

## Q4 2020 Earnings Call

### Company Participants

- Akash Palkhiwala, Executive Vice President and Chief Financial Officer
- Cristiano R. Amon, President
- Mauricio Lopez-Hodoyan, Vice President of Investor Relations
- Steven Mollenkopf, Chief Executive Officer

### Other Participants

- Blayne Curtis, Analyst
- C.J. Muse, Analyst
- Chris Caso, Analyst
- Joe Moore, Analyst
- Matt Ramsay, Analyst
- Mike Walkley, Analyst
- Mitch Steves, Analyst
- Rod Hall, Analyst
- Ross Seymore, Analyst
- Samik Chatterjee, Analyst
- Stacy Rasgon, Analyst
- Timothy Arcuri, Analyst

### Presentation

#### Operator

Ladies and gentlemen, thank you for standing by. Welcome to the Qualcomm Fourth Quarter and Fiscal 2020 Earnings Conference Call. At this time, all participants are in a listen-only mode. Later we will conduct a question-and-answer session. (Operator Instructions)

As a reminder, this conference is being recorded November 4, 2020. The playback number for today's call is 877660-6853, international callers please dial 201-612-7415. The playback reservation number is 13711766.

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** {BIO 20932685 <GO>}

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 a 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, 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 include 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 once filed 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.

### **Steven Mollenkopf** {BIO 16172191 <GO>}

Thank you, Mauricio, and good afternoon, everyone. Fiscal 2020 was an extraordinary year, presenting both a unique set of opportunities as well as challenges. We achieved a number of significant accomplishments including scaling 5G devices globally with our partners, while navigating the sudden onset of the global pandemic. In March with the safety of our employees as our top priority, we rapidly aligned our operations to a completely different work environment. We were able to limit the number of onsite essential workers, while simultaneously executing on product commitments and driving our business forward.

The challenges presented by the COVID-19 pandemic highlight the critical importance of our technology and products. I want to thank our 41,000 Qualcomm team members for their steadfast commitment to our mission of inventing and commercializing breakthrough wireless technologies.

As you can see from our results, the early stages of the 5G ramp are well underway with our strategy playing out largely as expected. We delivered Q4 non-GAAP revenues of \$6.5 billion and a record non-GAAP earnings of \$1.45 per share, representing year-over-year growth of 35% and 86%, respectively. Both exceeding the high end of our guidance.

QCT revenues of \$5 billion were up 38% year-over-year. It's worth noting that our Q4 QCT revenue a new record included only a partial quarter impact from a large US OEM customer. This strong result demonstrates the breadth of our customer traction. While our transition from a 4G leader to a 5G leader was faced with numerous challenges, our employees remained focus throughout.

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Since January 2016 confident in our ability to execute on the upcoming 5G ramp, we spent \$30 billion to retire 25% of our shares at an average price of approximately \$64.50, amplifying the benefits of the organic growth you are seeing today.

As you can see in our results, we have successfully commercialized our innovation leadership in our product business through a combination of higher dollar share of content combined with significant 5G design wins with leading OEMs around the world.

Our foundational 5G innovations unmatched patent portfolio and ecosystem collaborations enable us to drive the industry forward to facilitate the rapid global adoption of 5G. Our continued innovation drive success and stability in our licensing business. All major handset OEMs are under license and we now have over 110 5G agreements.

In fiscal '20, our focus on innovation continued at an accelerated pace despite COVID-19 challenges. Year-over-year invention disclosures were up over 60% and 5G related invention disclosures more than doubled. We continue to drive innovation advances in 5G through releases '17, '18 and beyond, which will enable the adoption of wireless technology broadly beyond smartphones and into other industries.

We have sustained this focus despite unwarranted legal challenges and we now look forward to continuing our decades-long commitment to fundamental transformative innovation. Over the years, we have built strong portfolios in several key areas that converge with and enable wireless systems and applications, such as multimedia, security and artificial intelligence. Our proven ability to invent and commercialize leading technologies is the foundation of how we drive long-term value for our stockholders.

The early success of our 5G rollout is a great testament to our strategy of investing well in advance of these large opportunities. 5G represents the single largest opportunity in our history, creating new opportunities to extend our leadership. This will continue to play out over many years as wireless disruption will impact many industries. As an example, several years ago, we identified RF as a unique transition opportunity to address many of the technical challenges of delivering a 5G experience. I am particularly proud of how the team has executed against this opportunity, creating a leadership position in a short period of time.

In fiscal '20, we delivered \$2.4 billion of RF front-end revenue, up 60% year-over-year. Qualcomm is now one of the largest RF suppliers with design wins across all our premium-tier smartphone customers and with a long-term roadmap to continue to grow our RF leadership, as 5G is adopted in other industries.

Our 5G design wins continue to be powered by our RF front-end solutions, whether they support 4G, sub-6, millimeter wave or both 5G bands and whether they are in smartphones or other products such as embedded modules for PCs, IoT solutions or mobile hotspots. As we have in RF, we have built beachhead positions in both auto and IoT. Our scale enables us to make multiple profitable bets in areas we expect a tailwind as each of these industry roadmaps adopts cellular technologies.

