accenture's Syed Alam at Mobile World Congress 2022

Six Five host Patrick Moorhead sits down with Accenture's Syed Alam, Managing Director and Global Lead, Semiconductor Practice, to discuss the company's presence at Mobile World Congress 2022.

The Six Five In the Booth with IBM and AT&T at Mobile World Congress 2022

Six Five hosts Patrick Moorhead and Daniel Newman talk with Steve Canepa, IBM's General Manager, Global Industries, and Zee Hussain, AT&T's Senior Vice President Global Business, about 5G and how it's about so much more than just speed.

The Six Five In the Booth with IBM and Dish at Mobile World Congress 2022

Six Five hosts Patrick Moorhead and Daniel Newman talk with Steve Canepa, IBM's General Manager, Global Industries, and Mark Rouanne, Chief Network Officer at Dish, about 5G and how the companies are working together to bring it to their markets.

The Six Five In the Booth with IBM and Boston Dynamics at Mobile World Congress 2022

Six Five hosts Patrick Moorhead and Daniel Newman talk with Rob High, IBM's CTO for Edge Computing, and Mike Pollitt, Chief Sales Officer for Boston Dynamics, about robotics and how the technology is growing in importance and helping organizations collect data and drive and inform decisions.

The Six Five In the Booth with IBM's Rob Thomas at Mobile World Congress 2022

Six Five hosts Patrick Moorhead and Daniel Newman talk with IBM's Rob Thomas, Senior Vice President, about the industry at large, what IBM brings to the 5G space, and what telcos need to do to better compete and survive.

Six Five In the Booth with Movandi at Mobile World Congress MIS

Six Five hosts Patrick Moorhead and Daniel Newman talk with Movandi Corporation Co-Founder and CEO, Maryam Rofougaran and Chief Revenue and Marketing Officer, Taher Behbehani. Their conversation focuses on RF and how Movandi is innovating and optimizing their technology solutions to meet the evolving needs of the 5G ecosystem.

MWC 2022 Wrap Up

Six Five hosts Patrick Moorhead and Daniel Newman wrap up MWC 2022 in episode 113 of the Six Five podcast.

THE G2 ON 5G- ANSHEL SAG, WILL TOWNSEND, PATRICK MOORHEAD

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G2 on 5G hosts Anshel Sag and Will Townsend with guest Patrick Moorhead wrap up MWC 2022 with Private 5G As a Service, vRAN, Open RAN, New 5G SoCs, New 5G Phones, Laptops, and iPhone SE 5G.

IMPORTANT INFORMATION ABOUT THIS PAPER

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