

Ladies and gentlemen, thank you for standing by. Welcome to the Qualcomm Fourth Quarter Fiscal 2019 Earnings Conference Call. [Operator Instructions] As a reminder, this conference is being recorded, November 6, 2019. The playback number for today's call is 877-660-6853. International callers, please dial 201-612-7415. The playback reservation number is 13695634.

I would now like to turn the call over to Mauricio Lopez-Hodoyan, Vice President of Investor Relations. Mr. Lopez-Hodoyan, please go ahead.

Mauricio Lopez-Hodoyan

Thank you, and good afternoon, everyone. Today's call will include prepared remarks by Steve Mollenkopf and Akash Palkhiwala. In addition, Cristiano Amon, Alex Rogers, and Don Rosenberg will join the question-and-answer session. You can access our earnings release and the slide presentation that accompany this call on our Investor Relations website. In addition, this call is being webcast on qualcomm.com, and a replay will be available on our website later today.

During the call today, we will use non-GAAP financial measures as defined in Regulation G, and you can find the related reconciliations to GAAP on our website. We will also make forward-looking statements, including projections and estimates of future events, business or industry trends or business or financial results. Actual events or results could differ materially from those projected in our forward-looking statements. Please refer to our SEC filings, including our most recent 10-K which contain important factors that could cause actual results to differ materially from the forward-looking statements.

And now to comments from Qualcomm's Chief Executive Officer, Steve Mollenkopf.

Steve Mollenkopf

Thank you, Mauricio, and good afternoon, everyone. We are pleased to report strong results in the fourth quarter with non-GAAP earnings of \$0.78 per share, above the high end of our guidance range on solid performance in our licensing business. We are also pleased to see our licensing revenue return to a seasonal pattern with fiscal Q1 as a high, based on our recent licensing agreement with Apple. Over the last several years, we have invested to establish Qualcomm as a leader in 5G. As a reminder, 5G brings a significant increase in complexity over 4G, such as new and dense network architectures, high performance basebands, advanced RF front end designs, increased processing requirements, in addition to driving the leading edge process node.

We are actively focused on helping to define and standardize releases 16 and 17 features to support the expansion of 5G into new large adjacent markets such as enterprise, industrial IoT and automotive. The complexity and expansion of cellular technologies beyond the smartphone into nearly every industry play directly to Qualcomm's strengths and are why we believe 5G will represent the single biggest opportunity in Qualcomm's history.

Looking ahead to fiscal year 2020, the Company remains focused on these three key priorities. Number one, continue executing on 5G with our partners around the world. The number of OEMs and operators launching 5G products and services continues to increase throughout the year. There are now over 40 OEMs and over 30 operators launching or announcing 5G products or commercial service, up from approximately 20 OEMs and operators respectively at the start of the year. Looking forward, we expect 5G to launch in all regions, within the next two years to three years.

On the product side, in September, we announced plans to accelerate 5G global commercialization at scale by expanding our portfolio of 5G mobile platforms into the Snapdragon 7 Series and 6 Series, launching as early as calendar Q1 2020. Our integrated 5G SoCs will support both sub-6 gigahertz and millimeter wave at the volume tiers across all geographies.

As we continue to expand our 5G product portfolio, our design wins are also increasing. We now have over 230 5G design wins launched or in development, up from 150 in the prior quarter, virtually, all of which are using our RF front-end solutions for 5G sub-6 and/or millimeter wave. Notably, multiple OEMs are now shipping or have announced their second or third 5G device models using both our Snapdragon 5G core chipset and our modem to antenna RF front-end solution. In Korea, the migration to 5G continues at a strong pace. According to the Korean Ministry of Science and ICT, Korean operators have already signed up 3.5 million 5G subscribers through September, a pace that remains faster than its migration to 4G. Additionally, 5G millimeter wave services are in planning stages by Korean carriers for calendar 2020.

In the United States, Verizon has committed to deploy 5G Ultra Wideband millimeter wave in 30 markets by year-end and T-Mobile separately announced plans to cover 200 million people with 5G on 600 megahertz before the end of this year. And in Europe, there are multiple 5G launches across Switzerland, Italy, the United Kingdom, and Germany.

In China, all three mobile operators commercially launched 5G services last week bringing 5G to the largest smartphone subscriber base in the world.

We now estimate that by the end of this year, the three operators will deploy a total of approximately 130,000 5G base stations. We further estimate that by the end of 2020, 5G base station deployments will increase to approximately 1 million which to put in context is 10 times the scale of the entire network of a large US operator.

Lastly, TSMC recently attributed the significant increase in demand for their leading technology nodes to a stronger outlook for 5G deployment next year. This is yet another significant indicator of the 5G ramp into 2020.