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As you can see taking place today in automotive, where we have emerged as a strategic technology partner through the automotive industry, with nearly all the major OEMs adopting our products. Next-generation 5G telematics design wins in addition to our 3G and 4G design wins solidify our position as a leader in connected cars. We are also extending our mobile RF front-end leadership into automotive, where 100% of our next-generation 5G and a majority of our next generation 4G telematics design wins include our automotive-qualified RF front-end products.

In addition, our digital cockpit solutions now in the third generation enable best-in-class capabilities across premium, mid and entry tier solutions. Our automotive design win pipeline is now approximately \$8 billion, up from almost \$6.5 billion at the start of the fiscal year, giving us great visibility into meeting the long-term revenue targets we provided at our Analyst Day last November.

The automotive industry is transforming at an unprecedented rate and we are incredibly well-positioned to lead the industry with a long-term opportunity to expand our dollar share of content in auto as we have done in smartphones.

Turning to IoT, we are extending our IP investments from across the Company into our portfolio of connected and non-connected products with a broad portfolio of technologies, including connectivity, lower power processing, and security. We are also diversified across multiple product areas and industry verticals as we have nearly 13,000 customers.

In fiscal '20, we saw better-than-anticipated performance in IoT with strong revenue growth driven largely by demand in networking, retail, industrial, tracking and utilities verticals. Our high-performance WiFi solutions continue to drive WiFi access point toward record levels. And looking forward, our WiFi continues to evolve, our execution on WiFi 6E has put Qualcomm into a leadership position.

We've also brought wearable solutions to our smartphone OEMs, as well as the broader ecosystem of consumer product companies. Our inventions, technology and roadmap have also enabled us to establish a leadership position in XR. With over 30 commercial devices are Snapdragon XR solutions that connect physical and digital spaces or the consumer and enterprise platforms of choice. We have been driving the cost and performance curve of low-power high-performance compute since our first launch of the Snapdragon in 2007.

We are also investing in next-generation infrastructure and edge compute, two areas today that we believe will create significant opportunities in several years. Our objective is to provide technology differentiation that will enable us to achieve a leadership position. As the cloud converges with the mobile Internet, wireless networks are transforming and becoming virtualized. Beyond the cost and operational benefits for service providers, virtualization is enabling new service provider models, where infrastructure is intersecting with digital services such as you have seen with Rakuten and Jio.

Turning to inference, with over 10 years of AI R&D and over 1 billion AI-capable devices enabled with our technology and fundamental assets such as low power compute, process node leadership and signal processing expertise, we are well-positioned to extend our smartphone AI leadership into growing applications such as data centers, edged appliances and 5G infrastructure.

Building on our modem and RF expertise, we recently announced our new 5G RAN platform offerings. These platforms will provide foundational technology for high-performance infrastructure and will accelerate the cellular ecosystem transition towards virtualized and interoperable Radio Access Networks, a trend driven by 5G.

Our expanded portfolio which is scalable from macro to micro sites will include integrated support for 5G millimeter wave and sub-6 gigahertz spectrum across all key global bands. Together with our partners, we are helping to drive the vRAN transition with commercial products expected by calendar year 2023.

In summary, with leading technology and intellectual property, a differentiated product roadmap and 5G, we are well-positioned for a multi-year growth opportunity.

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

### **Akash Palkhiwala** {BIO 19085180 <GO>}

Thank you, Steve, and good afternoon everyone. We are extremely pleased to report another strong quarter to conclude a challenging year in which we remained resilient and achieved several key business milestones.

Our fourth fiscal quarter non-GAAP results came in above the high end of our guidance range for revenue and EPS, driven by strong performance in both QTL and QCT. We delivered non-GAAP revenues of \$6.5 billion and record EPS of \$1.45 with year-over-year increases of 35% and 86%, respectively.

We delivered GAAP revenues of \$8.3 billion and EPS of \$2.58. As a reminder, these results include the benefit related to prior periods from our recent licensing and settlement agreements with Huawei.

In the fourth quarter, we saw a year-over-year reduction of approximately 5% in global 3G, 4G, 5G handset shipments relative to our prior planning assumption of a 15% reduction. The upside was driven by a strong rebound in emerging markets, following the impact of COVID-19 on handset demand in previous quarters.

In QTL, we delivered revenues of \$1.5 billion and EBT margin of 73% both above the high end of our guidance range. This upside was driven by higher global handset shipments and a favorable OEM mix.

In QCT, we delivered strong results with MSM shipments of 162 million units, revenues of \$5 billion, which was above the high end of our guidance range. We are pleased to report EBT margins of 20%, achieving the long-term target we had provided at our 2019 Analyst Day.

QCT revenues and EBT increased 38% and 103%, respectively on a year-over-year basis, driven by strength in handsets, RF front-end, automotive and IoT.

