

Podcast Transcript - How Xiaomi, Qualcomm are Delivering 5G, AI-based Experiences to Consumers

Neil: [00:00:17] Hello everyone. Thank you for tuning into yet another episode of The Counterpoint Podcast. I'm your host Neil Shah and today we have a very interesting topic lined up around how new technologies like 5G and AI are shaping the next-generation smartphones. For this discussion I'm very thrilled to be joined by our special guests, Kedar Kondap Vice President of Product Management at Qualcomm, Hey Kedar

Kedar: [00:00:40] Hi Neil, how are you?

Neil: [00:00:41] Good. Good. Thanks. So joining us so late in your time zone and we have Adam Zeng, Senior Vice President of smartphone business at Xiaomi. Hey Adam

Adam: [00:00:50] Hey Neil, very nice to meet you.

Neil: [00:00:53] Thanks for the time. Thanks. Thanks very much. So, today's theme for the discussion is going to be around new generation capabilities in the smartphones. So, what we have seen with every cellular generation, the mobile phones and factors have changed and there are different capabilities which have evolved. Right from high-speed connectivity to advanced photography, videography and gaming. So, the key components which are driving these significant transformation over the last three decades have been basically at the heart of the phones, which are like system on chip and the RF front end.

Right? So, these technologies, obviously Qualcomm is the leader driving these technologies across generations and across price tiers. And then we. Fast-growing OEMs, such as Xiaomi which are bringing these capabilities to the mass market. So let's start this discussion and maybe I can jump in starting with Kedar.

Qualcomm recently had a slew of announcements of starting from Snapdragon 778G at the 5G Summit to 888 Plus at the MWC 2021. So can you share your perspective on what are these enhancements we are seeing with respect to the previous generation and what form of capabilities and features does it unlock?

Kedar: [00:02:02] Sure. Thanks, Neil. So obviously we're very excited and the Snapdragon lineup for 2021 for all of the devices we've announced so far are definitely leading in terms of technologies. So, our general belief obviously is that we want to make sure we keep innovating and driving a good innovation in the market. And obviously we're very excited that Xiaomi and Qualcomm have been in this journey together off trying to make sure we bring a lot of premium tier devices to market.

Specifically talking about the 888 Plus is of course our latest flagship and the most premium Snapdragon platform that's available in the market today. If you go back we first introduced the Snapdragon 888 back in December of last year and 888 already debuted a whole list of impressive first in terms of technology innovation in the market. And now when we look at 888 we take that leading edge technology and innovation and enhance it even further. A couple of examples of what we've done, for example, it has a much faster CPU, significantly improved AI performance and our goal and theme if you will, has always been around making sure we drive good experiences. And in this case, we've talked specifically about driving intelligent entertainment experience. Specifically looking at the 888 Plus, we've improved, obviously the CPU performance, which we have the Kryo 680 it's up to 3GHz now. So obviously the intent with when we increase the CPU performance is to make sure that the response time with apps as much better, it has good browser performance. And obviously a lot of folks want to browse the web and stuff.

And then with AI it's actually huge. We're talking about a 20% improvement on AI, even over the 888. So, it is our sixth generation of AI with you know, 32 trillion operations per second. So 32 TOPS, so huge improvements. And the reason for that is because we want to make sure that as devices get more intelligent, And the interactions with the device and the user get more intuitive we want to drive the best mobile entertainment experience that is available. So, all in all, I think what you'll see is that with the 888, if you taught the 888 was best, now we have something that's even better with the 888 Plus.

Neil: [00:04:29] Oh, fantastic. So yeah, talking about intelligent experiences, I think that is something which is going to be a cornerstone of this decade I would believe. With 32 TOPS is huge in terms of capabilities for artificial intelligence. But the key thing is how and what OEMs do with these capabilities, right. Which you guys are offering. So I would like to understand Kedar briefly from you, what are the different applications, you talked about entertainment, right? So how does this AI change the experiences or transform the experiences like from camera to security voice assistant or battery life and so forth?

Kedar: [00:05:04] That's an excellent question Neil. When we look at you know, obviously today's environment, we let's say, we talk about the applications that exist today in a smartphone. I'd say that there is a strong demand for a lot of the applications to host what I like to call multimodalities. And what I mean by that is it's a fusion of various technologies that require, or that are enabled for a lot of things, such as for example, vision or speech or text. And a lot of times these technologies run pretty concurrently.

So let's, let's maybe take a step back and look at a specific use case. Today, we're talking about a lot of video conference, right? We're all several of us work from

home and video conferences, obviously getting more and more traction. So think about a use case where we're all on the video. We're dialed into a work from home. And you know, as a user, I'd like a lot of things in terms of background segmentation. I don't want to see anything except only show myself on camera. So I want to blur the background. All I want, you know, I want to look, obviously look handsome. So I want a much better camera, super resolution.