Second priority, to expand our technology platform into adjacent industry segments. In automotive, we are very encouraged with the engagement and design win traction we are experiencing from automakers and Tier 1 customers with our Telematics and third-generation Snapdragon automotive cockpit solutions. Our design win pipeline has now increased to almost \$6.5 billion, up from \$5 billion at the start of the fiscal year, giving us great visibility into strong growth in auto over the next several years. Over time, as the technology roadmap in auto converges with the cellular roadmap, we expect to see an increased opportunity to lead in new product categories, notably ADAS.

In compute, we continue to build traction in the Windows on Snapdragon always-on, always-connected PC category. In August, Samsung announced the Galaxy Book S, based on the Snapdragon 8cx. This is the Samsung second Windows on Snapdragon device, and the first announced Snapdragon 8cx always-connected PC.

In October, Microsoft launched the Surface Pro X, our first design with Microsoft in this premium tier, powered by a Snapdragon 8cx variant that is designed for the always-on compute environment, the Microsoft SQ1 developed in partnership with Microsoft. This is the finest surfaced ever and has three times the performance per watt of the Surface Pro 6.

Priority three, drive revenue growth, operating leverage and earnings per share. Consistent with our comments last quarter, we continue to expect a positive inflection point as 5G ramps beginning in our fiscal second quarter. With the conclusion of our cost plan and significant share repurchases over the last year, we are poised to deliver margin expansion, an outsized growth in earnings and earnings per share as revenue growth accelerates.

We are pleased with the progress we have made over the course of 2019 and believe the business is very well positioned for sustained long-term growth as we benefit from the decisions and investments made over the last several years, including 5G, the return of Apple licensing and product revenues, growth in RF front-end and growth in adjacent businesses.

Before I turn the call over to Akash, I'd like to congratulate him on becoming Qualcomm's Chief Financial Officer. As QCT Finance Lead for the past four years, Akash brings a deep knowledge base of our company, both operationally and strategically. I'm looking forward to working closely with Akash as we enter this next chapter of our history.

I would now like to turn the call over to Akash.

Akash Palkhiwala

Thank you, Steve, and good afternoon, everyone. It is a very exciting time to become Chief Financial Officer of Qualcomm and I'm looking forward to engaging with our shareholders and analysts. I will begin with a discussion of our fiscal fourth quarter earnings. We delivered strong results with non-GAAP EPS of \$0.78, \$0.03 above the high end of our guidance range, and revenues of \$4.8 billion, above the midpoint of our guidance range.

The outperformance in the quarter was primarily driven by QTL on higher units and stronger mix resulting in QTL revenues of \$1.16 billion and EBT margin of 68%. As a reminder, we did not record any royalty revenues from Huawei in our fiscal fourth quarter results. QCT delivered revenues of \$3.6 billion and \$152 million MSM chip shipments, in line with our expectations for the quarter. QCT's EBT margin was approximately 14%, flat sequentially and at the midpoint of our guidance range.

Turning to fiscal 2019, we recorded \$19.4 billion in non-GAAP revenues and \$3.54 in non-GAAP earnings per share. During the year, we achieved several key milestones that position us favorably for fiscal 2020 and beyond. First, our early investments in 5G played a key role in accelerating 5G deployments and we have secured over 230 chipset design wins. Second, we completed the acquisition of the remaining interest in RF360 Holdings and established a strong design win pipeline for RF front-end products across 5G sub-6 and millimeter wave devices.

Third, we signed global patent license and multi-year chipset supply agreements with Apple. Fourth, we concluded our cost reduction plan announced in January 2018. And lastly, since our July 2018 announcement, we have completed approximately \$23 billion in stock repurchase through fiscal 2019, at an average price of \$65 per share, resulting in a 22% reduction of our shares outstanding.

Turning to our outlook, we are maintaining our estimate of 1.7 billion to 1.8 billion units for calendar 2019 for global 3G, 4G, 5G device forecast. For calendar 2020, we are estimating 1.75 billion to 1.85 billion units, up approximately 3% at the midpoint, reflecting flat handsets and low double-

digit growth in non-handsets. We are estimating 175 million to 225 million 5G handset units in calendar 2020.

Consistent with our comments on our previous earnings call, our business outlook is impacted by several factors including weaker demand in China and certain developed regions, Huawei share gain in China and OEMs managing 4G inventory ahead of the transition to 5G.

Turning to our first quarter guidance for fiscal 2020, we expect revenues to be in the range of \$4.4 billion to \$5.2 billion and non-GAAP earnings per share of \$0.80 to \$0.90. We estimate fiscal first quarter QTL revenues to be in the range of \$1.3 billion to \$1.5 billion and EBT margin of 70% to 74%. We expect QTL revenues to be up 21% sequentially at the midpoint in our fiscal first quarter due to normal holiday seasonality driven by timing of flagship phone launches. Our fiscal first quarter forecast does not include any royalty revenues from Huawei while we continue to pursue a negotiated resolution of the licensing dispute.

With the completion of the global patent license agreement with Apple earlier this year, QTL revenues will begin to reflect a seasonally high fiscal first quarter. Following the seasonal uplift, we expect QTL revenues to return to a range of \$1.0 billion to \$1.2 billion in our fiscal second quarter.