RF front-end revenues of \$852 million were higher than our prior guidance of \$750 million, reflecting design traction across major handset OEMs. In automotive, we saw sequential revenue growth of 36%, to \$188 million as our telematics, connectivity and digital cockpit products benefited from the industry rebound.

In IoT, increased demand for connected devices due to the work from home environment drove 21% sequential revenue growth to \$926 million. We're excited about our opportunities in this growing industry segment.

I will now summarize the results for fiscal 2020. Despite the challenging economic environment due to COVID-19, we achieved non-GAAP revenues of \$21.7 billion, and EPS of \$4.19, up 12% and 18%, respectively, versus fiscal 2019. In addition, we executed on several key milestones, including the completion of long-term license agreements, acceleration of 5G and RF front-end design traction and building a platform for long-term growth in automotive and IoT.

Turning to 5G handsets, we are pleased to see that all major handset OEMs have now commercialized 5G smartphones, many of which are using our modem to antenna system solution, including millimeter-wave for select regions.

In total, we now have over 700 5G designs announced or in development. We are maintaining our bias towards the high end of our previous forecast of 175 million to 225 million units for calendar 2020 5G handsets. In calendar 2021, we are forecasting 450 to 550 5G handsets, a year-over-year growth of 150% at the midpoint.

For our global 3G, 4G, 5G handset forecast, we are using a planning assumption of approximately 5% decline versus calendar 2019 for the December quarter and for calendar 2021. This estimate is consistent with the impact we saw in the September quarter. This implies year-over-year growth of high-single digits for total handsets in calendar 2021.

I will now outline our decision to provide enhanced QCT revenue disclosures going forward.

Starting with this quarter's results, we are providing revenue breakout by handsets, RF front-end, automotive and IoT. With this change, we will not provide MSM guidance or actuals going forward. This disclosure will allow tracking of our progress for each of these categories as 5G expands our growth opportunity outside mobile. In addition, this

change is consistent with the framework we outlined at our 2019 Analyst Day. Please refer to our Investor Relations website for additional detail and historical revenue breakout.

Turning to our first fiscal quarter guidance. We are forecasting strong earnings with revenues of \$7.8 billion to \$8.6 billion and non-GAAP EPS of \$1.95 to \$2.15, a year-over-year increase of 62% and 107% respectively at the midpoint.

In QTL, we are estimating revenues of \$1.6 billion to \$1.8 billion and EBT margin of 74% to 78%, reflecting a sequential increase due to flagship handset launches and holiday seasonality. In QCT, we estimate revenues of \$6.2 billion to \$6.8 billion, up 80% year-over-year at the midpoint, driven by growth across handsets, RF front-end, automotive and IoT. We expect QCT EBT margins to be between 25% and 27%, reflecting an EBT increase of \$1.2 billion versus the year-ago period. Lastly, we anticipate non-GAAP combined R&D and SG&A expenses to be up approximately 2% sequentially.

Looking forward to the second fiscal quarter, based on the handset assumptions I previously outlined and the seasonal decline after the holidays, we estimate QTL revenues to be in the range of \$1.3 billion to \$1.5 billion. In QCT following the launch of a flagship 5G handset, we now expect second quarter seasonality to be consistent with QTL and global handset shipments. As a reminder, non-GAAP combined R&D and SG&A expenses are typically higher in the second fiscal quarter as it includes the normal calendar year reset for certain employee-related costs.

For the second half of fiscal 2021, we expect the quarterly profile for both our QTL and QCT businesses to be consistent with the seasonality of the global handset shipments. Lastly, for each quarter in fiscal 2021, we are forecasting net interest expense of approximately \$125 million, weighted average shares outstanding of 1.15 billion and a non-GAAP annual effective tax rate of 14%.

Before I finish my prepared remarks, I want to thank our employees for their contribution throughout this unprecedented year. In fiscal 2021, we are focused on delivering revenue growth and operating leverage in line with the financial targets we outlined at our 2019 Analyst Day. We remain focused on executing on our 5G roadmap and commercializing breakthrough technologies that will drive growth for many years.

Thank you. I'll now turn the call back to Mauricio.

**Mauricio Lopez-Hodoyan** {BIO 20932685 <GO>}

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

## Questions And Answers

**Operator**

Thank you. (Operator Instructions) Our first question comes from Mike Walkley with Canaccord Genuity. Please proceed with your question.

**Q - Mike Walkley** {BIO 21508060 <GO>}

Greater. Thanks for -- thanks for taking my questions. I hope everybody's well on the call. Just a question on the EBT margins, very strong implied guidance for the seasonally strong Q4, but you also highlighted some investment for growth in new areas. How should we think just about trends in terms of margins for QTL and QCT as you harvest 5G investments? And in QTL, perhaps your lower legal expenses and maybe see some higher margins there.

Thank you.

**A - Akash Palkhiwala** {BIO 19085180 <GO>}

Hi, Mike. This is Akash. Really from a margin perspective, we are extremely happy first of all to deliver the 20% margin in QCT in the September quarter. I mean that's -- we have guided a midpoint of 18% and we are happy to see us get to that target a quarter sooner than we had anticipated.