And sometimes I want the video stream that's coming in. I want a much improved video stream and, you know, people operate in different conditions, right? Like somebody is operating in a low light condition, but I still want to make sure that the video that is going through has the best possible experience ever.

And then, so that's just one piece talking about video. Think of the same use case where now I talk about audio, right? I want to eliminate background noise. Let's say there's a dog barking in the background, but on at home we have kids running around. So I want to be suppressed all this background noise. And for example, if you just look at a couple of these things, ideally what I'd like to have is that even want to have natural language translation as a part of this use case.

So just think about the use case that I'm talking about, right? It requires so much concurrently. I talked about speech. I talked about video, we're talking about text. So in order to enable a lot of these compute intensive platforms, there's a lot of AI that runs in the background. So just to provide a consistent use case, we're not even talking about a big use case, just a consistent use case, we need a lot of energy, high compute and all of that, but very low power. And the way to do that for us is to enable this through AI. And when we talk about AI, we do talk about the neural networks, multiple neural networks that can run concurrently. And that's part of the reason why we're focusing so much on making sure that our AI experience with say 32 TOPS as in the Snapdragon 888 Plus platform is something that we're focusing on to drive the best user experience.

Neil: [00:07:56] Great. Maybe I can, now I can extend this question to Adam. So Adam so my colleague Ritesh, who is producing this podcast have been testing a lot of Xiaomi devices that latest Mi 11 series as well. So what we have seen Xiaomi has done fantastic job. Integrating these cutting-edge features from Qualcomm into its phones. Can you talk about how Xiaomi is leveraging these features across the MI portfolio?

Adam: [00:08:21] Ok, thanks Neil. In 2020 the Xiaomi Mi 11 series devices, was first to adopt Snapdragon 8 & 7 series mobile platform, which are now very popular among users. Combining Qualcomm's Spectra ISP the top image processor in the globe with Xiaomi's vast investment and innovation on camera. We deliver the best in class camera experience by bringing together the world's best telecam, the top

fold lens, the largest pixel size and the most advanced algorithms. In our all round co-operation Qualcomm we provide excellent hardware, all which Xiaomi makes optimization and a differentiation efforts, including CIS and algorithms. Thus Xiaomi has maintained its leading position in camera. Currently, Xiaomi has established multiple camera research Institute in the United States, Europe, Japan, and China, and continued comprehensive partnership with Qualcomm.

Neil: [00:09:36] Great. Thank you very much, Adam. I think I completely agree with your points and the camera output, the photography and videography is phenomenal on the new Mi 11 series, and we look forward to Xiaomi adding more and more capabilities, leveraging the capabilities of the platform beneath. So talking about other capabilities, which 888 Plus unlocks Kedar, can you talk about some of the gaming experiences on these as gaming becomes very important in this 5G era and we, everyone is working from home, but also spending a lot of time on phones, right? So gaming has become one of the top use cases on phones.

Kedar: [00:10:13] Definitely Neil, I think there's no doubt, right that mobile gaming in general has had, a lot of traction as you just highlighted. I mean, we're you know, especially more specifically in the last year and a half with the remote work environment just to maybe point out a few facts on gaming that you were referencing just in 2020, the mobile gaming market was estimated at close to about a \$100 billion. And I think by 2030 mobile gaming is, I think we're projecting it closer to like \$250 billion. So definitely a huge focus in terms of how a handset devices are used for the best mobile gaming experience.

And sort of think about how Snapdragon focuses to drive that experience as gaming on platform. You know, at least the way I'd like to think about it is there are several features that are in gaming specifically that we bring first to mobile. And our goal is obviously to transform the premium mobile device into a gaming.

And the way we do that is we sort of develop an entire arsenal of hardware features and software features they're optimized specifically for gaming and are integrated in the premium peer Snapdragon mobile platform. So, you know, there's several things. If you think about just PC, like gaming experiences, we're talking about smooth interaction, superior performances are very fast, blazing, fast responses incredible audio. Then we're talking about ultra realistic graphics and cinematic like experiences and so much more. And so the way we do some of these enablement is we often times team up with top game studios and our goal to break barriers and to sort of bring in mobile games, even for example, at 144 frames per second.

And so we run that at such high frame rates. We want to make sure that would not compromise on quality. We're not compromising on a smooth performance. And obviously when it comes to gaming this so much more to, especially if you're a

professional game, what, you know, there is a little bit of jank on a little bit of stutter on a little bit of glitch. And that's where I guess winning matters in mobile gaming. So a lot of focus, at least from us in focusing on all these little things. So just to give you another example of a feature that we've enabled on mobile gaming, quick touch, where we spend a lot of time optimizing down to the millisecond level.