In QCT, we estimate fiscal first quarter MSM shipments of 145 million units to 165 million units and EBT margin in the range of 10% to 12%. QCT's EBT margin guidance reflects lower volume in the premium and high tiers, driven by a pause ahead of the transition to 5G in early calendar 2020 and the normal timing of handset launches by our customers in these tiers. As we look beyond our fiscal first quarter, we see a significant inflection point for QCT as we expect to realize the benefits from the ramp of 5G handset launches. In the fiscal second quarter, we anticipate QCT revenues to grow in the mid-teens sequentially and QCT EBT margin to return to the mid-teens.

In our fiscal first quarter, we expect non-GAAP combined R&D and SG&A expenses to be flat to down 2% sequentially. As a reminder, expenses are typically higher in our fiscal second quarter as it includes the normal calendar resets for certain employee-related costs.

Interest expense net of investment and other income in the fiscal first quarter is expected to be approximately \$100 million and is a reasonable estimate for each of the remaining quarters in fiscal 2020. For our fiscal first quarter, we also estimate approximately 1.16 billion weighted average shares outstanding and a tax rate of 14%.

Looking forward, 2020 is an exciting year for Qualcomm as we expect the financial upside of our 5G strategy to begin to play out with multiple drivers of non-GAAP revenue and earnings growth, including the launch of 5G devices, RF front-end design win traction, growth in adjacencies combined with operating leverage and a substantially reduced share count.

We look forward to seeing you in New York at our Analyst Day on November 19th, where we will be providing additional details about our long-term growth strategy. Thank you.

And, I will now turn the call back over to Mauricio.

Mauricio Lopez-Hodoyan

Thank you, Akash. Operator, we are ready for questions.

Question-and-Answer Session

Operator

[Operator Instructions] Our first question comes from Chris Caso with Raymond James. Please proceed with your question.

Chris Caso

Yes, thank you. Good evening. I guess, first question would be on the pace of the 5G ramp as we proceed through the fiscal year, you've given some indications on where you expect overall revenue to be, if you could talk about that in percentage terms of 5G as a percentage of the mix as it goes through the year even on revenue terms or MSM terms, whatever you could do to give us some sense of how 5G penetrates as the year goes on?

Cristiano Amon

Thanks, Chris. This is Cristiano. Consistent I think with what we just said, in the earnings call, I think timing, our fiscal Q2 is that we started to see the inflection point as the devices have just started to show up in volumes and overall I think mix, we expect that to be ramping in the high and the premium tier and some of the markets that we've seen launching 5G, within that, we provide a metric before that we will see probably 1.5 times the ASP as we look at higher content, both the modem as well as the RF front-end.

Chris Caso

Okay, thank you. And as a follow-on for that maybe you could give us some commentary on how that impacts QCT margins as the year progresses. Obviously, you've got that additional content. The margins are depressed

that you're making the transition now, what should we expect as the year goes on those QCT margins?

Akash Palkhiwala

Yes. Hi, Chris. This is Akash. The way you should think about the year playing out for QCT with 5G is really there is going to be two inflection points in the chip business. The first inflection point will be flagship launches in early 2020 by both our global and Chinese OEMs and you should think of it as RMB3000 and above handsets will start adopting 5G. The second inflection point will be in the fall time frame when another set of flagship devices will adopt 5G. So that should be kind of the shape of 5G adoption through the year, and how this translates into margin is, we gave guidance for our second quarter margin. We are expecting from first to second quarter revenue will go up mid-teens and operating margins will also be in the mid-teens range in the second quarter. We are not guiding longer term margins at this point, but we will talk about it at Analyst Day as well.

Operator

Thank you. Our next question will come from James Faucette with Morgan Stanley. Please proceed with your question.

James Faucette

Thank you very much. I wanted to ask kind of a follow-up to that and maybe, Cristiano, you can talk about where you see Qualcomm where it's particularly strong positioned in terms of like, if we look at flagships down through the different tiers of phones, where you've talked a lot about design wins, but where should we expect you to show up most strongly versus where may there be a bit more variety of suppliers?

Cristiano Amon

Thanks for the question, James, We updated our design pipeline. The design pipeline is about now 230 plus 5G devices across now multiple tiers. It's up substantially since 6 months ago, and I'll answer your question in two ways. First, I think, it's been very clear that our early investments in millimeter wave have provided Qualcomm with a significant technology advantage in having the technology to maturity and we're optimistic about millimeter wave going from the United States initial launches into Korea and Japan and other markets, including being license already in Europe where Telecom Italia was the first one happening throughout 2020, that's a very good thing for Qualcomm.

Having said that, I would probably say that every single launch of a flagship OEM today with the exception of Huawei, they use their own silicon, every other launch of every other OEM has been a Qualcomm Snapdragon platform, and that positioned us very well about partnering with OEMs for 5G ramp including Samsung, which we have not only launched with the traditional markets, but also I point you to the A Series, which is the second tier below the flagship that are being launching with Qualcomm globally in addition to the Galaxy Fold.