As you saw, we are guiding strength going into the December quarter as well with the midpoint that's at 26% in QCT. As we go forward, one of the things that you have to keep in mind is just the seasonality of the businesses. If -- let me address QTL and then QCT again. For QTL, seasonally strong quarter in December, given given kind of the handset launches that happened and then overall holiday impact. As you go beyond that, we've provided a guidance of -- for the March quarter, so that will give you a second data point. And then really between those data points and our actuals for September, you'll be able to forecast kind of the rest of the year.

From a margin perspective, we had given guidance at Analyst Day and that contemplated how our financials would play out in QTL. So it's very consistent with that. So we don't really have an update relative to that guidance point.

For QCT, as you think about the December quarter guidance, again, a very strong quarter seasonally now with the launch of flagship 5G handset with our chip in it. It drives our -- December quarter is very strong. The seasonality of the business changes though with this launch and what happens is when you look at -- it's different than the last couple of years, you almost have to go back three or four years, where typically, we saw a decline of 15% in revenues between first quarter and second quarter in QCT just based on seasonality. And so we'll be reconciled more to that seasonality going forward.

From a margin perspective, strong margin in QCT in first quarter and then really the margin will change based on the profile of the revenue as we move forward.

**Q - Mike Walkley** {BIO 21508060 <GO>}

Thank you.



## Operator

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

### Q - Samik Chatterjee {BIO 15496543 <GO>}

Hey, guys. Thanks for taking the question and congrats on the results, strong results here. I just wanted to start off, I have a couple of questions. Wanted to start off on the RF content, which you -- on smartphones, which you clearly outlined is doing better than you expected, just based on the visibility you have into the pipeline in fiscal '21. How should we think about either meeting or even exceeding the targets you outlined for RF on smartphone. I think it was about \$3.5 billion of revenue that you outlined at the Analyst Day. If you can just share your thoughts on that and I have a follow up?

### A - Akash Palkhiwala {BIO 19085180 <GO>}

Yeah. Hi, Samik, it's Akash again. So I think from a guidance perspective for RF front-end, as you'll recall at Analyst Day, we said we expect to be more than 20% share in an \$18 billion market and that target was really for fiscal '22 and we're very happy with the way our RF front-end business has played out, we are seeing, seeing a lot of strength, not just in the quarter we reported and the forward quarter, but just really in the long term design win pipeline across the board. So we're very optimistic that we'll be able to get to -- get to our target sooner, but really beyond that, we are not updating kind of our longer-term guidance at this point.

### A - Cristiano R. Amon {BIO 3259554 <GO>}

Hi, Samik. It's Cristiano. Just one quick comment for you. The -- as we increase the number of designs to 680, the trend continues, we see 5G prior to front end attached to some of those designs, so we feel pretty good about the pipeline, continue to grow that business.

### Q - Samik Chatterjee {BIO 15496543 <GO>}

All right. And if I could just follow up, obviously, there's been a lot of changes in the environment here with the current restrictions on Huawei smartphone business or kind of the restrictions impacting that, how should I think about how that is impacting results right now? Is it proving in your kind of view to be a headwind to industry volumes or kind of our -- competitors to Huawei ordering more, that's kind of helping results. How should I think about the impact?

### A - Cristiano R. Amon {BIO 3259554 <GO>}

Thanks for the question, Samik. This is Cristiano. So as you know, right now, we -- as we don't have a license to sell products to Huawei, we're not selling to Huawei. The way you should think about this and consistent to what we haven't [ph] said on the last earnings call, the Huawei opportunity creates an expansion of addressable market for QCT. We feel fully hedged in our position given our very high traction with all the premium and high tier OEMs, and whether that in the long run, it's an opportunity with Huawei, in the event that we receive a license or if an opportunity for our customers, we actually see that is a

net positive in the expansion of TAM [ph] for QCT and we expect that to play out as we look at demand in the handset towards 2021.

## Operator

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

### Q - Matt Ramsay {BIO 17978411 <GO>}

Yes. Thank you very much. Good afternoon, everybody. Akash, I guess, maybe this question is for you and Cristiano partly, really appreciate the additional disclosures in QTL or in QCT rather, maybe you could talk about given the magnitude of the upside to the outlook for the December quarter. And just help us a little bit to break down that upside in the chip business by maybe units and then also RF versus maybe core ASPs and units in the modem business. If you could just sort of give us some help there just given the magnitude of the upside and the change in the disclosures, just so we can all foot model that at least for this first quarter out of the gate? Thank you.

### A - Akash Palkhiwala {BIO 19085180 <GO>}

Yeah. Hi, Matt. So let me just kind of quickly run through the disclosure change. What we really wanted to do was over the last couple of years our business has evolved a bit and so we are seeing a different set of drivers for revenue growth than units and so it's driven by obviously 4G to 5G transition, driving more content, RF front-end and then automotive and IoT playing a key role in our growth as well.