And our goal is that as we do that with decrease the latency and increase the speed from touch to the display, but up to about say close to about 20%. So there's obviously a lot of focus for months as we bring desktop level features to the smartphone. And you know, our goal is to enable the market so that these are first available on Android.

Our developers can create more realistic experiences, more emerging, immersive graphic experiences. So overall, you know what we've talked about, for example, updatable drivers in the past, so if I'm a user that's really playing games and stuff. I don't have to wait for an OS update with the updatable graphics drivers from Qualcomm, you can actually just update the, some of the capabilities without waiting for a complete update. So, overall, I think as you highlighted Neil, there is huge focus from us on gaming because we believed that gaming as a category is extremely critical in in how people are using their mobile devices today.

Neil: [00:13:46] Completely agree. And I love the elite gaming features, which you have presented an offering the variable rate shading is something I believe is something game game-changer right? When it comes to power consumption savings, as well as FPS improvements. So that's, I think mobile gaming is going to be a huge use case it's already is, but even more, once we have 5g cloud gaming, anybody in multiple regions and multiple us take benefit of it.

Kedar: [00:14:13] Neil I hope you going to use one of the Xiaomi 888 devices and participate in Qualcomm's conquest gaming tournament, and I hope you win the tournament in India,

Neil: [00:14:26] I'll try, definitely try. So Kedar which is your favorite game?

Kedar: [00:14:30] Ohh I am not a mobile gamer, but my son does game, but I've done my games. He's also not like a active gamer, he just does it for fun, but I've liked to play a few games, but I can't claim to be a good gaming person.

Neil: [00:14:46] So, Adam talking about gaming and other 5G cloud experiences. Can you talk about how things are changing in China, from your perspective, with respect to 5G capabilities and is it unlocking newer features? Cloud gaming or high-speed broadband or augmented reality and how Xiaomi is ready for it.

Adam: [00:15:08] All our research on 5G has been going on for more than five years and we introduced 5G smartphone based on Qualcomm Snapdragon mobile platform as early as in 2019. In the 5G market Xiaomi has made plenty of progresses. Not only we have began a large market share, but also play a leading role in application innovation. Thanks to advantage like high bandwidth and low latency 5G has been bringing mobile gaming and HD video, to more people around the world. With the evolution of 5G technology more use cases will be better supported in the future, such as smart home XR and smart transportation, which can be seamlessly connected in all scenarios. And I believe Qualcomm is the, one of the most important partner of Xiaomi in 5G, and the have also set up a joint lab to drive the development and adoption.

Neil: [00:16:16] That's some great progress going on 5G space and bringing it to mainstream market and talking about mainstream market. Can you talk about 778G just launch at 5g summit because it's a next generation to Snapdragon 765G, which is one of the best selling SoC which brought 5G mainstream. Right. So can you talk about what our expectations with 778G, the design wins and so forth?

Kedar: [00:16:40] Yeah, of course. Thanks for highlighting that. Definitely 765 is an excellent platform. It was definitely game changing in terms of bringing 5G into a sub premium tier very, very quick. And the, you should definitely think of 778 as like the quintessential successor to already successful 765 and 768 devices in the market.

And so far we've had tremendous success with 778G I think our first device is already out in the market. I think Honor launched the first day. And very soon you get to see more and more devices that will come to market very, very soon. I think we've obviously even announced our partnership with Xiaomi and I wouldn't want to give away Adam's excitement, but we're definitely anxious to work.

We are working very closely with them. We've talked about our partnership on the 778 and the expectation is that in the coming year, you'll see many, many devices launched globally with the 778G. And obviously as we highlight the G for gaming. So definitely there is a lot of focus and we specifically talked about giving right before this, and you definitely see a lot of optimizations from our standpoint in terms of select gaming experiences that will definitely bring to the 778G platform.

Neil: [00:18:05] Great. So maybe switching gears, we talked about AI, we talked about gaming and 5g, right? So the thing which I wanted to check with Xiaomi as well as Qualcomm was, how do you guys see that evolution of a foldable phones and the foldable form factors?

And how does it change in terms of the different technologies which are baked in right from SOC to a camera like under display camera? For example. And also in

terms of capabilities, what are the new capabilities does it unlock in form of new experiences and so forth? How do you see these display camera tech shaping the industry?

Adam: [00:18:44] Thanks Neil. Xiaomi has constantly made large scale investment in display and camera technologies and taking the leading position. As early as in 2016, Xiaomi already made the full screen display commercially available on Xiaomi Mix for the first time in the development of full screen display over the past five years.

As you mentioned, we have already launched full concept smart phones this year, which are popular among users in China. Xiaomi has lead the R&D display globally when it comes to the future of display and camera technology we believe that the push of having higher resolution, higher refresh rates, more realistic color, a low power consumption is the challenge. And the Xiaomi, we will continue to invest in these segments with deeper partnership with Qualcomm and deliver a better user experience with more amazing products.