So those are positive things as we think 5G transition for Qualcomm

James Faucette

Great. And then follow-up question, maybe for Steve and Don. You mentioned that you're in ongoing negotiations with Huawei, but haven't reached any agreement as of yet. How do you think or what needs to happen to move an agreement across the line? And are we going to is -- I guess I'm wondering how China-US trade relations and potential resolution or at least a trade agreement may factor into those negotiations and conversations with Huawei?

Steve Mollenkopf

James, it's Steve. So we continue to talk to Huawei. I would characterize the discussions as ongoing, but really nothing to report on. Obviously, we don't have the numbers. We don't have any revenue in the numbers right now for licensing revenue. In terms of how the trade discussions between the two countries impact the probability or chance that we can get a resolution, I think it's too early to tell. I think it's pretty opaque at the moment. It's good that we're talking, but there's really nothing to report on right now. And you know that the product business for us is actually quite small. We tend to be a little bit more insulated I think from the trade talks compared to maybe other companies, but too early to tell in terms of what it will mean to the licensing discussions.

Operator

Thank you. Our next question comes from Samik Chatterjee with JPMorgan. Please proceed with your question.

Samik Chatterjee

Hi, thanks for taking the question. I would just wanted to start off firstly on the -- by focusing a bit on the RF front-end opportunity. You mentioned that most of the design wins you're seeing kind of both the modem and the RF front-end go together. So just wanted to kind of get your thoughts about

how you're thinking about market share in RF front-end and the early-generation 5G phones to do some of the incumbents in the space and then how should we think about sustaining that market share and kind of the second-generation, third-generation 5G phones? And then I have a follow-up. Thank you.

Cristiano Amon

Thanks for the question. So, we look at 5G as the key entry point for RF front-end business and we're very satisfied with the ability as we started to look into the designs with the 5G content, which are specifically sub-6 spectrum as well as millimeter wave spectrum. We actually have seen a very high percentage. Virtually, all of the 230-plus designs now for 5G content have Qualcomm modem to antenna design. We have seen in those devices, some of our existing incumbents continue to support and provide content for 4G, but the 5G position of Qualcomm is very strong. What we are very happy especially at this time, as we head into the Q2 ramp of 5G, we see now as we go into second-generation designs for these -- for the second-generation devices as well as lower tiers, we have maintained that pattern. So we're now going into design number two and design number three that maintain the 5G caught on the RF front-end and we're very happy with that development.

Samik Chatterjee

Okay. And if I can just follow-up, you've talked extensively about the opportunity on 5G handsets. If you can help me quantify the revenue opportunity outside of handsets, be it like small cells or IoT that is also tied to 5G opportunity, but outside of handsets? Just looking for some color there.

Cristiano Amon

Yes. So I may give you the first part of the answer, and I'll ask Akash to add. Devices and smartphones are definitely going to be the vast majority of the earnings, especially as we had in 2020 is how 5G is going to ramp. However, we are happy about the 5G traction in all of our adjacents from upgrade of Telematics in automotive to 5G, we've seen a lot of industrial IoT applications and even our small cell business is getting traction including with traditional infrastructure vendors. So we expect that to be a growth story in as we head into 2021 and '22. In '20 the ones I want to single out is CPE for mobile broadband. And that's part of a lot of the carriers deployment of 5G and fixed wireless.

Operator

Thank you. Our next question comes from Ross Seymore with Deutsche Bank. Please proceed with your question.

Ross Seymore

Hi guys, congrats on the strong results and 5G color. I just wanted to see about the seasonality in the QCT side, Steve -- or QTL side, excuse me. Steve, you mentioned that you were happy it was returning to a seasonal pattern. You talked a little bit, I think Akash about what it was going to do in the fiscal second quarter. Can you just talk about the seasonality of that? Is the range that you've given in the past of kind of the \$1.1 billion to \$1.2 billion, is that the new range in kind of the weak quarters and the stronger quarters be closer to the \$1.4 billion you just did? Or how should we think about that as the year progresses?

Akash Palkhiwala

Yes, hi, Ross, this is Akash. I think that's a fair way of thinking about it. We just reported actuals for the September quarter at \$1.16 billion and we are guiding the December quarter at the midpoint of \$1.4 billion and the March quarter at \$1.1 billion. So that kind of gives you a sense of the seasonality in the business, and those are fair numbers to use to project the business going forward.

Ross Seymore

Thanks for that. As my follow-up, perhaps one for Cristiano on the revenue per MSM side of things, just would hope to get a little more color on why is that going down sequentially in your fiscal first quarter guidance. And perhaps more importantly, it seems like it's up very nicely, almost 12% year-over-year in fiscal '19 and still despite that sequential decline in your fiscal first quarter is still up, the better part of 10% there. I was wondering what's driving the sequential decline, the year-over-year increases. And then, if that's all pre-5 G, how should we think about the lift off of this level?