And so the goal with it was to give data points that will allow the investors to track our progress in this area, and then again, it's very consistent with how we outlined our business at Analyst Day. And then that's kind of the core thought process behind it.

As you see in the September quarter, we've given a disclosure on the breakdown, a lot of strength across each of those areas, you've seen a strong growth in IoT which was driven by a demand for connected devices and in the home and as kind of the work from home environment permits, there is just an increasing need for connectivity. And then we also saw a rebound on the auto side, that drove significant strength.

As we look forward, all of those trends are holding for us, so we expect kind of a similar strength going into next quarter for each of those areas. We are obviously not providing a breakdown of our forecast, we are providing it at the total QCT level. But the underlying strength really all those drivers remain looking forward.

## Operator

Thank you. Our next question comes from the line of Chris Caso with Raymond James. Please proceed with your question.

### Q - Chris Caso {BIO 4815032 <GO>}

Yes, thank you. I guess, first question was with regard to QTL, and I guess the results for the September quarter and the guidance for the December quarter is above what the sort of normal levels that you've referred to before. So -- and I guess, what you're talking about for the March quarter is as well. Is this sort of a new normal level for the QTL business going forward and if you could explain why that's the case and the permanence of this level of revenue?

**A - Akash Palkhiwala** {BIO 19085180 <GO>}

Sure. So, Chris, As you will recall, in the March quarter, the market was down approximately 21%, because of the impact of COVID and June quarter was 20%. Our forecast, our planning assumption going into the September quarter was down 15% and really what happened is, we saw a rebound especially in emerging markets, we're following a couple quarters of lower demand because of COVID, the demand went up and we ended the quarter down approximately 5%.

So that was kind of the key driver for our performance in the September quarter. And in addition, we saw a stronger OEM mix that helped QTL a bit as well. So that's kind of the data point for our results for the September quarter at \$1.5 billion. Our forward guidance of \$1.7 billion midpoint for QTL is really kind of just projecting that same market impact, the 5% market impact that we saw year-over-year in the September quarter projecting it forward into the December quarter, and then into the March quarter and that's the basis for the numbers we provided.

As you think about kind of the full year forecast for it -- for QTL, using the September quarter number along with the December quarter and the March quarter guidance, that's a good way to project a year.

**Q - Chris Caso** {BIO 4815032 <GO>}

Got it. Thank you. A follow-up question is on the RF front-end business. And if you could provide some color now, I know that millimeter-wave is an important part of that business for you, it's something you've talked about a lot. Could you help us to quantify how much millimeter-wave has been contributing to the RF front-end business, sort of what's the content increase that you're anticipating for millimeter-wave? And then now that we've seen millimeter-wave kind of do what you said in terms of being a must-have on flagship handsets, what's the potential for that proliferating around the world to becoming a must-have in other geographies?

**A - Akash Palkhiwala** {BIO 19085180 <GO>}

Yeah. So, Chris, I'll take the first part of the question and then Cristiano can follow up. Just from a breakdown of technologies across our RF front-end revenue base, we are obviously not providing that, but you should not really think of our revenue being driven by millimeter-wave, we have a broad portfolio of technologies, 4G, 5G sub-6 and 5G millimeter-wave and our design traction reflects the strength of our portfolio. So it's really across all those technologies.

**A - Cristiano R. Amon** {BIO 3259554 <GO>}

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Yes. So this is Cristiano. So first I want to just build on what Akash had said, we're even starting to win some 4G content in RF front-end as well in especially some of the sub-6 frequency started to get converted into 5G, so we're excited about I think how broad of -- and diverse is RF front-end business is. Specific with the millimeter-wave, it does add a lot more content, it probably would drive a lot of higher on our average 1.5 multiplier if you remember. And we're happy about it is significant data points that continue to show the potential for growth. In addition, there have been a requirement for markets such as United States, Japan, DoCoMo launched millimeter-wave services back in September, Korea still tracking to launch service. And we have now 130 operators globally investing in the millimeter-wave. And especially as we see the price point devices, as you saw in the United States becoming very reasonable with millimeter-wave that opportunity for attach is going to be a significant tailwind for our business.

**A - Akash Palkhiwala** {BIO 19085180 <GO>}

And then maybe just to add a quick comment, I think for millimeter-wave really what has happened is, we outlined a vision a year ago of how the technology deployment will play out and really everything is happening consistent with what we had outlined and so we're very happy to see that.

**Operator**

Thank you. Our next question comes from Joe Moore with Morgan Stanley. Please proceed with your question.

**Q - Joe Moore** {BIO 17644779 <GO>}

Great. I think the question I get the most is just the sustainability of handset builds, obviously, it has been very robust. It seems like there is some investment to try to take share away from Huawei and yet. Huawei still has inventory still shipping. So can you just generally characterize the handset environment and the inventory environment that you're in heading into the strongest part of the year?

**A - Akash Palkhiwala** {BIO 19085180 <GO>}

Yeah, hi. This is Akash. So we are seeing some minor elevated demand across certain OEMs, given the uncertainty of the OEM mix, especially in China and how things play out. So that's already contemplated in our forecast. As we look forward -- and in our forward commentary.