Neil: [00:19:54] Great, Kedar, your thoughts on the same?

Kedar: [00:19:58] You know, honestly Neil, what Adam said is absolutely correct. Right? There's a lot of evolution that is happening in display and camera right. These are two areas where obviously every year you get to see more and more. I mean, think about it from a few years back. Not too long ago, we were talking about QXGA and lowQHD type displays 240. And now we were, then we started talking about 720p. Then we started talking about 1080p. Then we start talking about 2K displays, and then we went from you know, bezel-less, edge to edge displays. And so I think overall there's definitely and, I think Adam had it, something which is also interesting, right. That from not just was the resolution, but we also started talking about better refresh rates.

And some of these things matter to consumers that are playing games and you know, it drives a very different viewing experiences, especially you know, if you're like me and your eyes are starting to you know, as you start getting older and you need glasses and stuff, these things make a big difference.

So you know, obviously I think this is not the end, right? There's a lot more innovation that is still left in my mind. For example, we've talked about the cutouts for camera and, you know, none of us want a cutout right in the middle of your display just for camera.

And so there's obviously under display stuff that's going on, but many challenges and technology investments that have to be made. So exactly as Adam was highlighting, there are large scale investments that all of us are looking at, because we want to

drive a great user experience. We are working with display suppliers. We are working with camera vendors. We are doing a lot more R&D in this area and our goal is it's beyond just the hardware, right? There is a lot of AI, believe it or not, that can be used to help improve even the image. So lots of mechanisms because the camera's still blocked by the display.

And there are lots of issues. For example, with light sensitivity. The color tinting of the image as you know, how's the display substrate, is it made of plastic? And so how do you you know, there's a lot of diffraction that happens. So you really have to look at a lot of these R&D like projects to make, I know it seems very small that he might, can we just get rid of that notch and why can't we just dive a better experience?

But the goal is, you know, I'm looking to do what I want. Very cool. Some want to look pretty when I take that selfie. So when at the same time, I don't want that camera coming on top of my display. So the understanding from what the consumer wants is very clear, but to make that a reality, there's a lot of R&D work that's happening.

So I do think there's a, the innovation is not done yet. There's a lot more innovation that still exists even in display on camera. And I think you you'll start to see that over the next year.

Neil: [00:22:45] Great. And to my question on what are your thoughts on like foldables form factors? How does it change or make your job difficult from engineering perspective?

Kedar: [00:22:54] You mean just foldable form factors.

Neil: [00:22:56] Yeah. How does Qualcomm optimize for those kinds of experiences? Because the use cases are different right? Needs to be also more intelligent at software level, as well as at the hardware level, in terms of the thickness of the device, then where to put the millimeter wave and then a module and stuff. Right?

Kedar: [00:23:14] So, so we've been working with Adam and as you know, on the foldable display and stuff, but, but Neil, it's very interesting, right? There is so much more to these foldable displays than just the technology, right. There is obviously displays need to grow in terms of you know, mass scale adoption, second, you know, as a consumer, you really don't want to see that that folding line in between, especially as you fold displays.

So, I think there is a lot of investment that's going in that particular area. Third as you highlighted the software, there's a lot of software work. For example, especially

if I'm, if I have a large display like a 6-inch or 8-inch display, when I unfold the device, I want to be able to run multiple concurrent apps.

Right. And those need to be intelligent. So that's that, for example, on the left side, I want to be able to run my you know, communications app, whatever it is, could be Microsoft teams. It could be a Google Hangouts or whatever. And on the right side, I want to be able to check email. And so I want to be able to operate concurrently through multiple apps.

So how did they fit on the screen? And obviously, as you know, even in desktops, it took a long time to readjust those images and how it would fit to different form factors. I think it's a very interesting use case. I think there's going to be more and more investments in affordable and overall, I think between both hardware and software, there's going to be innovation over the next several years.

Neil: [00:24:43] Great. So I think we have discussed quite a lot today. From 5g AI camera as well as foldables, I really would like to thank Kedar and Adam for sharing their perspective and insights today. I believe this was quite interesting and and brings a lot of insights to those who are listening to this podcast.

Thank you very much, Adam. Thank you very much, Kedar

Adam: [00:25:06] Thank you, and see you next time.

Kedar: [00:25:08] Thank you Neil, it was nice talking to you.

Neil: [00:25:10] And for all our listeners, thank you for tuning in. You can listen to our previous podcast on counterpointresearch.com. And we are also present on major podcasting platforms, such as Spotify, Apple Podcast, Google Podcast, and more. So stay safe. And happy listening. Bye now. .