Cristiano Amon

All right, Ross. So our ASP per MSM has a very high sensitivity to high and premium tiers and I guess if you look at what happened in the quarter and the guide for the next one, I think consistent with what we said on the last earnings call that we're going to see the dynamic throughout the calendar year. We have seen a weaker market, weaker demand in China and that combined with Huawei gaining share in domestic China as well, that's one dynamic. The other dynamic is OEMs canceled some of the 4G flagships and moved their portfolio towards 5G getting ahead of the launch. So that created basically a change in the composition of MSM because of the high

and premium tier units as we go through that transition. However, the inflection point for Q2 is where you started to see the effect and when we talk about at the 1.5 times. If anything, the guide that we provide in Q2, it contemplates the core market environment, the typical seasonality of our business, no significant changes in OEM share and does not include yet the ramp of the Apple business, you will see that change just with the 1.5 which in average has higher ASP content on the modem plus the RF front-end.

Operator

Thank you. Our next question comes from Matt Ramsay with Cowen. Please proceed with your question.

Matt Ramsay

Thank you very much. Good afternoon. Congratulation Akash. I guess, Steve, my first question is around the 5G unit numbers that you gave for calendar '20, I guess the midpoint that you guys have laid out is 200 million units. Maybe you could give a little color on what you're assuming the geographic mix of those units is, in particular, what percentage might be China versus rest of world? And then I have a follow-up. Thanks.

Akash Palkhiwala

Yes, hi Matt, this is Akash. So the way we thought about the 5G forecast for 2020 is a couple of ways. We looked at the tops-down of how transitions have typically happened in previous generations. And the one - - the two things that are different with 5G versus transition from 3G to 4G is China is adopting 5G at the same time as the other geographies versus in 4G they were a couple of years late. And then also within 5G, we are seeing multiple tiers of products being launched simultaneously, which we did not have for 4G. So that's why we think the intensity of the 5G rollout is actually faster and you have China as a big portion of it happening early in the lifecycle. Of course, in addition to that, we are obviously talking to all of our OEM customers and we have a very good sense of how many devices they are planning to launch over the next and several months with 5G and at what price points and that also allows us to inform our tops-down forecast.

Matt Ramsay

Got it, that's really helpful. As my follow-up a quick one for Alex on the licensing agreements and obviously we're all encouraged to see the progress you've made on 5G. There has also been this dynamic of SEP-only licenses become a bigger piece of the mix and some implications for the implied royalty rate. I know that moves around a bit, but I think you guys talked about in an answer to an earlier question about how to model the QTL

business going forward. I wonder if we're now at relative steady state for implied royalty rates as we go forward? Any comments there would be helpful. Thank you.

Alex Rogers

So, I think that may be a fair way to look at it, but I think what -- the way you should look at it for guidance is we're guiding revenue. And so, as we noted, we're going to see seasonality and we're going to see the remaining quarters at the range that we identified, and of course, that's without the Huawei numbers, but we have made really good progress with signing up 5G agreements. We have over 75 agreements now in place since we started our 5G licensing program. So I think that reflects a very strong IP position. But I think again, if you look to our guidance on revenue, that's probably the easiest way to think about it.

Akash Palkhiwala

And Matt, this is a Akash. Just a quick reminder that our revenue guidance numbers does not include Huawei. So as that gets resolved, that would be incremental to the range.

Operator

Thank you. Our next question comes from the line of Stacy Rasgon with Bernstein Research. Please proceed with your question.

Stacy Rasgon

Thanks for taking my questions. Around the March quarter on QCT guide. So units in March quarter for MSM units are typically down seasonally, you're obviously guiding revenues up mid-teens on the 5G ramp. So is that all or even maybe more than 100% due to increases in revenue per MSM, like is it with the 5G ramp itself and content is enough to offset the normal seasonal decline in unit shipments? Or are you seeing kind of like an ending of the flush that we've been having and maybe a reversal with some fillers when the new products get in. How do we think about that unit versus ASP trend in that -- embedded in that March quarter revenue guide for chipsets?

Akash Palkhiwala

Yes, hi, Stacy. So there are couple of factors. This is Akash by the way. There are couple of factors that affect our second quarter numbers for units and ASP. You're correct about the seasonal -- seasonally lower quarter, but that is also offset by a stronger mix because we launched our new premium tier chip and new high tier chip during that quarter as well. So there is a mix

implication before we get to the 5G benefit. And then the third factor is our - what we have disclosed previously, which is with 5G devices on a like-for-like device basis, we expect 1.5x monetization as a combination of the chipset and the RF front-end revenue on top of it. So those are kind of the three factors that impact the volume and price revenue per MSM mix in that quarter.

Stacy Rasgon

Thanks. And maybe just a follow-up on that. So, you mentioned 1.5 times content increase, but at the same time, you also mentioned multiple tiers launching simultaneously, which is something we didn't really see in 4G. So how do we think about that, I guess that -- that differential of those drivers on content increase overall versus the general, a mix of tiers that are launching, and do you think that is enough to keep revenue per MSM rising through 2020 -- through fiscal 2020 as 5G becomes more mainstream?