As well as we look forward, we expect some uncertainty over the next few months. But really when you step back from that, and just look at overall design win pipeline and customer traction, it's really very consistent with the comment Cristiano made earlier where our technologies and our portfolio are really set up to take benefit from it, whether it's Huawei, who -- if we're allowed to ship to them or if other OEMs pick up that share.

**Q - Joe Moore** {BIO 17644779 <GO>}

Okay, great. Thank you. And then are you guys constrained at all on foundry capacity, is there -- are there any supply constraints that we should be aware of?

**A - Cristiano R. Amon** {BIO 3259554 <GO>}

Hi, Joe. This is Cristiano. We're very diversified from a supply standpoint, I think we're probably one of the few companies that have leading now the supply diversity. We are all seeing demand upside. We're driving a lot of our supply, and I will say, there probably, you're going to see some tightness of supply as we have this big [ph] demand, but we feel good about how we look about the year in 2021.

**Operator**

Thank you. Our next question comes from the line of Blayne Curtis with Barclays. Please proceed with your question.

**Q - Blayne Curtis** {BIO 15302785 <GO>}

Hey, good afternoon. Thanks for taking my question. And sort of [ph] a follow up on Joe's question, just kind of curious as you look at the build you're seeing today and then kind of the visibility in models, I think people have looked at some of the stats from the China market, saying, it's already 60% 5G. Kind of just curious with these builds, the strong builds you're seeing now, do you have any perspective where we're at in that adoption curve of 5G already and then kind of just trying to parse it together, where you're not getting MSM guidance anymore, but I mean are we already pretty close to that kind of run rate for 5G on a quarterly basis?

**A - Cristiano R. Amon** {BIO 3259554 <GO>}

Hi, Blayne. This is Cristiano. When you think about China market, we're very happy because the price points of 5G became very aggressive and we saw that even starting in the last quarter, and that's driving probably more than 50% of all the new activations and all of the new phone launches with 5G.

We like that position as Akash outlined in the prior question, we're very well hedged regardless of who wins in the marketplace. And we expect the China accelerated transition of 5G with lower price points to have an impact and how we're going to see this unfolding in emerging markets, as China provide a lot of the handsets for emerging markets as well.

**A - Akash Palkhiwala** {BIO 19085180 <GO>}

And then also just to add that we are providing an additional data point on the 5G side on the total size of the market for 2021, we are forecasting a range of 450 million to 550 million devices, which really when you look at year-over-year basis that's a 150% growth. So extremely strong growth going into it. And as we exit -- exit the calendar year 2020, we were seeing that that velocity going into '21.

**Q - Blayne Curtis** {BIO 15302785 <GO>}

Thanks. And then a follow up just really appreciate the segment detail. When you look at IoT you answered why it's liking [ph] up so much. I'd be curious to know a little bit more about the history of that segment, it looks like you kind of modeled it back to the details

you gave, it's been running around \$700 million a quarter. So I'm just trying to put in perspective the strength you're seeing here and how to think about it going forward obviously, everybody seeing a big work from home push, but as you move forward, does some of that roll-off or has this business been at higher levels prior, just any context will be great.

**A - Akash Palkhiwala** {BIO 19085180 <GO>}

Yeah. So if you look at the disclosure we have on our website, we are providing detail for fiscal '19 on an annual basis and '20 on a quarterly basis. And so I think there is enough data there for you to kind of come up with some trends on the business. And then -- and then maybe I'll go back to our Analyst Day commentary last year, we outlined a growth and a vision forecast for the IoT segment, and so you could think about at the same way, where you'll be able to look at how the SAM [ph] grows and the parts of that SAM that we are interested in and how that grows and that be a good way of thinking about the long-term opportunity?

**A - Cristiano R. Amon** {BIO 3259554 <GO>}

Hey, Blaine. This is Christian. If I could add some qualitative comments, as you pointed out, there is this enterprise transformation of the home, it's driving a lot of connectivity, you also have an accelerated digital transformation, but most importantly, you have 5G going to other industry. So this business and what it is today, is probably a good proxy of a growth business for us as we realized this vision of 5G in other industries going forward.

**Operator**

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

**Q - Ross Seymore** {BIO 20902787 <GO>}

Hi, guys. Thanks for letting me ask a question and a follow-up and congrats on the strong results. The first one is, I think everybody appreciates the end market splits that you're going to have, but before the MSMs and the revenue per MSM disappear for good. It's great to see that you've gotten it back above \$30 on the revenue per MSM side. I just wanted to dive into looking forward, does the 1.5x content framework continue or is that \$30 largely capturing it and really I guess what I'm getting at is if you're going to have a 150% increase in your 5G units next year, is that going to be a tailwind on both the unit and the revenue per MSM side or more so one than the other.