Akash Palkhiwala

Yes, so the way we think about the 1.5x is really for a given tier device, so comparing a premium tier to a premium tier device, when you go from 5G -- 4G to 5G, the revenue opportunity increases by 1.5x. And then this would also apply to the tiers as it penetrates further down, and so you should, you should think of that as a mechanism of modeling our business as the mix improves from 4G to 5G

Operator

Thank you. Our next question comes from Mitch Steves with RBC Capital Markets. Please proceed with your question.

Mitch Steves

Thanks for taking my question. I just wanted to focus a little bit back just on the pricing you guys are getting. So I realized this to be down a little bit in December quarter. But, so two really clarifications. If Huawei does come back, would you get an implied ASP that goes up or down? And then secondly, how do we think about that kind of ramping over the next 12 months. I mean, I think most models have it going up a few dollars. But is that rate still or do you guys think it needs to be changed after seeing the mix come through?

Alex Rogers

So, this is Alex. You're asking about on the licensing side or is --

Mitch Steves

Yes.

Alex Rogers

Okay. Look, again, the way we think about it is that -- Akash maybe weigh in here, the way we think about it is that Huawei is incremental and I'm not sure what more to say to that other than what we've already provided by way of guide.

Mitch Steves

Okay. I guess, maybe we should return to Huawei piece that if that comes back is that, are you going to be increasing ASPs, or you think that the ASPs will be flattish or similar?

Akash Palkhiwala

Yes, the way -- this is Akash, Mitch. The way you should think about Huawei is we don't have Huawei units or revenue contemplated in the QTL guide at this point. So when Huawei gets included into the guide, it would be based on what their device ASP is and our licensing deal with them. So it will just fall out of the agreement that we end up having with Huawei.

Operator

Thank you. Our next question comes from the line of Rod Hall with Goldman Sachs. Please proceed with your question.

Rod Hall

Yes, hi guys, thanks for the question. I wanted to just go back to the progress of 5G and particularly millimeter wave attach. And I wonder, Cristiano, if you could talk a little bit about -- of the 230 wins or maybe Steve, you want to address this, how many of those have millimeter waves attached to them or at least some version of them? And then as we get to the flagship launches at the beginning of next year, kind of proportionally, how does it look? And then as we get to the end of next year, how does that look? Do we get to most phones by beginning of next year having millimeter wave attach or some smaller proportion? Could you just walk us through that and then I have a follow-up.

Cristiano Amon

Rod, thanks for the question. So the way to think about it, it's pretty much at this point by market, for example, the United States market, all of the

devices they have launched, there is a requirement for millimeter wave that the spectrum utilized by all of the three of the four carriers right now and therefore we have seen the initial launches of millimeter wave. Going into 2020, the current planning assumption is you're going to start to see millimeter wave also coming in the Korean market, is going to come into the Japan market, and in the later part of '20 and beginning 2021, you start to see that in Europe. And that's how it's going to change the mix. So right now, you should look at some of the China launches that we're going to see in '20, they're all going to be sub-6, and the Europe in '22 first half will be sub-6, Japan, Korea, and United States are going to have millimeter wave. That's how to think about it.

Rod Hall

And is it your -- Cristiano, just to follow that up, is it your assumption then or our assumption should be that every market that has millimeter wave deployed in the wireless network, you would expect to see millimeter wave attach to most phones in that market. Is that correct?

Cristiano Amon

That's correct. Especially because you have in the wireless industry today you have probably a single SKU launched by an operator within their entire geography, even if you're going to have some markets with millimeter wave, some markets with sub-6, that has been the requirement of a millimeter wave capability in many of those 5G devices.

Operator

Thank you. Our next question comes from C.J. Muse with Evercore. Please proceed with your question.

C.J. Muse

Yes, good afternoon, and thank you for taking the question. I guess to follow-up on the last question, as you think about the 200 million 5G unit market plus or minus in 2020, what percentage do you believe will have millimeter waves? And then as part of that question, can you kind of talk through the tax rate that you're seeing on RF front-end for you guys at sub-6 versus millimeter wave. I would assume a much higher rate there on millimeter.

Steve Mollenkopf

Hi, let me answer in reverse order. So, on the Snapdragon platform today, the attach rate on millimeter wave in sub-6 is the same. I think we have

modem to antenna designs including RF front-end in all of the Snapdragon. There are very few exceptions, and sometimes exception is just one or another band and is very small quantities. I will say the absolutely majority of the devices, we've been winning RF front-end across millimeter wave and sub-6, is not unique to millimeter wave. However, millimeter wave drives a lot more content because unlike sub-6 you need multiple antenna modules and multiple RF change of millimeter wave. So the content is disproportionately higher on the millimeter wave side.

Akash Palkhiwala

C.J., on the mix of sub-6 versus millimeter wave within the 200 million, at this point, we're not disclosing a mix really. But the way to best think about it is what as Cristiano mentioned earlier, is by market and so there are certain markets, US and then Japan and Korea next year, where millimeter wave would be required from an operator perspective. And so those markets would have millimeter wave. So the best way to think about it is a mix of markets

C.J. Muse

Thank you very much.

Operator

Thank you. Our next question comes from Timothy Arcuri with UBS. Please proceed with your question

Timothy Arcuri

Hi, thanks. I wanted to just clarify the answer that you had to a prior question on the March guidance for QCT. So are you basically implying that units are going to maybe be seasonal plus just [indiscernible] and most of the increase in QCT revenue in March is ASP. Is that right?

Akash Palkhiwala

Yes, I think the units will have kind of the regular cadence of seasonality, maybe with some increase that's driven by 5G launches, but primarily it will be a mix of the tier mix within the chips we have and then also the 4G versus 5G mix.

Timothy Arcuri

Okay. And then I guess just following on to that then if you're not getting much of the unit benefit yet in March, obviously you're going to eventually have to see that unit benefit. So, how sustainable is the growth in QCT

revenue into fiscal Q3 when you would I would think see much more of the unit growth in that quarter? Thanks.

Akash Palkhiwala

So from a market perspective, the way we are planning our business going forward is, we're assuming the current market dynamics hold, and within that, our benefit as the transition happens to 5G and then so that's -- that should be the basis for the assumptions for next year. Now, as we have both kind of initial set of 5G launches happen and then additional 5G all launches happen across flagship models later in the year, we will see our operating margin ramp in addition to revenue per MSM as we see the benefit of 5G going through our portfolio.

Operator

Thank you. Our next question comes from Brett Simpson with Arete Research. Please proceed with your question.

Brett Simpson

Yes, thanks very much. Cristiano, I just have a couple of questions, maybe first up on the 5G outlook for calendar 2020. You're talking about 200 million units at the midpoint. And I know other chipmakers who have reported in the last week or so were talking more like 300 million units globally for 5G next year. I just wanted to sort of delve in a little bit into your assumptions. Are you expecting the large flagship launches next year to be only 5G or do you expect global flagships to also be 4G in that outlook? And anything you can tell us about what your assumptions are for China within that 5G outlook you've given would be very helpful. Thanks.

Cristiano Amon

Excellent question, so let me break that down. As we said earlier in this earnings call, I think Akash also mentioned this. We are assuming existing market dynamics. And I think that's why you probably see us in a more conservative estimate. If you believe that there is a pent-up demand for 5G devices and it's kind of consistent with other transitions, you could have a change in replacement rates and that's going to drive a bigger market, bigger market is even better news for Qualcomm. So we're just assuming existing market dynamics in our projections. Now, going back to the outlook in '20, we talk a lot about the dynamics on Q2, but maybe to add to the prior question, you should expect as we get into the second half of '20, then we're going to see the addition of Apple volumes and so that's, you should think about really a 5G ramp for Qualcomm in 2020.

Your last question is about China. The order of magnitude of deployment in China is significant in we said during the script that it's now the projection is 1 million [indiscernible] or base stations by 2020. That's going to drive a very aggressive migration. So China could also be upside if the market dynamics don't hold and you have higher replacement rates, and also if you assume that the current Huawei share gains in China, which we're assuming as our going assumption if that changes and get to some more normal levels, that's upside as well.

Brett Simpson

And maybe if I can just ask a quick follow up here, just to clarify on the RF front-end side, when you talk about modem to antenna in 5G, are you also including 4G modules, 4G RF modules, like low band, mid high band etcetera? Or are you really talking about ultra high band RF and also just on millimeter wave because I know there's a lot of investors questioning the viability of millimeter wave at the moment. What are you doing in your second-generation millimeter wave platforms to improve things like battery life, or how do we think performance is going to pick up here? Thank you.

Cristiano Amon

Okay, maybe I'll -- two questions. Let me try to go quickly to them. So the first one is we have been very focused in 5G as the entry point. So we have been winning RF front-end in the 5G mid bands, and the 3.5 bands in some cases, and some of the reform bands as well at lower frequencies as well as millimeter wave. It's both. We continue to see the incumbents providing the 4G, but I pointed to what we're going to see in 2020 especially with dynamic spectrum sharing is going to be the re-farming of existing 4G bands, and we expect that to be an expansion of our existing 5G RF front-end solution. So that was the first question.

If you -- can you remind me the second question -- on the millimeter wave performance. Yes. So as we launched a new technology, there is a lot of features that come across the device and the infrastructure and they don't come all day one. So some of the initial I think battery life or even terminal, that was experienced by millimeter wave in the first-generation chipsets, they've already been addressed with software updates and we've seen a full day battery life on existing first-generation chipset. As we go to the second-generation Snapdragon, we see with across process node and evolution of our modern technology also significant improvements in battery life area for the millimeter wave footprint as well as terminals.