**A - Akash Palkhiwala** {BIO 19085180 <GO>}

Well, from a unit perspective, Ross, it's really kind of the 4G margin -- market transitioning over to 5G, right, so it's less of a unit growth story, it's really a transition between technologies. And then within 5G, the framework we still think apply. So there is a benefit on the core chipset side and then there is the incremental RF opportunity on top of it.

**Q - Ross Seymore** {BIO 20902787 <GO>}

Great. And I guess for my follow-up, I want to switch over to the margin side of things. You talked Akash a little bit about the OpEx for the fourth quarter or the calendar fourth quarter than the calendar first quarter. You said it go up a little bit, now that you've hit or exceeded your targets, especially on the QCT side for EBT, any sort of idea of how we should think for fiscal '21 or calendar '21 about the general trends on the OpEx side of the equation?

**A - Akash Palkhiwala** {BIO 19085180 <GO>}

Yeah. So I mean, first of all, we are very happy to see -- as revenue has grown we're seeing the leverage -- operating margin leverage show up in our numbers, so happy to see that in the fourth quarter and the first quarter. As we look forward, I think you have data points for both of those quarters, first quarter and then we gave soft guidance for the following quarter, it's very reasonable to use those two data points to project forward for the OpEx for the year.

The other thing I'd say is just as we look forward, as Steve outlined in his prepared remarks, there are lots of opportunities we have for -- areas for growth in the long term, all organic opportunities and so we are selectively investing in a few of those consistent with what we said at the Analyst Day.

**Operator**

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

**Q - Stacy Rasgon** {BIO 16423886 <GO>}

Hi guys. Thanks for taking my questions. For my first one, I wanted to dig a little bit into chipset gross margins. I know you don't like actually provide them, but I know last quarter you gave us a little bit of qualitative color on what to expect, gross margins in the current quarter in chips were supposed to come down a little because of mix, and I think they did. In December quarter, is it fair to say that your guidance contemplates gross margins at least flattish sequentially even with the slug of revenue coming in and the mix changing somewhat. Is that an accurate statement?

**A - Akash Palkhiwala** {BIO 19085180 <GO>}

Yeah. Stacy, from a gross margin perspective, I mean, there really isn't something that we want to highlight on that topic. I think what we -- what we have is very consistent trend and we feel like that's something that holds going forward.

**Q - Stacy Rasgon** {BIO 16423886 <GO>}

Got it. Thank you. And so my follow-up, I want to ask about the trajectory of the RF business. So obviously you had a bunch of RF this quarter, does all of that RF revenue ship together with the rest of the platform or does some of that RF revenue like have to ship before and go into modules. So I guess what I'm asking is, is some of the RF that you shipped in Q4 actually going into some of the chip platforms that you're booking revenue for in Q1? Or are they all coincident with each other?

**A - Akash Palkhiwala** {BIO 19085180 <GO>}

Yeah. So just broadly as you think about RF business, there is a combination of factors, right? There are times when we make the module ourselves and those modules would -- timing-wise would be aligned with the chipset. If we are shipping components that go into someone else's module, there would be a shift in timing related to it. But really, all those are really timing comments, the fundamental trajectory remains the same.

**Operator**

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

**Q - Mitch Steves** {BIO 19155169 <GO>}

Hey, guys. Thanks for taking my question. I just have one just going back to kind of the QCT breakout here. So if we look at the long-term SAM, I mean it's kind of low double digits but then you're your guiding to significantly higher than that. And it looks like '21 is going to be a good year, so how do we think about just modeling correctly kind of the four segments we look out over, over the implied SAM targets. I mean, is there a bogey we should think about in terms of you guys being able to outgrow that number across the board? Just looking for any sort of detail there would be helpful?

**A - Akash Palkhiwala** {BIO 19085180 <GO>}

Yeah. I think in terms of kind of longer-term modeling of each of the segments, we gave some disclosures at Analyst Day. We still think those are very relevant metrics to use to model our businesses. So when you think about RF front-end, we gave a disclosure on greater than 20% of \$18 billion dollar SAM. On the auto side, we had given a pretty specific disclosure on our longer-term revenue target. And so that should be -- that should be instructive.

And then really IoT, it's really more about what's the -- the growth of the SAM addressable market for us, and then what's -- what are the components within that market that are growing faster than we'll be able to participate on.

**Q - Mitch Steves** {BIO 19155169 <GO>}

Understood. Thank you.

**Operator**

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

**Q - Rod Hall** {BIO 20453923 <GO>}

Yeah. Thanks for the question. I wanted to start with the supply chain and I know that COVID has been ramping up again in certain parts of the world and some participants in the industry have talked about potential for supply chain disruption again. And I wonder if



you guys could just talk a little bit about your thoughts on that, is your guidance for fiscal Q1 contemplating some disruption or do you believe that the production is most likely to just continue normally? And then I have a follow-up?

**A - Akash Palkhiwala** {BIO 19085180 <GO>}

Yeah. Hi, Rod. It's Akash. We are -- our guidance for the quarter is really constrained by what we can supply and so that's really contemplated in our forecast.

**Q - Rod Hall** {BIO 20453923 <GO>}

Okay, great. Thanks, Akash. And then my follow-up was on, I wanted to come back to millimeter-wave in terms of your preference for doing business there. I know you guys have talked about an interest or a willingness any way to sell components, and we've seen some of the net effect [ph] a lot of the early millimeter-wave is it looks like it's that, someone else's module assembly process your components probably, but then you do also sell your own module. So I'm just curious, which of those two things you prefer. I mean is it -- I would think it's preferable to go for the component side of things and let someone us worry about the module but I don't know if that really is your preference or do you -- do you have a preference one way or another. Just wondering how you want to do that business going forward?

**A - Akash Palkhiwala** {BIO 19085180 <GO>}

Hi, Rod. This is Cristiano. Look, we're very happy about the traction we're having with millimeter-wave. I feel the technology in itself requires a module because you have to have the RF front-end and the transceiver working together side by side. We're flexible, we have been commercializing our silicon within modules as well as commercializing our own module.

The important is the direction we having for customers in general is that when we provide a complete solution fully validated from a performance standpoint and from a scale standpoint, you save them a lot of R&D. So we'll continue to maintain the flexibility for our customers as they see value.

**Operator**

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

**Q - C.J. Muse**

Yeah, thank you for taking the question. I guess for my first question and thank you for the disclosure on that sub-segments, but curious, could you provide some help around how we should think about the PBT margins for each of those relative to the overall QCT business?

**A - Akash Palkhiwala** {BIO 19085180 <GO>}

I think C.J. at this point, we're really talking about a portfolio of businesses within QCT. As I'm sure you appreciate and we've discussed this in the past, one of the core premises of how we are addressing some of the incremental opportunities and especially auto and IoT is leveraging technology from mobile, and so it's really kind of one set of technology and product pools that we're leveraging across. And so I think it's best to look at the total QCT segment on margins.

## Q - C.J. Muse

Okay. That's helpful. And then as my follow-up. There's a question earlier and you talked about foundry supply constraints. And I guess curious what is the impact on the issues around SMIC, and I guess what kind of impact at least on the near-term side of things has that had on the pricing that you're getting from foundries, because I believe only TSMC has 28-nanometer capacity available. So we would love to hear your thoughts both from a near-term and medium-term perspective on sourcing supply from the leading-edge foundries?

## A - Akash Palkhiwala {BIO 19085180 <GO>}

Yeah. Sure C.J. So really from our foundry strategy is we're very diversified across a lot of different foundries. So we have close partnerships with all of them and typically went up from a pricing negotiation perspective, we are typically locked for a reasonable period of time. And so really, I'd say maybe no impact at this point, we are just operating as we would with our supplier partners.

## Operator

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

## Q - Timothy Arcuri {BIO 3824613 <GO>}

Thanks a lot. My first question, I wanted to see if we could -- if I could double click on the QCT mix. And I'm just wondering if you can give us either in terms of revenue or units maybe the split between 3G, 4G and 5G, because if you look at the China government data about two-thirds of the sell-through last month was 5G and about 50% year to date. But I'm sort of wondering on if you don't want to talk about units. Can you talk about QCT in total and maybe give us a sense of how much 5G is of QCT today?

## A - Akash Palkhiwala {BIO 19085180 <GO>}

Yeah, Tim, probably the best way to think about this is to really look at our forecast for total handsets. We are providing a range for calendar 2020 at 200 million and then going into next year at a range of 450 million to 550 million. And so I think those are reasonable data points to think about mix between 4G and 5G for the market and then it applies to our business as you think about individual OEMs.

## Q - Timothy Arcuri {BIO 3824613 <GO>}

Okay, okay. Thanks for that. And I guess, I also wanted to ask about the RF business. It's great that you actually breaking that out now. And I'm sort of wondering if you could help us maybe with what the attach rate looks like. Because if I just divide the 852 [ph] in September by the 162 million MSMs, I get about \$5 per unit. I mean obviously that had a very straightforward way to look at it, because the attach rate is not 100% but maybe can you help us think about what the attach rate is right now for the RF business? Thanks a lot.

**A - Akash Palkhiwala** {BIO 19085180 <GO>}

Yeah. As we think about the RF business, really there's tremendous complexity in that business, right, between which tier of device, it is, which OEM whether it's being designed for a specific geography or multiple geographies between sub-6 and millimeter-wave. The SAM addressable market per device changes quite a bit. And so we try to not think of it as an attach rate business rather we think of it as an available addressable market and we try to maximize our position within that.

**Operator**

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

**A - Steven Mollenkopf** {BIO 16172191 <GO>}

Yes. Just to thank you to the employees. I think this quarter probably more than any quarter I can think of really demonstrates the strength of not only the businesses and the products that we're working on, but also I would say the culture of the Company and its ability to keep things on track in a very difficult time. So thank you very much for your hard work. It's great to see the recognition of that in the market and keep it going. Thanks a lot. Bye-bye.

**Operator**

Ladies and gentlemen, this concludes today's conference call. You may now disconnect.

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