Operator

Thank you. Our next question comes from Srini [ph] with SMBC. Please proceed with your question.

Unidentified Analyst

Thank you. Couple of follow-ups actually. I guess first on the 5G ASP boost. There has been a lot of talk about the chipset ASP boost, but I'm just curious, I mean do you see any benefit on the QTL side, I know, I think most of the 4G premium phones are probably already hitting your cap, but as we transition to 5G, what sort of benefit, if any, do you see on the QTL side?

Akash Palkhiwala

Hi Srini, this is Akash. When -- again kind of going back to history, what has happened from 3G to 4G and previous generations. We have seen typically an increase in replacement rates and an increase in ASPs when we go to a new generation. So that is certainly something that is possible and maybe even likely with 5G. For our business planning purposes, we are, as we said earlier, we are planning based on a market being consistent and then within that having a transition to 5G. So that could be an upside opportunity for us. That's not included. And then, you could also see users with low and mid-tier devices upgrade and buy higher tier devices because of the increased capability that 5G brings and that could help QTL ASPs as well, but again, that is not modeled into our business at this point.

Steve Mollenkopf

And one quick point with our early R&D and IP leadership, it's just a really good context for driving new agreements.

Unidentified Analyst

Got it. And then Akash, on the margin front, at QCT, I know you said the margins will improve over the next few quarters. But my question is on a like-for-like basis, does 5G give you better margins? Meaning, if I go back to the second half of 2017, I think you hit your 20% and 21% EBIT margin for QCT at that time. Your revenue run rate was close to \$1 billion. So when we get back to that kind of revenue run rate, do you expect the margins to be higher than the 20%, 21%?

Akash Palkhiwala

Yes. So Srini, at this point, we are not disclosing kind of separate margins for our 4G versus our 5G business or a specific target for long-term margins. But this is something we will address at Analyst Day. So if you can stay tuned for a couple of weeks and we'll plan to address it there.

Operator

Thank you. Our next question comes from Vijay Rakesh with Mizuho. Please proceed with your question.

Vijay Rakesh

Yes. Just wondering -- just looking at the RF front-end wins that you're seeing into next year, if you could give us exiting calendar '20, what you see would be the mix of RFFE within your QCT or could you give us some dollar number on what you think your RFFE would be? Thanks.

Akash Palkhiwala

Hi, thanks for the question. We're not really breaking that down, but we did provide that metric of 1.5 times that include both the ASP increase in a 5G modem as well as our RF front-end content in average per tier.

Vijay Rakesh

Got it. And on the QCT side, I know you guys talked about a nice pickup with the mix going to 5G. What kind of ASP assumptions that you assuming on that as you go through 2020 especially as you might have some other merchant suppliers entering the market? Thanks.

Steve Mollenkopf

Well, the way to think about it is, we always have competition and there is nothing that we see in the market on the competitive side that is different than we expected and that is factored in our projections.

Operator

Thank you. Our next question comes from the line of Patrick Walsh with Oppenheimer. Please proceed with your question. Mr. Walsh, Your line is live. You may proceed with your question.

Patrick Walsh

Sorry about that. I had it on mute. I just had two quick questions. So the first question on the RF side, when you hear the traditional RF players, Qorvo Skyworks talk, they talk about a change in RF content from either 18 to 20 going to 25. And so my question for you, it seems like, initially you guys are focused more on that incremental \$5 to \$7. Is that a fair assessment and is the majority of that \$5 to \$7 made up by millimeter wave? And then if we think about that core 18 to 20 that's been historically there, are you really aiming for these kind of re-farmed band, and then I

guess within the bands, can you -- do you have -- I know you have bought capacity via TDK, I wouldn't imagine it's too much just given that [indiscernible] and Qorvo have probably I think 80% of the capacity out there. So would you be targeting more like low-band paths?

Akash Palkhiwala

Patrick, in terms of kind of the ASP question you asked, I think the examples you were quoting was for a premium tier device. Really, as you look at different regions and you look at different frequency bands in a given region and tier of device, those numbers could be vastly different. So I think it's very difficult to generalize in terms of ASP advantages. The way you should think about that is, there is a certain market for RF front-end that exists. With 5G coming in, that is going to expand, and that's going to create an opportunity for us to significantly improve our share in the market. And then on top of that, as Cristiano mentioned, as DSS happens, dynamic spectrum sharing and bands get re-farmed to 5G, we'll be able to participate and further expand our revenue opportunity. So that's kind of the framework you should use.

Operator

Thank you. That concludes today's question-and-answer session. Mr. Mollenkopf, do you have anything further to add before adjourning the call?

Steve Mollenkopf

Yes, thank you. I just want to thank the team -- the Qualcomm team for their hard work and the great execution through 2019. 2020 is the year of 5G. I want to thank everybody for their hard work, we're on the cusp of it, and I'm very excited about it. But thanks everybody, see you next time.